BIG TUJUNGA WASH
MITIGATION BANK
FINAL ANNUAL REPORT – 2005

Prepared for:

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
900 South Fremont Avenue
Alhambra, California 91803-1331
(626) 455-6138

Prepared by:

CHAMBERS GROUP, INC.
17671 Cowan Avenue, Suite 100
Irvine, California 92614
(949) 261-5414

April 2006

TABLE OF CONTENTS

Page

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

LIST OF FIGURES

LIST OF TABLES

SECTION 1.0 – INTRODUCTION

1.1 PURPOSE/GOALS

In 1999, Chambers Group, Inc. (Chambers Group) prepared a Master Mitigation Plan (MMP) for the Big Tujunga Wash Mitigation Bank for the Los Angeles County Department of Public Works (LACDPW). The purpose of the MMP is to serve as a guide for implementation of the 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 encompasses strategies to enhance and protect existing habitat for wildlife, and to create additional natural areas that will be utilized by wildlife and by numerous user groups. In addition, the MMP includes programs for the removal of exotic fish and amphibians, bullfrogs (*Rana catesbeiana*) and crayfish (*Procambarus clarkii*), from the Tujunga Ponds, trapping to control brown-headed cowbirds (*Molothrus ater*), plans for development of a formal trails system, and development of public awareness and education at the site. Eradication of exotic plant species, giant reed (*Arundo donax*) and tamarisk (*Tamarix ramosissima*), and habitat restoration and revegetation programs are also included in the MMP. The MMP is designed to include a five-year program of implementation, maintenance, and monitoring of the enhancement strategies.

The Master Plan also includes an optional program to create a diverse coast live oak-California sycamore woodland and coastal sage scrub habitat at a disturbed upland area on the site that may provide additional mitigation credits. The woodland is designed to provide foraging and nesting habitat for upland species as well as cover for both wildlife and equestrians using the trails incorporated into the design. The coastal sage scrub is designed to provide habitat for the federally listed as threatened California gnatcatcher (*Polioptila californica californica*).

The MMP includes performance standards for restoration, and includes a discussion of the target functions and values for riparian and aquatic habitats as well as for target wildlife species. This report also covers the project and goals success criteria, quality assurance/control, maintenance, and performance monitoring plans.

Implementation of the MMP began in August 2000. An annual implementation report is required under Section 6 of the MMP to document the progress of the programs that were implemented during the first year of the project. This report includes detailed descriptions of the methods used to implement each program, the current monitoring status, and recommendations for further maintenance and remedial actions.

1.2 SITE DESCRIPTION AND LOCATION

The Big Tujunga Wash Mitigation Bank is located in Big Tujunga Wash, just downstream of the Interstate 210 Freeway overcrossing, near the City of Los Angeles' Sunland area in Los Angeles County's San Fernando Valley. A map showing the general vicinity can be found on Figure 1-1. The site is bordered by the I-210 Freeway on the north and east, and on the south by Wentworth Street. The west side of the site is contiguous with the downstream portion of Big Tujunga Wash. A map showing the project location can be found in Figure 1-2. The Big Tujunga Wash Mitigation Bank supports two watercourses, one containing flow from Big Tujunga Wash proper, and the other conveying the flow from Haines Canyon to Big Tujunga Wash. The flow in the Big Tujunga Wash, on the north side of the site, is partially controlled by Big Tujunga Dam and is intermittent based on rainfall amounts and water releases from the Dam. The flow in Haines Canyon Creek, located on the south side of the site, is perennial and may be fed by groundwater and/or runoff from adjacent residential areas. The two drainages merge near the western boundary of the property and continue into the Hansen Dam Flood Control Basin, located approximately one-half mile downstream of the site. The site is wholly located within a state-designated Significant Natural Area (LAX-018), and the biological resources found on the site are of local, regional, and statewide significance.

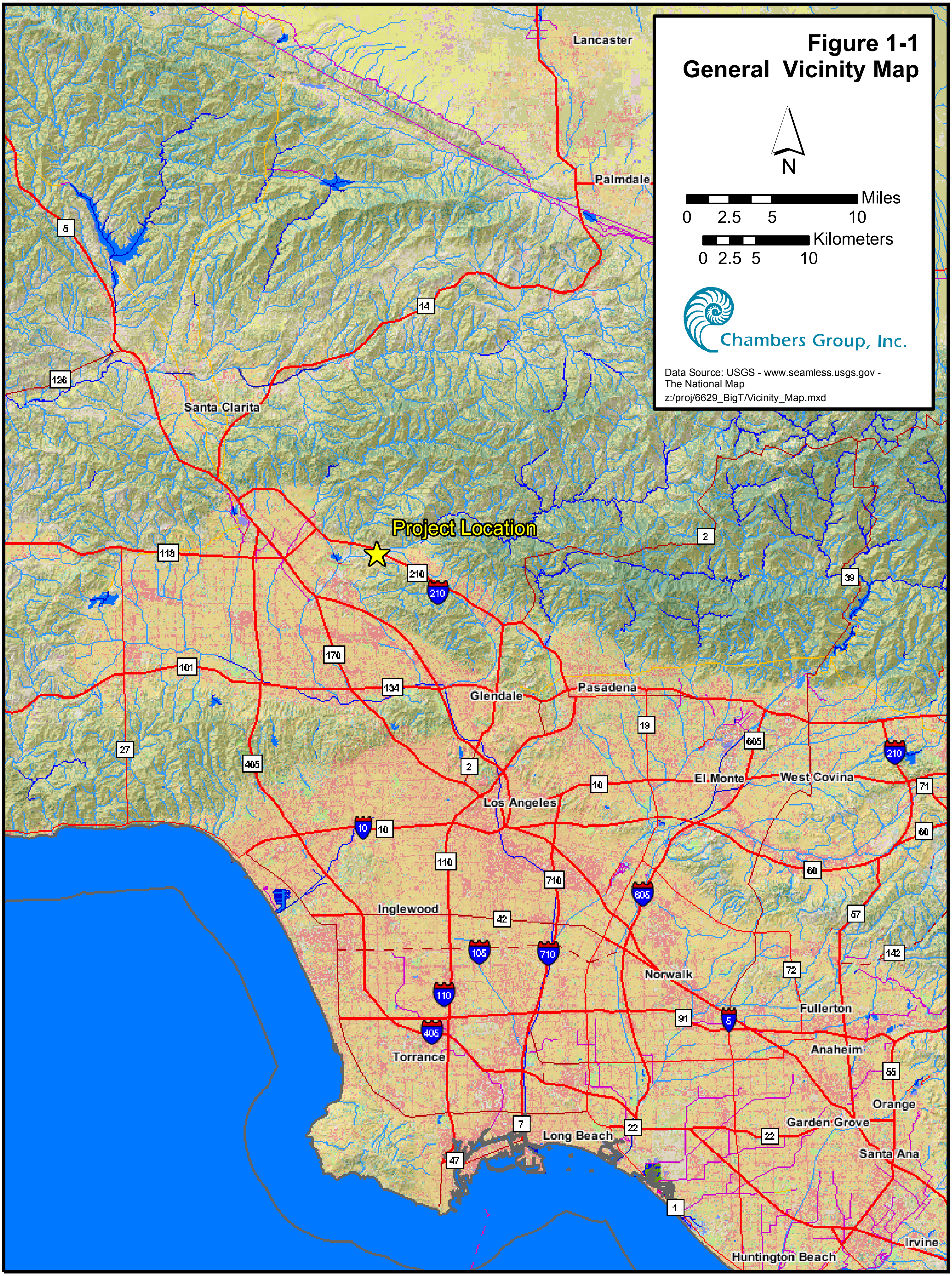


Figure 1-1
General Vicinity Map
N
Miles
0 2.5 5 10
Kilometers
0 2.5 5 10
Chambers Group, Inc.
Data Source: USGS - www.seamless.usgs.gov -
The National Map
z:/proj/6629_BigT/Vicinity_Map.mxd
Lancaster
Palmdale
Santa Clarita
Project Location
Glendale
Pasadena
El Monte
West Covina
Los Angeles
Inglewood
Norwalk
Fullerton
Anaheim
Torrance
Orange
Garden Grove
Long Beach
Santa Ana
Irvine
Huntington Beach

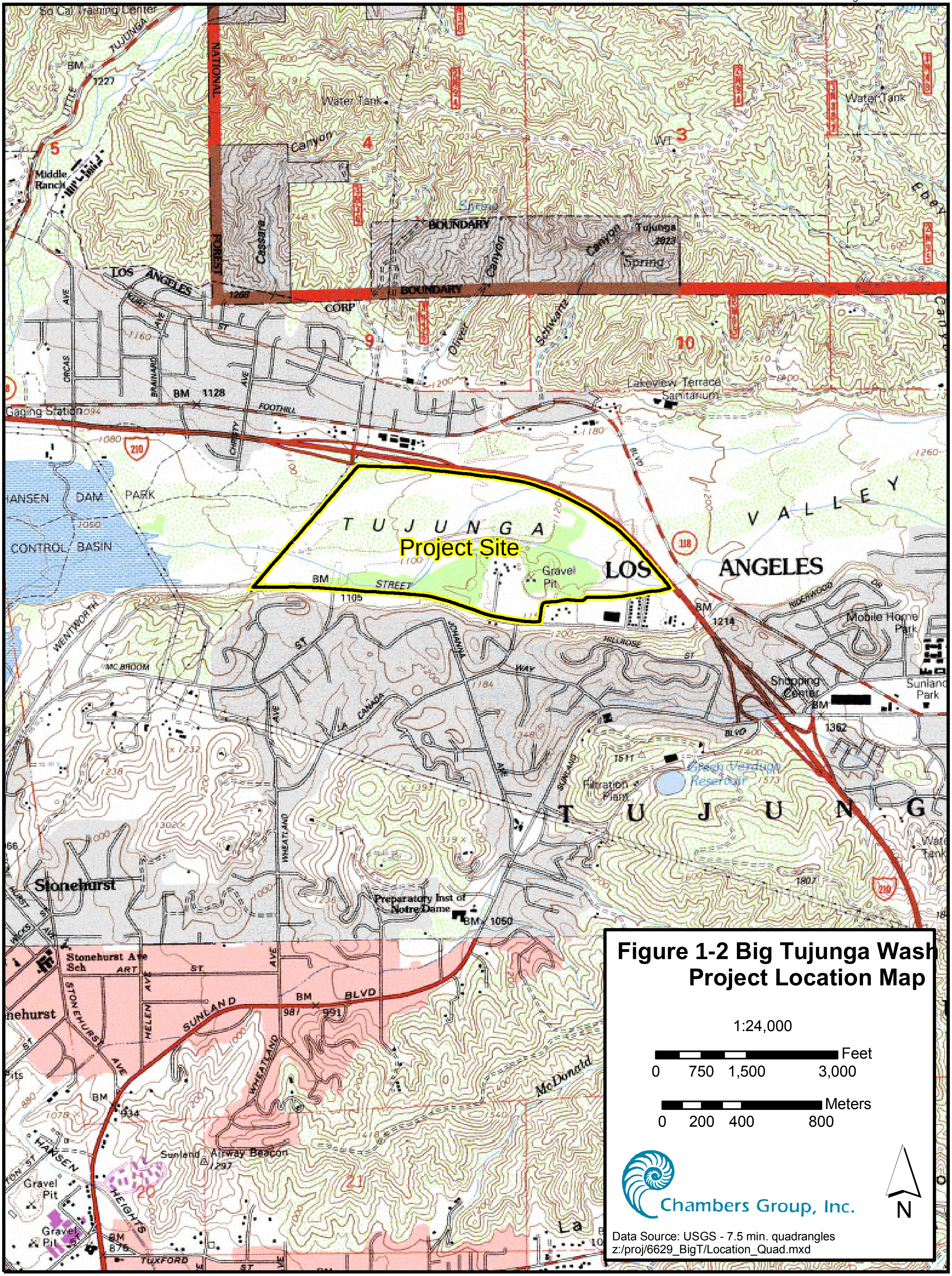


Figure 1-2 Big Tujunga Wash Project Location Map

1:24,000

Feet: 0 750 1,500 3,000

Meters: 0 200 400 800

Data Source: USGS - 7.5 min. quadrangles
z:/proj/6629_BigT/Location_Quad.mxd

The Big Tujunga Ponds and surrounding habitat, consisting of approximately 27 acres located in the northeast corner of the site, were originally created as part of the mitigation measures for the construction of the I-210 Freeway and are currently under the jurisdiction of the Los Angeles County Department of Recreation and Parks (LACDRC). An aerial photograph showing Big Tujunga Wash, Haines Canyon Creek, and the Tujunga Ponds can be found on Figure 1-3. LACDRC had no active management plan in place for these ponds, and as a result the pond habitat was severely degraded. LACDPW has included improvement of the pond habitat in the MMP.

1.3 SUMMARY OF THE ANNUAL REPORT

This summary identifies the elements of the MMP undertaken during the year 2005. Table 1-1, at the end of this section, shows the implementation and completion dates for these key elements.

Success Monitoring – Vegetation

This program consists of monitoring of the vegetation communities and the suitability of these habitats to support sensitive wildlife species during the five-year MMP implementation. Success monitoring encompasses qualitative and quantitative data analysis, including a functional analysis conducted in the riparian habitat. The purpose of the monitoring is to determine the health of vegetation on the site, the level of success of the MMP measures, and the compatibility of recreational activities with the site's primary function of habitat preservation and enhancement. The Consultant prepares the monitoring reports and the LACDPW transmits the reports to the resource agencies that are issuing the mitigation credits. The fifth Functional Analysis success monitoring survey was conducted in November 2005, and a success monitoring survey was conducted in December 2005. Although some areas experienced low survivorship, the target functional capacity unit value (FCU) set forth by the MMP has been exceeded. The results of the monitoring surveys are further summarized in Section 2.0.

Site Inspection and Maintenance

This program consists of overseeing the implementation and monitoring of the efforts to improve the trails, to remove the exotic species, and to revegetate the riparian and upland areas. Inspections occurred on a monthly basis during the first year after implementation was completed in each habitat, a quarterly basis during the second year, and on a semi-annual basis the third year. The fourth and fifth years of the MMP implementation included semi-annual monitoring. The progress of the program for 2005 is described in detail in Sections 2.0, 3.0, 4.0, and 5.0.

Sycamore-Oak Woodland Enhancement and Monitoring

This program consists of planting an 11.7-acre area near Cottonwood Avenue to create sycamore-oak woodland. The program also includes five years of maintenance and monitoring of the revegetation success. The semi-annual maintenance inspection was conducted in May 2005. The fifth annual success monitoring inspection was conducted in December 2005 and the overall site was in fair condition. The overall cover of vegetation has increased for the fifth year, but native vegetation was still lower than anticipated. Section 3.0 describes the implementation and status of the coast live oak-sycamore woodland program.

BIG TUJUNGA WASH
MITIGATION BANK

Figure 1-3 Aerial Photograph

Prepared For:
Los Angeles County
Department of Public Works

Aerial Source:

Date: August 2004

Location:
z:/proj/6629_BigT/Fig1-3_Aerial_Photograph.mxd

This map is not intended
for site-specific purposes.

Chambers Group, Inc.

Exotic Species Eradication

This program consists of the initial removal of non-native invasive vegetation, including giant reed, tamarisk, water hyacinth (*Eichhornia crassipes*), and non-native predatory wildlife, including cowbirds, bullfrogs, and crayfish, from the LACDPW's property and the adjacent Tujunga Ponds. Although LACDRC owns the Tujunga Ponds instead of the LACDPW, the LACDPW's MMP includes non-native species removal within the Ponds because they are the primary introduction sites for these harmful species on the LACDPW's adjacent property. The program for the removal of exotic plant species was initiated in November 2000 with giant reed removal at the Tujunga Ponds. Removal of water hyacinth was initiated in December 2000. Some regrowth of giant reed was noted in various areas occasionally throughout the year. As described in the methods section, the regrowth was treated with herbicides during monthly maintenance periods. No water hyacinth was observed during the 2005 maintenance period. No regrowth of tamarisk was observed during the 2005 maintenance period. Section 4.0 describes the exotic plant removal methods and progress for the year 2005. Exotic wildlife removal occurred in January 2005. Section 5.0 describes the exotic wildlife removal program and progress. Brown-headed cowbird removal was conducted from March 30, 2005 to August 1, 2005. Brown-headed cowbird trapping continues to be successful and a total of 137 cowbirds, consisting of 53 males, 66 females, and 18 juveniles, were trapped within the Big Tujunga Wash Mitigation Bank site and vicinity. Section 6.0 describes the brown-headed cowbird trapping and removal program, and provides the complete results for 2005.

Success Monitoring – Fish and Wildlife

This program consists of monitoring populations of sensitive fish, including Santa Ana sucker (*Catostomus santaanae*), Santa Ana speckled dace (*Rhinichthys osculus*), and arroyo chub (*Gila orcutti*); birds including least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*); and amphibians including arroyo toad (*Bufo microscaphus californicus*), during the five-year MMP implementation. The purpose of the monitoring is to determine the status of these species at the site, the level of success of the MMP's trails, exotic species eradication and restoration measures, and the compatibility of onsite recreational activities with the site's primary function of habitat preservation and enhancement. Monitoring reports are prepared and the LACDPW transmits the reports to the agencies that are issuing the mitigation credits. The results of the surveys for 2005 are summarized in Section 5.0. Seven surveys for the least Bell's vireo, five surveys for the southwestern willow flycatcher, and six surveys for the arroyo toad took place during April, May, June, and July 2005. None of these species were detected during any of the surveys. The results of the surveys for 2005 are summarized in Section 7.0.

Trails Enhancement and Reclamation

This program formalizes joint equestrian and hiking trails through the Big Tujunga Wash Mitigation Bank site to allow traffic that is compatible with the site's primary function of habitat restoration and preservation. This program consists of the LACDPW's installation of portable toilets and trash receptacles, entering into a partnership agreement with a sponsor for trash collection, and the Consultant's construction and placement of information kiosks. The trails reclamation program consists of the Consultant's actions to close non-essential trails and reclaim them for habitat. These actions include the installation of necessary barriers and signs, and the planting of native vegetation in the closed trails. Details of the program's progress for 2005 are described in Section 8.0.

Community Awareness Program

This program consists of utilizing a Community Advisory Committee, and newsletters to educate the local community (the primary source of visitors to the site) about the site's habitat preservation function and the importance of preserving and protecting the site. Semi-annual Community Advisory Committee (CAC) meetings were held in April and October 2005. Section 9.0 describes the Public Awareness and Outreach Program.

Regular Patrolling of the Mitigation Bank

LACDPW employs the Los Angeles County Office of Public Safety to patrol the site on weekends. The main goal of this action is to increase site safety by discouraging vandalism and unauthorized activities on the site.

Water Quality Monitoring

This program begins with the LACDPW's collection and analysis of baseline (pre-project) water quality samples and continues with quarterly sample collection and analysis by the Consultant throughout the five-year MMP implementation. The details of the water quality monitoring status for 2005 are provided in Section 10.0 of this report.

Annual Documentation

This documentation consists of the Consultant's reporting of the results of its success monitoring of wildlife and vegetation for 2005.

Mitigation Banking Agreement

This program consists of entering into an agreement with the CDFG to keep track of the LACDPW's mitigation credit usage from the Big Tujunga Wash Mitigation Bank site.

1.4 STATUS OF PERMITS

LACDPW entered into a Section 1601 Streambed Alteration Agreement (SAA), 5-247-00, with the CDFG on October 30, 2000 for the implementation of the enhancement measures at the Big Tujunga Wash site. The SAA stipulates the activities that can be undertaken in and adjacent to the stream channel. Because this project is primarily a habitat restoration project, the SAA does not require any mitigation for the activities that will be taking place. Instead, the SAA primarily focuses on measures that must be done to protect the sensitive plants, fishes, and animals on the site. The SAA for the Big Tujunga Wash site describes the accepted methods for removing the exotic (non-native) plants and animal species. The contractors performing the actual work on the site must abide by the conditions in the SAA.

The U.S. Army Corps of Engineers (USACE) and the Regional Water Quality Control Board (RWQCB) do not have to issue permits, because the only activities taking place on the Big Tujunga Wash site are habitat restoration and enhancement activities. On the other hand, because the federal-listed threatened Santa Ana sucker does occur in the stream on the site, the U.S. Fish and Wildlife Service (USFWS) does require that the project not result in negative impacts to this species.

1.5 RESPONSIBLE PARTIES

The LACDPW shall be responsible for the implementation of the MMP. The contact person is:

Ms. Belinda Kwan
Water Resources Division
Los Angeles County Department of Public Works
900 S. Fremont Avenue
Alhambra, California 91803-1331
(626) 458-6135

The preparer of the MMP is Chambers Group, Inc. The contact person is:

Dr. Larry Freeberg
Project Manager
Chambers Group, Inc.
17671 Cowan Avenue, Suite 100
Irvine, California 92614
(949) 261-5414

Table 1-1
MMP Implementation Schedule

Task	Performer	Task Initiation	Estimated Completion Date
Basic Elements			
Consultant Contract	LACDPW	04/11/2000	06/30/2000
Water Quality Monitoring	LACDPW & Consultant	03/15/2000	12/31/2005
Trails Enhancement	LACDPW & Consultant	07/01/2000	12/01/2005
Trails Reclamation	Consultant	07/02/2000	11/30/2002
Exotic Species Removal (Initial)	Consultant	08/15/2000	02/28/2001
Riparian Habitat Enhancement (Excluding Optional Cottonwood Avenue Area and Tujunga Ponds)	Consultant	12/01/2000	12/31/2005
Site Inspection and Maintenance (Trails, Erosion Control, Exotics Control)	Consultant	12/01/2000	12/08/2005
Annual Success Monitoring - Wildlife	Consultant	07/01/2000	08/04/2005
Annual Success Monitoring - Vegetation	Consultant	05/01/2001	08/31/2005
Annual Documentation	LACDPW & Consultant	12/01/2000	01/31/2006
Community Awareness Program	LACDPW & Consultant	07/15/2000	12/31/2005
Mitigation Banking Agreement	LACDPW & Consultant	07/15/2000	12/15/2002
Optional Elements			
Sycamore - Oak Woodland Enhancement	Consultant	10/10/2000	12/31/2005
Obtain Additional Mitigation Credits	LACDPW	04/15/2001	07/15/2001
Implementation and Success Monitoring	Consultant	07/15/2001	08/31/2005
Obtain Prelim. Estimate of Additional Mitigation Credits	LACDPW	05/01/2000	06/30/2000
Feasibility Study and Selection of Modification Option	Consultant	09/01/2000	07/15/2001
Obtain Additional Mitigation Credits	LACDPW & Consultant	07/15/2001	12/31/2001
Regular Patrolling	LACDPW & Consultant	11/15/2000	12/31/2005
Marybell Avenue Entrance	LACDPW & Consultant	05/20/2002	05/22/2002

SECTION 2.0 – NATIVE HABITAT RESTORATION PROGRAM

2.1 INTRODUCTION

The ultimate goal of the Big Tujunga Wash Mitigation Bank site is to provide for long-term preservation, management, and enhancement of the biological resources for the benefit of the state's fish and wildlife resources. In addition, the Bank will provide compensation for loss of similar resources elsewhere in the Los Angeles Basin.

2.1.1 Purpose and Goals

Restoration is intended to improve the habitat value of an existing plant community. The goal of the riparian restoration plan is to remove invasive non-native weed species such as giant reed and to replant these areas with native riparian species. In addition, several extraneous equestrian trails throughout the riparian zone were retired and reclaimed with native riparian species. A total of approximately 40 acres of habitat along Haines Canyon Creek and 20 acres of habitat surrounding the Tujunga Ponds will be enhanced. The composition of the replacement plantings in the enhancement areas will support the breeding and foraging activities of a variety of sensitive riparian species such as the least Bell's vireo. The enhancement plan consists of various tasks designed to remove the non-native species, prepare the areas prior to planting, and install cuttings and container plant materials.

The long-term goal of the MMP is to create a site that provides habitat for common and listed species of wildlife, requires minimal maintenance, and is resistant to invasion by non-native plant species. The established communities will encourage biotic interactions from the micro-organismal to the macro-organismal level by maintaining nutrients within the organic matter and providing a self-sustaining system.

Functional Analysis

The purpose of this analysis is to use an objective, quantitative method of habitat assessment to compare the functional values of riparian habitat in the Big Tujunga Wash mitigation site with the baseline functional analysis previously completed on the site (Chambers Group 1998). The functional analysis is also used as a tool to assess the success of the habitat restoration program initiated in late 2000.

2.1.2 Vegetation Descriptions

The habitat restoration and enhancement plan will improve the habitat quality of approximately 60 acres of southern arroyo willow woodlands along Haines Canyon Creek and the Big Tujunga Ponds. The southern willow riparian woodland is dominated by arroyo willow (*Salix lasiolepis*) occurring in the area surrounding the Tujunga ponds and follows the stream running along the southern section of the property (Haines Canyon Creek). Red willow (*Salix laevigata*) and black willow (*Salix gooddingii*) are well represented. Occasional individuals of Fremont cottonwood (*Populus fremontii*) and white alder (*Alnus rhombifolia*) are also found. The understory is dominated by eupatory (*Ageratina adenophora*), mule fat (*Baccharis salicifolia*), and mugwort (*Artemisia douglasiana*). A small stand of southern arroyo willow riparian woodland also occurs along a wash in the northern portion of the site (Big Tujunga Creek). Mule fat scrub also occurs in the restoration and enhancement areas. This tall, herbaceous riparian scrub is dominated by mule fat.

2.2 METHODOLOGY/DATE OF IMPLEMENTATION

Restoration

The initial site preparation included conducting a site walkover in early October 2000 to identify exotic plant removal areas, and the placement of orange snow fencing across trails and other access points to delineate the limits of the restoration areas. Trails to be reclaimed to native habitat were identified, and access to these trails was blocked with vegetative debris such as dead branches.

The first step in the restoration plan was pre-planting weed control, including removal of giant reed and tamarisk from areas to be reclaimed to native habitats. Giant reed and tamarisk removal was initiated on November 13, 2000 in the riparian habitat surrounding the Tujunga Ponds and Haines Canyon Creek and concluded on February 21, 2001. The status of the exotics removal program is described in detail in Section 4.0, Exotic Plant Removal Program.

The riparian enhancement planting schedule was revised due to weather conditions and material availability. Approximately one quarter of the site immediately adjacent to the stream channel was planted February 2001, while the remaining planting was delayed until early January 2002. The 120-day maintenance period was also delayed until the completion of the riparian planting installation. Approximately 1,500 hardwood cuttings of willow (*Salix* spp.) and mule fat cuttings were installed in the initial planting. Planting at least a portion of the site was preferable to delaying the complete installation until the following season for several reasons. Large areas of giant reed were removed from around the ponds and stream banks, leaving many of these areas without vegetation. Immediate revegetation of these areas was critical to provide erosion protection, thus protecting the stream fauna, including the sensitive fish species. Some of the cutting materials used in these areas utilized branches trimmed from the willows during the giant reed removal process. The cuttings were installed as per the specifications in the MMP, and under the supervision of the Project Biologist. The planting of cuttings in these areas was completed on February 21, 2001.

Planting of the remaining three-quarters of the enhancement area was initiated on January 3, 2002 and completed on January 18, 2002. Approximately 5,500 cuttings of willow and mule fat were installed in the 24 separate areas along Haines Canyon Creek in Sections 3 and 4. Additional container and liner plants were installed, including Fremont cottonwood, California rose (*Rosa californica*), California blackberry (*Rubus ursinus),* and coastal prickly pear (*Opuntia littoralis*). The sizes and quantities of plants were altered from the original numbers specified in the MMP. Final counts of all cutting and container plants installed in the riparian enhancement areas are documented in the As-Built Assessment (Chambers Group 2002). A major factor for the alteration of planting container sizes from the MMP was the survival of cuttings installed in 2001. These were primarily concentrated in shaded areas. The cottonwood trees were installed in all planting areas, including the areas previously planted in Sections 1 and 2. Planting materials were installed as per the specifications in the MMP, and under the supervision of the project biologist.

Biological monitors were onsite to oversee the implementation and completion of the exotic plant removal and partial planting in the restoration areas. Maintenance monitoring was initiated in the riparian enhancement areas after planting was finished.

Functional Analysis

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 Big Tujunga Wash Mitigation Bank. The logic behind the HGM approach is to compare the wetlands functions of the target sites to a reference standard site determined to have the highest level of functioning (Brinson 1995). By definition, reference standard functions receive an index score of 1.0. Target sites are assigned a score of between 0, for no function, and 1.0 for as high as the reference standard. The crediting and debiting mechanism for Skunk Hollow Mitigation Bank (Stein 1997) was used as a starting point and adapted to be specific for this analysis. Evaluation variables assess riparian habitat functions (e.g., cover, structure, etc.), hydrologic and biogeochemical functions, and wildlife values. A complete discussion of the functional analysis design is included in the 2005 Functional Analysis Report (Appendix A).

Annual functional analyses are scheduled 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 Group 1998). The fifth annual functional analysis was conducted on November 28 and 29 and December 7, 2005, by Chambers Group botanist Heather (Wendel) Clayton and biologist Jenny McGee. The full text of the 2005 Functional Analysis is included in Appendix A.

Enhancement/Trail Reclamation

Trails were enhanced throughout the year during periodic maintenance sessions. Large rocks and overhanging branches were removed. These materials were placed alongside the trails to further delineate the path. The closed trails were monitored and obstructive barriers were replaced as needed. No additional trails in the riparian restoration areas were reclaimed to native habitat.

Annual Performance Monitoring

Data were collected at the site by Chambers Group botanist Heather Clayton, and biologists Jenny McGee and Carleigh Neumeister on December 6, 8, and 13, 2005 and on April 6, 7, 13, and 18, 2006. Walking through each planting area, survival data were determined by assessing each installed cottonwood and willow tree and the other planted riparian area species (mule fat, California rose, California blackberry, and coastal prickly pear). Vegetation cover was determined by measuring the canopy cover of each installed tree or shrub and dividing by the size of each individual planting area. Photographs of the riparian planting areas are shown in Appendix B. Copies of all data sheets are included in Appendix C. Figure 2-1 shows the checklist for the tasks that have been completed.

Targets for Survival and Percent Cover

Survival and percent cover requirements were established in the MMP and are summarized below.

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. If the survival and cover requirements are not met, replacement plantings shall be implemented to achieve the required standards as necessary. Replacements will be monitored with the original plantings for a 5-year monitoring period with the same survival and growth requirements as the plantings.

The survival and cover standards for the cottonwood tree plantings are summarized in Table 2-1. Height standards for cottonwood trees are shown in Table 2-2.

Table 2-1
Survival and Cover Standards

Species	1st Year	3rd Year	5th Year[1]
Cottonwood	80% survival	90% survival	100% survival

[1] **Performance standards during Year 5 must be attained without human interference (irrigation, rodent control)**

Table 2-2
Tree Height Standards

Species	Size	Average Height (Feet)	
		3rd Year	5th Year
Cottonwood	5 Gallon	7	13

Figure 2-1

BIG TUJUNGA WASH MITIGATION BANK

NATIVE RIPARIAN HABITAT ENHANCEMENT PLAN CHECKLIST

- ☒ Coordinate with Corps regarding need for Nationwide Permit.
- ☒ Obtain Streambed Alternation Agreement.
- ☒ Remove invasive non-native weed species.
- ☒ Prepare equestrian trails designated for enhancement.
- ☒ Prepare enhancement sites (prune native trees as necessary).
- ☒ Install erosion control measures.
- ☒ Schedule plant materials delivery date and planting crew.
- ☒ Layout planting scheme for Landscape Contractor.
- ☒ Collect suitable plant material from site.
- ☒ Cuttings and container plants installed.
- ☒ Perform landscape maintenance.
- ☒ Inspect site monthly during the establishment period.
- ☒ Restoration Specialist submits report to LACDPW and Resource Agencies.

2.3 PROJECT MONITORING STATUS

Maintenance, Monitoring and Reports

Semi-annual and annual monitoring visits for the enhancement area were conducted in 2005. Summaries for the riparian planting areas were included in the semi-annual monitoring and annual monitoring reports for the Coast Live Oak/Sycamore Woodland Restoration area (Appendix D). The final semi-annual and annual maintenance monitoring visits of the riparian planting areas were conducted in May and December of 2005, respectively. The fifth and final Functional Analysis was conducted in November 2005.

2.4 RESULTS

Functional Analysis (Riparian Wash Areas)

Approximately 60 trees and 696 shrubs per acre were found in the riparian habitat at Big Tujunga Wash Mitigation Bank. Approximately 59 percent of the shrubs and 97 percent of the trees encountered during the survey were native species. The tree canopy forms a patchy canopy cover throughout the riparian wash habitat (approximately 55 percent cover overall), and shrubs form a sparser understory cover of approximately 13 percent. The relative frequency of trees to shrubs was 50 percent trees to 50 percent shrubs. The results for overall density, dominance (percent cover), and relative frequency for the Big Tujunga Wash riparian habitat are summarized in Table 2-3. A discussion of the shrub cover and tree survival of the upland planting areas is found in Section 3.0.

Table 2-3
Density, Dominance, and Relative Frequency

	Density (# plants/acre)	Dominance (Percent Cover)	Relative Frequency (% of total community)
Native Species			
Trees	58.6	55.1	-
Shrubs	410.7	9.3	-
Non-Native Species			
Trees	0	0	-
Shrubs	303.5	4.4	-
Summary All Species			
Trees	60.2	55.7	50.0
Shrubs	696.3	13.2	50.0

The overall organic cover was relatively high at approximately 85 percent, and the presence of annual grass cover has decreased to approximately 5.4 percent. The average number of topographic features encountered per 100 meters was approximately 2 features. The average tree height analysis indicated that most trees on the site are greater than four meters in height, with the majority falling into the two- to four-meter height range. The results of percent organic cover, percent annual grass cover, tree height, and average topography score measurements for the riparian habitat at the Big Tujunga Wash study area are summarized in Table 2-4.

Table 2-4
Percent Organic Cover, Annual Grass Cover, Average Tree Height, and Average Number of Topographic Features

Percent Organic Cover	Percent Cover of Annual Grass	Average Tree Height (Category units)	Average Topography Features (per 100 meters)
84.75	5.4	2.64	2

For the riparian system, the Functional Unit (FU) is calculated to be 0.88 per acre.

A total of 76 acres of willow habitat, calculated using the GIS technology, was delineated at the site during the initial study in 1997. Therefore, the total FCU for riparian habitat at Big Tujunga Wash is:

$FCU_{\text{Big T}} = (0.88_{\text{FU willows}})(76_{\text{acres of willows}}) = 66.88$

The Functional Capacity Unit value of the riparian habitat at the Big Tujunga Wash Mitigation Bank was 68.40 in 2003 and 2004, but decreased by 1.52 units to 66.88 in 2005. 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. Therefore, the functional capacity for the riparian habitat within the Big Tujunga Wash has slightly exceeded the fifth-year standards. Details of the results of the Functional Analysis are found in Appendix A.

Enhancement/Trails Reclamation

Several trails were re-established and trash was removed during a trail enhancement day in July 2005. Trail users have continued to access some of the reclaimed trails, particularly the trail between the two ponds, where trail users have continually pushed aside the barriers. An unauthorized footbridge was installed along the western edge of the Tujunga Ponds to replace the one washed out by storms. Because this footbridge is not causing any impacts to the water flow and will likely be replaced if removed, it was not removed during scheduled trail maintenance visits. Detailed information on the Trails Program can be found in Section 8.0. Figure 2-1 shows the checklist for the riparian habitat enhancement plan implementation tasks that have been completed thus far.

Riparian Areas Survival

The partial planting within the riparian revegetation areas has had better success in 2005. In some areas, willow and mule fat cuttings have grown up to 20 feet in height, while in other areas only a few cuttings have survived. The installed California rose and California blackberry were varied in their success, at 17 percent and 10 percent survival, respectively. The installed pads of coast prickly pear cactus had 156 percent survival, as 3 more individuals were observed in 2005 than when installed in 2002. Riparian planting area 23 was not located this year in 2005 due to flooding and therefore the 27 coast prickly pear cactus individuals counted here in 2004 were not included in the total for 2005. Survival of the cottonwood trees installed in the riparian planting area was approximately 39 percent. Of the original 231 cottonwoods planted, only 64 living trees were located. This is most likely due to the years of low rainfall until 2005 and the loss of habitat due to flooding events in early 2005. Willow and mule fat cuttings had low survival rates overall. Thirty-three of the original 100 black willow cuttings installed were observed in 2005 (46 percent survival). Only 650 of the original 3,660 red and arroyo willow cuttings installed were observed in 2005 (25 percent survival). There were 296 of the original 1,716 mule fat cuttings installed observed during 2005 (24 percent survival). The overall survival rate for the riparian planting areas was approximately 24 percent. This value does not meet the standards set forth in the MMP for the fifth year of monitoring (80 percent survival during Year 1, 90 percent during Year 3, 100 percent during Year 5). Additional numbers needed to meet the standard are provided in Table 2-5. No seeding was implemented in the riparian revegetation areas in 2005.

Table 2-5
Riparian Habitat Container Plantings Survival

Common Name	Species	As-Built Numbers Installed (2002)	Number Required for 5th Year Standard	2005 Observed Numbers	2005 Percent Survival	Additional Needed to Meet Standard
black willow	*Salix gooddingii*	100	72	33	**46**	**39**
red and arroyo willow	*Salix laevigata* and *Salix lasiolepis*	3,660	2,635	650	**25**	**1,985**
mule fat	*Baccharis salicifolia*	1,716	1,236	296	**24**	**940**
cottonwood	*Populus fremontii*	231	166	64	**39**	**102**
California rose	*Rosa californica*	978	704	117	**17**	**587**
California blackberry	*Rubus ursinus*	215	155	16	**10**	**139**
coast prickly pear cactus	*Opuntia littoralis*	25	18	28	**156**	**0**
Total		**6,925**	**4,986**	**1,204**	**24**	**3,782**

Riparian Areas Percent Cover

Vegetation cover in the riparian planting areas was moderate for 2005, with an overall value of 65 percent cover (Table 2-6). Installed cuttings were not well developed in many of the areas. The thick layer of giant reed mulch covering much of the planting areas is decomposing and allowing more naturally recruited plants to germinate. Fifth-year standards as specified in the MMP indicate that 75 percent cover is needed for all riparian plantings. Therefore, the plantings did not reach their set standards and additional planting and/or monitoring is recommended.

Table 2-6
Riparian Habitat Container Plantings Percent Cover

Common Name	Species	Percent Cover (%)[1]
black willow	*Salix gooddingii*	0.63
red and arroyo willow	*S. laevigata* and *S. lasiolepis*	43.30
Mule fat	*Baccharis salicifolia*	13.86
cottonwood	*Populus fremontii*	4.02
California rose	*Rosa californica*	2.63
California blackberry	*Rubus ursinus*	0.05
coast prickly pear cactus	*Opuntia littoralis*	0.09
Total[2]		**64.58**

[1] **Calculations of cover are based on the sizes of individual planting areas (4.03 acres) throughout the entire riparian habitat.**
[2] **Fifth-year standards specify that 75% cover is needed for riparian plantings.**

2.5 SITE EVALUATION AND RECOMMENDATIONS

Overall Site Conditions

Vegetation cover in the riparian planting areas has increased to a moderate level. Although many of the installed cuttings were not well developed in many of the areas, naturally recruited plants have emerged, adding to the vegetation cover on the site. The initial low survivorship of cottonwood trees and other container plantings in the riparian planting areas was attributed to lack of sufficient water during the first year following implementation. Supplemental irrigation was attempted during the first year but failed due to damage incurred by wildlife. The cottonwood and willow trees are highly dependent upon having sufficient water available during the establishment period. Other causes of tree mortality include over shading by large trees as they have filled in canopy gaps left after removal of giant reed, and increased amounts of vandalism, especially adjacent to the pond areas. The survival of California rose and California blackberry was also very low at less than 20 percent most likely due to the extreme competition with non-native species such as eupatory, castor bean (*Ricinus communis*), and Mediterranean grasses (*Bromus* spp.). Replacement plantings were not installed during the following years because of low rainfall and expectation of low survivorship.

The contractor kept weeds in the riparian planting areas, such as giant reed, to a minimum during regular maintenance activities throughout the year. Although the amount of castor bean and eupatory has dramatically increased since 2004, only occasional resprouts of giant reed were observed throughout the riparian planting areas, along the stream, and along the trails ranging from 2 feet in height to 6 feet in height. Furthermore, occasional tree of heaven (*Ailanthus altissima*) resprouts were observed this year throughout the riparian area, which is much lower than the amount observed in 2004.

Maintenance Recommendations and Remedial Actions

Replacement plantings of cottonwood trees in the riparian planting areas should be implemented. Due to the low survivorship of cottonwood trees overall, willows should be substituted for at least half of the cottonwoods. Approximately 102 cottonwood trees in 5-gallon containers and 2,024 willows in 1-gallon containers should be installed to increase the survivorship to the required fifth-year survival standard of 2,126 trees. As much of the mortality was due to insufficient rainfall, replacements should only be installed as close to the stream, pond, or corresponding water table, and as far from areas easily accessible to trail users as possible to increase survival potential of the plantings. If it is not possible to plant in appropriate areas, the planting numbers or species used should be altered to better accommodate the existing conditions. Replacement planting should be implemented during the winter months of 2006 to take advantage of the rains.

Supplementary seeding of the riparian planting areas should also be implemented to offset the low amount of cover observed. A supplementary seed mix consisting of riparian woodland species is included in Table 2-7.

Weed abatement should continue throughout the riparian planting areas to prevent the spread or regrowth of unwanted exotic plants, such as giant reed, castor bean, and eupatory, and prevent the increase of the weed-seed bank.

Table 2-7
Supplementary Seeding Mix for Riparian Planting Areas

Species	Common Name	Pounds of Seed Per Acre
Ambrosia psilostachya	western ragweed	5.0
Anemopsis californica	Yerba mansa	0.2
Artemisia douglasiana	mugwort	5.0
Baccharis salicifolia	mule fat	4.0
Oenothera elata	evening primrose	0.2
Phacelia campanularia	California bluebells	1.0
Pluchea odorata	Marsh fleabane	1.0
Rosa californica	California rose	0.5
Urtica dioica ssp. *holosericea*	stinging nettle	2.0
Scrophularia californica	California figwort	3.0

[1] **Final specifications for the seed mix will be developed after tests for purity and seed germination for each species.**

SECTION 3.0 – COAST LIVE OAK/SYCAMORE WOODLAND REVEGETATION PROGRAM

3.1 INTRODUCTION

The creation of a coast live oak-sycamore woodland with a coastal sage scrub understory community was included as an optional enhancement measure in the Draft Enhancement document for the Big Tujunga Wash Mitigation Bank site (Chambers Group 1998). During the preparation of the MMP, the determination was made that the upland area, where the asphalt plant used to be located, could be converted from non-native grassland to a native plant community. The existing oaks and sycamores in this area provide a good indication that the area would support a native plant community. Consequently, an optional enhancement measure was developed to address the revegetation of the upland areas. Preliminary discussions with the USACE indicated that they might offer a ratio of 0.5 to 1.0 for the establishment of coast live oak-sycamore woodland with a coastal sage scrub understory. If this mitigation ratio were accepted, then an additional 5.85 credits would be available in the Mitigation Bank. These credits would be associated with habitats that do not occur elsewhere in the bank and may potentially be used to offset impacts on these habitats from other LACDPW projects.

Purpose and Goals

The goal of the revegetation plan was to create a coast live oak-sycamore woodland with an undifferentiated coastal sage scrub understory in the revegetation areas on the site previously occupied by non-native grasslands. The composition of these revegetation areas, when mature, will support the breeding and foraging activities of a variety of sensitive species, such as red-shouldered hawk (*Buteo lineatus*), Cooper's hawk (*Accipiter cooperii*), and coastal California gnatcatcher. The mature revegetation area will also provide an additional buffer between the urban areas and the riparian zone. The revegetation plan consisted of various tasks from preparing the areas prior to planting to installing container plant and seed materials, and included provisions for the maintenance and monitoring of the site.

3.2 METHODOLOGY/DATE OF IMPLEMENTATION

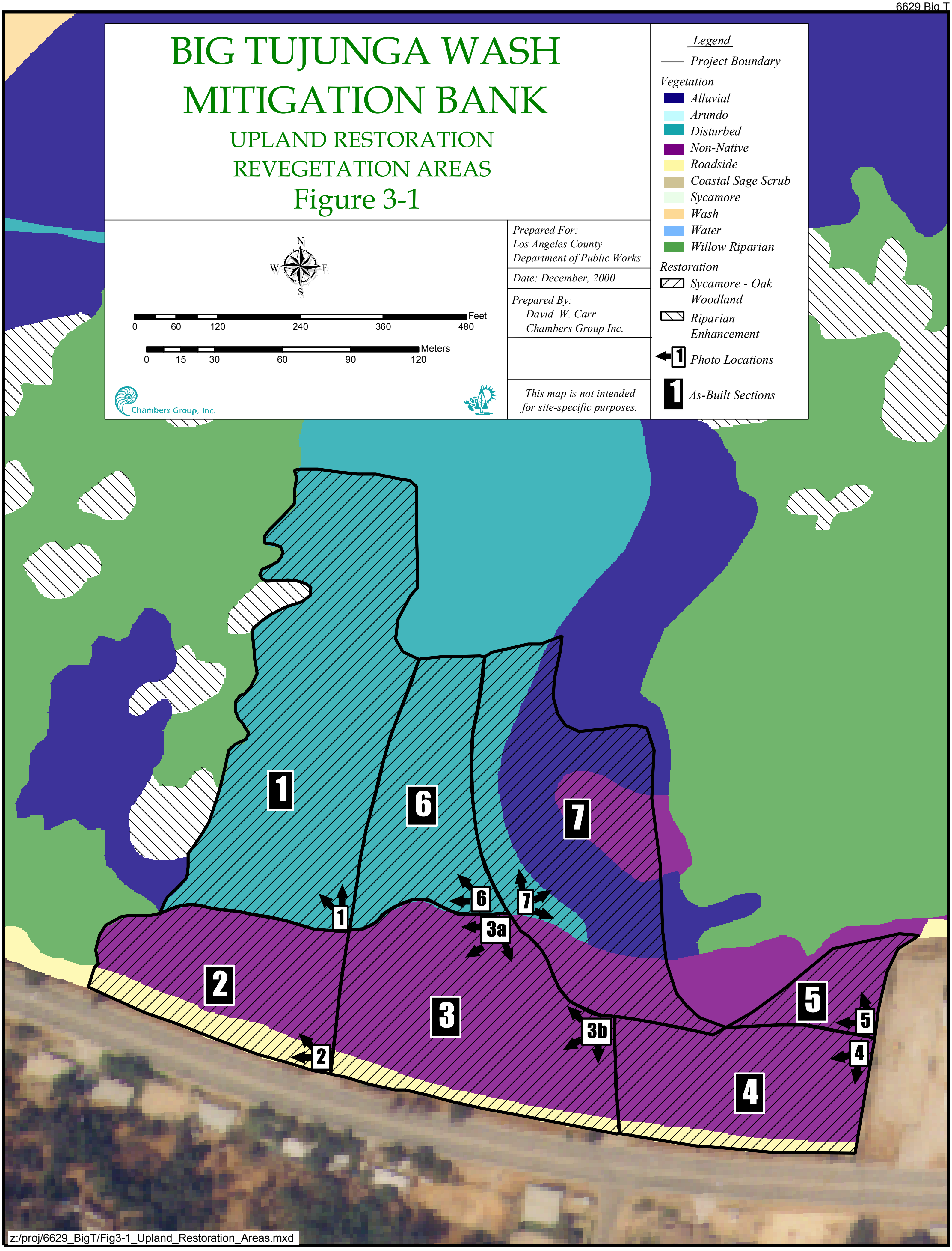
Location

Approximately 11.7 acres of habitat was planted on the terrace south of Haines Canyon Creek along Wentworth Street. The upland terrace is elevated on a bench approximately 25 feet above the riparian habitat. Approximately 4.8 acres of this area was planted primarily as a coastal sage scrub community with occasional sycamores. The remaining 6.9 acres was revegetated as coast live oak-sycamore woodland with an undifferentiated coastal sage scrub understory. Installation was completed November 22, 2000. The portion of the upland area that is covered with the concrete pad from the old asphalt plant was not included as part of the upland revegetation area. For convenience in monitoring and reporting, the restoration area was divided into sections. Sections 1 through 5 are the woodland revegetation areas, and Sections 6 and 7 are the coastal sage scrub areas. Figure 3-1 shows the locations and types of restoration and enhancement areas on the site.

Restoration Areas

Natures Image performed maintenance of the mitigation site, with the knowledge and oversight of a Chambers Group Restoration Specialist. Natures Image was responsible for conducting horticultural maintenance of the mitigation areas, including irrigation, pest control, erosion control, and weed removal throughout the mitigation areas.

A Chambers Group restoration specialist conducted semi-annual and annual monitoring visits in May and December 2005, respectively. After the monitoring visit in May, the Restoration Specialist produced a letter report describing site conditions and providing recommendations for changes in maintenance activities. Copies of the semi-annual maintenance monitoring report are provided in Appendix D.


BIG TUJUNGA WASH
MITIGATION BANK
UPLAND RESTORATION
REVEGETATION AREAS
Figure 3-1
N
W
E
S
Feet
0 60 120 240 360 480
Meters
0 15 30 60 90 120
Chambers Group, Inc.
Prepared For:
Los Angeles County
Department of Public Works
Date: December, 2000
Prepared By:
David W. Carr
Chambers Group Inc.
This map is not intended
for site-specific purposes.
Legend
Project Boundary
Vegetation
Alluvial
Arundo
Disturbed
Non-Native
Roadside
Coastal Sage Scrub
Sycamore
Wash
Water
Willow Riparian
Restoration
Sycamore - Oak
Woodland
Riparian
Enhancement
Photo Locations
As-Built Sections
1
6
7
2
3
5
4
3a
3b
z:/proj/6629_BigT/Fig3-1_Upland_Restoration_Areas.mxd

Enhancement/Trails Reclamation

No additional trails were reclaimed or closed during 2005. The existing trails in the upland habitat were kept clear of debris and vegetation as necessary during maintenance periods.

Annual Performance Monitoring

Data were collected at the upland site by Carleigh Neumeister and Heather Clayton on December 6 and 13, 2005. A stratified random sampling scheme was devised to avoid biased data collection. A total of 62 quadrats positioned on twenty 50-meter line transects were used to measure vegetation cover quantitatively. This method provides quantitative data on density, frequency, and dominance of vegetation. Line-transect and quadrat selection was randomized. Two to four perpendicular transect lines extending from a baseline transect in each of the seven sections were selected using a random number generator. At least three quadrat plots were selected along each transect line, using numbers from a random-number generator. Each point became the center for a meter-square quadrat. Each species visually encountered in each quadrat was noted, and the number of individuals of native species was recorded. The percent cover for all species and the percent of unvegetated ground was estimated within each quadrat. Cover estimates were then averaged to find the percent cover in each section and for the site as a whole. Additional information was recorded, such as date, field crew, and location information of each quadrat area. Photos taken from pre-established locations are included as Appendix E. Figure 3-2 shows the checklist for the tasks that have been completed thus far.

Tree and Container Plant Survival

Tree and container plant survival data were collected by walking parallel transects through each section and tabulating each living container plant encountered. The species of each installed plant encountered were recorded on standardized data sheets. The results are reported as the total number found for each species, and average height for each tree species. Copies of all data sheets are included in Appendix C.

Targets for Survival and Percent Cover

Survival and percent cover requirements were established in the MMP and are summarized below.

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. If the survival and cover requirements are not met, replacement plantings shall be implemented to achieve the required standards as necessary. Replacements will be monitored with the original plantings for a 5-year monitoring period with the same survival and growth requirements as the plantings.

The survival and cover standards for the coast live oak-sycamore woodland and coastal sage scrub plantings are summarized in Table 3-1. Height standards for coast live oaks (*Quercus agrifolia*) and western sycamores (*Platanus racemosa*) are shown in Table 3-2.

3.3 RESULTS

Cover and Density

The overall upland vegetation cover for the fifth year has increased since the fourth annual inspection, at approximately 95.9 percent. Cover of installed or seeded native species was 35.8 percent. Cover of non-native plants was approximately 55.4 percent. Density of native plants increased dramatically from 2004, and was high at approximately 34.1 native plants per square meter overall, or approximately 138,162 plants per acre, with herbaceous species comprising nearly all, or 99 percent, of this number.

Figure 3-2

BIG TUJUNGA WASH MITIGATION BANK

UPLAND NATIVE HABITAT RESTORATION PROGRAM CHECKLIST

- [x] Contract with Restoration Specialist.
- [x] Contract with Landscape Contractor.
- [x] Restoration Specialist and Landscape Contractor conduct field meeting.
- [x] Contract with Landscape Architect to design irrigation system.
- [x] Restoration Specialist identifies restoration areas.
- [x] Contract for plant materials.
- [x] Identify areas to be protected.
- [x] Isolate areas to be protected with construction fencing prior to construction.
- [x] Restrict construction equipment to designated areas and refueling to areas designated by Restoration Specialist.
- [x] Restrict heavy equipment to outside of dripline of any tree preserved.
- [x] Restoration Specialist attends pre-construction meeting(s).
- [x] Pre-treat site for weeds.
- [x] Conduct soil analysis (if necessary).
- [x] Install erosion control measures.
- [x] Install, test, and adjust irrigation system.
- [x] Schedule plant materials delivery date and planting crew.
- [x] Layout-planting scheme for Landscape Contractor.
- [x] Install container plants.
- [x] Apply seeds.
- [x] Initiate irrigation (if necessary).
- [x] Coordinate replacement plantings.
- [x] Install replacement plantings, monitored by Restoration Specialist.
- [x] Install plant protection fencing (if herbivory is a problem).
- [x] Perform landscape maintenance.
- [x] Inspect site monthly during the establishment period.
- [ ] Restoration Specialist submits annual report to LACDPW and revegetation contractor by January 1 each year following implementation

Table 3-1
Survival and Cover Standards

Species	1st Year	3rd Year	5th Year[1]
Shrubs	80% survival	90% survival	100% survival 75% cover
Sycamore and Oak Trees	80% survival	90% survival	100% survival
Seed Mixes[2]	None	None	None

[1] **Performance standards during Year 5 must be attained without human interference (irrigation, rodent control).**
[2] **If adequate germination is not attained to prevent erosion or exclude weed infestations, reseeding may be necessary.**

Table 3-2
Tree Height Standards

Species	Size	Average Height (Feet)	
		3rd Year	5th Year
Sycamore	5 Gallon	7	13
Oak	1 Gallon	3	6

Survival Rates

Overall survival of the installed upland container plants was high. A total of 2,224 plants were counted in December 2005, which is an increase from the 876 trees and shrubs counted in 2004. Survival of sycamore and oak trees was 76 percent and 57 percent, respectively. The sycamore trees increased since 2004 with 31 trees counted, a gain of 6 sycamores since the previous inspection. Oak trees declined with 86 trees counted, a loss of 29 oaks since the 2004 inspection. A total of 117 trees were counted (60 percent survival for 2005), which is below the requirement of 193 trees for the fifth year of monitoring. Performance standards set forth by the MMP require 100 percent survival of sycamore and oak trees during the fifth year. Due to very dry conditions and irrigation problems during the first few years and the lack of supplemental plantings, this criterion has not been met.

Overall shrub survival has increased since the previous inspection, now exceeding the fifth year 100 percent survival requirement. A total of 2,107 native shrubs were observed, which is much greater than 100 percent survival. This was due to the large increase in the number of naturally recruited California sagebrush (*Artemisia californica*) and California buckwheat (*Eriogonum fasciculatum*) shrubs that could not be easily distinguished from installed shrubs; however, there were decreases in the survival of other installed shrubs. There were no living fuchsia-flowered gooseberry (*Ribes speciosum*) or Nevin's barberry (*Berberis nevinii*) observed onsite in 2005. Chaparral whitethorn (*Ceanothus leucodermis*) experienced the greatest loss with a decline of 4 individuals, at 30 percent survival. Toyon (*Heteromeles arbutifolia*) and spiny redberry (*Rhamnus crocea*) also declined with a loss of 3 individuals each, at 28 and 29 percent survival, respectively. Typically, these species are found on north-facing slopes in cooler and moister environments (chaparral) than the upland areas of the Big Tujunga Wash. Because proper irrigation was not in place during the establishment period for these species, their survival rates have not been as high as the more drought-tolerant species typical of drier coastal sage scrub habitats such as California sagebrush, California buckwheat, brittlebush, and coastal prickly pear. Natural recruitment of native species was observed in several sections. Container planting survivorship for the upland planting area is summarized in Table 3-3 and Table 3-4.

Table 3-3
Coast Live Oak/Sycamore Woodland Container Tree Plantings Survival

Common Name	Species	As-Built Numbers Installed (2000)	Number Required for 5th Year Standard	2005 Observed Numbers	2005 Percent Survival	Additional Needed to Meet Standard
western sycamore	*Platanus racemosa*	56	41	31	**76**	**10**
coast live oak	*Quercus agrifolia*	211	152	86	**57**	**66**
Total		**267**	**193**	**117**	**61**	**76**

Table 3-4
Coast Live Oak/Sycamore Woodland Container Shrub Plantings Survival

Common Name	Species	Number Required for 5th Year Standard	2003 Observed Numbers	2004 Observed Numbers	2005 Observed Numbers	2005 Percent Survival
California buckwheat	*Eriogonum fasciculatum*	83	389*	442	1,856*	**>100**
fuchsia-flowered gooseberry	*Ribes speciosum*	41	2	1	0	**0**
chaparral whitethorn	*Ceanothus leucodermis*	23	8	11	7	**30**
California sagebrush	*Artemisia californica*	78	162*	192	201	**>100**
coastal prickly pear	*Opuntia littoralis*	41	21	13	13	**32**
Nevin's barberry	*Berberis nevinii*	2	1	1	0	**0**
toyon	*Heteromeles arbutifolia*	46	16	16	13	**28**
brittlebush	*Encelia farinosa*	14	10	10	10	**100**
spiny redberry	*Rhamnus crocea*	7	10	5	2	**29**
laurel sumac	*Malosma laurina*	35	27	17	15	**43**
	Total	370	646	708	2,117	**>100**
*** Large number of observed plants attributed to natural recruitment.**						

Tree Heights

The average tree height standard for the fifth year of monitoring for sycamores is 13 feet and for oaks is 6 feet. Tree heights of each species for the fifth year were exceeded.

3.4 SITE EVALUATION AND RECOMMENDATIONS

Overall Site Conditions

The site as a whole was in fair condition since the last maintenance-monitoring visit in November 2004. The number of native species per acre has greatly increased, even though the overall vegetative cover at the site has decreased by 20.6 percent from what was measured in 2004. This is a reflection of the high germination rates seen throughout the site, which was much greater during the fifth year than the rates observed in 2004. Often, naturally recruited shrubs were indistinguishable from installed species and were included in the total counts for each species.

Several of the installed upland container shrub species exhibited 100 percent or greater survival rates. These include California buckwheat, coastal sagebrush, and brittlebush, which were observed in particularly high numbers. Other shrub species were observed in low numbers in 2005 due to the high mortality seen shortly after installation. Those shrubs that were able to establish and survive the first summer drought, typically survived past the third year as well. Weed cover remains moderate between native shrubs with the potential to increase substantially, as numerous weed seedlings were observed. In addition to the lack of irrigation during late 2001 contributing to shrub mortality, weed cover also appears to be inhibiting natural recruitment of native shrubs and is perhaps limiting available natural water and nutrient supplies for less drought-tolerant shrubs.

Irrigation was not utilized during 2005 because irrigation lines were damaged beyond repair by wildlife. This lack of irrigation may have negatively affected some of the container trees and shrubs. Many appeared to be dead or extremely stressed due to lack of water. Many of these affected plants were likely stressed by prior irrigation line breaks in 2003 and earlier. Several of the trees have been completely lost as was evident by bare wooden support stakes still in place. The current irrigation regime is completely dependent on natural precipitation. If new trees are installed in 2006 or 2007, substantial changes in irrigation system design must be implemented.

In addition to lack of water, some of the loss of trees may be due to soil compaction caused by heavy equipment use in the years prior to the mitigation efforts. The compacted soil may have inhibited the rapid root growth needed to follow the low water table following years of little precipitation. If new trees are installed in 2006 or 2007, soil decompaction may be necessary prior to planting in the upland areas.

Erosion control devices have not been utilized and are not required for the site at this time. All trails in the restoration area are well marked, clear of weeds and debris, and in good repair.

Some minor problems were noted during the 2005 maintenance inspections. Recommendations for remedial actions are discussed below.

Maintenance Recommendations

Replacement planting of trees in the upland restoration area should be implemented during the wet season of the year (late fall or winter of 2006 or early spring of 2007) if performance standards are to be met. The trees to be installed should consist mostly of coast live oak, as this species had the greatest mortality. The 76 trees needed to bring the survival requirement to 193 should be installed in planting Areas 1, 2, 3, and 4. Sixty-six of these trees should be coast live oak trees and 10 should be sycamore trees. Irrigation to these newly planted trees should be put into operation for a minimum of one year to aid in establishment.

Weed cover remains moderate between native shrubs with the potential to increase substantially, as numerous weed seedlings were observed in this area. A greater amount of seeded native species between the already established native species groups would aid in deterring non-native weeds. Weed abatement activities should be continued as necessary to prevent weed competition with planted native species and to prevent the increase of the weed-seed bank.

3.5 PROJECT MONITORING STATUS

Maintenance, Monitoring and Reports

Inspection monitoring for 2005 began in May 2005 and continued through December 2005. After the monitoring visit in May, the Restoration Specialist produced a letter report describing site conditions and providing recommendations for changes in maintenance activities. A copy of the 2005 semi-annual maintenance monitoring report is provided in Appendix D.

The fifth annual performance monitoring survey was conducted in December 2005. Semi-annual and annual monitoring will be continued only if further notification is received by LACDPW. Table 3-5 shows the maintenance and performance monitoring inspection schedule and reporting requirements for the site.

Table 3-5
Maintenance and Success Monitoring Schedule and Reporting Requirements

Year	Maintenance Inspections and Reports	Success Monitoring Surveys and Reports
1 (2001)	Monthly (through November, 2001) – LACDPW	Annual (December, 2001) – LACDPW, CDFG, USACE
2 (2002)	Quarterly (February, May, August, November) – LACDPW	Annual (December, 2002) – LACDPW, CDFG, USACE
3 (2003)	Semi-annually (May, November) – LACDPW	Annual (December, 2003) – LACDPW, CDFG, USACE
4 (2004)	Semi-annually (May, November) – LACDPW	Annual (December, 2004) – LACDPW, CDFG, USACE
5 (2005)	Semi-annually (May, December) – LACDPW	Annual (December, 2005) – LACDPW, CDFG, USACE

Signs are repositioned when necessary, and any observed vandalism or other damage is reported in the monitoring reports.

Enhancement/Reclamation Trails

The existing upland trails are inspected during monitoring visits and maintained as necessary during routine maintenance periods.

SECTION 4.0 – EXOTIC PLANT REMOVAL PROGRAM

4.1 INTRODUCTION

The exotic plant removal program includes the removal of non-native plant species from Haines Canyon Creek, Big Tujunga Wash, and the Tujunga Ponds. These invasive weeds compete with the native vegetation for light, water and nutrients, and decrease the ecological value of the area. Native wildlife generally avoids using exotic vegetation for foraging, nesting, and cover. Removal of giant reed and other weed species will reduce competition pressure on the native southern arroyo willow plant community and allow for rapid recovery of the native habitat. The non-native weed species within the creek will be eradicated, with an emphasis on giant reed, water hyacinth, and tamarisk. Other weed species to be removed include eucalyptus, pepper trees (*Schinus molle* and *S. terebinthifolius*), castor bean, umbrella sedge (*Cyperus involucratus*), mustards (*Brassica* spp.), and tree tobacco (*Nicotiana glauca*), among others.

4.1.1 Purpose and Goals

Enhancement is intended to improve the habitat value of an existing plant community. The overall goal of the riparian enhancement plan is to remove invasive non-native weed species such as giant reed and to replant these areas with native riparian species. The enhancement plan consists of various tasks designed to remove the non-native species, prepare the areas prior to planting, and to install cuttings and container plant materials after the exotic species have been removed.

Impacts to existing habitat were minimized through project scheduling and construction monitoring. Construction on the site began after the end of the nesting season (approximately August 30th) to minimize impacts on nesting bird species and breeding activities of amphibians; and avoid violations of the Migratory Bird Treaty Act. Biological monitors were on the site to oversee the activities of the contractor removing the exotics, and provide recommendations for changes in the removal methods and other activities. The following sections describe the methods used for exotic plant species removal, and the progress of the program through December 2005.

4.2 METHODS

Some incidental removal of other exotic plant species from the restoration areas and along side trails was accomplished as giant reed was removed. Exotic weed removal activities will continue as needed if monitoring continues. Figure 4-1 shows the checklist for the exotic plant removal program tasks that have been completed.

4.2.1 Giant Reed Removal

Giant reed removal began on November 13, 2000 near the Tujunga Ponds, and was completed on February 21, 2001. During 2005, resprouts of giant reed were treated with a highly concentrated (up to 100 percent) solution of Aquamaster™ using hand-held equipment during the monthly maintenance visits. The regrowth was generally allowed to reach one to four feet in height, and was then treated. All regrowth of this species was reported to the contractor during the maintenance monitoring visits.

4.2.2 Water Hyacinth Eradication

Water hyacinth eradication was initiated on December 21, 2000 and was completed on January 10, 2001. Any reoccurrence of this species is identified during quarterly site visits and during the maintenance monitoring visits and is treated by the maintenance contractor.

Figure 4-1

BIG TUJUNGA WASH MITIGATION BANK

EXOTIC PLANT SPECIES ERADICATION PROGRAM CHECKLIST

☒ Ensure Streambed Alteration Agreement has been obtained.

☒ Coordinate with Corps to be sure 404 permit not required.

Giant Reed

☒ Notify CDFG.

☒ Notify U.S. Forest Service that we will be consistent with the plans they have submitted.

☒ Determine offsite locations for disposal.

☒ Purchase all supplies/equipment (e.g., Aquamaster®).

☒ Locate the vehicle containing Aquamaster® adjacent to the site.

☒ Use existing access areas that are devoid of vegetation.

☒ Treat Aquamaster® with dye.

☒ Apply 2 to 5 percent Aquamaster® solution to giant reed at a rate of .5 to 1 liter per hectare.

☒ Apply Aquamaster® from mid August to early November.

☒ Cut treated leaves and stems after the initial foliar treatment.

☒ Remove treated leaves and stems by hand tools.

☒ Avoid heavy equipment or other vehicles within the stream.

☒ Chip treated vegetative waste in situ for mulch.

☒ Ensure cut green stems are removed from site.

☒ Ensure dry, treated stems reduced to mulch are not placed to create a fire potential.

☒ Apply follow-up foliar application to resprouting stems in the third and seventh week after initial treatment.

☒ Quarterly inspect site for a minimum of five years.

Tamarisk

☒ Notify CDFG.

☒ Purchase all supplies/equipment (e.g., Aquamaster®).

☒ August 30 – Begin cutting plants within six inches of ground using hand tools.

☒ Determine offsite location for disposal.

☒ Remove cut material from site and dispose of at an offsite location.

☒ Ensure cut material is not left onsite.

☒ Apply undiluted Aquamaster® to the entire stump surface immediately after cutting.

☒ Cover the entire circumference of the stump with Aquamaster®.

Figure 4-1 (continued)

BIG TUJUNGA WASH MITIGATION BANK

EXOTIC PLANT SPECIES ERADICATION PROGRAM CHECKLIST

- [x] Inspect treated plants in the third and seventh week following the completion of the initial eradication.
- [x] If any treated stumps show signs of new growth, or any new plants are found, then perform subsequent treatment as described above.
- [x] Conduct quarterly inspections for a minimum of five years.

Water Hyacinth

- [x] Notify CDFG.
- [x] Purchase all supplies/equipment (e.g., Aquamaster®).
- [x] Determine offsite location for disposal.
- [x] August 30 – Begin eradication of water hyacinth.
- [x] Free-floating plants, including roots, will be removed from the water by hand. Completely necrotic plants will be removed by hand. All plant fragments must be collected and removed from the site.
- [x] If water hyacinth is rooted in the mud, an application of undiluted herbicide (Aquamaster®) per label guidelines will be applied to the entire plant surface by spraying evenly over the plants. The applicator will ensure that the herbicide spray does not drift onto neighboring native riparian plants.
- [x] Ensure dead material is not left onsite.
- [x] Inspect treated plants three weeks and seven weeks after application. If any treated plant shows evidence of new growth, or if any new water hyacinth plants are found, subsequent treatment will be performed as described above.
- [x] To prevent oxygen depletion of the pond water due to decomposition of the treated plants, dead biomass will be removed from the water during each inspection. Biomass will be removed from the site and disposed of at an approved offsite location.
- [x] Conduct quarterly inspections for a minimum of five years.

4.2.3 Tamarisk Eradication

Tamarisk eradication was conducted in the riparian habitat during the giant reed removal program. Any regrowth or new individuals of this species is identified during quarterly site visits and during the maintenance monitoring visits is treated by the maintenance contractor.

4.3 STATUS/RESULTS

Some regrowth of giant reed was noted in various areas occasionally throughout the year. As described in the methods section, the regrowth was treated with herbicides during monthly maintenance periods. No water hyacinth was observed during the 2005 maintenance period. Some regrowth of tamarisk was observed and removed during the 2005 maintenance period.

4.4 MONITORING SCHEDULE

Monitoring of exotic plants in the restoration areas during maintenance periods will continue only if further notification is received from LACDPW and is not currently scheduled for 2006.

SECTION 5.0 – EXOTIC WILDLIFE REMOVAL & NATIVE FISH SAMPLING PROGRAMS

5.1 INTRODUCTION

Dr. Dan Holland, Dr. Camm Swift, and Mr. Robert Goodman conducted initial surveys at the site to determine the most appropriate method of eradication of exotic wildlife species and enhancement for native fishes and amphibians. The MMP provides direction for the eradication of exotic aquatic wildlife during the five-year duration and also contains a more detailed description of the various methodologies available for exotic wildlife removal. Long-term monitoring of exotic aquatic wildlife populations and periodic eradication will be negotiated between Public Works and the resources agencies. The data presented in this section represent data collected during sampling efforts conducted during February and March of 2005.

5.1.1 Purpose and Goals

Swift et al. (1993) note that "Today, natural habitats for the freshwater fishes of coastal southern California exist in hilly or mountainous headwater areas and in a few coastal localities that have remained protected. The broad lowland areas between are highly modified and largely uninhabitable for resident species and those that migrate between the headwaters and the coast. Thus, the priorities for the preservation of the native fauna are: (1) protection of the remaining coastal and interior habitats containing elements of the native fauna and (2) restoration and/or rehabilitation of some portion of the now unsuitable intervening areas." Additionally, widespread loss and alteration of habitats has resulted in major reductions of both local species diversity and changes in the status and stability of many local vertebrate populations. Due to their extremely limited extent, the nature and degree of alteration, human activities and actions have disproportionately affected riparian and wash habitats and the species they hold. These include channelization, construction of dams, changes in historic water flow patterns, the effects of exotic species and other anthropogenic factors.

At present, suitable habitat on the project site for sensitive native aquatic vertebrates is largely confined to the portions of Haines Canyon Creek downstream from the ponds and in Tujunga Ponds when there is standing water in the system. The ponds essentially do not provide habitat for most native vertebrate species. Lacustrine habitats, particularly deep-water lacustrine habitats were a historically very uncommon type of environment in southern California, usually occurring only as seasonal deep-water pools along rivers and streams. Additionally, the ponds are likely to add significant negative impacts on the native vertebrate fauna by fostering the presence of a source population of exotic invertebrates and vertebrates. These exotic species may directly impact natives through predation or competition, or indirectly through transmission of pathogens and/or parasites.

Thus, the ultimate goals of this project are:

1. To restore or create and maintain habitat for native fishes and other sensitive vertebrate species,

2. To eliminate, diminish and/or restrict habitat which fosters the maintenance of exotic species, and

3. To engage in localized or site-by-site direct control efforts for exotic species to complement goals 1 and 2.

The exotic wildlife removal program consists of the removal of non-native fishes, bullfrogs, and crayfish from Haines Canyon Creek and the Tujunga Ponds. Bullfrogs are not native to the area and pose a major threat to native wildlife because they have voracious appetites and prey upon the sensitive fishes, frogs, and toads.

5.2 METHODOLOGY

The native fish sampling and exotic wildlife removal program is being conducted through the individual permit of the fish expert and exotic wildlife removal subconsultant, Dr. Dan Holland. The following sections describe the two primary efforts of (1) sampling native fishes within Haines Canyon Creek and (2) sampling and subsequently removing exotic aquatic species from both the Tujunga Ponds and the Haines Canyon Creek.

5.2.1 Native Fish Sampling in Haines Canyon Creek

At each native fish collection, the transect is blocked at the upper and lower end with an 0.125-inch mesh seine. This is done with minimal disturbance to the transect. Then, two people seine for at least 1 hour with a variety of techniques to exhaustively sample all of the fishes. Native fishes are held in large buckets and oxygenated frequently. At the end of each collection, the native fishes are counted, their sizes are estimated to the nearest 10 centimeters, and then are released back into the transect area. In addition to collecting data on the fishes, habitat features including water temperature, substrate type, depth, width, available cover, canopy, and gradient or slope are also measured and recorded.

5.2.2 Exotic Wildlife Removal in the Tujunga Ponds and Haines Canyon Creek

Extensive exotic wildlife removal efforts were conducted during the first half of 2005. Dr. Dan Holland and his staff removed bullfrogs, large mouth bass, goldfish, green sunfish, mosquito fish, and crayfish for 14 days in February 2005 and 25 days in March 2005. This concentrated effort was conducted prior to the spawning season for these exotic wildlife species. The objective was to remove potential non-native breeding/spawning wildlife prior to their reproduction cycle, thus minimizing propagation of their species in the ponds. This effort was conducted at the recommendation of Dr. Holland, as his theory was that it was cost effective to expend the year's budget prior to the reproduction cycle.

Six distinct methods were used to capture the aquatic organisms, including gill nets, small seines, crayfish and minnow traps, spearfishing, dip/lift nets, and turtle traps. "Standard" gill nets, namely five larger meshed nets ranging from 1.5 inch (3.7 cm), one inch (2.5 cm), and 0.5-inch (1.2 cm) openings, were used in each pond. The spearfishing and dipnetting were conducted while snorkeling. Visual observations and surveys were also made to look for and remove bullfrog egg masses in the ponds. Traps were baited with small cans of mackerel in tomato sauce, and "seafood grill" cat food with holes punched in the cans.

Figure 5-1 shows the checklist for the exotic wildlife species removal program tasks that have been completed thus far. Figure 5-2 shows the checklist for exotic wildlife maintenance and monitoring.

5.3 RESULTS

5.3.1 Results of Native Fish Sampling

Transect collections in 2005 followed a similar pattern to previous sampling periods in that the native species, Santa Ana sucker (*Catastomus santaanae*), Santa Ana speckled dace (*Rhinichthys osculus* ssp.), and arroyo chub (*Gila orcutti*), were the most abundant in the downstream transects. The numbers of Santa Ana sucker during the 2005 sampling were below the numbers in the late fall of 2000 and 2001. Santa Ana speckled dace and arroyo chub are still present in low numbers. Table 5-1 summarizes the results from the native fish sampling conducted during 2005.

Figure 5-1

BIG TUJUNGA WASH MITIGATION BANK

EXOTIC WILDLIFE SPECIES ERADICATION PROGRAM CHECKLIST

Note: This checklist applies to the preservation of the Tujunga Ponds in their current configuration

☒ Consult with USFWS regarding the need for Section 7 Consultation.
N/A If Section 7 is required, complete Section 7 process and obtain memorandum of understanding.
☒ Notify CDFG that fish removal from Tujunga Ponds and Haines Canyon Creek is eminent (CDFG may want to do some fish salvage).
N/A Coordinate with CDFG regarding timing of fish salvage (if CDFG elects to do this).
☒ Receive authorization letters from USFWS and CDFG.
☒ Purchase all supplies/equipment.

<u>Gill Netting in Tujunga Ponds</u>

☒ After removal of water hyacinth, set nets of varying sizes near habitat features (cattail banks, willow overhangs) and in open water.
☒ Check nets hourly or bi-hourly.
☒ Remove any native or other species captured.

<u>Seining</u>

☒ Conduct 4-5 days of seining in Tujunga Ponds per quarterly sampling period (if feasible).
☒ Conduct seining in Haines Canyon Creek using smaller seines to remove exotic species.
☒ Erect block seines across the width of the stream at the upstream and downstream end of a given section (usually 10 to 12 meters in length).
☒ Retrieve native fish and place in buckets.
☒ Remove and dispose of exotic species in consultation with CDFG.
☒ Remove block seines and move to another section.
☒ Release native fishes after block seines are removed.

<u>Electroshocking (optional sampling method based on consultation with USFWS)</u>

☐ Use electroshocker to capture fishes that were missed during seining (best used under mass of tree roots or under boulders).
☐ Retrieve fishes, and tally the capture on data sheets.
☐ Release native fishes after shocking is completed, and dispose of non-native fishes.

Figure 5-1 (continued)

BIG TUJUNGA WASH MITIGATION BANK

EXOTIC WILDLIFE SPECIES ERADICATION PROGRAM CHECKLIST

Note: This checklist applies to the preservation of the Tujunga Ponds in their current configuration

Baited Traps for Crayfish and Non-Native Fishes

☒ Bait traps with a fish carcass or punctured can of sardines in oil.
☒ Use baited traps of varying sizes and configurations (small minnow traps in Haines Canyon Creek and large traps in Tujunga Ponds).
☒ Submerge traps in areas where crayfish are likely to occur.
☒ Check traps on a regular basis, and remove captured animals.
☒ Sample for a 3-day periods to remove exotic species.

Shooting and Gigging of Bullfrogs (optional method if other control methods are ineffective)

☒ Perform gigging at night from a boat with the use of a headlamp.
N/A Shoot the bullfrogs at night with a small caliber weapon or a small bore shotgun (this method would have to be approved by local law enforcement).
☐ Electroshock post-metamorphic frogs.

Figure 5-2

BIG TUJUNGA WASH MITIGATION BANK

EXOTIC WILDLIFE MAINTENANCE AND MONIT0RNG CHECKLIST

MAINTENANCE CHECKLIST

- ☒ Implement control methods on a monthly basis if captures are > 5% of the initial total of exotic fishes and frogs in the system by the spring of 2001.
- ☒ Implement control methods on a monthly basis if captures are > 10% of the initial total of crayfish in the system.

<u>Monitoring Checklist</u>

- ☒ Monitor population sizes on a monthly basis.
- ☒ Sample repeatedly at established transect locations within Haines Canyon and Big Tujunga Creeks.
- ☒ Collect data on physical and biotic parameters, including but not limited to: substrate composition, streamside vegetation characteristics, flow volume and rate, turbidity, conductivity, dissolved oxygen, temperature, species diversity and abundance, and changes since last survey.
- ☒ Compare initial control effort with follow-up monitoring in late 2000 and 2001 and biannual up to 2005.
- ☐ Perform post-construction monitoring on use of existing and "created" habitat by native fishes.

Table 5-1
Results of Native Fish Sampling Conducted During 2005

Quarter	Santa Ana Sucker	Arroyo Chub	Santa Ana Speckled Dace	Other
1st (Jan.-March)	52	6	2	0
2nd (April-June)				0
3rd (July-Sept.)				0
4th (Oct.-Dec.)**				0
Totals	**52**	**6**	**2**	**0**
*** Transects were conducted in February 2005.**				

5.3.2 Results of Exotic Wildlife Removal

The primary accomplishments of the 2005 exotic maintenance were the decline in the numbers of crayfish in the ponds and in the stream, decreased catches of young bass (*Micropterus salmoides*) in the ponds, and the decreased catches of adult and juvenile bullfrogs. No bullfrog egg masses were located in 2005. More than 90 percent of all crayfish catches were small juveniles. Similar to previous sampling periods, non-native species were found primarily in the ponds and infrequently in the stream. Detailed results are included in the annual exotic aquatic wildlife removal report for 2005, included as Appendix F. Table 5-2 summarizes the results from the non-native aquatic wildlife removal conducted during 2005.

Table 5-2
Non-Native Aquatic Wildlife Removal Conducted During 2005

Method	Largemouth Bass	Sunfish	Crayfish	Bullfrog	Other
Crayfish Trap	0	26	541	10 larva	0
Spear	40	-	-	-	14 goldfish 1 South American armored catfish
Gill Net	15	1	0	0	0
Dip Net/Other	0	0	0	27	100 mosquito fish 14 red-eared sliders
Totals	**45**	**27**	**541**	**10 larvae** **27 adults**	**14goldfish** **14 red-eared sliders** **100 mosquito fish** **1 South American armored catfish**

5.4 DISCUSSION

Trapping efforts in the 3rd & 4th quarters of 2004 and in the 1st quarter of 2005 have documented and continue to document a major decline in the populations of red swamp crayfish and bullfrogs, and possibly bass. This follows intensive efforts to reduce populations of these species in the 3rd quarter 2003. Thus, the existing methodology and level of effort seem to be (at present) capable of reducing large populations and possibly maintaining them at a low level. The situation with bass is somewhat more problematic. Despite a considerable amount of effort expended in gill netting and spearfishing, small to moderate populations of adult bass remain at the site. Furthermore, populations of another exotic (green sunfish) are likely to increase in 2005 due to removal of large numbers of bass.

5.5 PROBLEMS ENCOUNTERED AND RECOMMENDATIONS

5.5.1 Rock Dams

Artificial damming of the stream with boulders and rocks cause ponding of the stream in several areas, and eliminate stretches that would otherwise be run or riffle habitat. These rock dams continue to be an issue of concern. As identified in previous reports, these rock dams were built for recreational purposes and to improve stream crossings for trail users. These structures tend to be washed out in the winter and are built back up in the spring and summer. The ponded and slower flowing nature of the water caused by these impoundments favor crayfish, largemouth bass, sunfishes, and bullfrogs. They also increase the amount of soft substrate at the expense of harder substrate like gravel, cobble, and rocks preferred by native species. Public education via CAC meetings over the past several years has helped to inform local residents of this constant issue. Several residents regularly break down the rock dams when they are observed throughout the site.

5.5.2 Sources of Non-Natives

All signage requesting that people do not fish or release unwanted pets or fish has been removed. Five signs were observed on and recovered from the bottom of the east pond during snorkeling surveys in mid-March. It has been recommended that these signs be re-installed by attaching them to fences. This will at least make it slightly more difficult to vandalize and remove the signs.

Fishing at the site continues, although at a reduced level from that seen in previous years. A total of nine persons were observed fishing on five days between 03 February and 23 March (out of a total of 39 days onsite). One fisherman stated that he had been visiting the site since childhood, and that it was common practice for fishermen to release goldfish from a local pet store to "feed the bass". This person also stated that he practiced catch and release fishing at the site.

SECTION 6.0 – BROWN-HEADED COWBIRD PROGRAM

6.1 INTRODUCTION

The brown-headed cowbird is an obligate brood parasitic bird species, meaning this species does not build its own nest or tend to its own young. Instead, female cowbirds deposit one or more eggs into a host species' nest, often removing or destroying some of the host eggs. The brown-headed cowbird has a variety of target host species and has been recorded as successfully parasitizing 144 of 220 species in whose nests its eggs have been observed (Ehrlich et al. 1988). Some host species include threatened or endangered species, such as the coastal California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher. In response, many of the host species, predominantly eastern species, have behavioral adaptations to deal with parasitism, such as ejecting the foreign egg, covering over the foreign egg, or abandoning the parasitized nest altogether. However, many other host species that have not evolved defensive reactions do not recognize cowbird eggs, and readily accept and rear cowbird young. Adult cowbirds will often destroy host nests containing nestlings by puncturing, removing, or eating host eggs, all of which increase the survivorship of young cowbirds at the expense of the host's reproductive success. Cowbird eggs do not closely mimic host eggs, nor do the young cowbirds expel host eggs and young rather, cowbirds tend to hatch earlier, grow faster, and crowd out or reduce the food intake of the hosts' young (Ehrlich et al. 1988). Cowbird eggs hatch in 10 days, several days ahead of most host species. In addition, cowbird chicks develop vigorous food begging behavior after just one day, compared to the four days required for most host species. In many of the smaller host species, the cowbird chick is the only successful fledging from any parasitized nest.

Female cowbirds, which are free from the time and expense of incubating and raising young, can lay as many as 40 eggs a season, far more than the average host species. Thus, a single successful female cowbird could ultimately parasitize 40 different host nests in one breeding season and in the process significantly reduce the breeding success of 40 pairs of host species. The decline in neotropical migratory songbirds across North America has been linked to, among other factors, the increase in cowbird numbers (Brittingham and Temple 1983; Harris 1991; Laymon 1993; Stallcup 1993). Although approximately 97 percent of cowbird eggs and nestlings fail to reach adulthood, cowbird parasitism affects host species by reducing the number of successful young. Furthermore, nest abandonment by the host species results in zero production for that breeding pair and therefore the reproductive effort will be significantly lower than that of an unparasitized species (Ehrlich et al. 1988). This cowbird species is not native in the western United States, so the host bird species here have not adapted to the presence of the cowbirds. In the eastern United States, where this bird is native, the host birds typically abandon a nest where a cowbird has laid its egg. While brown-headed cowbird parasitism poses a major threat to many species of songbirds, some host species, including the California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher, also have to contend with habitat loss and fragmentation, which increase the risk of being parasitized (Harris 1991; Laymon 1987; Mayfield 1977; Stafford and Valentine 1985).

6.2 PURPOSE AND GOALS

6.2.1 Cowbird Trapping Methodology

Cowbird traps were first used as a localized control in the early 1970s in Michigan and by the mid-1980s were in widespread use in southern California and Texas, mostly in programs associated with the protection of threatened or endangered bird species. These traps proved to be so successful at reducing cowbird numbers and levels of parasitism in the study areas that the USFWS began to require cowbird removal as mitigation for a variety of development projects. Inclusion of the five-year brown-headed cowbird trapping and removal program at the Big Tujunga Wash Mitigation Bank site will increase the overall value of the site as a conservation bank by allowing the sensitive riparian bird species to successfully reproduce without being parasitized by cowbirds. The brown-headed cowbird trapping program was conducted in accordance with Griffith Wildlife Biology's brown-headed cowbird trapping protocol which is the USFWS recommended protocol and is provided in Appendix A of the 2005 Final Annual Brown-Headed Cowbird Trapping and Removal Report, which is included in Appendix G.

6.2.2 Trap Location

The mitigation bank and adjacent properties were surveyed two months prior to the start of the trapping season in order to locate potential trap locations. Based on surveys and recommendations made in the Final 2001, 2002, 2003, and 2004 Annual Brown-Headed Cowbird Trapping and Removal Program Reports, traps were not placed in the immediate vicinity of Haines Canyon Creek or Tujunga Ponds. Three of the four onsite trap locations (Alluvial, Restoration and Upland) remained the same from the 2002, 2003 and 2004 trapping seasons. The Cottonwood trap location was moved slightly from the 2004 location, back to the 2002 and 2003 location. Other criteria used in determining trap locations included: potential foraging habitat for brown-headed cowbirds, potential nesting habitat for sensitive bird species such as the least Bell's vireo and southwestern willow flycatcher, accessibility for the daily trap monitors, and seclusion from the public (to prevent vandalism).

In accordance with USFWS permits, Public Works ran three additional offsite traps. The purpose of the offsite traps is to ensure that cowbirds in the vicinity of the site that have the potential to travel to and from Big Tujunga Wash are also trapped and removed from the area. All three offsite locations from 2004 (Equestrian A, Equestrian B, and Esko) remained the same in 2005. These site locations were utilized in order to increase trapping success and keep the offsite traps in the immediate vicinity of active stables.

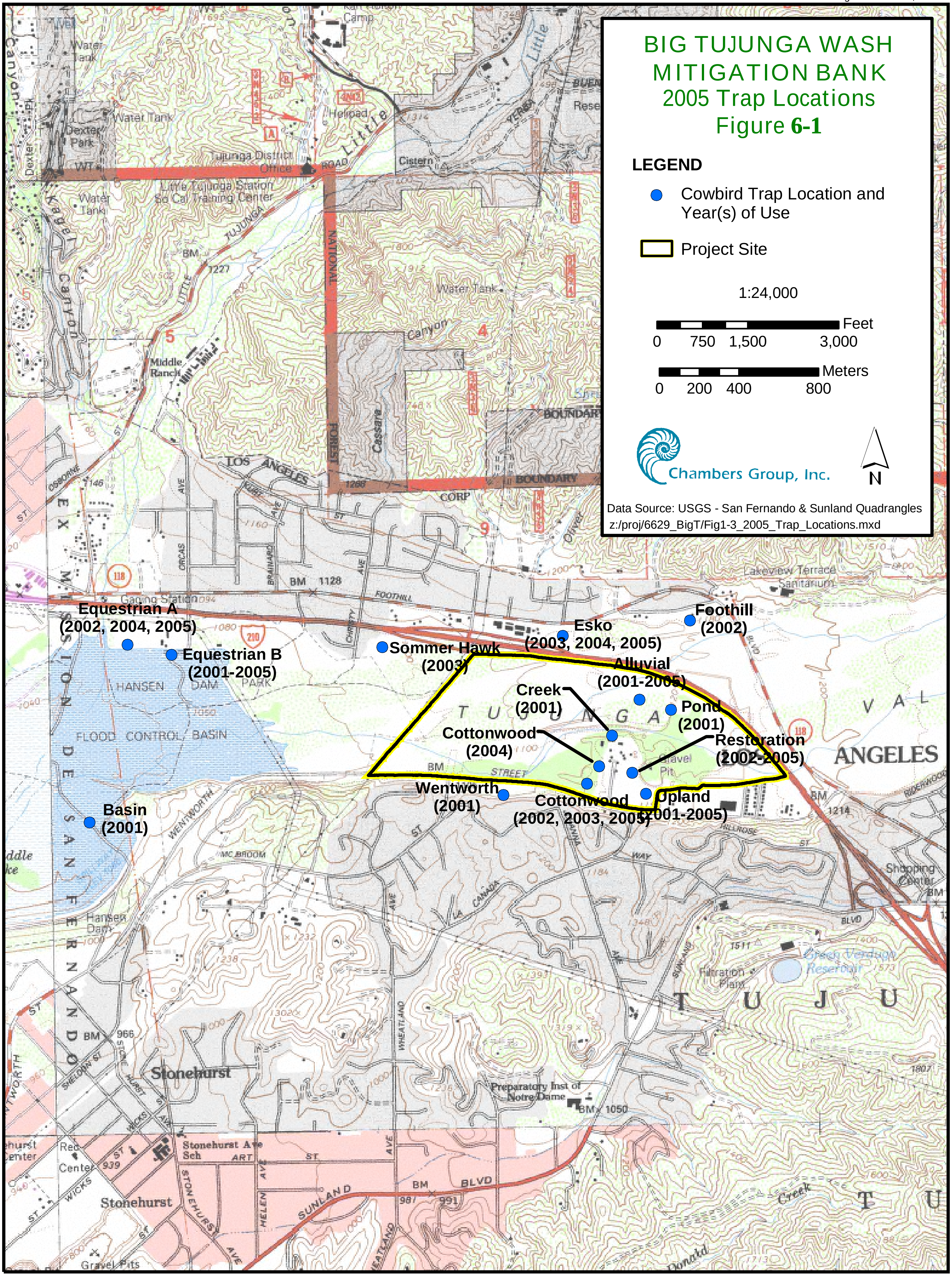
6.3 TRAP MONITORING

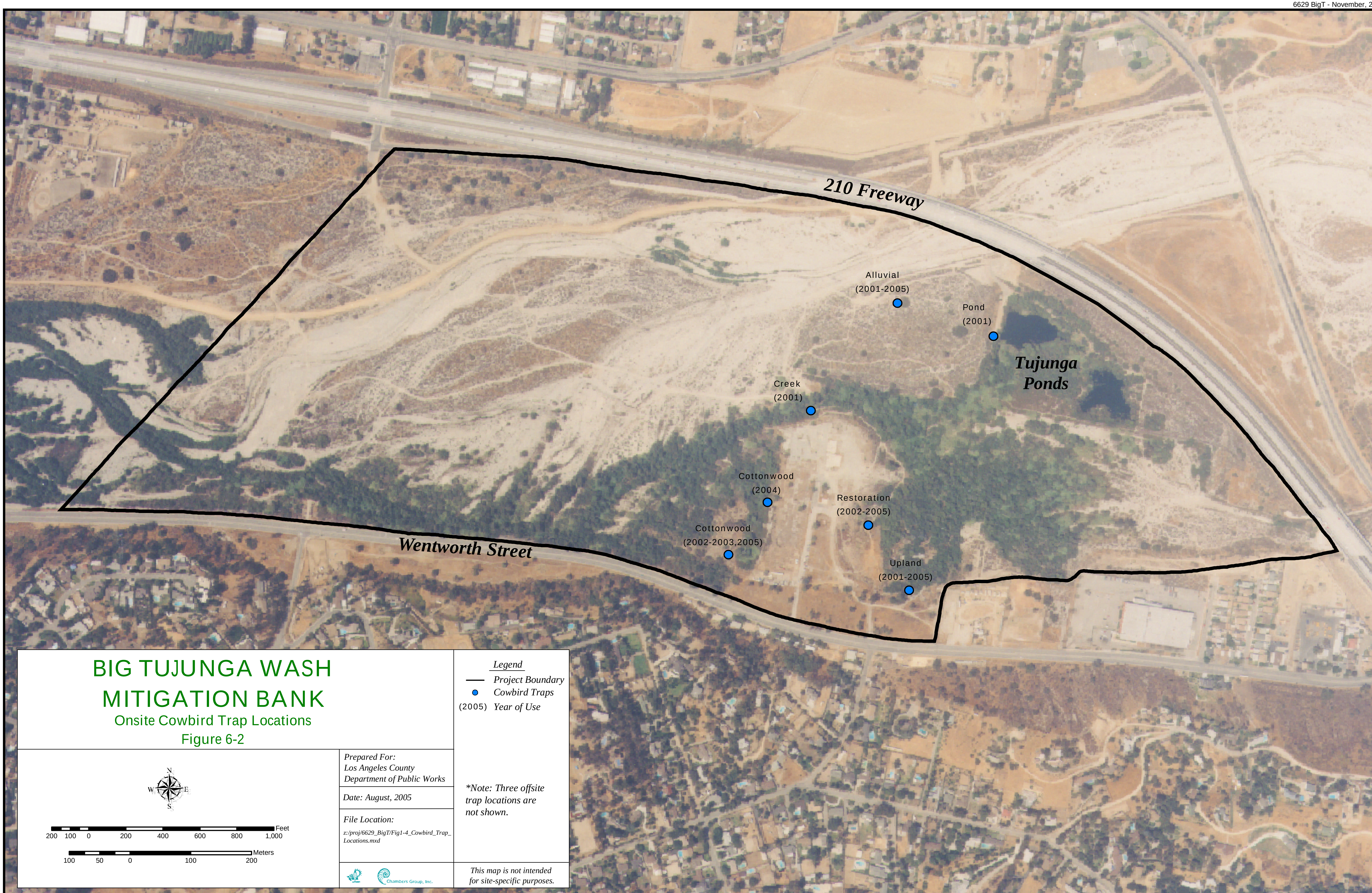
Due to an unusually low number of decoy cowbirds at the Orange County Water District (OCWD) early in the season, the 2005 cowbird trapping program at the Big Tujunga Wash Mitigation Bank was postponed until an adequate number of birds became available. A total of 37 decoys, 15 males, and 22 females were obtained from the OCWD trapping program at Prado Dam on March 30, 2005. The cowbirds were distributed among six traps at a ratio of 2:3 (male:female). Female cowbird captures correlate more directly to a reduction in nest parasitism than male cowbird captures. The maintenance of the 2:3 male to female decoy ratio is considered conducive to maximizing the number of female cowbirds captured. The Upland trap (trap 7) had a 3:4 ratio. Placement of perches, seed, water, natural foraging pads, and shade cloth was performed during the first several days. Additionally, during the first couple of weeks, seed was thrown on top of the traps to attract cowbirds. All seven traps were fully operational on March 30, 2005.

Traps were checked daily from March 30 through August 1, 2005, including all weekends and holidays falling within this time frame. Trappers collected data on the numbers of cowbirds captured, dead, and/or missing. Data on non-target birds were also recorded. Cowbird and non-target data was recorded by hand on data sheets.

6.4 RESULTS

The actual success of a Brown-headed Cowbird Trapping Program is not based on the number of cowbirds captured. The true measure of success is whether of not the riparian breeding birds are able to successfully produce young. Therefore, the success of the cowbird program is actually determined by the observations made during site visits. Based on the high number of native songbirds and habitat specialists observed in the riparian area during 2005, the Brown-headed Cowbird Trapping and Removal Program can be deemed successful. The results presented in this section are a summary of the results presented in the annual trapping and removal report. Please refer to Appendix G - 2005 Annual Brown-headed Cowbird Trapping and Removal Program (Chambers Group 2005) for detailed information regarding the 2005 cowbird program.


BIG TUJUNGA WASH
MITIGATION BANK
2005 Trap Locations
Figure 6-1
LEGEND
Cowbird Trap Location and Year(s) of Use
Project Site
1:24,000
0 750 1,500 3,000 Feet
0 200 400 800 Meters
Chambers Group, Inc.
N
Data Source: USGS - San Fernando & Sunland Quadrangles
z:/proj/6629_BigT/Fig1-3_2005_Trap_Locations.mxd
Equestrian A (2002, 2004, 2005)
Equestrian B (2001-2005)
Sommer Hawk (2003)
Esko (2003, 2004, 2005)
Foothill (2002)
Alluvial (2001-2005)
Creek (2001)
Pond (2001)
Cottonwood (2004)
Restoration (2002-2005)
Wentworth (2001)
Cottonwood (2002, 2003, 2005)
Upland (2001-2005)
Basin (2001)


210 Freeway
Wentworth Street
Tujunga Ponds
Alluvial (2001-2005)
Pond (2001)
Creek (2001)
Cottonwood (2004)
Restoration (2002-2005)
Cottonwood (2002-2003,2005)
Upland (2001-2005)
BIG TUJUNGA WASH MITIGATION BANK
Onsite Cowbird Trap Locations
Figure 6-2
Legend
Project Boundary
Cowbird Traps
(2005) Year of Use
N W E S
Feet 200 100 0 200 400 600 800 1,000
Meters 100 50 0 100 200
Prepared For: Los Angeles County Department of Public Works
Date: August, 2005
File Location: z:/proj/6629_BigT/Fig1-4_Cowbird_Trap_Locations.mxd
*Note: Three offsite trap locations are not shown.
This map is not intended for site-specific purposes.
Chambers Group, Inc.

A total of 137 cowbirds, consisting of 53 males, 66 females, and 18 juveniles, were trapped within the Big Tujunga Wash Mitigation Bank site and vicinity between March 30 and August 1, 2005. Of the 137 cowbirds, 31 were trapped within the onsite traps in the Big Tujunga Wash Mitigation Bank and 106 cowbirds were trapped in the offsite traps. This is greater than the number of trapped cowbirds during the 2001, 2003, and 2004 trapping seasons (70 total cowbirds, consisting of 37 males, 24 females, and 9 juveniles were trapped in 2001, 20 total cowbirds, consisting of 9 males, 11 females, and 0 juveniles were trapped in 2003, and 89 total cowbirds, consisting of 46 males, 37 females, and 6 juveniles were trapped in 2004). The low number of cowbirds trapped during the 2003 season can be attributed to a much shorter trapping season that year. In contrast, the cowbird captures in the 2005 trapping season were lower than the 2002 trapping season when 173 total cowbirds, consisting of 66 males, 105 females, and 2 juveniles were trapped.

Seventy-seven percent of all trapped cowbirds were captured within offsite traps. The Equestrian A trap was the most productive, capturing 34 percent of all cowbirds. The trap efficiency for this trap was 0.382, which represents the highest per trap per day capture rate. The trap efficiency value represents the number of cowbirds trapped in that particular trap over the time period in which the trap was operational, thus depicting the productivity of each trap, as compared to the other open traps operating in the trapping program. The second most productive traps were the Esko and Upland traps which both caught 22 percent of all trapped cowbirds and had 0.240 trap efficiency rates. The third most productive trap was the Equestrian B trap, which caught 21 percent of all cowbirds and had a 0.236 trap efficiency rate. The Alluvial trap caught 0.7 percent of all cowbirds and had a 0.008 trap efficiency rate. The Cottonwood and Restoration traps did not capture any cowbirds during the 2005 season. This year's capture totals per trap per day were the second highest since trapping began in 2001.

Female captures outnumbered male captures throughout the entire season. Therefore, the male to female capture rate for 2005 was 0.80, compared to 1.24 in 2004, 0.82 in 2003, 0.63 in 2002, and 1.54 in 2001.

Table 6-1 lists the numbers of cowbirds trapped and total trapping efficiency at each trapping location for the 2005 trapping season. This year's capture totals per trap per day were the second highest since trapping began in 2001. Female captures outnumbered male captures at three of the seven traps including Equestrian A, Equestrian B, and Esko. Male captures outnumbered female captures at the Alluvial and Upland traps. The Cottonwood and Restoration traps did not capture any cowbirds this season. Ninety-four percent of all trapped juvenile cowbirds were captured within offsite traps.

Table 6-1
Numbers of Cowbirds Trapped and Total Trapping Efficiency
At Each Trapping Location for the 2005 Trapping Season

Trap #	Trap Location	Male Cowbirds Trapped	Female Cowbirds Trapped	Juvenile Cowbirds Trapped	Total Cowbirds Trapped	Total Trapped (trap/day)
1	Equestrian A	14	23	10	47	0.382
2	Equestrian B	8	15	6	29	0.236
3	Esko	12	17	1	30	0.240
4	Alluvial	1	0	0	1	0.008
5	Cottonwood	0	0	0	0	0.000
6	Restoration	0	0	0	0	0.000
7	Upland	18	11	1	30	0.240
Total		53	66	18	137	1.106

One banded male cowbird (band # 168107528 ABRE) was trapped during the 2005 trapping season. This bird was re-trapped on many occasions throughout the season and was subsequently released each time as per our trapping protocol. Each time the banded cowbird was released it appeared to be in good condition. This individual was first trapped during the 2004 trapping season and most likely returned to the traps out of habit due to the presence of the decoy birds, seed, water, and shelter.

Two instances of trap vandalism occurred during the 2005 trapping season. The first instance occurred prior to the start of the first month of trapping. The back mesh panel of trap 3 was sliced open; however, no decoy cowbirds escaped or were harmed because the trap had not been activated yet. The second instance occurred during the second month of trapping. The back mesh panel of trap 2 was sliced open and all 9 cowbirds (4 males and 5 females) escaped from the trap. This trap was repaired and re-opened on the same day, using decoys from other active traps. Five of the nine cowbirds (2 male and 3 female) were later recaptured, but four remained missing throughout the rest of the 2005 trapping season. Although there were instances of vandalism, no trapping days were lost in 2005. Trap vandalism did not occur during the 2004 trapping season. The trap vandalism that occurred during the 2003 trapping season was not as severe as it was during the 2002 and 2001 seasons and trap days were not lost due to the incidences of vandalism in 2003. In comparison, a total of 4 days in 2002 and 12 days in 2001, were lost due to vandalism events.

A total of 156 birds from 4 non-target species were captured during the 2005 trapping season. The most frequently captured bird species was California towhee (*Pipilo crissalis*) followed by house sparrow (*Passer domesticus*). Table 6-2 lists the number of non-target bird species captured in each trap. The trapping program did not capture any bird species considered sensitive by the resource agencies. Figure 6-3 shows the checklist for the program tasks that have been completed thus far. Ninety-three of the 156 non-target birds were released safely. Six non-target birds were found dead in the traps, all of which appeared to have died due to pecking by cowbirds that were also in the traps. There were no signs of predation in any of the non-target mortalities (e.g., feathers outside of the trap).

Table 6-2
Number of Non-Target Bird Species Captured
At Each Trap Location for the 2005 Trapping Season

Bird Species	Trap 1		Trap 2		Trap 3		Trap 4		Trap 5		Trap 6		Trap 7		Total	Total
	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D
BEWR	0	0	0	0	0	0	0	1	4	1	4	2	1	1	9	5
CALT	2	0	4	0	4	0	15	0	8	1	4	0	46	0	83	1
HOFI	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
HOSP*	32	0	0	0	21	0	0	0	0	0	0	0	4	0	57	0
Totals for each trap	34	0	5	0	25	0	15	1	12	2	8	2	51	1	150	6

CALT = California towhee **HOFI = house finch** **HOSP = house sparrow**
BEWR = Bewick's wren
C: Captured and Released
D: Deceased
***: HOSP were euthanized per CDFG authorization letter**

A total of nine clipped decoy cowbirds (4 males and 5 females) escaped from the traps during the 2005 trapping season. Five of these birds were subsequently recaptured while two males and two females remained missing for the duration of the trapping season. Two males and one female cowbird died during the course of the 2005 trapping season. All three died inside a trap from what appeared to be excessive pecking and/or competition with the other cowbirds in the trap. A total of 166 cowbirds, including original decoy cowbirds and cowbirds that were captured in the traps, were euthanized during the 2005 trapping season. Additionally, a total of 57 house sparrows (19 males, 36 females, and 2 juveniles) were trapped and subsequently euthanized during the 2005 trapping season per CDFG's authorization letter.

Figure 6-3

BIG TUJUNGA WASH MITIGATION BANK

BROWN-HEADED COWBIRD ERADICATION PROGRAM CHECKLIST

☒ Send request letters to USFWS and CDFG for authorization (obtain verbal authorization to begin process).
☒ Receive authorization letters from USFWS and CDFG.
☒ Authorize trap construction.
☒ Purchase all supplies/equipment.
☒ Site inspection and preparation of trap locations.
☒ Hire trap checkers.
☒ Obtain decoys.
☒ Make signs for trap.
N/A Program palmtop computer (or other instrument for field data collection).
N/A Create process for downloading/storing field data.
☒ Create data sheets.
☒ Coordinate transportation for trap placement at designated locations.
☒ Follow approved protocol for trap set-up.
☒ Train trappers in both office and field procedures.
☒ March 8-15 - bait seed should be spread on the top of the trap as well as on foraging areas inside and outside the trap.
☒ Make sure traps are unlocked if they are in place before daily servicing.
☒ March 15 - begin daily servicing.
☒ Submit daily data sheet to Project Biologist.
☒ Dispose of cowbirds as necessary throughout the season.
☒ July 15 - end daily servicing.
☒ Follow approved protocol for trap disassembly and storage for next trapping season.
☒ Arrange for pickup and storage of traps.
☒ Submit report by November 30 (or by date specified by USFWS or by any other agency).

The non-target mortality rate for the 2005 trapping season totaled 3.8 percent, which is only slightly higher than the standard 2 percent mortality rate considered acceptable by the USFWS and discussed in Griffith Wildlife Biology Reports (GWB 1994b) on non-target birds. Efforts to reduce the non-target mortalities were made prior to closing down the traps and included switching out the aggressive decoy cowbirds. Two traps, trap 5-Cottonwood and trap 6-Restoration were closed down prematurely (June 6 and July 16, respectively) due to continued non-target mortality. Refer to Appendix G for details on the nontarget mortality rate.

6.5 RECOMMENDATIONS

6.5.1 Procedural Recommendations

Logistically, the 2005 trapping season ran smoothly and scheduling of trappers was generally not an issue. The use of the Hansen Dam Equestrian Center as the staging area was critical to the program's smooth operation. Public Works and Chambers Group should continue to maintain their relationship with Mr. Eddie Milligan in order for continued access and use of this area for future trapping seasons.

6.5.2 Securing Cowbird Decoys

The lack of available decoys, due to a cowbird shortage in the region, resulted in a two-week postponement of the beginning of the 2005 trapping season. In order to secure enough decoy cowbirds at the beginning of next season, the following measures are recommended:

- Assemble and open at least one trap during the first week of March so, as decoys become available, they can be placed into this holding trap. This will serve to promptly achieve the desired decoy ratios in each trap at the beginning of the season.
- Maintain contact with other southern California cowbird trapping programs to keep current on the status of their programs and on the availability of excess birds.

6.5.3 Vandalism

Trap vandalism was a minor problem in 2005. Prior to the start of the first month of trapping, the Esko trap (trap 3) was vandalized. The back mesh panel was sliced through. The trapper tied the mesh back together with wire. The vandalism did not cause the escape of any decoy cowbirds because the traps had not been activated yet. This trap is located offsite on private property. The owner was notified of the incident and asked to notify Chambers Group or LADPW of any suspicious activity in the area of the trap. Additionally, trap #2 located at the equestrian center was vandalized during the second month of trapping. The equestrian center manager (Eddie Milligan) was notified of the incident and the trap was repaired and activated the same day. A total of nine cowbirds escaped due to this incident, five of which were later recaptured. Vandalism was anticipated and has occurred during previous years of trapping because of heavy trail use. Informing community members of the importance of the program is ongoing and will continue throughout the 5-year implementation.

6.5.4 Trap Relocation Recommendations

Regardless of trap placement, both onsite and offsite trap locations should be used in order to increase productivity.

6.5.4.1 Onsite Traps

With the exception of the Upland trap, which was the second most productive trap during 2005, historically the onsite trap locations have not been very productive traps; however, these four locations represent both upland and riparian habitats and were not vandalized due to their semi-secluded access routes. Therefore, any of these remaining trap locations could continue to be used during future trapping seasons. Based on recommendations made following the 2001 trapping season, traps should not be placed near Haines Canyon Creek or Tujunga Ponds.

6.5.4.2 Offsite Traps

The Equestrian A trap was by far the most productive trap during 2005. The Equestrian B and Esko traps were also highly productive, respectively, due to their close proximity to active stables. The owners of these privately-owned stable/boarding areas were very cooperative and efforts should be made to contact them again in the future if trapping activities continue. If the exact locations are not available in the future, then efforts should be made in the 2 months prior to program implementation for other suitable stable locations.

SECTION 7.0 – WILDLIFE SUCCESS MONITORING

7.1 PURPOSE AND GOALS

The ultimate goal of the Big Tujunga Wash Mitigation Bank site is to provide for long-term preservation, management, and enhancement of the biological resources for the benefit of the state's fish and wildlife resources. The project site is presently used by various common and sensitive wildlife species. The primary goal of the Big Tujunga Wash Mitigation Plan is to establish breeding and foraging habitat for resident and migratory wildlife species associated with the riparian, alluvial scrub, and aquatic habitats. Observations of common wildlife and plant species within the mitigation area have been documented in previous surveys. In addition, the MMP requires that the wildlife monitoring surveys be conducted in order to document use of restoration areas by wildlife. Use of restored habitats by the following list of sensitive wildlife species will be considered progress indicators of revegetation success.

7.2 LEAST BELL'S VIREO

7.2.1 Methodology

Chambers Group wildlife biologists familiar with the songs, whisper songs, calls, scolds, and visual identification of the least Bell's vireo conducted eight focused surveys. These surveys were conducted at 10-day intervals during April, May, June, and July. No more than 50 hectares of suitable riparian habitat was surveyed by the biologist per day. The surveys were conducted on April 14, 25, May 6, 18, June 1, 14, 23, and July 7, 2005. Weather conditions during the surveys ranged from 100 percent overcast to clear skies with temperatures ranging from 52°F to 80°F. All surveys were conducted between the hours of 6:00 a.m. and 11:00 a.m. and were in accordance with USFWS guidelines (2001). The surveyors conducted the surveys by walking all suitable riparian habitats as well as stationing themselves in the best locations within the riparian habitat in order to listen and look for vireos. In addition to the least Bell's vireos, any detection of the parasitic brown-headed cowbird, the federally listed endangered southwestern willow flycatcher, or the federal candidate and state-listed endangered western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) was also recorded. All vireo detection, including number of individuals, sex, age, and leg bands, was recorded on standardized data sheets.

7.2.2 Status/Results

Least Bell's vireos were not observed or detected during the eight focused surveys at the Big Tujunga Wash Mitigation Bank project site. Riparian habitat on the site provides moderate to high quality habitat for this species. Additionally, least Bell's vireo are known to occur within 5 miles of the site, therefore, it is probable that if the population increases enough in number, they will disperse onto the Big Tujunga Wash Mitigation Bank project site. Southwestern willow flycatchers and western yellow-billed cuckoos were not seen or heard during any of the vireo surveys. Appendix H contains the report and field data sheets from each of the surveys.

7.3 SOUTHWESTERN WILLOW FLYCATCHER

7.3.1 Methodology

Permitted biologists, Mike McEntee (TE-758175) and Shelby Howard (TE-092163-0), conducted five focused surveys for the southwestern willow flycatcher. Survey methods followed the mandatory protocol developed by Sogge et. al (1997) and the subsequent revised protocol developed by the USFWS (2000). Surveys were conducted on May 27, June 17, 27, July 5, and 12, 2005. Each visit was at least 5 days apart. Sogge et. al (1997) recommends that surveys be conducted between dawn and 1000 hours. The biologist completed surveying the entire flycatcher habitat by 10:00 a.m.; however, surveying activity continued while returning to the vehicle. Weather conditions during the surveys ranged from 100 percent overcast to clear skies with temperatures ranging from 54° to 86° Fahrenheit (12.2° to 30° Celsius) and wind speeds ranging from 0-2 mile per hour (0 meters/second to 0.9 meters/second). Less than 2.6 linear miles (4.2 kilometers) of habitat were surveyed per day. Surveys were conducted by walking slowly and methodically under the canopy of the willow riparian woodland. Taped vocalizations of the species were played every 75 to 100 feet in an attempt to elicit a response from potentially present individuals. The tape was played for roughly 15 seconds and then stopped for one or two minutes to listen for a response. Tape playing was discontinued when a flycatcher was detected. Upon detection, observations were recorded, plotted, and Global Positioning System (GPS) readings of the location were taken. Behavior, number, and location of paired or unpaired birds; age and sex would be noted. The biologist also checked for leg bands and if present, the color combination of the bands recorded. Bird locations were mapped on U.S. Geological Survey (USGS) topographic maps. All wildlife species observed or detected during the surveys were documented.

7.3.2 Results

Southwestern willow flycatchers were not observed during the 2005 focused surveys, and no nesting southwestern willow flycatchers were reported in the vicinity. Southwestern willow flycatchers have been observed within the project site during previous focused surveys (2002 and 2004); however, there was no evidence or behavioral cues observed that would suggest that these flycatchers attempted to nest at the site and therefore they were all considered to be migrants. In addition, there is no designated critical habitat for this species located in the Big Tujunga watershed, or any other streams in Los Angeles County (USFWS 1997). Based on the negative survey results and the lack of documented nesting records for the surrounding area, the southwestern willow flycatcher is likely absent from the mitigation bank at this time. Additionally, neither least Bell's vireo or western yellow-billed cuckoo was observed during the willow flycatcher surveys. Appendix H contains the report and field data sheets from each of the surveys.

7.4 ARROYO TOAD

7.4.1 Methodology

Qualified wildlife biologists familiar with the habits, appearance, and vocalizations of the arroyo southwestern toad have conducted surveys, which follow the 1999 USFWS Survey Protocol Guidelines for the arroyo toad (Bufo californicus). The protocol states that at least six surveys must be conducted during the breeding season, which generally occurs from March 15 through July 1, with at least seven days between surveys and with at least one survey per month during April, May, and June. Surveys include both daytime and nighttime components conducted within the same 24-hour period (except when arroyo toads are detected in the survey area). Surveys were conducted on April 18, 27, May 12, 26, June 14, and 28, 2005. No evidence of the presence of arroyo southwestern toads was detected at the Big Tujunga Wash Mitigation Bank site in 2005.

Daytime surveys were conducted by walking slowly along stream margins and in adjacent riparian habitat, visually searching for (but not disturbing) eggs, larvae, and juveniles. Nighttime surveys were conducted by walking slowly and carefully on stream banks. Surveyors stopped periodically and remained still and silent for approximately 15 minutes at appropriate sites to wait for arroyo toads to call. Nighttime surveys were conducted between one hour after dusk and midnight, when air temperature at dusk was 55 degrees Fahrenheit or greater.

7.4.2 Results

Due to the high levels of rainfall this season, arroyo toad surveys were conducted for 2005. This is only the second year that water levels have been high enough to warrant arroyo toad surveys since the beginning of the project. No arroyo toads were detected on the mitigation bank site during the 2005 surveys nor were they found during surveys in 2003.

SECTION 8.0 – TRAILS PROGRAM

8.1 INTRODUCTION

This program was designed to formalize joint equestrian and hiking trails through the Big Tujunga Wash Mitigation Bank site to allow traffic that is compatible with the site's primary function of habitat restoration and preservation. This program consists of the LACDPW's installation of portable toilets and trash receptacles and entering into a partnership agreement with a sponsor for trash collection, and the Consultant's construction and placement of information kiosks. The trails reclamation program consists of the Consultant's actions to close non-essential trails and reclaim them for habitat. These actions include the installation of necessary barriers and signs, and the planting of native vegetation in the retired pathways. The trails reclamation program was initiated in November 2000.

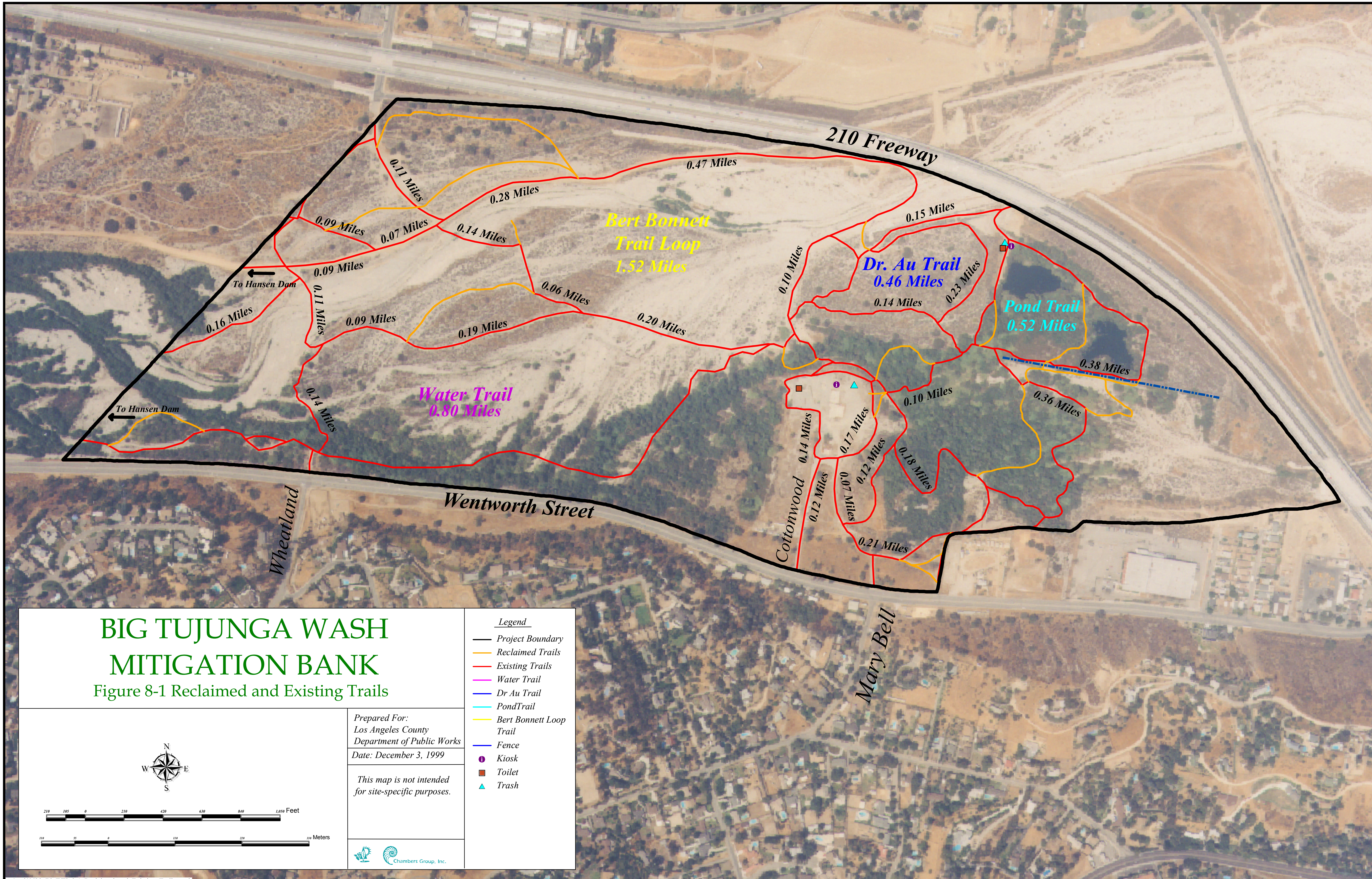
8.1.1 Purpose/Goals

The overall goal of the trails system is to allow for recreational activity while minimizing impacts on the habitat quality at the Big Tujunga Wash Mitigation Bank site. Essential to this process is the effort of returning unnecessary trails to their natural condition for the overall improvement of habitat quality. Because the trails closure and restoration is comprised of riparian habitat restoration, the trails program is an integral part of the evaluation process to help determine the success of the overall riparian restoration and enhancement program. Thus, it is evaluated and reported as part of the functional analysis of the riparian habitat and during the regular maintenance and monitoring of the riparian habitat restoration sites. It is also essential for determining if recreational use is having negative impacts on the success of the riparian restoration and enhancement program, or if wildlife use of the site is being compromised. The following sections describe implementation tasks that were conducted during the fifth year of MMP implementation, current status of the program, problems that were encountered during the implementation process, and future proposed implementation tasks.

8.1.2 Location

Figure 8-1 shows the trails map of the Big Tujunga Wash Mitigation Bank. The trails map was overlaid on a one inch=200 feet aerial photograph of the site and shows the trails as they exist, trails that are currently present, and the four designated main trails that serve as safe and scenic recreational trails. The four main trails include the Water Trail, Bert Bonnett Trail Loop, Dr. Au Trail, and Pond Trail.

Pedestrians and equestrians can access the mitigation bank site at four locations. One entrance is located in the southwestern portion of the site at the junction of Wentworth and Wheatland Avenue. Two entrances are located in the southeast corner of the site, one of which is adjacent to an existing parcel of private land, and the other is an equestrian step-over entrance, at the junction of Wentworth and Mary Bell. The private landowner just east of these two entrances has installed a gate at the back of his property, which allows for access to the site. The third entrance point consists of the main east-west trail in Big Tujunga Wash. This trail cannot be fenced off from the adjacent properties located west and northeast of the site because a fence placed across Big Tujunga Wash would interfere with water flow. Therefore, the public can freely enter the site via the adjacent properties. In addition to the public entrances, locked gates are located at the Wheatland entrance in the northwest portion of the site, at the Cottonwood/Wentworth intersection on the south side of the site, and at Foothill Boulevard near the junction with Big Tujunga Wash.



BIG TUJUNGA WASH MITIGATION BANK

Figure 8-1 Reclaimed and Existing Trails

N
W E
S

Feet

Meters

Prepared For:
Los Angeles County
Department of Public Works

Date: December 3, 1999

This map is not intended for site-specific purposes.

Chambers Group, Inc.

Legend

- Project Boundary
- Reclaimed Trails
- Existing Trails
- Water Trail
- Dr Au Trail
- PondTrail
- Bert Bonnett Loop Trail
- Fence
- Kiosk
- Toilet
- Trash

z:/proj/6629_BigT/Fig8-1_Reclaimed_and_Existing_Trails.mxd

8.2 METHODOLOGY

The following is an outline of the trails reclamation tasks as taken from the 2000 MMP. Trails implementation tasks were based on this outline and modified in the field as needed. Trails implementation is an on-going program and will continue on a quarterly basis until each of the following tasks has been successfully implemented.

Trails Program Tasks:

- Determine Needs for Permitting (404, 401, 1601, and Section 7)
- Obtain Permits (if necessary)
- Place and Maintain Trash Receptacles and Portable Toilets
- Construct and Place Information Kiosks
- Prepare Information for Inclusion in Kiosks
- Place Barriers Across Entrances to Reclaimed Trails
- Construct and Place Trail Signs
- Remove Debris from Reclaimed Trails
- Plant Native Plant Materials on Reclaimed Trails
- Maintain Reclaimed Trails
- Monitor Success of Trails Reclamation
- Annual Reporting

8.3 IMPLEMENTED TASKS

Trail implementation began in August 2000 and has continued on an intermittent basis. Enhancement of trails in 2005 primarily consisted of keeping the trails safe for pedestrians and equestrians. This program is exempt from California Environmental Quality Act (CEQA) under Section 15301(c) because it involves public safety issues. The implementation of the formal trails system program will not involve grading in waterways or wetlands. No mechanical clearing of trails or alteration of waterways was implemented, therefore 404, 401, 1601, and Section 7 permits were not necessary. Figures 8-2 and 8-3 show the checklists for the trails implementation tasks and the trails monitoring tasks that have been completed thus far.

8.3.1 Trails Enhancement and General Site Conditions

The placement of bilingual signage explaining the importance of not releasing pets and other non-native species into the ponds and aquatic habitats around the ponds was not attempted in 2005. Signs placed in this area in previous years resulted in the signs being removed, vandalized and often thrown into the ponds. A more permanent form of placement must be found before more signs can be displayed in this area.

Trails were monitored on a monthly basis and overhanging branches and plant materials that obstructed the trails were trimmed back as necessary. Additionally, several trails were re-established and trash was removed during a trail enhancement day in July 2005. An unauthorized footbridge was installed along the western edge of the Tujunga Ponds to replace the one washed out by storms. Because this footbridge is not causing any impacts to the water flow and will likely be replaced if removed, it was not removed during scheduled trail maintenance visits.

Figure 8-2

BIG TUJUNGA WASH MITIGATION BANK

TRAILS ENHANCEMENT PROGRAM CHECKLIST

☒ Place barriers (logs, rocks, etc.) in front of designated reclaimed trails.
☒ Place informative/restrictive signs at closure point of each closed trail (where feasible).
☒ Place portable toilet at main staging area and near Tujunga Ponds.
☒ Place trash receptacles along trails in designated areas.
☒ Clear large stones, debris, etc. from main trails to an approximately 8' width.
☒ Trim overhanging branches to approximately 10' above ground level (as-need basis).
N/A Place trail location signs at designated areas along the main trails.
☒ Rake compacted ground of reclaimed trails after closure.
☒ Plant cuttings along reclaimed trails. (Still in progress)
☒ Conduct bimonthly visits. (Monthly)
☒ Maintain trails on a bimonthly basis. (Monthly)
☒ Monitor success along reclaimed trails as part of the monitoring and maintenance program. (Still in progress)

Figure 8-3

BIG TUJUNGA WASH MITIGATION BANK

TRAIL MONITORING CHECKLIST

- ☒ Project Biologist performs monthly inspection of each trail.
- ☒ Remove trash from trails and adjacent areas and place in trash receptacles on an as-needed basis.
- ☒ Remove overgrowing vegetation from trail paths on an as-needed basis.
- ☒ Trim low overhanging branches to minimum of 10-feet above ground level on an as-needed basis.
- ☒ Document any flooding and erosion problems. If unsafe trail conditions occur, temporarily close the trails and notify LACDPW. Do not re-open trails until the problem has been resolved.
- ☒ Remove any obstructions from the paths on an as-needed basis. If large objects block the main trail, note the location and remove at a later time using proper equipment, etc.
- ☒ Ensure the use of trails by only equestrians and pedestrians. Place restrictive signs and barriers in proper locations in key problem areas. Notify enforcement authorities if problems continue.
- ☒ Correct all problems same day or document and take corrective actions as soon as possible/reasonable.
- ☒ Ensure the working condition of kiosks, trash receptacles, and portable toilets on an as-needed basis. Refill the brochures at each kiosk as necessary.
- ☒ Make sure all trail signs are standing, legible, and facing the appropriate direction on an as-needed basis.
- ☒ Document any differences in the path of trails if they seem altered or new paths "appear." Use field maps, photographs, and descriptive text to identify the location and notify LADPW. Restrict these areas from further use through use of signs and barriers.
- ☒ Ensure that reclaimed trails are no longer in use. Modify barriers and signs as needed to prevent the use of reclaimed trails.
- ☐ Remove barriers and restrictive signs from reclaimed trails once Restoration Specialist deems area successful.

8.4 PROBLEMS ENCOUNTERED AND CORRECTIVE ACTIONS

8.4.1 Signs/Kiosks

The Cottonwood kiosk was vandalized early in the year when a rock was thrown through the glass doors and has not yet been repaired. Flood Maintenance recovered the Haul Road kiosk from the wash where it fell during the winter storms. This kiosk has not been replaced and a new design has been proposed to replace the old kiosks. The design may include lexon material placed flush against the display board. This improved design would be implemented for both kiosks and would not include doors or space between the boards. This may reduce vandalism and weather damage.

CAC members decided against the installation of general trail signage. The possibility of bilingual informational signage attached to the fence at all entrances is being discussed by LACDPW.

SECTION 9.0 – PUBLIC AWARENESS AND OUTREACH PROGRAM

9.1 INTRODUCTION

Public awareness and involvement are major components of the MMP process. The local community generally supports the Big Tujunga Wash Mitigation Bank project and has been pro-active in its planning and implementation. Due to the community's history of taking care of the site for years, there is every reason to believe that with the proper education and training, local residents will continue to be dedicated caretakers of the site.

9.1.1 Purpose and Goals

There are many key stakeholders and community groups that have shown great interest in the Big Tujunga Wash Mitigation Bank project. These stakeholders include elected officials who are sensitive to the needs of the community and who must respond to residents concerns; local, state, and federal agencies; and local residents. Given the community's involvement with the site, the goal of the Public Awareness and Outreach Program is to keep the stakeholders and public informed of the ongoing enhancement activities at Big Tujunga Wash Mitigation Bank.

In order to facilitate the outreach program, a Community Advisory Committee (CAC) was created. The CAC is made up of representatives from various agencies and local organizations, and meets on a quarterly basis. The CAC meetings serve as an effective communication avenue between the Project Team (LACDPW and Chambers Group) and the local community.

The list of key stakeholders has been revised since the final MMP due to CAC participation and contacts. All current key stakeholders and persons on the mailing list are included in Figure 9-1. Figure 9-2 contains the current checklist for the community awareness and involvement program.

The CAC consists of community residents and representatives from local community organizations including, but not limited to:

- Shadow Hills Property Owners Association
- Lake View Terrace Homeowners Association
- Small Wilderness Area Preservation group
- California Trail Users Coalition and Equestrian Trails, Inc., Corrals 10 and 20
- Hansen Dam Community Advisory Committee
- Valley Horse Owners Association
- Lake View Terrace Improvement Association
- San Fernando Valley Rangers
- Tujunga Watershed Council
- Foothill Water Company

The committee also includes agency and elected officials with representatives from, but not limited to:

- U.S. Fish and Wildlife Service
- California Department of Fish and Game
- U.S. Army Corps of Engineers
- Regional Quality Control Board
- Supervisor Mike Antonovich's Office
- Councilman Joel Wachs' Office
- Councilman Alex Padilla's Office
- Council Member Wendy Greul's Office
- Assemblyperson Cindy Montanez's Office
- Los Angeles Police Department

Figure 9-1

CURRENT KEY STAKEHOLDERS/MAILING LIST

Current Key Stakeholders/Mailing List is attached

Mr. Paul Novak
Office of Supervisor Michael Antonovich
Supervisorial District 5
500 W. Temple
Los Angeles, CA 90012

Ms. Deb Baumann
P.O. Box 176
Sunland, CA 91041

Chris Olsen
6350 Laurel Canyon Boulevard, #201
North Hollywood, CA 91601

Chris Stone
Los Angeles County
Department of Public Works
900 S. Freemont
Alhambra, CA 91803

Mr. Alvin Kelly
Office of Assemblyman Tony Cardenas
Assembly District 39
11541 Laurel Canyon Blvd., Suite C
Mission Hills, CA 91345

Mr. Aaron Allen
U.S. Army Corps of Engineers
Office of the Chief, Regulatory Branch
P.O. Box 532711
Los Angeles, CA 90053-2325

Mr. Scott Harris
California Department of Fish and Game
1508 North Harding Avenue
Pasadena, CA 91104

Mr. Tony Klecha
California Regional Water Quality
Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013-1105

Ms. Mary Meyer
California Department of Fish & Game
South Coastal Region
1429 Foothill Blvd.
Ojai, CA 93023

Mr. Ken Corey
U.S. Fish and Wildlife Service
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Rd.
Carlsbad, CA 92009-4219

Ms. Cile Borman
Lake View Terrace
Improvement Association
11453 Alberni Avenue
Lake View Terrace, CA 91342

Ms. Kathy Delson
Shadow Hills Property
Owners Association
10910 Walnut Drive
Shadow Hills, CA 91040

Officer Larry Martinez
LAPD
12760 Osborne Street
Pacoima, CA 91331

Mr. Bill Eick
Small Wilderness Area Preserve
9647 Stonehurst Avenue
Sun Valley, CA 91352

Ms. Brenda Franklin
Lake View Terrace
Homeowners Association
11377 Osborne Place
Lake View Terrace, CA 91342

Mr. Mike Fullerton
California Trail Users Coalition and ETI
9800 Craig Mitchell
Sunland, CA 91040

Ms. Linda Fullerton
California Trail Users Coalition and ETI
9800 Craig Mitchell
Shadow Hills, CA 91040

Ms. Lise Graber
Lake View Terrace
Homeowners Association
9839 Foothill Place
Lakeview Terrace, CA 91342

Mr. Dennis Kroeplin
Hansen Dam Lakes Coalition
10942 Longford Street
Lake View Terrace, CA 91342

James and Andrea Gutman
Shadow Hills Property
Owners Association
10511 Mahoney Drive
Sunland, CA 91040

Ms. Phyllis Hines
Lake View Terrace
Improvement Association
11515 Orcas Avenue
Lake View Terrace, CA 91342

Mr. Terry Kaiser
Equestrian Trails, Inc. &
California Trail Users Coalition
10354 McBroom Street
Shadow Hills, CA 91040

Ms. Tama Lockwood
Valley Horse Owners Association
11370 Ruggiero Avenue
Lake View Terrace, CA 91342

Mr. Bill Mears
San Fernando Valley Rangers
11350 Clybourn Avenue
Lake View Terrace, CA 91342

Mr. Eddie Milligan
Hansen Dam Equestrian Center
11127 Orcas Avenue
Lake View Terrace, CA 91342

Ms. Nancy Snider
Lake View Terrace
Homeowners Association
10631 Foothill Blvd.
Lake View Terrace, CA 91342

Ms. Carol Roper
Shadow Hills Property
Owners Association
9635 La Canada Way
Sunland, CA 91040

Mr. Phil Tabbi
Small Wilderness Area Preserve
11134 Sheldon Street
Sun Valley, CA 91352

Ms. Pat MacLaughlin
MIG
169 North Marengo Avenue
Pasadena, CA 91101

Mr. Jerry Piro
Sun Valley Watershed Group
8600 Robert Avenue
Sun Valley, CA 91352

Ms. Patricia Wood
LADPW
900 South Fremont Avenue
Alhambra, CA 91803-1331

Mr. Vik Bapua
LADPW
900 South Fremont Avenue
Alhambra, CA 91803-1331

Ms. Elektra Kruger
Shadow Hills Property
Owners Association
10544 Mahoney Drive
Sunland, CA 91040

Ms. Chris Arlington
Shadow Hills Property
Owners Association
9635 La Canada Way
Sunland, CA 91040

Mr. James Wilson
Field Deputy
Councilmember Alex Padilla
13630 Van Nuys Boulevard
Pacoima, CA 91331

Mr. Mark Dierking
Legislative Deputy
Councilmember Alex Padilla
Room 312, City Hall East
200 N. Main Street
Los Angeles, CA 90012

Ms. Jaqy Gamble
9915 Mc Broom Street
Shadow Hills, CA 91040

Ms. Jennifer Plaisted
Senior Deputy
Supervisor Antonovich
215 North Marengo Avenue, Suite 120
Pasadena, CA 91101

Ms. Wendy Greuel
13619 Valerio Street, Unit C
Van Nuys, CA 91405

Ms. Madeleine Jenkin
LADPW
Personnel and Public Affairs
900 South Fremont Avenue
Alhambra, CA 91803-1331

Ms. Barbara Tarnowski
10410 Las Lunitas Avenue
Tujunga, CA 91042-1841

Ms. Ruth Luevanos
Assembly Member Cindy Montanez
11541 Laurel Canyon Blvd., Suite C
Mission Hills, CA 91345

Ms. Michele Chimienti
LADPW
900 South Fremont Avenue
Alhambra, CA 91803-1331

Ms. Mary Montgomery
770 N. Hoover Street
Los Angeles, CA 90029

Ms. Belinda Kwan
LADPW
900 South Fremont Avenue
Alhambra, CA 91803-1331

Mr. John Burton
LADPW
900 South Fremont Avenue
Alhambra, CA 91803-1331

Ms. Patricia Davenport
Field Deputy
City of Los Angeles
Sunland-Tujunga Field Office
7747 Foothill Boulevard
Tujunga, CA 91042

Ms. Mary Benson
FHTNC
11070 Sheldon Street
Sun Valley, CA 91352

Ms. Deb Baumann
Hansen Dam Lakes Coalition
11366 Orcas Avenue
Lake View Terrace, CA 91342

Ms. Patti Friedman, Deputy
Supervisor Michael D. Antonovich
San Fernando Valley Field Office
21949 Plummer Street
Chatsworth, CA 91311

Ms. Stephanie V. Landregan, ASLA
Mountains Recreation and
Conservation Authority
L.A. River Center & Gardens
570 West 26, Suite 100
Los Angeles, CA 90065

Figure 9-2

COMMUNITY AWARENESS AND INVOLVEMENT PROGRAM CHECKLIST

☒ Initiate formation of CAC in July 2000.

☒ Prepare letter and send to agencies and key community organizations inviting them to join CAC (late July 2000).

☒ Establish CAC and meet formally to discuss plans (mid August 2000)
- Identify CAC Chairperson
- Establish communications protocols amongst CAC members
- Schedule future meeting date(s)

☒ Prepare initial newsletter and mail to stakeholders September 2000.

☒ Prepare fact sheets and post in kiosk, distribute to CAC members (Fall, 2000).

☒ Identify community meetings, events, fairs, trail rides where public information materials can be distributed. This can be accomplished by working closely with CAC members, elected officials' offices, homeowner, and business groups in the area.

☒ Work with project landscape architects and technical consultants to establish appropriate signage and kiosks onsite. Signs shall be bilingual English/Spanish. Post public information materials and community updates (in kiosks within 1 week of preparation).

N/A Contact local schools.

N/A Attend onsite meeting with local school personnel.

☒ Prepare newsletters for distribution in September 2000; March, June, and September 2001.

☒ Prepare newsletters for distribution in March and September of years 2002-2005 (ongoing).

☒ Hold quarterly CAC meetings in years 2000-2003.

☒ Hold bi-annual CAC meeting in years 2004-2005 (March and September).

☒ Contact elected officials and agency personnel bi-annually to offer updates on the project (2000-2005).

9.2 ACTIONS TAKEN

9.2.1 Community Advisory Committee Meetings

Bi-annual CAC meetings were held on April 28 and October 27, 2005. The meetings were very successful, providing the community and Public Works with an opportunity to work together on issues including habitat restoration, trail closures, site security/safety and accessibility, and other enhancement measures. Before each meeting, a meeting reminder with the agenda and list of action items was mailed to all stakeholders. After each meeting, the minutes, attendance, and wall graphic were mailed to all meeting participants. Appendix I contains all of the CAC meeting minutes, attendance, and wall graphics. The following is a list of the major action items discussed during the 2005 CAC meetings:

- General Site Signage/Kiosks: The Wheatland kiosk was destroyed along with the haul road during the January 2005 storms. Public Works will attempt to remove the kiosk from the wash and repair it if possible. It will be relocated to the road near the Wheatland gate.
- Tamayo Property: Public Works has sent their documentation in for purchasing the land from the City. Pat Davenport offered to help keep track the paperwork as it goes through the appropriate channels. The 1-acre property will need trash removal and the encampment relocated. The land will be incorporated in the mitigation bank later.
- Website: The LACDPW website is functional and can be accessed at www.ladpw.org. Feedback on the site has been positive.
- Unauthorized Overnight Campers: This is a constant issue within the project site and LACDPW is in constant contact with the LA Homeless Services Authority.
- Site Safety: Patrols are being made on the site two times per week (but not on a regular basis) for 2 hours and updates can be found on the website.
- Trail Signage: Chambers Group has been coordinating with Terry Kaiser to make and install the trail signs. A few of the CAC members now feel that the use of signs along the trails is not a good idea. LACDPW will discuss the issue and decide what to do with the signs that have already been made.
- Graffiti: Public Works graffiti hotline number is (800) 675-4357. Graffiti continues to be observed.
- Water Quality Analysis: MWH conducted quarterly sampling and the results are available on the LACDPW website as soon as they are received.
- Cottonwood Area as Staging Area: Terry Kaiser raised this action item in anticipation of using the area near the Cottonwood Entrance as a horse trailer staging area in the event of a major fire. No proposal has been received by LACDPW.

9.2.2 Newsletters

The "Big T Wash Line" is the project newsletter that was published in April, 2005. The newsletters supplement the CAC meetings in that they provide detail on the various enhancement activities and are distributed to all identified key stakeholders.

9.2.3 Elected Official Contact

Chambers Group subcontracted Moore, Iacofano, & Goltsman Inc. (MIG) to provide expertise in public involvement and facilitation. MIG has facilitated all CAC meetings and has actively contacted local officials and agency personnel to update them on the status of the MMP measures. In an effort to keep elected officials up-to-date on happenings and emerging issues with the site, MIG has implemented periodic briefings in past years for the offices of City Council members Alex Padilla and Wendy Greul, Assemblyperson Cindy Montanez, and Supervisor Michael D. Antonovich. Thus far, the offices of the elected officials are supportive of the project and are interested in participating in advisory group meetings, coordinating their offices' activities with the project, and in serving as communications links with constituents. The individual briefing of the elected officials' offices was not conducted prior to the April and October 2005 CAC meetings due to scheduling/contractual issues.

9.2.4 Project Fact Sheets

Project fact sheets are brief descriptions of each of the MMP programs. Due to the vandalism of the Cottonwood kiosk, which is the only remaining kiosk, no new fact sheets have been posted for 2005.

9.3 STATUS

During 2005, the CAC meetings were held on a bi-annual basis. The final CAC meeting with Chambers Group was held on Thursday, October 27, 2005 at Hanson Yard in Sun Valley. The CAC meetings will continue between LACDPW and the CAC members on a quarterly basis. The final edition of the Big T Wash Line was published in 2005.

SECTION 10.0 – WATER QUALITY MONITORING PROGRAM

10.1 INTRODUCTION

In order to address both upstream and downstream water quality issues at the Big Tujunga Wash site, a water-quality monitoring program was implemented. The monitoring program addresses specific water quality issues, such as pesticide/fertilizer percolation or run-off and subsequent groundwater contamination, which may occur due to upstream development. Monitoring for elevated levels of nitrogen and organophosphates in the flow entering the site will help determine whether nitrate-laden irrigation water or pesticide containing run-off from upstream developments is affecting the Big Tujunga Wash Mitigation Bank. The water-quality monitoring program at Big Tujunga Wash shall complement the monitoring program that is a requirement of the upstream Angeles National Golf Club (formerly the Canyon Trails Golf Course).

10.2 PURPOSE/GOALS

The water quality program is specifically designed to look for changes in water quality that may potentially affect sensitive native fishes and amphibians in the aquatic environment. The LACDPW personnel established baseline water quality conditions on April 12, 2000, prior to the implementation of the MMP programs. The LACDPW personnel conducted the baseline water quality sampling in accordance with accepted protocols, and a certified water quality laboratory conducted the analyses. The water quality program at Big Tujunga Wash includes quarterly monitoring for the following water quality parameters:

Total Kjeldahl-Nitrogen (TKN)	Total Residual Chlorine
Nitrite-Nitrogen (NO_2^--N)	Total Coliform bacteria
Nitrate-Nitrogen (NO_3^--N)	Fecal Coliform bacteria
Ammonia-Nitrogen (NH_3-N)	Turbidity
Orthophosphorus	Dissolved Oxygen (DO)
Organophosphate	Temperature (°C)
Total Phosphorus	pH (pH units)
Glyphosate*	Chlorpyrifos*
*** Added to list of sampling parameters in 2004**	

10.3 METHODOLOGY

MWH Americas, a subconsultant to Chambers Group, is responsible for the water quality monitoring program described in the MMP. An experienced Water Quality Specialist sampled the site on April 7, June 30, October 25, and December 22, 2005. The samples were taken to Montgomery Watson Laboratories, Pasadena, California, to be analyzed immediately after sampling was completed. The results of the water quality analyses were summarized in quarterly letters and in an annual report distributed to LACDPW, CDFG, RWQCB, and USFWS. The Water Quality Monitoring Program will continue on a quarterly basis throughout the five-year duration of the MMP Program.

MWH has been in contact with the Angeles National Golf Club in order to obtain information regarding their pesticide and herbicide application. Based on the information obtained, glyphosate (an herbicide) was added to the list of sampling parameters starting in the first quarter of 2004. In addition, chlorpyrifos (an insecticide) was added to the list of sampling parameters during the fourth quarter of 2004.

10.3.1 Location of Sampling Sites

Water quality monitoring sites were permanently established with a GPS at various locations along the Haines Canyon Creek and Big Tujunga Wash. Three monitoring sites were located along Haines Canyon Creek. One site was located at the inflow to the Tujunga Ponds; a second site was located at the outflow of the Tujunga Ponds; and a third site was located in Haines Canyon Creek, just before it exits the Mitigation Bank. A fourth water quality monitoring station was also established in the Big Tujunga Wash, and sampling was performed only when flowing water was present during the quarterly sampling visits. Figure 10-1 shows the locations of the four sampling locations. Figure 10-2 shows the checklist for the water quality monitoring tasks.

Table 10-1
Big Tujunga Wash
2005 Water Quality Sampling Locations and Dates

Sampling Locations	Latitude	Longitude	Date of Sample
Haines Canyon Creek, just before exit from site	N 34 16' 2.9"	W 118 21' 22.2"	April 7, June 30, October 25, December 22
Haines Canyon Creek, inflow to Tujunga Ponds	N 34 16' 6.9"	W 118 20' 18.7"	April 7, June 30, October 25, December 22
Haines Canyon Creek, outflow from Tujunga Ponds	N 34 16' 7.1"	W 118 20' 28.3"	April 7, June 30, October 25, December 22
Big Tujunga Wash	N 34 16' 11.7"	W 118 21' 4.0"	April 7, June 30, October 25, December 22

10.3.2 Description of Analyses

A portion of the water quality parameters were analyzed in the field using the following field equipment:

- YSI Model 57 – dissolved oxygen and temperature
- HACH DR 700 – total residual chlorine
- Orion 230A – pH

All other analyses were performed in duplicate at Montgomery Watson Laboratories, Pasadena, California.

10.4 RESULTS

Table 10-2 summarizes the results from the 2005 water quality sampling efforts. Detailed descriptions of the analyses are located in Appendix J.

10.4.1 Comparison of Quarterly Monitoring

In general, the water quality on the site was relatively good. Water quality in 2005 was similar to the April 12, 2000 baseline conditions. Fluctuations in some of the readings corresponded to expected seasonal variation and from the releases from the Big Tujunga Dam resulting in high flows prior to the April sampling. Sampling during 2005 did not detect any contamination of the waters due to pesticides or fertilizers. Table 10-3 lists the baseline conditions. Results of analyses conducted by Montgomery Watson Laboratories for samples collected in 2005 are summarized in Tables 10-4 through 10-7. Where duplicate analyses were conducted, the average value is graphed.

BIG TUJUNGA WASH MITIGATION BANK

This map is not intended for site-specific purposes.

Prepared For:
Los Angeles County Department of Public Works

Date: December 3, 1999

Prepared By:
Leslie Backus
Chambers Group Inc.

This map was produced using ESRI's ArcView software.

Chambers Group, Inc.

Figure 10-1
Water Quality Sampling Stations

WQ Station No.	Name
1	Inflow to Tujunga Ponds
2	Outflow from Tujunga Ponds
3	Big Tujunga Wash
4	Haines Canyon Creek, just before exit from site

Figure 10-2

BIG TUJUNGA WASH MITIGATION BANK

WATER QUALITY MONITORING PROGRAM CHECKLIST

- ☒ Notify resource agencies.
- ☒ Authorization from resource agencies.
- ☒ Site visit to identify water quality monitoring stations.
- ☒ Establish monitoring stations in Haines Canyon Creek and Big Tujunga Wash with GPS.
- ☒ March 1 – Conduct baseline water quality on the site prior to implementation of enhancement measures.
- ☒ Submit samples to laboratory for analysis.
- ☒ April 1 – Submit baseline monitoring report.
- ☒ June 1 – 1st Quarterly sampling.
- ☒ Submit samples to laboratory for analysis.
- ☒ July 1 – Submit first quarterly monitoring report including a summary of baseline data to resource agencies and consultant.
- ☒ September 1 – 2nd Quarterly sampling.
- ☒ Submit samples to laboratory for analysis.
- ☒ October 1 – Submit quarterly monitoring report to resource agencies and consultant.
- ☒ December 1 – 3rd Quarterly sampling.
- ☒ Submit samples to laboratory for analysis.
- ☒ January 1 – Submit quarterly monitoring report to resource agencies and consultant.
- ☒ March 1 – 4th Quarterly sampling.
- ☒ Submit samples to laboratory for analysis.
- ☒ April 1 – Submit to resource agencies and consultant first quarterly monitoring report.
- ☒ May 1 – Submit annual monitoring report to resource agencies and consultant.

*Note: If at any time notable discrepancies occur between baseline data and quarterly sampling results, the resource agencies and consultant shall be notified within 7 days of receiving water quality analysis.

Table 10-2
Big Tujunga Wash
Summary of 2005 Water Quality Sampling Results

Parameter	Summary
Temperature	Seasonal fluctuations (up to 4C) were observed, with the June readings the highest and the December readings the lowest. Observed temperatures were below levels of concern for growth and survival of warm water fish species.
Dissolved Oxygen (DO)	DO fluctuations generally followed seasonal temperature changes, with the highest DO recorded during the April sampling. All DO readings in 2005 were above the recommended minimum for warm water species of 5.0 mg/L except at the inflow to and outflow from the Tujunga Ponds in the third quarter (4.5 and 4.8 mg/L respectively). During the past 5 monitoring years, only one other DO reading below 5.0 mg/L has been recorded (in the inflow to the ponds in March 2001).
pH	For all sampling dates in 2005, the pH of waters flowing into and out of the ponds varied by 0.1 units or less. The maximum seasonal pH fluctuation at any station in 2005 was 1.3 units. The pH values in 2005 were within the 6.5 to 8.5 range identified in the basin plan except at Haines Canyon Creek in the first quarter (9.0 units) and at Big Tujunga Wash in the first, third and fourth quarters (9,0, 8.6, and 8.6, respectively).
Total Residual Chlorine	As with all preceding years, total residual chlorine readings were below the detection limit.
Nitrogen	Nitrite-nitrogen was not detected in any samples in 2005. Ammonia-nitrogen was not detected in the first two quarters. In the third quarter, ammonia-nitrogen was detected in low concentrations (<0.1 mg/L) in the inflow to and outflow from the Tujunga Ponds. In the fourth quarter, ammonia nitrogen was detected at all sites in concentrations ranging from 0.06 to 0.17 mg/L. Kjeldahl nitrogen (organic plus ammonia) readings were consistently low (<1 mg/L) at all stations. Nitrate-nitrogen was consistently higher for the inflow to versus the outflow from the ponds (up to 2 mg/L difference) except in the third quarter when the values for inflow and outflow were similar (2.8 and 2.9 mg/L, respectively). Nitrate levels in Haines Canyon Creek were similar to or lower than the levels in the outflow from the ponds. All nitrate-nitrogen readings was below the drinking standard of 10mg/L.
Phosphorus	The EPA's recommendation for phosphorus values in streams is <0.05 – 0.1 mg/L. Total phosphorus levels in the inflow to and outflow from Tujunga Ponds and in Haines Canyon Creek exceeded the lower value of the EPA's recommendation (0.05 mg/L) in the fourth quarter of 2005. The total phosphorus values were below 0.1 mg/L at all stations for all four quarters of 2005.
Glyphosate	Glyphosate reading on all sampling dates were below the detection limit.
Chlorpyrifos	Chlorpyrifos and the other pesticides tested using EPA's analytical method 625 were not detected at any station in 2005.
Turbidity	The turbidity readings were below the drinking water standards of 5 NTU and were not excessive for aquatic life.
Bacteria	Fecal coliform levels in 2005 ranged from 2 to 170 MPN/100 mL and were below the water contact recreation standard of 200 MPN/100mL for all four quarters at all stations. Total coliforms were much higher (up to 16,000 MPN/100 mL), but total coliform spikes (over 50,000 – 100,000 MPN/100 mL) were not observed in 2005.

Table 10-3
Big Tujunga Wash
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	4,070	737

Table 10-4
Summary of Big Tujunga Wash Water Quality Results
1st Quarter 2005 (4/7/05)

Parameter	Units	Inflow to Tujunga Ponds 1	Inflow to Tujunga Ponds 2 (Duplicate)	Outflow From Tujunga Ponds 1	Outflow From Tujunga Ponds 2 (Duplicate)	Big Tujunga Wash 1	Big Tujunga Wash 2 (Duplicate)	Haines Canyon Creek Exiting Site 1	Haines Canyon Creek Exiting Site 2 (Duplicate)
Temperature	°C	19.0	--	17.8	--	17.0	--	15.3	--
Dissolved Oxygen	mg/L	7.4	--	7.7	--	11.5	--	11.4	--
PH	std units	7.2	--	7.3	--	9.0	--	9.0	--
Total residual chlorine	mg/L	ND	--	ND	--	ND	--	ND	--
Ammonia-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Kjeldahl Nitrogen	mg/L	0.44	0.31	4.10	0.30	0.23	0.24	0.21	0.54
Nitrite-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-Nitrogen	mg/L	5.4	5.4	3.2	3.6	ND	ND	ND	ND
Orthophosphate-P	mg/L	0.022	0.021	0.025	0.026	0.11	0.12	ND	ND
Total phosphorus-P	mg/L	0.021	0.024	0.022	0.022	0.010	ND	ND	0.012
Glyphosate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Chlorpyrifos*	ng/L	ND	ND	ND	ND	ND	ND	ND	ND
Turbidity	NTU	0.50	0.70	0.60	0.50	1.6	1.3	1.4	1.3
Fecal Coliform Bacteria	MPN/100ml	2	2	8	13	2	2	8	4

-- No duplicate samples taken for field measurements
NTU nephelometric turbidity units
MPN most probable number
ND non-detect
***** The analytical method used for chlorpyrifos (diazinon/chlorpyrifos by GCMS, EPA 625) also tests for the following chemicals: diazinon, sulprofos, demeton, dichlorvos, disulfoton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malathion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate. Samples for this quarter were all non-detect for these EPA 625 parameters.

Table 10-5
Summary of Big Tujunga Wash Water Quality Results
2nd Quarter 2005 (6/30/05)

Parameter	Units	Inflow to Tujunga Ponds 1	Inflow to Tujunga Ponds 2 (Duplicate)	Outflow From Tujunga Ponds 1	Outflow From Tujunga Ponds 2 (Duplicate)	Big Tujunga Wash 1	Big Tujunga Wash 2 (Duplicate)	Haines Canyon Creek Exiting Site 1	Haines Canyon Creek Exiting Site 2 (Duplicate)
Temperature	°C	20.5	--	19.5	--	26.3	--	19.5	--
Dissolved Oxygen	mg/L	7.5	--	5.1	--	5.2	--	7.8	--
PH	std units	6.8	--	6.9	--	8.4	--	7.8	--
Total residual chlorine	mg/L	ND	--	ND	--	ND	--	ND	--
Ammonia-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Kjeldahl Nitrogen	mg/L	0.24	0.21	ND	0.34	ND	0.36	0.23	0.21
Nitrite-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-Nitrogen	mg/L	4.6	4.7	2.6	2.6	ND	ND	2.3	2.3
Orthophosphate-P	mg/L	0.024	0.024	0.028	0.029	ND	ND	0.032	0.031
Total phosphorus-P	mg/L	0.042	0.012	0.025	0.040	0.013	ND	0.033	0.030
Glyphosate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Chlorpyrifos*	ng/L	ND	ND	ND	ND	ND	ND	ND	ND
Turbidity	NTU	0.20	0.30	0.25	0.25	0.20	0.30	0.25	0.20
Fecal Coliform Bacteria	MPN/100ml	50	17	170	170	2	13	80	110

-- **No duplicate samples taken for field measurements**
NTU **nephelometric turbidity units**
MPN **most probable number**
ND **non-detect**
***** **The analytical method used for chlorpyrifos (diazinon/chlorpyrifos by GCMS, EPA 625) also tests for the following chemicals: diazinon, sulprofos, demeton, dichlorvos, disulfoton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malathion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate. Samples for this quarter were all non-detect for these EPA 625 parameters.**

Table 10-6
Summary of Big Tujunga Wash Water Quality Results
3rd Quarter 2005 (10/25/05)

Parameter	Units	Inflow to Tujunga Ponds 1	Inflow to Tujunga Ponds 2 (Duplicate)	Outflow From Tujunga Ponds 1	Outflow From Tujunga Ponds 2 (Duplicate)	Big Tujunga Wash 1	Big Tujunga Wash 2 (Duplicate)	Haines Canyon Creek Exiting Site 1	Haines Canyon Creek Exiting Site 2 (Duplicate)
Temperature	°C	19.0	--	19.0	--	19.9	--	18.5	--
Dissolved Oxygen	mg/L	4.5	--	4.8	--	8.3	--	8.3	--
PH	std units	6.9	--	6.9	--	8.6	--	7.9	--
Total residual chlorine	mg/L	ND	--	ND	--	ND	--	ND	--
Ammonia-Nitrogen	mg/L	0.08	0.09	0.09	0.09	ND	ND	ND	ND
Kjeldahl Nitrogen	mg/L	0.35	0.31	0.30	0.28	0.24	0.24	0.34	0.27
Nitrite-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-Nitrogen	mg/L	2.8	2.8	2.9	2.9	ND	ND	2.8	2.8
Orthophosphate-P	mg/L	0.040	0.039	0.040	0.040	ND	ND	0.044	0.042
Total phosphorus-P	mg/L	ND	0.031	ND	ND	ND	ND	ND	ND
Glyphosate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Chlorpyrifos*	ng/L	ND	ND	ND	ND	ND	ND	ND	ND
Turbidity	NTU	0.50	0.60	0.65	0.70	3.5	3.6	1.7	0.50
Fecal Coliform Bacteria	MPN/100ml	50	13	50	50	17	13	80	130
Total Coliform Bacteria	MPN/100ml	1,400	1,100	3,000	500	700	1,600	1,600	2,200

-- No duplicate samples taken for field measurements
NTU nephelometric turbidity units
MPN most probable number
ND non-detect
***** The analytical method used for chlorpyrifos (diazinon/chlorpyrifos by GCMS, EPA 625) also tests for the following chemicals: diazinon, sulprofos, demeton, dichlorvos, disulfoton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malathion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate. Samples for this quarter were all non-detect for these EPA 625 parameters.

Table 10-7
Summary of Big Tujunga Wash Water Quality Results
4th Quarter 2005 (12/22/05)

Parameter	Units	Inflow to Tujunga Ponds 1	Inflow to Tujunga Ponds 2 (Duplicate)	Outflow From Tujunga Ponds 1	Outflow From Tujunga Ponds 2 (Duplicate)	Big Tujunga Wash 1	Big Tujunga Wash 2 (Duplicate)	Haines Canyon Creek Exiting Site 1	Haines Canyon Creek Exiting Site 2 (Duplicate)
Temperature	°C	17.4	--	18.0	--	13.0	--	15.0	--
Dissolved Oxygen	mg/L	7.4	--	5.3	--	9.2	--	8.4	--
PH	std units	6.8	--	6.9	--	8.6	--	7.7	--
Total residual chlorine	mg/L	ND	--	ND	--	ND	--	ND	--
Ammonia-Nitrogen	mg/L	ND	0.06	0.08	0.07	0.17	0.16	0.15	0.08
Kjeldahl Nitrogen	mg/L	0.23	0.37	0.56	0.25	0.25	0.21	0.26	0.27
Nitrite-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-Nitrogen	mg/L	3.9	3.9	3.4	3.4	ND	ND	3.4	3.4
Orthophosphate-P	mg/L	0.027	0.028	0.028	0.027	ND	ND	0.030	0.032
Total phosphorus-P	mg/L	0.086	0.083	0.051	0.083	0.067	0.010	0.054	0.083
Glyphosate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Chlorpyrifos*	ng/L	ND	ND	ND	ND	ND	ND	ND	ND
Turbidity	NTU	0.55	0.60	0.50	0.35	0.90	0.95	0.6	0.9
Fecal Coliform Bacteria	MPN/100ml	30	13	2	13	2	7	11	8
Total Coliform Bacteria	MPN/100ml	500	2,800	7,000	16,000	2,200	1,700	260	280

-- No duplicate samples taken for field measurements
NTU nephelometric turbidity units
MPN most probable number
ND non-detect
***** The analytical method used for chlorpyrifos (diazinon/chlorpyrifos by GCMS, EPA 625) also tests for the following chemicals: diazinon, sulprofos, demeton, dichlorvos, disulfoton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malathion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate. Samples for this quarter were all non-detect for these EPA 625 parameters.

10.5 RECOMMENDATIONS

The water quality at the mitigation bank during 2005 was good and there was no contamination of the waters due to pesticides or fertilizers. Other than maintaining contact with the golf course director for shared information regarding chemical application on the golf course, there are no further recommendations at this time.

SECTION 11.0 – REFERENCES

Atwood, J. L.

1990 *Status Review of the California Gnatcatcher (Polioptila californica).* Unpublished Technical Report, Manomet Bird Observatory, Manomet, Massachussetts.

1993 California Gnatcatchers and Coastal Sage Scrub: The Biological Basis for Endangered Species Listing. Pp. 149-169. In *Interface Between Ecology and Land Development* in California. Edited by J.E. Keeley, Southern California Academy of Sciences, Los Angeles.

Brinson, Mark

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

Brittingham, M. C. and S. A. Temple

1983 Have Cowbirds Caused Forest Songbirds to Decline? *BioScience* 33:31-35.

Chambers Group, Inc.

1998 *Draft Biological Resources Assessment and Functional Analysis of a Site in Big Tujunga Wash, Los Angeles County, California.* Prepared for Los Angeles County Department of Public Works, Alhambra, California. April 1998.

2005 *Final 2004 Master Mitigation Plan for the Big Tujunga Wash Mitigation Bank*. Prepared for the Los Angeles County Department of Public Works, Alhambra, California. April 2005.

2005 *Final 2005 Annual Brown-headed Cowbird Trapping and Removal Program*. Prepared for the Los Angeles County Department of Public Works, Alhambra, California, November 2005.

Clark, Kevin

Personal communications. USFWS, Carlsbad field office. October 2, 2001.

Ehrlich, P., D. Dobkin, and D. Wheye

1988 *The Birder's Handbook.* Simon and Schuster, Inc. New York, New York.

Ellison, J. P.

1984 A revised classification of native aquatic communities of California. California State Resources Agency, Sacramento, California. No. 84-1.

Graham, Frank Jr.

1998 Bad, Bad, Birds. *Audubon* September-October: 104-108.

Griffith Wildlife Biology (GWB)

1993 *Final Report, Brown-Headed Cowbird Trapping and Elimination Program.* Prepared for the International Boundary and Water Commission United States and Mexico United States Section, El Paso, Texas, and Chambers Group, Inc.

1994a *Brown-headed Cowbird Trapping Protocol*. Unpublished document prepared by Jane C. Griffith and John T. Griffith, Griffith Wildlife Biology, Calumet, Michigan.

1994b *San Joaquin Hills Transportation Corridor; Brown-Headed Cowbird Removal Program.* Prepared for California Corridor Constructors.

Harris, J. H.
1991 Effects of Brood Parasitism by Brown-Headed Cowbirds on Willow Flycatcher Nesting Success along the Kern River, California. *Western Birds* 22:13-26.

Laymon, S. S.
1987 Brown-Headed Cowbirds in California: Historical Perspectives and Management Opportunities in Riparian Habitats. *Western Birds* 18:63-70.

1993 *Brown-Headed Cowbird Impacts on South-Western Riparian Bird Communities: Management Options and Opportunities*. Paper from the North American Workshop on the Ecology and Management of Cowbirds, Austin, Texas.

Mayfield, H. F.
1977 Brown-Headed Cowbird: Agent of Extermination? *American Birds* 31:107-113.

Sogge, M., R. Marshall, S. Sferra, and T. Tibbitts
1997 A Southwestern Willow Flycatcher Natural History Summary and Survey Protocol. USGS Biological Resources Division, Colorado Plateau Research Station, Northern Arizona University. 36 pp. Plus appendix.

Stafford M. D. and B. E. Valentine
1985 *A Preliminary Report on the Biology of the Willow Flycatcher in Central Sierra Nevada.* Cal-Neva Wildlife Transactions 66-77.

Stallcup, R.
1993 *"Another Silent Spring?"* Pt. Reyes Bird Observatory News, Spring 1993.

Stokes, D. and L. Stokes.
1996 *Stokes Field Guide to Birds (western region)*. Little, Brown and Company Limited, New York, New York.

Swift, C.C., T.R. Haglund, M. Ruiz, and R.N. Fisher
1993 The status and distribution of the freshwater fishes of southern California. *Bulletin of the Southern California Academy of Science*s 92:101-167.

Unitt, P.
1984 *The Birds of San Diego County*. San Diego Society of Natural History, Memoir 13.

U.S. Fish and Wildlife Service (USFWS)
1985 Unarmored threespine stickleback recovery plan (revised). U. S Fish and Wildlife Service, Portland, Oregon, 80 pp.

1991 Endangered and Threatened Wildlife and Plants; Animal Candidate Review for Listing as Endangered or Threatened Species, Proposed Rule. In *Federal Register* Vol. 56, No. 225, government publications.

1994 Endangered and Threatened Wildlife and Plants; In *Federal Register* Vol. 56, No. 225, government publications. Final Determination of Critical Habitat for the Least Bell's Vireo.

1997 Endangered and Threatened Wildlife and Plants; Final Determination of Critical Habitat for the Southwestern Willow Flycatcher. In *Federal Register* Vol. 62, No. 140, government publications.

2000 Southwestern Willow Flycatcher Protocol Revision 2000. California/Nevada Operations Office, Sacramento, California. Letter dated July 11, 2000. 4 pp.

U.S. Geological Survey
1966 La Habra 7.5' Topographic Quadrangle. Photorevised 1972

1966 Yorba Linda 7.5' Topographic Quadrangle. Photorevised 1972.

Willet, G.
1933 Revised List of Birds of Southwestern California. *Pacific Coast Avifauna* 27:1-203.

SECTION 12.0 – LIST OF PREPARERS

Chambers Group, Inc.
17671 Cowan Avenue, Suite 100
Irvine, California 92614
(949) 261-5414
Shannan Shaffer
Heather Clayton
Lindsay Messett
Carleigh Neumeister

Los Angeles County Department of Public Works
Water Resources Division
900 S. Fremont Avenue
Alhambra, California 91803-1381
(949) 452-6135
Pat Wood
Belinda Kwan

Dan Holland, Ph.D.
Camm Swift, Ph.D.
Camp Pendleton Amphibian and Reptile Survey
334 A E. Fallbrook Street
Fallbrook, CA 92028

MWH Americas, Inc.
301 North Lake Avenue, Suite 600
Pasadena, CA 91101

Natures Image
20472 Crescent Bay, Suite 102
Lake Forest, CA 92630
(949) 454-1225

Moore, Lacofano, & Goltsman, Inc.
169 North Marengo Avenue
Pasadena, CA 91101
(626) 744-9872
Pat McLaughlin

Visuart
17500 Redhill Avenue, Suite 180
Irvine, CA 92614
(949) 756-8700
Eric Carlisle
Mike Neeman

BIG TUJUNGA WASH
MITIGATION BANK
FINAL ANNUAL REPORT – 2005

APPENDICES

Prepared for:

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
900 South Fremont Avenue
Alhambra, California 91803-1331
(626) 455-6138

Prepared by:

CHAMBERS GROUP, INC.
17671 Cowan Avenue, Suite 100
Irvine, California 92614
(949) 261-5414

April 2006

APPENDIX A

2005 FUNCTIONAL ANALYSIS REPORT

FUNCTIONAL ANALYSIS OF THE BIG TUJUNGA WASH MITIGATION BANK FOR 2005 LOS ANGELES COUNTY, CALIFORNIA

Prepared for:

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
900 S. Fremont Avenue
Alhambra, California 91803-1331

Prepared by:

CHAMBERS GROUP, INC.
17671 Cowan Avenue, Suite 100
Irvine, California 92614
(949) 261-5414

January 2006

TABLE OF CONTENTS

Page

LIST OF FIGURES

LIST OF TABLES

SECTION 1.0 – INTRODUCTION

1.1 PURPOSE OF THE STUDY

The purpose of this analysis is to use an objective, quantitative method of habitat assessment to compare the functional values of riparian habitat in the Big Tujunga Wash mitigation site with the previous functional analyses completed on the site. The functional analysis will also be used as a tool to assess the success of the habitat restoration program initiated in late 2000.

1.2 LOCATION AND SETTING

The Big Tujunga Wash Mitigation Bank is located in Big Tujunga Wash, just downstream of the Interstate 210 Freeway overcrossing, near the City of Los Angeles' Sunland area in Los Angeles County's San Fernando Valley. The site is bordered on the north and east by the I-210 Freeway and on the south by Wentworth Street. The west side of the site is contiguous with the downstream portion of Big Tujunga Wash. Figure 1 depicts the general vicinity of the project site. The Mitigation Bank location is shown in Figure 2.

The Big Tujunga Wash Mitigation Bank supports two watercourses, one containing flow from Big Tujunga Wash proper, and the other conveying the flow from Haines Canyon to Big Tujunga Wash. The flow in Big Tujunga Wash, on the north side of the site, is partially controlled by Big Tujunga Dam and is intermittent based on rainfall amounts and water releases from the Dam. The flow in Haines Canyon Creek, located on the south side of the site, is perennial and may be fed by groundwater and/or runoff from adjacent residential areas. The two drainages merge near the western boundary of the property and continue into the Hansen Dam Flood Control Basin, located approximately one-half mile downstream of the site. The site is wholly located within a state-designated Significant Natural Area (LAX-018) and the biological resources found on the site are of local, regional, and statewide significance.

The Big Tujunga Ponds and surrounding habitat, consisting of approximately 27 acres located in the northeast corner of the site, were originally created as partial mitigation for construction of the I-210 Freeway. The ponds are currently under the jurisdiction of the Los Angeles County Department of Parks and Recreation.


Figure 1
General Vicinity Map
N
Miles
0 2.5 5 10
Kilometers
0 2.5 5 10
Chambers Group, Inc.
Data Source: USGS - www.seamless.usgs.gov - The National Map
z:/proj/6629_BigT/Vicinity_Map.mxd
Lancaster
Palmdale
Santa Clarita
Project Location
Glendale
Pasadena
Los Angeles
El Monte
West Covina
Inglewood
Norwalk
Fullerton
Anaheim
Torrance
Orange
Garden Grove
Santa Ana
Long Beach
Irvine
Huntington Beach

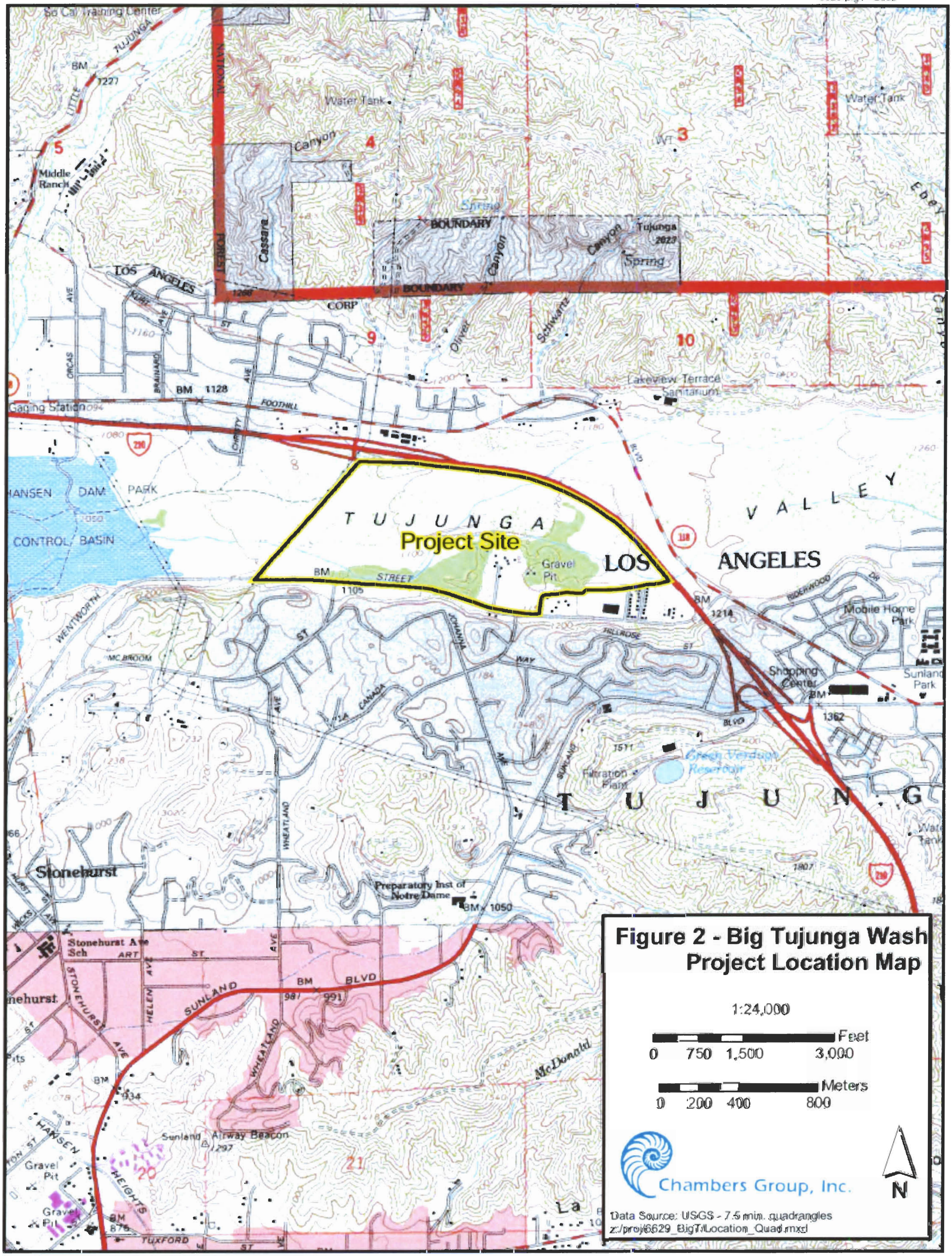


Figure 2 - Big Tujunga Wash Project Location Map

SECTION 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 Big Tujunga Wash Mitigation Bank. The logic behind the HGM approach is to compare the wetlands functions of the target sites to a reference standard site determined to have the highest level of functioning (Brinson 1995). By definition, reference standard functions receive an index score of 1.0. Target sites are assigned a score of between 0, for no function, and 1.0 for as high as the reference standard. The crediting and debiting mechanism for the Skunk Hollow Mitigation Bank (Stein 1997) was used as a starting point and adapted specifically for this analysis. Nine evaluation variables were used for the functional assessment of riparian habitat at Big Tujunga Wash:

Riparian Habitat Variables
- Cover (COV)
- Structural Diversity (STD)
- Contiguity (CON)
- Urban Encroachment (URB)
- Percent Exotic Vegetation (EXO)

Hydrologic Variables
- Hydrologic Regime (REG)
- Characteristics of Flood-Prone area (FPA)
- Micro and Macro Topographic Complexity (TOP)

Biogeochemical Variables
- Available Organic Carbon (CAR)

In addition to these variables, which evaluate wetlands function, three additional variables were added which address wildlife values. Although it is implicit in the HGM approach that if the functions are high, the wildlife values will be present, 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 Variables
- 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. To determine the Functional Units (FU) per acre of each system, the evaluation variables are combined into algorithms that express their relationship in the most streamlined fashion practical. Potential mathematical expressions of the relationship between evaluation variables were explored using guidelines in the U.S. Fish and Wildlife Service Habitat Evaluation Procedures Manual (1989). These relationships between evaluation variables are discussed briefly below.

It is appropriate to sum the scores of the evaluation variables (FU = EV1+EV2.......+EVn) when habitat value is determined by variables that act independently and when these variables cumulatively increase the value of the habitat. In contrast, a compensatory relationship exists when a variable with a low functional value can be offset by a variable with a high value. In that case the mathematical formula that best expresses the relationship between evaluation variables would be an arithmetic mean (FU = (EV1+EV2......+EVn) /n) because the overall habitat value will be equal to the average of the separate evaluation variables. If a compensatory relationship exists between variables, but overall functional value is strongly influenced by low values to the extent that if any of the evaluation variables are equal to zero, functional value is equal to zero, then a geometric mean (FU = (EV1xEV2 ....xEVn) /n) may be the most appropriate mathematical expression. Finally, if one evaluation variable strongly influences other variables and the value of these other variables is zero when the influential evaluation variable is zero, then it would be appropriate to multiply the dependent criteria by the influential variable.

For the riparian model, it was believed that most of the variables acted independently and contributed cumulatively to overall habitat function. Therefore, an additive function was used to describe the relationship between most of the variables with the exception that two of the variables, Percent Exotic Vegetation (EXO) and Hydrologic Regime (REG), strongly influence other variables. For example, the riparian habitat variables, Structural Diversity (STD) and Cover (COV) both contribute cumulatively to the habitat value and a high value for one does not compensate for a low value for the other. Therefore, it is appropriate to sum the values for these variables. However, exotic vegetation has little habitat value, and a site will have low habitat value 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 URB on habitat (cats and dogs, human disturbance, noise, invasive lighting) would act independently of exotic vegetation.

The Hydrologic Variables (FPA and TOP) and Biogeochemical criterion (CAR) contribute to functional value in an independent and cumulative function and are added. However, all of the functional variables, Habitat, Hydrologic, and Biogeochemical, are strongly dependent on water. Therefore all of these variables are multiplied by REG because water is the driving force behind riparian systems. If water is not present (REG=0), the riparian system has no functional value. The exception to this is the Urban Encroachment variable (URB), which is not dependent upon the presence of water. This variable was not multiplied by REG because it is an independent variable.

The maximum value that could be obtained if all variables were 1 is 10. To scale the FU to a value between 0 and 1, with 1 being the FU for a highly functional reference system in which all of the evaluation variables were equal to 1, the total value of the algorithm is divided by 10, the maximum possible score. Therefore the algorithm for riparian habitat is:

$$FU=\frac{((STD+COV)EXO+CON+CAR+FPA+TOP)REG+URB+RAR+RIC+SPE}{10}.$$

The total Functional Capacity Units (FCU) for the site are determined by multiplying the FU value by the number of acres of habitat present on the site:

FCU = FU * Acres of riparian habitat.

Table 2-1
Riparian Habitat and Hydrogeomorphic Functional Analysis Variables

Value	Variables
Riparian Habitat – Structural Diversity (STD)	
0.0	Site permanently converted to land use that will not be able to support native riparian vegetation, such as housing, agriculture, or concrete channel.
0.2	No existing riparian vegetation (e.g., covered with annual grasses and scrub, bare ground).
0.4	Vegetated areas of the site contain sparse, scattered, patchy, or remnant riparian vegetation that is immature and/or lacks structural (vertical) diversity, and may have exotic plants interspersed in riparian areas.
0.6	The patches of riparian vegetation on the site contain riparian trees and/or saplings (i.e., perennial dicots), but contain no, or poorly developed, shrub understory.

Table 2-1 (Continued)
Riparian Habitat and Hydrogeomorphic Functional Analysis Variables

Value	Variables
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, with other remaining sides surrounded by urban development.
0.6	Habitat has two opposite sides with similar habitat, with 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.

Table 2-1 (Continued)
Riparian Habitat and Hydrogeomorphic Functional Analysis Variables

Value	Variables
	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 (overbank flow, scour, or deposition.)
0.7	Site is within or adjacent to an impoundment on a natural watercourse which is subject to fluctuations in flow or hydroperiod.
1.0	Site is within or adjacent to a stream, river, or other concentrated flow conduit, which provides the primary source of water to the site. The site contains some evidence of riparian processes such as overbank flow or scour or deposition.
	Characteristics of Flood-Prone Area (FPA)
0.0	Channel is contained in a concrete-lined channel, culvert, etc.
0.2	Channel has an earthen bottom; however it is structurally confined (e.g., riprap or concrete sideslopes).
0.4	Channel has an earthen bottom and earthen side slopes; however, it is incised or confined such that the FPA 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 (i.e., during a ten-year flood event).
0.8	Site is part of a floodplain, which provides an opportunity for overbank flow during moderate flow events (i.e., 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 or macro topographic features.
0.6	Flood prone area contains micro and/or macro topographic features such as ponds, hummocks, bars, rills, and large boulders, but is predominantly a 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.

Table 2-1 (Continued)
Riparian Habitat and Hydrogeomorphic Functional Analysis Variables

Value	Variables
	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 of debris, leaf litter, or detritus.
0.8	Site contains between 26% and 60% relative cover of 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 2005 surveys. Suitable habitat still present on the site.
1.0	One or more sensitive or listed endangered or threatened species observed on the site during the 2005 surveys. Suitable habitat present on the site.
	Terrestrial Wildlife (Vertebrate) Species Richness (RIC)
0.0	Less than 10 species of wildlife detected during the surveys.
0.2	Between 11 and 30 species of wildlife detected during the surveys.
0.5	Between 31 and 50 species of wildlife detected during the surveys.
0.7	Between 51 and 60 species of wildlife detected during the surveys.
1.0	Over 60 species of wildlife detected during the surveys.
	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

Data Collection

Four of the habitat and hydrologic evaluation variables apply to the site as a whole and did not require the collection of additional field data. These criteria are CON, URB, REG, and Characteristics of the Flood-Prone Area (FPA). These criteria were scored based on the overall characteristics of the Big Tujunga Wash site.

The evaluation criteria derived from additional field sampling were STD, EXO, Micro and Macro Topographic Complexity (TOP), COV, Available Organic Carbon (CAR), Rareness (RAR), Terrestrial Wildlife Species Richness (RIC), and Presence of Habitat Specialists (SPE).

STD and EXO were scored primarily from measurements made using the point-centered quarter method (Mueller-Dombois and Ellenberg 1974; Cox 1996). In this method of vegetation sampling, the distance to the mid-point of the nearest tree and the nearest shrub from the sampling point is measured in four directions (one in each of the four quarters established at the sampling point through a cross formed by two perpendicular lines through the point). This method yields quantitative data, including the total number of species, and the density of each species by vegetation layer (shrubs and trees). These data are then used to derive scores for STD and EXO. In addition, at each point a line transect was conducted 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. The transect was either the distance to the furthest tree or shrub measured by the point-centered quarter method or a 10-meter transect through the 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 the features. However, in dense riparian brush, this distance may be very short. In that instance, a separate 10-meter transect to count topographic features was conducted. Finally, at each sampling point a one-square meter 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 (CAR).

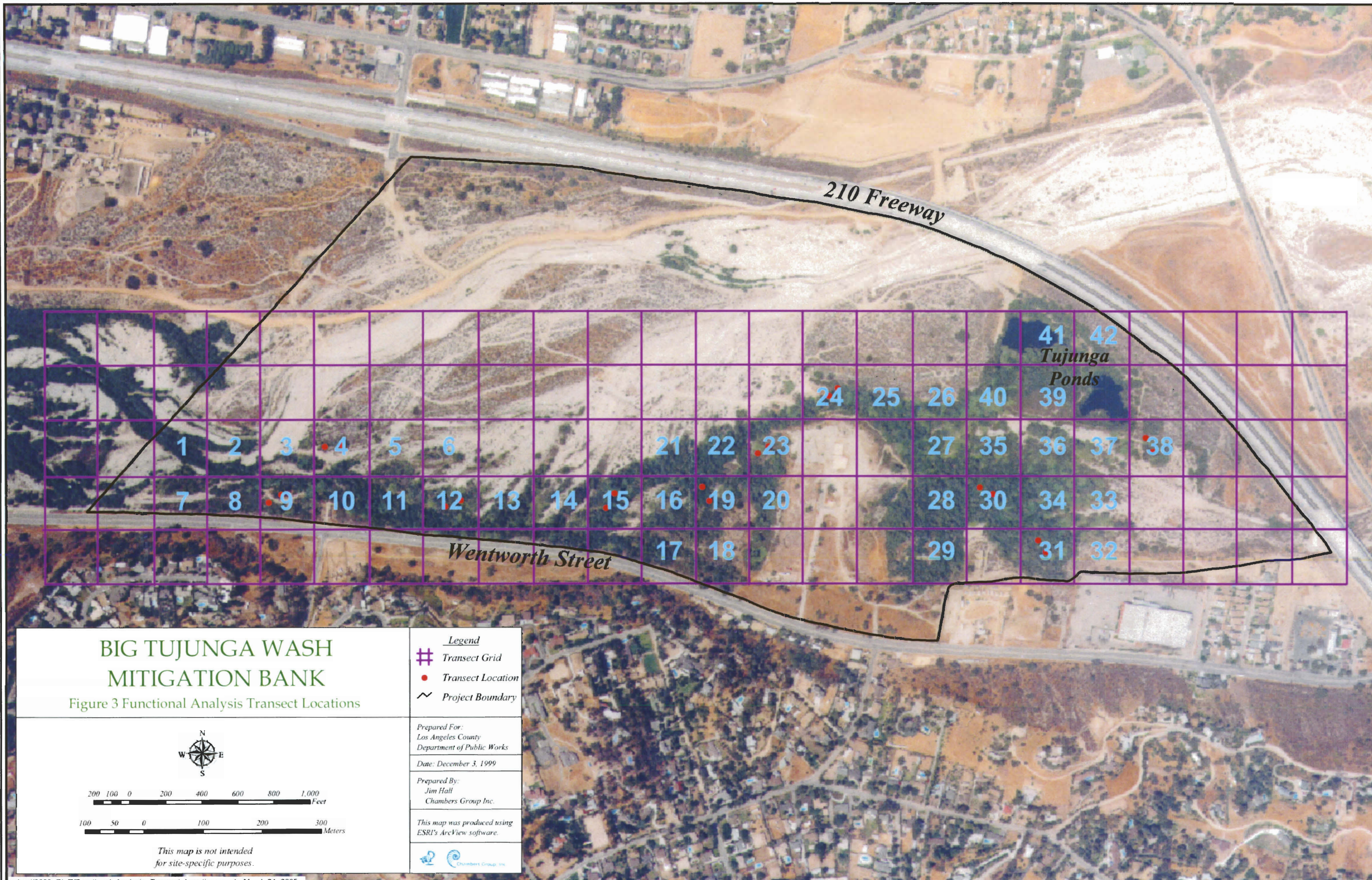
A stratified random sampling scheme was used to avoid biased data collection. The points were selected by dividing the riparian habitat into segments, each 300 feet in length and width. The grid was drawn over a scanned aerial photograph of the site. A stratified random method was used to select 10 grid segments throughout the riparian habitat. Two sampling points were selected within each of the 300-foot grid segments for point-centered quarter samples, quadrats, and transects. The first point was selected by walking into the approximate center of the predetermined square. The second point was determined by randomly selecting a compass direction and a number of paces selected from a random number generator. The surveyors then walked the selected number of paces in the selected compass direction. Each point became the center of the point-centered quarter measurements, the topographic features transect, and the one-meter square quadrat. Using this sampling scheme, 20 square meter quadrats, 20 transects, and 80 trees and 80 shrubs in the riparian areas of the site were conducted or counted.

To adequately compare any changes in functional values, the sampling points that were used during the previous surveys were revisited. Each point was found using a hand-held global positioning system (GPS) unit. The sampling points for the Big Tujunga Wash site are shown in Figure 3.

Two classifications of vegetation (trees and shrubs) were included in the point-centered quadrat measurements in the riparian habitat. The distance to the closest tree, defined as a woody plant of average to tall height (i.e., greater than two meters) originating from a single base, was measured in each quadrat. The distance to the nearest shrub, defined as a plant of small to medium height (i.e., less than two meters) with a woody base, was also measured for each quadrat. Young individuals of the willow 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 two meters. The estimated diameter of the canopy of each tree and shrub included in the distance measurement was also recorded to determine aerial cover. The presence of trees or shrubs within a 20-meter radius of the sampling point was often obscured by dense vegetation; thus, shrubs and/or trees that may have been present were not recorded in these areas. Trees or shrubs outside of the 20-meter radius were not included in the data.

Data Analysis

Functional analysis values for STD, COV, TOP, and CAR were determined by analyzing data collected for the habitat at Big Tujunga Wash Mitigation Bank. Specific information regarding the data analysis is provided below.



BIG TUJUNGA WASH MITIGATION BANK

Figure 3 Functional Analysis Transect Locations

Legend

Transect Grid

Transect Location

Project Boundary

Prepared For: Los Angeles County Department of Public Works

Date: December 3, 1999

Prepared By: Jim Hall Chambers Group Inc.

This map was produced using ESRI's ArcView software.

200 100 0 200 400 600 800 1,000 Feet

100 50 0 100 200 300 Meters

This map is not intended for site-specific purposes.

z:/proj/6629_BigT/Functional_Analysis_Transect_Locations.mxd - March 21, 2005

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). Density per acre was determined by the formula:

$$\text{Absolute (total) density of all species} = \text{Area} / D^2,$$

where area is 4,051.1 m^2 (1 acre) and D is the mean distance. The value for STD was determined using the results for density plus two additional sets of data. First, the relative frequency of shrubs and trees was examined for each habitat, and second, the vertical structure was examined based on the average heights of trees and shrubs encountered in the quadrats.

Frequency

Absolute frequency describes how often shrubs or trees were encountered relative to the number of points samples. Relative frequency describes the ratio of individual species to the sum total of all trees and shrubs. Absolute and relative frequency were determined by the following formulas:

$$\text{Absolute frequency} = \frac{\text{Number of points at which species occurs}}{\text{Total number of points sampled}},$$

$$\text{Relative frequency} = \frac{\text{Absolute frequency value for trees or shrubs} \times 100}{\text{Total of frequency values for all tree and shrub species}}.$$

Using the above formulas, the relative frequency for each type of vegetation can be expressed as a percentage of the total community. For example, a community evenly mixed between trees and shrubs would have relative frequency values totaling approximately 50 percent each for both trees and shrubs, while a community composed entirely of shrubs would have a total relative frequency value of 100 percent for shrubs and 0 percent for trees.

Dominance/Percent Cover

Absolute dominance refers to the area covered by the crown of an individual species or for a group of species per unit area, which is a measure of cover. Relative dominance refers to the percentage of the individual's or group's value with respect to all species. Absolute and relative dominance were calculated by the following formulas:

$$\text{Absolute dominance (trees)} = \text{Density of all trees} \times \text{average dominance value for all trees},$$

$$\text{Absolute dominance (shrubs)} = \text{Density of all shrubs} \times \text{average dominance value for all shrubs},$$

$$\text{Relative Dominance (group of species)} = \frac{\text{Absolute dominance of a group} \times 100}{\text{Total of dominance values for all tree and shrub species}}.$$

Where the average dominance value for a group of species (e.g., trees) is the average area covered by the crowns for those species.

Dominance for an individual species or for a group of species (e.g., native plants) can be expressed as a percent cover by dividing the absolute dominance value for that species or group by the unit area, and multiplying the result by 100:

$$\text{Percent Cover (group of species)} = \frac{\text{Absolute dominance of a group} \times 100}{\text{total area}}.$$

Vertical Structural Diversity

Another component of STD involves the vertical variety of the vegetation. As an aid in estimating vertical diversity, tree and shrub heights were estimated in each quadrat and classified into categories as follows:

Height of Tree or Shrub	Classification
< 2 meters	1
2 – 4 meters	2
> 4 meters	3

Total Available Carbon

The total available carbon was estimated by visually estimating the percentage cover of organic debris and leaf litter within the boundaries of each quadrat. These values were averaged to examine the total potential CAR in the habitat.

Topography

Topographic features were analyzed by scoring the number of rocks, ridges, slopes, or other geographic units measuring one foot or higher about the ground surface along a 10-meter transect line. Possible scores range from a value of 0 for a flat topography with no rocks or boulders to 12 or greater for a line transect with numerous boulders and/or slopes. Scores were averaged to determine a mean value per 100 linear meters.

SECTION 3.0 – RESULTS

3.1 DATA ANALYSIS RESULTS

Approximately 60 trees and 696 shrubs per acre were found in the riparian habitat at Big Tujunga Wash Mitigation Bank. Approximately 59 percent of the shrubs and 97 percent of the trees encountered during the survey were native species. The tree canopy forms a patchy canopy cover throughout the site in most areas (approximately 55 percent cover overall), and shrubs form a sparser understory cover of approximately 13 percent. The relative frequency of trees to shrubs was 50 percent trees to 50 percent shrubs. Performance standards set forth by the MMP require 75 percent shrub cover and 100 percent survival of sycamore and oak trees during the fifth year. The results for overall density, percent cover, and relative frequency for the Big Tujunga Wash riparian habitat are summarized in Table 3-1.

Table 3-1
Density, Dominance, and Relative Frequency

	Density (# plants/acre)	Percent Cover*	Relative Frequency (% of total community)
Native Species			
Trees	58.6	55.1	-
Shrubs	410.7	9.3	-
Non-Native Species			
Trees	0.1	<0.1	-
Shrubs	303.5	4.4	-
Summary All Species			
Trees	60.2	55.7	50.0
Shrubs	696.3	13.2	50.0

***Total cover for native and non-native species (trees or shrubs) is less than the sum of the individual values for native and non-native vegetation cover because of the overlap of native and non-native species in the vegetation layers.**

Overall, organic cover was relatively high at approximately 85 percent, and the presence of annual grasses has decreased from 7.4 to approximately 5.4 percent cover. The average number of topographic features encountered per 100 meters was approximately 2. The average tree height analysis indicated that most trees on the site are greater than 4 meters in height, with most falling into the two- to four-meter height range. The results of percent organic cover, percent annual grass cover, tree height, and average topography score measurements for the riparian habitat at the Big Tujunga Wash study 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 Grasses (%)	Average Tree Height (Category units)	Average Topographic Features (per 100 meters)
84.75	5.4	2.64	2

Copies of the original data sheets and tables of the raw data can be found in Appendix A.

3.2 QUALITATIVE DESCRIPTIONS AND DETERMINATION OF FUNCTIONAL VALUES

Structural Diversity (STD)	
Score	**Criterion**
0.8	0.8 - The patches of riparian vegetation on the site contain riparian trees and saplings, plus a well-developed native shrub understory.

Riparian vegetation on the site is diverse with 22 native species represented in the sampling quadrats and more species observed adjacent to the quadrats. The site contains a well-developed native tree component with trees generally averaging 4 meters or greater in height. The density of shrubs was 696 individuals per acre, and tree density is 60 individuals per acre. The relative frequency of shrubs to trees was equal at 50 trees to 50 shrubs. Overall, shrub cover was at approximately 13 percent and tree cover was approximately 56 percent. Saplings were noted occasionally during the survey. The shrub cover is proportional to tree canopy maturity and density. Shrub cover is greater this year in 2005 than it was in 2004, but the tree cover is lower this year than last year due to flooding. A score of 0.8 was selected to best represent the STD in this habitat.

Riparian Habitat - Cover (COV)	
Score	**Criterion**
0.9	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.

Native tree canopy cover is approximately 55 percent overall. Native shrubs comprise 9 percent cover in the understory. Therefore, a score of 0.9 was assigned to this variable.

Contiguity of Habitat (CON)	
Score	**Criterion**
1.0	1.0 - Habitat is contiguous with similar habitat upstream and downstream of the site.

The riparian willow habitat is contiguous 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	**Criterion**
0.6	0.6 - Habitat has two opposite sides with similar habitat, other remaining sides surrounded by urban development.

Interstate Highway Route 210 forms the boundary of the riparian willow 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 site's northern boundary and a portion of the southern boundary in the eastern portion of the site. Finally, the habitat is contiguous with similar habitat at the site's extreme western end. Although the URB variable 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	**Criterion**
1.0	1.0 - Site is covered by less than 10% exotic invasive vegetation

A variety of non-native species occur within the riparian habitat including eupatory (*Ageratina adenophora*), giant reed (*Arundo donax*), black mustard (*Brassica nigra*), bull thistle (*Cirsium vulgare*), eucalyptus (*Eucalyptus* sp.), fig (*Ficus carica*), castor bean (*Ricinus communis*), and Chinese elm (*Ulmus parvifolia*). The overall cover of exotic invasive species was low at approximately 4 percent. This value is greater than was measured last year; however, exotic cover remains below 10 percent. A score of 1.0 was therefore assigned to this variable.

Hydrologic Regime of Riparian Zone (REG)	
Score	**Criterion**
1.0	1.0 - Site is within or adjacent to a stream, river, or other concentrated flow conduit, which provides the primary source of water to the site. The site contains some evidence of riparian processes such as overbank flow or scour or deposition.

The riparian habitat is adjacent to Haines Canyon Creek, a perennial stream that is the primary source of water to the site. Evidence of deposition was also observed. Consequently, a score of 1.0 was assigned to this variable.

Characteristics of Flood-prone Area (FPA)	
Score	**Criterion**
0.8	0.8 -Site is part of a flood plain which provides an opportunity for overbank flow during moderate flow events (i.e., during a two to 10-year flood event).

The hydrological assessment for the Big Tujunga Wash has not changed since the initial analysis completed in 1987. 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	**Criterion**
0.7	0.6 - Flood-prone area is characterized by micro and macro topographic features such as ponds, hummocks, bars, rills, and large boulders, but is predominantly homogeneous or flat surface. 1.0 - Flood prone area is characterized by micro and macro topographic complexity such as pits, ponds, hummocks, rills, large boulders, etc.

The data analysis determined that approximately 20 topographic features are present per 100 meters. A score of 0.7 assigned to this variable best represents the topographic complexity due to recent scouring throughout the site and the relatively flat surface in the riparian habitat.

Available Organic Carbon (CAR)	
Score	**Criterion**
1.0	1.0 - Site contains over 60% relative cover with debris, leaf litter or detritus.

CAR in the form of leaf litter and organic debris was abundant on the site. Part of this litter is the result of the giant reed eradication activities where chipped material was mulched in place; which were breaking down. Leaf litter from the willow canopy and other types of debris are also abundant. The average litter cover of 84.8 percent was slightly greater than that observed in 2004 (approximately 81.5 percent). Because the average amount of litter for the site is greater than 80 percent, a score of 1.0 was assigned to this variable.

Rareness - Listed and Sensitive Species (RAR)	
Score	**Criteria**
1.0	1.0 - One or more sensitive or listed endangered species and/or sensitive species observed on the site during the 2005 surveys. Suitable habitat present on the site.

A total of 7 sensitive species were observed onsite during 2005. Three sensitive or listed fish species were observed onsite, including the Santa Ana sucker (*Catostomus santaanae*) that is federally-listed as threatened (FT) and considered a California Species of Special Concern (CSC), and arroyo chub (*Gila orcutti*) and Santa Ana speckled dace (*Rhinichthys osculus*), that are both considered to be CSCs. All three fish species were observed in Haines Canyon Creek. In addition to the sensitive fish species, four sensitive bird species, Cooper's hawk (*Accipiter cooperii*) and yellow warbler (*Dendroica petechia brewsteri*) both of which are CSCs and Pacific-slope flycatcher (*Empidonax difficilis*) and Costa's hummingbird (*Calypte costae*), which are both FSOC, were observed onsite during 2005. Due to the observation of these 7 sensitive wildlife species within the riparian habitat associated with Haines Canyon Creek, the rareness was assigned a score of 1.0.

Terrestrial Wildlife (Vertebrate) Species Richness (RIC)	
Score	**Criterion**
1.0	1.0 - Over 60 species of wildlife detected during the surveys.

A total of 94 aquatic and terrestrial wildlife species were detected during the course of the 2005 surveys. One crustacean, ten insect species, three fish species, three amphibian species, five reptile species, 62 bird species, and ten mammal species were detected during 2005. However, only 80 of the 94 species represent terrestrial vertebrate wildlife, and are included in the score for this variable. Therefore, the riparian habitat was assigned a score of 1.0.

Presence of Habitat Specialists (Terrestrial Vertebrate Wildlife) (SPE)	
Score	**Criterion**
1.0	1.0 - Greater than 10 habitat specialists observed on the site.

A total of 13 habitat specialists were observed during the 2005 surveys. These include pied-billed grebe (*Podilymbus podiceps*), great blue heron (*Ardea herodias*), snowy egret (*Egretta thula*), green heron (*Butorides virescens*), common moorhen (*Gallinula chloropus*), belted kingfisher (*Ceryle alcyon*), downy woodpecker (*Picoides pubescens*), hermit thrush (*Catharus guttatus*), yellow warbler (*Dendroica petechia*), Wilson's warbler (*Wilsonia pusilla*), common yellowthroat (*Geothlypis trichas*), red-winged blackbird (*Agelaius phoeniceus*), and song sparrow (*Melospiza melodia*).

The pied-billed grebe is found in areas of open water with emergent vegetation. The green heron is found in streams, ponds, and marshes. Common moorhen are found in freshwater ponds, marshes, and lakes and typically use cattail stems lined with grasses for nesting substrate. Pied-billed grebes, green herons, and common moorhen were observed in and around the Tujunga Ponds.

The belted kingfisher is found near a variety of open water habitats such as rivers, lakes, and coastal areas and eats fish, amphibians, reptiles, and insects. These tunnel excavators were observed near the Tujunga Ponds and along Haines Canyon Creek. The downy woodpecker uses riparian deciduous and mixed habitats and individuals were observed in the willows along Haines Canyon Creek and around the Tujunga Ponds. Hermit thrush are found in moist woods and thickets and were observed ground foraging along Haines Canyon Creek. The yellow warbler is typically found in moist thickets or swampy areas, and was observed in the willows along Haines Canyon Creek. Wilson's warbler nests in dense, moist thickets and streamside vegetation, and was observed in the riparian habitat associated with Haines Canyon Creek. The common yellowthroat is usually found in low, dense vegetation near water and was observed in the cattails around the Tujunga Ponds.

The red-winged blackbird is found near water, usually in emergent vegetation, and was observed around the Tujunga Ponds. The song sparrow breeds in dense riparian thickets and emergent wetlands (CDFG 1988). Song sparrows were observed around the Tujunga Ponds and Haines Canyon Creek. Because these 13 habitat specialists were observed in and around Haines Canyon Creek and Tujunga Ponds, the riparian habitat was assigned a 1.0 for this variable.

3.3 CALCULATION OF FUNCTIONAL UNITS AND FUNCTIONAL UNIT CAPACITY

The algorithm used to obtain a functional unit value for the riparian habitats is:

$$FU = \frac{((STD + COV)EXO + CON + CAR + FPA + TOP)REG + URB + RAR + RIC + SPE}{10}.$$

The calculation for the Functional Unit value for the riparian habitat is therefore:

$$FU = \frac{((0.8 + 0.9)\,1.0 + 1.0 + 1.0 + 0.8 + 0.7)\,1.0 + 0.6 + 1.0 + 1.0 + 1.0}{10}.$$

For the riparian system, the FU is calculated to be 0.88 per acre.

To calculate the total Functional Capacity Units for the riparian habitat at Big Tujunga Wash, the following formula was used:

$$FCU = FU_{willow}\,(\text{acres of willow riparian habitat}).$$

A total of 76 acres of willow habitat, calculated using the GIS system, was delineated at the site during the initial study in 1997. Therefore, the total FCU for riparian habitat at Big Tujunga Wash is:

$$FCU_{Big\ T} = (0.88_{FUwillows})(76\text{ acres of willows}) = 66.88.$$

3.4 DISCUSSION AND COMPARISON OF FUNCTIONAL VALUES

The Functional Unit Capacity value of the riparian habitat at the Big Tujunga Wash Mitigation Bank has increased from 59.74 in 1997 to 63.84 in 2001, 66.88 in 2002, and 68.40 in 2003 and 2004. The FCU has slightly decreased to 66.88 in 2005. This is a decrease of approximately 1.5 percent from 2004 to 2005, but a 7.1 percent increase from 1997 to 2005. The overall functional unit capacity increase is a result of increases in five different variables since 1997. Increases were noted in the variables for Structural Diversity (STD), Percent Exotic Invasive Species/Vegetation (EXO), Topographic Complexity (TOP), Terrestrial Wildlife (Vertebrate) Species Richness (RIC), and Presence of Habitat Specialists (SPE). These increases resulted in greater functional unit capacity values until 2005. When the Topographic Complexity variable decreased from 0.9 to 0.7 between 2004 and 2005, the overall functional unit capacity showed a decline. Table 3-3 presents a comparison of functional capacity values for each variable in 1997, 2001, 2002, 2003, 2004, and 2005.

Table 3-3
Comparison of Functional Capacity Values

Variable	2005	2004	2003	2002	2001	1997
Structural Diversity (STD)	0.8	0.8	0.8	0.7	0.7	0.7
Riparian Habitat Cover (COV)	0.9	0.9	0.9	0.8	0.8	1.0
Percent of Exotic Invasive Species/Vegetation (EXO)	1.0	1.0	1.0	1.0	1.0	0.8
Contiguity of Habitat (CON)	1.0	1.0	1.0	1.0	1.0	1.0
Available Organic Carbon (CAR)	1.0	1.0	1.0	1.0	1.0	1.0
Characteristics of Flood-Prone Area (FPA)	0.8	0.8	0.8	0.8	0.8	0.8
Micro and Macro Topographic Complexity (TOP)	0.7	0.9	0.9	0.9	0.9	0.8
Hydrologic Regime of Riparian Zone (REG)	1.0	1.0	1.0	1.0	1.0	1.0
Urban Encroachment (URB)	0.6	0.6	0.6	0.6	0.6	0.6
Rareness – Listed and Sensitive Species (RAR)	1.0	1.0	1.0	1.0	1.0	1.0
Terrestrial Wildlife (Vertebrate) Species Richness (RIC)	1.0	1.0	1.0	1.0	1.0	0.7
Presence of Habitat Specialists (Terrestrial Vertebrate Wildlife (SPE)	1.0	1.0	1.0	1.0	0.6	0.6
FU	**0.88**	**0.90**	**0.90**	**0.88**	**0.84**	**0.79**
Acres	**76.0**	**76.0**	**76.0**	**76.0**	**76.0**	**76.0**
FCU	**66.88**	**68.40**	**68.40**	**66.88**	**63.84**	**59.74**

Although the score for the rareness variable has not changed since 1997, the number of sensitive wildlife species has increased, until this year where there was a decrease between 2004 and 2005. A total of seven sensitive wildlife species were observed in 2005. In comparison, a total of, five and seven listed and sensitive species were observed onsite during 2001, 2002, respectively, and 10 listed and sensitive species were observed onsite during 2003 and 2004.

The score for species richness during 2005 has remained the same since 2001, but increased between 1997 and 2001. The score for species richness did not change from 2003, 2002 or 2001, and then increased during 2004; however, the actual numbers of species decreased during 2005. A total of 80 wildlife species were observed in the riparian habitat during 2005. In comparison, in 2004, 2003, 2002, 2001, and 1997, a total of 92, 79, 77, 76, and 51 different wildlife species were observed in the riparian habitat, respectively. It is important to mention that the increase in the number of species observed in 2005 versus 1997, may be a result of the increased survey efforts over the years. Whereas a single reconnaissance-level survey and two 24-hour surveys were conducted in late spring 1997, data on wildlife species during 2005 were obtained from focused surveys for least Bell's vireo, southwestern willow flycatcher (*Empidonax traillii extimus*), and arroyo toad (*Bufo californicus*), the brown-headed cowbird (*Molothrus ater*) trapping and removal program, and the exotic aquatic wildlife removal program. The increase in species richness from 1997 to 2001 may have been due to the increased observation opportunities rather than an improvement in the habitat that attracted a wider variety of species; the increase in the wildlife scores from 2001 to 2004 can be attributed to an increase in habitat value because a similar survey effort was conducted during this timeframe. The decrease in the number of species detected in 2005 is likely the result of limited access to some of the riparian areas due to high water levels following the winter storms. Some common species normally detected within these areas were seen onsite during 2005 but not during focused surveys and therefore were not recorded for the year.

Similar to the 2004 results, the largest single variable gain from 1997 was noted in the score for the presence of habitat specialists. The overall score for habitat specialists has not changed since 2002. The number of habitat specialists observed onsite has increased each year until this year, when the number decreased. A total of 13 habitat specialists were observed in 2005. In comparison, a total of 15, 14, 11, 10, and 9 habitat specialists were observed in 2004, 2003, 2002, 2001, and 1997, respectively. Although the overall scores for the three wildlife values have not changed since 2002, the number of species observed within each category has decreased, indicating an overall decrease in the functional value of the site for wildlife species.

A slight change in the riparian habitat cover (natives and exotics) was noted in the analysis; the functional value score was 0.88, which was 0.02 units lower than the score determined in 2004. Black mustard was the most common non-native species identified in the shrub layer overall with 11 hits out of 80 points sampled. Eupatory and castor bean (were the next most common non-native species identified in the shrub layer with 8 hits each. Giant reed was also common in the shrub layer with 5 hits total. Black mustard, giant reed, and castor bean have increased in frequency of observance within the year, but eupatory appears to be less common in 2005 than in 2004. Eupatory eradication has not yet been implemented onsite and the apparent decrease may simply be a result of the substantial increase in black mustard seedlings germinating in the riparian area. The most common exotic tree species was eucalyptus with 4 hits out of 80 points sampled. Fig and Chinese elm were also present in the tree layer with 1 hit each.

The average percent cover of exotic vegetation decreased in 2004 to 0.8 percent from 5.5 percent the previous year in 2003, yet has since returned to 4 percent in 2005. The removal of 20 acres of giant reed prior to the 2001 study increased the functional capacity unit value of the criteria for Percent of Exotic Species/Vegetation from 0.8 (10 to 25 percent exotic invasive vegetation) in 1997 to 1.0 in 2001 (less than 10 percent exotic invasive vegetation), where it has remained stable. A variety of exotic species remains in the habitat including giant reed, eucalyptus, fig, eupatory, Chinese elm, and castor bean. These species will continue to spread and lower the functional capacity of the habitat if weed control efforts are not maintained.

Native tree density decreased from 70 to 59 plants per acre while shrub density increased from 135 to 411 plants per acre between 2004 and 2005. Exotic tree density has decreased from 9 plants per acre in 2002 and in 2003, and remained the same since 2004 with less than 1 plant per acre in 2005. Exotic shrubs increased from 195 plants per acre in 2003 and 50 plants per acre in 2004, to 303 plants per acre in 2005. Total tree density (native and non-native species) decreased from 74 to 60 plants per acre in between 2004 and 2005. Total shrub density increased sharply from 185 plants per acre in 2004, to 696 plants per acre in 2005. Average tree height, a component of STD, remained consistent from 2.60 in 2004 to 2.64 in 2005. Twenty-two native species were observed in the riparian area in 2004 and 2005. The value for STD has therefore remained the same at 0.8 since 2004.

The micro and macro topographic complexity (TOP) variable was approximately 20 average topography features per 100 meters, which was a decrease from 44 in 2004. The score for available organic carbon (CAR) has remained at 1.0 since 2001.

The FCU was 66.40 in 2003 and 2004, but dropped to 66.88 in 2005. This decrease is attributed to a drop in the TOP score from 0.9 to 0.7. From 1997 to 2005, an overall FCU gain of 7.14 units was calculated for this riparian system.

Native cover and native species density increased between 2002 and 2003, and the number of different native species decreased from 24 in 2003 to 22 in 2004 and 2005, but more species were observed outside the sampling quadrats. The functional capacity of the site may continue to improve, but it is more likely that it will remain stable at the current capacity. The current program of riparian enhancement planting will improve the STD of the habitat by developing a more diverse native shrub understory. Although some loss of planted materials is expected, the remaining plantings appeared to be doing well at the time of this study. Overall, cover on the site is also expected to increase as the new plantings continue to mature. The number of habitat specialists will also likely continue to increase with improved habitat on the site.

SECTION 4.0 – REFERENCES

Brinson, Mark
1995 *The HGM Approach Explained.* National Wetlands Newsletter.

California Department of Fish and Game
1988 *Volume II – Birds. California Statewide Wildlife Habitats and Relationships System.* State of California Resources Agency. Sacramento, CA.

California Department of Fish and Game
1997 *Endangered and Threatened and Rare Plants of California.* State of California Resources Agency. Sacramento, CA.

1997 *Endangered and Threatened Animals of California.* State of California Resources Agency. Sacramento, CA.

2004 Special Animals. Wildlife and Habitat Data Analysis Branch. California Natural Diversity Database.

Chambers Group
1998 Draft Biological Resources Assessment and Functional Analysis of a Site in Big Tujunga Wash, Los Angeles, California. Unpublished Report prepared for County of Los Angeles, Department of Public Works.

Cox, George W.
1996 Laboratory Manual of General Ecology, Seventh Edition. Wm. C. Brown Publishers, Dubuque, IA.

Ehrich, P., D. Dobkin, and D. Wheye
1988 *The Birder's Handbook: A Field Guide to the Natural History of North American Birds.* Simon & Schuster Inc., New York.

Garrett, K. and J. Dunn
1982 Birds of Southern California Status and Distribution. Los Angeles Audubon Society Publication.

Hickman, James C., Ed.
1993 *The Jepson Manual: Higher Plants of California.* University of California Press, Ltd. Berkeley, CA.

Holland, D.C, and C.C. Swift
2004 Big Tujunga Mitigation Project – Exotic Aquatic Species Control Draft Reports – 3rd and 4th Quarters, 2004.

National Geographic
2002 *Field Guide to the Birds of North America*, Fourth edition.

Mueller-Dombois, Dieter and Heinz Ellenberg
1974 *Aims and Methods of Vegetation Ecology.* John Wiley & Sons, New York.

Sibley, D.A.
2000 National Audubon Society, Sibley Guide to Birds. Chanticleer Press, Inc., New York.

Stebbins, R.C.
2003 *A Field Guide to Western Reptiles and Amphibians, Third Edition.* Houghton Mifflin Company, Boston, Massachusetts.

Stein, Eric D.
1997 *Crediting and Debiting Mechanism for the Barry Jones Wetland Mitigation Bank (formerly Proposed as the Skunk Hollow Mitigation Bank).* Prepared for the U. S. Army Corps of Engineers, Los Angeles District, Regulatory Branch.

Stokes, D.W. and L.Q. Stokes
1996 *Stokes Field Guide to Birds – Western Region*, First edition. Little, Brown & Company Limited, Boston, Massachusetts.

APPENDIX A

DATA SHEETS

BIG TUJUNGA WASH

Date: 28 Nov 2005 Field Crew: H. Clayton, J. McGee

Sample Plot No: 4A Location: Wash

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	SALAS	2	4.3	6.6 / 5.6	COCA	1m	2.5 / 0.4
2	SALAV	3	11.3	7.1 / 5.8	LOSC	0.8	0.45 / 0.4
3	SALAS	3	21.1	8.8 / 10.5	BASA	4.35	.27 / .2
4	SALAS	3	20.4	6.5 / 5.3	BRNI	8.7	.8 / 0.8

[1]Height Categories: 1 = <2m; 2 = 2-4m; 3 = >4m
[2]Diameter

SaLas - Salix Lasiolepis
CoCa - Conyza Canadensis
LoSc - Lotus Scoparius
SALAV - Salix Laevigata
BASA - Baccharis Salicifolia
BRNI - Brassica Nigra

Square- Meter Quadrat Data:

% Cover debris / leaf litter, etc: 40 % Cover annual grasses: 20

No. of seedlings/saplings: 0 Non-native Cover: 30

GPS Coordinates: S11 ______ UTM ______

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 10 (m)

Comments:

Other species observed:
Mentzelia albicaulis
Lepidospartum squamatum
Lessingia filaginifolia
Gnaphalium canescence
Ambrosia achianthocarpa
Marah macrocarpus
Bromus sp.
Nicotiana glauca

* Resprouting Arundo in several spots, incl. Mulch pile

BIG TUJUNGA WASH

Date: 11-28-05 Field Crew: J. McGee, H. Clayton

Sample Plot No: 4B Location: Wash

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	SALAU	3	7.4	7.1 / 3.5	BFNI	2.3	0.5 / 0.4
2	SALAS	3	4.3	5.4 / 6.1	BASA	2.5	2.9 / 3.3
3	SALAS	3	28.9	3.9 / 2.8	lesa	5.0	1.0 / 1.2
4	SALAS	3	23.4	6.5 / 5.3	ARDON	12.9	0.6 / 0.7

[1]Height Categories: 1 = <2m; 2 = 2-4m; 3 = >4m
[2]Diameter

ARDON - Arundo Donax

Square- Meter Quadrat Data:

% Cover debris / leaf litter, etc: 70 % Cover annual grasses: 10

No. of seedlings/saplings: 0 Non-native Cover: 50

GPS Coordinates: S11 ______ UTM ______

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 1 Transect Length: 10 (m)

Comments:

Arundo Resprouts in this Area
Mustard Resprouts " "
Conyza canadensis
Mentzelia albicaulis
Ambrosia acanthicarpa

BIG TUJUNGA WASH

Date: 11/28/05 Field Crew: J. McGee H. Clayton

Sample Plot No: 9A Location: Wash

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	SALAS	3	6.0	6.3 / 7.1	ARDO	5.8	2.0 / 1.0
2	SALAS	3	3.9	8.9 / 4.2	OPLI	2.8	.3 / .2
3	SALAV	1	5.4	.3 / .4	BASA	1.5	.2 / .2
4	SALAS	1	4.4	.1 / .3	BASA	0.9	.1 / .1

[1]Height Categories: 1 = <2m; 2 = 2-4m; 3 = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris / leaf litter, etc: 10 % Cover annual grasses: 1

No. of seedlings/saplings: 3 indiv Non-native Cover: 0

GPS Coordinates: S11 ______ UTM ______

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 0 Transect Length: 10 (m)

Comments:

Other sp. present
Salix Goodingii
Ambrosia acanthicarpa
Datura Wrightii
Lepidosporum Squamatum
Brassica Nigra
Eriogonum fasciculatum
Erodium cicutarium

Arundo Resprouts in this area

BIG TUJUNGA WASH

Date: 11/28 Field Crew: H. Clayton, J. McGee

Sample Plot No: 9B Location: Wash

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	SAGO	3	5	8.7 / 7.8	BASA	1	1.5 / 4.0
2	SALAV	2	13.7	6.8 / 6.8	BASA	4.3	1.0 / 1.4
3	SAGO	2	2	2.5 / 1.4	BASA	1.8	.3 / .1
4	SALAS	3	12.9	4.8 / 6.3	BASA	.3	.2 / .2

[1]Height Categories: 1 = <2m; 2 = 2-4m; 3 = >4m
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris / leaf litter, etc: 25 % Cover annual grasses: 0

No. of seedlings/saplings: 1 Non-native Cover: 0

GPS Coordinates: S11 ________ UTM ________

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 3 Transect Length: 10 (m)

Comments:

Arundo Resprouts 13 m. near SALAS

Amb. Acanthicarpa
Populus fremontii

BIG TUJUNGA WASH

Date: 11/28/05 Field Crew: J McGee, H. Clayton

Sample Plot No: 12A Location: Riparian 10' from Trail

Point-Quarter Data:

(planting)

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	POER	3	1.	4.3 / 4.5	BRMI	1.8	.3 / .3
2	SALAS	2	4.5	5 / 4	TODI	.2	3.1 / 21
3	SALAS	3	5	5 / 6	TODI	1.6	.4 / .3
4	SALAS	2	3.5	1.4 / .5	ROCA	.5	1.5 / .4

[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: (38) stelaria media (1) Rosa Ca. Non-native Cover: 0

GPS Coordinates: S11 ________ UTM ________

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 10 (m)

Comments:

10' from trail

Coniza Ca.

Qu Ag

RiAu

Fraxinus Veletina

BIG TUJUNGA WASH

Date: 11/24/05 Field Crew: H. Clayton, J. McGee

Sample Plot No: 12B Location: Riparian (off trail 20')

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	SAGO	3	1.5	5 / 6	AGAD	0.2	1 / .5
2	QUAG	3	4	8 / 9	TODI	2.5	1 / 1.5
3	SAGO	2	1	5 / 4	AGAD	1.5	.5 / .5
4	QUAG	3	5.5	7 / 6.5	COCA	2.5	1.0 / .5

[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: 20 Eupatory Poison Oak Non-native Cover: 75%

GPS Coordinates: S11 ______ UTM ______

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 10 (m)

Comments:

Doing Well ← Rosa californica
Ribes aureum
B. nigra
S. lasiolepis
M. Laurina

Ricinis communis
P. freemontii
(near planting area & Lots of Poison oak - inaccesible)

BIG TUJUNGA WASH

Date: 7 Dec 2005 Field Crew: H. Clayton, J. McGee

Sample Plot No: 15 Location: A (5 m from Last Years plot)

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	ALRH	3	8.7	6.9/11.0	ARDO	1.9	.1/.1
2	SALAS	3	1.8	5.8/5	ARDO	0.7	.2/.2
3	SALAS	3	3.4	6.2/5.6	ARDO	1.8	.3/.4
4	SALAS	3	3.1	7.9/9.1	AGAD	3.4	1.7/1.1

[1]Height Categories: 1 = <2m; 2 = 2-4m; 3 = >4m
[2]Diameter

AlRH – Alnus rhombifolia
ARDO – Arundo Donax
AGAD – Ageratina Adenophora

Square- Meter Quadrat Data:

% Cover debris / leaf litter, etc: 100 % Cover annual grasses: 3

No. of seedlings/saplings: 0 Non-native Cover: 0

GPS Coordinates: S11 ______ UTM ______

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 10 (m)

Comments:

Most Arundo is small Resprouts

Other sp.

Baccharis salicifolia
Shinus molle
Euc. sp.
Alnus
Platanus Racemosa
Ficus carica
Salix gooddingii
~~Washintonia robusta~~
Fraxinus velutina
Opuntia litoralis
Liquidambar styraciflua

BIG TUJUNGA WASH

Date: 12-7-05 Field Crew: H. Clayton, J. McGee

Sample Plot No: 15 Location: B

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	SALAS	3	3.6	6.2/5.6	RICO	0.55	.2/.2
2	ALRH	3	4.1	12.4/10.3	RICO	0.6	.2/.2
3	Euc. sp	3	5.8	5.8/7.9	ARDOU	2.9	1.8/1.5
4	SALAS	3	5.3	7.9/8.1	AGAD	4.0	4.0/2.5

[1]Height Categories: 1 = <2m; 2 = 2-4m; 3 = >4m
[2]Diameter

Rico - Ricinis communis
ArDOU - Artemesia douglasiana

Square- Meter Quadrat Data:

% Cover debris / leaf litter, etc: 100 % Cover annual grasses: 2

No. of seedlings/saplings: 1-RICO Non-native Cover: 5%

GPS Coordinates: S11 ______ UTM ______

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 1 Transect Length: 10 (m)

Comments: Other Sp. Present:
Solanum douglasii
Fraxinus velutini
Ficus carica
Platanus Racemosa
Shinus molle
Opuntia litoralis

BIG TUJUNGA WASH

Date: 12-7-05 Field Crew: H. Clayton, J. McGee

Sample Plot No: ~~16~~ 19 Location: A

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	SALAV	2	5.4	5.7/5.7	COCA	2.9	1.5/0.3
2	SALAV	2	1.8	4.6/3.9	ARDO	6.5	1.1/1.6
3	SALAS	3	12.2	15/8	BRNI	1.9	0.3/.2
4	SALAS	2	10.3	9.1/6.0	BRNI	1.5	.3/.3

[1]Height Categories: 1 = <2m; 2 = 2-4m; 3 = >4m COCA – Coniza Canadensis
[2]Diameter

Square- Meter Quadrat Data:

% Cover debris / leaf litter, etc: 100 % Cover annual grasses: 0

No. of seedlings/saplings: 75-BRNI Non-native Cover: 45

GPS Coordinates: S11 ______ UTM ______

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 10 (m)

Comments:

other sp Present:

Quercus agrifolia
AGAD
Mara Macrocarpa
Ribes aureum
Ficus Carica
Lobularia maritima

BIG TUJUNGA WASH

Date: 12/7/05 Field Crew: H. Clayton, J. McGee

Sample Plot No: 19 Location: B

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	SALAS	2	3.8	4.9 / 4.3	COCA	0.6	1.3 / 0.2
2	SALAS	2	4.3	7.6 / 8.25	COCA	1.0	.1 / .1
3	SALAS	3	16.1	11.1 / 8.7	RIAU	1.1	.2 / .3
4	SALAS	3	15.9	13.6 / 5.3	COCA	3.0	1.0 / .5

[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: 2 - loma, 2 - COCA, ~500 BRNI Non-native Cover: 85

GPS Coordinates: S11 UTM

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 4 Transect Length: 10 (m)

Comments: 2 Resprouting Arundo Nearby

Other SP

Baccharis salicifolia
Artemesia douglasiana
Cyperus involucratus
Lobularia maritima
Ageratina adenophora
Sonchus asper

BIG TUJUNGA WASH

Date: 12/7/05 Field Crew: H Clayton, J. McBride

Sample Plot No: 23 Location: A

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	SAGO	3	21.7	6.2/8.0	RIAU	1.6	.3/.2
2	SALAS	3	19.0	11.4/9.6	COCA	1.5	.6/.2
3	SALAS	3	25.1	10.1/12	RICO	4.0	.3/.4
4	POFR	3	12.9	17.2/12.2	RIAU	1.8	1/1.3

[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 ______ UTM ______

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 1 Transect Length: 10 (m)

Comments:

other sp.
Baccharis Salicifolia
Marah Macrocarpa
BRNI
Populus fremontii
Lobelia
Phacelia sicutaria

BIG TUJUNGA WASH

Date: 12/9/05 Field Crew: H. Clayton, J. McGee

Sample Plot No: 23 Location: B

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	SAGO	3	16.5	6.2/8.0	COCA	0.8	1.6/0.8
2	SALAS	3	14.3	9.0/7.6	COCA	0.9	1.7/1.2
3	SALAS	3	15.1	11.4/9.6	COCA	1.2	2.3/0.8
4	POFR	3	14.7	17.2/12.2	BRNI	0.8	0.4/0.5

[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: 25

No. of seedlings/saplings: 0 Non-native Cover: 0

GPS Coordinates: S11 ______ UTM ______

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 2 Transect Length: 10 (m)

Comments: Lots of Mustard in this AREA; Big Arundo Palm 3 Debris Pile nearby & 1 Resprout

Other Sp. Present

Ribes aureum
lobelia maritima
Baccharis salicifolia
Heterotheca grandiflora

BIG TUJUNGA WASH

Date: 12/7/05 Field Crew: H. Clayton, J. McGee

Sample Plot No: 24 Location: A

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	POFR	3	6.6	22.6 / 15	RIAU	1.4	0.6 / .9
2	SALAS	2	9.7	8.1 / 6.0	MAMA	2.7	2.7 / .3
3	SALAS	3	7.8	3.7 / 8.0	BASA	5.6	4.1 / 3.4
4	SAGO	3	22.5	19.5 / 18.2	BRNI	2.7	.3 / .3

[1]Height Categories: 1 = <2m; 2 = 2-4m; 3 = >4m
[2]Diameter

MaMa - Mara Macrocarpus

Square- Meter Quadrat Data:

% Cover debris / leaf litter, etc: 95 % Cover annual grasses: 90

No. of seedlings/saplings: 2-BRNI 2 LOMA Non-native Cover: 25

GPS Coordinates: S11 ______ UTM ______

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 3 Transect Length: 10 (m)

Comments:

Bromus Madretensis
Urtica urins
Lobularia maritima
Artemesia douglasiana
Yucca whipplei
Eriogonum fasiculatum
Artemesia ca.

Heterotheca grandiflora
*Centaurea melitensis
Ageratina adenophora
Ambrosia psilostachya
Fraxinus Velutina
Washingtonian Robustra

BIG TUJUNGA WASH

Date: 12/7/05 Field Crew: J. McGee H. Clayton

Sample Plot No: 24 Location: B

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	SAGO	3	4.1	9.9 / 10.4	AGAD	0.4	2.9 / 1.9
2	SAGO	3	3.6	7.8 / 6.1	BRNI	0.7	.2 / .3
3	SAGO	2	3.8	4.6 / 3.6	AGAD	1.8	.4 / .2
4	SAGO	3	9.4	6.1 / 8.8	AGAD	2.0	2.9 / 3.4

[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: 2% (NON NATIVE)

No. of seedlings/saplings: 7-LOMA 50- stelaria Media Non-native Cover: 60

GPS Coordinates: S11 ______ UTM ______

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 1 Transect Length: 10 (m)

Comments:

other sp.
Baccharis Salicifolia
Cyperus involucratus
Lobularia maritima
Ribes aureum
Melilotus alba
Ricinus communis
Salix Lasiolepis
Populus fremontii
Urtica dioica

BIG TUJUNGA WASH

Date: 11/29/05 Field Crew: H. Clayton, J. McGee

Sample Plot No: 30 Location: A

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	ACNE	3	7	5.7/7.2	VICA *	.8	.3/.3
2	SALAS	3	4	6.3/9.5	CIVU	.8	2.5/.4
3	FICA	1	1.4	.7/.7	RICO	4.1	2.9/4.1
4	ULPA	1	9.5	1.6/2.0	VICA	3.8	.4/.3

* Not yet vine

[1]Height Categories: 1 = <2m; 2 = 2-4m; 3 = >4m
[2]Diameter

VICA - Vitis californica
ACNE - Acer negundo
CIVU - Cirsium vulgare
ULPA - Ulmus parvifolia

Square-Meter Quadrat Data:

% Cover debris / leaf litter, etc: 100 % Cover annual grasses: 0

No. of seedlings/saplings: 25 { 20-Stellaria, 2-cyperus, 2-[illegible], 1-FICA } Non-native Cover: 20

GPS Coordinates: S11 ______ UTM ______

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 1 Transect Length: 10 (m)

Comments:

other sp.

Quercus agrifolia

Ageratina adenophora

BIG TUJUNGA WASH

Date: 11/29/05 Field Crew: J. McGee, H. Clayton

Sample Plot No: 30 Location: B

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	SALAS	3	3.9	6.0/3.0	RICO	2.1	0.4/0.7
2	SALAS	3	15.6	9.0/10	RICO	1.7	0.6/0.8
3	SALAS	3	1.4	5.5/7.3	DAWR	.8	.1/.2
4	PSFR	1	1.1	.1/.1	BASA	1.25	.1/.1

[1]Height Categories: 1 = <2m; 2 = 2-4m; 3 = >4m
[2]Diameter

DAWR - Datura wrightii

Square- Meter Quadrat Data:

% Cover debris / leaf litter, etc: 85 % Cover annual grasses: 0

No. of seedlings/saplings: 10-Lobularia, 1-FRVE, 10-BRNI } 31 Non-native Cover: 10

GPS Coordinates: S11 ______ UTM ______

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 3 Transect Length: 10 (m)

Comments:

other
Cyperus involueratus
Artemesia Californica
Yucca sp.
Cryanthemum sp.

Silibum marianum -
Lobularia maritima
Brassica Negra

RICO - Throughout Area

BIG TUJUNGA WASH

Date: 11-29-05 Field Crew: H. Clayton, J. McGee

Sample Plot No: 31A Location:

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	SALAS	3	8.0	6.0 / 5.3	BASA	1.5	3.2 / 3.9
2	SALAS	3	3.9	5.9 / 7.0	BASA	1.0	.2 / .2
3	SALAS	3	6.2	6.6 / 11.7	AGAD	1.9	1.2 / 0.6
4	POFR	1	2.3	.35 / .2	BASA	1.2	.2 / .1

[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: ~~10~~ 5

No. of seedlings/saplings: 1-Palm tree Non-native Cover: 5

GPS Coordinates: S11 ________ UTM ________

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 1 Transect Length: 10 (m)

Comments: Other sp Present

Ricinis Communus - throughout

Laloularia maritima

Populus fremontii

Roripa nasturshum-aquatica

Cypress involucratus

Phacelia fasciculata

Oxalus pes-capre

Ailianthus Altissima

Rubus ursinus

Chrysanthemum sp, sm wh Flwrs

BIG TUJUNGA WASH

Date: 11/29/05 Field Crew: J. McGee H. Clayton

Sample Plot No: 3B Location: B

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	SALAS	1	2.2	.2/.2	SODO	1.9	1.1/1.9
2	SALAS	3	5	5/4	RICO	.8	.2/.9
3	SALAS	3	13	9.1/9.0	BASA	2.9	.3/.5
4	SALAS	3	5.6	4.1/4.9	RICO	.45	1.1/1.2

[1]Height Categories: 1 = <2m; 2 = 2-4m; 3 = >4m
[2]Diameter

RICO - Ricinus communis
SODO - Solanum douglasii

Square- Meter Quadrat Data:

% Cover debris / leaf litter, etc: 100 % Cover annual grasses: 0

No. of seedlings/saplings: 1 - Epilobium ciliatum Non-native Cover: 85

GPS Coordinates: S11 ______ UTM ______

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 3 Transect Length: 10 (m)

Comments:

* Ricinis communis & Adenophora ageratina throughout

Other sp.

Epilobium ciliatum
Cyperus involucratus
Polygonum hydropepperoides
Urtica dioica
Po
Helianthus

Lobelia maritima
Sonchus sp.
Populus fremontii
Ribes aureum
Crysanthemum sp.

BIG TUJUNGA WASH

Date: 11-29-05 Field Crew: H. Clayton, J. McGee

Sample Plot No: 38A Location: WASH

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	SALAV	1	2.5	3.9/2.4	BRNI	1.5	.1/.1
2	EU SP.	3	9.3	14/9.9	BRNI	1.9	.2/.2
3	SALAV	3	12	8.5/15.4	BRNI	.75	.2/.2
4	EU SP.	3	4.3	~~7.8~~/11.2	BASA	9.0	7.6/6.4

[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: 40

No. of seedlings/saplings: ~50- B. Nigra 20-erodium Non-native Cover: 50 (All veg)

GPS Coordinates: S11 ______ UTM ______

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 6 Transect Length: 10 (m)

Comments:

Lots of weedy sp. here
Centaurea melitensis
B. Nigra sprouting
1 sm. Tree of Heaven
Ricinus communis

other sp
Datura Wrightii
Helianthus annuus
Salix goodingii
Ribes aureum
Eriogonum fasciculatum
Cuscuta californica
Pennisetum setaceum

BIG TUJUNGA WASH

Date: 11-29-05 ~~[illegible]~~

Field Crew: J McGee H. Clayton

Sample Plot No: 38B

Location: in Eu. Above Wash

Point-Quarter Data:

¼	Tree Species	Ht. Cat.[1]	Distance (m)	Cover[2] (m)	Shrub Species	Distance (m)	Cover[2] (m)
1	SALAV	3	3.9	9.7/10.7	RIAU	.15	.2/.2
2	EUSP.	3	5.5	14/9.9	RIAU	.2	.2/.2
3	SALAV	3	3.9	4.5/4.3	RIAU	1.2	.6/.5
4	SARA	2	7.0	4.5/7.0	PHCI	16	.6/1.0

[1]Height Categories: 1 = <2m; 2 = 2-4m; 3 = >4m
[2]Diameter

PHCI - phacelia cicutaria
RIAU - Ribes aureum
SARA - Sambucus Racemosa

Square- Meter Quadrat Data:

% Cover debris / leaf litter, etc: 100 % Cover annual grasses: 0

No. of seedlings/saplings: 2-RIAU Non-native Cover: 0

GPS Coordinates: S11 ______ UTM ______

Topographic Complexity Transect Data:

No. of topographic features > 1 foot tall: 0 Transect Length: 10 (m)

Comments:

Other sp. present
Mara Macrophyllum
Solanum douglasii

Sprouting Arundo

APPENDIX B

WILDLIFE OBSERVED AT THE BIG TUJUNGA WASH MITIGATION BANK

Appendix B
Wildlife Observed at the Big Tujunga Wash Mitigation Bank

Scientific Name	Common Name	Sign*
CLASS MALACOSTRACA	**CRUSTACEAN**	
CAMBARIDAE	**CRAYFISH**	
Procambarus sp.	Crayfish	O
CLASS INSECTA	**INSECTS**	
PAPILIONIDAE	**PARNASSIANS, SWALLOWTAILS**	
Papilio eurymedon	Pale swallowtail	O
Paplio rutulus	western tiger swallowtail	O
PIERIDAE	**WHITES & SULPHURS**	
Artogeia rapae	cabbage white	O
Pontia protodice	common white	O
NYMPHALIDAE	**BRUSH-FOOTED BUTTERFLIES**	
Vanessa cardui	Painted lady	O
Vanessa annabella	West coast lady	O
Vanessa atalanta	red admiral	O
Basilarchia lorquini	Lorquin's admiral	O
Nymphalis antiopa	mourning cloak	O
LYCAENIDAE	**GOSSAMER WINGS**	
Icaricia acmon	Acmon blue	O
CLASS OSTEICTHYES	**BONY FISH**	
CYPRINIDAE	**CARPS AND MINNOWS**	
Carassius auratus	domestic goldfish	O
Gila orcutti	Arroyo chub	O
Rhinichthys osculus ssp. 3	Santa Ana speckled dace	O
CATOSTOMIDAE	**SUCKERS**	
Catostomus santaanae	Santa Ana Sucker	O
CENTRARCHIDAE	**SUNFISHES**	
Lepomis cyanellus	green sunfish	O
Micropterus salmoides	largemouth bass	O
CLASS AMPHIBIA	**AMPHIBIANS**	
BUFONIDAE	**TRUE TOADS**	
Bufo boreas	Western toad	O
HYLIDAE	**TREEFROGS**	
Pseudacris regilla	Pacific chorus frog	O
RANIDAE	**TRUE FROGS**	
Rana catesbeiana	Bullfrog	O
CLASS REPTILIA	**REPTILES**	
EMYDIDAE	**BOX AND WATER TURTLES**	
Pseudemys scripta elegans	red-eared slider	O
PHRYNOSOMATIDAE	**ZEBRA-TAILED, EARLESS, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, AND HORNY LIZARDS**	
Sceloporus occidentalis	western fence lizard	O
Uta stansburiana	common side-blotched lizard	O
TEIIDAE	**WHIPTAIL LIZARDS**	
Cnemidophorus tigris stejnegeri	coastal western whiptail	O

Appendix B (continued)
Wildlife Observed at the Big Tujunga Wash Mitigation Bank

Scientific Name	Common Name	Sign*
COLUBRIDAE	**COLUBRID SNAKES**	
Lampropeltis getula californiae	California common kingsnake	O
CLASS AVES	**BIRDS**	
PODICIPEDIDAE	**GREBES**	
Podilymbus podiceps	pied-billed grebe	O, V
ARDEIDAE	**HERONS, BITTERNS**	
Ardea herodias	great blue heron	O
Butorides virescens	Green heron	O, V
Egretta thula	snowy egret	O
Nycticorax nycticorax	black-crowned night heron	O
ANATIDAE	**DUCKS, GEESE, SWANS**	
Anas platyrhynchos	Mallard	O, V
Oxyura jamaicensis	Ruddy duck	O
CATHARTIDAE	**NEW WORLD VULTURES**	
Cathartes aura	Turkey vulture	O
ACCIPITRIDAE	**HAWKS, KITES, EAGLES**	
Accipiter cooperii	Cooper's hawk	O, V, N
Buteo jamaicensis	red-tailed hawk	O, V
Buteo lineatus	red-shouldered hawk	O, V
FALCONIDAE	**FALCONS**	
Falco sparverius	American kestrel	O
ODONTOPHORIDAE	**NEW WORLD QUAIL**	
Callipepla californica	California quail	O, V
RALLIDAE	**RAILS, GALLINULES, COOTS**	
Fulica americana	American coot	O, V
Gallinula chloropus	common moorhen	O
CHARADRIIDAE	**PLOVERS**	
Charadrius vociferus	Killdeer	O, V
COLUMBIDAE	**PIGEONS & DOVES**	
Columba livia	rock dove	O, V
Zenaida macroura	mourning dove	O, V
TROCHILIDAE	**HUMMINGBIRDS**	
Archilochus alexandri	black-chinned hummingbird	O
Calypte anna	Anna's hummingbird	O, V
Calypte costae	Costa's hummingbird	V
Selasphorus sasin	Allen's hummingbird	O, V
ALCEDINIDAE	**KINGFISHERS**	
Ceryle alcyon	belted kingfisher	O, V
PICIDAE	**WOODPECKERS**	
Colaptes auratus	northern flicker	O, V
Picoides nuttallii	Nuttall's woodpecker	O, V
Picoides pubescens	downy woodpecker	O, V

Appendix B (continued)
Wildlife Observed at the Big Tujunga Wash Mitigation Bank

Scientific Name	Common Name	Sign*
TYRANNIDAE	**TYRANT FLYCATCHERS**	
Empidonax difficilis	Pacific-slope flycatcher	O, V
Myiarchus cinerascens	ash-throated flycatcher	O, V
Sayornis nigricans	black phoebe	O, V
Sayornis saya	Say's phoebe	O, V
Tyrannus verticalis	western kingbird	O
HIRUNDINIDAE	**SWALLOWS**	
Stelgidopteryx serripennis	northern rough-winged swallow	O
CORVIDAE	**JAYS & CROWS**	
Aphelocoma californica	western scrub-jay	O, V
Corvus brachyrhynchos	American crow	O, V
AEGITHALIDAE	**BUSHTITS**	
Psaltriparus minimus	Bushtit	O, V, N
TROGLODYTIDAE	**WRENS**	
Troglodytes aedon	house wren	V
Campylorhynchus brunneicapillus	cactus wren	O, V
Thryomanes bewickii	Bewick's wren	O, V
TIMALIIDAE	**BABBLERS**	
Chamaea fasciata	wrentit	O, V
TURDIDAE	**THRUSHES**	
Catharus guttatus	hermit thrush	O, V
MIMIDAE	**MOCKINGBIRDS, THRASHERS**	
Mimus polyglottos	northern mockingbird	O, V
Toxostoma redivivum	California thrasher	O, V
PTILOGONATIDAE	**SILKY-FLYCATCHERS**	
Phainopepla nitens	phainopepla	O, V
STURNIDAE	**STARLINGS**	
Sturnus vulgaris	European starling	O, V
PARULIDAE	**WOOD WARBLERS**	
Dendroica petechia	yellow warbler	O, V
Dendroica nigrescens	black-throated gray warbler	O, V
Geothlypis trichas	common yellowthroat	O, V
Vermivora celata	orange-crowned warbler	O, V
Wilsonia pusilla	Wilson's warbler	O, V
ICTERIDAE	**BLACKBIRDS**	
Agelaius phoeniceus	red-winged blackbird	O
Icterus cucullatus	hooded oriole	O, V
Quiscalus mexicanus	great-tailed grackle	O
Molothrus ater	brown-headed cowbird	V
EMBERIZIDAE	**EMBERIZIDS**	
Aimophila ruficeps	rufous-crowned sparrow	O, V
Melospiza melodia	song sparrow	O, V
Pipilo crissalis	California towhee	O, V
Pipilo maculatus	spotted towhee	O, V
CARDINALIDAE	**CARDINALS**	
Pheucticus melanocephalus	black-headed grosbeak	O, V

Appendix B (continued)
Wildlife Observed at the Big Tujunga Wash Mitigation Bank

Scientific Name	Common Name	Sign*
FRINGILLIDAE	**FINCHES**	
Carduelis psaltria	lesser goldfinch	O, V
Carduelis tristis	American goldfinch	O, V
Carpodacus mexicanus	house finch	O, V
PASSERIDAE	**OLD WORLD SPARROWS**	
Passer domesticus	house sparrow	O, V
CLASS MAMMALIA	**MAMMALS**	
DIDELPHIDAE	**NEW WORLD OPOSSUMS**	
Didelphis virginiana	Virginia opossum	T
LEPORIDAE	**HARES & RABBITS**	
Sylvilagus audubonii	desert cottontail	O, S, T
SCIURIDAE	**SQUIRRELS**	
Spermophilus beecheyi	California ground squirrel	O, V, B
Scirius niger	fox squirrel	O, V
CANIDAE	**WOLVES & FOXES**	
Canis familiaris	domestic dog	O, T
Canis latrans	coyote	O, V, S, T
PROCYONIDAE	**RACCOONS**	
Procyon lotor	Racoon	T
MUSTELIDAE	**WEASELS, SKUNKS & OTTERS**	
Mephitis mephitis	striped skunk	O
EQUIDAE	**HORSES & BURROS**	
Equus caballus	horse	O, S, T
CERVIDAE	**DEER**	
Odocoileus hemionus	mule deer	T
*** O = Observation, V = Vocalization, N = Nest, S = Scat, T = Tracks, C = Carcass**		

APPENDIX B

RIPARIAN PLANTING AREA
SITE PHOTOGRAPHS

Photo 1. Area 1, Section 3. Corresponds with Photo 1 of the As-Built.

Photo 2. Area 2, Section 3. Corresponds with Photo 2 of the As-Built.

Photo 3. Area 3, Section 3. Corresponds with Photo 3 of the As-Built.

Photo 4. Area 4, Section 3. Corresponds with Photo 4 of the As-Built.

Photo 5. Area 5, Section 3. Corresponds with Photo 5 of the As-Built.

Photo 6. Area 6, Section 3. Corresponds with Photo 6 of the As-Built.

Photo 7. Area 7, Section 3. Corresponds with Photo 7 of the As-Built.

Photo 8. Area 8, Section 4. Corresponds with photo 8 of the 2004 Annual Report.

Photo 9. Area 9, Section 4. Corresponds with Photo 8 of the As-Built.

Photo 10. Area 10, Section 4. Corresponds with Photo 9 of the As-Built.

Photo 11. Area 11, Section 4. Corresponds with Photo 10 of the As-Built.

Photo 12. Area 12, Section 4. Corresponds with Photo 11 of the As-Built.

Photo 13. Area 13, Section 4. Corresponds with Photo 12 of the As-Built.

Photo 14. Area 14, Section 4. Corresponds with Photo 13 of the As-Built.

Photo 15. Area 15, Section 4. Corresponds with Photo 14 of the As-Built.

Photo 16. Area 16, Section 4. Corresponds with Photo 15 of the As-Built.

Photo 17. Area 17, Section 4. Corresponds with Photo 16 of the As-Built.

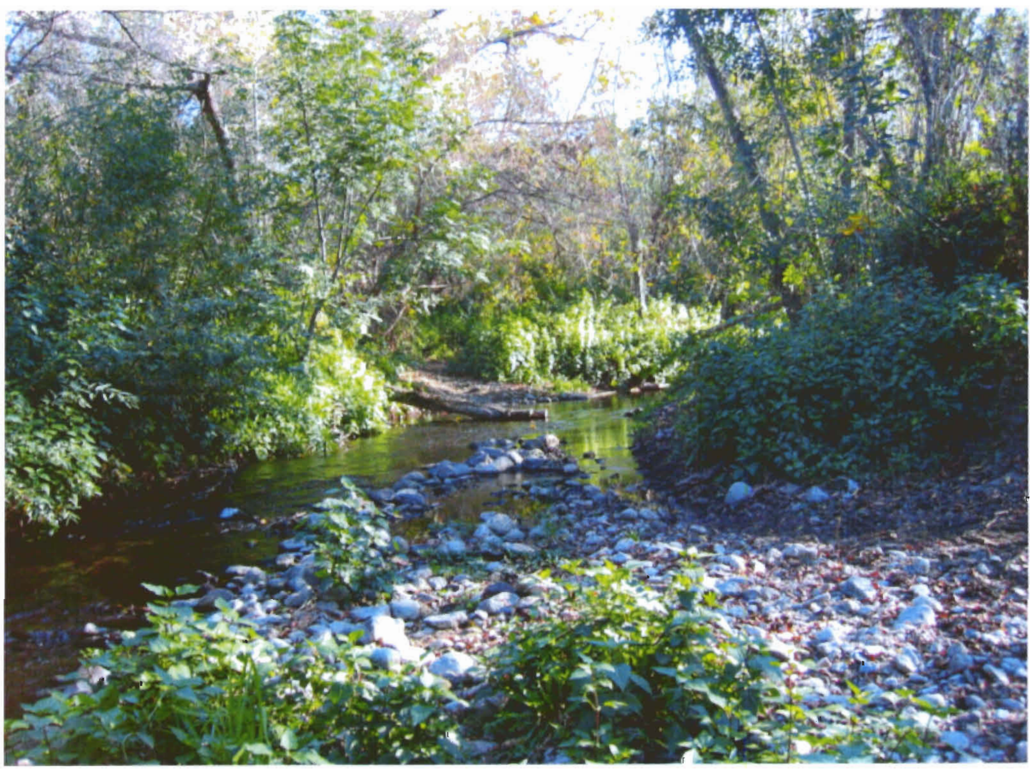


Photo 18. Area 18, Section 4. Corresponds with Photo 17 of the As-Built.

Photo 19. Area 19, Section 4. Corresponds with Photo 19 of the 2004 Annual Report.

Photo 20. Area 20, Section 4. Corresponds with Photo 18 of the As-Built.

Photo 21. Area 21, Section 4. Corresponds with Photo 19 of the As-Built.

Photo 22. Area 22, Section 4. Corresponds with Photo 20 of the As-Built.

Photo 23. Area 23, Section 4, taken in November 2004. This area was not located in 2005 due to flood damage.

Photo 24. Area 24, Section 4. Corresponds with photo 24 of the 2004 Annual Report.

Photo 25. Section 1. Area along Haines Canyon Creek.

Photo 26. Section 1. Area between Pond and Pond Trail.

APPENDIX C

SUCCESS MONITORING DATA SHEETS

BIG T RIPARIAN SUCCESS:		DATE: 8 Dec 2005
SURVEYORS: H.Clayton, J. McGee		SECTION: 1
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica	卌 卌 II	12
Rubus ursinus	卌 IIII	9
Opuntia littoralis	I	1

---

1 Eucalyptus present (5') near trail above planting area

BIG T RIPARIAN SUCCESS:		DATE: 8 Dec 2005
SURVEYORS: H. Clayton, J. McGee		SECTION: 2
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica		0
Rubus ursinus		0
Opuntia littoralis		0

Photo 4

large castor bean in planting area

some mustard, some fennel, some eupatory, some alyssum

1 small (2') Arundo resprout near stream

some willows present

BIG T RIPARIAN SUCCESS:		DATE: 8 Dec 2005
SURVEYORS: H. Clayton, J. McGee		SECTION: 3
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica		0
Rubus ursinus		0
Opuntia littoralis		6

photos 5 + 6

---

large castor bean
lots of mustard

poison oak present

BIG T RIPARIAN SUCCESS:		DATE: 8 Dec. 2005
SURVEYORS: H. clayton, J McGee		SECTION: 4
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica		0
Rubus ursinus		0
Opuntia littoralis		1

very different from last year
substantial flood damage altered ground
leaf litter low, rocks exposed

BIG T RIPARIAN SUCCESS:		DATE: 8 Dec. 2005
SURVEYORS: H. Clayton, J. McGee		SECTION: 5
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica	𝍸 𝍸 𝍸 I	16
Rubus ursinus	IIII	4
Opuntia littoralis		0

Mustard abundant Alyssum abundant

Mugwort abundant

BIG T RIPARIAN SUCCESS:		DATE: 8 Dec. 2005
SURVEYORS: H. Clayton, J. McGee		SECTION: 6
SPECIES:	TALLY:	TOTAL:
Populus fremontii	~~||||~~ | 10', 12', 9', 15', 16', 18'	6
Rosa californica	~~||||~~ ~~||||~~ ~~||||~~ ||||	19
Rubus ursinus		0
Opuntia littoralis	||||	4

Mustard present near trail

Arundo resprouts present

Castor bean present near stream

Phacelia cicutaria

Quercus saplings present

BIG T RIPARIAN SUCCESS:		DATE: 8 Dec. 2005
SURVEYORS: H. Clayton, J. McGee		SECTION: 7
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica	III in Agaratina	3
Rubus ursinus		0
Opuntia littoralis		0

Agaratina too thick to count planted species.

- section right against stream
  may have lost planting area when stream was widened in flood.

- under Fraxinus

BIG T RIPARIAN SUCCESS:		DATE: 8 Dec. 2005
SURVEYORS: H. Clayton, J. McGee		SECTION: 8 ?
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica		0
Rubus ursinus		0
Opuntia littoralis	1	1

Tree fell, planting area destroyed

"New" concrete piling?

Exact location unknown.

BIG T RIPARIAN SUCCESS:		DATE: 8 Dec. 2005
SURVEYORS: H. Clayton, J. McGee		SECTION: 9
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica	卌 4 of which are near water & large	5
Rubus ursinus	|||	3
Opuntia littoralis		1

alyssum
poison oak
Wild cucumber

present in area

correct GPS point

#45 11S 0375734
UTM 3792487

BIG T RIPARIAN SUCCESS:		DATE: 13 Dec. 2005
SURVEYORS: H. Clayton, J. McGee, C. Neumeister		SECTION: 10
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica	𝍸 II	7
Rubus ursinus		0
Opuntia littoralis	𝍸 II	7

Some small Arundo resprouts

GPS
#46

planted on both sides of trail + down past large alder

Eriastrum across from trail at this section.

BIG T RIPARIAN SUCCESS:		DATE: 13 Dec. 2005
SURVEYORS: H. Clayton, J. McGee, C. Neumeister		SECTION: 11
SPECIES:	TALLY:	TOTAL:
Populus fremontii	1 = 15'	1
Rosa californica	~~IIII~~ II	7
Rubus ursinus		0
Opuntia littoralis	IIII	4

numerous willow cuttings

A lot of castor bean + arundo and eupatory

GPS #47

BIG T RIPARIAN SUCCESS:		DATE: 12/13/05
SURVEYORS: H. Clayton, J. McGee, C. Houmeister		SECTION: 12
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica		0
Rubus ursinus		0
Opuntia littoralis		0

GPS #48

Tons of toxicodendron diversilobum and eupatory

BIG T RIPARIAN SUCCESS:		DATE: 12/13/05
SURVEYORS: H. Clayton, J McGee, C Neumeister		SECTION: 13
SPECIES:	TALLY:	TOTAL:
Populus fremontii	1=18", 1=16'	2
Rosa californica	20 + 5 + 1 + 2 small seedlings	28
Rubus ursinus		0
Opuntia littoralis	1	1

Lots of poison oak

GPS #49

BIG T RIPARIAN SUCCESS:		DATE: 12/13/05
SURVEYORS: H. Clayton, J McGee C. Neumeister		SECTION: 14
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica	卌 I	6
Rubus ursinus		0
Opuntia littoralis		0

Lots of eupatory covering entire area, 2 alders. GPS #50

2 oak in planted area, 2 narrowleafed willows on opposite side of trail

Poison oak present

Mule fat abundant

BIG T RIPARIAN SUCCESS:		DATE: 12/13/05
SURVEYORS: H. Claxton, J. McGee, C. Neumeister		SECTION: 15
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica	IIII	4
Rubus ursinus	1 dead	0
Opuntia littoralis		0

off of old trail (left of new trail by 20) GPS#51

Eupatory abundant
some casterbean in section + nearby
near 5' cmp
some arundo resprouts
willows doing well

BIG T RIPARIAN SUCCESS:		DATE: 12/13/05
SURVEYORS: H Clayton, J. McGee, C. Neumeister		SECTION: 16
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica		0
Rubus ursinus		0
Opuntia littoralis		0

Photo taken facing due North GPS #52

Lots of eupatory

BIG T RIPARIAN SUCCESS:		DATE: 13 Dec. 2005
SURVEYORS: H. Clayton, J. McGee, C. Neumeister		SECTION: 17
SPECIES:	TALLY:	TOTAL:
Populus fremontii	13', 11', 8'	3
Rosa californica		0
Rubus ursinus		0
Opuntia littoralis		0

---

2 photos taken

GPS
53

BIG T RIPARIAN SUCCESS:		DATE: 13 Dec. 2005
SURVEYORS: H. Clayton, J. McGee, C. Neumeister		SECTION: 18
SPECIES:	TALLY:	TOTAL:
Populus fremontii	none	0
Rosa californica	none	0
Rubus ursinus		0
Opuntia littoralis		0

Eupatory present
no cottonwood trees

Rocky area

GPS
#54

BIG T RIPARIAN SUCCESS:		DATE: 13 Dec. 2005
SURVEYORS: H. Clayton, J. McGee, C. Neumaster		SECTION: 19
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica		0
Rubus ursinus		0
Opuntia littoralis	|	1

Numerous Arundo resprouts >10' in height
castor bean

GPS
#55

questionable as to exact
spot as in 2004

BIG T RIPARIAN SUCCESS:		DATE: 13 Dec. 2005
SURVEYORS: H. Clayton, C. Neumeister, J. McGee		SECTION: 20
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica		0
Rubus ursinus		0
Opuntia littoralis		0

Some large Arundo resprouts

GPS
#56
#57 $\}$ same

BIG T RIPARIAN SUCCESS:		DATE: 13 Dec. 2005
SURVEYORS: H. Clayton, J. McGee, C. Neumeister		SECTION: 21
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica		0
Rubus ursinus		0
Opuntia littoralis		0

---

ground has dropped 2'

GPS

trail is different #58

very rocky ground now, new trail above site

BIG T RIPARIAN SUCCESS:		DATE: 13 Dec. 2005
SURVEYORS: H. Clayton, J. Hefler, C. Neumeister		SECTION: 22
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica		0
Rubus ursinus		0
Opuntia littoralis		0

Resprouting Arundo

trail is to the Left of tree not on Right anymore

GPS
#59

BIG T RIPARIAN SUCCESS:		DATE: 13 Dec, 2005
SURVEYORS: H.Clayton, J. McGee, C. Neumeister		SECTION: 23 ?
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica		0
Rubus ursinus		0
Opuntia littoralis		0

unable to locate site.

May have been washed out.

BIG T RIPARIAN SUCCESS:		DATE: 13 Dec. 2005
SURVEYORS: H. Clayton, J. McGee, C. Neumeister		SECTION: 24
SPECIES:	TALLY:	TOTAL:
Populus fremontii		0
Rosa californica	~~||||~~ ~~||||~~	10
Rubus ursinus	Ø	0
Opuntia littoralis	|	1

Photo taken facing N

6' high Arundo

fence + road is S on L of trail going from 22 → 24 → 23

GPS #60

BIG T RIPARIAN SUCCESS:		DATE: 4/6/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 1	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	∅	∅	∅
Salix lasiolepis and Salix laevigata	6.1m x 4.4m	III	3
Baccharis salicifolia	0.3m², 1.25m², 2m², 2.4m x 2.1m ↑ x 4 individuals	𝍸 II	7

Approximate Size of Planting Area: 51' x 20'.

Rosa californica 5' x 5'
Rubus ursinus 1.1m x 0.6m
Opuntia littoralis 1' x 0.5'

BIG T RIPARIAN SUCCESS:		DATE: 4/6/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 2	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	ϕ	∅	∅
Salix lasiolepis and Salix laevigata	3.2 x 2.6m	~~IIII~~ ~~IIII~~ ~~IIII~~	15
Baccharis salicifolia	3m x 2m, 3m x 2.5m, 3m x 4m → x 2 individuals	IIII	4

Approximate Size of Planting Area: 23m x 12.7m.

BIG T RIPARIAN SUCCESS:		DATE: 4/6/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 3	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii		0	
Salix lasiolepis and Salix laevigata	15 m x 12.1 m = total area of all 66 arroyo willow trees	66	
Baccharis salicifolia	4m x 3m	6	

Approximate Size of Planting Area: 18.6m x 27.5m.

Opuntia littoralis 0.25 x 0.25 m^2
6 individuals not recorded in December

BIG T RIPARIAN SUCCESS:		DATE: 4/6/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 4	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii			
Salix lasiolepis and Salix laevigata	5.4 x 5.5 m for 6 willows 2.7 x 3 m for other 5 individuals	11	11
Baccharis salicifolia	3 x 3 m average	13 + 5 + 5 + 2	25

Approximate Size of Planting Area: 25 x 30.4 m.

1 Opuntia litoralis ~~not~~ recorded in Dec. 2005
cover = 0.1 m²

BIG T RIPARIAN SUCCESS:		DATE: 4/6/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 5	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii		0	
Salix lasiolepis and Salix laevigata	0.5^2	11	2
Baccharis salicifolia	4 × 3.5 m	1	1

Approximate Size of Planting Area: 20 x 6.8 m.

Cover

Rosa californica 1.7 × 1 m

Rubus ursinus 2.1 × 0.4 m × 1

0.3 × 0.3 × 3

Locate Area 1, cross creek to do 2-4 on opposite side. Cross back to locate Area 5. US 0375997 UTM 3792563 (17' accuracy) Walk a pretty far distance to 6 w/ Alder trees. 7 is only 25' down at water. Cross creek to get to 8 by culvert. 9 is straight across creek & up berm on "ledge" of Arundo.

BIG T RIPARIAN SUCCESS:		DATE: 4/6/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 6	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	∅	∅	∅
Salix lasiolepis and Salix laevigata	4m x 4m, 5m x 4m	II	2
Baccharis salicifolia	6m x 5m, 3m x 2m	II	2

Approximate Size of Planting Area: 20.8m x 14.3m.

Rosa californica 0.6m x 0.7m
Opuntia littoralis 0.9m x 0.3m

GPS: 11 S 0375816
UTM 3792492

BIG T RIPARIAN SUCCESS:		DATE: 4/6/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 7	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	∅	∅	∅
Salix lasiolepis and Salix laevigata	2 m^2	5+2+3+3	13
Baccharis salicifolia	6x5 m	2	2

Approximate Size of Planting Area: 16.3 x 4.7 m.

Rosa californica 0.2 x 0.8 m

GPS: adjacent to section 6
25' down, @ waters edge.

BIG T RIPARIAN SUCCESS:		DATE: 4/6/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 8	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii		0	
Salix lasiolepis and Salix laevigata		0	
Baccharis salicifolia		0	

Approximate Size of Planting Area: ~ 20 x 10 m.

GPS: 11 S 0375778
UTM 3792442

Opuntia
0,9 m x 0.3 m

BIG T RIPARIAN SUCCESS:		DATE: 4/6/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 9	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii			
Salix lasiolepis and Salix laevigata	2×1 m	~~||||~~ ||	7
Baccharis salicifolia	4×5 m	||||	4

Approximate Size of Planting Area: (18.2 m × 16 m) + (12 × 16 m)

Opuntia littoralis 0.1 × 0.1

Rosa californica 0.9 × 0.9 m

Rubus ursinus 1.2 × 0.4 m

BIG T RIPARIAN SUCCESS:		DATE: 4/6/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 10	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	ϕ	ϕ	ϕ
Salix lasiolepis and Salix laevigata	5x5m	3+4	7
Baccharis salicifolia	9x7m	2	2

Approximate Size of Planting Area: 32.7m x 13.0m.

BIG T RIPARIAN SUCCESS:		DATE: 4/6/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 11	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii		0	0
Salix lasiolepis and Salix laevigata	$3 m^2 \times 5$ $5 m^2 \times 4$ $1 m^2 \times 5$	14	14
Baccharis salicifolia		0	0

Approximate Size of Planting Area: 15m x 15.7m.

Rosa californica (0.8 × 0.6) × 1 and (1.5 × 0.3) × 4
Opuntia littoralis (1 × 0.7) × 1
(0.1 m^2) × 3

BIG T RIPARIAN SUCCESS:		DATE: 4/7/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 12	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	∅	∅	∅
Salix lasiolepis and Salix laevigata	2 m^2	18	18
Baccharis salicifolia	∅	∅	∅

Approximate Size of Planting Area: 15m x 10m.

site has lots of poison oak and eupatory

BIG T RIPARIAN SUCCESS:		DATE: 4/7/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 13	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	ϕ	ϕ	ϕ
Salix lasiolepis and Salix laevigata	4x4m	6	6
Baccharis salicifolia	3.7x3.8m	1	1

Approximate Size of Planting Area: 21.3m × 25m.

Rosa ca. (20) (1.6 x 1.8m) (8) 0.1 x 0.1m

BIG T RIPARIAN SUCCESS:		DATE: 4/7/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 14	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	∅	∅	∅
Salix lasiolepis and Salix laevigata	24 x (0.3m²) 7 x (5m x 6m)	31	31
Baccharis salicifolia	2m²	19	19

Approximate Size of Planting Area: 12.5m x 10m.

- lots of poison oak
- many new arroyo willow seedlings

BIG T RIPARIAN SUCCESS:		DATE: 4/7/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 15	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	∅	∅	∅
Salix lasiolepis and Salix laevigata	6 x (0.5m²) 15 x (3m²)	21	21
Baccharis salicifolia	∅	∅	∅

Approximate Size of Planting Area: 10.8m x 6m.

- Rosa californica (1m²)
- 5' cmp

BIG T RIPARIAN SUCCESS:		DATE: 4/7/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 16	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	∅	∅	∅
Salix lasiolepis and Salix laevigata	3x3m	2	2
Baccharis salicifolia	1.5x3m	1	1

Approximate Size of Planting Area: 11.8m x 11.5m.

log in foreground of pic is gone

BIG T RIPARIAN SUCCESS:		DATE: 4/7/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 17	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	Ø	Ø	Ø
Salix lasiolepis and Salix laevigata	4 x (0.2m x 0.3m) 11 x (2m x 3m)	15	15
Baccharis salicifolia	17 x (2x3m) 6 x (1 x 1m)	17 + 6	23

Approximate Size of Planting Area: 26.1m x 18.4m.

BIG T RIPARIAN SUCCESS:		DATE: 4/7/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 18	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	Ø	Ø	Ø
Salix lasiolepis and Salix laevigata	1 (6x4) 6 (2x3	7	7
Baccharis salicifolia	2x3	3	3

Approximate Size of Planting Area: 7.1m x 13.7m.

BIG T RIPARIAN SUCCESS:		DATE: 4/7/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 19	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	∅	∅	∅
Salix lasiolepis and Salix laevigata	6 (6m x 6m) 4 (2 x 2m)	10	10
Baccharis salicifolia	2 (2.5m x 2.5m) 4 (2m x 3m)	6	6

Approximate Size of Planting Area: 23.1m x 15.6m.

BIG T RIPARIAN SUCCESS:		DATE: 4/7/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 20	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	∅	∅	∅
Salix lasiolepis and Salix laevigata	1 (5x4m) 1 (2x2m)	11	2
Baccharis salicifolia	∅	∅	∅

Approximate Size of Planting Area: 21.6m x 13.6m.

BIG T RIPARIAN SUCCESS:		DATE: 4/7/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 21	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	ø	ø	ø
Salix lasiolepis and Salix laevigata	1 ($4 m^2$)	1	1
Baccharis salicifolia	3m x 2m	15	15

Approximate Size of Planting Area: 20.5m x 11.5m.

BIG T RIPARIAN SUCCESS:		DATE: 4/7/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 22	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	∅	∅	∅
Salix lasiolepis and Salix laevigata	3mx10m	2	2
Baccharis salicifolia	1x1.5	2	2

Approximate Size of Planting Area: 10.1m x 8.7m.

BIG T RIPARIAN SUCCESS:		DATE: 4/7/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 23	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	ϕ	ϕ	ϕ
Salix lasiolepis and Salix laevigata			
Baccharis salicifolia			

Approximate Size of Planting Area: ______________________.

BIG T RIPARIAN SUCCESS:		DATE: 4/7/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: 24	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	7m x 4m	1	1
Salix lasiolepis and Salix laevigata	3(4m²)	3	3
Baccharis salicifolia	(2m x 3m) 6	6	6

Approximate Size of Planting Area: 20.5m x 23.4m.

Opuntia littoralis 3.3m x 3.4m

Rosa californica (0.8m x 0.5) x10

BIG T RIPARIAN SUCCESS:		DATE: 4/18/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: Pond Area Point #1	
SPECIES:	ESTIMATE OF COVER: m	TALLY:	TOTAL:
Salix gooddingii	Ø	Ø	Ø
Salix lasiolepis and Salix laevigata	6x6	2	2
Baccharis salicifolia	1(6x4) 1(4x2) 6(3x2)	~~||||~~ |||	8

Approximate Size of Planting Area: 15.5m x 25.2m.

P. fremontii: Φ

BIG T RIPARIAN SUCCESS:		DATE: 4/18/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: Pond Area Point # 2	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	Ø	Ø	Ø
Salix lasiolepis and Salix laevigata	$1.5 m^2$ = 4 4(7×6)	4+4	8
Baccharis salicifolia	3(1× 0.1) 4(0.2 m^2) 7(3 m^2) 2(6×4) 1(1 m^2) 1(2 m^2)	~~||||~~ ~~||||~~ ~~||||~~ |||	18

Approximate Size of Planting Area: 25.8m × 24.2m.

P. fremontii : 1 (5×5m)

BIG T RIPARIAN SUCCESS:		DATE: 4/18/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: Pond Area Point # 3	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii			∅
Salix lasiolepis and Salix laevigata	25 (6in²) 10 (0.5m²)	25 + 10	35
Baccharis salicifolia		∅	∅

Approximate Size of Planting Area: 36.5m x 22.5.

P. fremontii : 1 (5x5)

2 Quercus agrifolia

BIG T RIPARIAN SUCCESS:		DATE: 4/18/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: Pond Area Point #4	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	∅	∅	∅
Salix lasiolepis and Salix laevigata	4 (5m²)	4	4
Baccharis salicifolia	5(3m²) 5(5x 4m) 2(1 x 2m) 3(0.1m²) 1(0,5 x0.1m) 12 = (12x10m)	6 +3 + 2 +12 +5	28

Approximate Size of Planting Area: 24m x 23m.

P. fremontii : ∅

BIG T RIPARIAN SUCCESS:		DATE: 4/18/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: Pond Area Point #5	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii		∅	∅
Salix lasiolepis and Salix laevigata	12(4m²)	12	12
Baccharis salicifolia	5(3 m2) 2(6x4m) 2(3 x 4 m) 1(6 x3 m) 1(2m²)	5 +2 +2	9

Approximate Size of Planting Area: 28.4m x 25m.

P. fremontii - ∅

BIG T RIPARIAN SUCCESS:		DATE: 4/18/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: Pond Area Point #6	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	Ø	Ø	Ø
Salix lasiolepis and Salix laevigata	($6 m^2$) 9 ($4 m^2$) 3	9+3	12
Baccharis salicifolia	2($0.5 m^2$)	ll	2

Approximate Size of Planting Area: 24.3m x 34.8m.

P. fremontii : 1 ($1 m^2$)
3 (6 x 8m)

BIG T RIPARIAN SUCCESS:		DATE: 4/18/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: Pond Area Point #7	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	Ø	Ø	Ø
Salix lasiolepis and Salix laevigata	9 x (5 x 7.5 m) 9 x (1 m x 1 m)	9 + 9	18
Baccharis salicifolia	Ø	Ø	Ø

Approximate Size of Planting Area: 10 x 15 m.

bordered by Haines Creek (Water is on S + E side)

No P. fremontii present

BIG T RIPARIAN SUCCESS:		DATE: 4/13/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: Pond Area Point #8	
SPECIES:	ESTIMATE OF COVER: (m)	TALLY:	TOTAL:
Salix gooddingii		∅	∅
Salix lasiolepis and Salix laevigata	(5 x 6)	33	33
Baccharis salicifolia	6(0.1 x 0.1) 4(1x2) 1(0.7 x 0.5) 1(4x2) 6(3 x 3) 6(3 x 2) 5(2 x 2) 3(4 x 3) 3(5 x 5) 1(1m²)	~~IIII~~ ~~IIII~~ ~~IIII~~ ~~IIII~~ ~~IIII~~ I ~~IIII~~ ~~IIII~~	36

Approximate Size of Planting Area: 25.5m x 24.1m.

Pop. fremontii 9 : 5(1m²), 1(4m²), 3(2x3)

BIG T RIPARIAN SUCCESS:		DATE: 4/13/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: Pond Area Point #9	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	1m²	2	2
Salix lasiolepis and Salix laevigata	(5m x 6m)	H	14
Baccharis salicifolia	1 (6.2m x 4.5m)	1	1

Approximate Size of Planting Area: 15.7m x 9.1m.

Populus fremontii 3 → (2m x 2m)

BIG T RIPARIAN SUCCESS:		DATE: 4/13/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: Pond Area Point #10	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii			
Salix lasiolepis and Salix laevigata	5(1m²) 19 (2m x 3m)	24	24
Baccharis salicifolia	2 m²	|||	3

Approximate Size of Planting Area: 20.2m x 9.5m.

Pop. fre. 12 5(4m²) 7(1x2)

BIG T RIPARIAN SUCCESS:		DATE: 4/13/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: Pond Area Poly #1	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	(1 m²)	18 + 3	21
Salix lasiolepis and Salix laevigata	(2.5m x 3m)	28 13	41
Baccharis salicifolia	5 (0.5 m²) 1 (7x4m) 2 (5x2m) 1 (1x1m) 1 (3.5m²)	~~||||~~ ~~||||~~	10

Approximate Size of Planting Area: GIS.

Populus fremontii 17 (2m x 3m)

BIG T RIPARIAN SUCCESS:		DATE: 4/13/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: Pond Area Poly #2	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii			∅
Salix lasiolepis and Salix laevigata	2m²	15+3	18
Baccharis salicifolia	4m²	11	2

Approximate Size of Planting Area: GIS.

P. fremontii - ∅ (1 dead)

Site is over an old Arundo donax patch, but is now covered in typha and flooded.

BIG T RIPARIAN SUCCESS:		DATE: 4/18/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: Pond Area Poly #3	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	∅	∅	∅
Salix lasiolepis and Salix laevigata	11 ($1m^2$) 3 ($3m^2$) 4 ($4m^2$) + 5	10 + 3 + 4 + 5	22
Baccharis salicifolia	5(2 x 1.5) 2(1 x 2)	~~IIII~~ II	7

Approximate Size of Planting Area: ______________________.

P. fremontii : ∅

BIG T RIPARIAN SUCCESS:		DATE: 4/18/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: Pond Area Poly #4	
SPECIES:	ESTIMATE OF COVER: (m)	TALLY:	TOTAL:
Salix gooddingii	(3m x 4 m) 1 (2 x 2) 1	11	2
Salix lasiolepis and Salix laevigata	3 = 6.9m x 5.7m 1 (4x4m) 15=(10m x 20m) 14 x (4x4m) 11 x (3m²) 2 (6m²)	3+1+15+14+11+2	46
Baccharis salicifolia	(4x3.5m) 2 1 (0.3 x 1) (5m x 6m) 2 1 (0.2m²) (6 x 2.5m) 3 2 (3 x 2m) (1 x 2m) 2 1 (6m²) (5m x 4m) 1 1 (1.5 x 1m) 1 (3 m²)	~~||||~~ ~~||||~~ ~~||||~~ ||	17

Approximate Size of Planting Area: ______________________.

P. fremontii : 5 x (5m²)

BIG T RIPARIAN SUCCESS:		DATE: 4/18/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: Pond Area Poly # 5	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	$3m^2$	|	|
Salix lasiolepis and Salix laevigata	$(1m^2)$ 2 $(4m^2)$ 1	||	2
Baccharis salicifolia	∅	∅	∅

Approximate Size of Planting Area: GIS.

P. fremontii : 1 $(1m^2)$

BIG T RIPARIAN SUCCESS:		DATE: 4/18/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: Pond Area Poly #6	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	$2 m^2$	5 + 1	6
Salix lasiolepis and Salix laevigata	($3 m^2$) 35 ($4 m^2$) 2	35 + 2	37
Baccharis salicifolia	2(3x3.5) 7(3 x 2)	~~IIII~~ IIII	9

Approximate Size of Planting Area: GIS.

P. fremontii : ∅

Planting area is from water to trail. (H_2O on N side)

BIG T RIPARIAN SUCCESS:		DATE: 4/13/06	
SURVEYORS: H. Clayton, C. Neumeister		SECTION: Pond Area Poly #7	
SPECIES:	ESTIMATE OF COVER:	TALLY:	TOTAL:
Salix gooddingii	(1.5 x 1.5 m)	2	2
Salix lasiolepis and Salix laevigata	1 x 2m	59 + 1 + 1 + 1	62
Baccharis salicifolia	(1 x 1)3 2(4 x 2) (0.6 x 0.7)5 1(3 x 3) 2(3 x 1) 1(2 x 1) 1(5 x 2)	~~||||~~ ~~||||~~ ~~||||~~	15

Approximate Size of Planting Area: GIS.

P. fremontii : Ø

APPENDIX D

2005 SEMI-ANNUAL MITIGATION BANK REPORT

BIG TUJUNGA WASH
SEMI-ANNUAL MITIGATION BANK REPORT
JANUARY – JUNE 2005

Prepared for:

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
900 S. Fremont Avenue
Alhambra, California 91803-1331
(626) 455-6138

Prepared by:

CHAMBERS GROUP, INC.
17671 Cowan Avenue, Suite 100
Irvine, California 92614
(949) 261-5414

July 2005

TABLE OF CONTENTS

Page

TABLE OF CONTENTS (continued)

Page

TABLE OF CONTENTS (continued)

Page

LIST OF FIGURES

LIST OF TABLES

SECTION 1.0 – INTRODUCTION

1.1 PURPOSE OF THE SEMI-ANNUAL REPORT

The Semi-Annual Monitoring Report provides documentation of the work done at the Big Tujunga Wash Mitigation Bank during a 6-month period and a summary of the progress or success of each of the programs. Control of weeds and exotic plants is critical to the success of the revegetation program and is a primary focus of monitoring. The removal of exotic wildlife, maintenance of the formal trail system, and the community awareness program are other key elements of the Master Mitigation Plan. The Semi-Annual Monitoring Report provides a brief summary of the results of the maintenance monitoring visits and an overview of community meetings held during the reporting period, January through June 2005. The document also provides information on any problems encountered on the site, actions taken to correct any observed deficiencies, and recommendations for additional maintenance measures.

1.2 SITE LOCATION

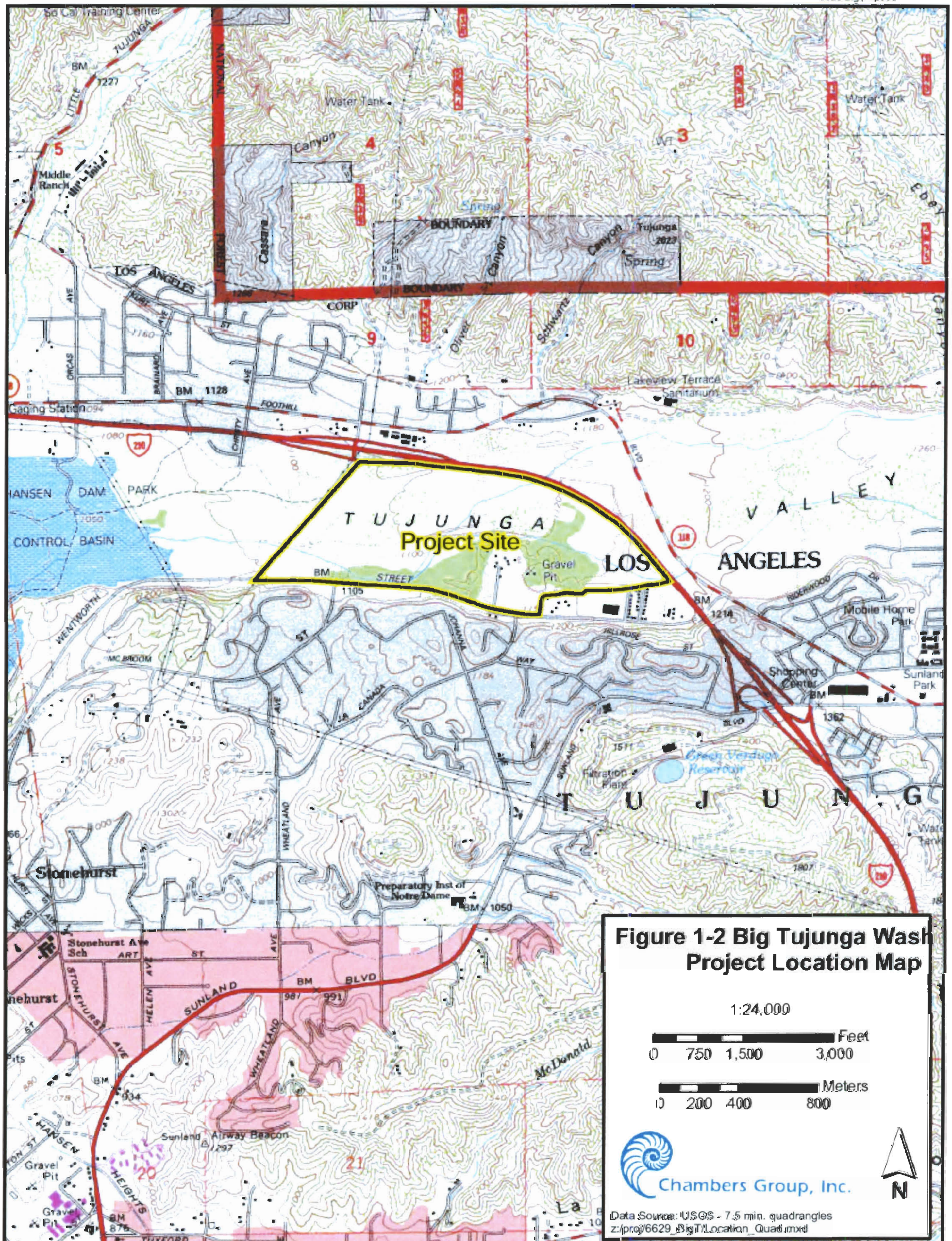
The Big Tujunga Wash Mitigation Bank is located in Big Tujunga Wash, just downstream of the 210 Freeway overcrossing, near the city of Los Angeles' Sunland area, in Los Angeles County's San Fernando Valley. The site is bordered on the north and east by the 210 Freeway and on the south by Wentworth Street. The west side of the site is contiguous with the downstream portion of Big Tujunga Wash. The general vicinity of the site is shown in Figure 1-1. A map depicting the project location is shown on Figure 1-2.

1.3 SITE DESCRIPTION

The Big Tujunga Wash Mitigation Bank consists of approximately 207 acres of native habitats. Several plant communities are found on the site including southern arroyo willow riparian woodland, oak/sycamore alluvial woodland, Riversidean alluvial sage scrub, mule fat scrub, coastal sage scrub, non-native grassland, and disturbed areas. The Tujunga Ponds are located in the northeast corner of the site. These ponds were originally created as part of the mitigation measures for the construction of the 210 Freeway and are currently under the jurisdiction of the Los Angeles County Department of Recreation and Parks.

The Big Tujunga Wash Mitigation Bank supports two watercourses, one containing flow from Big Tujunga Wash proper, and the other conveying the flow from Haines Canyon to Big Tujunga Wash. The flow in Big Tujunga Wash, on the north side of the site, is partially controlled by Big Tujunga Dam and is intermittent based on rainfall amounts and water releases from the Dam. The flow in Haines Canyon Creek, located on the south side of the site, is perennial and originates from the Tujunga Ponds, which may be fed by groundwater and/or runoff from adjacent residential areas. The two drainages merge near the western boundary of the mitigation bank site 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. An aerial photograph showing Big Tujunga Wash, Haines Canyon Creek, and the Tujunga Ponds is shown on Figure 1-3.


Figure 1-1
General Vicinity Map
N
Miles
0 2.5 5 10
Kilometers
0 2.5 5 10
Chambers Group, Inc.
Data Source: USGS - www.seamless.usgs.gov -
The National Map
z:/proj/6629_BigT/Vicinity_Map.mxd
Project Location
Lancaster
Palmdale
Santa Clarita
Glendale
Pasadena
Los Angeles
El Monte
West Covina
Inglewood
Norwalk
Fullerton
Anaheim
Torrance
Orange
Garden Grove
Santa Ana
Long Beach
Irvine
Huntington Beach


Project Site
TUJUNGA
LOS ANGELES
VALLEY
HANSEN DAM PARK
CONTROL BASIN
Gravel Pit
Stonehurst
Preparatory Inst of Notre Dame
Lakeview Terrace Sanitarium
Shopping Center
Sunland Park
Mobile Home Park
Filtration Plant
Sunland Airway Beacon
Figure 1-2 Big Tujunga Wash
Project Location Map
1:24,000
0 750 1,500 3,000 Feet
0 200 400 800 Meters
N
Chambers Group, Inc.
Data Source: USGS - 7.5 min. quadrangles
z:/proj/6629_BigT/Location_Quad.mxd

BIG TUJUNGA WASH MITIGATION BANK

Figure 1-3 Aerial Photograph

This map is not intended for site-specific purposes.

Prepared For:
Los Angeles County
Department of Public Works

Aerial Source:

Date: August 2004

Location:
z:/proj/6629_BigT/Fig1-3_Aerial_Photograph.mxd

Chambers Group, Inc.

1.4 MASTER MITIGATION PLAN

In mid-1999, Chambers Group, Inc., prepared a Master Mitigation Plan (MMP) for the Big Tujunga Wash Mitigation Bank. The purpose of the MMP is to serve as a guide for implementation of the 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 encompasses strategies to enhance and protect existing habitat for wildlife and to create additional natural areas that will be utilized by wildlife and by numerous user groups. In addition, the MMP includes programs for the removal of exotic fish and amphibians from the Tujunga Ponds, trapping to control brown-headed cowbirds, plans for development of a formal trails system, and development of a public awareness program at the site. Eradication of exotic plant species, including giant reed (*Arundo donax*) and tamarisk (*Tamarix* sp.), and habitat restoration and revegetation programs, which include planting and irrigation strategies, plant palettes, and long-term maintenance and monitoring of the site, are also included in the MMP. The MMP is designed to include a five-year program of implementation, maintenance, and monitoring of the enhancement strategies. Implementation of the MMP was initiated in August 2000.

SECTION 2.0 – NATIVE RIPARIAN HABITAT RESTORATION PROGRAM

2.1 PURPOSE AND GOALS

The ultimate goal of the Big Tujunga Wash Mitigation Bank site is to provide for long-term preservation, management, and enhancement of the biological resources for the benefit of the region's fish and wildlife resources. In addition, the Bank will provide compensation for loss of similar resources elsewhere in the Los Angeles Basin resulting from impacts of flood control projects. The habitat restoration program at the Big Tujunga Wash Mitigation Bank consists of a riparian habitat enhancement plan, which addresses the restoration of habitat along Haines Canyon Creek and the Tujunga Ponds. The goal of the riparian enhancement plan is to remove invasive, non-native plant species, such as giant reed, and to revegetate these areas with native riparian species to support the breeding and foraging activities of a variety of sensitive riparian wildlife species, including the endangered least Bell's vireo (*Vireo bellii pusillus*).

2.1.1 Description and Locations of Native Habitat Restoration

The habitat restoration and enhancement plan was designed to improve the habitat quality of approximately 60 acres of southern arroyo willow woodland along Haines Canyon Creek and the Big Tujunga Ponds. The southern willow riparian woodland is dominated by arroyo willow (*Salix lasiolepis*), and occurs in the area surrounding the Tujunga ponds and follows the stream running along the southern section of the property (Haines Canyon Creek). Red willow (*Salix laevigata*) and black willow (*Salix gooddingii*) are common in southern arroyo willow woodland, and occasional individuals of Fremont cottonwood (*Populus fremontii*) and white alder (*Alnus rhombifolia*) are also found. The understory is dominated by eupatory (*Ageratina adenophora*), mule fat (*Baccharis salicifolia*), and mugwort (*Artemisia douglasiana*). A small stand of southern arroyo willow riparian woodland also occurs along a wash in the northern portion of the site (Big Tujunga Creek). Mule fat scrub also occurs in the restoration and enhancement areas. This tall, herbaceous riparian scrub is dominated by mule fat.

2.2 METHODOLOGY/DATE OF IMPLEMENTATION

Restoration

Approximately one quarter of the planned riparian planting was completed during the first quarter of 2001. The remaining restoration areas were planted in January 2002. Planting consisted of installing hardwood cuttings, liners, and container plants. Cuttings consisted of willow species (*Salix* spp.), mule fat, and coastal prickly-pear cactus (*Opuntia littoralis*). Container plants included saplings of cottonwood, California rose (*Rosa californica*), and California blackberry (*Rubus ursinus*). The cuttings, liners, and container plants were installed in open areas near the ponds and the downstream portions of Haines Canyon Creek. No seeding took place in the riparian revegetation areas. No planting was implemented during the January to June 2005 period. The approximate locations of the planted areas are shown on Figure 2-1.

2.3 PROJECT MONITORING STATUS

Maintenance, Monitoring, and Reports

Maintenance monitoring of the planted areas was initiated immediately after the partial planting was completed in February 2001. Maintenance monitoring for the remaining planting was also initiated immediately after completion in January 2002. The first monthly monitoring visit for the partial plantings was conducted on March 28, 2001. The semi-annual inspection for 2004 was conducted on May 18. Monitoring summaries for the riparian planting areas are included in the annual and semi-annual monitoring reports for the Big Tujunga Mitigation Bank Restoration (Appendix A). Semi-annual monitoring visits of the planted areas will continue through 2005.


210 Freeway
Tujunga Ponds
Section 1
Section 2
Section 3
Section 4
Wentworth Street
Wheatland
Cottonwood
Mary Bell
BIG TUJUNGA WASH
MITIGATION BANK
Figure 2-1 Riparian Restoration &
Exotic Plant Removal Areas
Legend
Project Boundary
Restoration Sections
Prepared For:
Los Angeles County
Department of Public Works
Date: September 2004
This map is not intended for site-specific purposes.
Location:
z:/proj/6629_BigT/Fig2-1_Riparian_Restoration_Exotic_Plant_Removal_Areas.mxd
Meters
Feet
Chambers Group, Inc

2.4 RESULTS

Planting in Revegetation Areas

The riparian plantings areas have increased vegetatively since the annual inspection. The willow and mule fat cuttings surviving from initial drought and vandalism have grown well. Generally the cuttings that grew the most vigorously were located those near the stream or in areas where the water table was not far below the ground surface. Most of the cottonwood trees that were initially planted appeared not to have survived, most likely due to the lack of water. The surviving cottonwood trees were healthy and growing well. The remaining California blackberry and California rose plants that were initially installed were small, but appeared healthy.

Resprouts of giant reed (*Arundo donax*) were observed intermittently throughout the riparian restoration area. Most of these resprouts had been recently treated with herbicide. Numerous tree of heaven (*Ailanthus altissima*) saplings were observed near the creek and pond area, and near planting areas 9 and 17. Non-native eupatory (*Ageratina adenophora*) was also observed throughout the restoration area and has formed dense thickets along the creek in planting areas 1, 4, 9, and 15. These exotic species are invasive and have become a problem for native riparian species.

Enhancement/Trails Reclamation

The trails not damaged by winter storms were generally clear and free of obstacles. Several of the restoration areas, including planting areas 6-8, 10, 16, and 18-19, may have been lost due to flooding and redirecting of the creek. These areas were not accessible and therefore were not visited during the semi-annual inspection visit. With trail reclamation scheduled for the summer of 2005, these areas will be more easily accessed in the future, and monitoring can proceed in November during the annual inspection.

Overall Site Conditions

The large areas that were initially cleared of giant reed continue to remain mostly free of this invasive species. Maintenance to clear the site of giant reed occurred during monthly maintenance periods. Control of other exotics, including castor bean (*Ricinus communis*), occurred during monthly maintenance periods during the first half of the year and is expected to continue throughout 2005. Very little castor bean was observed within the restoration planting areas.

Maintenance Recommendations and Remedial Actions

Revegetation Areas

The low survival of cuttings after their installation indicated that there was insufficient water available for proper establishment. In the future, container plantings should be used for any required replacement planting instead of liners (when possible) because the container plants have root systems that are more developed and should be able to establish more quickly. Cuttings and liners can be installed in areas immediately adjacent to the stream or in lower areas that are closer to the groundwater table; however, replacement planting is not recommended at this time. The thick giant reed mulch has continued to decompose. Installation of a seed mix of riparian understory plants is recommended.

The resprouts of giant reed should continue to be treated with herbicide. Other exotic species such as tree of heaven, eupatory, castor bean, Chinese elm (*Ulmus parvifolia*), edible fig (*Ficus carica*), and ivy (*Hedera helix*) should also be removed. No water hyacinth or tamarisk was observed during the inspection.

No additional maintenance recommendations or remedial actions are required at this time.

SECTION 3.0 – COAST LIVE OAK/SYCAMORE WOODLAND REVEGETATION PROGRAM

3.1 PURPOSE AND GOALS

The goal of the revegetation plan was to create a coast live oak/sycamore woodland with an undifferentiated coastal sage scrub understory in the revegetation areas on the site previously occupied by non-native grasslands. The composition of these revegetation areas, when mature, will support the breeding and foraging activities of a variety of sensitive species, including red shouldered hawk (*Buteo lineatus*), Cooper's hawk (*Accipiter cooperii*), and coastal California gnatcatcher (*Polioptila californica californica*). The mature revegetation area will also provide an additional buffer between the urban areas and the riparian zone. The revegetation program consists of various tasks, from preparing the areas prior to planting, to installing container plant and seed materials, and includes provisions for the maintenance and monitoring of the site.

3.2 METHODOLOGY/DATE OF IMPLEMENTATION

General

Initial planting was implemented in late 2000. Replacement plantings were installed February 2002. Pest abatement activities were initiated in April 2002 to prevent continuing underground herbivory of installed plants by gophers. A Chambers Group restoration specialist conducted monthly monitoring visits, beginning in November 2000, and continuing through November 2001. A semi-annual inspection was conducted in May 2003, and will continue for the remainder of the upland restoration time period ending in 2005. After each monitoring visit, the Chambers Group Restoration Specialist incorporated the description of the site conditions and provided recommendations for changes in maintenance activities into the semi-annual or annual report. The semi-annual monitoring inspection report is included as Appendix A. Field data sheets are provided in Appendix B.

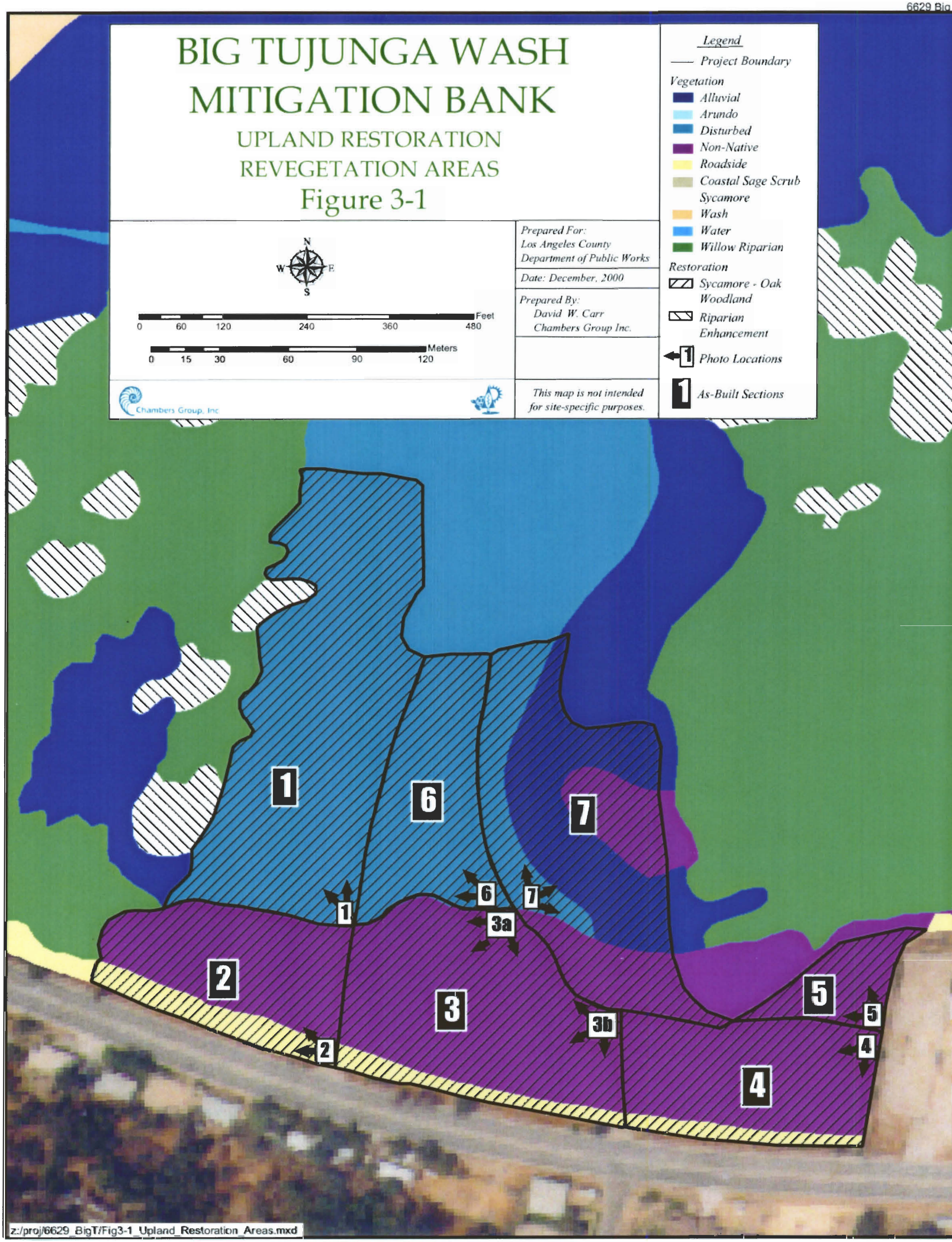
Location

Approximately 11.7 acres of habitat were created on the terrace south of Haines Canyon Creek along Wentworth Street. The upland terrace is elevated on a bench approximately 25 feet above the riparian habitat. Approximately 4.8 acres of this area was planted primarily as a coastal sage scrub community with occasional sycamores. The remaining 6.9 acres was revegetated as coast live oak/sycamore woodland with an undifferentiated coastal sage scrub understory. Installation was completed November 22, 2000. The portion of the upland area that is covered with the concrete pad from the old asphalt plant was not included as part of the upland revegetation area. For convenience in monitoring and reporting, the restoration area was divided into sections. Sections 1 through 5 are the woodland revegetation areas, and Sections 6 and 7 are the coastal sage scrub areas. Figure 3-1 shows the locations and types of restoration and enhancement areas on the site.

3.3 SITE EVALUATION AND RECOMMENDATIONS

Overall Site Conditions

The semi-annual maintenance monitoring inspection was conducted on May 18 and June 6, 2005. The overall cover of native vegetation has increased, although weeds were very abundant throughout the restoration area. Large areas bare of shrubs occurred in Section 6, and few of the installed container plants in Section 7 were present. Weed abatement on most of the site has not been adequate. Sections 2, 3, 4, 5, and 7 were thickly vegetated by non-native, annual weeds. Sections 1 and 6 had fewer weeds that occurred mainly in patches. Non-native plants included black mustard (*Brassica nigra*), tocalote (*Centaurea melitensis*), horehound (*Marrubium vulgare*), sourclover (*Melilotus indica*), red-stemmed filaree (*Erodium cicutarium*), scarlet pimpernel (*Anagallis arvensis*), prickly sow thistle (*Sonchus asper*


BIG TUJUNGA WASH
MITIGATION BANK
UPLAND RESTORATION
REVEGETATION AREAS
Figure 3-1
N
W
E
S
0 60 120 240 360 480 Feet
0 15 30 60 90 120 Meters
Chambers Group, Inc
Prepared For:
Los Angeles County
Department of Public Works
Date: December, 2000
Prepared By:
David W. Carr
Chambers Group Inc.
This map is not intended for site-specific purposes.
Legend
Project Boundary
Vegetation
Alluvial
Arundo
Disturbed
Non-Native
Roadside
Coastal Sage Scrub
Sycamore
Wash
Water
Willow Riparian
Restoration
Sycamore - Oak Woodland
Riparian Enhancement
1 Photo Locations
1 As-Built Sections
1
6
7
2
3
5
4
1
6
7
3a
2
3b
5
4
z:/proj/6629_BigT/Fig3-1_Upland_Restoration_Areas.mxd

ssp. *asper*), and annual grasses (*Bromus* spp., *Avena fatua*, *Hordeum murinum*, and *Vulpia myuros*). Recruitment of native plants was observed throughout the site, although very little recent germination was observed.

Erosion control devices have not been utilized and are not required for the site at this time. One of the trails adjacent to Section 6 had been damaged during winter storms and caused equestrians to make a new trail though the restoration area. This damage on the main trail has recently been repaired and will likely encourage riders to keep out of the restoration area. All other trails in the restoration area are well marked, clear of weeds and debris, and in good repair during the time of the inspection.

The irrigation system for the site has been destroyed by coyotes in several sections and therefore, is not currently in use. The fencing, trails, and habitat restoration signs were in good condition with the exception of one damaged sign on the ground in the northwestern corner of Section 5. There was no evidence of vandalism in any of the areas.

Maintenance Recommendations

Weeds were abundant throughout much of the site. Weed abatement activities should be continued as necessary to prevent weed competition with planted native species and to prevent the increase of the weed-seed bank. Future maintenance should be conducted before non-native plants set seed. A greater amount of seeded native species would aid in crowding out non-native weeds. Remedial seeding throughout the revegetation area including the damaged portion in Section 6 should be considered for the next appropriate planting season (winter 2005/2006).

SECTION 4.0 – EXOTIC PLANT REMOVAL PROGRAM

4.1 INTRODUCTION

The exotic plant removal program includes the removal of non-native plant species from Haines Canyon Creek, Big Tujunga Wash, and Tujunga Ponds. These invasive weeds compete with the native vegetation for light, water, and nutrients, and they also decrease the ecological value of the area. Removal of giant reed and other weed species will reduce competition pressure on the native southern arroyo willow plant community and allow for rapid recovery of the native habitat. The target non-native species include giant reed (*Arundo donax*), water hyacinth (*Eichhornia crassipes)*, and tamarisk (*Tamarix ramosissima*). Other target species include pepper trees (*Schinus molle* and *S. terebinthifolia*), castor bean (*Ricinus communis*), umbrella sedge (*Cyperus involucratus*), mustards (*Brassica* sp.), and tree tobacco (*Nicotiana glauca*), among others.

4.1.1 Purpose/Goals

Enhancement is intended to improve the habitat value of an existing plant community. The overall goal of the riparian enhancement plan is to remove invasive non-native plant species and to replant these areas with native riparian species. The enhancement plan consists of various tasks designed to remove the non-native species, prepare the areas prior to planting, and to install cuttings and container plant materials after the exotic species have been removed. The following sections describe the methods used for exotic plant species removal, and the progress of the program from January 2005 through June 2005.

4.2 METHODS

4.2.1 Giant Reed Treatment

Although treatment with Rodeo® was conducted, giant reed removal was not aggressive during the first half of 2005. Giant reed resprouts are treated with herbicide when appropriate. The regrowth is allowed to reach 3 to 4 feet in height, and is then treated with a highly concentrated (up to 100 percent) solution of Rodeo® using hand-held equipment. Treatment occurred during monthly maintenance periods. Retreatment will be continued throughout the growing season of 2005 to prevent competition within the newly planted areas.

4.2.2 Water Hyacinth Eradication

No water hyacinth removal was required during the first half of 2005

4.2.3 Tamarisk Eradication Technique

No tamarisk removal was required during the first half of 2005

4.2.4 Other Exotics

Some incidental removal of other exotic plant species such as black mustard (*Brassica nigra*), field mustard (*Brassica rapa*), milk thistle (*Silybum marianum*) and cheeseweed (*Malva parviflora*) from the restoration areas and along side trails was accomplished by hand pulling on several occasions during the first half of 2005.

4.3 STATUS/RESULTS

Minimal herbicide treatment was used to control giant reed growing within and adjacent to preserved vegetation in the riparian areas during the second quarter due to nesting bird season. New regrowth was seen throughout the site during the first two quarters and was treated with herbicide by the contractor periodically. No water hyacinth or tamarisk regrowth was observed. The contractor has concentrated mainly on giant reed and a few other target non-native species, including palm trees (*Washingtonia* sp. and *Phoenix* sp.), castor-bean (*Ricinus communis*), tree of heaven (*Ailanthus altissima*), edible fig (*Ficus carica*), Chinese elm (*Ulmus parvifolia*), and English ivy (*Hedera helix*).

Weed removal is an ongoing project and many of these species still require attention, therefore, exotic weed removal activities will continue as needed.

SECTION 5.0 – BROWN-HEADED COWBIRD PROGRAM

5.1 PURPOSE AND GOAL

The brown-headed cowbird (*Molothrus ater*) is an obligate brood-parasitic bird species, meaning this species does not build its own nests or tend to its own young. Instead, female cowbirds deposit one or more eggs into a host species' nest, often removing or destroying some of the host eggs. Brown-headed cowbird parasitism has been linked to the decline of numerous native bird species and therefore poses a major threat to many songbirds. Additionally, some host species, including the California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher (*Empidonax traillii extimus*), have also had to contend with habitat loss and fragmentation, which increase the risk of being parasitized (Harris 1991; Laymon 1987; Mayfield 1977; Stafford and Valentine 1985). Cowbird trapping has been successfully employed as a method of controlling cowbird numbers and the level of parasitism on threatened bird species. The goal of the brown-headed cowbird trapping and removal program at the Big Tujunga Wash Mitigation Bank site is to increase the overall value of the site as a conservation bank by allowing the sensitive riparian bird species to successfully reproduce without being parasitized by cowbirds.

5.2 METHODS

5.2.1 Program Status

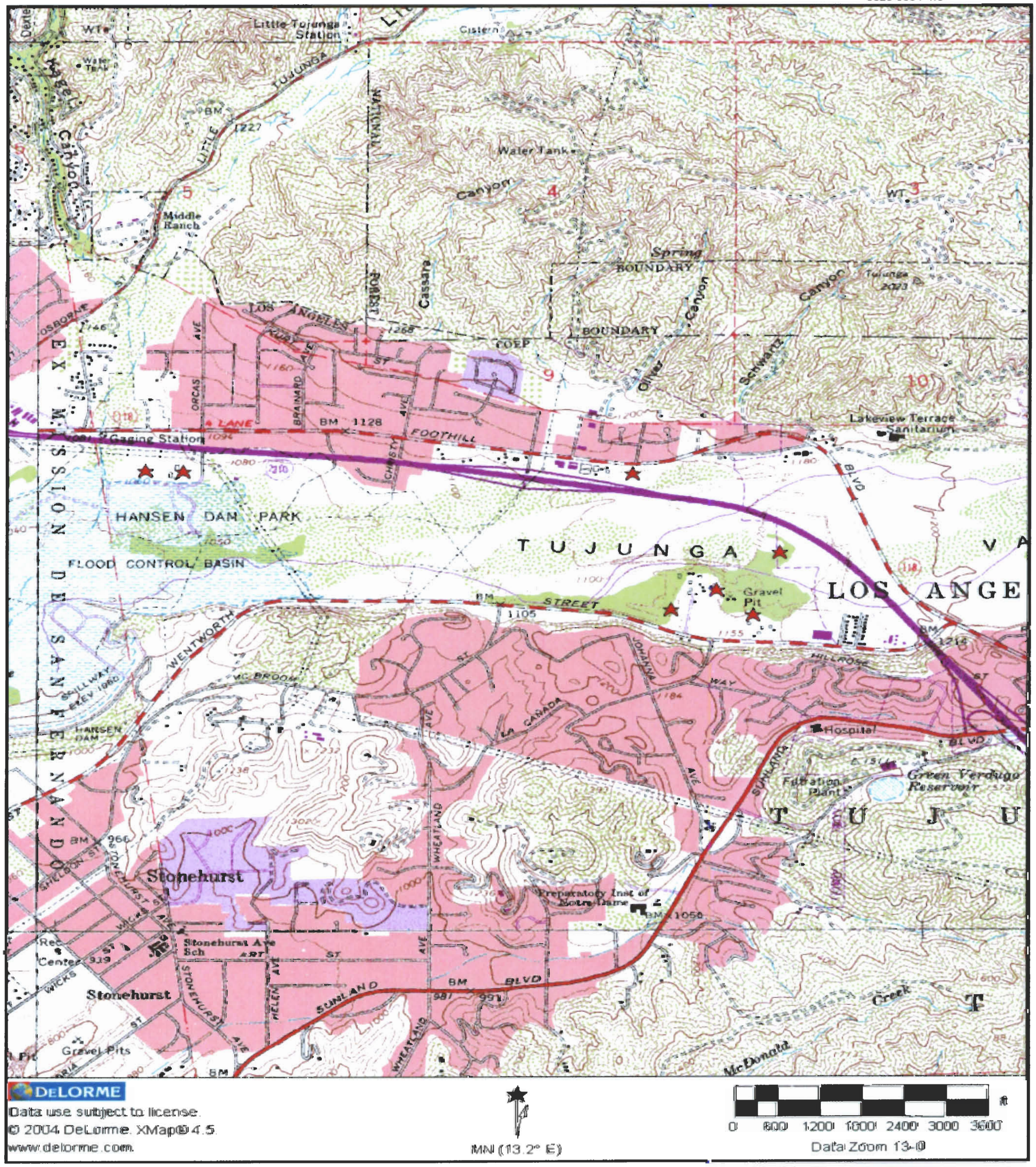
Cowbird trapping at the Big Tujunga Wash Mitigation Bank was implemented on March 30, 2005 and will end on July 30, 2005. The initial task was the identification of trap sites. Areas within and adjacent to the Mitigation Bank were surveyed during the two months prior to trap placement in order to determine the most appropriate trap locations. Considerations for trap location included accessibility for monitors, visibility to the target bird species, areas of known cowbird concentration or flight paths, and seclusion from the public to prevent vandalism.

The appropriate property owners (U.S. Army Corps of Engineers and private residents) were contacted and authorization was granted prior to accessing the three offsite locations. Notification and permitting letters were sent to U.S. Fish and Wildlife Service (USFWS) and CDFG prior to the start of the trapping season. Construction of the seven traps and onsite placement took place on March 10 and 11, 2005. Boards were placed over the top slots of each trap to prevent birds from entering prior to the start of trapping season.

A total of 37 decoys, 15 males and 22 females, were obtained from the Orange County Water District (OCWD) trapping program at Prado Dam on March 30, 2005. One extra male and one extra female were collected due to a miscount. The decoys were distributed among seven traps at a ratio of 2:3 (male:female). The Upland trap had a 3:4 ratio due to the two extra birds.

The brown-headed cowbird trapping program generally follows the methods described in the Griffith Wildlife Biology protocol which have been adopted by USFWS as the standard trapping methodology (GWB 1994a). Placement of perches, seed, water, natural foraging pads, and shade cloth was performed during the first several days of trapping. Additionally, during the first couple of weeks, seed was thrown on top of the traps to attract cowbirds. Bilingual (Spanish and English) informational signs explaining the purpose of the traps were attached to all seven traps. The boards were removed and all seven traps were fully operational on March 30, 2005. Figure 5-1 shows all seven trap locations on the USGS 7.5 minute topographic quadrangle.

6625 006 P1.6



SCALE 1:24,000
SOURCE: USGS San Fernando & Sunland Quadrangles

N

2005 TRAP LOCATIONS
FIGURE 5-1

Chambers Group, Inc.

5.2.2 Monitoring Status

Traps were checked daily from March 30 through June 30, 2005, including all weekends and holidays falling within this time frame and will continue to be checked through the end of trapping on July 31, 2005. Trappers collected data on the numbers of cowbirds captured, dead, and/or missing. Data on non-target birds were also recorded. Cowbird and non-target data was recorded by hand on data sheets. Newly captured cowbirds were wing-clipped and all cowbirds placed in a temporary holding cage. Non-target birds were then flushed from the trap. Daily maintenance included the cleaning and replenishment of seed and water dishes, adjustment of perches, removal of weeds within the traps, and placement of additional shade cloth as-needed.

5.3 RESULTS

A total of 112 cowbirds, consisting of 46 males, 62 females, and 4 juveniles, were trapped within the Big Tujunga Wash Mitigation Bank site and vicinity between March 30 and June 30, 2005. Of these, 29 cowbirds were trapped within the onsite traps in the Big Tujunga Wash Mitigation Bank and 83 cowbirds were trapped in the offsite traps.

Focused surveys for least Bell's vireo and southwestern willow flycatcher were conducted within the Mitigation Bank during 2005. Neither species was detected within the project area during these surveys. Although southwestern willow flycatchers were observed in willow riparian woodland habitat within the project area in 2004, there was no evidence or behavioral cues observed that would suggest that the flycatchers attempted to nest at the site (Bloom and Kamada 2004). Because these sensitive species did not nest within the mitigation bank during 2004, brood parasitism on these species by cowbirds was not likely.

Minor vandalism on the traps occurred during the first two months of trapping and was significantly less problematic than the first two years of the program. Two offsite traps were vandalized; in both cases, a hole was cut into the mesh on the back side of the trap. The first incident occurred at trap number 3 (Esko) prior to the start of trapping and no birds escaped. The second incident took place at trap number 2 (Equestrian B) during the second month of trapping. In both cases, the traps were repaired and activated the same day. No other problems with vandalism have occurred during the month of June. In addition, predation on the birds in the traps, by raptors, mammals, or snakes, has not a problem during the 2005 trapping program.

During the course of the 2005 trapping season, 112 non-target birds were captured during the first 3 months of trapping and capture rates are expected to continue at a steady rate through July 31, 2005. A total of six non-target birds died in the traps, likely due to competition and pecking within the trap. None of the non-target birds captured are considered sensitive species by the resource agencies.

5.4 DISCUSSION

In terms of brown-headed cowbird capture rates, the 2005 trapping season has been very successful and had the second highest cowbird capture rates so far since implementation of the trapping program in 2001. As of June 30, a total of 112 cowbirds, consisting of 46 males, 62 females, and 4 juveniles have been captured in 2005. In comparison, total of 89 cowbirds, consisting of 46 males, 37 females, and 6 juveniles were trapped in 2004, a total of 20 cowbirds consisting of 9 males, 11 females, and 0 juveniles were trapped in 2003; a total of 173 cowbirds consisting of 66 males, 105 females, and 2 juveniles were trapped in 2002; and a total of 70 cowbirds consisting of 37 males, 24 females, and 9 juveniles were trapped in 2001. The three offsite trap locations have accounted for the majority of the cowbird captures. Cowbirds have been seen perching on top of and in the immediate vicinity of the traps, and with we remain optimistic that the capture totals should remain steady, if not continue to increase, as the trapping season progresses.

Efforts were made to reduce non-target mortality prior to closing down traps and included switching out the aggressive decoy cowbirds. Two traps were closed down prematurely. Trap number 5 (Cottonwood) was closed on June 6, 2005 and trap number 6 (Restoration) was closed on June 16, 2005.

SECTION 6.0 – EXOTIC WILDLIFE REMOVAL & NATIVE FISH SAMPLING PROGRAMS

6.1 INTRODUCTION

Dr. Dan Holland, Dr. Camm Swift, and Mr. Robert Goodman conducted initial surveys at the site to determine the most appropriate method of eradication of exotic wildlife species and enhancement for native fishes and amphibians. The MMP provides direction for the eradication of exotic aquatic wildlife during the 5-year duration and also contains a more detailed description of the various methodologies available for exotic wildlife removal.

6.2 PURPOSE AND GOALS

At present, suitable habitat on the project site for sensitive native aquatic vertebrates is almost exclusively confined to the portions of Haines Canyon Creek downstream from the ponds. The Tujunga ponds essentially do not provide good habitat for most native vertebrate species because they support a large population of non-native predatory amphibians, fishes, and crayfish. In addition, the ponds likely contribute to substantial negative impacts on the native vertebrate fauna downstream by fostering the presence of a source population of non-native invertebrates bullfrogs and fishes. These exotic species may directly affect natives through predation or competition, or indirectly through transmission of pathogens and/or parasites. Additionally, modification of the stream environment by the creation of cobble dams (for "swimming holes") along Haines Canyon Creek continue to be problem for native species. These modifications exacerbate problems with control of exotic species in the stream by creating large areas of habitat suitable for exotic species and less suitable or unsuitable for native species. Removal of these cobble dams and prevention of further construction is a high priority.

The ultimate goals of this project are:

1. to restore or create and maintain habitat for native fishes and other sensitive vertebrate species;
2. to eliminate, diminish, and/or restrict habitat which fosters the maintenance of exotic species; and
3. to engage in localized or site-by-site direct control efforts for exotic species to complement goals 1 and 2.

The exotic wildlife removal program consists of the removal of non-native fishes, bullfrogs (*Rana catesbeiana*), and red swamp crayfish (*Procambarus clarkii*) from Haines Canyon Creek and the Tujunga Ponds. Bullfrogs are not native to the area and pose a major threat to native wildlife because they have voracious appetites and prey upon the sensitive fishes, frogs, toads, and birds.

6.3 METHODOLOGY

6.3.1 Exotic Wildlife Removal

Six distinct methods are used to capture the aquatic organisms, including gill nets, small seines, crayfish and minnow traps, spearfishing, dip/lift nets, and turtle traps. "Standard" gill nets, namely five larger meshed nets which ranged from 1.5 inch (3.7 cm), 1 inch (2.5 cm), and 0.5 inch (1.2 cm), are sometimes used. Visual observations and surveys are also made. Traps are typically baited with small cans of mackerel with tomato sauce and "seafood grill" cat food with holes punched in the cans.

6.3.2 Native Fish Monitoring

At each native fish collection, the transect is blocked at the upper and lower end with a 0.125-inch mesh seine. This is done with minimal disturbance to the transect. Then, two people seine for at least 1 hour with a variety of techniques to exhaustively sample all of the fishes. Native fishes are held in large buckets and oxygenated frequently. At the end of each collection, the native fishes are counted, their sizes are estimated to the nearest 10 centimeters, and then are released back into the transect area. In addition to collecting data on the fishes, habitat features including water temperature, substrate type, depth, width, available cover, canopy, and gradient or slope are also measured and recorded.

6.4 STATUS/RESULTS

Extensive exotic wildlife removal efforts were conducted during the first half of 2005. Dr. Dan Holland and his staff removed bullfrogs, large mouth bass, goldfish, green sunfish, mosquito fish, and crayfish for 14 days in February 2005 and 25 days in March 2005. This concentrated effort was conducted prior to the spawning season for these exotic wildlife species. The objective was to remove potential non-native breeding/spawning wildlife prior to their reproduction cycle, thus minimizing propagation of their species in the ponds. This effort was conducted at the recommendation of Dr. Holland, as his theory was that it was cost effective to expend the year's budget prior to the reproduction cycle.

SECTION 7.0 – TERRESTRIAL WILDLIFE MONITORING

7.1 PURPOSE AND GOALS

The ultimate goal of the Big Tujunga Wash Mitigation Bank site is to provide for long-term preservation, management, and enhancement of the biological resources for the benefit of the state's fish and wildlife resources. The project site is presently used by various common and sensitive wildlife species. The primary goal of the Big Tujunga Wash Mitigation Plan is to establish breeding and foraging habitat for resident and migratory wildlife species associated with the riparian, alluvial scrub, and aquatic habitats. Observations of common wildlife and plant species within the mitigation area have been documented in previous surveys. In addition, the MMP requires that wildlife-monitoring surveys be conducted in order to document use of restoration areas by sensitive wildlife species. Use of restored habitats by the following sensitive wildlife species will be considered progress indicators of revegetation success.

7.2 LEAST BELL'S VIREO

7.2.1 <u>Methodology</u>

Qualified wildlife biologists familiar with the songs, calls, and visual identification of the least Bell's vireo conducted eight focused protocol surveys. These surveys were conducted at 10-day intervals during the period from April 10 through July 31. The surveys were conducted on April 14, 25, May 5, 18, 24, June 1, 14, 23, 2005 and a final survey is scheduled for July 7, 2005. The biologists surveyed no more than 50 hectares of suitable riparian habitat per day. All surveys were conducted between the hours of 6:00 a.m. and 11:00 a.m. and were in accordance with USFWS guidelines (2001). The surveyors conducted the surveys by walking all suitable riparian habitats as well as stationing themselves in the best locations within the riparian habitat in order to listen and look for vireos. All vireo detection, including number of individuals, sex, age, and leg bands, were recorded on standardized data sheets.

7.2.2 <u>Results</u>

Least Bell's vireos were not observed or detected during the seven focused surveys at the Big Tujunga Wash Mitigation Bank project site through June 2005. Additionally, southwestern willow flycatchers or western yellow-billed cuckoos (*Coccyzus americanus occidentalis*) were not seen or heard during any of the vireo surveys.

7.3 SOUTHWESTERN WILLOW FLYCATCHER

7.3.1 <u>Methodology</u>

Permitted biologists, Mike McEntee (TE-758175) and Shelby Howard (TE-092163-0), have conducted focused surveys for the southwestern willow flycatcher. Survey methods followed the mandatory protocol developed by Sogge et al. (1997) and the subsequent revised protocol developed by the U.S. Fish and Wildlife Service (USFWS 2000). Surveys were conducted on May 27, June 17 and 27, 2005 and two more surveys are scheduled for July 5 and 13, 2005. Surveys were conducted between dawn and 10:00 a.m., during suitable weather conditions, by walking slowly and methodically under the canopy of the willow riparian woodland. Taped vocalizations of the species were played every 75 to 100 feet in an attempt to elicit a response from potentially present individuals. The tape was played for roughly 15 seconds and then stopped for one or two minutes to listen for a response. All southwestern willow flycatcher detection, including number of individuals, sex, age, and leg bands, will be recorded on standardized data sheets. All wildlife observed or detected during the surveys has been documented. As of the end of June 2005, no southwestern willow flycatchers have been detected.

7.3.2 Results

Southwestern willow flycatchers were not observed or detected during the first three focused surveys at the Big Tujunga Wash Mitigation Bank project site through June 2005. Additionally, least Bell's vireo or western yellow-billed cuckoos (*Coccyzus americanus occidentalis*) were not seen or heard during any of the southwestern willow flycatcher surveys.

7.4 ARROYO SOUTHWESTERN TOAD

7.4.1 Methodology

Qualified wildlife biologists familiar with the habits, appearance, and vocalizations of the arroyo southwestern toad have conducted surveys, which follow the 1999 USFWS Survey Protocol Guidelines for the arroyo toad (*Bufo californicus*). The protocol states that at least six surveys must be conducted during the breeding season, which generally occurs from March 15 through July 1, with at least seven days between surveys and with at least one survey per month during April, May, and June. Surveys include both daytime and nighttime components conducted within the same 24-hour period (except when arroyo toads are detected in the survey area). Surveys were conducted on April 18, 27, May 12, 26, June 14, and 28, 2005. No evidence of the presence of arroyo southwestern toads was detected at the Big Tujunga Wash Mitigation Bank site in 2005.

Daytime surveys were conducted by walking slowly along stream margins and in adjacent riparian habitat, visually searching for (but not disturbing) eggs, larvae, and juveniles. Nighttime surveys were conducted by walking slowly and carefully on stream banks. Surveyors stopped periodically and remained still and silent for approximately 15 minutes at appropriate sites to wait for arroyo toads to call. Nighttime surveys were conducted between one hour after dusk and midnight, when air temperature at dusk was 55 degrees Fahrenheit or greater.

7.4.2 Results

Due to the high levels of rainfall this season, arroyo toad surveys were conducted for 2005. This is only the second year that water levels have been high enough to warrant arroyo toad surveys since the beginning of the project. No arroyo toads were detected on the mitigation bank site during the 2005 surveys nor were they found during surveys in 2003.

SECTION 8.0 – TRAILS PROGRAM

8.1 PURPOSE/GOALS

The overall goal of the trail system is to allow for recreational activity while minimizing impacts on the habitat quality at the Big Tujunga Wash Mitigation Bank site. Essential to this process is the effort of returning unnecessary trails to their natural condition for the overall improvement of habitat quality. Many of the trails occur in the riparian habitat along Haines Canyon Creek and the Tujunga Ponds. The closure of several riparian trails was essential to the success of riparian restoration and enhancement. Therefore, the trails program is an integral part of the evaluation process to help determine the success of the overall riparian restoration and enhancement program. Thus, it is evaluated and reported as part of the functional analysis of the riparian habitat and during the regular maintenance and monitoring of the riparian habitat restoration sites. It is also essential for determining if recreational use is having negative impacts on the success of the riparian restoration and enhancement program, or if wildlife use of the site is being compromised. The following sections describe implementation tasks that were conducted during the first two quarters of this year, problems that were encountered, and future proposed tasks.

8.2 TRAILS MAINTENANCE AND RESTORATION

Figure 8-1 shows the trails map of the Big Tujunga Wash Mitigation Bank. The trails map was overlaid on a 1 inch = 200 feet aerial photograph of the site and shows the trails as they existed prior to project implementation. Also shown are trails that are currently present, but that were closed (reclaimed) during the second year of implementation, and the four designated main trails that serve as safe and scenic recreational trails. The four main trails include the Water Trail, Bert Bonnett Trail Loop, Dr. Au Trail, and Pond Trail.

8.2.1 General Trail Conditions

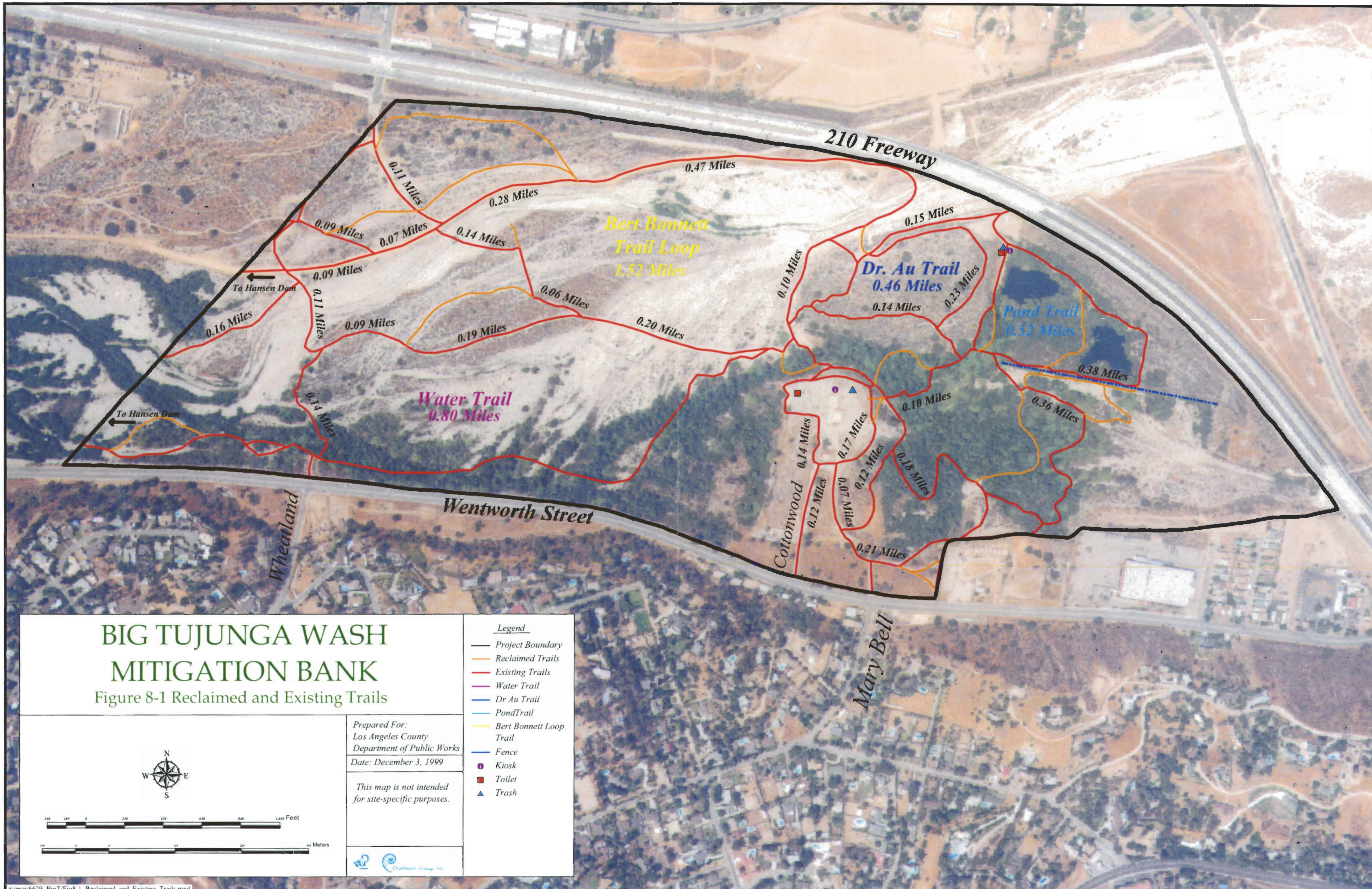
Due to two severe storms in early 2005 and abnormally high rainfall throughout the winter season, many of the trails were flooded or washed out. Chambers Group visited the site in January 2005 to access the damage to the trails after the first storm and in February 2005 to clear the trails of debris brought in by the water flow of the first storm and to re-establish the trail system. The majority of the fallen trees and all branches were removed from the trail and used to line and mark existing trails. Safe paths around flooded trails and high flowing waters were established using the best choices to limit further impact. Shortly after this visit, the second storm caused more damage to the site and diminished the prior efforts to clear the trails. Chambers Group is continuing monthly trail maintenance visits but will not attempt to re-establish the trails until water levels have subsided substantially. It has been noted that the poison oak and other vegetation needs to be trimmed back in several areas. Additionally, the silt fencing along portions of the creek needs to be removed. Natures Image has been informed of these trails issues.

Due to high levels of water and fallen trees, some portions of the established trails are not accessible by foot or horseback and will remained closed at this time. A trail re-establishment day is planned for Saturday, July 23, 2005.

Flood Maintenance repaired the erosion gully caused by the winter storms. Access to the road was restored and horse and foot traffic have been diverted away from the small trail through the upland vegetation area.

8.2.2 Rock Dams

Rock dams did not seem to be as prevalent during this reporting period. High water flows may have aided in removing the rocks. Limited use of the site due to the adverse weather conditions as well as public education regarding the harmful effects on the dams may also be contributing to the lack of dams.



BIG TUJUNGA WASH
MITIGATION BANK
Figure 8-1 Reclaimed and Existing Trails

8.2.3 Information Kiosks and Informational Trail Signs

The kiosk located in the Cottonwood area is basically intact, however, the glass on one of the doors was broken by a rock near the end of June 2005. Additionally, the haul road kiosk suffered damage when the northern bank of the Big Tujunga Creek eroded by the storm, causing the kiosk to fall into the streambed below. The kiosk was removed from the streambed in June by flood maintenance and the replacement of this kiosk is being evaluated by LADPW.

Although the original kiosk display boards were made with a special ultraviolet (UV) coating to protect them from sun damage, the replacement board installed in the Cottonwood kiosk by LADPW at the end of 2004 did not have the same treatment and extreme conditions (heat, sun, and rain) have adversely affected it.

8.2.4 Unauthorized Overnight Campers and Trail Safety

Use of the site by unauthorized overnight campers continues to be an issue. Although some evidence of the presence of overnight campers has been apparent, Chambers Group observed no unauthorized encampments during trails maintenance visits between January and June 2005.

8.2.5 Trash Receptacles and Portable Toilets

Due to heavy rains, trash and debris is present throughout the site. Chambers Group has attempted to remove trash from the site during scheduled visits and plans to schedule a trash clean up day. The portable toilets appear to be in good condition.

SECTION 9.0 – PUBLIC AWARENESS AND OUTREACH PROGRAM

9.1 PURPOSE AND GOALS

Numerous key stakeholders and community groups have shown great interest in the Big Tujunga Wash Mitigation Bank project. These stakeholders include elected officials, who are sensitive to the needs of the community; local, state, and federal agencies, and local residents. Given the community's involvement with the site, the goal of the Public Awareness and Outreach Program is to keep the stakeholders and public informed of the ongoing enhancement activities at Big Tujunga Wash Mitigation Bank. Among the provisions of the Program are bi-annual newsletters (*The Big T Washline*) designed to provide current information regarding restoration activities on the site, and regularly scheduled community meetings to give interested parties an opportunity to participate in the management of the site.

9.2 ACTIONS TAKEN

9.2.1 Community Advisory Committee Meeting

The Community Advisory Committee (CAC) meetings will be held on a bi-annual basis for the remainder of the implementation period (2005). The CAC consists of residents and representatives from local community organizations as well as agency and elected officials. The first CAC meeting in 2005 was held on April 28 at the Hansen Yard.

Before the meeting, a meeting reminder was mailed to all stakeholders. After the meeting, the minutes, action list, attendance, and wall graphics were mailed to all meeting participants. Additionally, the spring edition of the *Big T Wash Line* was prepared and sent to LADPW. The site advisory panel present at the meeting included Chris Stone and Michele Chimienti of Los Angeles County Department of Public Works (Public Works), Larry Freeberg and Shannan Shaffer of Chambers Group, and Pat McLaughlin of Moore Iacofano Goltsman, Inc. (MIG). The agenda for the meeting included a review of the action items from the previous CAC meeting (October 2004), an overview of programs to be implemented 2005, and site maintenance issues. A brief summary of the key points discussed at the meeting is provided in the next sections. The full text of the meeting minutes and attendance is provided in Appendix C.

9.2.1.1 Action Items From CAC Meeting

Current action items included discussions of the following:

- General Site Signage/Kiosks: The kiosk sign by the haul road was washed out during the winter storms and LADPW is going to attempt to pull it out of the wash. Provided the damage is not too extensive, the kiosk will be repaired and moved to the Wheatland entrance.

- Tamayo Property: The purchase of the property is in the final phases. The paperwork is still at the Treasure Tax Collectors Office but has not yet made it onto the board agenda.

- Website: The LADPW website is up and can be accessed at www.ladpw.org. It includes a link to the Tujunga Council site on the main page. To access the Big T site, click environmental and on the top right of the screen click on the Big T site. Chris Stone from LADPW requested feedback and recommendations from anyone visiting the site. Also, Mary Benson requested a list of wildlife, including photos, of the species found at Big T to be included on the website.

- Unauthorized Overnight Campers: Patrols are been made on the site each weekend and updates can be found on the website. Public Works asked for feedback on the overnight camper situation. Barbara Tarnowski reported a new encampment on the hillside, which will be followed up on by the patrol.

Dan Holland sighted a Bronco near the ponds during one of his visits. The police were called but it is unknown if the person was cited. The gates were locked and it is unclear as to how the individual entered the site.

- Trails: A few of the CAC members now feel that the use of trails signs is not a good idea. Mary Benson suggested landscaping trails through the North end of the site and that potential funds from the Foothill Bridge widening project from the City of Los Angeles Department of Transportation may be available for this project. It will be discuss as to what to do with the trail signs that have already been made.

  A trail clean-up day is planned for Saturday, July 23. Chambers Group and LADPW will lead groups of volunteers from the community to re-establish the trails by laying down wood chips and lining with rocks. Notices will be placed in community bulletins and flyers will be put up in the remaining cottonwood kiosk and at some of the local businesses.

- Graffiti: Public Works' graffiti hotline number is (800) 675-4357. New graffiti is present under the freeway in the wash areas and needs to be removed.

- Pond Crossing/Footbridge: The footbridge was washed out by the storms and unsuccessful attempts have been made to replace it. This will no longer be an action item. CAC members asked if the fencing around the ponds could be removed.

- Water Quality Report: Montgomery Watson performed Water quality tests in April. The results have not yet been received but will be posted on the website once they are available.

- Cottonwood Area as a Staging Area: This is was an action item raised by Terry Kaiser at the October meeting. LADPW has requested a proposal from Terry Kaiser but it has not been presented. If a proposal is not given then this will no longer be an action item.

- Fencing: Fencing is not yet up by Radland due to questions regarding property lines. It has been suggested that the fencing be brought further in to the bank. Barbara Tarnowski reported a cut fence and a pole knocked over by the locked gate.

- Cottonwood Road: The cottonwood road was washed out by the storms and will be repaired by flood maintenance next week. The culvert by the erosion was painted green due to concerns about reflection.

- Trash removal: Flood maintenance removed trash by Wentworth including part of a car. An encampment in that area was also cleaned out.

9.2.1.2 Site Maintenance

Michele Chimienti discussed site maintenance and safety issues as presented in the above section on Action Items.

9.2.1.3 Status of Ongoing and Planned Programs at the Site

Ms. Shaffer presented an overview of the current status of each program and programs to be implemented between January 2005 and June 2005. The protocol surveys for sensitive wildlife species, the least Bell's vireo, southwestern willow flycatcher, and brown-headed cowbird trapping were conducted through July 2005. Focused surveys to date have not detected the presence of least Bell's vireo, southwestern willow flycatcher, or arroyo toad. A total of 112 cowbirds, consisting of 46 males, 62 females, and 4 juveniles, were trapped within the Big Tujunga Wash Mitigation Bank site and vicinity between March 30 and June 30, 2005. Trapping efforts will continue through July 31, 2005. Extensive exotic aquatic wildlife removal efforts were conducted during the first quarter of this reporting period. Sections 5.0, 6.0, and 7.0 discuss the detailed results of these programs. Water quality sampling was conducted on April 7, 2005 and is discussed in Section 10.0.

9.2.1.4 Elected Official Briefing

Chambers Group subcontracted MIG to provide expertise in public involvement and facilitation. MIG has facilitated all CAC meetings and has actively contacted local officials and agency personnel to update them on the status of the MMP measures. In an effort to keep elected officials up-to-date on happenings and emerging issues with the site, MIG has implemented periodic briefings for the offices of City Council members Alex Padilla and Wendy Greul, Assemblyperson Cindy Montanez, and Supervisor Michael D. Antonovich. The offices of the elected officials are supportive of the project and are interested in participating in advisory group meetings, coordinating their offices' activities with the project, and in serving as communications links with constituents. The individual briefing of the elected officials' offices was not conducted prior to the April CAC meeting due to scheduling/contractual issues. An elected official briefing will be conducted prior to the October CAC meeting.

9.3 FUTURE ACTIONS

The CAC meetings will be held on a bi-annual basis for the remainder of the implementation period. The next CAC meeting is scheduled for 7:00 to 9:00 p.m. on Thursday, October 27, 2005 at the Hansen Yard. The Big T Wash Line will continue to be published on a bi-annual basis for the remainder of the MMP implementation. The next edition will be published in fall 2005.

SECTION 10.0 – WATER QUALITY MONITORING PROGRAM

10.1 INTRODUCTION

In order to address both upstream and downstream water quality issues at the Big Tujunga Wash site, a water quality monitoring program was implemented. The monitoring program addresses specific water quality issues, such as pesticide/fertilizer percolation and run-off and subsequent groundwater contamination, which may occur due to upstream development, including the Angeles National Golf Club (formerly known as Canyon Trails Golf Course). Monitoring for elevated levels of nitrogen and organophosphates in the flow entering the site will help determine whether nitrate-laden irrigation water or pesticide run-off from upstream developments are affecting the Big Tujunga Wash Mitigation Bank. The water quality monitoring program at Big Tujunga Wash will complement the monitoring program that is a requirement of the upstream Angeles National Golf Club.

Grading at the Angeles National Golf Club began in October 2002, construction was complete by fall 2003, and the golf club was opened to the public at the end of June 2004. Additional construction of a club house is in progress and is scheduled for completion in 2006. Since opening in 2004, Primo™ (a grass growth inhibitor used for turf management) has been applied as necessary for turf grass maintenance and Rodeo® is applied as necessary for giant reed control.

10.2 PURPOSE/GOALS

The water quality program is specifically designed to look for changes in water quality that may potentially affect sensitive native fishes and amphibians in the aquatic environment. The LACDPW personnel established baseline water quality conditions on April 12, 2000, prior to the implementation of the MMP programs. The LACDPW personnel conducted the baseline water quality sampling in accordance with accepted protocols, and a certified water quality laboratory conducted the analyses. The water quality program at Big Tujunga Wash includes quarterly monitoring for the following water quality parameters:

- Total Kjeldahl Nitrogen (TKN)
- Nitrite (NO_2)
- Nitrate (NO_3)
- Ammonia (NH_4)
- Orthophosphate - P
- Total coliform
- Total Fecal Coliform
- Organochlorides *
- Total Phosphorus - P
- Organophosphate
- Turbidity
- Glyphosate
- Chlorpyrifos
- 1 golf course fungicide *
- Dissolved oxygen (DO)
- Total residual chlorine
- Temperature (degrees Celsius)
- pH (pH units)

* not sampled on April 7, 2005

10.3 METHODOLOGY

An experienced Water Quality Specialist collected samples on April 7, 2005, and the samples were taken to Montgomery Watson Laboratories, Pasadena, California, to be analyzed within the standard limits after sampling is completed. The results of the water quality analyses are summarized in quarterly letters and in an annual report distributed to Public Works, CDFG, Regional Water Quality Control Board (RWQCB), and USFWS. The Water Quality Monitoring Program will continue on a quarterly basis throughout the 5-year duration of the MMP Program. Table 10-1 lists the locations of the four water quality monitoring sites.

Table 10-1
Big Tujunga Wash
2004 Water Quality Sampling

Sampling Locations	Latitude	Longitude	Times of Samples
			April 7, 2005
Haines Canyon Creek, just before exit from site	N 34 16' 2.9"	W 118 21' 22.2"	1000 1015
Haines Canyon Creek, inflow to Tujunga Ponds	N 34 16' 6.9"	W 118 20' 18.7"	1225 1240
Haines Canyon Creek, outflow from Tujunga Ponds	N 34 16' 7.1"	W 118 20' 28.3"	1325 1340
Big Tujunga Wash	N 34 16' 11.7"	W 118 21' 4.0"	1120 1135

In addition to water quality monitoring conducted during the first quarter of 2005, discharge measurements in the outlet of Big Tujunga Ponds and in Haines Canyon Creek leaving the site were estimated. Stream velocities in these areas were estimated using a simple field procedure that uses a float (an object such as a ping-pong ball, pine cone, etc.) to measure stream flow.

10.3.1 Location of Sampling Sites

Water quality monitoring sites were permanently established with a Global Positioning System (GPS) receiver at various locations along Haines Canyon Creek and Big Tujunga Wash. Three monitoring sites were located along Haines Canyon Creek. One site was located at the inflow to the Tujunga Ponds, a second site was located at the outflow from the Tujunga Ponds, and the third site was located in Haines Canyon Creek, just before it exits the Mitigation Bank and the fourth water quality monitoring station was established in Big Tujunga Wash. Figure 10-1 shows the locations of the four sampling locations.

10.3.2 Description of Analyses

A portion of the water quality parameters were analyzed in the field using the following field equipment:

- YSI Model 57 – dissolved oxygen and temperature
- HACH DR 700 – total residual chlorine
- Orion 230A – pH

All other analyses were performed in duplicate at Montgomery Watson Laboratories, Pasadena, California.

10.4 RESULTS

10.4.1 Quarterly Monitoring

In general, water quality on the site during the first quarter was relatively good and was comparable to baseline conditions established in 2000 for most parameters. Turbidity was low at all stations and the turbidity levels in Big Tujunga Wash and Haines Canyon Creek were higher than in the Tujunga Ponds, reflecting the higher flows present at these stations. Glyphosate (the test parameter for Rodeo®) was not detected at any station. Table 10-2 lists the data from sampling conducted during the first quarter of 2005. Table 10-3 summarizes the results from sampling conducted during the first quarter of 2005. Second quarter sampling took place on June 30, 2005 and results of this sampling will be presented in the annual report for 2005.

BIG TUJUNGA WASH MITIGATION BANK

Prepared For: Los Angeles County Department of Public Works

Date: December 3, 1999

Prepared By: Leslie Backus, Chambers Group Inc.

This map was produced using ESRI's ArcView software.

Figure 10-1
Water Quality Sampling Stations

WQ Station No.	Name
1	Inflow to Tujunga Ponds
2	Outflow from Tujunga Ponds
3	Big Tujunga Wash
4	Haines Canyon Creek, just before exit from site

Table 10-2
Summary of Big Tujunga Wash Water Quality Results
1st Quarter 2004 (4/7/05)

Parameter	Units	Inflow to Tujunga Ponds 1	Inflow to Tujunga Ponds 2 (duplicate)	Outflow from Tujunga Ponds 1	Outflow from Tujunga Ponds 2 (duplicate)	Big Tujunga Wash 1	Big Tujunga Wash 2 (duplicate)	Haines Cyn Creek exiting Site 1	Haines Cyn Creek exiting Site 2 (duplicate)
Temperature	°C	19.0	--	17.8	--	17.0	--	15.3	--
Dissolved Oxygen	mg/L	7.4	--	7.7	--	11.5	--	11.4	--
PH	std units	7.2	--	7.3	--	9.0	--	9.0	--
Total residual chlorine	mg/L	ND	--	ND	--	ND	--	ND	--
Ammonia-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Kjeldahl Nitrogen	mg/L	0.44	0.31	0.27	0.30	0.23	0.24	0.21	0.54
Nitrite-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-Nitrogen	mg/L	5.4	5.4	3.2	3.6	ND	ND	ND	ND
Orthophosphate-P	mg/L	0.022	0.021	0.025	0.026	0.011	0.012	ND	ND
Total phosphorus-P	mg/L	0.021	0.024	0.022	0.022	0.010	ND	ND	0.021
Glyphosate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Chloropyrifos*	ng/L	ND	ND	ND	ND	ND	ND	ND	ND
Turbidity	NTU	0.50	0.70	0.60	0.50	1.6	1.3	1.4	1.3
Fecal Coliform Bacteria	MPN/100ml	2	2	8	13	2	2	8	4
Total Coliform Bacteria	MPN/100ml	500	220	500	700	170	21	500	21

NTU: nephelometric turbidity units
MPN: most probable number
ND: non-detect
-- No duplicate samples taken
***:** Also tests for the following chemicals: diazinon, sulprofos, demeton, dichlorvos, disulforton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malthion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate. Samples were all non-detect for these.

Table 10-3
Big Tujunga Wash
Summary of the 1st Quarter of 2004 Water Quality Sampling Results

Parameter	Summary
Temperature	Observed temperatures were below levels of concern for growth and survival of warm water fish species. Temperatures in Aprils 2005 were generally similar to the previous first quarter sampling periods.
Dissolved Oxygen (DO)	Dissolved oxygen levels at the three stations with flow were above the recommended minimum for warm water species of 5.0 mg/L. Oxygen levels in the inflow t and outflow from the ponds were lower than in the first quarter sampling periods for 2002, 2003 and 2004, but slightly higher than in 2001. The oxygen levels in Haines Canyon Creek were generally higher than in the first quarters of previous sampling years.
pH	The pH of water from the Tujunga Panks was within the 6.5 to 8.5 range identified in the Basin Plan. The pH values observed in Big Tujunga Wash and Haines Canyon were above the Basin Plan's upper limit
Total Residual Chlorine	Residual chlorine was not detected at any station.
Nitrogen	Nitrate-nitrogen at all stations was below the drinking standard of 10 mg/L. Ammonia was not detected at any station.
Phosphorus	Total phosphorus and orthophosphorus levels were present in very low levels in the Tujunga Ponds and in Haines Canyon Creek. Total phosphorus levels at these sites were within the EPA's recommended range for streams to prevent excess algae growth (<0.05-0.10 mg/L). Orthophosphate in Big Tujunga Wash was at the High en of the EPA's recommended range.
Glyphosate	Glyphosate was not detected at any station.
Chloropyrifos	Chloropyrifos was added to the list of sampling parameters in the fourth quarter of 2004. Chloropyrifos and the other pesticides tested using EPA's analytical method 625 were not detected at any station in the first quarter.
Turbidity	Turbidity was low at all stations. Turbidity levels in Big Tujunga Wash and Haines Canyon Creek were higher than in the Tujunga Ponds, reflecting higher flows present at these stations.
Bacteria	Fecal coliform levels at all stations were above the water contact recreation standard of 200 MPN. In general, both fecal and total coliform levels were similar to or lower than levels observed in previous first quarter sampling periods.

10.4.2 <u>Discharge Measurements</u>

Discharge flows measured in the outlet from Big Tujunga Ponds, in Haines Canyon Creek leaving the site, and in Big Tujunga Wash were approximated. Flows on April 7, 2005 were estimated at:

- Outlet from Big Tujunga Ponds — 14.8 cubic feet per second (cfs)
- Haines Canyon Creek leaving the site — 94.9 cfs
- Big Tujunga Wash — 151.2 cfs

10.5 DISCUSSION

Water quality at the mitigation bank during the first quarter of 2005 was relatively good and there was no contamination of the waters due to pesticides or fertilizers. The golf club has continued to cooperate with Public Works. The golf club is fully operational, thus it is critical that the water quality program continue to monitor all sampling parameters. In December 2004 and February 2005, the golf club provided Montgomery Watson with its monthly pesticide use reports.

SECTION 11.0 – REFERENCES

Brinson, Mark

1985 *The HGM Approach Explained*. National Wetlands Newsletter.

Chambers Group, Inc.

1998 *Draft Biological Resources Assessment and Functional Analysis of a Site in Big Tujunga Wash, Los Angeles County, California.* Prepared for County of Los Angeles Department of Public Works, Alhambra, California. April 1998.

2000 *Final Master Mitigation Plan for the Big Tujunga Wash Mitigation Bank.* Prepared for the Los Angeles County Department of Public Works, Alhambra, California. April 2000.

2001 *Final 2001 Annual Brown-headed Cowbird Trapping and Removal Program.* Prepared for the Los Angeles County Department of Public Works, Alhambra, California, October 2001.

2004 *Final 2004 Annual Report for the Big Tujunga Wash Mitigation Bank.* Prepared for the Los Angeles County Department of Public Works, Alhambra, California, April 2005.

Garrett, K. and J. Dunn

1981 *Birds of Southern California Status and Distribution.* Los Angeles Audubon Society Publication.

Ellison, J. P.

1984 A revised classification of native aquatic communities of California. California State Resources Agency, Sacramento, California No. 84-1.

Graham, Frank Jr.

1998 *Bad, Bad, Birds*. Audubon. September-October: 104-108.

Griffith Wildlife Biology (GWB)

1994a *Brown-headed Cowbird Trapping Protocol.* Unpublished document prepared by Jane C. Griffith and John T. Griffith, Griffith Wildlife Biology, Calumet, Michigan.

1994b *San Joaquin Hills Transportation Corridor; Brown-Headed Cowbird Removal Program.* Prepared for California Corridor Constructors.

Harris, J. H.

1991 *Effects of Brood Parasitism by Brown-Headed Cowbirds on Willow Flycatcher Nesting Success Along the Kern River, California. Western Birds* 22:13-26.

Laymon, S. S.

1987 *Brown-Headed Cowbirds in California: Historical Perspectives and Management Opportunities in Riparian Habitats. Western Birds* 18:63-70.

Mayfield, H. F.

1977 Brown-Headed Cowbird: Agent of Extermination? *American Birds* 31:107-113.

Montgomery Watson Harza (MWH)

2005 *Water Quality Monitoring Report 1st Quarter 2005 for Master Mitigation Plan for the Big Tujunga Wash Mitigation Bank.* Prepared for Chambers Group.

National Geographic

2002 *Field Guide to the Birds of North America*, Fourth edition.

Sibley, D.A.
2000 *National Audubon Society The Sibley Guide to Birds.* Alfred A. Knopf, Inc., New York, New York.

Sogge, M., R. Marshall, S. Sferra, and T. Tibbitts
1997 A southwestern willow flycatcher natural history summary and survey protocol. USGS Biological Resources Division, Colorado Plateau Research Station, Northern Arizona University. 36 pp. Plus appendix.

Stafford M. D. and B. E. Valentine
1985 *A Preliminary Report on the Biology of the Willow Flycatcher in Central Sierra Nevada.* Cal-Neva Wildlife Transactions 66-77.

Stallcup, R.
1993 *Another Silent Spring?* Pt. Reyes Bird Observatory News, Spring 1993.

Stebbins, R.C.
2003 *A Field Guide to Western Reptiles and Amphibians, Third Edition.* Houghton Mifflin Company, Boston, Massachusetts.

Stokes, D. and L. Stokes.
1996 *Stokes Field Guide to Birds (western region).* Little, Brown and Company Limited, New York, New York.

Swift, C.C., T.R. Haglund, M. Ruiz, and R.N. Fisher
1993 *The status and distribution of the freshwater fishes of southern California.* Bull. So. Calif. Acad. Sci. 92:101-167.

Unitt, P.
1984 *The Birds of San Diego County.* San Diego Society of Natural History, Memoir 13.

U.S. Fish and Wildlife Service (USFWS)
1991 Endangered and Threatened Wildlife and Plants; Animal Candidate Review for Listing as Endangered or Threatened Species, Proposed Rule. In Federal Register Vol. 56, No. 225, government publications.

1994 Endangered and Threatened Wildlife and Plants;. In Federal Register Vol. 56, No. 225, government publications. Final Determination of Critical Habitat for the Least Bell's Vireo.

1997 Endangered and Threatened Wildlife and Plants; Final Determination of Critical Habitat for the Southwestern Willow Flycatcher. In Federal Register Vol. 62, No. 140, government publications.

2000 Southwestern Willow Flycatcher Protocol Revision 2000. California/Nevada Operations Office, Sacramento, California. Letter dated July 11, 2000. 4 pp.

U.S. Geological Survey (USGS)
1959 Sunland 7.5-minute topographic quadrangle.

Willet, G.
1933 *Revised List of Birds of Southwestern California. Pacific Coast Avifauna* 27: 1-203.

BIG TUJUNGA WASH
MITIGATION BANK
FINAL ANNUAL REPORT – 2005

APPENDICES

Prepared for:

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
900 South Fremont Avenue
Alhambra, California 91803-1331
(626) 455-6138

Prepared by:

CHAMBERS GROUP, INC.
17671 Cowan Avenue, Suite 100
Irvine, California 92614
(949) 261-5414

April 2006

APPENDIX A

QUARTERLY MONITORING LETTERS
RIPARIAN HABITAT

July 29, 2005
(6629-I13.6)

Ms. Belinda Kwan
Los Angeles County Department of Public Works
900 South Fremont Avenue
Alhambra, CA 91803-1331

Subject: Big Tujunga Wash Mitigation Bank
Oak/Sycamore Restoration Project Maintenance Monitoring Inspection and
Riparian Restoration Maintenance Monitoring Inspection Semi-Annual Report

Dear Ms. Kwan:

The purpose of this letter is to report the findings of the semi-annual monitoring inspection visit to the Oak/Sycamore Revegetation area and the semi-annual monitoring inspection visit of the Riparian Restoration Project planting areas at the Big Tujunga Wash Mitigation Bank. Heather Wendel and Shari Norton of Chambers Group, Inc. conducted a maintenance inspection of the upland and riparian areas on Wednesday, May 18 and Monday, June 6, 2005.

Oak/Sycamore Revegetation Area

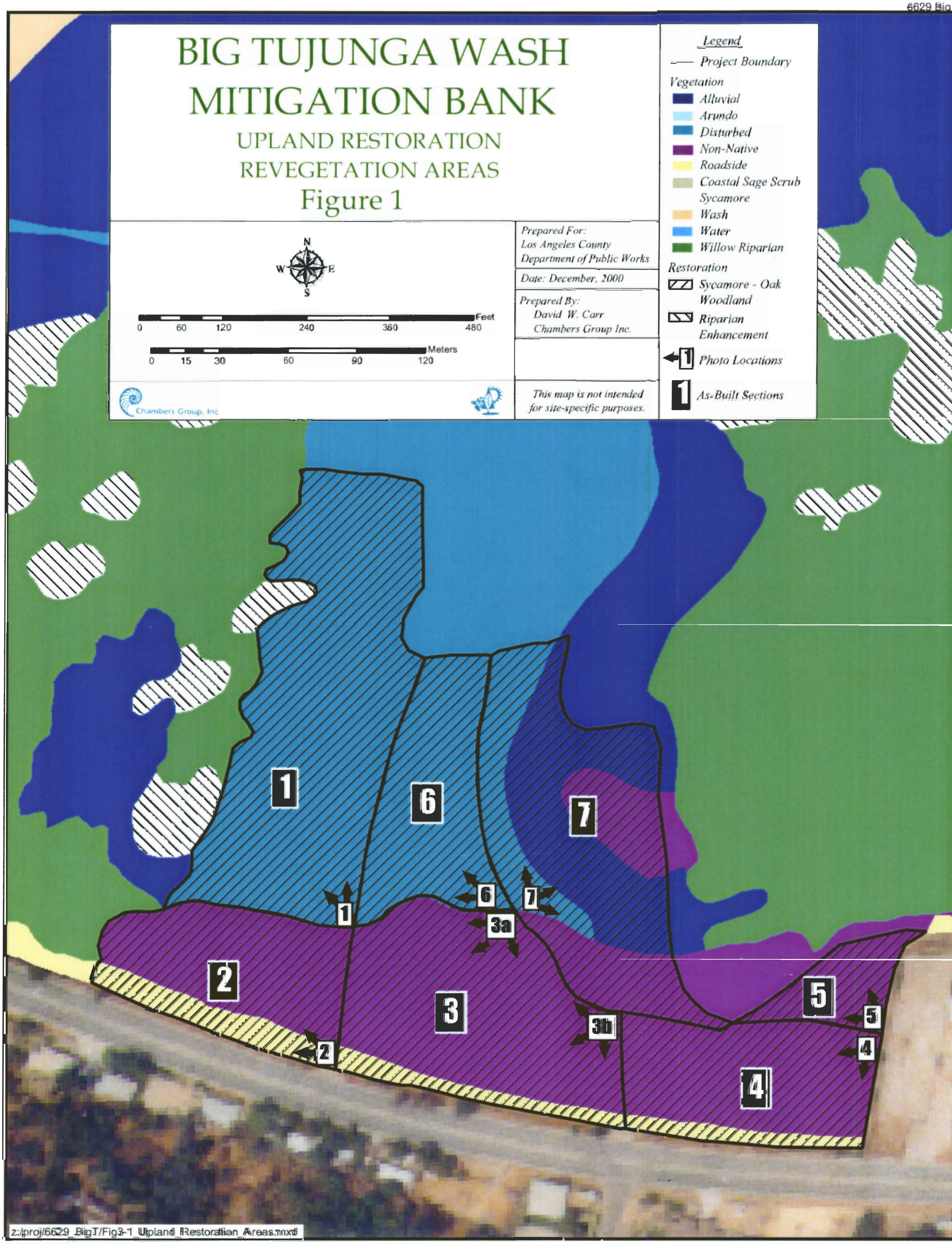
This was the semi-annual maintenance inspection of the site for the fifth year of monitoring this area. The purpose of the inspection was to ensure that the maintenance program promotes the establishment of the native plant community. Maintenance inspections were scheduled on a monthly basis during the first year, a quarterly basis in the second year, and semi-annually thereafter.

For convenience in monitoring and reporting, the restoration area was divided into sections. Sections 1 through 5 are the oak and sycamore woodland revegetation areas, and Sections 6 and 7 are the coastal sage scrub areas (Figure 1). The monitoring checklists are included as Appendix B. The various sections of the restoration site are discussed individually below.

Overall, cover of native plants has increased since the annual inspection although the cover of non-native weeds has increased as well. Evidence of natural recruitment of native species was observed throughout most of the restoration area.

Weed abatement of the site has not been adequate. Sections 1 and 6 had a fairly low cover of weeds, while Sections 2, 3, 4, 5, and 7 were thickly vegetated by non-native annual weeds. Common non-native plants observed included black mustard (*Brassica nigra*), tocalote (*Centaurea melitensis*), horehound (*Marrubium vulgare*), sourclover (*Melilotus indica*), and annual grasses.

The irrigation system for the site did not appear to be in use. The irrigation lines in Section 7 had been chewed by coyotes. The fencing was in good condition and, where necessary, trails had been repaired. One of the signs in the northwest corner of Section 5 had fallen down, likely as a result of winter storm damage, but all other signs were okay. There was no evidence of vandalism in any of the areas.


BIG TUJUNGA WASH
MITIGATION BANK
UPLAND RESTORATION
REVEGETATION AREAS
Figure 1
Legend
Project Boundary
Vegetation
Alluvial
Arundo
Disturbed
Non-Native
Roadside
Coastal Sage Scrub
Sycamore
Wash
Water
Willow Riparian
Restoration
Sycamore - Oak Woodland
Riparian Enhancement
Photo Locations
As-Built Sections
Prepared For:
Los Angeles County
Department of Public Works
Date: December, 2000
Prepared By:
David W. Carr
Chambers Group Inc.
This map is not intended for site-specific purposes.
N
W
E
S
0 60 120 240 360 480 Feet
0 15 30 60 90 120 Meters
Chambers Group, Inc
1
2
3
3a
3b
4
5
6
7
z:/proj/6629_BigT/Fig3-1_Upland_Restoration_Areas.mxd

Section 1 – Coast Live Oak/Sycamore Woodland

Weeds were controlled for the most part with a few weeds along the western boundary of the area and black mustard along the eastern edge of this section. Container plants were growing well and the shrub canopy was becoming full in places. Naturally recruited native plants were observed throughout the area. No sign of herbivory was observed in this section and all the exclusion cages have been removed.

Section 2 – Coast Live Oak/Sycamore Woodland

This section was extremely weedy with a continuous understory of non-native grasses. These non-native grasses consisted of wild oat (*Avena fatua*), ripgut grass (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), glaucous foxtail barley (*Hordeum murinum*), and fescue (*Vulpia myuros*). Additional, less-abundant weeds included red-stemmed filaree (*Erodium cicutarium*) and black mustard. Container plants were growing well, but abundant weeds prevented observation of most potential naturally recruited native plants. Several coast live oak (*Quercus agrifolia*) saplings less than 5 inches in height were observed. Most of the planted oak trees were living, however, most of the planted sycamore (*Platanus racemosa*) trees appeared to be non-living or dormant. No sign of herbivory was observed in this section and all the exclusion cages have been removed.

Section 3 – Coast Live Oak/Sycamore Woodland

Abundant weeds were observed throughout this section, dominated by fescue and black mustard. Other common weedy species include red-stemmed filaree, wild oat, sourclover, and ripgut grass. Container plants were growing well, but abundant weeds prevented observation of potential naturally recruited native plants. Overall, the planted oak trees were in excellent condition, but there appeared to be some mortality of the planted sycamore trees. Mule fat (*Baccharis salicifolia*) and giant wild rye (*Leymus condensatus*) in this area appeared to be healthy and receiving adequate natural water. No sign of herbivory was observed.

Section 4 – Coast Live Oak/Sycamore Woodland

Weeds were abundant in this section with the greatest concentration along the perimeter next to trails and along the southern border by the fence where black mustard was greater than 3 feet in height. Additional, non-native species included ripgut grass, soft chess, fescue, sourclover, and tocalote. Native seeded species were difficult to observe in this section due to the presence of tall weeds. Most container plants appeared healthy, yet several non-living sycamore trees were observed. No sign of herbivory was detected. Fencing was in good repair adjacent to the main road.

Section 5 - Coast Live Oak/Sycamore Woodland

This section was very weedy, especially adjacent to the trail and along the southern and western boundaries. The dominant weed species was black mustard with red-stemmed filaree also present. The greatest difference in weed cover between 2004 and 2005 was observed in this section. Weeds have begun to overcrowd the planted oak trees and other container species and need to be eradicated. The container plants were apparently present; however, it was difficult to determine their condition due to the abundance of weeds. Herbivory was not detected in this section. One of the restoration signs had fallen by the northwestern corner of the section, but the other signs appeared to be in good condition.

Section 6 – Coastal Sage Scrub

Weeds were mostly controlled in this section. Red-stemmed filaree and fescue were abundant in this section, while black mustard, foxtail chess (*Bromus madritensis* ssp. *rubens*), prickly sow thistle (*Sonchus asper* ssp. *asper*) and scarlet pimpernel (*Anagallis arvensis*) were present in lower densities. Container plants appeared to be healthy. There were some areas in which only a few shrubs were present and weeds dominated the area, but overall, the community has been restored nicely. No sign of herbivory was observed and all the exclusion cages have been removed. Equestrians have made a new trail though the restoration area to avoid the damaged main trail. This damage has recently been repaired and will likely encourage riders to keep out of the restoration area.

Section 7 – Coastal Sage Scrub

Low growing weeds were abundant in the center area of this section, consisting primarily of fescue, sourclover, red-stemmed filaree, and tocalote. Black mustard was uncommon in this section. Coyotes have damaged the irrigation line in this section. The container plants were healthy, but they were few in number. Apparent mortality of sycamore trees has occurred.

Summary and Recommendations

Weeds were abundant in several sections of the site. Most of the non-native species had gone to seed by the time of the inspection, adding additional seed to the weed-seed bank. Weed abatement activities should be continued aggressively as necessary and in a timely manner to prevent weed competition with planted native species and to prevent the further increase of the weed-seed bank.

Herbivory did not appear to be a problem at the time of the inspection. Fencing was in good repair. Most of the signs were also in good condition, however, replacement or repair of the one damaged sign in Section 5 should occur. It is recommended that a new sign be installed in Section 6 where a trail was made through the restoration area to avoid the formerly damaged main trail.

Areas of low native plant species survival or recruitment should receive remedial reseeding. The addition of the seed mix will increase species richness and reduce invasion of most non-native plant species on the site. Seeding should be conducted between October and January. A seed mix species palette will be developed upon approval. New sycamore trees should also be planted, as mortality appeared to be high in several of the restoration areas.

Riparian Enhancement Areas

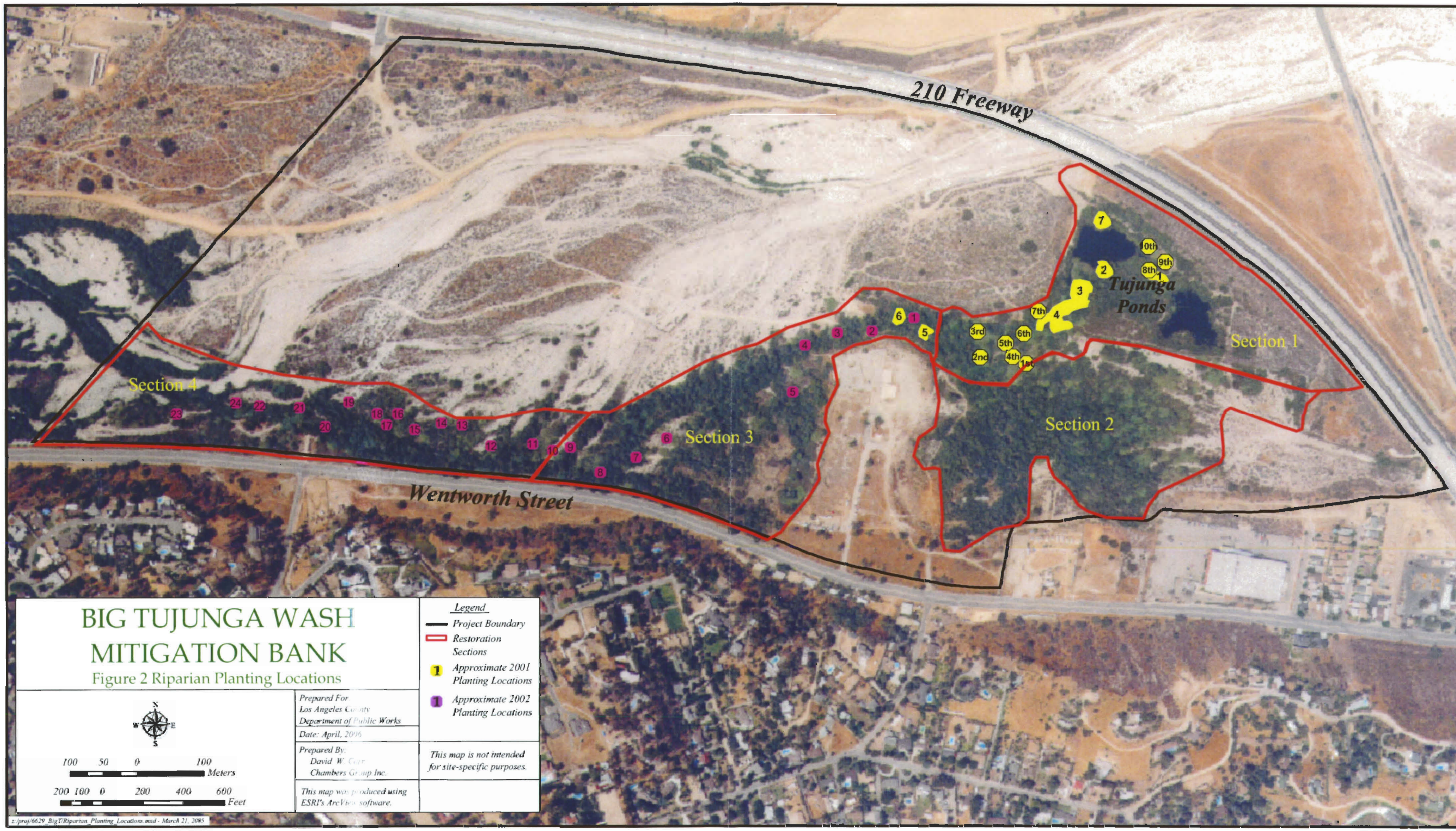
This was the semi-annual inspection of the planted portions of the riparian habitat adjacent to the Tujunga Ponds and downstream areas of Haines Canyon Creek. The purpose of this inspection was to identify any maintenance concerns in these areas in order to promote the establishment of the enhancement plantings. Approximately one-fourth of the enhancement area was planted in February 2001. Planting of the remaining three-quarters of the enhancement area occurred in January 2002. Approximately 5,500 additional cuttings of willow and mule fat were installed in the 24 separate areas along Haines Canyon Creek in Sections 3 and 4. Additional container and liner plants were also installed, including Fremont Cottonwood (*Populus fremontii*), California rose (*Rosa californica*), California blackberry (*Rubus ursinus),* and coastal prickly pear (*Opuntia littoralis*). The approximate locations of the planted areas are shown in Figure 2.

The majority of the willow and mule fat cuttings installed in the planting areas throughout the project site have grown and were healthy. Many of the surviving installed cottonwood trees in the area near the ponds appeared to be growing well, with several reaching more than 15 feet in height. The few installed California blackberry and California rose plants that were observed were growing well.

Resprouts of giant reed (*Arundo donax*) were seen scattered throughout the riparian restoration area. Most of the resprouts had recently been treated with herbicide and did not appear healthy. Many tree of heaven (*Ailanthus altissima*) saplings were observed throughout the site, especially along the trails and near the creek. Non-native eupatory (*Ageratina adenophora*) has continued to encroach upon native habitat forming dense thickets along the creek banks in areas 1, 4, 9, and 15. Both tree of heaven and eupatory should be removed from the site as they are considered by the California Exotic Pest Plant Council to be wildland pest plants of great concern in California[1]. Other exotic species, such as Chinese elm (*Ulmus parvifolia*), edible fig (*Ficus carica*), and ivy (*Hedera helix*) also require removal. Continued aggressive abatement is required to control these non-native species. Palm tree (*Washingtonia* sp.) saplings were also observed intermittently throughout the site. Although these trees are not as invasive or competitive as other non-native plant species, trail users commented on their presence and voiced a desire to have them removed. No water hyacinth or tamarisk was observed during the inspection.

---

[1] California Exotic Pest Plant Council (CalEPPC). 1999. The CalEPPC List: Exotic Pest Plants of Greatest Ecological Concern in California. Accessed July 28, 2005 via http://groups.ucanr.org/ceppc/1999_Cal-IPC_list/.


210 Freeway
Tujunga Ponds
Section 1
Section 2
Section 3
Section 4
Wentworth Street
BIG TUJUNGA WASH
MITIGATION BANK
Figure 2 Riparian Planting Locations
N
W
E
S
100 50 0 100
Meters
200 100 0 200 400 600
Feet
Prepared For
Los Angeles
Department of
Date: April,
Prepared By:
David W.
Chambers
This map was
ESRI's
Legend
Project Boundary
Restoration Sections
Approximate 2001 Planting Locations
Approximate 2002 Planting Locations
This map is not intended for site-specific purposes.
z:/proj/6629_BigT/Riparian_Planting_Locations.mxd - March 21, 2005

Trails

The trails not damaged by winter storms were generally clear and free of obstacles. Several of the restoration areas including areas 6-8, 10, 16, and 18-19 may have been lost due to flooding and redirecting of the creek. These areas were not accessible and therefore not visited during the semi-annual inspection visit. The closed trail between the two ponds showed signs of heavy use. A rudimentary makeshift bridge of logs, branches, and rocks has been erected again, though evidence of a campfire was not seen during this visit. The unauthorized overnight camper that frequented the eastern edge of the upper pond and location near restoration area 20 has now been removed from the site.

The maintenance contractor is kept advised of the current status at the site and will schedule maintenance crews to address the problems noted above. Maintenance inspections of the upland site and riparian planting areas will continue on a semi-annual basis. Please feel free to call me at (949) 261-5414 if you have any questions.

Sincerely,

Chambers Group, Inc.

____

Heather Wendel
Project Biologist

CC: Natures Image, Inc.

APPENDIX B

FIELD DATA SHEETS
COAST LIVE OAK/SYCAMORE WOODLAND HABITAT

PROJECT: Big T – Semi-annual Success Monitoring – 6629 | DATE: 18 May 2005 + 6 June

SURVEYOR(S): H. Wendel, S. Norton   UPLAND/ RIPARIAN

SPECIES:	NOTES:
Areas corresponding to photos in 2004 annual	RIPARIAN
5/18 Area 1: Ageratina abundant, public use	Plantago indica
Eucalyptus, Rosa and Rubus present	in upland area.
Area 20: Mustard abundant, some re-spronts of Arundo	
no plantings found, Poison oak where once was transient home	
Area 21: river has carved out trail – no reveg. left, small grass + mustard	
Area 22: re-sprouts of Arundo along trail in area	
Area 24: mustard abundant + Arundo resprouts, Opuntia doing well	
Area 23: some mustard, some Arundo resprouts under willows	
Ailanthus S of area 23 toward road	
6 Area 2: Some unhealthy Arundo + mustard (maybe sprayed) willows good	onsite 9:45am – 3:30
Area 3: 1 planted Opuntia, lots of mustard	11S 0376051, UTM 3792675
Area 4: Some mustard, Ageratina, Arundo resprouts sprayed	Photo Order: 2, 3, 4, 1x2, 5, 5, 5, 9
castor bean	
Area 5: (on W. of river) Rubus + Rosa abundant, Mugwort	
Area 9: Opuntia doing well, many Arundo resprouts (not all killed)	
Some Ageratina, willows growing well	
? Area 8: unknown, now on river, Mugwort	pink flags
Area 10: unknown washed out? Melilot on edges ~~Cottonwood~~ + Eucalyptus	
Area 11: Arundo resprouts near trail not treated?	
Area 12: 3 Alders gone? Rubus present > 5 Mustard, no Arundo	
Area 13: Some mulefat, willows, some mustard.	
? Area 14: Some Arundo resprouts, Ribes, Mustard	Eriastrum densifolium
Area 15: Rosa present, Ageratina abundant, switchgrass	
Area 16: ? in water?	
Area 17: Cottonwood, Mule fat 2 photos both wrong	
Areas: 6, 7, 8, 10, 16, 18, 19 → we were unable	
to locate due to flood/damage. Conditions	
of these areas were not documented.	UPLAND
	Area surveyed, photographed, and
	notes have been recorded on
	separate data sheets.

BIG TUJUNGA WASH MITIGATION BANK
COTTONWOOD RESTORATION AREA MAINTENANCE CHECKLIST

Staff: Heather Wendel and Shari Norton

Date: May 18, 2005

Vegetation Type: Oak / Sycamore

Section: 1

	Yes	No	N/A	Comments/Section
Weeds controlled	■	[ ]	[ ]	for the most part, only few along W boundary, Mustard along E edge
Erosion control devices in place	[ ]	[ ]	■	
Irrigation system in good order	[ ]	[ ]	■	
Container plants in good health	■	[ ]	[ ]	only 2 dead Platanus
Trails clear and in good repair	[ ]	[ ]	■	
Seeded species in good health	■	[ ]	[ ]	
Site clear of debris & litter	■	[ ]	[ ]	
Herbivory controlled	■	[ ]	[ ]	no cages present
Fencing in good repair	[ ]	[ ]	■	
Signs in good repair	■	[ ]	[ ]	
Site free of vandalism	■	[ ]	[ ]	

Comments: Weeds controlled for the most part

Photo 1

BIG TUJUNGA WASH MITIGATION BANK
COTTONWOOD RESTORATION AREA MAINTENANCE CHECKLIST

Staff: Heather Wendel and Shari Norton

Date: May 18, 2005

Vegetation Type: Oak/Sycamore

Section: 2

Hordeum murinum
Avena fatua
Bromus hordeaceous
Vulpia myuros
Bromus diandrus
Erodium cicutarium

	Yes	No	N/A	Comments/Section
Weeds controlled	[]	■	[]	Very weedy w/ understory non-native grasses (small amounts of mustard)
Erosion control devices in place	[]	[]	■	
Irrigation system in good order	[]	[]	■	
Container plants in good health	■	[]	[]	Platanus : 6 dead, 3 living Quercus : most living
Trails clear and in good repair	[]	[]	■	
Seeded species in good health	■	[]	[]	difficult to tell due to high weed cover
Site clear of debris & litter	■	[]	[]	
Herbivory controlled	■	[]	[]	
Fencing in good repair	■	[]	[]	
Signs in good repair	[]	[]	■	
Site free of vandalism	■	[]	[]	

Comments: several Quercus saplings (< 5" tall) seen

Photo 2

BIG TUJUNGA WASH MITIGATION BANK
COTTONWOOD RESTORATION AREA MAINTENANCE CHECKLIST

Staff: Heather Wendel and Shari Norton

Date: May 18, 2005

Vegetation Type: Oak/Sycamore

Section: 3

	Yes	No	N/A	Comments/Section
Weeds controlled	[ ]	[x]	[ ]	Vulpia dominant, Mustard common; Avena, Erodium, Melilotus, B. diandrus abundant
Erosion control devices in place	[ ]	[ ]	[x]	
Irrigation system in good order	[ ]	[ ]	[x]	
Container plants in good health	[x]	[ ]	[ ]	Quercus look good!, some mortality of Platanus, 1 dead oak
Trails clear and in good repair	[x]	[ ]	[ ]	
Seeded species in good health	[x]	[ ]	[ ]	difficult to determine due to weed cover
Site clear of debris & litter	[x]	[ ]	[ ]	
Herbivory controlled	[x]	[ ]	[ ]	
Fencing in good repair	[x]	[ ]	[ ]	
Signs in good repair	[x]	[ ]	[ ]	
Site free of vandalism	[x]	[ ]	[ ]	

Comments: Some Mule Fat + Leymus condensatus doing well. Very weedy!

Figure 3a = photo 5 Fig. 3b = Photo 6

BIG TUJUNGA WASH MITIGATION BANK
COTTONWOOD RESTORATION AREA MAINTENANCE CHECKLIST

Staff: Heather Wendel and Shari Norton

Date: May 18, 2005

Vegetation Type: Oak/Sycamore

Section: 4

	Yes	No	N/A	Comments/Section
Weeds controlled	[ ]	[X]	[ ]	many weeds, mostly along trails on section perimeter — Malilotus indica, Cantabrea melitensis, Vulpia myuros, Bromus hordeaceous, B. diandrus, Brassica nigra
Erosion control devices in place	[ ]	[ ]	[X]	
Irrigation system in good order	[ ]	[ ]	[X]	
Container plants in good health	[X]	[ ]	[ ]	Several dead platanus
Trails clear and in good repair	[X]	[ ]	[ ]	
Seeded species in good health	[ ]	[ ]	[X]	too many weeds to determine
Site clear of debris & litter	[X]	[ ]	[ ]	
Herbivory controlled	[X]	[ ]	[ ]	
Fencing in good repair	[X]	[ ]	[ ]	by road
Signs in good repair	[X]	[ ]	[ ]	
Site free of vandalism	[X]	[ ]	[ ]	

Comments: too weedy! very weedy along S boundary along fence = Brassica 3-feet tall

Photo 8

BIG TUJUNGA WASH MITIGATION BANK
COTTONWOOD RESTORATION AREA MAINTENANCE CHECKLIST

Staff: Heather Wendel and Shari Norton **Date:** May 18, 2005

Vegetation Type: Oak/Sycamore **Section:** 5

	Yes	No	N/A	Comments/Section
Weeds controlled	[ ]	■	[ ]	very weedy especially along trail – Brassica dominant
Erosion control devices in place	[ ]	[ ]	■	
Irrigation system in good order	[ ]	[ ]	■	
Container plants in good health	■	[ ]	[ ]	apparently present, but difficult to determine
Trails clear and in good repair	■	[ ]	[ ]	
Seeded species in good health	[ ]	[ ]	■	apparently present – can't determine
Site clear of debris & litter	■	[ ]	[ ]	
Herbivory controlled	■	[ ]	[ ]	
Fencing in good repair	■	[ ]	[ ]	
Signs in good repair	[ ]	■	[ ]	1 fallen by NW corner, other = okay
Site free of vandalism	■	[ ]	[ ]	

Comments: Very weedy! many along S and W boundaries even crowding over planted oak species
very different from last year – overgrown w/ weeds

photo 7

BIG TUJUNGA WASH MITIGATION BANK
COTTONWOOD RESTORATION AREA MAINTENANCE CHECKLIST

Staff: Heather Wendel and Shari Norton

Date: May 18, 2005

Vegetation Type: Coastal Sage Scrub

Section: 6

	Yes	No	N/A	Comments/Section
Weeds controlled	mostly ■	[ ]	[ ]	Abundant Erodium, Vulpia; Some Brassica nigra + B. madritensis Sonchus asper, Anagallis arvensis
Erosion control devices in place	[ ]	[ ]	■	
Irrigation system in good order	[ ]	[ ]	■	
Container plants in good health	■	[ ]	[ ]	doing well – dead Artemisia californica
Trails clear and in good repair	■	[ ]	[ ]	New trail maintenance / grading on E boundary – fill hole
Seeded species in good health	■	[ ]	[ ]	Some areas with few shrubs and many weeds in places
Site clear of debris & litter	■	[ ]	[ ]	
Herbivory controlled	■	[ ]	[ ]	
Fencing in good repair	[ ]	[ ]	■	
Signs in good repair	■	[ ]	[ ]	looks good
Site free of vandalism	■	[ ]	[ ]	

Comments: Equestrians made new trail through restoration area to avoid washed out trail – which has been filled in recently

Photo 3

BIG TUJUNGA WASH MITIGATION BANK
COTTONWOOD RESTORATION AREA MAINTENANCE CHECKLIST

Staff: Heather Wendel and Shari Norton

Date: May 18, 2005

Vegetation Type: Coastal Sage Scrub

Section: 7

	Yes	No	N/A	Comments/Section
Weeds controlled	[ ]	■	[ ]	Vulpia abundant + Melilotus present, Erodium, Centaurea, Conyza present.
Erosion control devices in place	[ ]	[ ]	■	
Irrigation system in good order	[ ]	[ ]	■	
Container plants in good health	[ ]	■	[ ]	not many, health ok, but not good – 1 live, 3 dead Platanus
Trails clear and in good repair	[ ]	[ ]	■	
Seeded species in good health	[ ]	■	[ ]	
Site clear of debris & litter	■	[ ]	[ ]	
Herbivory controlled	■	[ ]	[ ]	
Fencing in good repair	[ ]	[ ]	■	
Signs in good repair	[ ]	[ ]	■	none seen
Site free of vandalism	■	[ ]	[ ]	

Comments: 1 large Schinus molle outside area on E boundary
weeds abundant in center of section, some Mustard (uncommon)

Photo 4

APPENDIX C

MEETING MINUTES AND ATTENDANCE
COMMUNITY AWARENESS COMMITTEE

BIG TUJUNGA WASH MITIGATION BANK
COMMUNITY ADVISORY COMMITTEE MEETING MINUTES
APRIL 28, 2005
HANSEN YARD 7 – 9 P.M.

I. Welcome / Introduction (P. McLaughlin, MIG)

1. Welcome
2. Review of agenda

II. Site Maintenance Issues and Discussion of Action Items (M. Chimienti, Public Works)

1. General Site Signage/Kiosks: The kiosk sign by the haul road was washed out during the winter storms and LADPW is going to try and pull it out of the wash. Provided the damage is not too extensive, the kiosk will be repaired and moved to the Wheatland entrance.
2. Tamayo Property: The purchase of the property is in the final phases. The paperwork is still at the Treasure Tax Collectors Office but has not yet made it onto the board agenda.
3. Website: The LADPW website is up and can be accessed at www.ladpw.org. It includes a link to the Tujunga Council site on the main page. To access the Big T site, click environmental and on the top right of the screen click on the Big T site. Chris Stone from LADPW requested feedback and recommendations from anyone visiting the site. Also, Mary Benson requested a list of wildlife, including photos, of the species found at Big T to be included on the website.
4. Unauthorized Overnight Campers: Patrols are been made on the site every weekend and updates can be found on the website. Public Works asked for feedback on the overnight camper situation. Barbara Tarnowski reported a new encampment on the hillside, which will be followed up on by the patrol.
   Dan Holland sighted a Bronco near the ponds during one of his visits. The police were called but it is unknown if the person was cited. The gates were locked and it is unclear as to how the individual entered the site.
5. Trails: A few of the CAC members now feel that the use of trails signs is not a good idea. Mary Benson suggested landscaping trails through the North end of the site and that potential funds from the Foothill Bridge widening project from the City of Los Angeles Department of Transportation may be available for this project. It will be discuss as to what to do with the trail signs that have already been made.
   A trail clean-up day is planned for Saturday, July 23. Chambers Group and LADPW will lead groups of volunteers from the community to re-establish the trails by laying down wood chips and lining with rocks. Notices will be placed in community bulletins and flyers will be put up in the remaining cottonwood kiosk and at some of the local businesses.
6. Graffiti: Public Works' graffiti hotline number is (800) 675-4357. New graffiti is present under the freeway in the wash areas and needs to be removed.
7. Pond Crossing/Footbridge: The footbridge was washed out by the storms and unsuccessful attempts have been made to replace it. This will no longer be an action item. CAC members asked if the fencing around the ponds could be removed.
8. Water Quality Report: Montgomery Watson performed Water quality tests in April. The results have not yet been received but will be posted on the website once they are available.
9. Cottonwood Area as a Staging Area: This is was an action item raised by Terry Kaiser at the October meeting. LADPW has requested a proposal from Terry Kaiser but it has not been presented. If a proposal is not given then this will no longer be an action item.

10. Fencing: Fencing is not yet up by Radland due to questions regarding property lines. It has been suggested that the fencing be brought further in to the bank. Barbara Tarnowski reported a cut fence and a pole knocked over by the locked gate.
11. Cottonwood road: The cottonwood road was washed out by the storms and will be repaired by flood maintenance next week. The culvert by the erosion was painted green due to concerns about reflection.
12. Trash removal: Flood maintenance removed trash by Wentworth including part of a car. An encampment in that area was also cleaned out.

III. Current Status of Programs (S. Shaffer)

1. Exotic Plant Removal: A few sprouts of Arundo have been reported and will be removed as soon as possible. Some weed removal was accomplished in the upland area in the early part of the year but is not currently being done due to nesting birds in the area. CAC members asked that the debris from the plant removal around the ponds be removed from the area because it causes blockage to the pond flow. They also reported a problem with milk thistle along the trails and plastic silt fencing between the ponds and the cottonwood area that needs to be removed. Chambers Group will do these removals during site visits.
2. Riparian Habitat Restoration: All riparian plantings are doing well with the exception of the cottonwoods, which experienced low survivorship during the first years due to dry conditions. CAC members are concerned about a possible infestation of Argentinean ants on the cottonwood trees.
3. Upland Habitat Restoration: Weed removal was accomplished in this area prior to March and was halted due to nesting birds in the surrounding brush. CAC members are concerned about gophers in the area. If they become a problem, trapping will be used to remove them.
4. Exotic Wildlife Removal: Dan Holland accomplished exotic wildlife removal in the first quarter of the year. Tadpoles have been spotted in a small pool of water near the pond and there is some concern that they may be bullfrog tadpoles. Due to the size of the tadpoles, a positive identification cannot be made at this time so no removal of these tadpoles will be done. Cowbird trapping began on March 30 and the offsite traps have been very successful.
5. Wildlife Monitoring: Surveys for Least Bell's Vireo and Arroyo toad have already begun but neither species has been detected yet. Southwestern willow flycatcher surveys will begin in May.
6. Water Quality Analysis: The first quarter water quality analysis was done by Montgomery Watson earlier this month and the report will be available on the LADPW website as soon as it is received.
7. Trails Restoration: A trail restoration day is set for Saturday, July 23 and volunteers from the community will be asked to participate.

IV. Schedule Next CAC Meeting (P. McLaughlin)

1. A follow-up meeting to the April CAC meeting will be held at 7:00 p.m. on July 7 at the Hansen Yard. This will be a meeting with Public Works and will not include Chambers Group.
2. The next regularly scheduled CAC meeting is scheduled to take place on October 27, 2005. A meeting reminder will be mailed to all stakeholders with the meeting date, time and place.

BIG TUJUNGA WASH MITIGATION BANK
COMMUNITY ADVISORY COMMITTEE MEETING
APRIL 28, 2005

	NAME	ADDRESS	PHONE/FAX	EMAIL	AFFILIATION
1	Shannan Shaffer	17671 Cowan Ave Ste100, Irvine	949 261 5414	SShaffer@Chambersgroupinc.com	Chambers
2	Larry Freeberg	"	"	LFreeberg@chambersgroupinc.com	Chambers
3	Chris Stone	900 S. Fremont	(626) 458-6102	cstone@ladpw.org	LACo.PW
4	Michael Chimienti	900 S. Fremont Ave.	(626) 458-6111	mchimien@ladpw.org	LACDPW
5	ELEKTRA KRUGER	10544 MAHONEY DR 5/14	818-352-6220	KALKRUGER5/earthlink.net	STPA
6	CAROL Roper	9635 La Canada Wy	3535534		SHPOA
7	Mary Benger	11070 Shelton St S.V. 91352	767-5217	www.TujungaWatershed.org	Tujunga Watershed Council
8	Chris Olsen	6350 Laurel Cyn Blvd #201, NoHo 91601	818-755-7676	clolsen@council.lacity.org	CD2 - Wendy Greuel
9	Barbara Tarnowski	10410 [illegible] Ave Tujunga CA 91042	(818) 352-8294	babsi_tarnowski_usa@yahoo.com	FOTAR
10	Debra Bauman	PO Box 176 Sunland CA 91041	818 486 0712	db@baumann.vg	Tujunga Watershed
11					
12					
13					
14					
15					
16					
17					

APPENDIX E

COTTONWOOD REVEGETATION SITE PHOTOS

Oaks/Sycamore Area 1 – Facing North and West from Southeast corner.

Chambers Group, Inc.

BIG TUJUNGA WASH MITIGATION BANK
COTTONWOOD REVEGETATION SITE
PHOTO 1
DECEMBER, 2005

Oaks/Sycamore Area 2 – Facing North and Northwest.

Chambers Group, Inc.

BIG TUJUNGA WASH MITIGATION BANK
COTTONWOOD REVEGETATION SITE
PHOTO 2
DECEMBER, 2005

Oaks/Sycamore Area 3 – Facing West and South from North Center of section.

Chambers Group, Inc.

BIG TUJUNGA WASH MITIGATION BANK
COTTONWOOD REVEGETATION SITE
PHOTO 3a
DECEMBER, 2005

Oaks/Sycamore Area 3 – Facing West and South from Northwestern corner.

Oaks/Sycamore Area 4 – Facing West from the Northeastern corner.

Oaks/Sycamore Area 5 – Facing West and North from the Southeastern corner.

Oaks/Sycamore Area 6 – Facing West and North from the Southeastern corner.

Chambers Group, Inc.

BIG TUJUNGA WASH MITIGATION BANK
COTTONWOOD REVEGETATION SITE
PHOTO 6
DECEMBER, 2005

Oaks/Sycamore Area 7 – Facing West and East from West Center Boundary.

APPENDIX F

EXOTIC AQUATIC SPECIES CONTROL DRAFT REPORT #01

Big Tujunga Mitigation Project – Exotic Aquatic Species Control
Draft Report #01 – 1st Quarter 2005

Prepared for:

Chambers Group, Inc.
17671 Cowan Avenue, Suite 100
Irvine, CA
92614

Prepared by:

Dan C. Holland, Ph.D.
CPARS
201 Five Cities Dr. #89
Pismo Beach, CA
93449

Camm C. Swift, Ph.D.
ENTRIX, Inc.
8 Corporate Park, Suite 300
Irvine, CA
92606

27 March 2005

INTRODUCTION

This report describes work conducted in the 1st quarter of 2005 (February-March), and should be read in conjunction with earlier reports (Holland and Swift 2004, Swift and Holland 2004, Holland and Swift 2003). This project is currently in its fifth and final calendar year and has been conducted in the Haines Creek ponds on the Big Tujunga Mitigation Project site. For the purposes of this report discussion is restricted to the two ponds immediately south of the 210 Freeway and east of Big Tujunga wash.

This report covers activities involved in the control of exotic aquatic species in the ponds during the 1st quarter of 2005 between 03 February and 23 March and represents the first effort at control of exotics in this area for this year. Two survey/control efforts were conducted in this time frame; between 03 and 17 February and between 27 February and 23 March. In each case the senior author was present on an essentially continuous basis during this time period. Control efforts are expected to continue through July-August 2005. Extensive removal of exotics was conducted in Haines Creek downstream of the ponds in January 2004 (see Swift and Holland 2004), and in the ponds in August-October 2004 (Holland and Swift 2004). Control methods in the ponds are in essence identical to those used from 2000-2004 and involve use of baited traps for crayfish, bullfrog larvae and small exotic fishes, gill netting for exotic fishes, gigging of post-metamorphic bullfrogs, spearfishing of exotic fishes, dipnetting/seining of exotic fishes and capture and removal of exotic turtle species.

DESCRIPTION OF AREA

The area remains generally unchanged from previous reports. However, heavy rains prior to and in this period have allowed at least one intermittent connection between Haines Creek and the outlet of the west pond prior to 03 February 2005. Standing water and debris piles/flotsam indicate a connection such that water may have flowed into the pond at this point to a depth of ca: 15 cm on at least one occasion. Snorkeling surveys during the 1s survey period (03-16 February 2005) indicated that there were significant differences in the ponds in this period in relation to visibility/turbidity as noted in late 2004. Initial surveys in the west pond on 03 February indicated relatively high visibility of 3-4 m+, although there were numerous areas where the visibility was ca: 2m. The west pond in particular was thermally stratified, with the top layer being 25-40+ cm thick, and 1-2° C warmer. The lower layer exhibited higher turbidity, which appears to be due to suspended fines or phytoplankton. There was little (est. <5%) floating green algae on the surface, although an estimated 95% of the bottom of the pond was covered to a depth of 10-20 cm with a mixture of green algae and fines/silt. Interestingly, 3 new "springs" were noted on the bottom of the north side of the west pond during snorkeling surveys. The first of these was observed on 03 February, and was approximately 40 cm in diameter. The algae on the substrate had apparently been removed by the vigorous bubbling action of the spring, and the current could be seen to be lifting portions of sand 4-5 cm at this site. Two new springs on the north side were noted on 15 February, and had not been seen on 14 February. These were slightly smaller in diameter (est. 30 cm) but otherwise similar in appearance. By mid-March several springs had appeared and disappeared over the course of 2-3 weeks. By 21 March at least two were still noted to have visible outflow , although at least two observed in early February appeared to have ceased outflow and were being re-colonized by filamentous green algae

Visibility in the east pond was generally higher than in the west pond, often 4-5 m or more. The east pond was less thermally stratified than the west, although there were "cold spots", particularly on the northeast corner at the spring source of the pond. Floating green algae covered an estimated <5% of the surface, but an estimated 85-90% of the bottom/substrate. By 22 March the amount of surface covered by green algae in he east pond had not changed significantly, but was aggregated in the area of the outlet. Small patches of floating green algae were noted on the west end of the west pond by 18 March. Several small willows which were upright in October 2004 appeared to have fallen into the east pond prior to the current surveys.

Snorkeling surveys on 06-07 February indicated that turbidity in the west pond had changed significantly (increased) from only a few days prior; this may be due to the snorkeling surveys. Swimming with fins seems to disturb large amount of fines in the substrate, which appear to remain suspended in the water column for prolonged periods. Additionally, there appears to be a strong influence of weather on turbidity; phytoplankton vertical migration appears to be greatest on days when there is continuous sunshine. Thus, there are significant differences in turbidity/visibility (particularly in relation to spearfishing efficiency) on a day –to-day basis at this time of year due to weather. Significant rainfall and occasional high winds in the period from 14-22 March produced observable turnover in the west pond, such that cooler bottom water (ca: 16^{o} C) was mixed with warmer surface water. This situation was not noted in the east pond.

METHODS

The same methods noted in previous reports were utilized in this effort. Crayfish traps were baited with canned dog or cat food, and checked on a daily basis. All species captured were recorded. A sample (>90%) of the crayfish capture was measured prior to being discarded. Frogs were gigged using a standard three or five-prong gig, and fish were speared by use of a 2 m three-pronged Hawaiian sling or speargun. Turtles were collected by hand.

RESULTS

Fishes

Approximately 197 exotic fishes were removed during the control effort from 03-17 February and 27 February-23 March. A summary of the method of capture is provided below:

Species	Crayfish Trap	Spear	Gill Net	Dip Net/Other
Largemouth bass	0	40	15	0
Green sunfish	26	0	1	0
Goldfish	0	14	0	0
Mosquitofish	0	0	0	100
Other	0	1	0	0

All bass taken from 03-17 February were adults, raging from 300-400 mm SL. No small bass (<250 mm SL) were observed during any snorkeling surveys in this time period. Spearfishing was conducted on 12 of the 15 days during this period. By 16 February, only 2-3 bass were observed in each pond. In the period from 27 February-23 March, bass were observed in the 150-400mm+ size range, although most (>90%) were > 250 mm. A maximum of 14 bass were observed on 28 February. Spearfishing was conducted at least once/day on 20 days between 27 February and 23 March.

Green sunfish were taken (with a single exception) only in the minnow/crayfish traps, and ranged in size from 30-85 mm SL. These are likely YOY fish from 2004, when they were present in large numbers. No green sunfish of any size were observed during snorkeling surveys; however this may be due to the generally low water temperatures which may inhibit activity. One adult green sunfish ca: 160 mm SL was taken in the gill net in the east pond. Twelve large (300-350 mm SL) goldfish were speared and recovered between 03-17 February, and an additional two animals were taken from 27 February-23 March. At least two other goldfish 250+ mm SL were observed during snorkeling in the east pond and/or connecting channel. Interestingly, at least twelve goldfish were observed in one school in the west pond on 03 February. Prior to this, we had never observed more than 5 fish together at any one time.

On 03 February the senior author speared and removed an approximately 300 mm+ SL South American armored catfish (*Pterygoplicthys* sp.) at the northeast corner (source). This animal was wedged upright into the cattails at this site. The specimen has been deposited in the Fishes Collection at LACM by the junior author.

Bullfrogs (larvae)

Bullfrog larvae were removed by use of crayfish/minnow traps. The numbers are summarized below.

Date/Period	# larvae removed	CPUE
05-17 February	3	0.0037
27 February-23 March	7	0.0052

No animals with limbs or even limb buds were noted. No bullfrog larvae were observed during snorkeling surveys.

Bullfrogs (post-metamorphic)

A total of 27 post-metamorphic bullfrogs were gigged during this survey effort. The distribution of animals removed is summarized below.

Date/Period	# animals removed	n nights	CPUE
10-16 February	11	7	1.57
27 February-22 March	16	20	0.80

Of the11 animals speared in the first survey period, there was only a single (large) metamorph noted. Of the remainder, only two (22%) were subadults. Of animals (n=8) on which sex was determined, all were males. In the second survey period, there were two metamorphs (ca: 60 mm SUL) noted, and two subadults ca: 100-110 mm. Of the twelve remaining frogs, only one was noted to be a female. At least three of the adult frogs were observed to be very thin, in effect emaciated.

Turtles

A total of fourteen red-eared sliders were captured and removed during both survey periods. These animals were captured on 03 February (3), 09 February (1), 10 February (2), 12 February (1), 13 February (2), 28 February (1), 01 March (1), 05 March (1), 16 March (1) and 20 March (1). Of these, ten were adults (5 females, 5 male) and four were juveniles (60-80 mm). One female captured on 05 March was very large (270 mm CL). All females captured were palpated for either oviducal or shelled eggs, but none were detected. The large female Florida soft-shelled turtle that has been noted at the site since 2000 was observed but not captured on 03 February.

Crayfish

A total of 541 crayfish were taken during the survey effort (all in crayfish traps). The distribution of animals removed is summarized below.

Date/Period	# animals removed	CPUE
05-17 February	121	0.152
27 Februart-23 March	420	0.313

No crayfish were observed during snorkeling surveys. However, several of the adult bullfrogs gigged were observed to have crayfish in their stomachs.

ANALYSIS & DISCUSSION

Several interpretations can be drawn from the current results. In our view, the most likely is that after considerable time and effort, the control effort is producing and continues to produce a major decline in the populations of at least two of the three primary target species, specifically bullfrogs and crayfish. These are considered below.

Crayfish capture rates over the 12 trap days in the first survey period averaged 0.152 crayfish/trap/day (this is the CPUE – catch per unit effort). This represents a major decline from the 3 and 4th quarters of 2004, which in turn represented major declines from the 2nd and 3rd quarters of 2003. However, the CPUE approximately double in the second survey period (to 0.313).

Date	CPUE (average)
21-31 May 2003	1.525
21 July – 04 Aug 2003	1.340
20 Aug – 19 Oct 2004	0.356
05-17 February 2005	0.152
27 February-23 March 2005	0.313

Averaged across both survey periods in 2005, this represents a CPUE of 0.254, a decrease in the CPUE of approximately 82% from the 2nd & 3rd quarter 2003. This represents a decline of 29% from the 3rd-4th quarter 2004. As with previous reports for these efforts, we note that the majority of crayfish now being captured are relatively small. However, in the second trapping period an increased number of adult crayfish were captured. We suspect that this is due to 1) increased activity due to increased water temperatures and 2) trapping in areas where we have previously only conducted limited trapping efforts. In contrast, captures in 2000-2002 were predominantly adults. There are at least three positive aspects to this situation. First, a decrease in the average size of the animals captured is indicative of a classic "overfishing" scenario, wherein the mean and modal size of the individuals in the population decreases. Second, by removing the adults from the population, we also removal reproductive potential. Third, by removing all individuals, we are decreasing the available food supply for other exotic species (specifically bass and bullfrogs). Regardless, intensive trapping of some areas within a pond indicates that major localized reductions in the crayfish population can be achieved.

Larval bullfrog capture rates have (in general) declined even more dramatically. CPUE averaged over the 5 sub-periods between 20 August and 19 October 2004 was 0.187 larvae/trap/day. In contrast, the results from 2005 are shown below.

Date	CPUE (average)
20 August – 19 October 2004	0.187
05-17 February 2005	0.0037
27 February-23 March 2005	0.0052

While removal of over 11,625 bullfrog larvae during the 2nd/3rd quarter of 2003 undoubtedly had a strong negative impact on the 2004 metamorph/subadult cohort (only a single metamorph was noted in 2004, and three in 2005), it is more likely that the removal of 1) large numbers of potentially breeding adults from the population and 2) removal of large numbers of egg masses have been primarily responsible for the decline observed in 2004-2005 (see below). Additionally, we suspect that due to low water temperatures, remaining bullfrog larvae are still relatively inactive. As such, we expect that removal efforts in the remainder of 2005 (particularly May and June) may produce slightly tomoderately higher CPUEs. Regardless, the trapping results indicate an approximately 97.2% reduction overall in the CPUE between 2004 and 2005.

Bullfrogs (post-metamorphic)

Bullfrog gigging was conducted on a total of seven nights between 10 and 16 February 2005, and 20 nights between 27 February and 22 March. The number of bullfrogs observed ranged from a high of nine (on 12 February) to a low of zero (several nights). The number of animals gigged in 2005 (based on CPUE averaged across both periods) declined approximately 42% from the 3rd and 4th quarter 2004, and 95.6% from the second and third quarters of 2003. As with the larvae, this represents a significant overall decline. Results are shown below.

Date(s)	# nights	total n bullfrogs	CPUE
21 July – 07 Aug 2003	5	133	26.60
20 Aug – 19 Oct 2004	26	53	2.03
10-16 February 2005	7	11	1.57
27 February-23 March 2005	20	16	0.80

The number of frogs observed in the first survey period peaked on the third night (9), probably in response to a general warming trend. The lowest number (1) was observed on 15 February. The proportion killed ranged from a low of 0% (0 of 1) on 15 February to 100% (3 of 3) on 16 February. In the second survey period, a maximum of six frogs were observed on 10 and 11 March, and a minimum of one on 6 and 7 March. The proportion killed ranged from a low of 33% (on 10 March) to a high of 100% (on 06,07,11and 20 March).

No eggs masses have been removed in 2005, as the breeding season is not likely to start until April. In 2003-2004 the removal of large numbers of adults (180+), large numbers of egg masses (47) and >20,000 larvae have all had a major impact on the numbers of bullfrogs present in the pond system at this time. This effect would occur in three ways: 1) removal of large numbers of adults from the breeding population would decrease the number of 1st year larvae present in 2004-2005 – as reflected in our trap results 2) removal of a large number of lst and 2nd year larvae should dramatically decrease the number of metamorphic subadult frogs present – as reflected in our survey results and 3) removal of large numbers of adults should be reflected in a decreased CPUE for gigging in 2005 – as has been observed.. In general, these numbers are indicative of overall success of the control effort. However, other indicators are more ambiguous.

Turtles

A total of nine red-eared sliders (*Trachemys scripta*) were taken in this survey period. All turtles of this species observed were captured, with one exception. Of these, ten were adults (5 female, 5 male) and four were juveniles. As noted in the 2004 report, the most parsimonious explanation for the presence of juveniles is that this species is reproductively established on site, and that these represent animals born in late 2003 or early 2004. Capture of at least one adult female in 2002 carrying eggs, capture of a hatchling in the same year, and the capture of several juveniles in 2004-2005 constitute support for this hypothesis. Given the extensive and intensive nature of survey efforts in the 3rd and 4th quarter of 2004, we now strongly suspect that there is a deliberate effort to maintain an exotic turtle population at this site via illegal releases. We base this conclusion on four observations. First, the lack of observations of more than isolated individuals in the first few years of the project. Second, the improbability of invasion from other sites. Third, the observation of multiple species at the site. For example, on 03 October 2004 a large (est. 25-30 cm) softshell turtle was observed in the east pond. This was *not* the large female Florida softshell (*Apalone ferox*) we have previously observed. Based upon color and appearance, it is likely a spiny softshell (*Apalone spinifera*) or smooth softshell (*Apalone mutica*). Fourth, the lack of observation of more than two individual sliders remaining after several dozen surveys in mid-late 2004.

Fishes

The continued capture and/or observation of large numbers of largemouth bass and the increasing numbers of (small) green sunfish indicate that a sizeable population of at least the former species is still occurs on site. Despite intensive spearfishing and gillnetting efforts to date, a nucleus population of large bass remains in both ponds. While observations of small (25-30 mm) bass are markedly reduced from previous years, this may be due to reduced visibility (at least in the west pond) and decreased activity due to low temperatures rather than any actual decrease in numbers. It is likely that even if numbers are drastically reduced in one pond, individuals from the other pond can move between the areas and maintain a small-moderate sized population. Furthermore, given the species fecundity and general lack of predators on large fish, the failure to removal essentially all adults every year virtually guarantees a rapid recovery.

While green sunfish have been present in the ponds in small numbers throughout the study, 2004 was the first year we have observed schools of very small fish. Additionally, the number of small (ca:20-30 mm) fish in 2004 increased greatly over previous years. This is likely due in large part to the reduction of bass and/or crayfish, which would be expected to prey heavily on the eggs and fry of this species. We expect that numerous fish of this species in the 50-80+ mm size range will be captured in 2005.

The presence of small-moderate numbers of large goldfish is somewhat puzzling. While these fish tend to be somewhat more secretive than bass, the bright orange morph of this species is very conspicuous. In every case, we have succeeded in spearing these animals when observed, and yet small numbers continue to be observed every year. The continued presence of the dark back morph is more easily explained through natural crypsis. We suspect that low-level dumping of pets may account for the continued presence of the more brightly colored forms.

CONCLUSIONS & RECOMMENDATIONS

Trapping efforts in the 3rd & 4th quarters of 2004 and in the 1st quarter of 2005 have documented and continue to document a major decline in the populations of red swamp crayfish and bullfrogs, and possibly bass. This follows intensive efforts to reduce populations of these species in the 3rd quarter 2003. Thus, the existing methodology and level of effort seem to be (at present) capable of reducing large populations and possibly maintaining them at a low level. The situation with bass is somewhat more problematic. Despite a considerable amount of effort expended in gill netting and spearfishing, small to moderate populations of adult bass remain at the site. Furthermore, populations of another exotic (green sunfish) are likely to increase in 2005 due to removal of large numbers of bass.

Planned efforts for the remainder of 2005 include:

1. Maintenance of the level of trapping for crayfish and bullfrog larvae
2. Conduct at least another 50+ nights of gigging for adult bullfrogs in 2005.
3. Continue intensive spearfishing efforts in the east pond, and in the west pond as conditions allow.
4. Increase spearfishing and gillnetting pressure in early 2005 to remove as many potentially reproductive fish (prior to spawning) as possible.
5. Increase levels of bullfrog gigging in spring 2005 to remove as many potentially reproductive frogs as possible.
6. Continue sampling of native fishes in Haines Creek in early 2005.

Problems noted at the site include:

1. All signage requesting that people do not fish or release unwanted pets or fish has been removed. Five signs were observed on and recovered from the bottom of the east pond during snorkeling surveys in mid-March We recommend that these signs be re-installed but anchored with 80-100 lbs of cement. This will at least make it more difficult to vandalize and remove the signs. We also recommend installation of different signs on and immediately adjacent to the pipe gate on Foothill Blvd. (see below) regarding restricted access to the site.
2. Fishing at the site continues, although at a reduced level from that seen in previous years. A total of nine persons were observed fishing on five days between 03 February and 23 March (out of a total of 39 days on site). One fisherman stated that he had been visiting the site since childhood, and that it was common practice for fishermen to release goldfish from a local pet store to "feed the bass". This person also stated that he practiced catch & release fishing at the site.
3. Litter deposits indicate that use of the area by other persons (or unobserved fishermen) exceeds the minimum levels recorded here. At least two homeless persons are resident in the area.
4. Vehicular trespass by a large SUV was noted on the morning of 13 February. The vehicle was a black Blazer/Explorer/Bronco type, California license 1PWR912. The Foothill Blvd. gate had been opened and was left open. The persons involved were fishing at the site. The senior author informed the persons involved that they were engaged in vehicular trespass and they were asked to leave. They stated that they had observed that the gate was open (from the 210 Freeway) and had just "driven in". As the senior author had been the only person on site for several days, this statement was patently false.
   On 14 March at approximately 1410 hours the senior author returned to the site after a brief absence and noted that the gate had been forced open by jamming the

riser/locking rod into the space supposedly secured by the small silver lock (between the yellow Master lock and black Aries lock). The small-diameter hasp of the silver lock may facilitate this action. The senior author found a tan Chevrolet pickup, California license 6S75936, with a paddle boat/waterbike in the Bed, parked at the west pond area. The same persons were observed fishing, and again claimed that they did not have a key and that the "gate was open". The senior author drove to the gate and called the LAPD. Approximately 30 minutes later, Officers Hoefler and Molina arrived and took a report. The first person involved in the trespass was a white male, approximately early 40's, approximately 5'6" and medium-heavy build. This person had sandy-brown hair of medium-long length, and a mustache. The police report identified the person as a Van Jameson or Van Jonson (sp?). The second person (not identified in the police report) was a Hispanic male, late 30s-early 40's, approximately 5'6", and of medium-heavy build. This person had black hair of medium-long length and a mustache.

We recommend installation of at least one sign on the pipe gate and one adjacent to it advising of restricted access to the site. On several occasions in the past few years we have found persons fishing or boating at the site who either gained access by use of unauthorized keys or by jamming the gate as described above. There are several problems with this situation, not the least of which is that it may allow for vehicular access to transport and illegally release pets or to restock fish on the site.

APPENDIX G

2005 ANNUAL BROWN-HEADED COWBIRD TRAPPING AND REMOVAL PROGRAM

FINAL
2005 ANNUAL BROWN-HEADED COWBIRD TRAPPING AND REMOVAL PROGRAM REPORT FOR THE BIG TUJUNGA WASH MITIGATION BANK LOS ANGELES COUNTY, CALIFORNIA

Prepared for:

LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
WATER RESOURCES DIVISION
900 S. Fremont Avenue
Alhambra, California 91803
(626) 458-6138

Prepared by:

CHAMBERS GROUP, INC.
17671 Cowan Avenue, Suite 100
Irvine, California 92614
(949) 261-5414

December 2005

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

Page

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

As part of the 5-year Master Mitigation Plan for the Big Tujunga Wash Mitigation Bank, the Los Angeles County Department of Public Works (Public Works) implemented a brown-headed cowbird (*Molothrus ater*) control program. This report provides a description of the program and the results of the fifth year (2005) of trapping and removal of brown-headed cowbirds.

A total of seven modified Australian crow traps were used to trap brown-headed cowbirds within and around the vicinity of the Big Tujunga Wash Mitigation Bank site in 2005. Trap locations included four onsite traps (Cottonwood, Upland, Restoration, and Alluvial) and three offsite traps (two traps were located at the Hansen Dam Equestrian Center and one was located at a private residence located off Foothill Avenue). Each trap was maintained and serviced, and all non-target birds, which are those that incidentally enter the trap and are not cowbirds, were released on a daily basis throughout the trapping period (March 31 through August 1, 2005).

A total of 137 cowbirds, consisting of 53 males, 66 females, and 18 juveniles, were trapped within the Big Tujunga Wash Mitigation Bank site and vicinity between March 30 and August 1, 2005. Of these, 31 cowbirds were trapped within the onsite traps in the Big Tujunga Wash Mitigation Bank and 106 cowbirds were trapped in the offsite traps. The male to female cowbird capture rate was 0.80, with all of the captures occurring from April through July. Focused surveys for least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*) were conducted within the Mitigation Bank. Least Bell's vireos were not detected during 2005. Although willow flycatchers were observed in willow riparian woodland habitat within the project area during previous focused surveys in 2003 and 2004, they were not detected during the 2005 surveys. The individuals observed during the 2003 and 2004 surveys were believed to be migrants and did not nest within the project site. Because these sensitive species were not observed or detected within the mitigation bank during 2005, nest parasitism on these species by cowbirds was not likely. Trap vandalism did occur during the 2005 trapping season. Predation on the birds in the traps, by raptors, mammals, or snakes, also was not a problem during the 2005 trapping program. The smaller mesh size used in the construction of the traps has been and continues to be effective in eliminating predation.

During the course of the 2005 trapping season, 154 non-target birds were captured. A total of 6 non-target bird died in the traps, likely due to competition and pecking within the trap. None of the non-target birds captured were considered sensitive species by the resource agencies.

SECTION 1.0 – INTRODUCTION

1.1 PURPOSE AND GOAL

In mid-1999, Chambers Group, Inc., prepared a Master Mitigation Plan (MMP) for the Big Tujunga Wash Mitigation Bank. The purpose of the MMP is to serve as a guide for the 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 encompasses strategies to enhance and protect existing habitat for wildlife and to create additional natural areas that will be utilized by wildlife and by numerous user groups. In addition, the MMP includes programs for the removal of exotic fish and amphibians from the Tujunga Ponds and Haines Canyon Creek, trapping and removal of cowbirds from the mitigation bank area, development of a formal trails system, and development of public and community awareness of the site. Eradication of exotic plant species (Arundo or giant reed and tamarisk), habitat restoration, and revegetation programs, which include planting and irrigation strategies, plant palettes, and long-term maintenance and monitoring of the site, are also included in the MMP. The MMP is designed to include a 5-year program of implementation, maintenance, and monitoring of the enhancement strategies.

The brown-headed cowbird trapping and removal program at the Big Tujunga Mitigation Bank site is included in the MMP for the purpose of eradicating cowbirds from the mitigation bank area and increasing the potential for sensitive songbird species to utilize the riparian habitat within the mitigation bank. The 2005 trapping season was the fifth consecutive year in which this program was run. Cowbird traps were first used as a localized control in the early 1970s in Michigan, and by the mid-1980s were in widespread use in southern California and Texas, mostly in programs associated with the protection of threatened or endangered bird species. These traps proved to be so successful at reducing cowbird numbers and levels of parasitism in the study areas that the U.S. Fish and Wildlife Service (USFWS) began to require cowbird removal as mitigation for a variety of development projects. The five-year brown-headed cowbird trapping and removal program at the Big Tujunga Wash Mitigation Bank has helped to decrease the numbers of cowbirds within the immediate area and to provide a safe-haven for many native bird species, as well as increase the overall value of the site as a conservation bank.

1.2 BACKGROUND ON THE BROWN-HEADED COWBIRD

1.2.1 <u>Brown-Headed Cowbird Life History</u>

Cowbirds are members of the blackbird family of icterids, which also includes grackles, orioles, meadowlarks, and bobolinks. The brown-headed cowbird is one of six species of cowbirds and one of two species that occurs in North America. Originally from the Great Plains of North America, brown-headed cowbirds co-evolved with bison during the 1800s. Historically, cowbirds fed in grassland areas on seeds in buffalo droppings and on insects associated with or flushed by the herds of migratory buffalo and other large herbivores. The rapid decline of the American bison caused brown-headed cowbirds to follow domestic cattle. The shift from bison to sedentary domestic cattle caused native grasslands to be replaced by agricultural crops and forests to be cleared and replaced with agricultural land. Subsequently, as the range of domestic cattle increased, the range and numbers of cowbirds began to increase, and by the mid-1970s brown-headed cowbirds had expanded their range throughout the continental United States and southern Canada (Graham 1998). Brown-headed cowbirds were first documented in California in 1896 at Borrego Springs, San Diego County (Unitt 1984), and were apparently well established by the 1930s (Willet 1933). Male brown-headed cowbirds are easily recognized by their iridescent black body plumage and brown heads. Female cowbirds are a uniform, dull-brown color.

1.2.2 Brood Parasitism

The brown-headed cowbird is an obligate brood parasitic bird species, meaning this species does not build its own nests or tend to its own young. Instead, female cowbirds deposit one or more eggs into a host species' nest, often removing or destroying some of the host eggs. The brown-headed cowbird has a variety of target host species and has been recorded as successfully parasitizing 144 of 220 species in whose nests its eggs have been observed (Ehrlich et al. 1988). Some host species include threatened or endangered species such as the coastal California gnatcatcher *(Polioptila californica californica),* least Bell's vireo, and southwestern willow flycatcher. In response, many of the host species, predominantly eastern species, have behavioral adaptations to deal with parasitism, such as ejecting the foreign egg, covering over the foreign egg, or abandoning the parasitized nest altogether. However, many other host species that have not evolved defensive reactions do not recognize cowbird eggs, and readily accept and rear cowbird young. Adult cowbirds will often destroy host nests containing nestlings by puncturing the eggs, reducing the host's reproductive success. Cowbird eggs do not closely mimic host eggs, nor do the young cowbirds expel host eggs and young; rather, cowbirds tend to hatch earlier, grow faster, and crowd out or reduce the food intake of the hosts' young (Ehrlich et al. 1988). Cowbird eggs hatch in 10 days, several days ahead of most host species. In addition, cowbird chicks develop vigorous food begging behavior after just 1 day, compared to the 4 days required for most host species. In many of the smaller host species, the cowbird chick is the only successful fledgling from any parasitized nest.

1.2.3 Impacts to Parasitized Host Species

Female cowbirds, which are free from the time and expense of incubating and raising young, can lay as many as 40 eggs a season, far more than the average host species. Thus, a single successful female cowbird could ultimately parasitize 40 different host nests in one breeding season and in the process significantly reduce the breeding success of 40 pairs of host species. The decline in neotropical migratory songbirds across North America has been linked to, among other factors, the increase in cowbird numbers (Brittingham and Temple 1983; Harris 1991; Laymon 1993; Stallcup 1993). Although approximately 97 percent of cowbird eggs and nestlings fail to reach adulthood, cowbird parasitism affects host species by reducing the number of successful young. Furthermore, nest abandonment by the host species results in zero production for that breeding pair and therefore the reproductive effort will be significantly lower than that of an unparasitized species (Ehrlich et al. 1988). While brown-headed cowbird parasitism poses a major threat to many species of songbirds, some host species, including the California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher, have also had to contend with habitat loss and fragmentation, which increase the risk of being parasitized (Harris 1991; Laymon 1987; Mayfield 1977; Stafford and Valentine 1985).

1.3 LEAST BELL'S VIREO

The least Bell's vireo, a federally and state-listed as endangered species, is a small bird with olive gray above and white underneath with a plain, ash-gray head and pale sulfur yellow-tinged sides. Each wing has two dull white wing bars. It typically occurs in moist thickets and dense riparian areas comprised of willow, mule fat, and mesquite. It winters in Latin America and migrates into its breeding range near the end of March. This species inhabits and nests along waterways with willow riparian thickets mainly along the coast and the western edge of the Mojave Desert. The breeding season for the least Bell's vireo typically extends from April through the end of July (Stokes 1996). Loss and fragmentation of suitable riparian habitat and nest parasitism of remaining habitat fragments by brown-headed cowbirds have been major factors in the declining numbers of this species in southern California.

Although least Bell's vireos are present in the downstream Hansen Dam Flood Control Basin, the focused surveys conducted in spring 2005 for least Bell's vireo did not detect this species within the mitigation bank.

1.4 SOUTHWESTERN WILLOW FLYCATCHER

The southwestern willow flycatcher, a federally listed as endangered species, is a sparrow-size bird with greenish or brownish-gray above and a pale yellow underside with two white wing bars. They prefer extensive thickets of low, dense willows on the edge of wet meadows, ponds, or backwaters. Willow thickets are necessary for nesting and roosting. They build an open, cup-shaped nest positioned in an upright fork of a willow branch. The nest is typically built of shredded bark, cattail tufts, and grasses, and lined with fine grasses and feathers. It is a summer resident in California from mid-April through September. Breeding for this species begins in mid-April (Stokes 1996). This species is in decline due to extensive habitat loss of riparian habitat and nest parasitism by the brown-headed cowbird.

There were no southwestern willow flycatchers observed or detected during the 2005 focused surveys. Although there have been observations of willow flycatchers within the mitigation bank during previous focused surveys (2003 and 2004), there was no evidence or behavioral cues observed that would suggest that these flycatchers attempted to nest at the site.

1.5 PROJECT LOCATION

The Big Tujunga Wash Mitigation Bank is located in Big Tujunga Wash, just downstream of the 210 Freeway overcrossing, near the city of Los Angeles' Sunland area in Los Angeles County's San Fernando Valley. A map showing the project vicinity can be found on Figure 1-1. The site is bordered on the north and east by the 210 Freeway and on the south by Wentworth Street. The west side of the site is contiguous with the downstream portion of Big Tujunga Wash. A map showing the project location can be found on Figure 1-2. The Big Tujunga Wash Mitigation Bank supports two watercourses, one containing flow from Big Tujunga Wash proper, and the other conveying the flow from Haines Canyon to Big Tujunga Wash. The flow in the Big Tujunga Wash, on the north side of the site, is partially controlled by Big Tujunga Dam and is intermittent based on rainfall amounts and water releases from the Dam. The flow in Haines Canyon Creek, located on the south side of the site, is perennial and may be fed by groundwater and/or runoff from adjacent residential areas. The two drainages merge near the western boundary of the property and continue into the Hansen Dam Flood Control Basin, located approximately 1/2 mile downstream of the site. The site is wholly located within a state-designated Significant Natural Area (LAX-018) and the biological resources found on the site are of local, regional, and statewide significance.

The following sections describe each trap location. The Cottonwood, Upland, Restoration, Alluvial, Equestrian A, Equestrian B, and Esko trap locations were located in an unincorporated, non-numbered section of the U.S. Geological Survey (USGS) Sunland 7.5 minute topographic quadrangle in Township 2 North, Range 14 West. Figure 1-3 shows all seven trap locations on the USGS 7.5 minute topographic quadrangle. Figure 1-4 is an aerial photograph showing the four onsite cowbird trap locations.

1.6 SITE DESCRIPTIONS

The mitigation bank and adjacent properties were surveyed two months prior to the start of the trapping season in order to locate potential trap locations. Based on surveys and recommendations made in the Final 2001, 2002, 2003, and 2004 Annual Brown-Headed Cowbird Trapping and Removal Program Reports, traps were not placed in the immediate vicinity of Haines Canyon Creek or Tujunga Ponds. Three of the four onsite trap locations (Alluvial, Restoration and Upland) remained the same from the 2002, 2003 and 2004 trapping seasons. The Cottonwood trap location was moved slightly from the 2004 location, back to the 2002 and 2003 location. Other criteria used in determining trap locations included: potential foraging habitat for brown-headed cowbirds, potential nesting habitat for sensitive bird species such as the least Bell's vireo and southwestern willow flycatcher, accessibility for the daily trap monitors, and seclusion from the public (to prevent vandalism).

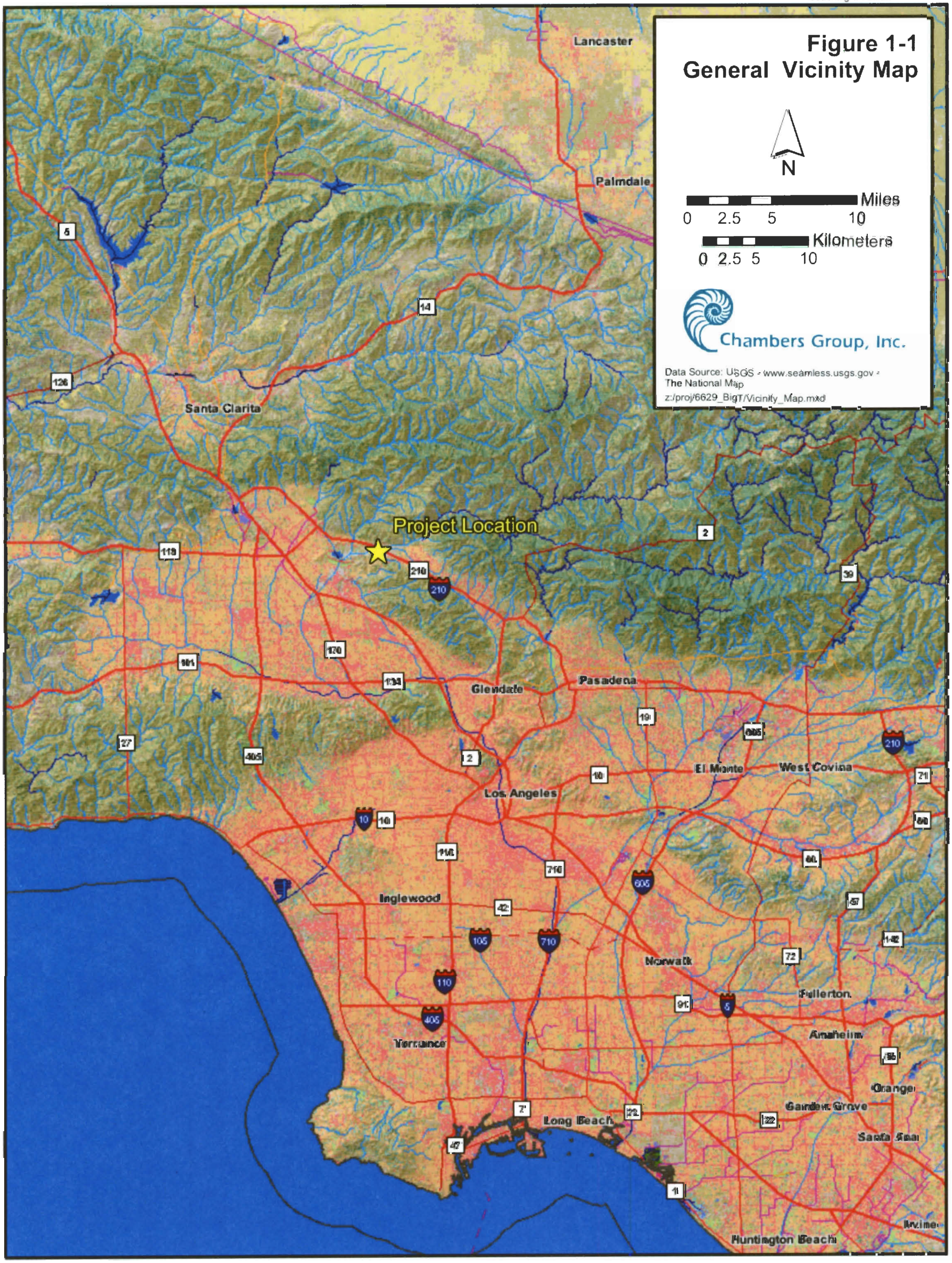
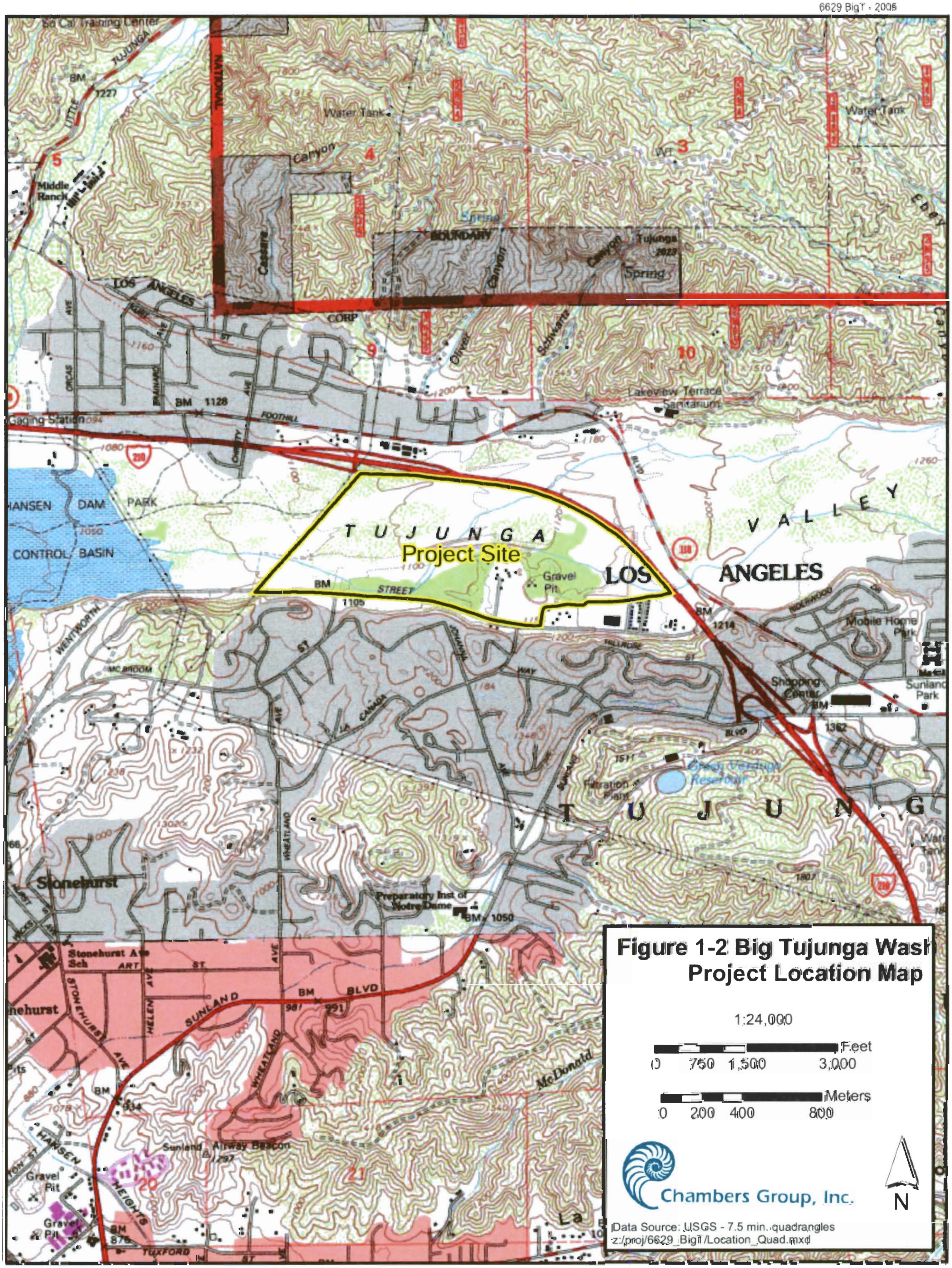
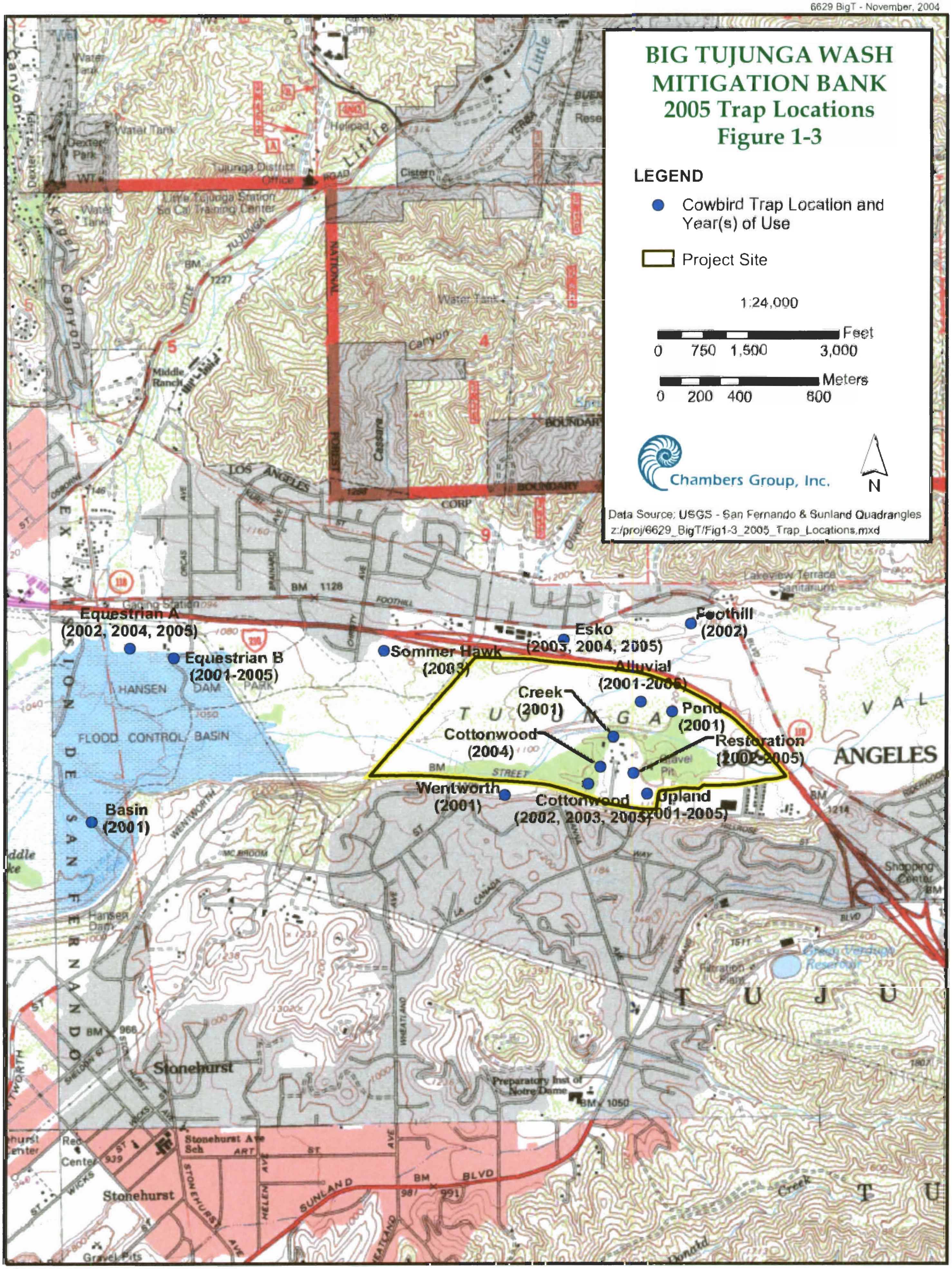


Figure 1-1
General Vicinity Map
N
Miles
0 2.5 5 10
Kilometers
0 2.5 5 10
Chambers Group, Inc.
Data Source: USGS - www.seamless.usgs.gov - The National Map
z:/proj/6629_BigT/Vicinity_Map.mxd
Project Location
Lancaster
Palmdale
Santa Clarita
Glendale
Pasadena
El Monte
West Covina
Los Angeles
Inglewood
Norwalk
Fullerton
Anaheim
Torrance
Orange
Garden Grove
Long Beach
Santa Ana
Huntington Beach
Irvine

6629 BigT - 2006



6629 BigT - November, 2004




210 Freeway
Alluvial
(2001-2005)
Pond
(2001)
Tujunga Ponds
Creek
(2001)
Cottonwood
(2004)
Restoration
(2002-2005)
Cottonwood
(2002-2003,2005)
Upland
(2001-2005)
Wentworth Street
BIG TUJUNGA WASH
MITIGATION BANK
Onsite Cowbird Trap Locations
Figure 1-4
Legend
Project Boundary
Cowbird Traps
(2005) Year of Use
N
W
E
S
Feet
200 100 0 200 400 600 800 1,000
Meters
100 50 0 100 200
Prepared For:
Los Angeles County
Department of Public Works
Date: August, 2005
File Location:
z:/proj/6629_BigT/Fig1-4_Cowbird_Trap Locations.mxd
*Note: Three offsite trap locations are not shown.
Chambers Group, Inc.
This map is not intended for site-specific purposes

In accordance with USFWS permits, Public Works ran three additional offsite traps. The purpose of the offsite traps is to ensure that cowbirds in the vicinity of the site that have the potential to travel to and from Big Tujunga Wash are also trapped and removed from the area. All three offsite locations from 2004 (Equestrian A, Equestrian B and Esko) remained the same in 2005. These site locations were utilized in order to increase trapping success and keep the offsite traps in the immediate vicinity of active stables.

1.6.1 Cottonwood Trap Location

The Cottonwood trap was located near the upland habitat restoration area along the southern portion of the project site. Access to this trap was through a locked gate off of Wentworth Street. This trap was located near a riparian and upland habitat with mule fat (*Baccharis salicifolia*), willows (*Salix sp.*) and California buckwheat (*Eriogonum fasciculatum*) growing within the vicinity of the trap, and tributaries of Haines Canyon Creek flowing to the south and northwest. This trap location was well vegetated and received plenty of afternoon shade. Placement of the Cottonwood trap was designed to trap and remove cowbirds from both upland and riparian habitats.

1.6.2 Upland Trap Location

The Upland trap was located in the upland habitat restoration area in the southeastern portion of the project site. This trap was placed mid-way down a closed trail and was surrounded by upland vegetation such as California buckwheat scrub. The ledge that the trap was located on overlooked a portion of the riparian vegetation associated with Haines Canyon Creek, and was therefore also located adjacent to willows and riparian vegetation. Shade cloth placed around the trap provided adequate shade since this trap was not placed next to a tree. Placement of the Upland trap was designed to trap and remove cowbirds from both upland and riparian habitats.

1.6.3 Restoration Trap Location

The Restoration trap was located near the upland habitat restoration area in the southeastern portion of the project site. This trap was placed mid-way down a closed trail and was adjacent to riparian vegetation associated with Haines Canyon Creek and restored upland habitat consisting of California buckwheat scrub. Shade cloth placed around the trap provided adequate shade since this trap was not placed next to a tree. Placement of the Restoration trap was designed to trap and remove cowbirds from both upland and riparian habitats.

1.6.4 Alluvial Trap Location

The Alluvial trap was placed in alluvial scrub vegetation located on the northeastern portion of the project site. The trap was placed next to a large laurel sumac (*Malosma laurina*) for shade and seclusion from the public. Placement of the Alluvial trap was designed to trap and remove cowbirds from upland habitat.

1.6.5 Equestrian A Trap Location (Offsite)

The Equestrian A trap was a previously used trap site located in the southwestern corner of the Hansen Dam Equestrian Center. This parcel of land is owned by the U.S. Army Corps of Engineers (USACE) and leased by Mr. Eddie Milligan and managed as a private equestrian center. The trap was placed in the southwestern portion of the equestrian center next to an active horse arena and adjacent to the Hansen Dam Flood Control Basin. Shade cloth placed around the trap provided adequate shade since this trap was not placed next to a tree. Placement of the Equestrian trap was designed to trap and remove cowbirds from the surrounding stables and riparian habitat.

1.6.6 Equestrian B Trap Location (Offsite)

The Equestrian B trap was located in the southwestern corner of the Hansen Dam Equestrian Center. The trap was located next to a small restoration plot, adjacent to the Hansen Dam Flood Control Basin. Shade cloth placed around the trap provided adequate shade since this trap was not placed next to a tree. Placement of the Equestrian B trap was designed to trap and remove cowbirds from the surrounding stables and riparian habitat.

1.6.7 Esko Trap Location (Offsite)

The Esko trap site was located along Foothill Boulevard. This parcel of land was located on private property owned by a local resident who runs a small stable. The trap was placed next to a tree and shade cloth placed around the trap provided additional shade. Although a limited strip of mule fat scrub was located immediately behind the trap, the Esko trap was surrounded by residential development. Placement of the Esko trap was designed to trap and remove cowbirds from the surrounding stables and riparian habitat.

SECTION 2.0 – METHODOLOGY

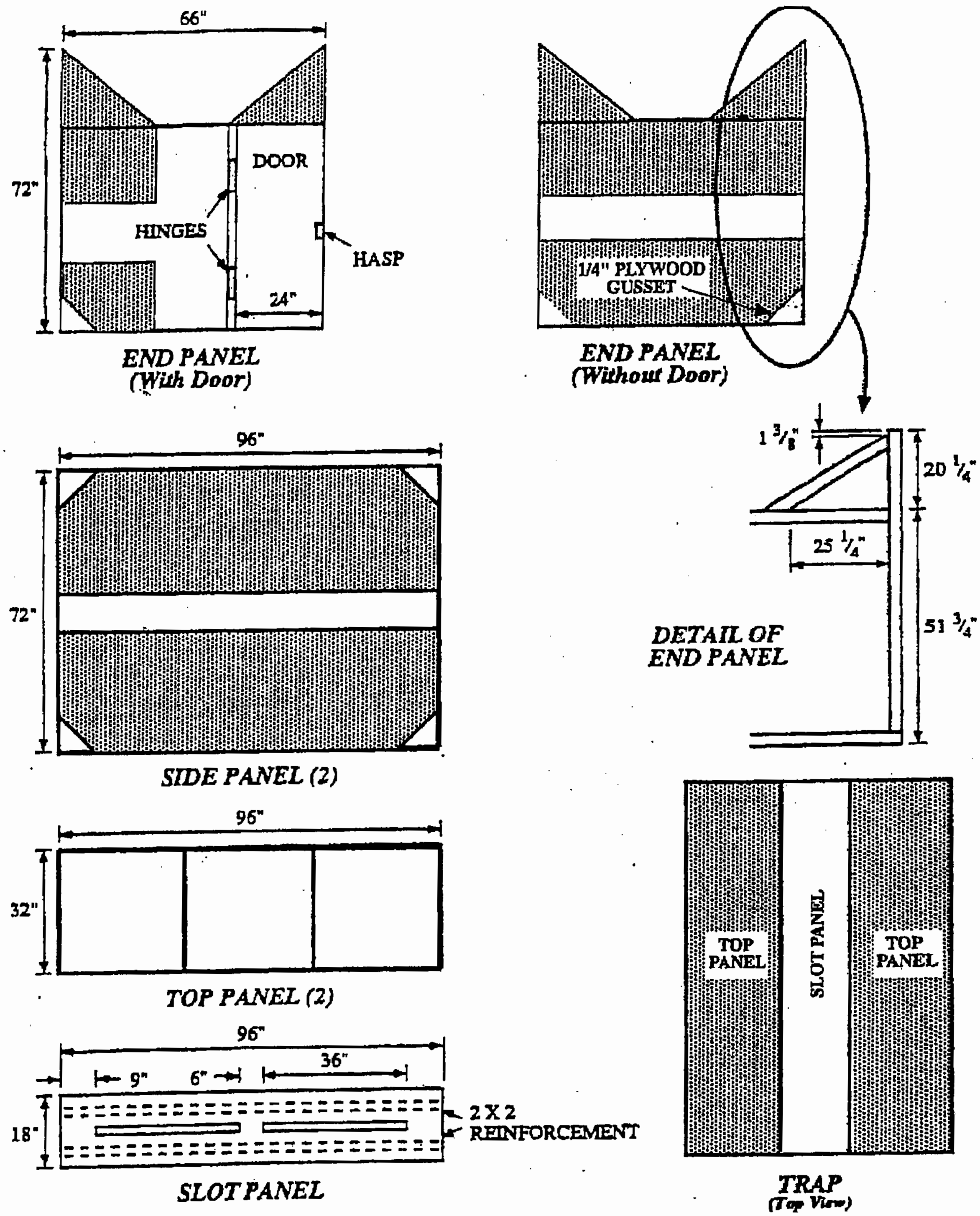
Cowbird traps were first used as a localized control in the early 1970s in Michigan, and by the mid-1980s were in widespread use in southern California and Texas, mostly in programs associated with the protection of threatened or endangered bird species. These traps proved to be so successful at reducing cowbird numbers and levels of parasitism in the study areas that the USFWS began to require cowbird removal as mitigation for a variety of development projects. Inclusion of the five-year brown-headed cowbird trapping and removal program at the Big Tujunga Wash Mitigation Bank site has helped to provide a safe-haven for many native bird species, as well as increase the overall value of the site as a conservation bank. The majority of the following cowbird trapping methodology is taken from Griffith Wildlife Biology's (GWB) brown-headed cowbird trapping protocol (GWB 1994a). This protocol has been adopted by the USFWS and is included as Appendix A.

2.1 TRAP CONSTRUCTION

As recommended by the USFWS, modified Australian crow traps were used to trap the brown-headed cowbirds. These traps are 4 feet high (with two additional triangular sections, 2 feet higher on either side of the top panel), 8 feet long, and 6 feet wide. The panels consist of wood frames covered with ¼-inch mesh wire. Top slot openings were 1-3/8 inches. Figure 2-1 is a schematic of the trap specifications. All traps were painted dull green and held together with bolts and screws. Bilingual signs (English and Spanish) were posted on every trap front panel to inform the public of the nature and relevance of the trapping program. These signs were clearly written and laminated to maintain legibility. Figure 2-2 shows the bilingual signs placed on every trap. The traps were also clearly numbered for reference and to ensure that they could be properly reassembled in future seasons. Padlocks were used on the doors to discourage vandalism. Photographs of a representative cowbird trap are shown on Figure 2-3.

Two trap modifications were made as a pro-active effort to reduce predation issues encountered in previous trapping programs. The first modification was the reduced size of the top slot from the standard 1-5/8 inches to 1-3/8 inches. John Griffith, with GWB, had recommended this trap modification during a previous trapping program in Orange County as a way to reduce the number of larger non-target bird species from entering the traps without deterring cowbirds. At the time, Dr. John Gustafson, with CDFG, also recommended reducing the slot opening for the same reason. The USFWS was contacted regarding reduced slot opening size and they concurred with the CDFG recommendation. The second trap modification was the use of ¼-inch mesh wire instead of the standard specification of 1-inch mesh wire. In past trapping programs, this smaller mesh seemed to reduce predation and effectively decrease target and non-target mortality rates. Therefore, in a pro-active effort to reduce predation, the traps for the Big Tujunga Wash Mitigation Bank project were constructed with the 1-3/8 inches top slots and ¼-inch mesh wire panels. The smaller mesh size used in the construction of the traps has been and continues to be effective in eliminating predation. Please refer to Section 3.12-Non-target Captures and Section 4.0-Discussion for further details.

The Big Tujunga Wash Mitigation Bank is a well-traveled open space area that generates heavy foot and equestrian traffic. There are also unauthorized overnight campers that use the site. Therefore, in order to deter vandalism and unauthorized trap disassembly and subsequent relocation, not only were padlocks placed on the front doors, but the traps were also constructed with an eyebolt near the bottom of the back panel. Where necessary, a chain with a padlock strung through the eyebolt effectively attached the trap to a nearby tree or post.



All panels (except slot panel) consist of wood frames and 1/4"steel mesh. This mesh is ideal; smaller birds (e.g., song sparrows) can come and go at will through mesh. Most frames are made with 2 X 2's; top panel can be made with 1 X 2's. Top slot is usually 1/4" or 3/8" plywood. Holes should be drilled so that connecting pieces are bolted in two places. Floors with mesh are recommended.

COWBIRD TRAP SPECIFICATIONS
Figure 2-1

PLEASE DO NOT DISTURB

BIOLOGICAL STUDY IN PROGRESS

THE LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS, IN CONJUNCTION WITH THE U.S. FISH AND WILDLIFE SERVICE, IS CONDUCTING A COWBIRD TRAPPING AND REMOVAL PROGRAM IN AN EFFORT TO ENHANCE THE BIG TUJUNGA WASH MITIGATION BANK. THE PROGRAM WILL REDUCE THE NUMBER OF PARASITIC BROWN-HEADED COWBIRDS IN THIS AREA AND HELP TO PROMOTE THE SUCCESSFUL BREEDING OF SONGBIRDS, SUCH AS THE LEAST BELL'S VIREO, SOUTHWESTERN WILLOW FLYCATCHER, AND THE CALIFORNIA GNATCATCHER. BIRD SPECIES (OTHER THAN THE COWBIRD) THAT ARE UNINTENTIONALLY TRAPPED ARE RELEASED ON A DAILY BASIS.

IF YOU HAVE ANY QUESTIONS REGARDING THIS STUDY, PLEASE CONTACT EITHER SOPHIE CHIANG OR CHRISTINE MUKAI AT (949) 261-5414.

THANK YOU FOR YOUR COOPERATION.

POR FAVOR NO PERTURBE

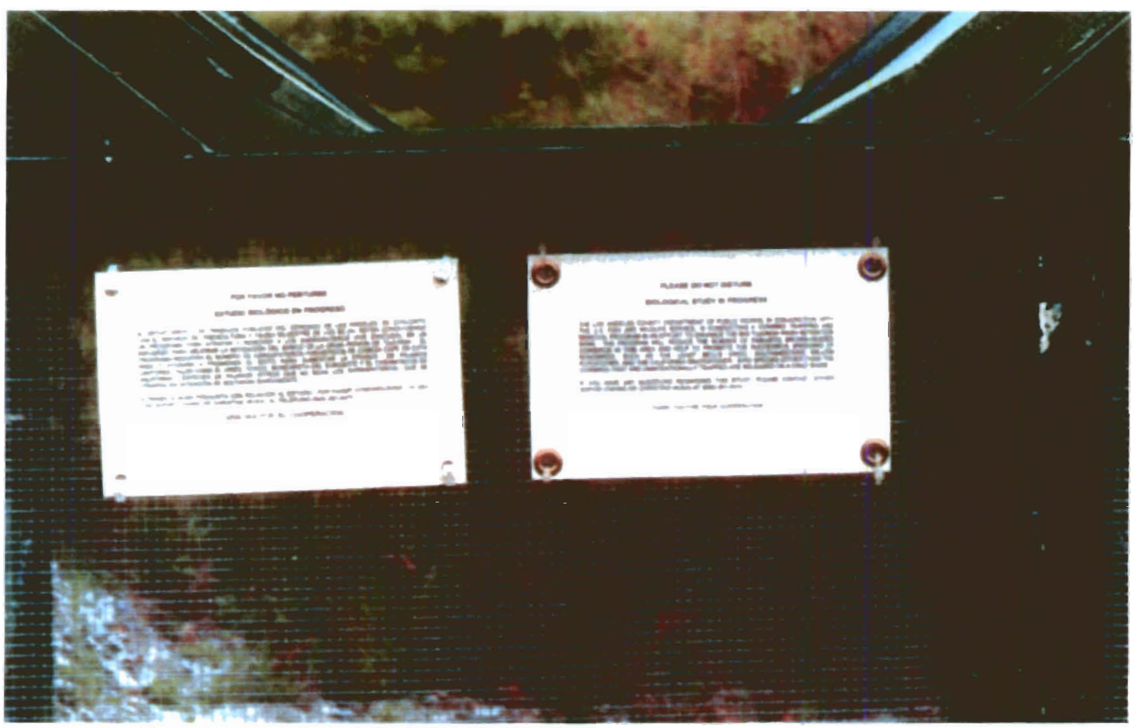
ESTUDIO BIOLÓGICO EN PROGRESO

EL DEPARTAMENTO DE TRABAJOS PÚBLICOS DEL CONDADO DE LOS ÁNGELES, EN CONJUNTO CON EL SERVICIO DE PISCICULTURA Y FAUNA SILVESTRE DE LOS EE.UU. ESTÁN CONDUCIENDO UN PROGRAMA PARA ATRAPAR Y REMOVER A LOS GARRAPATEROS (AVE ZANCUDA), EN UN ESFUERZO PARA MEJORAR LA MITIGACIÓN DEL BANCO DE LA GRAN REGIÓN DE TUJUNGA. EL PROGRAMA REDUCIRÁ EL NÚMERO DE GARRAPATEROS PARASÍTICOS DE CABEZA CAFÉ EN ESTA ÁREA Y AYUDARÁ A PROMOVER EL ÉXITO PARA AUMENTAR LA CRIANZA DE PÁJAROS CANTORES, TALES COMO EL VIREO, TORDO, MOSCARETA DEL SUROESTE Y EL CASAMOSCOS DE CALIFORNIA. ESPECIES DE PÁJAROS (OTROS QUE NO SEAN LOS GARRAPATEROS), QUE SE ATRAPEN SIN INTENCIÓN SE SOLTARÁN DIARIAMENTE.

SI TIENEN ALGUNA PREGUNTA CON RELACIÓN AL ESTUDIO, POR FAVOR COMUNÍQUENSE, YA SEA CON SOPHIE CHIANG OR CHRISTINE MUKAI, AL TELÉFONO (949) 261-5414.

GRACIAS POR SU COOPERACIÓN

Representative brown-headed cowbird trap from the 2001 trapping season.



Spanish and English translation of the information signs.

BROWN-HEADED COWBIRD TRAPS
Figure 2-3

2.2 TRAP LOCATIONS

Areas within and adjacent to the Mitigation Bank were surveyed during the two months prior to trap placement to determine the most appropriate trap locations. Final trap locations were based on the following criteria:

1. Potential foraging habitat, perching site, or daily migration path for brown-headed cowbirds.
2. Potential nesting habitat for sensitive bird species such as the least Bell's vireo and southwestern willow flycatcher.
3. Accessibility for the daily trap monitors; and
4. Seclusion from the public (to prevent vandalism).

Notification letters were sent to USFWS and CDFG prior to the start of the 2005 trapping season. The appropriate property owners (USACE and one private resident) were contacted and authorization was granted prior to accessing the 3 offsite locations. Construction of the seven traps and onsite placement occurred on March 10 and 11, 2005. A board was placed over the top slots of each trap to prevent non-target birds from entering prior to the start of trapping season. The boards were removed and all seven traps were fully operational on the first day of the trapping season (March 30). The brown-headed trapping program was conducted in accordance with the provisions of protocol, agency authorization, and permit conditions (TE-781217).

2.3 TRAP MAINTENANCE

Before the traps were assembled, each trap site was leveled so that all four corners of the trap would be flush against the ground. After trap assembly, a portion of the mesh floor was covered with a thin layer of soil, and seed was placed on the dirt ground to encourage natural foraging behavior among decoy and non-target birds. Ten or more horizontal perches were placed in the trap corners for the decoy and non-target birds. If trap locations did not provide morning and afternoon shade, shade cloth was attached to the outside of the trap as necessary to provide adequate shade. An abundant supply of wild birdseed (without sunflowers) and a 1-gallon guzzler of water were kept in each trap. Seed was scattered on top of and in front of the traps for the first few weeks in order to attract cowbirds. Dirt and algal growth was regularly cleaned from the rim and inside of the water guzzler. The traps were also inspected daily to determine the structural integrity of each trap.

Additional shade cloth and perches were added to the traps as necessary throughout the trapping season. Trappers also cleared the bottom panel of any weeds. Minor repairs to the trap floors were made in response to extensive burrows made by California ground squirrels (*Spermophilus beecheyi*). Trap vandalism was a minor issue during the 2005 trapping season. Prior to the start of the first month of trapping, the Esko trap (trap 3) was vandalized. The vandalism did not cause the escape of any decoy cowbirds because the traps had not been activated yet. Additionally, the Equestrian B trap (trap 2) was vandalized during the second month of trapping. The equestrian center manager (Eddie Milligan) was notified of the incident and the trap was repaired and activated the same day. A total of nine cowbirds escaped due to this incident, five of which were later recaptured.

2.4 TRAP MONITORING

Due to an unusually low number of decoy cowbirds at the Orange County Water District (OCWD) early in the season, the 2005 cowbird trapping program at the Big Tujunga Wash Mitigation Bank was postponed until an adequate number of birds became available. A total of 37 decoys, 15 males and 22 females, were obtained from the OCWD trapping program at Prado Dam on March 30, 2005. The cowbirds were distributed among six traps at a ratio of 2:3 (male:female). Female cowbird captures correlate more directly to a reduction in nest parasitism than male cowbird captures. The maintenance of the 2:3 male to female decoy ratio is considered conducive to maximizing the number of female cowbirds captured. The

Upland trap (trap 7) had a 3:4 ratio. Placement of perches, seed, water, natural foraging pads, and shade cloth was performed during the first several days. Additionally, during the first couple of weeks, seed was thrown on top of the traps to attract cowbirds. All seven traps were fully operational on March 30, 2005.

Traps were checked daily from March 30 through August 1, 2005 including all weekends and holidays falling within this time frame. Trappers collected data on the numbers of cowbirds captured, dead, and/or missing. Data on non-target birds were also recorded. Cowbird and non-target data was recorded by hand on data sheets.

Newly captured cowbirds were wing-clipped, then all cowbirds were netted and placed into a temporary holding cage, while non-target birds were then flushed from the trap. With the non-target birds removed, the seed was replenished and the 1-gallon water guzzlers were scrubbed and refilled with clean water as needed. Specific wild birdseed was used that did not contain sunflower seeds because cowbirds are not attracted to them. Guzzlers were checked to ensure that the openings were on the downhill side and that the water was not running out of the tray. The guzzlers and seed were placed in the middle of the trap, clear of any perches, to protect them from being contaminated with feces.

Perches in the traps were adjusted according to the pattern of usage by the birds which was indicated by the accumulation of droppings on the cage floor. If a cage caught large numbers of birds on a regular basis, extra perches were placed to accommodate the birds and to eliminate the pecking associated with overcrowding. Perches that were unstable or knocked down were checked and repositioned on a daily basis. In general, at least 10 perches were placed in the traps, 3 were located in each corner except over the door and 1 in the middle of one or both of the long sides of the trap. By keeping the perches away from the door, the birds were discouraged from finding gaps in the doorway or escaping when the door was opened. Low perches were not placed in the traps because clipped cowbirds were able to easily climb up the sides of the traps to all perches. Also, low perches were not used in order to prevent cowbirds from seeing the top slot and possibly escaping by flying up and out through the slot opening.

Weed grasses in the traps were removed, as necessary, to ensure the safety of the birds, as well as the trappers from predators, especially rattlesnakes. After trap maintenance was complete, the decoy cowbirds were released back into each trap. Upon leaving the trap, the shading was adjusted or added to suit the needs of the birds, taking into consideration the different locations of the sun throughout the day. Also, a detailed inspection was given to locate and repair any damage from vandalism that would jeopardize bird safety.

2.5 COWBIRD DISPOSAL

Several times during the season, excess cowbirds were terminated (by carbon monoxide poisoning) in a discreet location. Cowbirds were placed into a large, plastic bucket. This bucket was fully enclosed with the exception of a small hole cut into the side in order to attach an approximately 1" PVC pipe, which was then connected to the tailpipe of an automobile. This fast method was developed by the USFWS and is the standard method of terminating cowbirds; it is considered to be the most humane method. When completed, the cowbirds were placed into a clear plastic bag, labeled, dated, and if necessary, placed into a freezer specifically designated for the storage of cowbirds. Museums and educational institutions, specifically the Wildlife Waystation located in Lake View Terrace, were contacted and offered any terminated birds. Any cowbirds not needed by the museums and educational institutions were disposed of according to local ordinances and regulations.

SECTION 3.0 – RESULTS

3.1 BROWN-HEADED COWBIRD CAPTURE TOTALS

A total of 137 cowbirds, consisting of 53 males, 66 females, and 18 juveniles, were trapped within the Big Tujunga Wash Mitigation Bank site and vicinity between March 30 and August 1, 2005. Of the 137 cowbirds, 31 were trapped within the onsite traps in the Big Tujunga Wash Mitigation Bank and 106 cowbirds were trapped in the offsite traps. This is greater than the number of trapped cowbirds during the 2001, 2003, and 2004 trapping seasons (70 total cowbirds, consisting of 37 males, 24 females, and 9 juveniles were trapped in 2001, 20 total cowbirds, consisting of 9 males, 11 females and 0 juveniles were trapped in 2003, and 89 total cowbirds, consisting of 46 males, 37 females and 6 juveniles were trapped in 2004). The low number of cowbirds trapped during the 2003 season can be attributed to a much shorter trapping season that year. In contrast, the cowbird captures in the 2005 trapping season were lower than the 2002 trapping season when 173 total cowbirds, consisting of 66 males, 105 females, and 2 juveniles were trapped.

A total of nine clipped decoy cowbirds (4 males and 5 females) escaped from the traps during the 2005 trapping season. Five of these birds were subsequently recaptured while two males and two females remained missing for the duration of the trapping season. Two males and one female cowbird died during the course of the 2005 trapping season. All three died inside a trap from what appeared to be excessive pecking and/or competition with the other cowbirds in the trap. A total of 166 cowbirds, including original decoy cowbirds and cowbirds that were captured in the traps, were euthanized during the 2005 trapping season.

3.2 MALE TO FEMALE CAPTURE RATIO

Female cowbird captures correlate more directly to a reduction in nest parasitism than male cowbird captures. The maintenance of the 2:3 male to female decoy ratio, favorable trap conditions, optimum trap location, and the absence of blackbirds and hawks in or close to the traps are all considered conducive to maximizing the number of female cowbirds captured. Female captures outnumbered male captures throughout the entire season. Therefore, the male to female capture rate for 2005 was 0.80, compared to 1.24 in 2004, 0.82 in 2003, 0.63 in 2002, and 1.54 in 2001.

Previous studies have indicated that, for reasons unknown, the 2:3 male to female ratio results in higher female cowbird captures (GWB 1993, 1994b). All traps were at or above the standard decoy ratio for the entire 2005 trapping season.

3.3 JUVENILE COWBIRD CAPTURES

A total of 18 juvenile cowbirds were captured in 2005. The juvenile capture rate represents 13.1 percent of the total cowbirds caught. This coincides with the typical migration and capture pattern. Juvenile cowbirds typically begin migrating through the region in mid to late June, with peak captures in July. The juvenile capture rates for 2004, 2003, 2002, and 2001 were 6.7, 0.0, 1.2 and 13 respectively.

3.4 SITE VARIATION IN COWBIRD CAPTURE TOTALS

Seventy-seven percent of all trapped cowbirds were captured within offsite traps. The Equestrian A trap was the most productive, capturing 34 percent of all cowbirds. The trap efficiency for this trap was 0.382, which represents the highest per trap per day capture rate. The trap efficiency value represents the amount of cowbirds trapped in that particular trap over the time period in which the trap was operational. The Equestrian A trap captured more cowbirds than any other trap during the 2005 trapping season. The second most productive traps were the Esko and Upland traps which both caught 22 percent of all trapped cowbirds and had 0.240 trap efficiency rates. The third most productive trap was the Equestrian

B trap, which caught 21 percent of all cowbirds and had a 0.236 trap efficiency rate. The Alluvial trap caught 0.7 percent of all cowbirds and had a 0.008 trap efficiency rate. The Cottonwood and Restoration traps did not capture any cowbirds during the 2005 season. Table 3-1 lists the numbers of cowbirds trapped and total trapping efficiency at each trapping location for the 2005 trapping season. Tables 3-2, 3-3, 3-4, and 3-5 show the number of male, female, and juvenile cowbirds caught at each trapping location during the 2004, 2003, 2002, and 2001 trapping seasons, respectively. This year's capture totals per trap per day were the second highest since trapping began in 2001. Female captures outnumbered male captures at three of the seven traps including Equestrian A, Equestrian B, and Esko. Male captures outnumbered female captures at the Alluvial and Upland traps. The Cottonwood and Restoration traps did not capture any cowbirds this season. Ninety-four percent of all trapped juvenile cowbirds were captured within offsite traps.

The trapping and removal of brown-headed cowbirds is an ongoing process designed to decrease the number of cowbirds in an area in order to increase the reproductive success of vulnerable passerines. The areas surrounding the Big Tujunga Wash Mitigation Bank provide suitable foraging habitat for the cowbird; therefore, a constant influx of cowbirds will continue to utilize these areas.

Table 3-1
Numbers of Cowbirds Trapped and Total Trapping Efficiency at Each Trapping Location for the 2005 Trapping Season

Trap #	Trap Location	Male Cowbirds Trapped	Female Cowbirds Trapped	Juvenile Cowbirds Trapped	Total Cowbirds Trapped	Total Trapped (trap/day)
1	Equestrian A	14	23	10	47	0.382
2	Equestrian B	8	15	6	29	0.236
3	Esko	12	17	1	30	0.240
4	Alluvial	1	0	0	1	0.008
5	Cottonwood	0	0	0	0	0.000
6	Restoration	0	0	0	0	0.000
7	Upland	18	11	1	30	0.240
Total		53	66	18	137	1.106

Table 3-2
Numbers of Cowbirds Trapped and Total Trapping Efficiency at Each Trapping Location for the 2004 Trapping Season

Trap #	Trap Location	Male Cowbirds Trapped	Female Cowbirds Trapped	Juvenile Cowbirds Trapped	Total Cowbirds Trapped	Total Trapped (trap/day)
1	Equestrian A	7	3	1	11	0.089
2	Equestrian B	17	8	1	26	0.211
3	Esko	11	21	2	34	0.276
4	Alluvial	2	1	0	3	0.024
5	Cottonwood	0	0	0	0	0.000
6	Restoration	2	1	0	3	0.024
7	Upland	7	3	2	12	0.098
Total		46	37	6	89	0.723

Table 3-3
Numbers of Cowbirds Trapped and Total Trapping Efficiency at Each Trapping Location for the 2003 Trapping Season

Trap #	Trap Location	Male Cowbirds Trapped	Female Cowbirds Trapped	Juvenile Cowbirds Trapped	Total Cowbirds Trapped	Total Trapped (trap/day)
1	Equestrian B	3	5	0	8	0.082
2	SommerHawk	5	4	0	9	0.093
3	Esko	0	2	0	2	0.021
4	Cottonwood	0	0	0	0	0.000
5	Upland	0	0	0	0	0.000
6	Restoration	1	0	0	1	0.011
7	Alluvial	0	0	0	0	0.000
Total		9	11	0	20	0.207

Table 3-4
Numbers of Cowbirds Trapped and Total Trapping Efficiency at Each Trapping Location for the 2002 Trapping Season

Trap #	Trap Location	Male Cowbirds Trapped	Female Cowbirds Trapped	Juvenile Cowbirds Trapped	Total Cowbirds Trapped	Total Trapped (trap/day)
1	Cottonwood	**3**	**1**	**0**	**4**	**0.033**
2	Restoration	**3**	**6**	**0**	**9**	**0.073**
3	Upland	**1**	**3**	**1**	**5**	**0.041**
4	Alluvial	**0**	**0**	**0**	**0**	**0.000**
5	Foothill	**29**	**61**	**0**	**90**	**0.732**
6	Equestrian A	**24**	**24**	**1**	**49**	**0.398**
7	Equestrian B	**6**	**10**	**0**	**16**	**0.130**
Total		**66**	**105**	**2**	**173**	**1.407**

Table 3-5
Numbers of Cowbirds Trapped and Total Trapping Efficiency at Each Trapping Location for the 2001 Trapping Season

Trap #	Trap Location	Male Cowbirds Trapped	Female Cowbirds Trapped	Juvenile Cowbirds Trapped	Total Cowbirds Trapped	Total Trapped (trap/day)
1	Creek	**0**	**0**	**0**	**0**	**0.000**
2	Upland	**5**	**2**	**0**	**7**	**0.057**
3	Pond	**1**	**2**	**1**	**4**	**0.033**
4	Alluvial	**0**	**2**	**0**	**2**	**0.016**
5	Wentworth	**3**	**1**	**0**	**4**	**0.033**
6	Equestrian	**26**	**15**	**3**	**44**	**0.358**
7	Basin	**2**	**2**	**5**	**9**	**0.073**
Total		**37**	**24**	**9**	**70**	**0.569**

3.5 COWBIRD CAPTURE TOTALS BY TRAP

Considerable variation in capture totals occurred between the onsite and offsite traps. As previously stated, the offsite traps were by far the most productive, capturing 106 of the 137 total captures. Among the offsite traps, the Equestrian A trap was the most productive, capturing 47 cowbirds; and the Esko trap was the second most productive trap, capturing 30 cowbirds. Onsite traps, Upland and Equestrian B were also very productive capturing 30 and 29 cowbirds, respectively. The Alluvial trap, an onsite trap, caught 1 cowbird, while the Cottonwood and Restoration traps did not capture any cowbirds. The number of male, female, juvenile, and total cowbirds captured in each trap for the 2005, 2004, 2003, 2002, and 2001 trapping seasons is summarized in Figure 3-1.

The three most productive traps, Equestrian A, Esko and Upland were all located directly within active stable areas. The Equestrian A trap was located within the Hansen Dam Equestrian Center, while the Esko trap was located within a private residence, which contained stables within the property. The Upland trap was an onsite trap; however, there were active stables located immediately adjacent to the trap location.

3.6 SEASONAL VARIATION IN COWBIRD CAPTURE TOTALS

Typically, adult cowbird captures (both male and female) peak in April and July, with April being the most productive month for adult captures. In comparison, juvenile captures typically peak in July. The first cowbird was captured in the beginning of April, with the majority of cowbirds captured during this month. Fifty percent of all cowbirds (23 males and 45 females) were captured in April. Twenty-five percent of all cowbirds (19 males and 15 females) were captured in May. Seven percent of all cowbirds (4 males, 2 females and 4 juvenile) were captured in June and the remaining eighteen percent of cowbirds (7 males 4 females and 14 juveniles) were captured in July. Total female captures outnumbered male captures by 13 during the 2005 trapping season.

Cowbird captures during the 2005 trapping season followed the overall capture pattern from the past four years, with cowbird captures peaking in April (both male and female) and declining steadily throughout the remainder of the season. Slight seasonal variation has occurred throughout the past five years, including 2001 when captures peaked in April (both male and female) and July (juvenile). The seasonal variation in cowbird captures for 2005, 2004, 2003, 2002, and 2001 are shown in Figures 3-2, 3-3, 3-4, 3-5, and 3-6 respectively. Female captures outnumbered male captures in 2005, 2003 and 2002, whereas male captures outnumbered female captures in 2004 and 2001. Eighty-two percent of cowbirds were captured by June 2005 (program closed on August 1). Eighty-five percent of cowbirds were captured by June 2004 (program closed on July 15). One hundred percent of cowbirds were captured by June 2003 (program closed on June 19) whereas 95 percent of all cowbirds were captured by June 2002 (program closed on July 16), and only 71 percent of all cowbirds were captured by June 2001 (program closed on July 15).

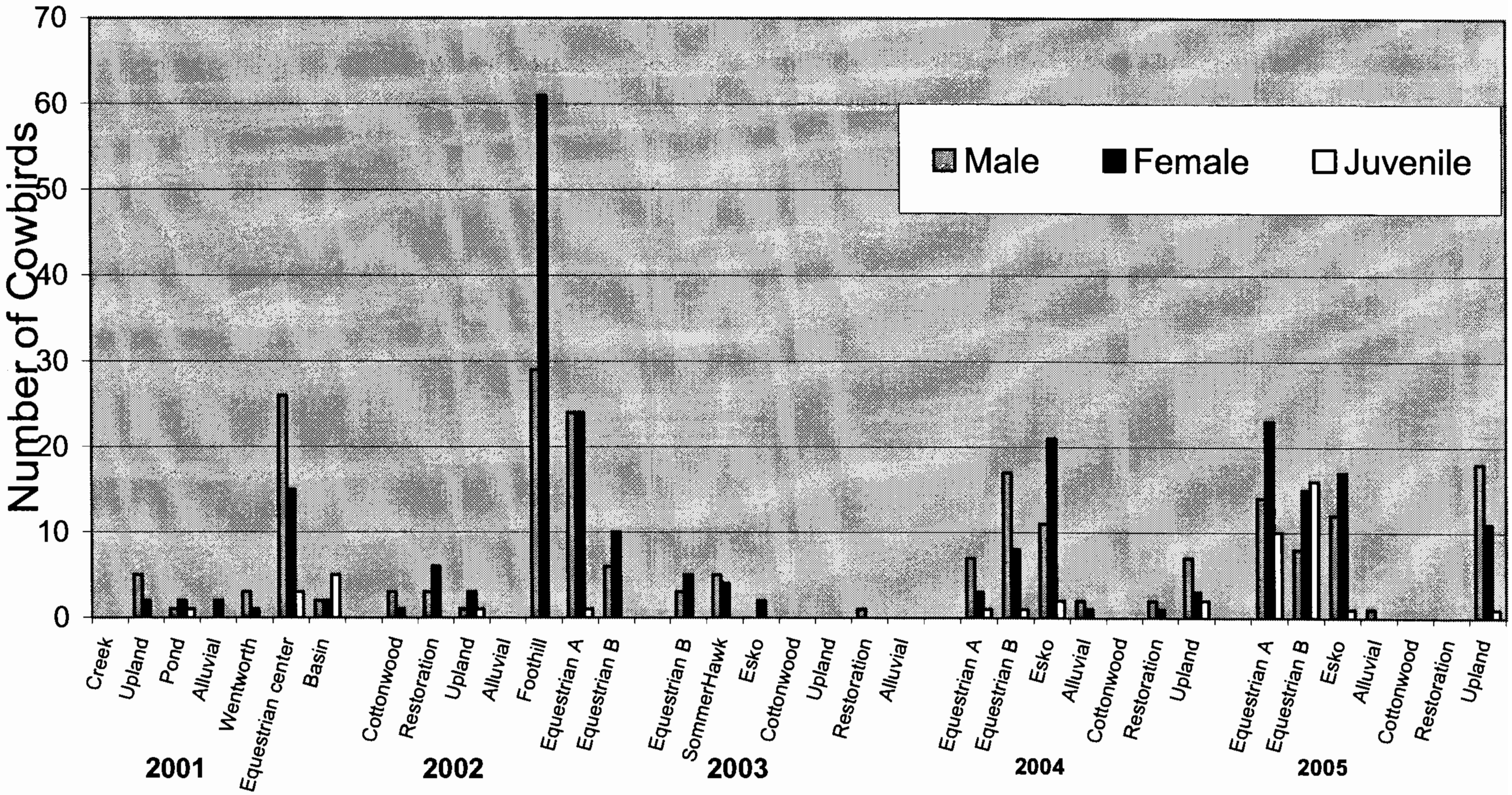


Figure 3-1
Trap Location Based on Year

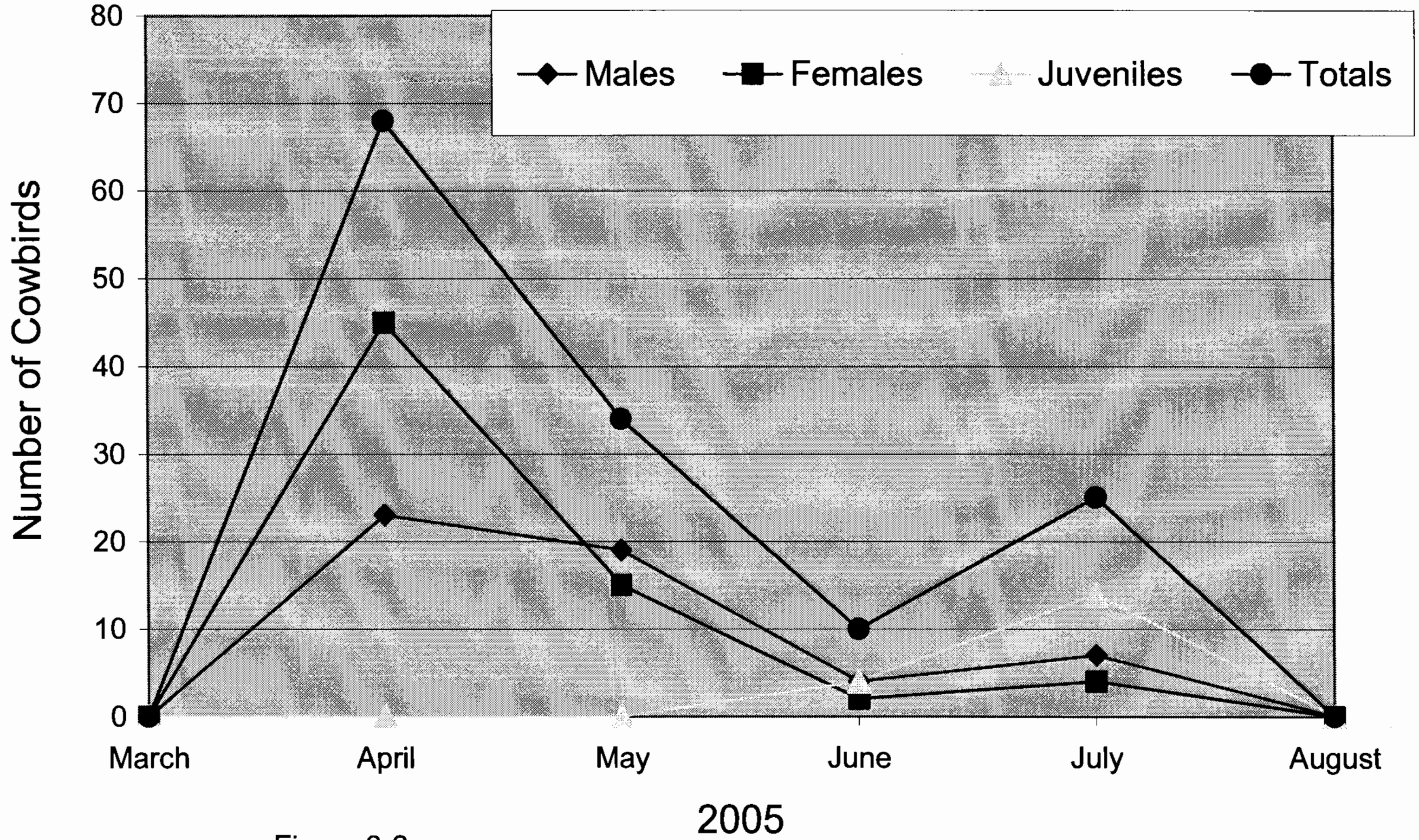


Figure 3-2
SEASONAL VARIATION IN MALE, FEMALE AND JUVENILE COWBIRD CAPTURES
2005

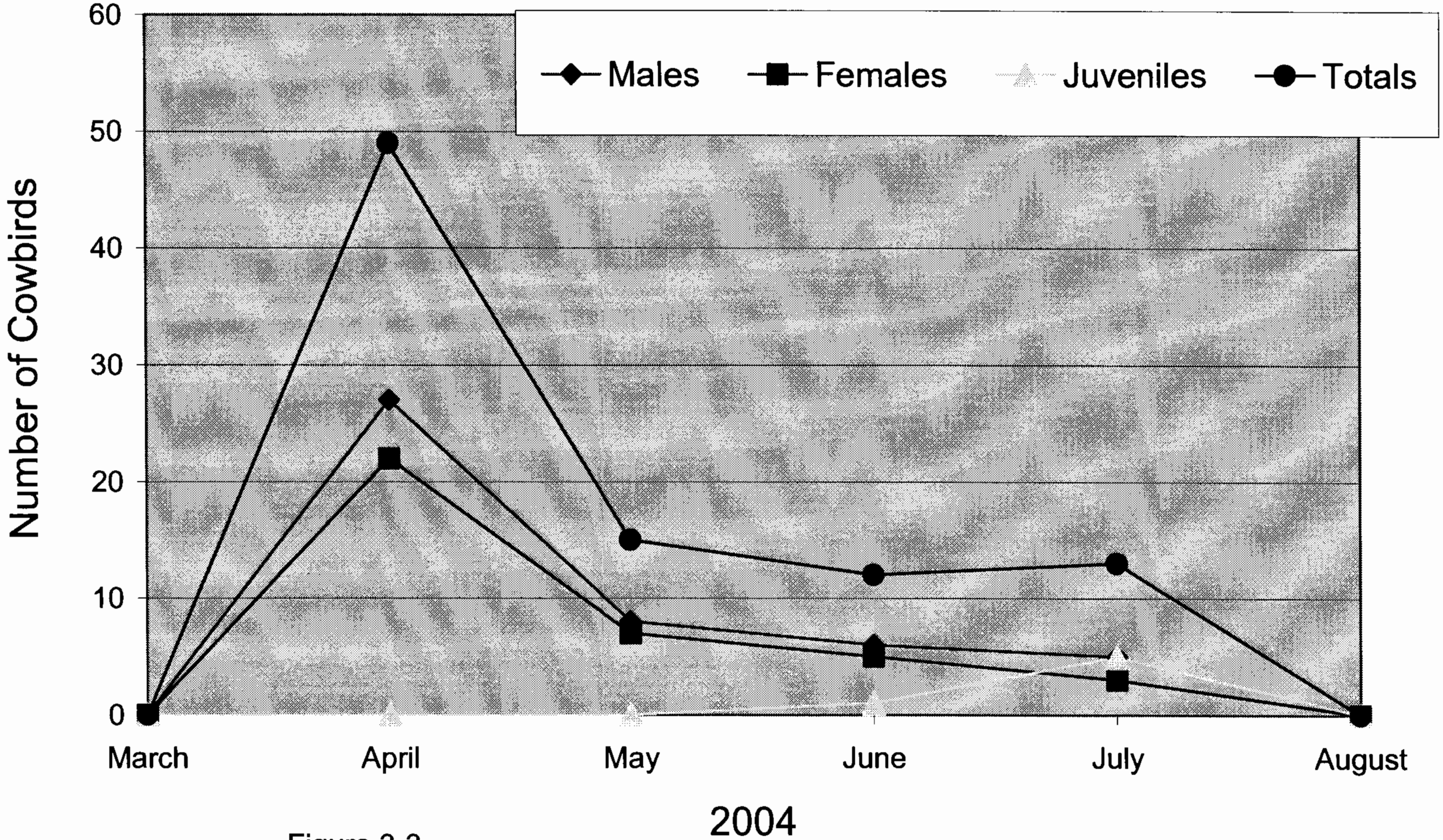


Figure 3-3
SEASONAL VARIATION IN MALE, FEMALE AND JUVENILE COWBIRD CAPTURES
2004

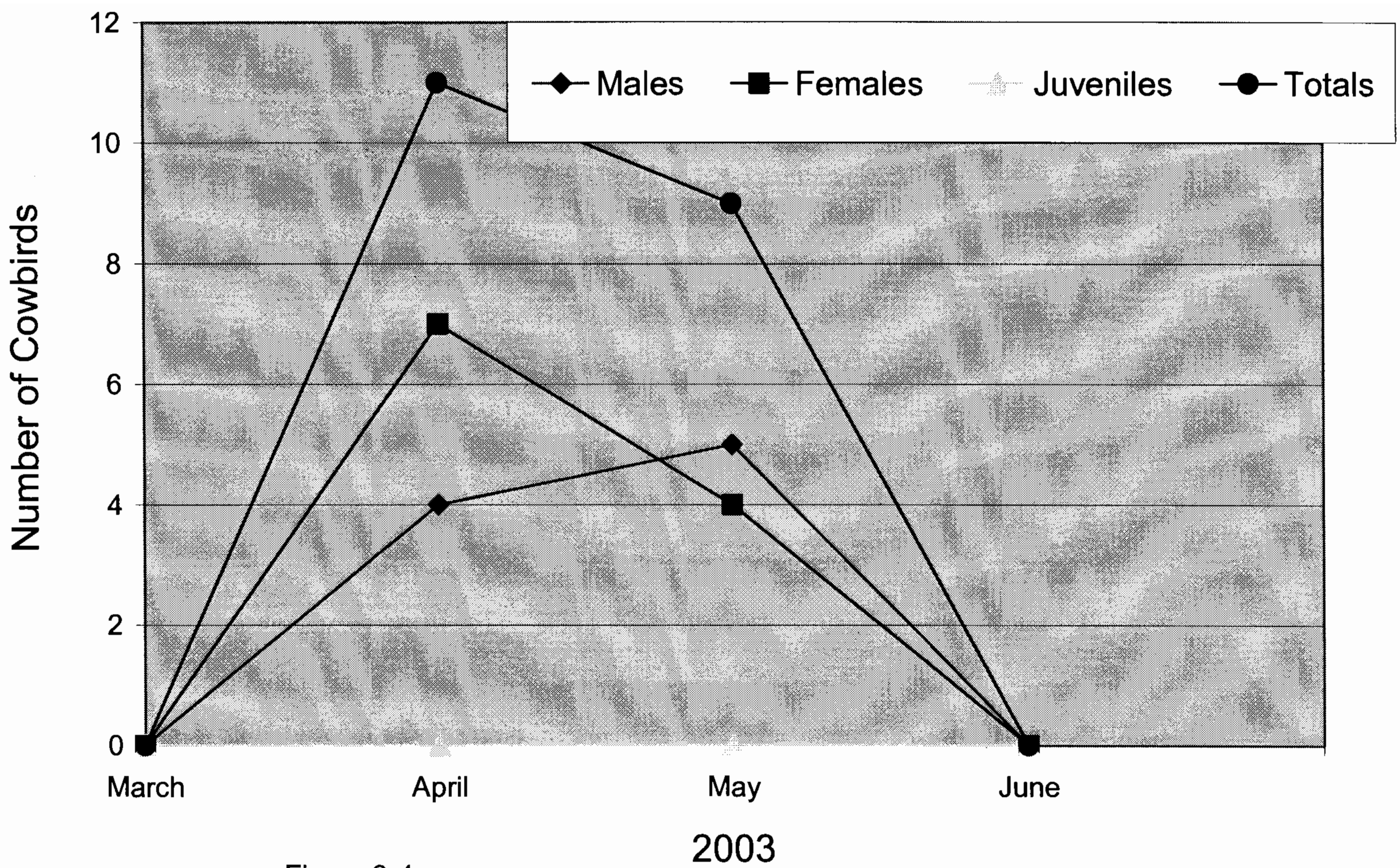


Figure 3-4
SEASONAL VARIATION IN MALE, FEMALE AND JUVENILE COWBIRD CAPTURES
2003

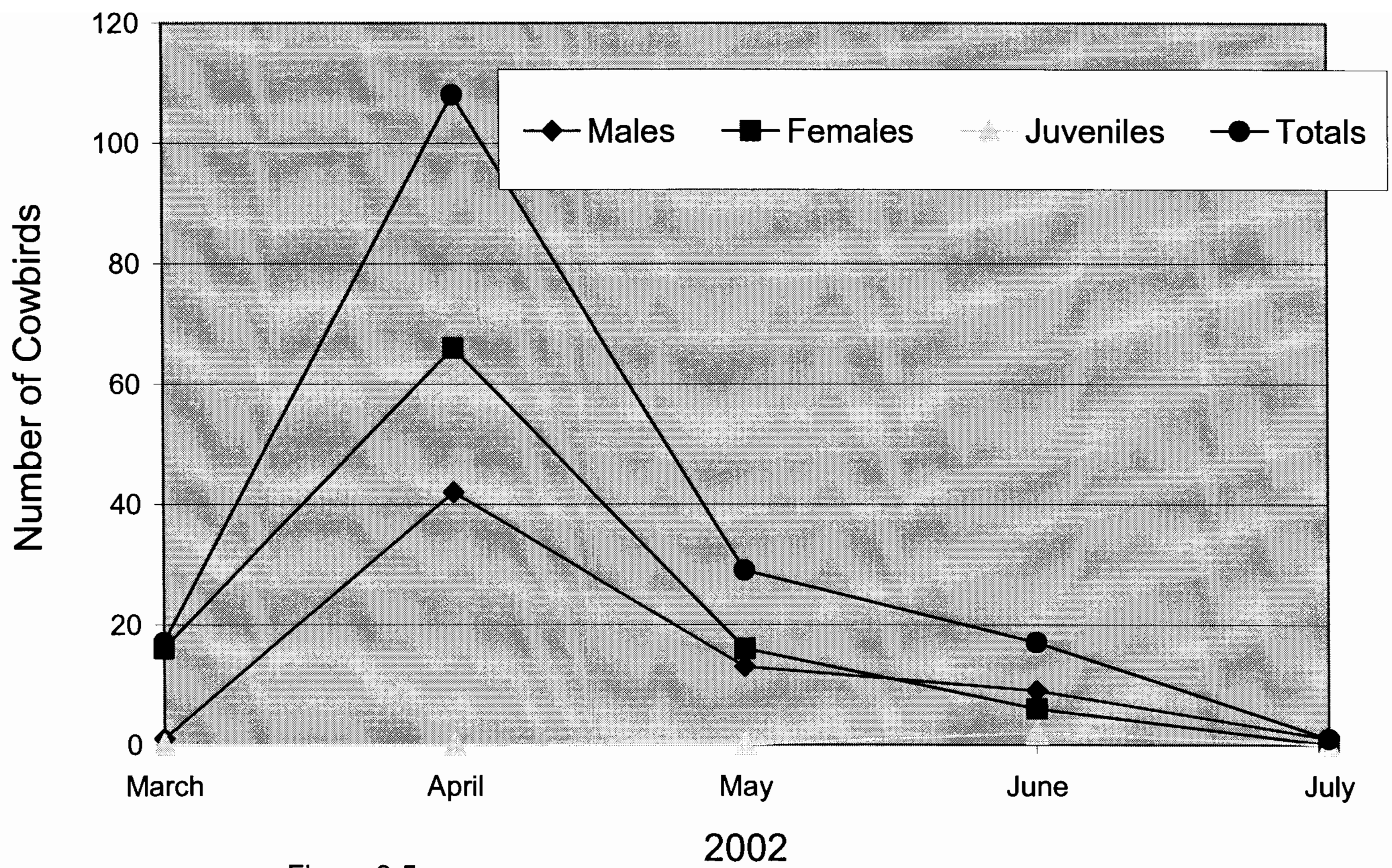


Figure 3-5
SEASONAL VARIATION IN MALE, FEMALE AND JUVENILE COWBIRD CAPTURES
2002

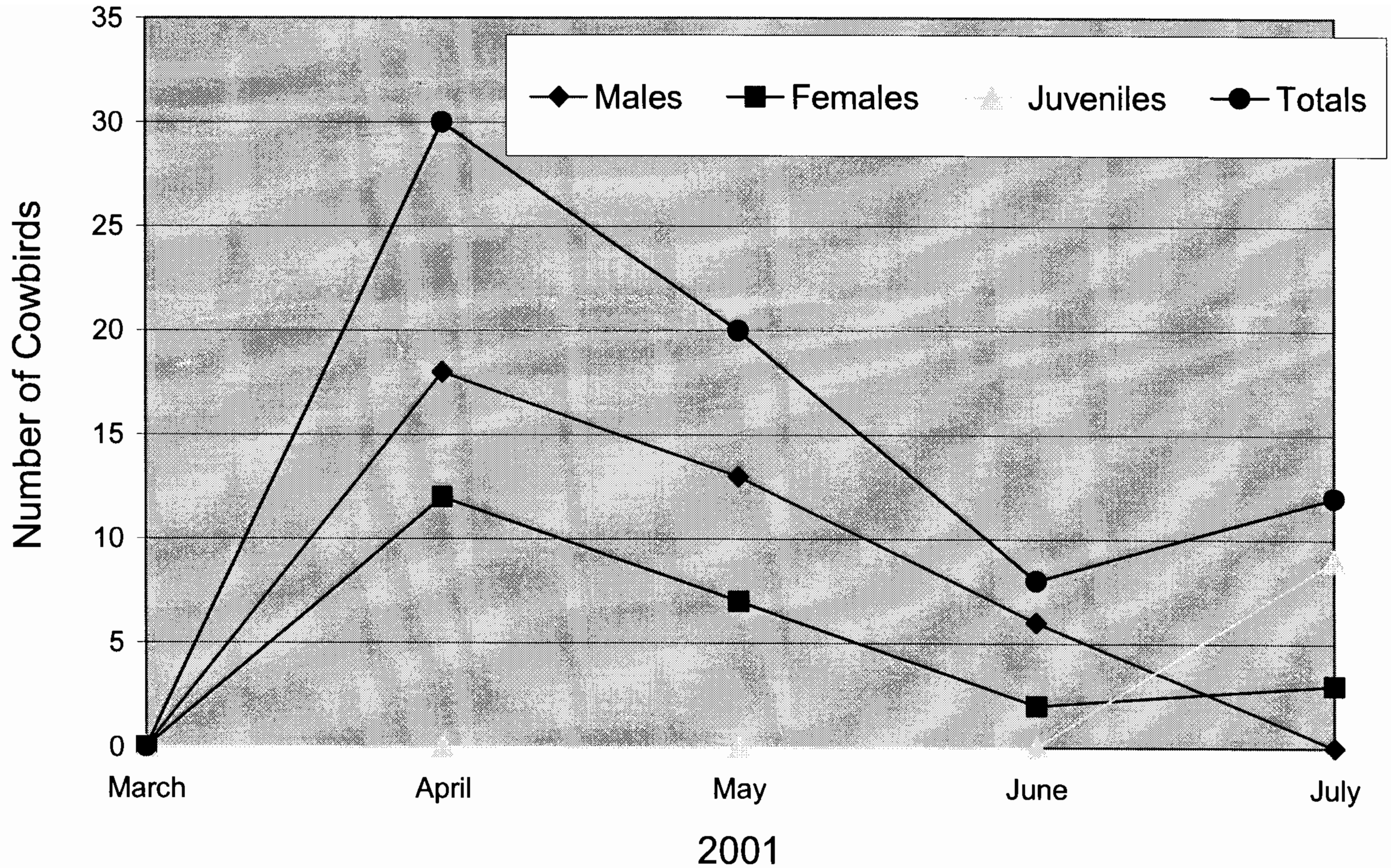


Figure 3-6
SEASONAL VARIATION IN MALE, FEMALE AND JUVENILE COWBIRD CAPTURES
2001

3.7 TRAP EFFICIENCY

The 2005 trapping season consisted of a possible 875 trap days (seven traps for 125 days from March 31 through August 1). However, due to an unusually high percentage of non-target mortalities two of the seven traps were prematurely closed. Additionally, due to an increased risk of vandalism, two traps were temporarily shut down, while two closed traps were temporarily opened (July 9 and 10). Three of the traps (Traps 3, 4 and 7) were in operation from March 31 through August 1 for a total of 375 trap days (three traps for 125 days). Two traps (Trap 1 and 2) were in operation from March 31 through August 1 with a temporary closure occurring on July 9 and 10 for a total of 246 trap days (two traps for 123 days). Trap 5 was in operation from March 31 through June 6, with a temporary re-opening occurring on July 9 and 10 for a total of 70 trap days. Trap 6 was in operation from March 31 through June 16 with a temporary re-opening on July 9 and 10 for a total of 80 trap days. Thus, the total number of trap days during the 2005 season was 771, or 88 percent of the total possible trap days. This number increased from the 656 trap days in 2003, but decreased from the 804 trap days in 2004, 857 trap days in 2002 and 849 trap days in 2001. Unlike the 2002 and 2001 trapping seasons, none of the trap days during the 2005 season were lost to vandalism events. The 2005, 2004 and 2003 trapping seasons all had early trap closures due to increased human presence (events held at Hansen Dam Equestrian Center) around the traps and non-target mortalities. These early trap closures may have negatively impacted the overall trap efficiency for these trapping seasons.

Overall, 0.18 cowbirds were caught per trap per day, including 0.07 males, 0.09 females and 0.02 juveniles. These figures are higher than the 2004, 2003 and 2001 trapping seasons, but slightly lower than the 2002 season. These numbers reflected the higher overall capture total in 2005 compared to 2004, 2003 and 2001. Throughout the 5-year implementation of the cowbird trapping program at the Big Tujunga Wash Mitigation Bank, the 2002 trapping season was the most productive, depicting a higher overall capture total than all other years.

3.8 BANDED COWBIRDS CAUGHT

One banded male cowbird (band # 168107528 ABRE) was trapped during the 2005 trapping season. This bird was re-trapped on many occasions throughout the season and was subsequently released each time as per our trapping protocol. Each time the banded cowbird was released it appeared to be in good condition. This individual was first trapped during the 2004 trapping season and most likely returned to the traps out of habit due to the presence of the decoy birds, seed, water, and shelter.

3.9 TRAP PREDATION

Two male and one female decoy cowbirds died during the 2005 trapping season. All of them died within the traps, presumably from stress and/or from pecking by cowbirds. A total of 6 non-target birds died in the traps during the 2005 trapping season. The non-target birds most likely died due to competition and pecking within the trap versus predation, as there were no signs of predation in and around the traps. Therefore, there were no deaths caused by predation from hawks, large passerines such as scrub jays (*Aphelocoma californica*), or snakes.

The prevention of predation can be attributed to the combination of smaller wire mesh that was used for the panels and the reduced top slot size. The reduced top slot size prevents raptors, such as Cooper's hawks (*Accipiter cooperii*), from standing on top of the trap, reaching into the top slot, and grabbing decoy cowbirds or non-target birds. The smaller top slot also prevents larger non-target birds from entering the traps. The smaller wire mesh prevents snakes and burrowing mammals such as ground squirrels from getting into the trap and causing undue stress and possibly death of decoys or non-targets. However, the smaller ¼-inch mesh design is believed to have contributed to an unusually high incidence of non-target mortality during the 2005 season as well as the 2003 trapping season. Whereas smaller passerines would be able to fly out of the traps via 1-inch wire mesh, they were not able to fly out of the ¼-inch mesh and were attacked by the cowbirds. Therefore, the smaller mesh design, although very effective at preventing predation, prevented the smaller birds, primarily Bewick's wrens (*Thryomanes bewickii*), from flying out of the traps. Therefore, the nontarget mortality rate for these years was higher than normal.

Although ground squirrel burrows were abundant below the floor panel of the traps during 2005, the ground squirrel activity did not result in target or non-target mortality.

3.10 INCIDENCE OF PARASITISM

California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher nest monitoring surveys were not conducted in the vicinity of the project area during the 2005 breeding season. Instances of nest parasitism by brown-headed cowbirds cannot be documented without conducting monitoring/nesting surveys for these bird species. Although monitoring/nesting surveys were not conducted, qualified biologists did conduct protocol presence/absence surveys for least Bell's vireo and southwestern willow flycatcher in the Big Tujunga Wash Mitigation Bank site during the 2005 breeding season. Least Bell's vireo, southwestern willow flycatcher and western yellow-billed cuckoo were not observed during any focused surveys. Thus, it is assumed that these species did not nest within the mitigation bank, and therefore could not have been parasitized by cowbirds. Since protocol surveys were not conducted for California gnatcatcher, the incidence of parasitism cannot be determined.

3.11 TRAP VANDALISM

Two instances of trap vandalism occurred during the 2005 trapping season. The first instance occurred prior to the start of the first month of trapping. The back mesh panel of trap 3 was sliced open; however, no decoy cowbirds escaped or were harmed because the trap had not been activated yet. The second instance occurred during the second month of trapping. The back mesh panel of trap 2 was sliced open and all 9 cowbirds (4 males and 5 females) escaped from the trap. This trap was repaired and re-opened on the same day, using decoys from other active traps. Five of the nine cowbirds (2 male and 3 female) were later recaptured, but four remained missing throughout the rest of the 2005 trapping season. Although there were instances of vandalism, no trapping days were lost in 2005. Trap vandalism did not occur during the 2004 trapping season. The trap vandalism that occurred during the 2003 trapping season was not as severe as it was during the 2002 and 2001 seasons and trap days were not lost due to the incidences of vandalism in 2003. In comparison, a total of 4 days in 2002 and 12 days in 2001, were lost due to vandalism events.

3.12 NON-TARGET CAPTURES

A total of 156 birds from 4 non-target species were captured during the 2005 trapping season. The most frequently captured bird species was California towhee (*Pipilo crissalis*) followed by house sparrow (*Passer domesticus*). Ninety-three of the 156 non-target birds were released safely. Six non-target birds were found dead in the traps, all of which appeared to have died due to pecking by cowbirds that were also in the traps. There were no signs of predation in any of the non-target mortalities (e.g., feathers outside of the trap). The trapping program did not capture any bird species considered sensitive by the resource agencies.

The non-target mortality rate for the 2005 trapping season totaled 3.8 percent, which is only slightly higher than the standard 2 percent mortality rate considered acceptable by the USFWS and discussed in Griffith Wildlife Biology Reports (GWB 1994b) on non-target birds. Efforts to reduce the non-target mortalities were made prior to closing down the traps and included switching out the aggressive decoy cowbirds. Two traps, trap 5-Cottonwood and trap 6-Restoration were closed down prematurely (June 6 and July 16, respectively) due to continued non-target mortality.

Additionally, a total of 57 house sparrows (19 males, 36 females, and 2 juveniles) were trapped and subsequently euthanized during the 2005 trapping season per CDFG's authorization letter.

The total non-target bird captures for 2005 (156 birds) was lower than the total non-target bird captures for 2004 (182 birds), and 2003 (176 birds) and 2002 (233 birds); however, it was higher than the total non-target captures for and 2001 (74 birds). The composition was similar to 2004 and 2003 with the California towhee being the most commonly captured bird, but it varied from the 2002 and 2001 seasons. The most frequently captured bird species in 2002 were white-crowned sparrow (*Zonotrichia leucophrys*), red-winged blackbird (*Agelaius phoeniceus*) and California thrasher (*Toxostoma redivivum*). The most frequently captured bird species in 2001 were western meadowlark (*Sturnella neglecta*), California towhee, and song sparrow (*Melospiza melodia*). The difference in non-target bird species captured can be attributed to the different trap locations used each year, and more specifically, to the absence of the pond and creek trap locations used in 2001. Tables 3-6, 3-7, 3-8, 3-9, and 3-10 list the number of non-target bird species captured in each trap during the 2005, 2004, 2003, 2002, and 2001 trapping seasons.

Table 3-6
Number of Non-Target Bird Species Captured in Each Trap
2005 Trapping Season

Bird Species	Trap 1		Trap 2		Trap 3		Trap 4		Trap 5		Trap 6		Trap 7		Total	Total
	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D
BEWR	0	0	0	0	0	0	0	1	4	1	4	2	1	1	9	5
CALT	2	0	4	0	4	0	15	0	8	1	4	0	46	0	83	1
HOFI	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
HOSP*	32	0	0	0	21	0	0	0	0	0	0	0	4	0	57	0
Totals for each trap	34	0	5	0	25	0	15	1	12	2	8	2	51	1	150	6

CALT = California towhee HOFI = house finch HOSP = house sparrow
BEWR = Bewick's wren

C: Captured and Released
D: Deceased
***: HOSP were euthanized per CDFG authorization letter**

Table 3-7
Number of Non-Target Bird Species Captured in Each Trap
2004 Trapping Season

Bird Species	Trap 1		Trap 2		Trap 3		Trap 4		Trap 5		Trap 6		Trap 7		Total	Total
	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D
CALT	1	0	10	0	1	0	22	1	79	1	39	1	3	0	155	3
HOFI	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
HOSP*	1	0	7	0	14	1	0	0	0	0	0	0	0	0	22	1

CALT = California towhee HOFI = house finch HOSP = house sparrow
BEWR = Bewick's wren

C: Captured and Released
D: Deceased
***: HOSP were euthanized per CDFG authorization letter**

Table 3-8
Number of Non-Target Bird Species Captured in Each Trap
2003 Trapping Season

Bird Species	Trap 1		Trap 2		Trap 3		Trap 4		Trap 5		Trap 6		Trap 7		Total	Total
	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D
BEWR	0	0	0	1	0	1	1	3	0	0	2	3	0	0	3	8
CALT	0	0	3	0	0	0	66	1	15	0	11	1	37	0	132	2
HOFI	1	0	0	0	1	0	3	0	1	0	0	0	0	0	6	0
HOSP*	0	0	8	0	14	0	0	0	0	0	0	0	0	0	22	0
RWBL	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
SOSP	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0
Totals for each trap	2	0	11	1	15	1	72	4	16	0	13	4	37	0	166	10

BEWR = Bewick's wren CALT = California towhee HOFI = house finch HOSP = house sparrow
RWBL = red-winged blackbird SOSP = song sparrow

C: Captured and Released
D: Deceased
***: HOSP were euthanized per CDFG authorization letter**

Table 3-9
Number of Non-Target Bird Species Captured in Each Trap
2002 Trapping Season

Bird Species	Trap 1		Trap 2		Trap 3		Trap 4		Trap 5		Trap 6		Trap 7		Total	Total
	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D
CALT	3	0	0	0	2	0	1	0	2	0	4	0	1	0	13	0
HOFI	6	0	1	0	5	0	1	0	1	0	1	0	1	0	16	0
CATH	3	0	1	0	3	0	3	0	2	0	3	0	2	0	17	0
WCSP	41	0	28	0	71	0	0	0	1	0	1	0	0	0	142	0
SOSP	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
HOSP	0	0	0	0	0	0	0	0	3	0	2	0	3	0	8	0
RWBL	1	0	0	0	0	0	0	0	1	0	27	0	5	0	34	0
Unidentified	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Totals for each trap	**56**	**0**	**30**	**1**	**81**	**0**	**5**	**0**	**10**	**0**	**38**	**0**	**12**	**0**	**232**	**1**

CALT = California towhee **SOSP = song sparrow**
HOFI = house finch **HOSP = house sparrow**
CATH = California thrasher **RWBL = red-winged blackbird**
WCSP = white-crowned sparrow

C: Captured and Released
D: Dead

Table 3-10
Number of Non-Target Bird Species Captured in Each Trap
2001 Trapping Season

Bird Species	Trap 1		Trap 2		Trap 3		Trap 4		Trap 5		Trap 6		Trap 7		Total	Total
	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D
CALT	1	0	1	0	5	0	2	0	3	0	0	0	2	0	14	0
HOWR	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
CATH	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0
WCSP	0	0	0	0	0	0	1	0	2	0	1	0	6	0	10	0
RWBL	0	0	0	0	2	0	1	0	0	0	7	0	0	0	10	0
SOSP	5	0	0	0	1	0	0	0	0	0	7	0	0	1	13	1
HOFI	0	0	0	0	0	0	0	0	0	0	6	0	0	0	6	0
GCSP	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
WEME	0	0	0	0	0	0	0	0	0	0	15	0	0	0	15	0
BEWR	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
Totals for each trap	**9**	**0**	**2**	**0**	**8**	**0**	**4**	**0**	**5**	**0**	**36**	**0**	**9**	**1**	**73**	**1**

CALT = California towhee
HOWR= house wren
CATH = California thrasher
WCSP = white-crowned sparrow
RWBL = red-winged blackbird
SOSP = song sparrow
HOFI = house finch
GCSP = golden-crowned sparrow
WEME = western meadowlark
BEWR = Bewick's wren

C: Captured and Released
D: Dead

SECTION 4.0 – DISCUSSION

In terms of brown-headed cowbird capture rates and overall mortality rates, the 2005 trapping season at the Big Tujunga Wash Mitigation Bank site was extremely successful and had the second highest brown-headed cowbird capture rates since implementation of the trapping program began in 2001. The absence of trap predation also added to the success of the 2005 season.

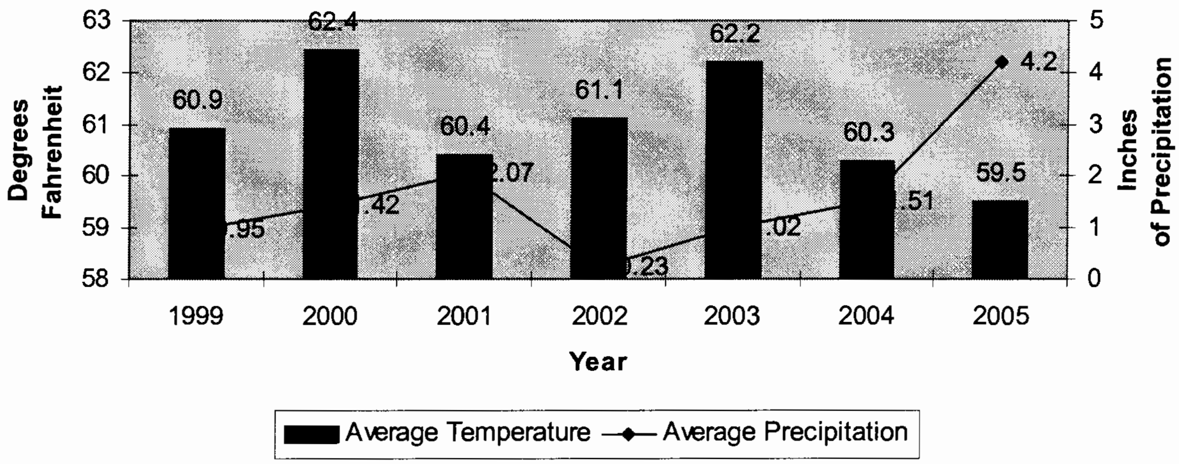
A total of 137 cowbirds, consisting of 53 males, 66 females, and 18 juveniles, were trapped within the Big Tujunga Wash Mitigation Bank site and vicinity between March 30 and August 1, 2005. In comparison, a total of 89 cowbirds, consisting of 46 males, 37 females, and 6 juveniles were trapped in 2004. A total of 20 cowbirds, consisting of 9 males, 11 females, and 0 juveniles were trapped in 2003. A total of 173 cowbirds, consisting of 66 males, 105 females, and 2 juveniles were trapped in 2002; and a total of 70 cowbirds, consisting of 37 males, 24 females, and 9 juveniles were trapped in 2001. The overall trap efficiency rate for the 2005 season was 1.106 cowbirds caught per day, which is the second highest when compared to the efficiency rates for previous trapping seasons and therefore indicates a successful trapping season. The 2004 trapping season had an overall trap efficiency rate of 0.723, the 2003 season had a rate of 0.207, the 2002 season was the most successful with an overall efficiency rate of 1.407 and the 2001 season had a rate of 0.569. The three offsite trap locations accounted for the majority of the cowbird captures.

The juvenile capture rate of 13.1 percent is the highest since the program implementation. This high percentage is most likely due to the fact that the 2005 trapping season was delayed two weeks and therefore extended two weeks, going further into July, a peak migration period for juvenile cowbirds. In comparison, the juvenile capture rate in 2004 was 6.7. The juvenile capture rate in 2003 was zero percent, the lowest since the program implementation. The early closure of the 2003 trapping program resulted in the zero percent juvenile capture rate because the program ended prior to juvenile migration through the area. The juvenile capture rate in 2002 was 1.2 percent, whereas the juvenile capture rate was 9 percent in 2001. The low juvenile capture rate in 2001 could have been due to the fact that cowbirds were not parasitizing nests in large numbers in the vicinity of the Big Tujunga Wash, and were therefore not producing many juveniles. The even lower juvenile capture rate in 2002 was most likely associated with the unusually dry season, which seems to have affected bird breeding behavior during spring 2002.

Trap vandalism was a minor issue during the 2005 trapping season. Prior to the start of trapping, the Esko trap (trap 3) was vandalized. The vandalism did not cause the escape of any decoy cowbirds because the traps had not been activated yet. Additionally, the equestrian B trap (trap 2) was vandalized during the second month of trapping. The trap was repaired and activated the same day. A total of nine cowbirds escaped due to this incident, five of which were later recaptured. Vandalism was anticipated and has occurred during previous years of trapping because of heavy trail use. The 5-year implementation of the MMP already includes a Community Awareness component in which Public Works and Chambers Group work with the community to keep residents updated of ongoing programs. As a result, community members are aware of the importance of the trapping program and monitor the site for any suspicious activity around the traps. It is likely that community awareness and ideal trap placement helped to decrease vandalism events during the 2005 trapping season.

It is important to track total cowbird captures in relation to climatic conditions, specifically average rainfall and temperature, throughout the 5-year implementation. Figure 4-1 shows climate data for Los Angeles from January through July from years 1999 through 2005. Weather conditions during 2005 included low average temperatures with above normal precipitation. These conditions are favorable for breeding birds and may explain the high cowbird capture rate for the 2005 trapping season. Average precipitation and temperature during 2004 was similar to climatic conditions during the first year of trapping in 2001. Although the average temperature during spring 2002 followed the general climatic trend, the 2002 trapping season was exceptionally dry and not conducive to bird breeding activity. However, the atypically dry conditions did not affect total cowbird captures for 2002. Weather conditions during the 2003 trapping season, included average temperatures with slightly above normal precipitation. These conditions were favorable for breeding birds; however, due to the shortened trapping season, it is difficult to compare the results of 2003 with other trapping seasons. The differences in total cowbird captures between trapping seasons seems to be attributed to more productive trap locations than weather conditions.

Figure 4-1
Climate Data for Los Angeles From January Through July 2005



Source: http://wwwcimis.water.ca.gov

SECTION 5.0 – RECOMMENDATIONS

The 2005 cowbird trapping program within Big Tujunga Wash Mitigation Bank was the second most successful, meaning there were more cowbirds captured during the 2005 trapping season than during three out of the four previous trapping seasons, since the implementation of the program in 2001. In addition, with the implementation of a cowbird trapping program by the USACE at Hansen Dam, the native bird species will further benefit by increasing the number of cowbirds removed from the region.

Although the Big Tujunga mitigation bank does not currently support the least Bell's vireo or southwestern willow flycatcher it could be considered an important corridor for the species. Fledgling least Bell's vireos expand their dispersal distances later in the season and have been observed up to 1.6 kilometers from natal sites (Gray and Greaves 1984). In addition, the cowbird trapping program benefits the population of vireos at the adjacent Hansen Dam. The trapping program includes traps within the riparian areas of the wash and offsite foraging and roosting areas for cowbirds. These offsite feeding and roost sites, especially those with livestock, provide opportunities for optimal trap sites that benefit the existing population of least bells vireo downstream at Hansen Dam. Over time, it is possible that vireos will re-establish territories at the Big Tujunga mitigation bank. However, it is impossible to estimate how long this may take and is dependant on the success of vireos in the region. For least Bell's vireo the annual average number of fledglings per pair ranges from 1.8 and 2.5. In addition, based on studies of color banded birds it is estimated that only 5 to 29 percent of Least Bell's Vireos survive to their first breeding season (Fish & Wildlife 1998) and the average life span for least bells vireo is 3-4 years (Greaves and Gray1989). Urban areas surround the territories at Hansen Dam; vireo territories surrounded by agriculture, farming, urban development such as golf courses, residential and commercial developments are significantly less successful in producing young than territories bordering on coastal sage scrub, grassland and chaparral (RECON 1989).

Although trapping and removal of brown-headed cowbirds is designed to increase the reproductive success of vulnerable passerines, a program's effectiveness cannot be truly determined without concurrent nest monitoring surveys. Since least Bell's vireo or southwestern willow flycatcher nest monitoring surveys were not conducted during the 2005 season, it is difficult to assess the 2005 trapping season's effectiveness in terms of reducing nest parasitism in the area. Focused presence/absence surveys for these two bird species did not detect nesting within the project site. Since focused presence/ absence or nest monitoring surveys were not conducted for California gnatcatchers, the incidence of parasitism on this species cannot be determined.

5.1 PROCEDURAL RECOMMENDATIONS

The 2005 trapping season ran smoothly and scheduling of trappers was generally not an issue. The use of the Hansen Dam Equestrian Center as the staging area was critical to the program's smooth operation. Public Works and Chambers Group should continue to maintain their relationship with Mr. Eddie Milligan in order for continued access and use of this area for future trapping seasons.

5.2 SECURING COWBIRD DECOYS

The lack of available decoys, due to a cowbird shortage in the region, resulted in a two-week postponement of the beginning of the 2005 trapping season. In order to secure enough decoy cowbirds at the beginning of next season, the following measures are recommended:

- Assemble and open at least one trap during the first week of March so, as decoys become available, they can be placed into this holding trap. This will serve to promptly achieve the desired decoy ratios in each trap at the beginning of the season.
- Maintain contact with other southern California cowbird trapping programs to keep current on the status of their programs and on the availability of excess birds.

5.3 VANDALISM

Trap vandalism was a minor problem in 2005. Prior to the start of the first month of trapping, the Esko trap (trap 3) was vandalized. The back mesh panel was sliced through. The trapper tied the mesh back together with wire. The vandalism did not cause the escape of any decoy cowbirds because the traps had not been activated yet. This trap is located offsite on private property. The owner was notified of the incident and asked to notify Chambers Group or LADPW of any suspicious activity in the area of the trap. Additionally, trap #2 located at the equestrian center was vandalized during the second month of trapping. The equestrian center manager (Eddie Milligan) was notified of the incident and the trap was repaired and activated the same day. A total of nine cowbirds escaped due to this incident, five of which were later recaptured. Vandalism was anticipated and has occurred during previous years of trapping because of heavy trail use. Informing community members of the importance of the program is ongoing and will continue throughout the 5-year implementation. Regardless of trap location, the traps should continue to be chained to a nearby tree or permanent object during future trapping seasons. Detail on potential future trap locations is discussed below in Section 5.4 Trap Relocation Recommendations.

5.4 TRAP RELOCATION RECOMMENDATIONS

Regardless of trap placement, the appropriate balance of four onsite versus three offsite trap locations must be maintained in order to comply with the USFWS and CDFG terms of mitigation bank approval.

5.4.1 Onsite Traps

With the exception of the Upland trap, which was the second most productive trap during 2005, historically the onsite trap locations have not been very productive traps; however, these four locations represent both upland and riparian habitats and were not vandalized due to their semi-secluded access routes. Therefore, these remaining trap locations should continue to be used during future trapping seasons. Based on recommendations made following the 2001 trapping season, traps should not be placed near Haines Canyon Creek or Tujunga Ponds.

5.4.2 Offsite Traps

The Equestrian A trap was by far the most productive trap during 2005. The Equestrian B and Esko traps were also highly productive, respectively due to their close proximity to active stables. The owners of these privately-owned stable/boarding areas were very cooperative and efforts should be made to contact them again in the future. If the exact locations are not available in the future, then efforts should be made in the 2 months prior to program implementation for other suitable stable locations.

SECTION 6.0 – REFERENCES

Atwood, J.L.

1990 Status Review of the California Gnatcatcher *(Polioptila californica)*. Unpublished Technical Report, Manomet Bird Observatory, Manomet, Massachusetts.

1993 California Gnatcatchers and Coastal Sage Scrub: The Biological Basis for Endangered Species Listing. Pp. 149-169. In *Interface Between Ecology and Land Development* in California. Edited by J.E. Keeley, Southern California Academy of Sciences, Los Angeles.

Brittingham, M.C. and S.A. Temple

1983 Have Cowbirds Caused Forest Songbirds to Decline? *BioScience* 33:31-35.

Chambers Group, Inc.

2000 Final Master Mitigation Plan for the Big Tujunga Wash Mitigation Bank. Prepared for the Los Angeles County Department of Public Works, Alhambra, California. April 2000.

2001 Final 2001 Annual Brown-headed Cowbird Trapping and Removal Program Report. Prepared for the Los Angeles County Department of Public Works, Alhambra, California. October 2001.

2002 Final 2002 Annual Brown-headed Cowbird Trapping and Removal Program Report. Prepared for the Los Angeles County Department of Public Works, Alhambra, California. October 2002.

2003 Final 2003 Annual Brown-headed Cowbird Trapping and Removal Program Report. Prepared for the Los Angeles County Department of Public Works, Alhambra, California. October 2002.

2004 Final 2004 Annual Brown-headed Cowbird Trapping and Removal Program Report. Prepared for the Los Angeles County Department of Public Works, Alhambra, California. October 2002.

Ehrlich, P., D. Dobkin, and D. Wheye

1988 *The Birder's Handbook.* Simon and Schuster, Inc. New York, New York.

Graham, Frank Jr.

1998 Bad, Bad, Birds. Audubon. September-October: 104-108.

Gray, M.V., and J. Greaves.

1984 The Riparian Forest as Habitat for the Least Bell's Vireo. Pp. In R. Warner and K. Hendrix, eds. California Riparian Systems: Ecology, Conservation, and Productive Management. University of California Press, Davis California.

Greaves, J.M.

1989 Maintaining Site Integrity for Breeding Least Bells Vireos. Pp. 293-298 in D. L. Abell, ed. California Riparian Systems Conference: Protection, Management, and restoration for the 1990's; 1988 September 22-24, Davis, CA. Pacific Northwest Forest and Range Experiment Station, Berkeley, CA; USDA Forest Service General Technical Report. PSW-110. 544 pp.

Griffith Wildlife Biology (GWB)

1993 Final Report, Brown-Headed Cowbird Trapping and Elimination Program. Prepared for the International Boundary and Water Commission United States and Mexico United States Section, El Paso, Texas, and Chambers Group, Inc.

1994a Brown-Headed Cowbird Trapping Protocol. Unpublished document prepared by Jane C. Griffith and John T. Griffith, Griffith Wildlife Biology, Calumet, Michigan.

1994b San Joaquin Hills Transportation Corridor; Brown-Headed Cowbird Removal Program. Prepared for California Corridor Constructors.

Harris, J. H.

1991 Effects of Brood Parasitism by Brown-Headed Cowbirds on Willow Flycatcher Nesting Success Along the Kern River, California. *Western Birds* 22:13-26.

Laymon, S. S.

1987 Brown-Headed Cowbirds in California: Historical Perspectives and Management Opportunities in Riparian Habitats. *Western Birds* 18:63-70.

1993 *Brown-Headed Cowbird Impacts on South-Western Riparian Bird Communities: Management Options and Opportunities*. Paper from the North American Workshop on the Ecology and Management of Cowbirds, Austin, Texas.

Mayfield, H. F.

1977 Brown-Headed Cowbird: Agent of Extermination? *American Birds* 31:107-113.

RECON (Regional Environmental Consultants).

1989 Comprehensive species management plan for the least Bell's vireo (*Vireo bellii pusillus*). Prepared for San Diego Association of Governments, San Diego.

Sibley, D.A.

2000 National Audubon Society, Sibley Guide to Birds. Chanticleer Press, Inc.

Stafford M. D. and B. E. Valentine

1985 A Preliminary Report on the Biology of the Willow Flycatcher in Central Sierra Nevada. Cal-Neva Wildlife Transactions 66-77.

Stallcup, R.

1993 "Another Silent Spring?" Pt. Reyes Bird Observatory News, Spring 1993.

Stokes, D. and L. Stokes.

1996 *Stokes Field Guide to Birds (western region)*. Little, Brown and Company Limited, New York, New York.

Unitt, P.

1984 The Birds of San Diego County. San Diego Society of Natural History, Memoir 13.

U.S. Fish and Wildlife Service (USFWS)

1991 Endangered and Threatened Wildlife and Plants; Animal Candidate Review for Listing as Endangered or Threatened Species, Proposed Rule. In Federal Register Vol. 56, No. 225, government publications.

1994 Endangered and Threatened Wildlife and Plants. In Federal Register Vol. 56, No. 225, government publications. Final Determination of Critical Habitat for the Least Bell's Vireo.

1997 Endangered and Threatened Wildlife and Plants; Final Determination of Critical Habitat for the Southwestern Willow Flycatcher. In Federal Register Vol. 62, No. 140, government publications.

1998 Draft recovery plan for the least Bell's vireo. U.S. Fish and Wildlife Service, Portland, OR. 139pp.

United States Geological Survey (USGS)
1959 Sunland, 7.5-minute topographic quadrangle, photorevised

Willet, G.
1933 Revised List of Birds of Southwestern California. *Pacific Coast Avifauna* 27: 1-203.

SECTION 7.0 – LIST OF PREPARERS

Chambers Group, Inc.
17671 Cowan Avenue, Suite 100
Irvine, CA 92614

Lindsay Messett
Task Manager

Los Angeles County Department of Public Works
Water Resources Division
900 South Fremont Avenue
Alhambra, CA 91803

Pat Wood
Senior Civil Engineer

Belinda Kwan
Associate Civil Engineer

Michele Chimienti
Senior Civil Engineer Assistant

APPENDIX A

BROWN-HEADED COWBIRD TRAPPING PROGRAM AND PROTOCOL

BROWN-HEADED COWBIRD TRAPPING PROTOCOL[1]

TRAP PLACEMENT

Goal: To place traps in areas naturally preferred or visited by cowbirds, yet close to target host habitat so that the cowbirds removed are those impacting the target hosts.

Fulfill as many of the following criteria as possible by locating traps:

1. In a natural geographic funnel -- river/valley-canyon mouth, river/valley-canyon confluence, ridge line saddle. *Cowbirds usually travel in defined corridors/flight paths between roosting, foraging, and breeding areas.*

2. Near or within a cowbird roosting area (survey at dusk to locate). *Cowbirds usually roost with other blackbirds in wetlands.*

3. Near or within a cowbird foraging area -- stable, dairy, stockyard, agricultural field, golf course. *Cowbirds may commute 5 miles or more between breeding and foraging areas.*

4. Near or within a cowbird breeding area (survey your study area to observe the habitat with the most cowbirds present). *Cowbirds prefer riparian habitat with its high host density over all others.*

5. Near or within the target host habitat (at edge or in clearing). *Cowbirds prefer traps in open areas, not dense brush.*

6. Where visible from above (cowbird's eye view). *Cowbirds are attracted visually to the traps by the motion of live decoys and non-target birds.*

7. Under a cowbird perch -- telephone wire, snag, tree, fence. *Cowbirds prefer to inspect the trap from a nearby perch before close approach.*

8. Where accessible by vehicle (facilitates economical and quality daily servicing).

9. Out of public sight and in a low activity area (if possible).

[1] *Preferred Citation*:

Griffith Wildlife Biology (GWB) 1994. Brown-headed Cowbird Trapping Protocol. Unpublished document prepared by Jane C. Griffith and John T. Griffith, Griffith Wildlife Biology, Calumet, Michigan.

Griffith Wildlife Biology 304 M-203, P.O. Box 47, Calumet, MI 49913
phone/fax (906) 337-0782, E-mail: griffith@up.net

TRAP ACTIVATION

Goal: To create an oasis of comfort (perches, shade), abundant food, clean water, and loud social-sexual interaction (among happy live decoys) which free cowbirds will find irresistible.

1. Level the trap site if necessary with pick and shovel so that the floor panel lies flat (otherwise the assembled trap will have gaps).

2. Bolt all panels together tightly with a socket wrench (so that vandals cannot easily disassemble the trap).

3. Cover the front half of the mesh floor with native material (sand, dirt) (to create a cowbird foraging pad onto which bait seed will be poured daily through the capture slot above).

4. Insert 1 m long, 1-1.5 cm diameter smooth perches (Arundo donax works best) into three trap corners at chest height (except above door) and 1 at knee height in a back corner for wing-clipped female decoy cowbirds and subordinate cowbirds/non-target species. Collect all perches prior to the day of trap activation.

5. Place a 1 gallon water guzzler on the rear floor in the middle (such placement precludes fouling of water by seed or perched birds). Make certain the water outlet hole in the guzzler faces down hill (else all the water will drain out).

6. Attach green nylon mesh to the west-facing side panel of the trap if the site does not offer afternoon shade (keep this in mind when orienting trap floor during Step 1).

7. Staple an easily replaced informative notice on the trap door (to include information about the trap owner, project administrator, project permit, project purpose, and trap operator, including phone number).

8. Label the trap with a number.

9. Add bait seed. For the first week of trapping, add 1 scoop outside the trap on a bare dirt area visible from above, and 1 scoop onto the foraging pad through the capture slot (allowing about 1/4 to remain on the slot board). Continue baiting both outside and inside only foraging area traps. At non-foraging sites, add 1 scoop per day (regardless of the amount inside -- the decoys and non-target birds need *fresh* seed daily) to each trap through the capture slot (allowing a sprinkling of seed -- enough to attract but not satisfy -- to remain on the slot board). Important: do not use wild bird mix containing sunflower seed (which only attracts non-target species).

10. Add the live decoys (2 males and 3 wing-clipped females). While building to the preferred ratio, never place more than 2 male decoys per trap. Build as follows (male:female ratio): 1:0 or 0:1 (spread available decoys so there is at least 1 bird, male or female, per trap), 1:1, 1:2 (you may use 2:1 if you have extra males), 2:2, 2:3.

11. Lock the trap with a heavy lock. Key all locks alike.

12. Leave the trap door locked open or the slot board off if daily servicing of the assembled trap will not begin immediately. DO NOT LEAVE LOCKED TRAPS UNATTENDED FOR MORE THAN 24 HOURS. *Assembled, locked, unattended traps can kill animals that enter by dehydration or starvation. It is especially important to lock open or remove the slot board of assembled traps around the start and end of trapping, when assembled traps may be in the field and not serviced daily.*

TRAP DAILY SERVICING

Goal: To release any non-target species captured, add fresh bait seed and water, maintain the 2M:3F live decoy ratio, and maintain the shade, perches, sign, and general trap integrity.

1. Add 1 scoop of bait seed through the capture slot.
2. Release all non-target birds immediately. Most are less hardy than cowbirds and can die in hand if not immediately released (mortality should be <2%). If there are many more non-target birds than cowbirds in a trap, capture and hold the cowbirds, then open the trap door and flush out the non-target birds.
3. Wing-clip the right wing of any newly-captured female cowbirds.
4. Remove or add newly captured or spare decoy cowbirds (carried with the trap technician daily) as necessary to maintain the 2:3 decoy ratio. Substitute any newly captured cowbirds as "fresh" live decoys.
5. To preclude accidental release of captured cowbirds or spare decoy cowbirds, DO NOT TRANSFER COWBIRDS INTO OR OUT OF THE SMALL HOLDING CAGE UNLESS YOU ARE INSIDE THE TRAP.
6. Fill the water guzzler if it is less than half full. Scrub out the tank and rim of each guzzler weekly.
7. If decoys are missing, carefully inspect the trap for vandalism (some vandals clip a very small hole in the mesh that only close inspection reveals) or evidence that the missing bird died or was preyed upon (blood or feathers on the mesh, carcass). Beware of king snakes and rattlesnakes too thick to escape the trap.
8. Repair any damage from vandals immediately.
9. Verify that the perches, shade, and sign are in place. Repair-replace as needed.
10. When leaving the trap site, verify that the trap is locked and that you have the capture net with keys, seed scoop, and any tools and materials used for repairs.
11. Record all captures, activities, and comment on the daily data sheet.

TRAP DISASSEMBLY AND STORAGE

Goal: To have all traps in good repair and ready for placement and activation the following year.

1. Disassemble the traps. DO NOT pound on the threaded end of the carriage bolts with metal implements (it will make them unusable); use a rubber mallet or the wooden handle of a hammer to drive the bolts from the frames.

2. Collect all salvageable perches; bind and store in bundles of 100.

3. Separate the bolts from the nuts and washers. Apply a light spray of lubricant to the bolts. Store in a dry building or a sealed container.

4. String all the slot board straps together with baling wire.

5. Lubricate all locks with graphite.

6. Remove all staples left from shade or sign application from panels. Well-attached shade cloth can remain for use the following year.

7. Remove all vegetation from panel mesh, especially the floor.

8. Inspect all panels as they are disassembled. Make notes on any required repairs. Keep panels in need of repair separate.

9. Stack like panels in neat stacks (prevents warping) in the storage area. If outdoors, use 2x4 spacers to provide air circulation. Cover with canvas tarps if not indoors or under shelter (overpass) outdoors. Do not use plastic tarps, which cause condensation and subsequent wood rot.

10. Make all necessary repairs to the damaged panels separated during disassembly, then place on the proper stack.

11. Compile a list of the number and type of panels stored.

12. Scrub clean all salvageable water guzzlers. Remove all algal growth from the rim and tank and dry completely. Store the rims stacked together in firm boxes or 5 gallon plastic buckets. Store tanks in firm boxes or plastic bags. Store out of direct sunlight in an area safe from compaction.

TRAP OPERATION DATES

Topical Trapping

Goal: To minimize the number of parasitism days (the number of days a host population is exposed to each female cowbird) in targeted habitat. Standard Southern California trapping period for riparian hosts: March 15 - July 15.

Start Date

1. Determine the date of cowbird dispersal from winter flocks into targeted host habitat. *In San Diego and Orange Counties, this usually occurs during the third week of March.*

2. Determine the date of earliest egg-laying by the target host. *For least Bell's vireos, this is the first week of April.*

3. Place and activate all traps, with at least 1 male decoy cowbird, at the start of the cowbird dispersal period (for coastal Southern California: March 15) OR about 2 weeks prior to the first egg-laying by the target host (for vireos: March 15).

Example: San Diego County

March 15: Traps placed and activated.
March 15-21 (Week 1): All equipment/logistical/procedural/administrative kinks are worked out, cowbirds disperse into breeding habitat, first cowbirds captured. *There is a lag period of 3-7 days between trap activation and cowbird captures while cowbirds present in the target habitat become accustomed to the traps.*
March 22-28 (Week 2): Most/all female cowbirds present in the target habitat are removed prior to/coincident with the first host egg-laying.
March 22 - July 15 (Weeks 3-18): Cowbirds are removed as they continue to disperse into the habitat, limiting parasitism days to ≤3 per female cowbird (too short to locate and parasitize host nests).

Note: It is likely that nearly the same number of adult cowbirds could be removed from targeted habitat by trapping only in May. However, the number of parasitism days and actual parasitism events would not be greatly reduced. Similarly, a greater number of cowbirds could be removed by trapping only at cowbird foraging areas, again without the desired effect of reducing/eliminating parasitism of the target host.

End Date

1. Determine the duration of the target host nesting period. Operate cowbird traps until all/most of the nests are past the egg stage (2 weeks past last nest-initiation). *Least Bell's vireos initiate nests as late as early July (trap through July 15), though most are done by mid-June (trap through June 30).*

2. If nest-monitoring of target hosts is not performed, some measure of the efficacy of the cowbird control effort can be gained by trapping through July. *Juvenile cowbirds, like juveniles of all avian species, are more easily captured than adults. We believe the number of juvenile cowbirds captured in host habitat is an accurate indicator of the success or failure of the cowbird control program. Determining the success of cowbird control in this manner precludes having to perform expensive and invasive host nest-monitoring.*

3. If the trapping period must be shortened for any reason, do not start later than April 1 or end sooner than June 30.

Note: Topical trapping has been performed at several sites for a decade or more. The number of cowbirds captured each year has remained relatively constant. We believe topical trapping, while effective in reducing/eliminating parasitism in targeted habitat or of targeted hosts, has not had a significant effect upon the regional cowbird population.

Winter Trapping, Foraging Area Trapping, Roost Trapping

Goal:. To reduce the local/regional cowbird population for broad general benefit.

1. Locate/identify major foraging sites (dairies, stables, agricultural areas) and roosts.

2. Operate multiple traps at these locations during periods of greatest concentration (fall-winter) or year-round.

3. Captured cowbirds can be banded and released, saved for use as decoys, or euthanized.

Note: Limited winter banding and release of cowbirds in Southern California has shown that cowbirds that winter locally (banded and released in winter) breed locally (recaptured during the host nesting season in host breeding habitat traps). We believe that intensive winter/foraging area/roost trapping would have broad benefit to local host species by actual reduction of the local/regional cowbird population.

NON-TARGET SPECIES

Southern California Species Captured

SSHA	Sharp-shinned hawk	rarely
COHA	Cooper's hawk	sometimes
CAQU	California quail	sometimes
MODO	**Mourning dove**	**often**
CGDO	Common ground dove	sometimes
BLPH	Black phoebe	sometimes
ATFL	Ash-throated flycatcher	rarely
CAKI	Cassin's kingbird	rarely
SCJA	Scrub jay	sometimes
NOMO	Northern mockingbird	sometimes
CATH	**California thrasher**	**often**
LOSH	Loggerhead shrike	sometimes
EUST	European starling	sometimes (non-native)
YBCH	Yellow-breasted chat	rarely
NOCA	Northern cardinal	rarely
BHGR	Black-headed grosbeak	sometimes
RSTO	**Rufous-sided towhee**	**often**
CATO	**California towhee**	**very often**
LASP	**Lark sparrow**	**often**
SOSP	**Song sparrow**	**often (can fly through 1" mesh)**
GCSP	Golden-crowned sparrow	rarely (first few weeks)
WCSP	**White-crowned sparrow**	**often** (first few weeks)
RWBL	**Red-winged blackbird**	**very often**
TRBL	Tricolored blackbird	sometimes
WEME	Western meadowlark	rarely
YHBL	Yellow-headed blackbird	rarely
BRBL	Brewer's blackbird	sometimes
GTGR	Great-tailed grackle	rarely
BRCO	Bronzed cowbird	rarely
HOOR	Hooded Oriole	rarely
NOOR	Northern Oriole	rarely
HOFI	**House finch**	**very often**
HOSP	**House sparrow**	**often (non-native)**

APPENDIX H

TECHNICAL REPORT OF FINDINGS FOR THE LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER

TECHNICAL REPORT OF FINDINGS FOR THE LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER AT THE BIG TUJUNGA WASH MITIGATION BANK LOS ANGELES COUNTY, CALIFORNIA

Prepared for:

LOS ANGELES COUNTY
DEPARTMENT OF PUBLIC WORKS
900 S. Fremont Avenue
Alhambra, California 91803-1381

And

U.S. FISH AND WILDLIFE SERVICE
Attention: Daniel Marquez
Department of the Interior
6010 Hidden Valley Road
Carlsbad, California 92011

Prepared by:

CHAMBERS GROUP, INC.
17671 Cowan Avenue, Suite 100
Irvine, California 92614
(949) 261-5414

August 2005

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

SECTION 1.0 – INTRODUCTION

Chambers Group, Inc., was retained by Los Angeles County Department of Public Works (LACDPW) to conduct focused presence/absence surveys for the least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*) at the Big Tujunga Wash Mitigation Bank. These surveys are in accordance with the Big Tujunga Wash Mitigation and Monitoring Plan (MMP) developed by Chambers Group in 2000. The Big Tujunga Wash Mitigation Bank is an approximately 247-acre site located in Big Tujunga Wash, just downstream of the 210 Freeway overcrossing, near the City of Los Angeles' Sunland area, in Los Angeles County's San Fernando Valley, California. The purpose of this report is to document the results of the 2005 surveys for least Bell's vireo and southwestern willow flycatcher.

1.1 LEAST BELL'S VIREO

The least Bell's vireo was state-listed as an endangered species by the California Department of Fish and Game (CDFG) in 1980 and federally listed as endangered by the U.S. Fish and Wildlife Service (USFWS) in 1986. Critical habitat for the least Bell's vireo was designated in 1994 (USFWS 1986, 1994). Least Bell's vireo is a small migratory songbird that nests in southern California. This species is a summer resident of southern California and breeds in willow thickets and other dense, low riparian growths in lowlands and lower portions of canyons. They are generally found along permanent or nearly permanent streams. This species was formerly widespread and common throughout low-lying riparian habitats of central and southern California, but are now restricted to a limited number of locations in southern California. Habitat reduction due largely to past and present flood control practices has contributed to this species' population declines. Nest parasitism by brown-headed cowbirds (*Molothrus ater*) has also seriously affected this species.

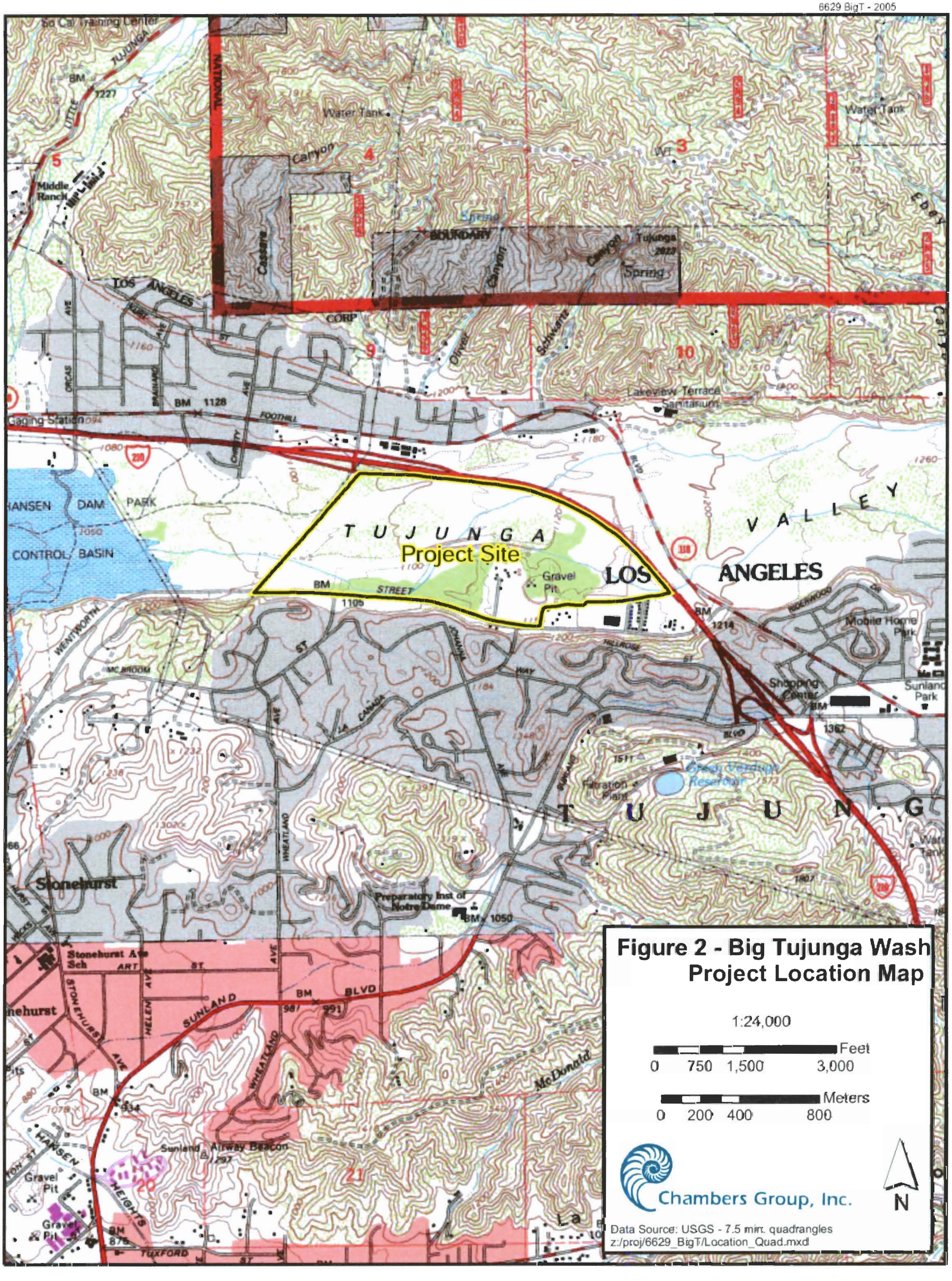
1.2 SOUTHWESTERN WILLOW FLYCATCHER

The willow flycatcher subspecies, the southwestern willow flycatcher, is a federal-listed endangered species (USFWS 1995). Critical habitat for the southwestern willow flycatcher was designated in 1997 (USFWS 1997). The southwestern willow flycatcher is a migratory bird, occurring in this region only during the breeding season (late May to early August) and is the only subspecies that nests in southern California. This species breeds in riparian habitat along rivers, streams, other wetlands in floodplains and broader canyons, it prefers dense riparian thickets near surface water (Sogge et al. 1997), 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* sp.), mule fat (*Baccharis salicifolia*), or other tree species (including tamarisk [*Tamarix* sp.] in some areas), usually with scattered cottonwood (*Populus* sp.) 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).

SECTION 2.0 – SITE LOCATION AND DESCRIPTION

The Big Tujunga Wash Mitigation Bank is located in Big Tujunga Wash, just downstream of the 210 Freeway overpass, near the City of Sunland in north Los Angeles County (Figures 1 and 2). The site is bordered on the north and east by the 210 Freeway and on the south by Wentworth Street. The west side of the site is contiguous with the downstream portion of Big Tujunga Wash. The Big Tujunga Wash Mitigation Bank supports two watercourses, one containing flow from Big Tujunga Wash proper, and the other conveying the flow from Haines Canyon to Big Tujunga Wash. The flow in the Big Tujunga Wash, on the north side of the site, is partially controlled by Big Tujunga Dam and is intermittent based on rainfall amounts and water releases from the Dam. The flow in Haines Canyon Creek, located on the south side of the site, is perennial and may be fed by groundwater and/or runoff from adjacent residential areas. The two drainages merge near the western boundary of the property and continue into the Hansen Dam Flood Control Basin, located approximately one-half mile downstream of the site. Elevation on the site ranges from approximately 1,100 to 1,120 feet above sea level. The site is wholly located within a state-designated Significant Natural Area (LAX-018) and the biological resources found on the site are of local, regional, and statewide significance.

6629 Big T - 2005


TUJUNGA
Project Site
Gravel Pit
LOS
ANGELES
VALLEY
HANSEN DAM PARK
CONTROL BASIN
TUJUNG
Stonehurst
Lakeview Terrace Sanitarium
Preparatory Inst of Notre Dame
Filtration Plant
Mobile Home Park
Shopping Center
Sunland Park
Sunland Airway Beacon
Water Tank
Middle Ranch
Gaging Station
BOUNDARY
CORP
FOOTHILL
SUNLAND
BLVD
Figure 2 - Big Tujunga Wash
Project Location Map
1:24,000
Feet
0 750 1,500 3,000
Meters
0 200 400 800
Chambers Group, Inc.
N
Data Source: USGS - 7.5 min. quadrangles
z:/proj/6629_BigT/Location_Quad.mxd

SECTION 3.0 – SURVEY METHODOLOGY

3.1 LEAST BELL'S VIREO

Eight focused surveys were conducted by Chambers Group wildlife biologists familiar with the songs, whisper songs, calls, scolds, and visual identification of the least Bell's vireo. These surveys were conducted at 10-day intervals during April, May, June, and July. No more than 50 hectares of suitable riparian habitat were surveyed by the biologist per day. The surveys were conducted on April 14, 25, May 6, 18, June 1, 14, 23, and July 7, 2005. Weather conditions during the surveys ranged from 100 percent overcast to clear skies with temperatures ranging from 52°F to 80°F. All surveys were conducted between the hours of 6:00 a.m. and 11:00 a.m. and were in accordance with USFWS guidelines (1997). The surveyors conducted the surveys by walking all suitable riparian habitats as well as stationing themselves in the best locations within the riparian habitat in order to listen and look for vireos. All vireo detection, including number of individuals, sex, age, and leg bands, was recorded on standardized data sheets. In addition to the least Bell's vireos, any detection of the parasitic brown-headed cowbird, the federally listed endangered southwestern willow flycatcher, or the federal candidate and state-listed endangered western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) was also recorded. Appendix A contains the field data sheets from each of the surveys. Appendix B contains a list of plant species observed. Wildlife observed during the surveys were also noted and listed in Appendix C.

3.2 SOUTHWESTERN WILLOW FLYCATCHER

Permitted biologists, Mike McEntee (TE-758175-8) and Shelby Howard (TE-092163-0), conducted five focused surveys for the southwestern willow flycatcher. Survey methods followed the mandatory protocol developed by Sogge et. al (1997) and the subsequent revised protocol developed by the USFWS (2000). Surveys were conducted on May 27, June 17, 27, July 5, and 12, 2005. Each visit was at least 5 days apart. Sogge et. al (1997) recommend that surveys be conducted between dawn and 1000 hours. The biologist completed surveying the entire flycatcher habitat by 10:00 a.m.; however, surveying activity continued while returning to the vehicle. Weather conditions during the surveys ranged from 100 percent overcast to clear skies with temperatures ranging from 54° to 86° Fahrenheit (12.2° to 30°Celsius) and wind speeds ranging from 0-2 mile per hour (0 meters/second to 0.9 m/s). Less than 2.6 linear miles (4.2 kilometers) of habitat were surveyed per day. Surveys were conducted by walking slowly and methodically under the canopy of the willow riparian woodland. Taped vocalizations of the species were played every 75 to 100 feet in an attempt to elicit a response from potentially present individuals. The tape was played for roughly 15 seconds and then stopped for one or two minutes to listen for a response. Tape playing was discontinued when a flycatcher was detected. Upon detection, observations were recorded, plotted, and Global Positioning System (GPS) readings of the location were taken. Behavior, number, and location of paired or unpaired birds; age and sex would be noted. The biologist also checked for leg bands and if present, the color combination of the bands recorded. Bird locations were mapped on U.S. Geological Survey (USGS) topographic maps. All wildlife species observed or detected during the surveys were documented. Appendix A contains the field data sheets from each of the surveys.

SECTION 4.0 – RESULTS

4.1 RESULTS

4.1.1 Vegetation Communities

Biological resources surveys were conducted by Chambers Group at the project site in May 1997 to document biological diversity and assess the habitat for its potential to support native plant and wildlife species (Chambers Group 1998). Since that time, some of the non-native vegetation communities have been altered as part of the restoration effort that is described in detail in the MMP. The vegetation community descriptions and acreages are based on the 1997 surveys, but have been altered to reflect changes that have occurred since that time.

Six plant communities were identified and mapped (Figure 3). These include southern arroyo willow riparian woodland, sycamore alluvial woodland, Riversidean alluvial fan sage scrub, mule fat scrub, coastal sage scrub, and non-native grassland. In addition, disturbed areas occur on the site, as well. Table 1 summarizes the acreages of each vegetation community found on the site. Flycatcher and vireo surveys were focused on the southern arroyo willow riparian woodland, sycamore alluvial woodland, and mule fat scrub plant communities that occur along the creeks and ponds. A complete list of the plant species observed on the site is included as Appendix B.

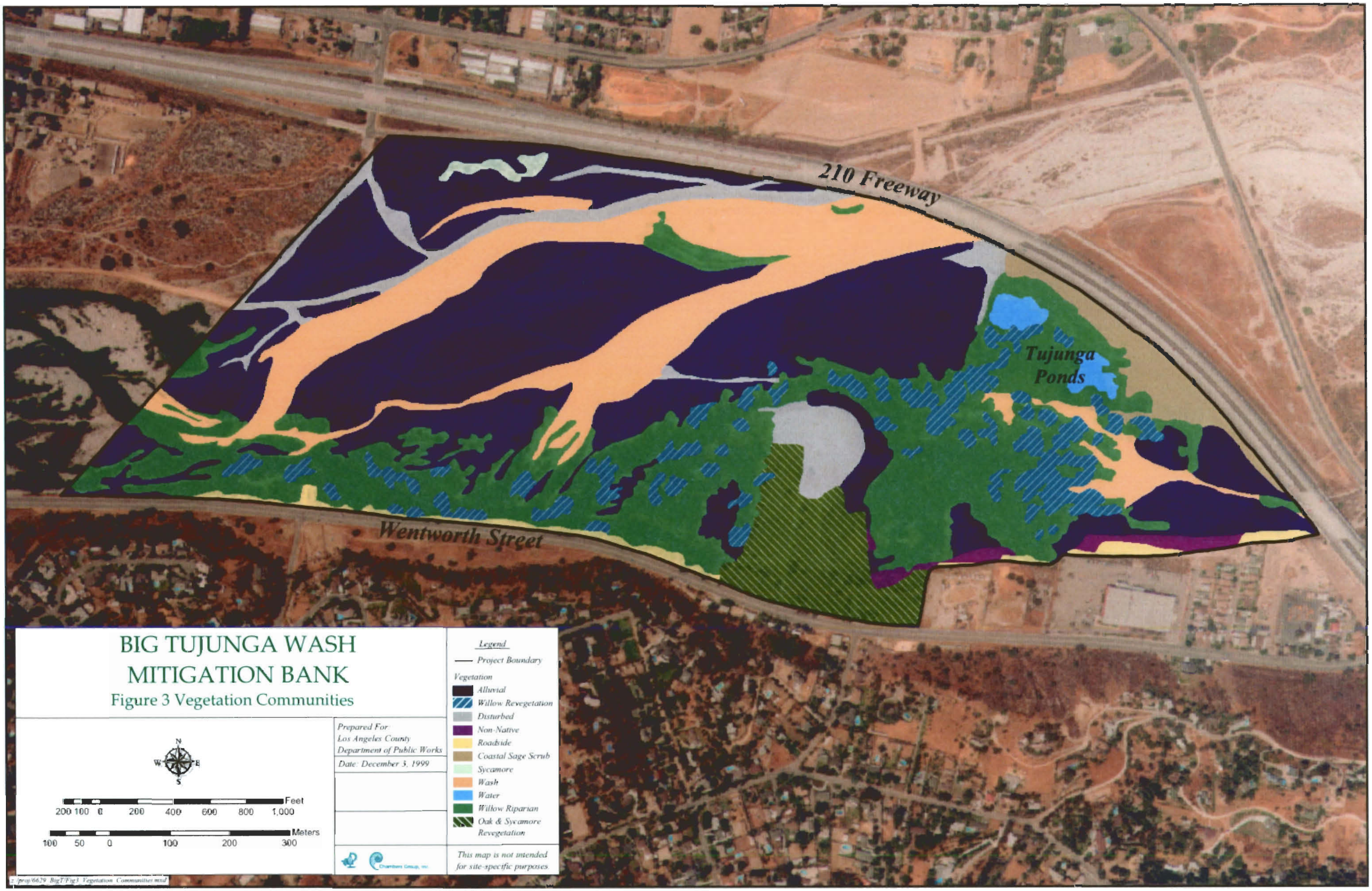
Table 1
Vegetation Communities Occurring Within the Big Tujunga Wash Mitigation Bank Site

Vegetation Community*	Acreage present on the site
Riversidean Alluvial Fan Sage Scrub	96.0
Southern Arroyo Willow Riparian Woodland	61.0
– Giant reed – Removal Areas	15.0
Mule Fat Scrub	37.0
Sycamore Alluvial Woodland	1.0
Coastal Sage Scrub	6.0
Non-Native Grassland - Restoration Areas	11.0
Disturbed Areas	20.0
Total	**247.0**
***Plant community classifications according to Holland (1986)**	

Riversidean Alluvial Fan Sage Scrub

Riversidean alluvial fan scrub vegetation communities occur on outwash fans along the base of the San Gabriel, San Bernardino and San Jacinto Mountains. It is generally composed of a variety of evergreen woody shrubs and drought-deciduous shrubs adapted to survival in the presence of intense periodic flooding.

The Riversidean alluvial fan sage scrub at the Big Tujunga Wash is dominated by scalebroom (*Lepidospartum squamatum*) and California bush buckwheat (*Eriogonum fasciculatum*) and occurs on benches above the washes throughout the site. Prickly pear cactus (*Opuntia littoralis*), our Lord's candle (*Yucca whipplei*), yerba santa (*Eriodictyon crassifolium*), pine bush (*Ericameria pinifolia*), California matchweed (*Guitierrizia californica*), and California sagebrush (*Artemisia californica*) are also represented in this community.


210 Freeway
Tujunga Ponds
Wentworth Street
BIG TUJUNGA WASH
MITIGATION BANK
Figure 3 Vegetation Communities
Prepared For:
Los Angeles County
Department of Public Works
Date: December 3, 1999
Legend
Project Boundary
Vegetation
Alluvial
Willow Revegetation
Disturbed
Non-Native
Roadside
Coastal Sage Scrub
Sycamore
Wash
Water
Willow Riparian
Oak & Sycamore Revegetation
This map is not intended for site-specific purposes.
N
W
E
S
200 100 0 200 400 600 800 1,000 Feet
100 50 0 100 200 300 Meters
Chambers Group, Inc.
z:/proj/6629_BigT/Fig3_Vegetation_Communities.mxd

Three stages of alluvial fan scrub succession can be identified on the site with density and species diversity varying in direct relationship to the frequency of water scouring each stage receives. These stages are described based on the definitions presented by Smith (1980). The older stages of alluvial scrub are located on high benches and have not been subjected to a recent major flood event. This mature stage can be identified by the presence of larger shrubs, an increase in species diversity, and a groundcover of organic material and annual grasses such as red brome (*Bromus madritensis* ssp. *rubens*). Many large shrubs over 10 feet in height are found in the mature community including laurel sumac (*Malosma laurina*) and thick-leafed ceanothus (*Ceanothus crassifolius*). The intermediate and early stages are located on lower benches closer to the active wash and have been subjected to relatively recent flooding events. Intermediate and early stages are progressively more open and less diverse. Medium-sized shrubs up to 4 feet in height can be found in intermediate stage areas while early stage shrubs are rarely over 2 feet in height. Organic material and annual grasses are much less dense in intermediate areas and are almost completely absent in early stages. Riversidean alluvial fan sage scrub occupies 96.0 acres of the site. Approximately 20 percent community consists of the more mature stage.

Southern Arroyo Willow Riparian Woodland

Southern arroyo willow riparian woodland dominated by arroyo willow (*Salix laseolepis*) occurs in the area surrounding the Tujunga ponds and follows the stream running along the southern section of the property (Haines Canyon Creek). Red willow (*Salix laevigata*) and black willow (*Salix goodingii*) are well represented, and occasional individuals of Fremont cottonwood (*Populus fremontii*) and white alder (*Alnus rhombifolia*) are also found. The understory is dominated by sticky eupatorium (*Ageratina adenophora*), mule fat and mugwort (*Artemisia douglasiana*). A small stand of southern arroyo willow riparian woodland also occurs along a wash in the northern portion of the site (Big Tujunga Wash). Vegetation in Big Tujunga Wash is subject to regular, periodic scouring and flooding and is consequently open and sparse and lacks the understory found along the ponds and streams. Southern arroyo willow riparian woodland occupies approximately 61.0 acres of the site.

Much of the arroyo willow riparian woodland was infested with the invasive giant reed (*Arundo donax*). Over 15.0 acres of giant reed dominated riparian habitat has been removed to date. Areas that were formerly dominated by reed now consist of large open areas underneath the willow canopy. Giant reed removal is a continual process and these areas are regularly treated with herbicide as part of the MMP. These areas are in the process of being restored with native riparian vegetation.

Mule Fat Scrub

Mule fat scrub is a tall, herbaceous riparian scrub community dominated by mule fat. This community is an early seral stage that forms in damp sandy soils and is maintained by frequent flooding. When such flooding is absent, this community usually evolves into cottonwood-sycamore riparian forest or woodlands (Holland 1986). The washes in the project area are subject to regular, periodic scouring and flooding and support a sparse mule fat scrub community. The vegetation in the Big Tujunga Wash differs from the dense mule fat scrub communities commonly found in riparian systems in that coverage of mule fat in the Big Tujunga Wash is very sparse, often less than 10 percent. Occasional individuals of California buckwheat and scalebroom are present on benches elevated above the main water channels and represent the transition into early-stage alluvial sage scrub communities. Wash areas containing mule fat scrub occupy approximately 37.0 acres of the site.

Sycamore Alluvial Woodland

A small stand of sycamore alluvial woodland is located on a bench in the northern portion of the site adjacent to the fill slope below the 210 Freeway. This community is dominated by California sycamores (*Platanus racemosa*) with an understory of alluvial scrub species such as scalebroom, California buckwheat, and prickly pear cactus. The woodland community occupies approximately 1.0 acre.

Coastal Sage Scrub

The fill slopes below the 210 Freeway in the northwest portion of the site are covered by with coastal sage scrub species. California buckwheat is the dominant species. Other sage scrub species occurring on these slopes are California sagebrush, four-winged saltbush (*Atriplex canescens*), and laurel sumac. Non-native trees were scattered throughout this area, but have recently been removed as part of the MMP. Non-native trees that were removed included primarily Peruvian pepper trees (*Schinus molle*) and eucalyptus (*Eucalyptus* sp.). The fill slope occupies approximately 6.0 acres.

Non-Native Grassland

Approximately 11.0 acres of non-native grassland occurred on the site. This community was primarily composed of annual non-native grass species such as red brome, ripgut grass (*Bromus diandrus*), annual fescue (*Vulpia myuros*), and wild oats (*Avena* sp.). However, as part of the MMP, these areas are now a part of the native restoration areas. Areas that formerly consisted of non-native grassland have been restored with oak-sycamore woodlands and coastal sage scrub habitat. These areas are monitored on a regular basis to ensure restorative success.

Disturbed

Disturbed areas are those areas that are either devoid of vegetation (cleared or graded) such as dirt roads or those areas that are dominated by a sparse cover of ruderal vegetation. The most common plant species within the disturbed areas include tree tobacco (*Nicotiana glauca*), wild fennel (*Foeniculum vulgare*), and golden aster (*Heterotheca sessiliflora*). Disturbed areas comprise approximately 20.0 acres of the site. Although a few of the trails have been closed and restored with native vegetation, they are still included in the 20.0 acres.

4.2 WILDLIFE

4.2.1 General

The site supports a variety of wildlife species. All wildlife species and wildlife sign (scat, tracks, etc.) encountered during the least Bell's vireo and willow flycatcher surveys were recorded and are discussed below. A list of general wildlife species that were observed is included as Appendix C.

Butterflies

Ten butterfly species were noted during the surveys. The cabbage white *(Artogeia rapae),* common white *(Pontia protodice),* western tiger swallowtail *(Paplio rutulus),* Lorquin's admiral *(Basilarchia lorquini),* pale swallowtail (*Papilio eurymedon*), red admiral *(Vanessa atalanta),* mourning cloak *(Nymphalis antiopa),* painted lady (*Vanessa cardui*), west coast lady (*Vanessa annabella*), and acmon blue (*Icaricia acmon)* were all observed along the riparian corridor.

Amphibians

Three amphibian species, western toad (*Bufo Boreas*), pacific chorus frog (*Pseudacris regilla*), and bullfrog (*Rana catesbeiana*) were detected during the surveys. Bullfrogs are a non-native species that feed on a variety of wildlife including aquatic invertebrates, native fishes, other amphibian species, and birds. Due to the abundant aquatic habitat present on the site, other amphibian species such as the California tree frog (*Pseudacris cadaverina*) are expected to occur on the site.

Reptiles

Five reptile species, including the western fence lizard (*Sceloporus occidentalis*), side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), California common kingsnake (*Lampropeltis getula californiae*) and the non-native red-eared slider (*Pseudemys scripta elegans*) were observed over the course of the surveys. The habitat on the site undoubtedly supports a variety of other reptile species that were not observed during the surveys including but not limited to alligator lizard (*Elgaria multicarinata*), coast horned lizard (*Phrynosoma coronatum*), gopher snake (*Pituophis melanoleucus*), coachwhip (*Masticophis flagellum),* and southern pacific rattlesnake (*Crotalus viridis helleri*).

Birds

Bird species constituted the most diverse group of wildlife. Sixty-two bird species were observed during the surveys. Some of the birds observed onsite are characteristic of urban or disturbed habitats. These include the northern mockingbird (*Mimus polygottos*), house finch (*Carpodacus mexicanus*), American crow (*Corvus brachyrhynchus*), rock dove (*Columba livia*), and European starling (*Sturnus vulgaris*). Several passerine species were observed within the riparian vegetation along the creek. These included the black-headed grosbeak (*Pheucticus melanocephalus*), downy woodpecker (*Picoides pubescens*), pacific-slope flycatcher (*Empidonax difficilis*), common yellowthroat (*Geothylpis trichas*), Wilson's warbler (*Wilsonia pusilla*), and hooded oriole (*Icterus cucullatus*). Other avian species including the black phoebe (*Sayornis nigricans*), lesser goldfinch (*Carduelis psaltria*), phainopepla (*Phainopepla nitens*), California quail (*Callipepla californica*), Bewick's wren (*Thryomanes bewickii*), California towhee (*Pipilo crissalis*), and California thrasher (*Toxostoma redivivum*), were also observed in the vicinity of the riparian corridor. Bushtits (*Psaltriparus minimus*) and wrentits *(Chamaea fasciata*) were common throughout the survey area.

Mammals

Ten mammal species were observed or detected during the surveys. California ground squirrels (*Spermophilus beecheyi*) and desert cottontails (*Sylvilagus audubonii*) were the most common mammal species encountered. Three non-native mammal species, fox squirrel (*Scirius niger*), domestic dog (*Canis familiaris*), and horse (*Equus caballus*), were also observed during several surveys. Fox squirrels were first observed on the project site during the 2004 focused surveys. Additional common mammal species observed or detected include raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), and striped skunk (*Mephitis mephitis).*

<u>Sensitive Species</u>

Least Bell's Vireo

Least Bell's vireo were not observed or detected during the eight focused surveys at the Big Tujunga Wash Mitigation Bank project site. Riparian habitat on the site provides moderate to high quality habitat for this species. Southwestern willow flycatchers or western yellow-billed cuckoos were not seen or heard during any of the vireo surveys. Brown-headed cowbirds were observed and heard vocalizing during the fourth focused vireo survey.

Southwestern Willow Flycatcher

Southwestern willow flycatchers were not observed during the 2005 focused surveys, and no nesting southwestern willow flycatchers were reported in the vicinity. Southwestern willow flycatchers have been observed within the project site during previous focused surveys (2002 and 2004); however, there was no evidence or behavioral cues observed that would suggest that these flycatchers attempted to nest at the site and therefore they were all considered to be migrants. In addition, there is no designated critical habitat for this species located in the Big Tujunga watershed, or any other streams in Los Angeles County

(USFWS 1997). Based on the negative survey results and the lack of documented nesting records for the surrounding area, the southwestern willow flycatcher is likely absent from the mitigation bank at this time.

Cooper's Hawk

The Cooper's hawk (*Accipiter cooperii*) is a California Species of Special Concern, and was observed foraging throughout the project site. Cooper's hawks have also successfully nested on the project site in previous years.

Yellow Warbler

The yellow warbler (*Dendroica petechia brewsteri*) is a California Species of Special Concern. This species is generally associated with riparian vegetation, especially willows, cottonwoods, alders, aspens, and sycamores. The yellow warbler also nests in montane shrubbery and conifer forest. Yellow warblers were detected or observed during five of the eight vireo surveys. The number of pairs and nesting status was not determined.

Pacific Slope Flycatcher

The pacific slope flycatcher *(Empidonax difficilis)* is a Federal Species of Concern. Pacific slope flycatchers typically occur in warm, moist woodlands including valley foothill and montane riparian, hardwood, and hardwood-conifer habitats. This species was observed and heard vocalizing during three of the eight focused vireo surveys. The number of pairs and nesting status was not determined.

Costa's Hummingbird

The Costa's hummingbird *(Calypte costae)* is a Federal Species of Concern. Costa's hummingbirds occur in dry deserts of yuccas and cacti, often far away from water. In southern California, this species usually inhabits dry washes and chaparral. This species was only detected by vocalization during one of the eight focused vireo surveys. The number of pairs and nesting status was not determined.

SECTION 5.0 – CONCLUSIONS AND RECOMMENDATIONS

Least Bell's vireos were not observed/detected during the 2005 focused surveys. Additionally, although southwestern willow flycatchers had been observed on the project site during focused surveys in 2002 and 2004, they were not observed/detected during the 2005 focused surveys. It is believed that the birds observed during the previous years were migratory or transient to the project site and therefore, were not residents and did not breed at the Big Tujunga Wash Mitigation Bank site.

5.1 SENSITIVE SPECIES MITIGATION PROTECTION

Brown-headed cowbirds were detected once during focused vireo surveys and once during focused southwestern willow flycatcher surveys. In accordance with the MMP, this was the fifth year of the brown-headed cowbird trapping and removal program at the Big Tujunga Wash Mitigation Bank, and the success of that program may be responsible for the low numbers of cowbirds detected during this year and the low numbers of cowbirds detected during the previous year. The trapping and removal program most likely helped reduce the threat of brood parasitism to potentially nesting sensitive species, including the yellow warbler.

SECTION 6.0 – REFERENCES

Abrams, L.
1923 1944 1951 Illustrated Flora of the Pacific States, Volumes I-III. Stanford University Press, Stanford, California.

Abrams, L. and R.S. Ferris.
1960 Illustrated Flora of the Pacific States, Volume IV. Stanford University Press, Stanford, California.

Bonham, C.D.
1988 Measurements for Terrestrial Vegetation. John Wiley and Sons, New York.

California Department of Fish and Game
2005 *State and Federally Listed Endangered and Threatened Animals of California*. State of California Resources Agency. Sacramento, California. July.

2005 *Special Animals*. State of California Resources Agency. Sacramento, California. July.

California Natural Diversity Data Base (CNDDB)
2005 *Data Base Record Search*. California Department of Fish and Game, State of California Resources Agency. Sacramento, California.

Chambers Group, Inc.
1998 *Draft Biological Resources Assessment and Functional Analysis of a Site in Big Tujunga Wash, Los Angeles County, California*. Prepared for County of Los Angeles Department of Public Works, Alhambra, California. April, 1998.

2000 *Final Master Mitigation Plan for the Big Tujunga Wash Mitigation Bank*. Prepared for County of Los Angeles Department of Public Works, Alhambra, California. April, 2000.

Ehrich, P., D. Dobkin, and D. Wheye
1988 The Birder's Handbook: A Field Guide to the Natural History of North American Birds. Simon & Schuster Inc., New York.

Garrett, K. and J. Dunn
1981 Birds of Southern California Status and Distribution. Los Angeles Audubon Society Publication.

Hickman, J.C. (Editor)
1993 The Jepson Manual: Higher Plants of California. University of California Press. Berkeley, California.

Holland, R.F.
1986 Preliminary descriptions of the terrestrial natural communities of California. Unpublished report available from California Department of Fish and Game, Sacramento, California.

Johnsgard, P.
1990 Hawks, Eagles, and Falcons of North America. Smithsonian Institution Press, Washington, D.C.

Mayer, K.E. and W.F. Laudenslayer, Jr. (eds.)
1988 A guide to the wildlife habitats of California. California Dept. of Fish and Game, Sacramento.

Munz, P.A.
1974 A Flora of Southern California. University of California Press, Berkeley, California.

Peterson, R.
1990 A Field Guide to Western Birds. Houghton Mifflin Company, Boston, Massachusetts.

Sawyer, J.O., Jr. and Todd Keeler-Wolf.
1995 A Manual of California Vegetation. California Native Plant Society, Sacramento.

Skinner, Mark W. and Bruce M. Pavlik (ed).
1994 California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California. 5th ed.

Smith, Robin Lee
1980 *Alluvial Scrub Vegetation of the San Gabriel River Floodplain, California.* Madrono Vol. 27:3, p. 126-138.

Sogge, M., R. Marshall, S. Sferra, and T. Tibbitts
1997 A southwestern willow flycatcher natural history summary and survey protocol. USGS Biological Resources Division, Colorado Plateau Research Station, Northern Arizona University. 36 pp. Plus appendix.

U.S. Fish and Wildlife Service
1986 Endangered and threatened wildlife and plants; Final rule determining endangered status for the least Bell's vireo. Federal Register 51: 16474-16482.

1994 Endangered and threatened wildlife and plants; Final determination of critical habitat for the least Bell's vireo. Federal Register 59: 4845-4867.

1995 Endangered and threatened wildlife and plants; Final rule determining endangered status for the southwestern willow flycatcher. Federal Register 60: 10694-10715.

1997 Endangered and threatened wildlife and plants; Final determination of critical habitat for the southwestern willow flycatcher. Federal Register 62: 39129-39147.

2000 Southwestern willow flycatcher protocol revision 2000. California/Nevada Operations Office, Sacramento, California. Letter dated July 11, 2000. 4 pp.

2001 Least Bell's vireo survey guidelines. Carlsbad Field Office, Carlsbad, California. Letter dated January 19, 2001. 3 pp.

U.S. Geological Survey
1966 *Sunland,* California 7.5-minute quadrangle. Photo revised 1988.

APPENDIX A

FIELD DATA SHEETS

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Big T Project # 6029 Task ______ Billing Group 006
Location Sunland Tujunga Survey Type LBV #1
Surveyor(s) L. Hessett, P. Date 4/14/05 Time (Start) 7:30 am (End) 11:15 am
General Habitat Description of Area
Weather (Cloud cover, Estimated wind speed, precipitation) 0 / 0-1 / 0
Temperature (In C, taken at 6" above the ground in the shade) (Start) 52°F (End) 72°F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
WESC	WEST	O,V		
CATO	CALT	O		
OCWA	OCWA	O,V		
	WREN	V,O		
	CATH	V,O		
	BEWR	O,V		
	SOSP	O,V		
	COHA	O		
	ANHU	O,V		
	LEGO	V		
	Fox Squirrel	O		
	DOWO	V		
	BUSH	O,V		
	w. fence lizard	O		
	w. tiger swallowtail	O		
	EUST	O		
	MALL	O,V		
2 SPTO	SPTD	V		
	SNEG	O		
ASFL	ATFL	V		
	AMCR	O,V		
	MODO	O		
	COYE	O,V		
	AMCO	O		
PIGR	PBGR	O		
	GRHE	O,V		
	BTGWA	O		Blk-throated gray Warbler
RUSP	RCSP	O,V		
RTHA	RTHA	O,V		
	AMKE	O		

General Comments: no LBV observed or detected

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

4/13/2005

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Big T **Project #** 6029 **Task** #13.6 **Billing Group** 006

Location Sunland **Survey Type** Focus-survey-vireo #2

Surveyor(s) Mike McEntee, Shannon Shaffer **Date** 4/25/05 **Time (Start)** 7:15 **(End)** 11:25

General Habitat Description of Area willow riparian

Weather (Cloud cover, Estimated wind speed, precipitation) 40 / 1-2 / Ø

Temperature (in C, taken at 6" above the ground in the shade) **(Start)** 68 **(End)** 72

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
7:15	BEWR	V, O		
YEWA	YRWA	V, O		
	CATO	V		
	SPTO	V		
	LEGO	V		
	ANHU	V, O		
	COHA	V		
	COYE	V		
	SOSP	O, V		
	NUWO	V		
	ground squirrel	O		
	WSJA	O V		
	NRWS	O V		
	~~BAKI~~ WEKI	O		
	GRHE	O		
	BLPH	O V		
	PBGR	O		
	RUDU	O		
REBL	RWBB	O		
BUSH	BUTI	O V		
	Lorquins admiral	O		
	AMCR	O		
	Coyote	S		
	W. fence lizard	O		
	SAPH	O V		
	Phainopepla	O V		
	BEKI	O		
	ALHU	O V		
	MODO	V		
REHA	RSHA	V		

General Comments:

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

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Big T **Project #** 6629 **Task** H13.6 **Billing Group** 006

Location Sunland **Survey Type** LBV 2

Surveyor(s) M. McEntee, S. Shaffer **Date** 4/25/05 **Time (Start)** ______ **(End)** ______

General Habitat Description of Area ______

Weather (Cloud cover, Estimated wind speed, precipitation) ______ / ______ / ______

Temperature (in C, taken at 6" above the ground in the shade) **(Start)** ______ **(End)** ______

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	MALL	O		
BLGG	BHGB	V		

General Comments:

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

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Big T **Project #** 6619 **Task** _______ **Billing Group** 0010

Location Sunland / Tujunga **Survey Type** LBV #3

Surveyor(s) L Wessett, S Shaffer **Date** 5/10/05 **Time (Start)** 730 **(End)** 1140

General Habitat Description of Area Willow/cottonwood Riparian : Mulefat scrub

Weather (Cloud cover, Estimated wind speed, precipitation) 100% / 1-2 / 0

Temperature (In C, taken at 6" above the ground in the shade) **(Start)** 55°F **(End)** 60°F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	HOFI	O,V		Sidebloteh O
	WREN	V		NOMO O,V
	NRWSW	O		
	ANHU	O,V		
	BEWR	V		
	ATFI	V,O		
	WESJ	V,O		
	BUSH	V		
	AMCR	O,V		
	CALT	V,O		
	SOSP	V,O		
	AMCO	O		
	COVE	V		
	PBGR	O		
	MALL	O,V		
	SPTO	V		
	BLPH	O,V		
	BHGB	V		
	LEGO	V,O		
	OCWA	V		
	MODO	O		
	RTHA	O		
	GRHE	O		
	Coyote	ST		
	W. Cost Lady	O		
	NUWO	O,V		
	DOWO	O		
	W. toad.	O		
	W. tiger sw.	O		
	flycatcher sp.	O		

General Comments:

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

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Big T **Project #** 6629 **Task** H/3.6 **Billing Group** 006

Location Sunland **Survey Type** Vireo #4

Surveyor(s) Mike McEntee, Shelby Howard **Date** 18 May 05 **Time (Start)** 630 **(End)** 1140

General Habitat Description of Area

Weather (Cloud cover, Estimated wind speed, precipitation) 10% / 0-1 / 0

Temperature (In C, taken at 6" above the ground in the shade) **(Start)** 57 **(End)** 80

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
✓	Bewr	OV		
✓	COHA	V		
✓	SPTO	OV		
✓	Cato	V		
✓	BHCO	V		
✓	BEKI	~~O~~V		
✓	EUST	OV		
✓	SOSP	OV		
✓	OHAI	OV		
✓	Wiwa	OV		
✓	BUSH	OV		Nest
✓	LADU	O		
✓	ANHU	V		
✓	ScJA	V		
✓	LEGO	VO		
✓	NRWS	V		
✓	RTHA	V		
✓	RODO	V		
✓	AMCR	V		
✓	~~B~~ PBGR	V		
✓	~~Eurt~~ AMCO	V		
✓	GRHE	V		
✓	COMO	V		
✓	BHGR	V		
✓	CATH	V		
✓	RUDU	V		
✓	Coyote	~~T~~ O		
✓	Fence lizard	O		
✓	Side blotched liz	O		
✓	West. whiptail	O		

General Comments:

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

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Big T Project # 6629 Task 413.6 Billing Group 006

Location Sundland Survey Type Vireo 4

Surveyor(s) S Howard M. McEntee Date 18 May 2005 Time (Start) 630 (End) 1140

General Habitat Description of Area

Weather (Cloud cover, Estimated wind speed, precipitation) 10% / 0-1 / 0

Temperature (In C, taken at 6" above the ground in the shade) (Start) 57 (End) 80

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
✓	HOOR	VO		
✓	COYE	TVS		
✓	~~[illegible]~~ RSHA	V		
✓	ASFL	~~[illegible]~~ V		
✓	AMGO	OV		
✓	BLPH	OV		
✓	BUSH	OV		
✓	DOWO	OV		
✓	~~ASFL~~ PSFL	OV		
✓	MODO	OV		
	mourning cloak			
	cabbage white			
	western tiger swallowtail			
	red admiral ?			

General Comments:

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

6/8/2004

Biological Resources Survey Form

Chambers Group, Inc.

Project Name Big T Project # 6629 Task H13.6 Billing Group 006

Location Sunland Survey Type Vireo #5

Surveyor(s) M. McEntee, S. Shaffer Date 6/1/05 Time (Start) 0700 (End) 1100

General Habitat Description of Area

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

Temperature (In C, taken at 6" above the ground in the shade) (Start) 59° F (End) 66° F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
0705	COHA	O, NV		
	WSJA	OV		
	Coyote	O, S		
	BUTI	N		
	CVTH	V		
	CALT	V		
	NRWS	V		
	PSFL	V		
	ATFL	O		
	AMCR	V		
	BEWR	OV		
	SPTO	V		
	CATH	OV		
	GRHE	O		
	RUDU	O		
	PBGR	O		
	AMCO	O		
	NOFL	O		
	BLPH	O		
	SOSP	VO		
	CAQU	V		
	ANHU	OV		
	WREN	V		
	HOFI	V		
	MODO	O		
	GBHE	O		
	DOWO	O		
	LEGO	OV		
	YEWA	O		
	Cottontail	O		

General Comments:

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

6/1/2005

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Big T **Project #** 10629 **Task** H13.6 **Billing Group** 006

Date 6/1/05 **Survey Type** Vireo #5

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	ground squirell	V		
	GTGR	O		
	RSHA	O V		

General Comments:

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

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Bi+ T (LBLI) Project # ______ Task ______ Billing Group ______

Location Sandland Survey Type ______

Surveyor(s) M. McEntee S. Howard Date 6/1/05 Time (Start) 0620 (End) 1125

General Habitat Description of Area ______

Weather (Cloud cover, Estimated wind speed, precipitation) 0 / 0 / 0

Temperature (in C, taken at 6" above the ground in the shade) (Start) 62 (End) 76

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	SOSP			
	BUSH			
	Cato			
	BEWR			
	LEGO			
	AMCR			
	ATFL			
	BHGR			
	COHA			
	ANHU			
	Skunk			
	COYE			
	[illegible]			
	Gr. squirrel			
	BLPH			
	PSFI			
	Hofi			
	PHAI			
	MODO			
	WREN			
	WOST			
	YEWA			
	NRWS			
	DOWO			
	Amke			
	ALHU			
	W. Fence Lizard			
	DBGR			
	COOT			
	GRHE			

General Comments:

Tree of Heaven. B-10dbh

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

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Big T (cBui) Project # ______ Task ______ Billing Group ______

Location ______ Survey Type ______

Surveyor(s) ______ Date ______ Time (Start) ______ (End) 1125

General Habitat Description of Area ______

Weather (Cloud cover, Estimated wind speed, precipitation) ______ / ______ / ______

Temperature (in C, taken at 6" above the ground in the shade) (Start) ______ (End) 76

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	RCDU			
	MALL			
	W. Swallowtail			
	Red admiral			
	CAWR			
	W. whiptail			
	Common white			
	RSHA			
	NOMO			
	Cabbage white			
	Mourning cloak			

General Comments:

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

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Big T Project # 6629 Task ______ Billing Group 0010

Location Sunland Survey Type UBV #7

Surveyor(s) Messett / Shaffer Date 6/23/05 Time (Start) 700 am (End) 10: am

General Habitat Description of Area Riparian Woodland

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

Temperature (In C, taken at 6" above the ground in the shade) (Start) 65°F (End) 77°F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	wren	V		
	WEST	O		
	BEWR	O,V		
	SPTO	V		
	BUSH	V		
	NOFI	V		
	LEGO	V		
	BLPH	O,V		
	CALT	V		
	ATFI	V		
	BCNH	O		
	coyotes	O		
	Morning cloak	O		
	AMCR	O,V		
	YEWA	V		
	BHGR	V		
	HOFI	O,V		
	DOWO	V		
	COYE	V,O		
	PSFL	O		
	NUWO	V		
	SOSP	V		
	PBGR	O		
	AMCO	O		
	Lorquins admiral	O		
	AMHU	V		
	NRWS	O		
	com wht	O		
	MODO	O,V		

General Comments: Ø UBV

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

Page ___ of ___

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Big T LBV Project # 6029 Task HB6 Billing Group 006

Location Sunland / Tujunga Survey Type LBV #8

Surveyor(s) Hessett / Shaffer Date 7/7/05 Time (Start) 0645 (End) 1050

General Habitat Description of Area Riparian Woodland / Mulefat scrub

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

Temperature (In C, taken at 6" above the ground in the shade) (Start) 64°F (End) 78°F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	WREN	V,O		fish sp. observed in
	SPTO	V,O		ponds (large and small)
	Phaino	O		-poss large mouth bass.
	CALT	V,O		
	LEGO	V,O		
	BEWR	O,V		
	WEST	O,V		
	ATFL	V		
	COHA	V,O		
	BUSH	V,O		
	AMCR	O,V		
	YEWA	V		
	DOWO	V,O		
	HOFI	O,V		
	BHGB	V,O		
	TUVU	O		
	RTHA	O		
	w. fence liz.	O		
	com. wht.	O		
	pale swallowt.	O		
	SOSP	V,O		
	COYE	V,O		
	PBGR	O		HETH O
	AMCO	O		COHU O,V
	GR HE	O,V		KILL V
	ANHU	V,O		Mourning cloak O
	MODO	O		coyote S
	com. sideblotch	O		acmon blue O
	BLPH	O,V		cottontail O,S
	NUWO	V,O		Ca. ground Sq. O,V

General Comments: Ø LBV

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

4/13/2005

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Big T **Project #** ________ **Task** ______ **Billing Group** ________

Location Sundial **Survey Type** Surv

Surveyor(s) [illegible] S. Howard **Date** 5/27/05 **Time (Start)** 0550 **(End)** 1120

General Habitat Description of Area ____________

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

Temperature (In C, taken at 6" above the ground in the shade) **(Start)** 60 **(End)** 76

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	Cato			
	Anhu			
	spto			
	psfl			
	nrws			
	Yewa			
	howo			
	bugl (n)			
	Atfl			
	bewr			
	Sosp			
	Amcr			
	Nuwo			
	wesj			
	Hofi			
	Dowo			
	mall			
	Lego			
	CaQu			
	Coha (n)			
	Grhe			
	coye			
	Rsha			

General Comments:

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

8/22/2005

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Big T Project # 6629 Task H13.6 Billing Group .006

Location From Cottonwood Kiosk west to site boundary Survey Type SWFL #2

Surveyor(s) S. Howard Date 17 June 05 Time (Start) ________ (End) ________

General Habitat Description of Area riparian

Weather (Cloud cover, Estimated wind speed, precipitation) ______ / ______ / ______

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

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	BEWR	V, O		
	SOSP	V, O		
	NOMO	V		
	LEGO	V, O		
	BHCO	V SH		flyover?
	DOWO	V		
	NRWS	O, V		
	WESJ	V, O		
	SPTO	V, O		
	RSHA	V		
	YEWA	V		
	PSFL	V, O		
	ANHU	V		
	COHA	O, V		juvenile
	BUSH	V, O, N		
	AMCR	V, O		
	BLPH	V, O		
	NUWO	V		
	ATFL	V, O		
	CALT	O, V		
	Cal. ground squirrel	O, V		
	desert cottontail	O		
	HOFI	V		
	BCHU	O		
	WREN	V		
	AMGO	O, V		
	PHAI	V		
	MODO	V		
	GRHE	O		
	NOFL	V		

General Comments: HOWR V
RODO O

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

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Big T SWWF **Project #** ______ **Task** ______ **Billing Group** ______

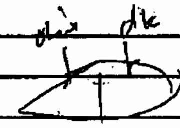
Location ______ **Survey Type** SWWF

Surveyor(s) M. McEtee **Date** 6/17 **Time (Start)** 0610 **(End)** 1005

General Habitat Description of Area ______

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

Temperature (In C, taken at 6" above the ground in the shade) **(Start)** 61° **(End)** 67

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	BEWR			BLPH
	ATFL			BHGR
	PSFI			CAQU
	AMCR			W. Fence Liz
	NUWO			HOFI
	YEWA			PHAI
	GBHE			ACHU
	JOSP			RTHA
	COYE			HOOR
	WEST			G-Squirrel
	SPTO			
	Wren			
	BUSH			
	Brush rabbit			
	~~NTGS~~ NRWS			
	Deer	T		
	P. chor. Frog			
	AMGO			
	ANHU			
	COHA			
	GRHE			
	COOT			
	RUDU			
	PBGR (eating a Crayfish)			dike dike 
	Bullfrog			
	Crayfish			
	Racoon	T		
	opossum	T		
	NOFL	VO		
	Bass			

General Comments:
I surveyed the ~~West~~ East "pond side" of the project. SH surveyed the west side.

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

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Big T **Project #** ______ **Task** ______ **Billing Group** ______

Location ______ **Survey Type** ______

Surveyor(s) M. McEtee ~~[illegible]~~ 5.5 **Date** 6/27/05 **Time (Start)** 0545 **(End)** 1037

General Habitat Description of Area ______

Weather (Cloud cover, Estimated wind speed, precipitation) 0-0 / 0-0 / —

Temperature (in C, taken at 6" above the ground in the shade) **(Start)** 54 **(End)** 71

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	NUWO			
	PSFl			
	ATFl			
	BEWR			
	CATO			
	SPTO			
	BUSH			
	GRHE			
	AMCR			
	ANHU			
	ALHU			
	COHA			
	YEWA			
	WESJ			
	BLPH			
	COOT			
	BHGR			
	NOFl			
	CATH			
	NRWS			
	MODO			
	RSHA			

General Comments:

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

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Big T Project # 6629 Task #13.6 Billing Group 006

Location Sunland Survey Type SWFL #4

Surveyor(s) S. Howard; M. McEntee Date 5 July 05 Time (Start) 0620 (End) 0930

General Habitat Description of Area riparian – east of Cottonwood entrance

Weather (Cloud cover, Estimated wind speed, precipitation) 0 / 1-2 / 0

Temperature (In C, taken at 6" above the ground in the shade) (Start) 61°F (End) 70°F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
0620	BLPH	V, O		
	LEGO	V		
	COHA	O, V		2 juveniles
	WREN	V		
	SPTO	V, O		
	NRWS	V, O		
	PSFL	V		
	ATFL	V, O		
	AMCR	O, V		
	BEWR	V, O		
	DOWO	V, O		2♂, 1♀ by ponds
	BUSH	V, O		
	YEWA	V		
	MODO	O		
	RSHA	V		
	SOSP	O, V		
	HOFI	O, V		
	western fence lizard	O		
	common white	O		
	PBGR	O		
	AMCO	O, V		adults & juvie
	COYE	V, O		
	RTHA	V		
	red-eared slider	O		east pond
	GRHE	O, V		eating a crayfish
	bullfrog	O		
	coyote	T		
	domestic dog	T		
	mule deer	T		
	GBHE	O		west pond

General Comments: RUDU O
HOSP O, V
Mourning cloak O
western tiger swallowtail O
CATO – V, O
Cal. ground squirrel – V

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

desert cottontail O
western whiptail O
AMGO – V

5/6/2004

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Big T Project # ________ Task ________ Billing Group ________

Location ____________________ Survey Type Surf #4

Surveyor(s) M. McGhee S. Hurd Date 7/5/05 Time (Start) 0620 (End) 0930

General Habitat Description of Area ____________________

Weather (Cloud cover, Estimated wind speed, precipitation) 0 / 0 / 0

Temperature (in C, taken at 6" above the ground in the shade) (Start) 60 (End) 70

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	COWA			
	BEWR			
	BUSH			
	PSFl			
	YEWA			
	PHai			
	COYE			
	AMCR			
	WESJ			
	CAWR			
	CATO			
	HOFI			
	SPTO			
	ATFl			
	ANHU			
	HOOR			
	AMGO			
	NOMO			
	LEGO			
	MODO			
	CAQU			
	~~[illegible]~~			
	Coyote (pup)			
	DOWO			
	NRWS			
	W. Fence lizard			
	Side blotched lizard			
	W. Whiptail			

General Comments:

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

Chambers Group, Inc.

Biological Resources Survey Form

Project Name Big T **Project #** ______ **Task** ______ **Billing Group** ______

Location ______ **Survey Type** ______

Surveyor(s) M. McEntee **Date** 7/12/05 **Time (Start)** 0532 **(End)** 1039

General Habitat Description of Area ______

Weather (Cloud cover, Estimated wind speed, precipitation) 0-0 / 0-1 BF / —

Temperature (In C, taken at 6" above the ground in the shade) **(Start)** 62 **(End)** 86

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
	Coha			W. Whiptail
	Anhu			Cath
	Bcph			Rsha
	Cato			Bchu
	Spto			
	Wren			
	Bewr			
	Hofi			
	Psfl			
	Atfl			
	Dowo			
	Amcr			
	Coye			
	Cuqu			
	Wesj			
	Sosp			
	Bush			
	coot			
	Grhe			
	Modo			
	Bass			
	Bullfrog			
	PBGr			
	Achu			
	Ca. Kingsnake			
	BHgr			
	Nowo			
	Modo			
	W. fence liz.			
	Side blotched Liz.			

General Comments:

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

8/22/2005

APPENDIX B

PLANT SPECIES OBSERVED AT THE BIG TUJUNGA WASH MITIGATION BANK

Appendix B
Plants Observed at the Big Tujunga Wash Mitigation Bank

Scientific Name	Common Name
LOASACEAE	**LOASA FAMILY**
Mentzelia laevicaulis	giant blazing Star
MALVACEAE	**MALLOW FAMILY**
Malacothamnus davidsonii	Davidson's bushmallow
Malacothamnus fasciculatus	Mesa bushmallow
MORACEAE	**MULLBERRY FAMILY**
*Ficus carica**	common fig
*Morus alba**	white mullberry
MYRTACEAE	**MYRTLE FAMILY**
*Eucalyptus sp.**	eucalyptus/gum Tree
OLEACEAE	**OLIVE FAMILY**
Fraxinus velutina	velvet ash
*Olea uhdei**	Mexican ash
ONAGRACEAE	**EVENING PRIMROSE FAMILY**
Camissonia bistorta	Camissonia
Camissonia hirtella	small flowered suncup
Camissonia californica	California evening primrose
Camissonia micrantha (?)	small primrose
Epilobium ciliatum	California cottonweed
Oenothera elata ssp. hookeri	evening primrose
PAPAVERACEAE	**POPPY FAMILY**
Dendromecon rigida	bush poppy
Eschscholzia californica	California poppy
PITTOSPORACEAE	**PITTOSPORUM FAMILY**
*Pittosporum undulatum**	Victorian box
PLANTAGINACEAE	**PLANTAIN FAMILY**
*Plantago indica**	India plantain
*Plantago major**	common plantain
PLATANACEAE	**SYCAMORE FAMILY**
Platanus racemosa	Western sycamore
POLEMONIACEAE	**PHLOX FAMILY**
Eriastrum densifolium	woollystar
Eriastrum sapphirinum	Sapphire Eriastrum
Loeseliastrum schottii	Schott's Loeseliastrum
Navarretia hamata	hooked navarretia
POLYGONACEAE	**BUCKWHEAT FAMILY**
Eriogonum sp (sterile)	wild Buckwheat
Eriogonum fasciculatum var. fasciculatum	California Buckwheat
Eriogonum fasciculatum var. foliolosum	California buckwheat
Eriogonum thurberi	Thurber's buckwheat
Lastarriaea coriacea	lastarriaea
*Polygonum arenastrum**	common knotweed
Polygonum lapathifolium (?)	pale smartweed
*Rumex conglomeratus**	whorled dock
*Rumex crispus**	Curly dock
PRIMULACEAE	**PRIMROSE FAMILY**
*Anagallis arvensis**	Scarlet pimpernel
RHAMNACEAE	**BUCKTHORN FAMILY**
Ceonothus crassifolius	Hoary leaf ceonothus
Ceanothus integerrimus	Buckbrush
Ceanothus leucodermis	Chaparral whitethorn

Appendix B (continued)
Plants Observed at the Big Tujunga Wash Mitigation Bank

Scientific Name	Common Name
ROSACEAE	**ROSE FAMILY**
Prunus virginiana	western chokecherry
RUBIACEAE	**MADDER FAMILY**
Galium angustifolium	bedstraw
SALICACEAE	**WILLOW FAMILY**
Populus fremontii ssp. fremontii	Fremont's cottonwood
Salix exigua	Sandbar willow
Salix gooddingii	black willow
Salix laevigata	red willow
Salix lasiolepis	arroyo willow
SCROPHULARIACEAE	**FIGWORT FAMILY**
Mimulus aurantiacus	orange bush monkey flower
Mimulus cardinalis	Scarlet monkey flower
Mimulus guttatus	common monkey flower
Mimulus pilosus	Downey monkey flower
Penstemon heterophyllus australis	chaparral penstemon
*Veronica anagallis-aquatica**	water speedwell
Veronica peregrina ssp. xalapensis	Purslane speedwell
SIMAROUBACEAE	**QUASSIA FAMILY**
*Ailanthus altissima**	tree of heaven
SOLANACEAE	**NIGHTSHADE FAMILY**
Datura wrightii	Jimsonweed
*Nicotiana glauca**	tree tobacco
Solanum douglasii	Douglas' nightshade
TAMARICACEAE	**TAMARISK FAMILY**
*Tamarix ramosissima**	salt Cedar/ Tamarisk
ULMACEAE	**ELM FAMILY**
*Ulmus parvifolia**	Chinese elm
URTICACEAE	**NETTLE FAMILY**
Urtica dioica ssp. holosericea	giant creek nettle
VERBENACEAE	**VERVAIN FAMILY**
Verbena menthifolia	mint-leaf vervain/Verbena
VITACEAE	**GRAPE FAMILY**
*Vitus vinifera.**	cultivated grape
ANGIOSPERMS (MONOCOTYLEDONS)	
ARECACEAE	**PALM FAMILY**
Washingtonia sp.	fan palm
CYPERACEAE	**SEDGE FAMILY**
Cyperus eragrostis	tall cyperus
Cyperus involucratus	umbrella plant
Eleocharis parishii	Parish's spike-sedge
JUNCACEAE	**RUSH FAMILY**
Juncus oxymeris	rush
Juncus rugulosus	wrinkled rush
LEMNACEAE	**DUCKWEED FAMILY**
Lemna sp.	duckweed
LILIACEAE	**LILY FAMILY**
Yucca whipplei	Our Lord's candle

Appendix B (continued)
Plants Observed at the Big Tujunga Wash Mitigation Bank

Scientific Name	Common Name
POACEAE	**GRASS FAMILY**
*Agrostis viridis**	water bentgrass
*Arundo donax**	giant reed
*Avena barbata**	slender wild oat
*Avena fatua**	wild oat
*Bromus diandrus**	ripgut grass
*Bromus madritensis ssp. rubens**	red Brome
*Cortaderia jubata**	Pampas grass
*Cortaderia selloana**	Pampas grass
*Echinochloa crus-galli**	barnyard grass/Echinochloa
*Festuca arundinacea**	tall fescue
*Hordeum murinum**	Glaucous foxtail barley
*Lolium perenne**	Perennial ryegrass
*Pennisetum setaceum**	fountain grass
*Piptatherum miliaceum**	Smilo grass
*Polypogon monspeliensis**	annual beard grass/rabbitfoot grass
*Schismus barbatus**	Mediterranean schismus
*Vulpia myuros var. hirsuta**	foxtail fescue/vulpia
TYPHACEAE	**CATTAIL FAMILY**
Typha domingensis	slender cattail
Typha latifolia	broad-leaved cattail
*** Indicates Non-Native Species.**	

APPENDIX C

WILDLIFE SPECIES OBSERVED AT THE BIG TUJUNGA WASH MITIGATION BANK

Appendix C
Wildlife Observed at the Big Tujunga Wash Mitigation Bank

Scientific Name	Common Name	Sign*
CLASS MALACOSTRACA	**CRUSTACEAN**	
CAMBARIDAE	**CRAYFISH**	
Procambarus sp.	Crayfish	O
CLASS INSECTA	**INSECTS**	
PAPILIONIDAE	**PARNASSIANS, SWALLOWTAILS**	
Papilio eurymedon	Pale swallowtail	O
Paplio rutulus	western tiger swallowtail	O
PIERIDAE	**WHITES & SULPHURS**	
Artogeia rapae	cabbage white	O
Pontia protodice	common white	O
NYMPHALIDAE	**BRUSH-FOOTED BUTTERFLIES**	
Vanessa cardui	Painted lady	O
Vanessa annabella	West coast lady	O
Vanessa atalanta	red admiral	O
Basilarchia lorquini	Lorquin's admiral	O
Nymphalis antiopa	mourning cloak	O
LYCAENIDAE	**GOSSAMER WINGS**	
Icaricia acmon	Acmon blue	O
CLASS AMPHIBIA	**AMPHIBIANS**	
BUFONIDAE	**TRUE TOADS**	
Bufo boreas	Western toad	O
HYLIDAE	**TREEFROGS**	
Pseudacris regilla	Pacific chorus frog	O
RANIDAE	**TRUE FROGS**	
Rana catesbeiana	Bullfrog	O
CLASS REPTILIA	**REPTILES**	
EMYDIDAE	**BOX AND WATER TURTLES**	
Pseudemys scripta elegans	red-eared slider	O
PHRYNOSOMATIDAE	**ZEBRA-TAILED, EARLESS, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, AND HORNY LIZARDS**	
Sceloporus occidentalis	western fence lizard	O
Uta stansburiana	common side-blotched lizard	O
TEIIDAE	**WHIPTAIL LIZARDS**	
Cnemidophorus tigris stejnegeri	coastal western whiptail	O
COLUBRIDAE	**COLUBRID SNAKES**	
Lampropeltis getula californiae	California common kingsnake	O
CLASS AVES	**BIRDS**	
PODICIPEDIDAE	**GREBES**	
Podilymbus podiceps	pied-billed grebe	O, V
ARDEIDAE	**HERONS, BITTERNS**	
Ardea herodias	great blue heron	O
Butorides virescens	Green heron	O, V
Egretta thula	snowy egret	O
Nycticorax nycticorax	black-crowned night heron	O

Appendix C (continued)
Wildlife Observed at the Big Tujunga Wash Mitigation Bank

Scientific Name	Common Name	Sign*
ANATIDAE	**DUCKS, GEESE, SWANS**	
Anas platyrhynchos	Mallard	O, V
Oxyura jamaicensis	Ruddy duck	O
CATHARTIDAE	**NEW WORLD VULTURES**	
Cathartes aura	Turkey vulture	O
ACCIPITRIDAE	**HAWKS, KITES, EAGLES**	
Accipiter cooperii	Cooper's hawk	O, V, N
Buteo jamaicensis	red-tailed hawk	O, V
Buteo lineatus	red-shouldered hawk	O, V
FALCONIDAE	**FALCONS**	
Falco sparverius	American kestrel	O
ODONTOPHORIDAE	**NEW WORLD QUAIL**	
Callipepla californica	California quail	O, V
RALLIDAE	**RAILS, GALLINULES, COOTS**	
Fulica americana	American coot	O, V
Gallinula chloropus	common moorhen	O
CHARADRIIDAE	**PLOVERS**	
Charadrius vociferus	Killdeer	O, V
COLUMBIDAE	**PIGEONS & DOVES**	
Columba livia	rock dove	O, V
Zenaida macroura	mourning dove	O, V
TROCHILIDAE	**HUMMINGBIRDS**	
Archilochus alexandri	black-chinned hummingbird	O
Calypte anna	Anna's hummingbird	O, V
Calypte costae	Costa's hummingbird	V
Selasphorus sasin	Allen's hummingbird	O, V
ALCEDINIDAE	**KINGFISHERS**	
Ceryle alcyon	belted kingfisher	O, V
PICIDAE	**WOODPECKERS**	
Colaptes auratus	northern flicker	O, V
Picoides nuttallii	Nuttall's woodpecker	O, V
Picoides pubescens	downy woodpecker	O, V
TYRANNIDAE	**TYRANT FLYCATCHERS**	
Empidonax difficilis	Pacific-slope flycatcher	O, V
Myiarchus cinerascens	ash-throated flycatcher	O, V
Sayornis nigricans	black phoebe	O, V
Sayornis saya	Say's phoebe	O, V
Tyrannus verticalis	western kingbird	O
HIRUNDINIDAE	**SWALLOWS**	
Stelgidopteryx serripennis	northern rough-winged swallow	O
CORVIDAE	**JAYS & CROWS**	
Aphelocoma californica	western scrub-jay	O, V
Corvus brachyrhynchos	American crow	O, V
AEGITHALIDAE	**BUSHTITS**	
Psaltriparus minimus	Bushtit	O, V, N

Appendix C (continued)
Wildlife Observed at the Big Tujunga Wash Mitigation Bank

Scientific Name	Common Name	Sign*
TROGLODYTIDAE	**WRENS**	
Troglodytes aedon	house wren	V
Campylorhynchus brunneicapillus	cactus wren	O, V
Thryomanes bewickii	Bewick's wren	O, V
TIMALIIDAE	**BABBLERS**	
Chamaea fasciata	wrentit	O, V
TURDIDAE	**THRUSHES**	
Catharus guttatus	hermit thrush	O, V
MIMIDAE	**MOCKINGBIRDS, THRASHERS**	
Mimus polyglottos	northern mockingbird	O, V
Toxostoma redivivum	California thrasher	O, V
PTILOGONATIDAE	**SILKY-FLYCATCHERS**	
Phainopepla nitens	phainopepla	O, V
STURNIDAE	**STARLINGS**	
Sturnus vulgaris	European starling	O, V
PARULIDAE	**WOOD WARBLERS**	
Dendroica petechia	yellow warbler	O, V
Dendroica nigrescens	black-throated gray warbler	O, V
Geothlypis trichas	common yellowthroat	O, V
Vermivora celata	orange-crowned warbler	O, V
Wilsonia pusilla	Wilson's warbler	O, V
ICTERIDAE	**BLACKBIRDS**	
Agelaius phoeniceus	red-winged blackbird	O
Icterus cucullatus	hooded oriole	O, V
Quiscalus mexicanus	great-tailed grackle	O
Molothrus ater	brown-headed cowbird	V
EMBERIZIDAE	**EMBERIZIDS**	
Aimophila ruficeps	rufous-crowned sparrow	O, V
Melospiza melodia	song sparrow	O, V
Pipilo crissalis	California towhee	O, V
Pipilo maculatus	spotted towhee	O, V
CARDINALIDAE	**CARDINALS**	
Pheucticus melanocephalus	black-headed grosbeak	O, V
FRINGILLIDAE	**FINCHES**	
Carduelis psaltria	lesser goldfinch	O, V
Carduelis tristis	American goldfinch	O, V
Carpodacus mexicanus	house finch	O, V
PASSERIDAE	**OLD WORLD SPARROWS**	
Passer domesticus	house sparrow	O, V
CLASS MAMMALIA	**MAMMALS**	
DIDELPHIDAE	**NEW WORLD OPOSSUMS**	
Didelphis virginiana	Virginia opossum	T
LEPORIDAE	**HARES & RABBITS**	
Sylvilagus audubonii	desert cottontail	O, S, T

Appendix C (continued)
Wildlife Observed at the Big Tujunga Wash Mitigation Bank

Scientific Name	Common Name	Sign*
SCIURIDAE	**SQUIRRELS**	
Spermophilus beecheyi	California ground squirrel	O, V, B
Scirius niger	fox squirrel	O, V
CANIDAE	**WOLVES & FOXES**	
Canis familiaris	domestic dog	O, T
Canis latrans	coyote	O, V, S, T
PROCYONIDAE	**RACCOONS**	
Procyon lotor	Racoon	T
MUSTELIDAE	**WEASELS, SKUNKS & OTTERS**	
Mephitis mephitis	striped skunk	O
EQUIDAE	**HORSES & BURROS**	
Equus caballus	horse	O, S, T
CERVIDAE	**DEER**	
Odocoileus hemionus	mule deer	T
*** O = Observation, V = Vocalization, N = Nest, S = Scat, T = Tracks, C = Carcass**		

BIG TUJUNGA WASH
MITIGATION BANK
ARROYO TOAD (*BUFO CALIFORNICUS*)
2005 SURVEY REPORT

Prepared for:

LOS ANGELES COUNTY
DEPARTMENT OF PUBLIC WORKS
900 South Fremont Avenue
Alhambra, California 91803-1331
(626) 455-6138

Prepared by:

CHAMBERS GROUP, INC.
17671 Cowan Avenue, Suite 100
Irvine, California 92614
(949) 261-5414

August 2005

TABLE OF CONTENTS

Page

LIST OF FIGURES

LIST OF TABLES

SECTION 1.0 – INTRODUCTION

Chambers Group, Inc., was retained by the Los Angeles County Department of Public Works (LACDPW), to conduct a focused survey for the arroyo toad (*Bufo californicus*) which is federally listed as endangered. Six arroyo toad focused surveys were conducted pursuant to the protocols established by the U.S. Fish & Wildlife Service (USFWS) in 1999 (see Appendix A). No evidence of arroyo toad adults, juveniles, larvae, or eggs was found during any of the daytime or nighttime surveys. The following report includes the methodology and results of these surveys.

1.1 PROJECT LOCATION, PROJECT DESCRIPTION, AND SURVEY AREA

1.1.1 Project Location

The Big Tujunga Wash Mitigation Bank is located in Big Tujunga Wash, just downstream of the 210 Freeway overcrossing, near the City of Sunland in north Los Angeles County (Figures 1 and 2). The site is bordered on the north and east by the 210 Freeway and on the south by Wentworth Street. The west side of the site is contiguous with the downstream portion of Big Tujunga Wash. The Big Tujunga Wash Mitigation Bank supports two watercourses, one containing the actual flow from Big Tujunga Wash and the other conveying the flow from Haines Canyon to Big Tujunga Wash. The flow in the Big Tujunga Wash, on the north side of the site, is controlled by Big Tujunga Dam and is intermittent based on rainfall amounts and water releases from the Dam. The flow in Haines Canyon Creek, located on the south side of the site, is perennial and may be fed by groundwater and/or runoff from adjacent residential areas. The two drainages merge near the western boundary of the property and continue into the Hansen Dam Flood Control Basin, located approximately one-half mile downstream of the site. Elevation on the site ranges from approximately 1,100 to 1,120 feet above sea level.

1.1.2 Project Description

In late 1998, LACDPW purchased a 207-acre site in the Big Tujunga Wash to serve as mitigation for some of the LACDPW's other projects. Prior to the purchase of the site, the LACDPW obtained concurrence from the U.S. Army Corps of Engineers (USACE), California Department of Fish and Game (CDFG), and Regional Water Quality Control Board (RWQCB) that the site would serve as a mitigation bank. Both the USACE and the RWQCB allotted credits in the bank based on the number of acres of the site within the U.S. waters and the value of the upland habitats on the site.

1.1.3 Survey Area

The focused surveys were conducted within the portion of the project site that contained arroyo toad habitat within and immediately adjacent to the Big Tujunga Mitigation Bank. The survey site included approximately 5,000 linear feet of the Big Tujunga Wash located in the northern portion of the Big Tujunga Mitigation Bank (see Figure 2).

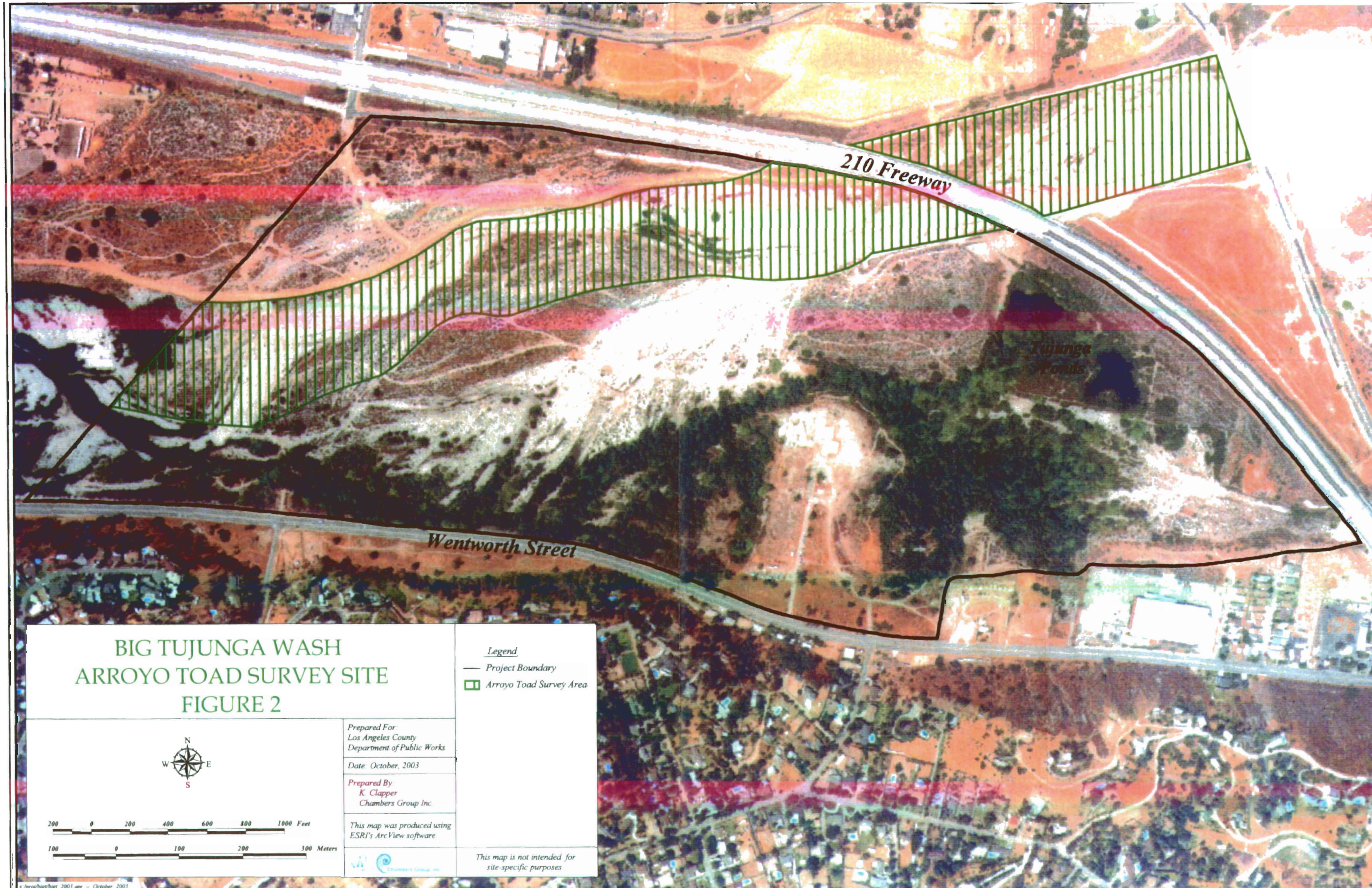
SCALE 1:250,000

SOURCE: DeLorme 3-D Topo Quads

N

BIG TUJUNGA WASH MITIGATION BANK
VICINITY MAP
Figure 1

Chambers Group, Inc.


210 Freeway
Tujunga Ponds
Wentworth Street
BIG TUJUNGA WASH
ARROYO TOAD SURVEY SITE
FIGURE 2
Legend
Project Boundary
Arroyo Toad Survey Area
N
W
E
S
200 0 200 400 600 800 1000 Feet
100 0 100 200 300 Meters
Prepared For:
Los Angeles County
Department of Public Works
Date: October, 2003
Prepared By:
K. Clapper
Chambers Group Inc.
This map was produced using
ESRI's ArcView software.
This map is not intended for
site-specific purposes
z:/proj/bigt/bigt_2003.apr - October, 2003

1.2 REVIEW OF ARROYO TOAD HABITAT, MORPHOLOGICAL AND BEHAVIORAL CHARACTERISTICS

1.2.1 Habitat Characteristics

The following is a review of the habitat characteristics associated with the arroyo toad (Behler and King, 1985; Brown, 1993; Griffin and Case, 2001; Noda, 1999; Stebbins, R.C. 2003; Sweet, 1991; USFWS, 1993; USFWS, 1999; and USFWS, 2000). Arroyo toads require shallow, slow-moving streams which frequently form shallow pools with gravel or sand bottoms in order to breed as well as open, non-vegetated sandy stream channels and terraces. These habitats must be present and separated by less than 0.10 mile for a site to be considered suitable (Sweet, 1991). High quality arroyo toad habitat is subjected to flooding on a regular basis, which helps to maintain non-vegetated areas and ensures substrate friable enough for burrow formation. Arroyo toads occur in foothill canyons and valleys where medium to large-sized streams and rivers are bordered by gently sloping riverbeds.

Arroyo toads require a relatively open canopy over the lower banks of the stream channel to ensure a suitable water and soil temperature and appropriate algal mat development for larval and juvenile arroyo toads. Eggs are deposited in the margins of shallow pools on mud, sand, gravel, or cobble in non-vegetated areas. Juveniles utilize areas consisting of sand and gravel bars with adjacent sandy terraces and streamside flats and little vegetation cover. Juveniles utilize moist areas around the margins of breeding pools for approximately 1 to 3 weeks at which time they are active during the day. As the toads mature, they move further from the pools onto the sand and gravel bars, begin to dig shallow burrows, and transition into a nocturnal activity pattern. Juvenile toads may disperse further into nearby stands of riparian vegetation such as mule fat if friable substrates are not present close to the stream channel. Arroyo toads will transition into adjacent riparian vegetation as they continue to mature and as the stream dries naturally.

Subadults and adults utilize adjacent sandy terraces for burrowing and foraging. These sandy terraces may have a sparsely to heavily vegetated canopy with an unvegetated to sparsely vegetated understory. The canopy may include riparian species such as mule fat (*Baccharis salicifolia*), California sycamore (*Platanus racemosa*), cottonwood (*Populus* spp.), and willow (*Salix* spp.). The understory vegetation may consist of grass or herbaceous annuals. Upland habitats utilized during the non-breeding season include coastal sage scrub, chaparral, oak woodland, grassland, and alluvial scrub. Arroyo toads feed primarily on ants, although they are also known to consume beetles and other prey.

Arroyo toads inhabit a wide range of upland macro habitat/vegetation types, including coastal sage scrub, grassland, chaparral, oak woodland, and ruderal/disturbed areas (Holland and Sisk, 2000). Substantial areas of fine sand, into which adult toads burrow, must be present, but can be interspersed with gravel or cobble deposits (USFWS, 1999).

1.2.2 Morphological Characteristics

Adult: The arroyo toad is small (2-3 inches in length), light greenish grey or tan with warty skin and dark spots. A prominent characteristic of the adult is presence of a conspicuous whitish heavy bar across the front of each eyelid meeting at the midline of the head to form a V pattern (Myers, 1930; Behler & King, 1985; Stebbins, 1985). The parotoid glands are oval-shaped and widely separated, and the adult usually has a light area on the sacral hump and appears buff colored on the underbelly (Stebbins, 1985).

Juvenile: The juvenile is ash white, light olive or salmon colored with the underside of the feet appearing yellow, and it harmonizes with the color of the surrounding rock and gravel (Stebbins, 1985).

Larva: To about 21 days of age, the arroyo toad tadpoles are uniformly black and exhibit a fusiform shape. After this early larval stage the arroyo toad larva is olive tan or grey, or mottled including the tail musculature (Stebbins, 1985). The larva have an irregular dark line down the side of the tail and most have dark crossbars on the dorsal tailbase. The ventral surface is a flat white (Sweet, 1991).

Egg: The eggs of the arroyo toad are laid in gelatinous tubes of tangled strings. The eggs of the arroyo toad are laid in 1-3 irregular rows thick of approximately 1,500 eggs and their gelatinous tube contains only one envelope (Stebbins, 1985; Sweet, 1991).

Scat. The appearance of arroyo toad scat can depend upon diet and the state of hydration of the animal (Holland and Sisk, 2000). The appearance of the scat is dictated by the ant and beetle diet of the arroyo toad. Occasionally, arroyo toad scat contains a uric acid cap that is white in appearance.

1.2.3 Behavioral Characteristics

Male and female arroyo toads are usually sexually mature at 2 years of age (Sweet, 1993). Breeding occurs on large streams with persistent water from late March to mid-June (Brown, 1993). Males generally vocalize at the edge of a flowing stream, facing either the near shore or the opposite bank with their forelimbs resting on the bottom and their hindquarters submerged in the flowing water (Sullivan, 1992).

The courtship vocalization of the male is a high trill, usually lasting 8 to 10 seconds (Behler & King, 1985; Davidson, 1995; Sullivan, 1992). The vocalization rises in pitch at first and usually ends abruptly (Stebbins, 1985). Calling activity (as well as general surface activity) generally occurs from after dusk to midnight. Males stop calling when disturbed, or when air temperatures fall below 13-14 degrees centigrade (Myers, 1930).

Egg strings are deposited and larva develop in shallow pools with minimum current (Brown, 1993; Behler & King, 1985), and eggs hatch in about 5 days after being laid (Sweet, 1991). Once arroyo toad tadpoles have dispersed from the vicinity of the clutch site, arroyo toad tadpoles are typically solitary. The tadpole stage averages 72 days in length (Sweet, 1991). From hatching to about 13 days of age the tadpoles are incapable of swimming (Sweet, 1991). Unique among local tadpoles, arroyo toad tadpoles do not feed on vegetation; rather they feed on organic detritus that settles among the sand grains. Mature larvae typically swim in bursts about 1 inch then remain still for 2 to 4 minutes while they process the substrate.

After metamorphosis, the toadlets remain on the bordering gravel bars that have nearly complete closure of cottonwoods, oaks, or willows and almost no grass or herbaceous cover at ground level. Toadlets tend not to burrow, and are diurnal and feed mostly on ants. Small juvenile toads that are unable to burrow may be susceptible to desiccation. Newly metamorphosed arroyo toads occupy the saturated sand bars for about a week and then move to somewhat drier zones of the sand bars where they remain for up to 8 weeks (Sweet, 1991). As they mature, they shift to burrowing, nocturnal behavior, and introduce beetles and ants to their diet (Sweet, 1991). The movement of the juvenile and adult arroyo toad consists more of hopping than walking (Brown, 1993; Behler & King, 1985).

Adult arroyo toads excavate shallow burrows on the terraces where they shelter during the day or during long intervals in the dry season (Brown, 1993). Adults forage for insects on sandy stream terraces that have nearly complete closure of cottonwoods, oaks or willows and no grass and herbaceous cover at the ground level (Brown, 1993). Adult arroyo toads are entirely nocturnal and are active after the first substantial rains (usually in January or early February) through August (Sweet, 1991). Winter activity in adults is focused on terraces above the level of most floods while spring and summer activity shifts to the sand and gravel flats bordering the stream. During the latter period, the adults forage in areas bordered by low vegetation and conceal themselves by day in shallow burrows (Sweet, 1991).

Adult toads move to higher terraces in midsummer where they construct a relatively deep burrow and aestivate. Dispersal distances to upland aestivation sites in excess of 0.5 mile were frequent and in a few cases exceeded 1 mile (Holland and Sisk, 2000; Sweet, 1993). Arroyo toads have not been reported to utilize small mammal burrows where soils are compacted (USFWS, 1999).

SECTION 2.0 – METHODS

The USFWS survey protocols for the arroyo toad (see Appendix) state that 6 daytime and 6 nighttime surveys are required between March 15 and July 1 with at least one survey conducted during the months of April, May, and June. Protocols also state that nighttime surveys should not be conducted during evenings when a full or near-full moon is illuminating the survey area and should only be conducted when the air temperature at dusk is 55 degrees Fahrenheit or greater. Two Chambers Group biologists conducted daytime and nighttime surveys on April 18, April 27, May 12, May 26, June 14, and June 28, 2005. These biologists included Shannan Shaffer, Lindsay Messett, and Paul Morrissey.

Prior to performing the field survey, existing documentation relevant to the project site was reviewed. The most recent records of the California Natural Diversity Database (CNDDB 2005) were reviewed for the arroyo toad. This database contains records of reported occurrences that may occur within or in the immediate vicinity of the project site.

2.1 HABITAT ASSESSMENT

As part of the focused surveys for arroyo toads, the habitat within the project area was assessed for its potential to support arroyo toad populations. Observations were made as to whether appropriate breeding, feeding, and/or aestivation habitat was present (i.e., shallow, slow-moving streams, shallow pools with gravel or sand bottoms, unvegetated sandy stream channels and terraces, and uplands).

2.2 DAYTIME SURVEYS

Surveys were conducted by walking along the stream bank and/or channel visually searching for scat, eggs, larvae, and juveniles. Data regarding wind speed, cloud cover, air temperature, water temperature, habitat quality, species observed, and potential evidence of arroyo toads was recorded during each survey. Survey equipment included a Sherpa Atmospheric Data Center (water and air thermometer and wind speed device), camera, magnifying lens, binoculars, field data sheets, and guidebooks. Photographs were taken to document site conditions (see Figure 3, Photos 1-3). Caution was taken to avoid potential breeding pools and burrow sites. The stream channel was avoided whenever possible and stream crossings were made downstream from possible breeding pools or areas that potentially supported eggs and/or larvae.

Scat can be used as an indicator of arroyo toad presence. Scat was inspected for the presence of a uric acid cap as well as the remains of ants, beetles, or other prey. The horned lizard (*Phrynosoma* sp.) can occur in the same habitat and its scat looks similar to the arroyo toad due to the similar diet. It is worth noting that the horned lizard is unlikely to eat the exotic Argentine ants (*Iridomyrmex humilis*) whereas the arroyo toad appears to eat them readily. Occasionally, arroyo toad scat contains a uric acid cap that is white in appearance. The presence of a uric acid cap is a strong indicator of the presence of arroyo toads and is probably not seen in the Western toad (*Bufo boreas*), spadefoot toad (*Scaphiopus* sp.) and horned lizard scats (Chambers Group, 2003).

Egg masses were visually inspected for arroyo toad characteristics; however, it is difficult to distinguish between Western toad and arroyo toad egg masses without physical handling, which requires a Section 10 of the Endangered Species Act take permit. Because the surveyors do not have a Section 10 permit, no egg masses were handled.

Photo 1. View of the densely vegetated channel located along the southern portion of the project site. No arroyo toad habitat is located within this channel.

Photo 2. View of the easement portion of the survey area looking west. This site has been highly modified and the bed of the channel contains mainly cobbles with little sand.

Chambers Group

BIG TUJUNGA WASH
SITE PHOTOGRAPHS
Figure 3

Photo 3. View of the western portion of the survey area, looking east. This site contains mainly cobbles with little sand.

The larva of the Western toad is uniformly black, dark brown or dark grey, including tail musculature and is around two inches in length but often is much smaller. To about 21 days of age the arroyo toad tadpoles closely resemble the Western toad tadpole (uniformly black) after which the arroyo toad tadpole becomes tan dorsally with a white ventral surface and an irregular black line along each side of the tail. The pre-21-day-old arroyo toad tadpole can be distinguished from the Western toad tadpole by its overall shape. The shape of the young arroyo toad tadpole is fusiform, while the Western toad tadpole tapers sharply as it transitions from the head to the tail.

As the arroyo toad larva matures, it begins to resemble the California tree frog (*Pseudacris cadaverina*). The eyes of the California tree frog are inset within the outline of the head when viewed from above. The dorsal surface of the tail musculature is marked with alternating dark crossbars. Comparatively, the eyes of the arroyo toad larva are also inset from the outline of the head and appear olive tan or grey, or mottled, including the tail musculature and white below (Stebbins, 1985). A few differences between larva of the two species have been noted; however, these may be difficult to distinguish in the field. The body of the California tree frog larva is more squared off in the posterior region than arroyo toad larva, which has a more rounded posterior region (Holland and Sisk, 2000). Furthermore, the ventral surface in California tree frog tadpoles is iridescent, while arroyo toad tadpoles ventral surface is flat white. In most locations, California treefrog tadpoles have longer tails than arroyo toad tadpoles, and they lack the irregular dark line on the side of the tail that is present on arroyo toad larva. (Chambers Group, 2003).

2.3 NIGHTTIME SURVEYS

Nighttime surveys were conducted between one hour after dusk and midnight. As in the daytime surveys, caution was taken to avoid potential breeding pools and burrow sites. The stream channel was avoided whenever possible and stream crossings were made downstream from possible breeding pools or areas that potentially supported eggs and/or larvae.

Surveys were conducted by walking along the stream bank and/or channel visually searching for adult arroyo toads and listening for arroyo toad vocalizations. Flashlights were used to scan the stream channel and banks upstream and downstream for eye shine. The surveyors remained motionless and silent for approximately 15 minutes at appropriate sites along the creek to listen for arroyo toad calls.

Data regarding wind speed, cloud cover, air temperature, water temperature, and species observed and heard were recorded during each survey. Survey equipment included flashlights, thermometer, camera, wind speed device, field data sheets, and guidebooks.

SECTION 3.0 – RESULTS

3.1 HABITAT ASSESSMENT

Along Big Tujunga Wash within the project area, a sufficient number of habitat characteristics were present to warrant arroyo toad surveys (see Figure 2). Water in this location was shallow and slow moving, and shallow pools were present adjacent to the stream. Although the substrate consisted predominantly of cobbles and little sand (see Figure 3, Photo 3), a few unvegetated sandy terraces were present within and adjacent to the stream channel. Most of the areas adjacent to Big Tujunga Wash within the project site consisted of slopes and/or terraces with a large amount of cobbles and little sand. Upland areas in the western portion of the survey area consisted of buckwheat (*Eriogonum fasciculatum*), Our Lord's Candle (*Yucca whipplei*), and thick-leaved yerba santa (*Eriodictyon crassifolium*) and were characterized as alluvial. Within the easternmost portion of the survey area, the channel has been highly modified and concrete slopes have replaced any suitable upland habitat (see Figure 3, Photo 2). The stream channel was sparsely vegetated with mule fat (*Baccharis salicifolia*) and scalebroom (*Lepidospartum squamatum*). In addition, bullfrogs have been observed within the survey area and are known to prey upon arroyo toads (Sweet 1991).

A stream channel flows from the Tujunga Ponds and feeds into Big Tujunga Wash near the western boundary of the project site. No suitable breeding, feeding, or estivation habitat for arroyo toads was present along this stream. The stream banks are vegetated with a mature willow (*Salix* ssp.) woodland and are highly vegetated along the banks with an herbaceous understory. Within the stream channel, water is fast moving with occasional deep pools (see Figure 3, Photo 1). Boulders are also present within the stream channel forming several riffle-pool complexes. Although some areas with unvegetated sandy terraces were located, no shallow, slow moving water characteristic of arroyo toad habitat is present within this area of the project site. Exotic predatory species such as crayfish (*Procambaris* sp.), adult and larva bullfrogs, and largemouth bass (*Micropterus salmoides*) have been observed within the Tujunga Ponds as well as along this stream channel (Chambers Group 1998). No suitable arroyo toad habitat was identified in the southern portion of the Big Tujunga Mitigation Bank; therefore, focused surveys were not conducted in this area of the project site (see Figure 2).

3.2 ARROYO TOAD FOCUSED SURVEYS

No arroyo toad adults, juveniles, larvae, or eggs were observed during the focused surveys, and no indirect evidence of arroyo toad presence was identified (i.e., arroyo toad vocalizations or scat). Consequently, no evidence was identified to suggest that arroyo toads currently occupy the Big Tujunga Wash Mitigation Bank area.

The following table provides details regarding weather conditions during each of the six nighttime protocol surveys. Observations during each of the daytime and nighttime surveys are provided in the paragraphs that follow.

Table 1
Weather Conditions During Protocol Night Surveys

Survey No.	Date	Water Temp. (F)	Air Temp (F)	Wind Speed (mph)	Cloud Cover	Moon Phase
1	4/18/05	63	59	0-1	Overcast	First Quarter
2	4/27/05	66	61	1-2	Overcast	Full Moon
3	5/12/05	63	63	0-1	None	First Quarter
4	5/26/05	62	63	0-1	None	Last Quarter
5	6/14/05	67	71	1-2	None	First Quarter
6	6/28/05	67	69	0-1	None	Last Quarter

April 18, 2005

Weather conditions were consistent with the guidelines described in the USFWS Survey Protocol for conducting arroyo toad surveys (see Table 1). No amphibian species were observed during the daytime survey. Several Pacific chorus frogs (*Pseudacris regilla*) were heard vocalizing during the nighttime survey.

April 27, 2005

The USFWS Survey Protocol guidelines for conducting arroyo toad surveys indicate that nighttime surveys should not be conducted during a full or near-full moon without sufficient cloud cover. This nighttime survey was conducted during a full moon with complete cloud cover.

All other weather conditions were consistent with the guidelines described in the USFWS Survey Protocol for conducting arroyo toad surveys (see Table 1). No amphibian species were observed during the daytime survey. During the nighttime survey, several pacific chorus frog tadpoles and 3 adult pacific chorus frogs were observed. They were also heard vocalizing prior to and after observation.

May 12, 2005

Weather conditions were consistent with the guidelines described in the USFWS Survey Protocol for conducting arroyo toad surveys (see Table 1). No amphibian species were observed during the daytime survey. Pacific chorus frogs were heard vocalizing and several pacific chorus frog tadpoles were observed during the nighttime survey.

May 26, 2005

Weather conditions were consistent with the guidelines described in the USFWS Survey Protocol for conducting arroyo toad surveys (see Table 1). Several Pacific chorus frog tadpoles and several Western toad tadpoles (*Bufo boreas*) were observed during both the daytime and nighttime surveys. During the nighttime survey, Western toads and Pacific chorus frogs were heard vocalizing.

June 14, 2005

Weather conditions were consistent with the guidelines described in the USFWS Survey Protocol for conducting arroyo toad surveys (see Table 1). Several Pacific chorus frog tadpoles and several Western toad tadpoles (*Bufo boreas*) were observed during both the daytime and nighttime surveys. During the nighttime survey, Pacific chorus frogs were heard vocalizing.

June 28, 2005

Weather conditions were consistent with the guidelines described in the USFWS Survey Protocol for conducting arroyo toad surveys (see Table 1). Several Pacific chorus frog tadpoles and several Western toad tadpoles (*Bufo boreas*) were observed during both the daytime and nighttime surveys. During the nighttime survey, Pacific chorus frogs were heard vocalizing.

3.3 HISTORICAL OCCURRENCES

Two historical occurrences of the arroyo toad have been documented within the vicinity of the survey area. An occurrence was recorded in 1991 along Mill Creek, a tributary of Big Tujunga Creek, at the Mill Creek picnic ground which is approximately 8 miles northeast of the eastern edge of the project site (CNDDB 2005). An occurrence was also documented in the west fork of Alder Creek which is a tributary of Upper Big Tujunga Creek, and this occurrence is located approximately 9 miles northeast of the eastern edge of the project site (Brown 2000).

SECTION 4.0 – CONCLUSIONS

Although historical occurrences of arroyo toads have been recorded within the project vicinity, no evidence was identified to suggest arroyo toads currently occupy the project site. Although the survey area had many characteristics associated with arroyo toad habitat (i.e., a shallow, slow-moving stream, and shallow pools with sand/gravel bottoms), sandy stream terraces were very limited and contained many cobbles and boulders which would make locomotion difficult for arroyo toads

Upland habitat utilized for aestivation was limited due to the presence of roads and residential and commercial developments. Arroyo toads utilize upland habitats for foraging and aestivation; therefore, habitat loss may be a significant factor in the lack of any empirical evidence that arroyo toads occupy this site. Big Tujunga wash is used for recreational purposes such as horseback riding and hiking. These activities may also be detrimental to the success of arroyo toad populations through habitat loss and the mortality of toads moving from the stream channel to adjacent areas for feeding and aestivation.

Bullfrogs have become established within the survey area along Big Tujunga Wash, which may have contributed to the lack of evidence that arroyo toads occupy the survey site. Bullfrogs constitute a major threat to arroyo toad populations and are likely to prey upon calling male toads and juveniles (Sweet 1991). Although they were not observed within the survey area, crayfish and largemouth bass have been observed within the creek that feeds into Big Tujunga Wash at the western project boundary. Crayfish likely prey upon larvae, which can be detrimental to existing populations (USFWS, 1999). Arroyo toad larvae are highly susceptible to predation by exotic fish, particularly bass, since they do not respond to fish 'odors' in the water (Sweet 1991).

In summary, this site contains many of the habitat characteristics associated with arroyo toads and arroyo toads have been known to occur within the vicinity of the project site. However, this site contains very few sand deposits and is composed of mostly cobbles making it marginal arroyo toad habitat. No evidence was found during the surveys to indicate that arroyo toads currently occupy this site.

SECTION 5.0 – REFERENCES

Behler, J.L. and King, W.F.

1985 The Audubon Society Field Guide to North American Reptiles & Amphibians. Alfred A. Knopf, Inc.

Brown, C. R.

1993 Proposed Endangered Status for the Arroyo Southwestern Toad. U.S. Fish and Wildlife Service.

Brown, Jr.,William J.

2000 Angeles National Forest Recreation Residence Permit Reissuance, Biological Assessment, Angeles Forest, Los Angeles County, California.

California Natural Diversity Data Base (CNDDB)

2005 Arroyo toad (*Bufo californicus*).

Chambers Group, Inc.

1998 Biological Resources Assessment and Functional Analysis of a Site in Big Tujunga Wash, Los Angeles County, California.

2003 Arroyo Toad (*Bufo californicus*) Survey Report for the Big Tujunga Wash Project Site, Los Angeles County, California.

Davidson, C.

1995 Frog and Toad Calls of the Pacific Coast. Library of Natural Sounds – Cornell Laboratories of Ornithology, USDA Forest Service.

Griffen, P.C. and Case, T.J.

2001 Terrestrial Habitat Preferences of Adult Arroyo Southwestern Toads. Journal of Wildlife Management. 65(4): 633-644.

Holland D.C. and Sisk, N.R.

2000 Habitat Use and Population Demographics of the Arroyo Toad (Bufo californicus) on MCB Camp Pendleton, San Diego County, California: Final Report for 1998-1999.

Myers, G.S.,

1930 The Status of the Southern Western toad, Bufo Californicus (Camp). Proceedings of the Biological Society of Washington. 43: 73-78.

Noda, D.K.

1999 Survey Protocol for the Arroyo Toad. U.S. Fish and Wildlife Service.

Stebbins, R.C.

2003 Western Reptiles and Amphibians, Third Edition. Houghton Mifflin Company, Boston New York.

Sullivan, B.K.

1992 Calling Behavior of the southwestern Toad (*Bufo Microscaphus*). Herpetology. 48(4): 383-389.

Sweet, S.S.

1991 (Revised 1992). Initial Report on the Ecology and Status of the Arroyo Toad (*Bufo microscaphus californicus*) on the Los Angeles National Forest of Southern California, with Management Recommendations. Report to U.S. Department of Agriculture, Forest Service, Los Padres National Forest, Goleta, California.

Sweet, S.S.

1993 Second Report on the Biology and Status of the Arroyo Toad (*Bufo microscaphus californicus*) on the Los Padres National Forest of Southern California. Report to U.S. Department of Agriculture, Forest Service, Los Padres National Forest, Goleta, California.

U.S. Fish and Wildlife Service

1993 Proposed Endangered Status for the Arroyo Southwestern Toad. 50 Codes of Federal Regulations, Part 17.

1999 Recovery Plan for the Arroyo Southwestern Toad. Region 1.

2000 Proposed Designation of Critical Habitat for the Arroyo Toad; Proposed Rule. 50 Codes of Federal Regulations, Part 17.

APPENDIX A

SURVEY PROTOCOL

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

May 19, 1999

SURVEY PROTOCOL FOR THE ARROYO TOAD

The following guidelines are provided to facilitate accurate assessments of the presence or absence of the federally listed endangered arroyo toad (*Bufo microscaphus californicus*). Accurate survey data are needed to provide the U.S. Fish and Wildlife Service (Service) with sufficient information to respond to requests for Federal permits and licenses. Currently, surveys performed in accordance with these guidelines will not require a permit under section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended. However, permits to conduct arroyo toad surveys may be required in the future. In all cases, extreme care must be taken when conducting surveys to avoid inadvertently injuring or killing toads, or damaging their habitat. These guidelines are not meant to be used for long-term monitoring of projects or the overall status of populations; guidelines for such monitoring efforts should be developed with the assistance of the Service for specific cases.

The Service recommends that the following survey guidelines be used to determine if arroyo toads are present in the vicinity of proposed activities, but cautions that negative surveys during a year of severe weather (e.g., drought, extended rainy season, cold weather) may be inconclusive. Contact the appropriate field office (addresses and phone numbers below) before conducting surveys for additional information.

1) Areas within one kilometer (1 km) of arroyo toad sites (documented by the presence of eggs, larvae, juveniles, or adults) that have suitable habitat shall be presumed to have arroyo toads.

2) If the sole purpose of surveys is to determine the presence or absence of the arroyo toad, surveys shall cease immediately upon determination that arroyo toad eggs, larvae, juveniles, or adults are present in the survey area. The arroyo toad locations shall be recorded on a USGS 1:24,000 (7.5 minute) map.

3) To be reasonably confident that arroyo toads are not present at a site, at least six (6) surveys must be conducted during the breeding season, which generally occurs from March 15 through July 1, with at least seven (7) days between surveys. Extreme weather conditions can cause variations in the breeding season; these conditions should be fully considered when developing a schedule of surveys. If uncertainty exists as to whether

environmental conditions are suitable (see guideline #9 below), contact the appropriate field office for further information.

4) At least one survey shall be conducted per month during April, May, and June.

5) Surveys shall include both daytime and nighttime components conducted within the same 24-hour period (except when arroyo toads have been detected in the survey area).

6) Daytime surveys shall include an assessment and mapping of: a) arroyo toad habitat suitability, and b) the presence of arroyo toad eggs, larvae, or juveniles. Extreme caution must be used to avoid crushing arroyo toads that are burrowed into sand bars and banks, or lodged in depressions in the substrate (sand, gravel, soil). Arroyo toads will use trails and roads up to several hundred meters from breeding sites while foraging; therefore, caution must be taken to not disturb, injure, or kill arroyo toads when using these roads and trails.

7) Daytime surveys shall be conducted by walking slowly along stream margins and in adjacent riparian habitat, visually searching for (but not disturbing) eggs, larvae, and juveniles. If necessary, surveyors may walk within the stream, taking care not to disturb or create silt deposits within breeding pools. If stream crossings are necessary, these should be on the downstream ends of potential breeding pools or in fast-flowing channels to minimize the likelihood of stirring up silt deposits. Arroyo toad eggs are usually laid in shallow water (less than four inches deep), and are susceptible to being smothered by silt that may be raised by walking in or across breeding pools.

8) Nighttime surveys (assuming eggs, larvae, and/or juveniles have not been detected) shall be conducted by walking slowly and carefully on stream banks. Surveyors should stop periodically and remain still and silent for approximately 15 minutes at appropriate sites to wait for arroyo toads to begin calling. The same cautions used for daytime surveys to avoid disturbing, injuring, or killing arroyo toads shall be incorporated.

9) Nighttime surveys must be conducted between one hour after dusk and midnight, when air temperature at dusk is 55 degrees Fahrenheit or greater. Surveys should not be conducted during nights when a full or near-full moon is illuminating the survey area or during adverse weather conditions such as rain, high winds, or flood flows.

10) Nighttime surveys must be conducted as silently as possible, because talking or other human-generated noises may cause arroyo toads to stop calling or leave the creek. Strong headlights or flashlights may be used to visually locate and identify adult arroyo toads, and flash photography may be used to document sightings of solitary individuals; otherwise lighting should be kept to a minimum.

11) Pairs of arroyo toads are very sensitive to disturbances, particularly waves or ripples (calling males are less easily disturbed). Therefore, surveyors must not enter the water

near amplexing or courting pairs, and must immediately leave the vicinity upon their discovery.

12) A final report, to be submitted within 30 days of each field season or positive survey shall be prepared that includes survey dates and times, names of surveyor(s), air temperature, estimated wind speed, lighting conditions, a description of the survey methods used, and survey locations plotted on a USGS 1:24,000 (7.5 minute) map.

13) The results of a field survey may not be valid for any of the following reasons: a) surveys were conducted in a manner inconsistent with this protocol, b) surveys were incomplete, c) surveys were conducted during adverse conditions or during a season of severe weather conditions, or d) reporting requirements were not fulfilled. In such cases, the Service may request that additional surveys be conducted.

The final report should be provided to the appropriate Service field office:

For surveys in Monterey, San Luis Obispo, Santa Barbara, and Ventura Counties, Los Angeles County west of Highway 405, and the desert portions of Los Angeles and San Bernardino Counties, reports should be sent to the Ventura Fish and Wildlife Office, 2493 Portola Road, Suite B, Ventura, California 93003 (phone: (805) 644-1766).

For surveys in Los Angeles County east of Highway 405 and south of the desert, Orange, Riverside, Imperial, San Diego, and montane and cismontane San Bernardino Counties, reports should be sent to the Carlsbad Fish and Wildlife Office, 2730 Loker Avenue West, Carlsbad, California 92008 (phone: (760) 431-9440).

If a surveyor thinks that a specific project warrants alterations in this protocol, the Service should be contacted prior to the onset of surveys to discuss and possibly grant permission for proposed modifications. We would appreciate receiving any comments or ideas on these guidelines or recommendations for their improvement. For additional information, please contact the Ventura Fish and Wildlife Office at (805) 644-1766 or the Carlsbad Fish and Wildlife Office at (760) 431-9440.

Diane K. Noda

Diane K. Noda

Field Supervisor

APPENDIX B

SURVEY DATA SHEETS

Chambers Group, Inc.

Arroyo Toad Survey Form

Project Name Big T **Project #** 6629 **Task** HH.6 **Billing Group** 006

Location Sunland **Survey #** 1

General Habitat Description of Area unvegetated, sandy stream channels,

Surveyor(s) S. Shaffer, L. Messett **Date** 4/18 **Moon Phase** Quarter moon

Day Survey – **Time (Start)** 4:45 **(End)** 6:45

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

Water Temperature (in C) (Start) 65°F **(End)** 63°F

Air Temperature (in C, taken at 6" above the ground in the shade) (Start) 61°F **(End)** 60°F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
4:45	W. Fence lizard	O		Area #1
				11S 0375301
				UTM 3792541
				Area #2
				11S 037648
				UTM 3793095

General Comments:

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

Chambers Group, Inc.

Arroyo Toad Survey Form

Night Survey – Time (Start) 7:45 (End) 10:25

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

Water Temperature (in C) (Start) 63°F (End) 62°F

Air Temperature (in C, taken at 6" above the ground in the shade) (Start) 59°F (End) 57°F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
7:45	Pacific tree frog	V		

General Comments:

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

Chambers Group, Inc.

Arroyo Toad Survey Form

Project Name Big T **Project #** 6629 **Task** HM.6 **Billing Group** 006

Location Sunland **Survey #** 2

General Habitat Description of Area Alluvial Wash

Surveyor(s) J. Shaffer, P. Monroe **Date** 4/27/05 **Moon Phase** Full moon

Day Survey – Time (Start) 3:50 **(End)** 5:45

Weather (Cloud cover, Estimated wind speed, precipitation) 100 / 1-2 / Ø

Water Temperature (in C) (Start) 68°F **(End)** 68°F

Air Temperature (in C, taken at 6" above the ground in the shade) (Start) 68°F **(End)** 66°F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
3:50	AMCR	O		
	W. Swallowtail	O		

General Comments:

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

Chambers Group, Inc.

Arroyo Toad Survey Form

Night Survey – Time (Start) 7:40 (End) 10:00

Weather (Cloud cover, Estimated wind speed, precipitation) 100 / 1-2 / Ø

Water Temperature (in C) (Start) 66°F (End) 66°F

Air Temperature (in C, taken at 6" above the ground in the shade) (Start) 61°F (End) 58°F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
7:40	Pacific tree frog	O V		

General Comments:

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

Chambers Group, Inc.

Arroyo Toad Survey Form

Project Name Big T **Project #** 6629 **Task** HM.6 **Billing Group** 006

Location Sunland **Survey #** 3

General Habitat Description of Area

Surveyor(s) L. Messett, C. Shaffer **Date** 5-12-05 **Moon Phase** Quarter moon

Day Survey – **Time (Start)** 6:15 **(End)** 7:45

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

Water Temperature (in C) (Start) 65°F **(End)** 66°F

Air Temperature (in C, taken at 6" above the ground in the shade) (Start) 79°F **(End)** 72°F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
6:20	Skunk	C		
	Coyote	S		
	Fence lizard	O		
	AMCR	OV		
	SPTO	V		
	NRWS	OV		

General Comments:

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

Chambers Group, Inc.

Arroyo Toad Survey Form

Night Survey – Time (Start) 8:45pm (End) 10:00 pm

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

Water Temperature (in C) (Start) 63°F (End) 61°F

Air Temperature (in C, taken at 6" above the ground in the shade) (Start) 63°F (End) 63°F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
8:50	Pacific Chorus frog	V		numerous pac chorus frog tadpoles

General Comments:

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

Chambers Group, Inc.

Arroyo Toad Survey Form

Project Name Big T Arroyo Toad **Project #** 60629 **Task** H14.6 **Billing Group** 006
Location Sunland **Survey #** 4
General Habitat Description of Area Alluvial Wash
Surveyor(s) L. Messett, S. Shaffer **Date** 5/26/05 **Moon Phase** Quarter moon

Day Survey – Time (Start) 6:10 pm (End) 7:45

Weather (Cloud cover, Estimated wind speed, precipitation) 0 / 0 / 0
Water Temperature (in C) (Start) ~~73°~~ 65°F (End) 64° F
Air Temperature (in C, taken at 6" above the ground in the shade) (Start) 73°F (End) 72°F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
6:15	Fence lizard	O		
	NRWS	O		
	~~[illegible]~~ KILL	O V		
	Pac Chorus frog tadpoles	O		
	~~tadpole sp~~	O		
	Western toad tad			

General Comments:

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

Chambers Group, Inc.

Arroyo Toad Survey Form

Night Survey -- Time (Start) 9:00 (End) 10:15

Weather (Cloud cover, Estimated wind speed, precipitation) 0 / 0 / 0

Water Temperature (in C) (Start) 62° F **(End)** ~60°F

Air Temperature (in C, taken at 6" above the ground in the shade) (Start) 63°F **(End)** 63°F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
9:00	Pac Chorus frog	V		
	Western toad	V		Pacific Chorus frog tadpoles
	~~[illegible]~~ KILL	O,V		& Western toad tadpoles
				observed near area
				where vocalizations
				were heard

General Comments:

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

Chambers Group, Inc.

Arroyo Toad Survey Form

Project Name Big T Arroyo toad **Project #** 6629 **Task** H14.6 **Billing Group** 006
Location Sunland **Survey #** 5
General Habitat Description of Area Alluvial Wash
Surveyor(s) S.Shaffer, L. Messett **Date** 6/14/05 **Moon Phase** Quarter moon

Day Survey – Time (Start) 6:20 (End) 7:45

Weather (Cloud cover, Estimated wind speed, precipitation) 0 / 1-2 / 0
Water Temperature (in C) (Start) 74 (End) 73
Air Temperature (in C, taken at 6" above the ground in the shade) (Start) 82 (End) 82

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
6:20	KILL	V O		
	Western toad tadpoles	O		
	Ca. Chorus frog tadp.	O		
	Tadpole sp	O		- Probably Western toad
	NRWS	O		

General Comments:

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

Chambers Group, Inc.

Arroyo Toad Survey Form

Night Survey -- Time (Start) 8:56 pm (End) 10:35 pm

Weather (Cloud cover, Estimated wind speed, precipitation) 0 / 1-2 / 0

Water Temperature (in C) (Start) 67°F (End) 66°F

Air Temperature (in C, taken at 6" above the ground in the shade) (Start) 71°F (End) 70°F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
9:05	Pacific Chorus frog	V		
	Western toad tadpoles	O		
	pacific Chorus frog tadpoles	O		

General Comments:

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

Chambers Group, Inc.

Arroyo Toad Survey Form

Project Name Big T Project # 6629 Task HK6 Billing Group 006

Location Sunland Survey # 6

General Habitat Description of Area

Surveyor(s) S. Shaffer Date 6/28/05 Moon Phase Quarter

Day Survey – Time (Start) 5:45pm (End) 7:15pm

Weather (Cloud cover, Estimated wind speed, precipitation) 0 / 1-2 / 0

Water Temperature (in C) (Start) 68°F (End) 67°F

Air Temperature (in C, taken at 6" above the ground in the shade) (Start) 78°F (End) 72°F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
5:45	KILL	O V		
	NRWS	O		
	AMCR	O		
	Western toad	L		
	Pac Chorus frog	L		
	Coyote	S		

General Comments:

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

Chambers Group, Inc.

Arroyo Toad Survey Form

Night Survey -- Time (Start) 9:10p (End) 11:25pm

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

Water Temperature (in C) (Start) 67°F (End) 66°F

Air Temperature (in C, taken at 6" above the ground in the shade) (Start) 69°F (End) 66°F

Time	Wildlife Species	Sign*	Microhabitat	Comments/Behavior/Notes (GPS Coordinates taken in UTM, Zone 11, NAD83, meters) Easting Northing
9:20	Pacific Chorus	V,L		
	frog			
	Western toad	L		

General Comments:

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

APPENDIX I

2005 CAC MEETING MINUTES, ATTENDANCE, AND WALL GRAPHICS

BIG TUJUNGA WASH MITIGATION BANK
COMMUNITY ADVISORY COMMITTEE MEETING MINUTES
APRIL 28, 2005
HANSEN YARD 7 – 9 P.M.

I. Welcome / Introduction (P. McLaughlin, MIG)

1. Welcome
2. Review of agenda

II. Site Maintenance Issues and Discussion of Action Items (M. Chimienti, Public Works)

1. General Site Signage/Kiosks: The kiosk sign by the haul road was washed out during the winter storms and LADPW is going to try and pull it out of the wash. Provided the damage is not too extensive, the kiosk will be repaired and moved to the Wheatland entrance.
2. Tamayo Property: The purchase of the property is in the final phases. The paperwork is still at the Treasure Tax Collectors Office but has not yet made it onto the board agenda.
3. Website: The LADPW website is up and can be accessed at www.ladpw.org. It includes a link to the Tujunga Council site on the main page. To access the Big T site, click environmental and on the top right of the screen click on the Big T site. Chris Stone from LADPW requested feedback and recommendations from anyone visiting the site. Also, Mary Benson requested a list of wildlife, including photos, of the species found at Big T to be included on the website.
4. Unauthorized Overnight Campers: Patrols are been made on the site every weekend and updates can be found on the website. Public Works asked for feedback on the overnight camper situation. Barbara Tarnowski reported a new encampment on the hillside, which will be followed up on by the patrol.
   Dan Holland sighted a Bronco near the ponds during one of his visits. The police were called but it is unknown if the person was cited. The gates were locked and it is unclear as to how the individual entered the site.
5. Trails: A few of the CAC members now feel that the use of trails signs is not a good idea. Mary Benson suggested landscaping trails through the North end of the site and that potential funds from the Foothill Bridge widening project from the City of Los Angeles Department of Transportation may be available for this project. It will be discuss as to what to do with the trail signs that have already been made.
   A trail clean-up day is planned for Saturday, July 23. Chambers Group and LADPW will lead groups of volunteers from the community to re-establish the trails by laying down wood chips and lining with rocks. Notices will be placed in community bulletins and flyers will be put up in the remaining cottonwood kiosk and at some of the local businesses.
6. Graffiti: Public Works' graffiti hotline number is (800) 675-4357. New graffiti is present under the freeway in the wash areas and needs to be removed.
7. Pond Crossing/Footbridge: The footbridge was washed out by the storms and unsuccessful attempts have been made to replace it. This will no longer be an action item. CAC members asked if the fencing around the ponds could be removed.
8. Water Quality Report: Montgomery Watson performed Water quality tests in April. The results have not yet been received but will be posted on the website once they are available.
9. Cottonwood Area as a Staging Area: This is was an action item raised by Terry Kaiser at the October meeting. LADPW has requested a proposal from Terry Kaiser but it has not been presented. If a proposal is not given then this will no longer be an action item.

10. Fencing: Fencing is not yet up by Radland due to questions regarding property lines. It has been suggested that the fencing be brought further in to the bank. Barbara Tarnowski reported a cut fence and a pole knocked over by the locked gate.
11. Cottonwood road: The cottonwood road was washed out by the storms and will be repaired by flood maintenance next week. The culvert by the erosion was painted green due to concerns about reflection.
12. Trash removal: Flood maintenance removed trash by Wentworth including part of a car. An encampment in that area was also cleaned out.

III. Current Status of Programs (S. Shaffer)

1. Exotic Plant Removal: A few sprouts of Arundo have been reported and will be removed as soon as possible. Some weed removal was accomplished in the upland area in the early part of the year but is not currently being done due to nesting birds in the area. CAC members asked that the debris from the plant removal around the ponds be removed from the area because it causes blockage to the pond flow. They also reported a problem with milk thistle along the trails and plastic silt fencing between the ponds and the cottonwood area that needs to be removed. Chambers Group will do these removals during site visits.
2. Riparian Habitat Restoration: All riparian plantings are doing well with the exception of the cottonwoods, which experienced low survivorship during the first years due to dry conditions. CAC members are concerned about a possible infestation of Argentinean ants on the cottonwood trees.
3. Upland Habitat Restoration: Weed removal was accomplished in this area prior to March and was halted due to nesting birds in the surrounding brush. CAC members are concerned about gophers in the area. If they become a problem, trapping will be used to remove them.
4. Exotic Wildlife Removal: Dan Holland accomplished exotic wildlife removal in the first quarter of the year. Tadpoles have been spotted in a small pool of water near the pond and there is some concern that they may be bullfrog tadpoles. Due to the size of the tadpoles, a positive identification cannot be made at this time so no removal of these tadpoles will be done. Cowbird trapping began on March 30 and the offsite traps have been very successful.
5. Wildlife Monitoring: Surveys for Least Bell's Vireo and Arroyo toad have already begun but neither species has been detected yet. Southwestern willow flycatcher surveys will begin in May.
6. Water Quality Analysis: The first quarter water quality analysis was done by Montgomery Watson earlier this month and the report will be available on the LADPW website as soon as it is received.
7. Trails Restoration: A trail restoration day is set for Saturday, July 23 and volunteers from the community will be asked to participate.

IV. Schedule Next CAC Meeting (P. McLaughlin)

1. A follow-up meeting to the April CAC meeting will be held at 7:00 p.m. on July 7 at the Hansen Yard. This will be a meeting with Public Works and will not include Chambers Group.
2. The next regularly scheduled CAC meeting is scheduled to take place on October 27, 2005. A meeting reminder will be mailed to all stakeholders with the meeting date, time and place.

BIG TUJUNGA WASH MITIGATION BANK
COMMUNITY ADVISORY COMMITTEE MEETING
APRIL 28, 2005

	NAME	ADDRESS	PHONE/FAX	EMAIL	AFFILIATION
1	Shannan Shaffer	17671 Cowan Ave Ste 100, Irvine	949 261 5414	SShaffer@chambersgroupinc.com	Chambers
2	Larry Freeberg	"	"	LFreeberg@chambersgroupinc.com	Chambers
3	Chris Stone	900 S. Fremont	(626) 458-6102	cstone@ladpw.org	LACo.DPW
4	Michele Chimienti	900 S. Fremont Ave.	(626) 458-6111	mchimien@ladpw.org	LACDPW
5	ELVIRA KRUGER	10544 MAHONEY DR 5/14	818-352-6220	KALKRUGER@earthlink.net	STPOA
6	CAROL Roper	9635 La Canada Wy	3535534		STPOA
7	Mary Benson	11070 Sheldon St S.V. 91352	767-5217	www.TujungaWatershed.org	Tujunga Watershed Council
8	Chris Olsen	6350 Laurel Cyn Blvd #201, NoHo 91601	818-755-7676	clolsen@council7.lacity.org	CD2 - Wendy Greuel
9	Barbara Tarnowski	10410 Las Lunitas Ave. Tujunga CA 91042	(818) 352-8294	babsi_tarnowski_usa@yahoo.com	FOTAR
10	Debra Bauman	PO Box 176 Sunland CA 91041	818 486 0712	db@bauman.org	Tujunga Watershed
11					
12					
13					
14					
15					
16					
17					

...AILHEAD MAP //

IMPROVE, FOCUS ON TRAILS
- GATES /
- IMPROVE /
- SIGNAGE

→ WE HAVE A CALTRANS ENCROACHMENT CONTACT /

☐ GRAFFITI //
- sightings //
555-GO-AWAY

...OSK "WHERE'S THE TRAIL?"

...HER INLAND

⊖ posts can be "construction materials"

OUTLINE THE TRAIL /
WAIT 'TIL JUNE = 'DRY' //

"TRAIL" CAN ATTRACT LOTS OF PEOPLE

→ "TRAIL MAINTENANCE DAY"
AIM FOR SAT, SUN IN JUL/AUGUST
- NEWSLETTER TIMING //
ORGANIZATIONS /
SIGNS /
NEIGH COUNCIL /
JULY 23
? CAN WE USE EQUIPMENT?
CHECK //

...ED BUT
...ENDA
Big T
...w. ladpw.org → environmental page
...NGA COUNCIL SITE

...K AT SITE //
...nce for sightings
...ana sucker)
- plants /
- animals /
...fast loading !!
KIDS VISIT FOR SCHOOL //

...R - PATROL
...LEGER ON SITE //
...ENT@T-2
...relocated to Shadow Hills /

...E W/ JEEP /
...THRU HAUL ROAD /
...ED VEHICLES
...H... "EXPLORING" FROM THERE?
...RSE?
... ON HOLD
...GIVEN CONSTANT CHANGE IN WASH?
...AGE ON
...IL
...OTHILL BRIDGE
...$ FOR ART
...E LA RIVER?

☐ ...
- WASHED OUT //
→ WE KEEP IT OPEN //
- CHAIN LINK FENCE
- disruptive to flow?
- can we remove?
"what fence?"

NEXT MEETING...
JULY 7th ← EARLY JULY W/ PUBLIC WORKS /
OCTOBER 27th ← W/ CHAMBERS

☐ WATER QUALITY ANALYSIS
- done / will post on web /
→ OUR SAMPLE + MWH SAMPLE MATCH //

☐ COTTONWOOD STAGING AREA
- MANY AREAS BETTER //
→ NO ACTION ON COTTONWOOD (COUNTY) / NO WORD /

☐ CORRAL ENCROACHMENT - STILL GOING ON...

☐ SOME ISSUES W/ FENCING...
JURISDICTIONAL ISSUE
→ WILL DO ON OUR PROPERTY ONLY

- being addressed next week

EXOTIC PLANT REMOVAL
DEBRIS FROM CUTTING...
- IN PILES = BLOCKAGE
→ REMOVE IN SUMMER /
(Company may change but we will inform)
- thistle removal - lots of it //
bird nesting timing vs "seeding"
→ REMOVE BLACK PLASTIC FENCE BETWEEN PONDS & COTTONWOOD /

☐ RIPARIAN HABITAT
- doing well except cottonwoods /
→ Argentinian ant infestation //
- transport fungus / → will check re: ability to use pesticides
→ GOPHERS, TOO //
- food for everything //
- + they eat
"GOLF COURSE POISON SPREAD /

☐ EXOTIC WILDLIFE
- POTENTIAL BREEDERS REMOVED /
? SANTA ANA SUCKERS? A PHENOMENAL YEAR //
? TADPOLES, BULLFROGS
- can't positively ID at this stage...
- COWBIRD TRAPPING
- success offsite / not many on-site (GOOD!)

☐ WILDLIFE MONITORING
- no Vireos yet (but in Hansen)
- Arroyo Toad - still looking
- Flycatcher survey in May

BIG TUJUNGA WASH MITIGATION BANK
COMMUNITY ADVISORY COMMITTEE MEETING MINUTES
OCTOBER 27, 2005
HANSEN YARD 7 – 9 P.M.

I. Welcome / Introduction (P. McLaughlin, MIG)

1. Welcome
2. Review of agenda

II. Site Maintenance Issues and Discussion of Action Items (B Kwan, Public Works)

1. General Site Signage/Kiosks: The kiosk sign by the haul road was removed from the wash and is not salvageable. A new kiosk is being built. Suggestions were made that bilingual metal advisory signs at the major gates would be helpful in lieu of the new kiosk.
2. Tamayo Property: The purchase of the property is in the final phases. The paperwork is still at the Treasure Tax Collectors Office but has not yet made it onto the board agenda.
3. Website: The LADPW website is up and can be accessed at www.ladpw.org. A few of the CAC members have visited the website and feedback has been positive.
4. Unauthorized Overnight Campers: Patrols are being made on the site two times per week (but not on a regular basis) for 2 hours and updates can be found on the website. There is still an encampment on the hillside just below the 210 freeway, which will be followed up on by the patrol.
5. Trails: It was decided that trail signs are not needed within the mitigation bank due to constantly changing conditions. LADPW will decide what to do with the trail signs that have already been made. A few large trees and stumps still block some of the trails. Chambers Group will arrange to have them removed as soon as possible.
   LADPW will discuss the idea of hosting trail walks through the mitigation bank.
6. Graffiti: Public Works' graffiti hotline number is (800) 675-4357. New graffiti is present on all of the rocks on the Lakeview Terrace side of the bank. County will field review.
7. Water Quality Report: Barbara Tarnowski has done her own water quality testing and has found high phosphates and low dissolved oxygen levels. Montgomery Watson performed Water quality tests with good results. The results will be posted on the LADPW website.
8. Exotic Vegetation: The large palm tree still remains a concern of the CAC members. The cost for removal of the tree has been estimated at $11,000. Suggestions were made regarding limiting removal to the top of the tree but this leaves other concerns of liability. The matter will be explored further. Other exotics such as thistle, ivy, Arundo, and castor bean are also an ongoing problem.
9. Cottonwood Area as a Staging Area: This is was an action item raised by Terry Kaiser at the 2004 October meeting. LADPW has requested a proposal from Terry Kaiser but it has not yet been presented.
10. Cottonwood road: The cottonwood road near the recently installed culvert was repaired by flood maintenance but requires further repairs and grading to convey the storm water to the culvert.
11. Trash removal: CAC members will continue to pick up trash within the bank and LADPW will contact Flood maintenance to remove that trash.

III. Current Status of Programs (L. Freeberg and S. Shaffer, Chambers Group)

1. Exotic Plant Removal: A few sprouts of Arundo have been reported and will be removed as soon as possible. Chambers is working with Nature's Image to arrange the removal of other weed species.

2. Riparian Habitat Restoration: Chambers Group is exploring all riparian areas for future planting sites.
3. Upland Habitat Restoration: Soil compaction is an issue in the Cottonwood area and is believed to be the major reason for low survivorship of some plants. The use of an auger may be necessary for re-planting.
4. Exotic Wildlife Removal: Santa Ana sucker is well established in Haines Canyon Creeks due to removal efforts over the years. Dan Holland accomplished extensive exotic wildlife removal prior to breeding season however large bass are present in the ponds which suggests they are being stocked. Additional removal efforts will be made in November. There was some concern as to the lack of horned lizards spotted at the bank. They are very secretive and it is unlikely they will be spotted frequently. Due to the increase in the number of other reptile species this year, it is likely that the horned lizards are also doing well. Tadpoles have been spotted in small pools of water and have been identified as both western toads and pacific chorus frogs both of which are native species. Cowbird trapping began on March 30 and ended on August 1 and trapping was very successful.
5. Wildlife Monitoring: Surveys for least Bell's vireo, southwestern willow flycatcher and arroyo toad were conducted for 2005. No vireo or willow flycatchers were observed in Big T this season. The absence of these species may be attributed to the lack of population growth in other areas. The bird will not disperse from those areas until the populations exceed that which the territory can sustain. If this does happen, Big T will likely gain these species due to excellent habitat. This was only the second of 5 years with enough rain to justify arroyo toad surveys. Although moderate habitat was present, it has not been consistent and no arroyo toads were found.

IV. Comments, Questions, and Answers (Panel)

1. Some of the CAC members are interested in removing the over pour of concrete from the Gibson property onto the Big T property. It was suggested that the removal would be costly and difficult. County Flood Maintenance will investigate.
2. A trail sponsorship program "adopt a trail" was suggested. LADPW will look into it.

V. Schedule Next CAC Meeting (LADPW)

1. LADPW will continue the meetings with the CAC on a quarterly basis without Chambers Group or MIG. The next meeting is scheduled to take place on January 26, 2006 at 7:00 p.m. at the Hansen Yard.

BIG TUJUNGA WASH MITIGATION BANK
COMMUNITY ADVISORY COMMITTEE MEETING
October 27, 2005

	NAME	ADDRESS	PHONE/FAX	EMAIL	AFFILIATION
1	James Gatman	10511 Mahoney Dr	8183535974	Ajmsh@Juno.Com	SHPOA
2	Andrea "	"	"	"	
3	Barbara Tarnowski	10410 Las Lunitas ave Tujunga, CA 91042	(818) 352-8294	babsi_tarnowski_usa@yahoo.com	FoLAR
4	~~Andrea~~	~~10511 Mahoney Dr.~~	~~353-5974~~		
5	TERRY KAISER	10354 McBROOM ST	(818) 262-0315	HD CONCERNS @ COMCAST.NET	ETI
6	Carol Roper	9635 LaCanada Wy	3535534	Chrisbluedog@Juno.com	SHPOA
7	Chris Stone	900 S. Fremont Ave, Alhambra	(626) 458-6102	cstone@ladpw.org	Public Works
8	Michele Chimienti	900 S. Fremont Ave.	(626) 458-6111	mchimien@ladpw.org	LACDPW
9	Larry Freeberg	17671 Cowan Av. Irvine, CA	(949) 261-5414	LFreeberg@chambersgroupinc.com	Chambers
10	Shannan Shaffer	17671 Cowan Ave Ste100 Irvine 92614	949-261-5414	sshaffer@chambersgroupinc.com	Chambers
11	Belinda Kwan	900 Fremont Ave Alhambra	(626) 458-6035	bkwan@ladpw.org	
12					
13					
14					
15					
16					
17					

BigT

OCTOBER 27
2005

ACTION ITEMS

- KIOSKS
  - DAMAGED REMOVED
  - BUILDING NEW ONE
  - COMMENT: USE LEXAN UP AGAINST WOOD
  - ? NEED TO REPLACE ?
    - YES... LIABILITY/PEOPLE LOST
    - NO... GET LOST IN BACK AREA ... NO KIOSK THERE
    - $$ COSTLY VANDALISM MAGNET
  - METAL "ADVISORY" SIGN INSTEAD
  - CONCLUSION: SIGN W/ADVISORIES
  - Terry TRAILS ASSN WILL PROVIDE MORE + BILINGUAL
- TAMAYA PROP.
  - @ WATERLAND - Shadow terrace + 4 LOCATIONS
  - low priority - NEED TO GET ON TAX ASSESSOR
  - ? MAINTENANCE ? PLUS AGENDA COME BACK
  - IF WE CONTROL, CAN PATROL
- WEBSITE
  - WE USE / VERY GOOD
  - "LAID BACK" PATROL ONLY ON COTTONWOOD - WON'T MOVE
  - WILL ADDRESS W/HIS SUPERVISOR
  - WRITE UP FOR HOMEOWNERS NEWSLETTER + TRAILS, KOREAN CHURCH NEWSLETTERS
- OVERNIGHT CAMPERS
  - STILL ON SIDE OF HILL
  - Not dangerous but use soap, pollute
  - Dug into hill

- TRAIL SIGNAGE
  - can be washed out
  - Terry has volunteers available to make
  - If don't mark real trails, new ones can "pop up"
  - Can outline w/ rocks/branches
  - Conclusion: NO TRAIL SIGNS
  - HOW ABOUT A QUARTERLY DOCENT TOUR?
  - COUNTY WILL DISCUSS
- GRAFFITI
  - HAVE GRAFFITI ON EVERY ROCK
  - Lakeview terrace entrance
  - ROAD-ACCESSIBLE sand truck
  - HAVE OLD PVC TO PICK UP
- WATER QUALITY
  - FOUR SAMPLING - Dissolved O_2 DANGEROUSLY LOW
  - + DEAD CRAYFISH
  - less dragonflies, less mosquito larvae
  - ? ANY DATA FOR GOLF COURSE SEDIMENT MONITORING
  - REG. WATER CONTROL KEEPING A CLOSE EYE NOW - L.A. REGION
  - NEED PERMIT # - Avail online
- TRAIL MONITORING
  - holding up well
  - one near pond/riparian area needs clearing
  - ? BACK TRAIL NR FWY CLEARING
  - ACCESS DIFFICULT W/ RECENT WATER LEVEL - ON THE LIST
  - BLOCKAGE LEADS TO CIRCUITOUS ROUTE
  - BLOCKAGE WHERE TREE FELL - BIG ROOT
  - WILL DO ROOT REMOVAL/FILL
- ? PALM TREE ALONG WENTWORTH
  - REMOVAL COMPLEX + COSTLY
  - CUT TOP OFF ... IT DIES - $11,000
  - JUST CUT IT DOWN
  - PUBLIC WORKS WILL DISCUSS
- ? THISTLE - STILL NOT ADDRESSED
  - nr gate @ Mambell + IVY STILL THERE

- ? ARUNDO - BETTER TO FOLD/SPRAY? (new technique)
  - CONTACT OXNARD NATURE CONSERVANCY
- COTTONWOOD STAGING AREA
  - NEW TECH - GOOD AREA - LAGUNA TERR
  - CABRILLO PARK IS ALT IF IN SHADOW HILLS
  - ? GOLF COURSE HARDER TO USE
- COTTONWOOD BERM EROSION
  - SAW THE MOVIE ... GOING OUT
  - INFO/REFERRAL

STATUS

- EXOTIC PLANTS
  - ARUNDO BACK - TREATING
  - CASTOR BEAN - "
  - OK to leave plant/remove bean dead
- RIPARIAN HABITAT RESTORATION
  - SOIL COMPACTION AN ISSUE IN COTTONWOOD AREA
  - USE BACKHOE W/AUGER AT DIFFERENT ANGLES
  - LAYING OUT PLANTING AREA
- GETTING SANTA ANA SUCKER ESTABLISHED - PLENTIFUL - Haines Can Creek
  - BUT BIG BASS STOCKING STILL GOING ON
  - LARGE CRAWDADS
  - ? POND MAINT BY DR HOLLAND/CAN
  - GOING BACK IN NEXT MO
- HORNY TOAD COUNT?
  - NONE SEEN at BIG T EVASIVE - WESTERN TOADS, LIZARDS DOING WELL
  - ? POLLIWOGS?
  - PACIFIC TREE FROG + WESTERN TOAD IN PUDDLES

- BROWN HEADED COWBIRDS
  - HIGHEST TRAPPING EVER
  - MOST WERE OFFSITE
  - BUT NO LEAST BELL'S VIREO/FLYCATCHER
  - COWBIRD POPS DISPERSED - VIREOS HANG OUT WHERE THEY ARE
- ARROYO TOAD
  - 2004 TOO DRY
  - 2005 O.K. BUT HAVEN'T HAD CONSISTENT HABITAT

OTHER

- GET RID OF CEMENT ON BIG T PROPERTY
- TRAIL SPONSORSHIP PROGRAM "Adopt a Trail"
  - Public Works will consider
  - need guidelines, volunteer agreement

NEXT

- COUNTY WILL CONTINUE MTGS
  - TO QUARTERLY
  - JANUARY 26, 2006

MIG

APPENDIX J

WATER QUALITY MONITORING REPORTS

County of Los Angeles
Department of Public Works

Water Quality Monitoring Report
1st Quarter 2005

for the

Master Mitigation Plan
for the Big Tujunga Wash Mitigation Bank

May 2005

MWH

Water Quality Monitoring Report
1st Quarter 2005

for

Master Mitigation Plan
for the Big Tujunga Wash Mitigation Bank

May 2005

Prepared For:

Chambers Group, Inc.
17671 Cowan Avenue, Suite 100
Irvine, California 92614

Prepared By:

MWH
301 North Lake Avenue, Suite 600
Pasadena, California 91101

Table of Contents

Section Name **Page Number**

Appendix A Big Tujunga Wash Mitigation Bank Water Quality Monitoring Program Laboratory Results

LIST OF FIGURES

Figure Number **Page**

LIST OF TABLES

Table Number **Page**

Distribution

Quarterly and annual water quality monitoring reports are distributed to the following agencies:

Los Angeles County Department of Public Works
Ms. Belinda Kwan
Water Resources Division, Dams Section
900 South Fremont Avenue
Alhambra, California 91803-1331

California Department of Fish and Game
Ms. Mary Meyer
402 West Ojai Avenue, Suite 101, PMB 501
Ojai, California 93023

Mr. Scott Harris
1508 N. Harding Ave.
Pasadena, California 91104

Regional Water Quality Control Board, Los Angeles Region (4)
Ms. Valerie Carrillo
320 West 4th Street, Suite 200
Los Angeles, California 90013

U.S. Fish and Wildlife Service
Mr. Jesse Bennett
6010 Hidden Valley Road
Carlsbad, California 92009

U.S. Army Corps of Engineers
Mr. Aaron Allen
P.O. Box 532711
Los Angeles, California 90053-2325

Interested Party
Mr. William Eick
2604 Foothill Boulevard, Suite C
La Crescenta, California 91214

Water Quality Monitoring
1st Quarter 2005

BACKGROUND

County of Los Angeles Department of Public Works (LADPW) purchased a 207-acre parcel in Big Tujunga Wash as a mitigation bank for County flood control projects throughout Los Angeles. In coordination with local agencies, the County defined a number of measures to improve habitat quality at the site. A Master Mitigation Plan (MMP) was prepared to guide the implementation of these enhancements. The MMP also includes a 5-year monitoring program to gather data on conditions at the site during implementation of the improvements. The MMP was prepared and is being implemented by Chambers Group, Inc. MWH, a subconsultant to Chambers Group, is responsible for the water quality monitoring program described in the MMP. This is the eighteenth quarterly report on water quality. The 5-year program began in the fourth quarter of 2000.

The project site is located just east of Hansen Dam in the Shadow Hills area of the City of Los Angeles. Both Big Tujunga Wash, an intermittent stream, and Haines Canyon Creek, a perennial stream, traverse the project site in an east-to-west direction. The two Tujunga ponds are located at the far eastern portion of the site.

Project Site Activities

A timeline of project-related activities that could influence water quality is presented in **Table 1**. This table will be updated and expanded as the monitoring program progresses.

Table 1
Major Activities to Date at the Big Tujunga Wash Mitigation Bank

Month/Year	Activity
4/00	Baseline water quality sampling
11/00 to 11/01	Arundo, tamarisk, and pepper tree removal Chemical (Rodeo®) application
12/00 to 11/02	Water hyacinth removal
12/00	Fish Sampling at Haines Canyon Creek
12/14/00	Water quality sampling
1/01 to present	Exotic aquatic wildlife (non-native fish, crayfish, bullfrog, and turtle) removal – conducted quarterly
2/01	Partial riparian planting
3/01	Selective clearing at Canyon Trails Golf Club
3/12/01	Water quality sampling
6/19/01	Water quality sampling
7/01	Fish Sampling at Haines Canyon Creek
9/11/01	Water quality sampling
10/01 to 11/01	Fish Sampling at Haines Canyon Creek

Table 1 (Continued)
Major Activities to Date at the Big Tujunga Wash Mitigation Bank

Month/Year	Activity
12/12/01	Water quality sampling
1/02	Final riparian planting
2/02	Upland replacement planting
3/26/02	Water quality sampling
6/25/02	Water quality sampling
7/02	Fish Sampling at Haines Canyon Creek
9/12/02	Water quality sampling
10/02	Grading at Canyon Trails Golf Club begins
11/02	Fish Sampling at Haines Canyon Creek
12/19/02	Water quality sampling
3/20/03	Water quality sampling
4/1/03	Meeting with Canyon Trails Golf Club to discuss future use of herbicides and fertilizers
6/23/03	Water quality sampling
8/03	Fish Sampling at Haines Canyon Creek
9/30/03	Water quality sampling
Fall 2003	Completion of the golf course construction
12/17/03	Water quality sampling
1/04	Fish Sampling at Haines Canyon Creek
4/2/04	Water quality sampling
4/3/04	Rock Dam Removal Day
6/04	Angeles National Golf Club (previously named Canyon Trails) opens to the public
7/2/04	Water quality sampling
10/5/04	Water quality sampling
12/9/04	Water quality sampling
4/7/05	Water quality sampling

Water Quality Monitoring Program

In order to establish water quality upstream and downstream of the site, quarterly sampling and analysis will be performed for 5 years, for a total of 20 individual sampling days. The monitoring program has been designed to specifically address inputs to the site from upstream land uses such as the Angeles National Golf Club (previously named Canyon Trails Golf Club). Potential impacts to aquatic species from run-on to the site that contains excessive nutrients or pesticides are of primary concern.

The golf course has been operating since June 2004. Additional construction at the club house building is in progress and is scheduled for completion in spring of 2006 (J. Reidinger, Angeles National Golf Club, pers. comm. to A. Kawaguchi, MWH, December 2, 2004).

In March 2004, the golf course maintenance staff indicated that the following chemicals may be used on an as needed basis: Primo™ (a grass growth inhibitor used for turf management; active ingredient – trinexapac-ethyl) and Rodeo® (an herbicide used to control aquatic weeds; active ingredient – glyphosate) (J. Reidinger, pers. comm. to M. Chimienti, LADPW, March 18, 2004). Based on this information, glyphosate was added to the list of sampling parameters starting in the first quarter of 2004.

In December 2004 and February 2005, the Golf Club provided MWH with the golf course's monthly pesticide use reports. The reports indicate that 10 types of chemical products (seven herbicides, one insecticide, one fungicide, and one grass growth inhibitor) were applied as summarized in **Table 2**.

In December 2004, the Golf Club also provided MWH with the golf course's water quality monitoring reports to date. The results were summarized and presented in the 2004 Annual Report for the Big Tujunga Wash Mitigation Bank Water Quality Monitoring Program (distributed in February 2005).

Table 2
Pesticide Applications at the Angeles National Golf Course
(June – November 2004)

Active Ingredient	Manufacturer and Product Name	Applications
Chlorpyrifos	Dow AgroSciences Dursban Pro (insecticide)	One application (145,000 sq. ft.) in August
Diquat dibromide	Syngenta Reward (herbicide)	Two applications (43,000 sq. ft. and not recorded) in August, one application (87,000 sq. ft.) in September, and one application in November
Flutolanil	Bayer Prostar 70 WP (fungicide)	One application (120,000 sq. ft.) in July and one application (140,000 sq. ft.) in August
Glyphosate	Lesco Prosecutor (herbicide)	Three applications (one 86,000 sq. ft. and two not recorded) in August
Glyphosate and Diquat dibromide	Monsanto QuickPRO (herbicide)	Three applications (20,000 to 30,000 sq. ft.) in June and one application (20,000 sq. ft.) in July
Imazapyr	BASF Stalker (herbicide)	Two applications in November
Oryzalin	Dow AgroSciences Surflan (herbicide)	One application (87,000 sq. ft.) in September
Pelargonic acid	Mycogen Scythe (herbicide)	One application (86,000 sq. ft.) in August
Prodiamine	Syngenta Barricade (herbicide)	Three applications (two 86,000 sq. ft. and one not recorded) in August
Trinexapac-ethyl	Syngenta Primo Maxx (grass growth inhibitor)	One application (120,000 sq. ft.) in June, three applications (76,000 to 120,000 sq. ft.) in July, two applications (140,000 and 156,000 sq. ft.) in August, and two applications (60,000 and 128,000 sq. ft.) in September

Source: Angeles National Golf Course Monthly Summary Pesticide Use Reports for June through November 2004.
sq. ft. – square feet

MATERIALS AND METHODS

Sampling Stations

Four sampling locations have been identified for the 5-year monitoring program for the Big Tujunga Wash Mitigation Bank (**Figure 1**). **Table 3** summarizes sampling locations and the conditions observed on April 7, 2005. The coordinates of the sampling stations were determined by a hand-held Global Positioning System.

Sampling Parameters

Water Quality. Table 4 summarizes the sampling parameters included in the water quality monitoring program. The following meters were used in the field:

- Dissolved oxygen and temperature – HACH SensION 6 DO meter
- Total residual chlorine – HACH DR 700
- pH – Orion 230A with HACH 51935 electrode

All other analyses were performed in duplicate at MWH Laboratories, Monrovia, California. Samples were taken at mid-depth, along a transect perpendicular to the stream channel alignment. Quality assurance/quality control (QA/QC) procedures in the laboratory followed the methods described in the MWH Laboratories *Quality Assurance Manual.*

Table 3
Water Quality Sampling Locations and Conditions for the 1st Quarter 2005

Date	April 7, 2005		
Air Temperature	Approximately 70 degrees Fahrenheit		
Skies	Sunny		
Water Volume	High flows in Haines Canyon Creek – Two additional streams had been created due to heavy rains, and much of the surrounding vegetation had been washed out.		
Sampling Locations	**Latitude**	**Longitude**	**Time of sample**
Haines Canyon Creek, just before exit from site	N 34° 16' 2.9"	W 118° 21' 22.2"	10:15 a.m.
Haines Canyon Creek, inflow to Tujunga Ponds	N 34° 16' 6.9"	W 118° 20' 18.7"	12:40 p.m.
Haines Canyon Creek, outflow from Tujunga Ponds	N 34° 16' 7.1"	W 118° 20' 28.3"	1:25 p.m.
Big Tujunga Wash	N 34° 16' 11.7"	W 118° 21' 4.0"	11:35 a.m.

Figure 1
Water Quality Sampling Stations

This page to be replaced with Figure 1

Table 4
Water Quality Sampling Parameters

Parameter	Analysis Location	Analytical Method
total Kjeldahl nitrogen (TKN)	laboratory	EPA 351.2
nitrite (NO_2)	laboratory	EPA 300.0 by IC
nitrate (NO_3)	laboratory	EPA 300.0 by IC
ammonia (NH_4)	laboratory	EPA 350.1
orthophosphate - P	laboratory	Standard Methods 4500P-E
total coliform	laboratory	Standard Methods 9221B
fecal coliform	laboratory	Standard Methods 9221C
total organic halogens (organochlorides)	not sampled this date	--
total phosphorus - P	laboratory	Standard Methods 4500PE/EPA 365.1
organophosphate (total P minus ortho-P)	calculation	--
turbidity	laboratory	EPA 180.1
glyphosate (Roundup/Rodeo)[1]	laboratory	EPA 547
chlorpyrifos[2]	laboratory	EPA 625
1 golf course fungicide	not sampled this date	--
dissolved oxygen	field	Standard Methods 4500-O G
total residual chlorine	field	Standard Methods 4500-Cl D
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.
Notes:
1 First analysis completed in the first quarter of 2004
2 First analysis completed in the fourth quarter of 2004. This analytical method (diazinon/chlorpyrifos by GCMS, EPA 625) tests for the following chemicals: diazinon, sulprofos, chlorpyrifos, demeton, dichlorvos, disulfoton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malathion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate.

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 (a small plastic ball) 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 ft)
C = A coefficient or correction factor (0.8 for rocky-bottom streams or 0.9 for muddy-bottom

streams). This allows you to correct for the fact that water at the surface travels faster than near the stream bottom due to resistance from gravel, cobble, etc. Multiplying the surface velocity by a correction coefficient decreases the value and gives a better measure of the stream's overall velocity.

T = Time, in seconds, for the float to travel the length of L

RESULTS

Baseline Water Quality

Sampling and analysis conducted by LADPW prior to implementation of the MMP is considered the baseline for water quality conditions at the site. The results of analyses conducted in April 2000 are presented in **Table 5**. Higher bacteria and turbidity observed in the 4/18/00 samples are attributable to a rain event. Phosphorus levels were also high in the 4/18/00 samples, perhaps due to release from sediments.

First Quarter 2005 Results

Water Quality

Results of analyses conducted by MWH Laboratories are appended to this report (**Appendix A**) and summarized in **Table 6**. Note that the yields (percent recoveries) of QC samples were at or within acceptable limits (percentages) for all samples.

Table 5
Bank 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
1st Quarter 2005 (4/7/05)

Parameter	Units	Inflow to Tujunga Ponds 1	Inflow to Tujunga Ponds 2 (duplicate)	Outflow from Tujunga Ponds 1	Outflow from Tujunga Ponds 2 (duplicate)	Big Tujunga Wash 1	Big Tujunga Wash 2 (duplicate)	Haines Cyn Creek exiting site 1	Haines Cyn Creek exiting site 2 (duplicate)
Temperature	°C	19.0	--	17.8	--	17.0	--	15.3	--
Dissolved Oxygen	mg/L	7.4	--	7.7	--	11.5	--	11.4	--
pH	std units	7.2	--	7.3	--	9.0	--	9.0	--
Total residual chlorine	mg/L	ND	--	ND	--	ND	--	ND	--
Ammonia-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Kjeldahl Nitrogen	mg/L	0.44	0.31	4.10(2)	0.30	0.23	0.24	0.21	0.54
Nitrite-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-Nitrogen	mg/L	5.4	5.4	3.2	3.6	ND	ND	ND	ND
Orthophosphate-P	mg/L	0.022	0.021	0.025	0.026	0.11	0.12	ND	ND
Total phosphorus-P	mg/L	0.021	0.024	0.022	0.022	0.010(3)	ND(3)	ND	0.012
Glyphosate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Chloropyrifos(1)	ng/L	ND	ND	ND	ND	ND	ND	ND	ND
Turbidity	NTU	0.50	0.70	0.60	0.50	1.6	1.3	1.4	1.3
Fecal Coliform Bacteria	MPN/100ml	2	2	8	13	2	2	8	4
Total Coliform Bacteria	MPN/100ml	500	220	500	700	170	21	500	21

-- No duplicate samples are taken for field measurements.

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

(1) The analytical method used for chloropyrifos (diazinon/chlorpyrifos by GCMS, EPA 625) also tests for the following chemicals: diazinon, sulprofos, demeton, dichlorvos, disulfoton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malathion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate. Samples for this quarter were all non-detect for these EPA 625 parameters.

(2) Possible sample/lab analysis error.

(3) Underreporting of total phosphorus reflects difference in methodologies used for analyses of orthophosphate and total phosphorus.

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 the first quarter of 2005 are summarized in **Table 7**.

Table 7
Estimated Flows for 1st Quarter 2005

Sampling Date	Flow (cubic feet per second)		
	Outlet of Big Tujunga Ponds	**Haines Canyon Creek leaving the site***	**Big Tujunga Wash**
4/7/2005	14.8	94.9	151.2

* Flow at Haines Canyon Creek was measured at the original site. Additional channels with flow (not measured) were also present.

Comparison of Results with Baseline Data

Water quality in April 2005 was similar to baseline conditions for some parameters. Substantially higher bacteria and turbidity were observed in the 4/18/00 samples. Phosphorus levels were also higher in the April 2000 samples than in April 2005, perhaps due to release from sediments. Observed values for pH in Big Tujunga Wash and Haines Canyon Creek leaving the site were higher in April 2004 than April 2000.

Comparison of Results with Aquatic Life Criteria

Tables 7 and **11** present objectives established by the Los Angeles Regional Water Quality Control Board (Regional Board) for protection of beneficial uses in Big Tujunga Wash including wildlife habitat. EPA's criteria for freshwater aquatic life are also presented in **Tables 7, 8, 9, 10** and **12.**

Table 8
National and Local Recommended Water Quality Criteria - Freshwaters

Parameter	Basin Plan Objectives[a]	EPA Criteria		
		CMC	CCC	Human Health
Temperature (°C)	b	See Table 11	See Table 11	--
Dissolved oxygen (mg/L)	>7.0 mean >5.0 min	5.0[c] (warmwater, early life stages, 1-day minimum)	6.0[c] (warmwater, early life stages, 7-day mean)	--
pH	6.5 - 8.5	--	6.5-9.0[d,e]	5.0-9.0[d,e]
Total residual chlorine (mg/L)	0.1	0.019[d,e]	0.011[d,e]	4.0 (maximum residual disinfectant level goal)
Fecal coliform (MPN/100 ml)	200[f] (water contact recreation)	--	--	Swimming stds: 33[g] (geometric mean for enterococci) 126[g] (geometric mean for *E. coli*)
Ammonia-nitrogen (mg/L)	See Table 12	See Tables 9, 10, and 11	See Tables 9, 10, and 11	--
Nitrite-nitrogen (mg/L)	1	--	--	1 (primary drinking water std.)
Nitrate-nitrogen (mg/L)	10	--	--	10 (primary drinking water std.)
Total phosphorus (mg/L)	--	<0.05 – 0.1[e] (recommendation for streams, no criterion)		--
Turbidity (NTU)	h	i	i	5 (secondary drinking water standard) 0.5 – 1.0 (std. for systems that filter)

Notes:

-- No criterion

CMC Criteria Maximum Concentration or acute criterion

CCC Criteria Continuous Concentration or chronic criterion

a Source: California Regional Water Quality Control Board, Los Angeles Region. 1994. Water Quality Control Plan (Basin Plan).

b Narrative criterion: "The natural receiving water temperature of all regional waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses."

c Source: USEPA. 1986. Ambient Water Quality Criteria for Dissolved Oxygen. EPA 440-5-86-003. Washington, D.C.

d Source: USEPA. 1999. National Recommended Water Quality Criteria – Correction. EPA 822-Z-99-001. Washington, D.C.

e Source: USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

f Standard based on a minimum of not less than four samples for any 30-day period, 10% of total samples during any 30-day period shall not exceed 400/100ml.

g Source: USEPA. 1986. Ambient Water Quality Criteria for Bacteria – 1986. EPA 440-5-84-002. Washington, D.C.

h Narrative criterion: "Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses."

i Narrative criterion for freshwater fish and other aquatic life: "Settleable and suspended solids should not reduce the depth of the compensation point for photosynthetic activity by more than 10 percent from the seasonally established norm for aquatic life."

Table 9
Numeric Values of the Criterion Maximum Concentration (CMC) with Salmonids Present and Absent and the Criterion Continuous Concentration (CCC) for Ammonia Nitrogen (mg/L)

pH	CMC with Salmonids Present	CMC with Salmonids Absent	CCC
6.5	32.6	48.8	3.48
6.6	31.3	46.8	3.42
6.7	29.8	44.6	3.36
6.8	28.1	42.0	3.28
6.9	26.2	39.1	3.19
7.0	24.1	36.1	3.08
7.1	22.0	32.8	2.96
7.2	19.7	29.5	2.81
7.3	17.5	26.2	2.65
7.4	15.4	23.0	2.47
7.5	13.3	19.9	2.28
7.6	11.4	17.0	2.07
7.7	9.65	14.4	1.87
7.8	8.11	12.1	1.66
7.9	6.77	10.1	1.46
8.0	5.62	8.4	1.27
8.1	4.64	6.95	1.09
8.2	3.83	5.72	0.935
8.3	3.15	4.71	0.795
8.4	2.59	3.88	0.673
8.5	2.14	3.2	0.568
8.6	1.77	2.65	0.480
8.7	1.47	2.2	0.406
8.8	1.23	1.84	0.345
8.9	1.04	1.56	0.295
9.0	0.885	1.32	0.254

Source: USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 10
Temperature and pH-Dependent Values of the Ammonia-Nitrogen CCC (Chronic Criterion) for Fish Early Life Stages Absent

CCC for Fish Early Life Stages Absent, mg N/L										
	Temperature (°Celsius)									
pH	0-7	8	9	10	11	12	13	14	15*	16*
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	5.72
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	5.37
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49	5.15
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	4.90
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	4.61
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	4.30
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	3.97
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	3.61
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	3.25
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	2.54
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	2.21
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	1.91
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74	1.63
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	0.990
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892	0.836
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754	0.707
8.8	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684	0.641	0.601
8.9	0.917	0.860	0.806	0.756	0.709	0.664	0.623	0.584	0.548	0.513
9.0	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471	0.442

* At 15° C and above, the criterion for fish ELS absent is the same as the criterion for fish ELS present.

Source: USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 11
Temperature and pH-Dependent Values of the Ammonia-Nitrogen CCC (Chronic Criterion) for Fish Early Life Stages Present

CCC for Fish Early Life Stages Present, mg N/L										
pH	Temperature (° Celsius)									
	0	14	16	18	20	22	24	26	28	30
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

Source: USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 12
Maximum One-Hour Average Concentration for Total Ammonia (mg/L NH_3)

pH	Temperature (°Celsius)						
	0	5	10	15	20	25	30
6.50	35	33	31	30	29	20	14.3
6.75	32	30	28	27	27	18.6	13.2
7.00	28	26	25	24	23	16.4	11.6
7.25	23	22	20	19.7	19.2	13.4	9.5
7.50	17.4	16.3	15.5	14.9	14.6	10.2	7.3
7.75	12.2	11.4	10.9	10.5	10.3	7.2	5.2
8.00	8.0	7.5	7.1	6.9	6.8	4.8	3.5
8.25	4.5	4.2	4.1	4.0	3.9	2.8	2.1
8.50	2.6	2.4	2.3	2.3	2.3	1.71	1.28
8.75	1.47	1.40	1.37	1.38	1.42	1.07	0.83
9.00	0.86	0.83	0.83	0.86	0.91	0.72	0.58

Source: California Regional Water Quality Control Board, Los Angeles Region. 1994. Water Quality Control Plan (Basin Plan). Taken from USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

Table 13
Example Calculated Values for Maximum Weekly Average Temperature for Growth and Short-Term Maxima for Survival of Juvenile and Adult Fishes During the Summer

Species	Growth (°Celsius)	Maxima (°Celsius)
Black crappie	27	--
Bluegill	32	35
Channel catfish	32	35
Emerald shiner	30	--
Largemouth bass	32	34
Brook trout	19	24

Source: USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

DISCUSSION

Results from the first quarter of the 2005 sampling program are described by parameter in **Table 14**.

Table 14
Discussion of 1st Quarter 2005 Big Tujunga Wash Sampling Results

Parameter	Discussion
Temperature	• Observed temperatures were below levels of concern for growth and survival of warmwater fish species. Temperatures in April 2005 were generally similar to the previous first quarter sampling periods (late-March to early April of 2001, 2002, 2003 and 2004).
Dissolved oxygen	• Dissolved oxygen levels at all stations were above the recommended minimum for warmwater species of 5.0 mg/L. • The oxygen levels in the inflow to and outflow from Tujunga Ponds in April 2005 were approximately 2 mg/L lower than in the first quarter sampling periods for 2002, 2003 and 2004, but approximately 2.5 mg/L higher than in the first quarter of 2001. • The oxygen levels in Haines Canyon Creek in April 2005 were generally higher (1.6 to 2.7 mg/L) than in the first quarters of previous sampling years.
pH	• The pH of water from the Tujunga Ponds was within the 6.5 to 8.5 range identified in the Basin Plan. The pH values observed in Big Tujunga Wash and Haines Canyon Creek (9.0 for both sites) were above the Basin Plan's upper limit.
Total residual chlorine	• No residual chlorine was detected at any station.
Nitrogen	• Nitrate-nitrogen at all stations was below the drinking water standard of 10 mg/L. • Ammonia was not detected at any station.
Phosphorus	• Total phosphorus and orthophosphate were present in very low levels in the Tujunga Ponds and in Haines Canyon Creek. Total phosphorus levels at these sites were within EPA's recommended range for streams to prevent excess algae growth (<0.05 – 0.1 mg/L). • Orthophosphate in Big Tujunga Wash was at the high end of EPA's recommended range.
Glyphosate	• No glyphosate was detected at any station.
Chloropyrifos	• Chloropyrifos was added to the list of sampling parameters in the fourth quarter of 2004. Chloropyrifos and the other pesticides tested using EPA's analytical method 625 were not detected at any station in the first quarter of 2005.
Turbidity	• Turbidity was low (<2.0 NTU) at all stations. Turbidity levels in Big Tujunga Wash and Haines Canyon Creek were higher than in the Tujunga Ponds, reflecting the higher flows present at these stations.
Bacteria	• Fecal coliform levels at all stations were below the water contact recreation standard of 200 MPN. • In general, fecal coliform and total coliform levels were similar to or lower than levels observed in the previous first quarter sampling periods.

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.

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.

Kjeldahl Nitrogen – Named for the laboratory technique used for detection, Kjeldahl nitrogen includes organic nitrogen and ammonia nitrogen.

Nitrate-Nitrogen – $NO3^-$-N is an essential nutrient for many photosynthetic autotrophs.

Nitrite-Nitrogen – $NO2^-$-N is an intermediate oxidation state of nitrogen, both in the oxidation of ammonia to nitrate and in the reduction of nitrate.

Orthophosphorus – the reactive form of phosphorus, commonly used as fertilizer.

pH – the hydrogen ion activity of water (pH) is measured on a logarithmic scale, ranging from 0 to 14. The pH of "pure" water at 25°C is 7.0 (neutral). Low pH is acidic; high pH is basic or alkaline.

Total Phosphorus – In natural waters, phosphorus occurs almost solely as orthophosphates, condensed phosphates, and organically bound phosphate. Phosphorus is essential to the growth of organisms.

Turbidity – attributable to the suspended and colloidal matter in water, including clay, silt, finely divided organic and inorganic matter, soluble colored organic compounds, and plankton and other microscopic organisms. The reduction of clearness in turbid waters diminishes the penetration of light and therefore can adversely affect photosynthesis.

APPENDIX A

BIG TUJUNGA WASH MITIGATION BANK
WATER QUALITY MONITORING PROGRAM

LABORATORY RESULTS

County of Los Angeles
Department of Public Works

Water Quality Monitoring Report
2nd Quarter 2005

for the

Master Mitigation Plan
for the Big Tujunga Wash Mitigation Bank

August 2005

MWH

Water Quality Monitoring Report
2nd Quarter 2005

for

Master Mitigation Plan
for the Big Tujunga Wash Mitigation Bank

August 2005

Prepared For:

Chambers Group, Inc.
17671 Cowan Avenue, Suite 100
Irvine, California 92614

Prepared By:

MWH
301 North Lake Avenue, Suite 600
Pasadena, California 91101

Table of Contents

Section Name **Page Number**

LIST OF FIGURES

Figure Number **Page**

LIST OF TABLES

Table Number **Page**

Distribution

Quarterly and annual water quality monitoring reports are distributed to the following agencies:

Los Angeles County Department of Public Works
Ms. Belinda Kwan
Water Resources Division, Dams Section
900 South Fremont Avenue
Alhambra, California 91803-1331

California Department of Fish and Game
Ms. Mary Meyer
402 West Ojai Avenue, Suite 101, PMB 501
Ojai, California 93023

Mr. Scott Harris
1508 N. Harding Ave.
Pasadena, California 91104

Regional Water Quality Control Board, Los Angeles Region (4)
Ms. Valerie Carrillo
320 West 4th Street, Suite 200
Los Angeles, California 90013

U.S. Fish and Wildlife Service
Mr. Jesse Bennett
6010 Hidden Valley Road
Carlsbad, California 92009

U.S. Army Corps of Engineers
Mr. Aaron Allen
P.O. Box 532711
Los Angeles, California 90053-2325

Interested Party
Mr. William Eick
2604 Foothill Boulevard, Suite C
La Crescenta, California 91214

Water Quality Monitoring
2nd Quarter 2005

BACKGROUND

The County of Los Angeles Department of Public Works (LADPW) purchased a 207-acre parcel in Big Tujunga Wash as a mitigation bank for County flood control projects throughout Los Angeles. In coordination with local agencies, the County defined a number of measures to improve habitat quality at the site. A Master Mitigation Plan (MMP) was prepared to guide the implementation of these enhancements. The MMP also includes a 5-year monitoring program to gather data on conditions at the site during implementation of the improvements. The MMP was prepared and is being implemented by Chambers Group, Inc. MWH, a subconsultant to Chambers Group, is responsible for the water quality monitoring program described in the MMP. This is the nineteenth quarterly report on water quality. The 5-year program began in the fourth quarter of 2000.

The project site is located just east of Hansen Dam in the Shadow Hills area of the City of Los Angeles. Both Big Tujunga Wash, an intermittent stream, and Haines Canyon Creek, a perennial stream, traverse the project site in an east-to-west direction. The two Tujunga ponds are located at the far eastern portion of the site.

Project Site Activities

A timeline of project-related activities that could influence water quality is presented in **Table 1**.

Table 1
Major Activities to Date at the Big Tujunga Wash Mitigation Bank

Month/Year	Activity
4/00	Baseline water quality sampling
11/00 to 11/01	Arundo, tamarisk, and pepper tree removal Chemical (Rodeo®) application
12/00 to 11/02	Water hyacinth removal
12/00	Fish Sampling at Haines Canyon Creek
12/14/00	Water quality sampling
1/01 to present	Exotic aquatic wildlife (non-native fish, crayfish, bullfrog, and turtle) removal – conducted quarterly
2/01	Partial riparian planting
3/01	Selective clearing at Canyon Trails Golf Club
3/12/01	Water quality sampling
6/19/01	Water quality sampling
7/01	Fish Sampling at Haines Canyon Creek
9/11/01	Water quality sampling
10/01 to 11/01	Fish Sampling at Haines Canyon Creek

Table 1 (Continued)
Major Activities to Date at the Big Tujunga Wash Mitigation Bank

Month/Year	Activity
12/12/01	Water quality sampling
1/02	Final riparian planting
2/02	Upland replacement planting
3/26/02	Water quality sampling
6/25/02	Water quality sampling
7/02	Fish Sampling at Haines Canyon Creek
9/12/02	Water quality sampling
10/02	Grading at Canyon Trails Golf Club begins
11/02	Fish Sampling at Haines Canyon Creek
12/19/02	Water quality sampling
3/20/03	Water quality sampling
4/1/03	Meeting with Canyon Trails Golf Club to discuss future use of herbicides and fertilizers
6/23/03	Water quality sampling
8/03	Fish Sampling at Haines Canyon Creek
9/30/03	Water quality sampling
Fall 2003	Completion of the golf course construction
12/17/03	Water quality sampling
1/04	Fish Sampling at Haines Canyon Creek
4/2/04	Water quality sampling
4/3/04	Rock Dam Removal Day
6/04	Angeles National Golf Club (previously named Canyon Trails) opens to the public
7/2/04	Water quality sampling
10/5/04	Water quality sampling
12/9/04	Water quality sampling
4/7/05	Water quality sampling
6/30/05	Water quality sampling

Water Quality Monitoring Program

In order to establish water quality upstream and downstream of the site, quarterly sampling and analysis will be performed for 5 years, for a total of 20 individual sampling days. The monitoring program has been designed to specifically address inputs to the site from upstream land uses such as the Angeles National Golf Club (previously named Canyon Trails Golf Club). Potential impacts to aquatic species from run-on to the site that contains excessive nutrients or pesticides are of primary concern.

The golf course has been operating since June 2004. Additional construction at the club house building is in progress and is scheduled for completion in spring of 2006 (J. Reidinger, Angeles National Golf Club, pers. comm. to A. Kawaguchi, MWH, December 2, 2004).

In March 2004, the golf course maintenance staff indicated that the following chemicals may be used on an as needed basis: Primo™ (a grass growth inhibitor used for turf management; active ingredient – trinexapac-ethyl) and Rodeo® (an herbicide used to control aquatic weeds; active ingredient – glyphosate) (J. Reidinger, pers. comm. to M. Chimienti, LADPW, March 18, 2004). Based on this information, glyphosate was added to the list of sampling parameters starting in the first quarter of 2004.

In December 2004 and February 2005, the Golf Club provided MWH with the golf course's monthly pesticide use reports. The reports indicate that 10 types of chemical products (seven herbicides, one insecticide, one fungicide, and one grass growth inhibitor) were applied as summarized in **Table 2**. No further data were provided as a result of a telephone request made in August 2005.

In December 2004, the Golf Club also provided MWH with the golf course's water quality monitoring reports to date. The results were summarized and presented in the 2004 Annual Report for the Big Tujunga Wash Mitigation Bank Water Quality Monitoring Program (distributed in February 2005).

Table 2
Pesticide Applications at the Angeles National Golf Course
(June – November 2004)

Active Ingredient	Manufacturer and Product Name	Applications
Chlorpyrifos	Dow AgroSciences Dursban Pro (insecticide)	One application (145,000 sq. ft.) in August
Diquat dibromide	Syngenta Reward (herbicide)	Two applications (43,000 sq. ft. and not recorded) in August, one application (87,000 sq. ft.) in September, and one application in November
Flutolanil	Bayer Prostar 70 WP (fungicide)	One application (120,000 sq. ft.) in July and one application (140,000 sq. ft.) in August
Glyphosate	Lesco Prosecutor (herbicide)	Three applications (one 86,000 sq. ft. and two not recorded) in August
Glyphosate and Diquat dibromide	Monsanto QuickPRO (herbicide)	Three applications (20,000 to 30,000 sq. ft.) in June and one application (20,000 sq. ft.) in July
Imazapyr	BASF Stalker (herbicide)	Two applications in November
Oryzalin	Dow AgroSciences Surflan (herbicide)	One application (87,000 sq. ft.) in September
Pelargonic acid	Mycogen Scythe (herbicide)	One application (86,000 sq. ft.) in August
Prodiamine	Syngenta Barricade (herbicide)	Three applications (two 86,000 sq. ft. and one not recorded) in August
Trinexapac-ethyl	Syngenta Primo Maxx (grass growth inhibitor)	One application (120,000 sq. ft.) in June, three applications (76,000 to 120,000 sq. ft.) in July, two applications (140,000 and 156,000 sq. ft.) in August, and two applications (60,000 and 128,000 sq. ft.) in September

Source: Angeles National Golf Course Monthly Summary Pesticide Use Reports for June through November 2004.
sq. ft. – square feet

MATERIALS AND METHODS

Sampling Stations

Four sampling locations have been identified for the 5-year monitoring program for the Big Tujunga Wash Mitigation Bank (**Figure 1**). **Table 3** summarizes sampling locations and the conditions observed on June 30, 2005. The coordinates of the sampling stations were determined by a hand-held Global Positioning System.

Sampling Parameters

Water Quality. Table 4 summarizes the sampling parameters included in the water quality monitoring program. The following meters were used in the field:

- Dissolved oxygen and temperature – HACH SensION 6 DO meter
- Total residual chlorine – HACH DR 700
- pH – Orion 230A with HACH 51935 electrode

All other analyses were performed in duplicate at MWH Laboratories, Monrovia, California. Samples were taken at mid-depth, along a transect perpendicular to the stream channel alignment. Quality assurance/quality control (QA/QC) procedures in the laboratory followed the methods described in the MWH Laboratories *Quality Assurance Manual.*

Table 3
Water Quality Sampling Locations and Conditions for the 2nd Quarter 2005

Date	June 30, 2005		
Air Temperature	Approximately 75 degrees Fahrenheit		
Skies	Sunny / hazy		
Observations	Dense algae in inflow to Tujunga Ponds		
Sampling Locations	**Latitude**	**Longitude**	**Time of sample**
Haines Canyon Creek, just before exit from site	N 34° 16' 2.9"	W 118° 21' 22.2"	10:00
Haines Canyon Creek, inflow to Tujunga Ponds	N 34° 16' 6.9"	W 118° 20' 18.7"	12:30
Haines Canyon Creek, outflow from Tujunga Ponds	N 34° 16' 7.1"	W 118° 20' 28.3"	11:00
Big Tujunga Wash	N 34° 16' 11.7"	W 118° 21' 4.0"	13:30

Figure 1
Water Quality Sampling Stations

This page to be replaced with Figure 1

Table 4
Water Quality Sampling Parameters

Parameter	Analysis Location	Analytical Method
total Kjeldahl nitrogen (TKN)	laboratory	EPA 351.2
nitrite (NO_2)	laboratory	EPA 300.0 by IC
nitrate (NO_3)	laboratory	EPA 300.0 by IC
ammonia (NH_4)	laboratory	EPA 350.1
orthophosphate - P	laboratory	Standard Methods 4500P-E
total coliform	laboratory	Standard Methods 9221B
fecal coliform	laboratory	Standard Methods 9221C
total organic halogens (organochlorides)	not sampled this date	--
total phosphorus - P	laboratory	Standard Methods 4500PE/EPA 365.1
organophosphate (total P minus ortho-P)	calculation	--
turbidity	laboratory	EPA 180.1
glyphosate (Roundup/Rodeo)[1]	laboratory	EPA 547
chlorpyrifos[2]	laboratory	EPA 625
1 golf course fungicide	not sampled this date	--
dissolved oxygen	field	Standard Methods 4500-O G
total residual chlorine	field	Standard Methods 4500-Cl D
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.
Notes:
1 First analysis completed in the first quarter of 2004
2 First analysis completed in the fourth quarter of 2004. This analytical method (diazinon/chlorpyrifos by GCMS, EPA 625) tests for the following chemicals: diazinon, sulprofos, chlorpyrifos, demeton, dichlorvos, disulfoton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malathion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate.

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 (a small plastic ball) 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 ft)
C = A coefficient or correction factor (0.8 for rocky-bottom streams or 0.9 for muddy-bottom

streams). This allows you to correct for the fact that water at the surface travels faster than near the stream bottom due to resistance from gravel, cobble, etc. Multiplying the surface velocity by a correction coefficient decreases the value and gives a better measure of the stream's overall velocity.

T = Time, in seconds, for the float to travel the length of L

RESULTS

Baseline Water Quality

Sampling and analysis conducted by LADPW prior to implementation of the MMP is considered the baseline for water quality conditions at the site. The results of analyses conducted in April 2000 are presented in **Table 5**. Higher bacteria and turbidity observed in the 4/18/00 samples are attributable to a rain event. Phosphorus levels were also high in the 4/18/00 samples, perhaps due to release from sediments.

Second Quarter 2005 Results

Water Quality

Results of analyses conducted by MWH 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
2nd Quarter 2005 (6/30/05)

Parameter	Units	Inflow to Tujunga Ponds 1	Inflow to Tujunga Ponds 2 (duplicate)	Outflow from Tujunga Ponds 1	Outflow from Tujunga Ponds 2 (duplicate)	Big Tujunga Wash 1	Big Tujunga Wash 2 (duplicate)	Haines Cyn Creek exiting site 1	Haines Cyn Creek exiting site 2 (duplicate)
Temperature	°C	20.5	--	19.5	--	26.3	--	19.5	--
Dissolved Oxygen	mg/L	7.5	--	5.1	--	5.2	--	7.8	--
pH	std units	6.8	--	6.9	--	8.4	--	7.8	--
Total residual chlorine	mg/L	ND	--	ND	--	ND	--	ND	--
Ammonia-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Kjeldahl Nitrogen	mg/L	0.24	0.21	ND	0.34	ND	0.36	0.23	0.21
Nitrite-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-Nitrogen	mg/L	4.6	4.7	2.6	2.6	ND	ND	2.3	2.3
Orthophosphate-P	mg/L	0.024	0.024	0.028	0.029	ND	ND	0.032	0.031
Total phosphorus-P	mg/L	0.042	0.012	0.025	0.040	0.013	ND	0.033	0.030
Glyphosate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Chloropyrifos*	ng/L	ND	ND	ND	ND	ND	ND	ND	ND
Turbidity	NTU	0.20	0.30	0.25	0.25	0.20	0.30	0.25	0.20
Fecal Coliform Bacteria	MPN/100ml	50	17	170	170	2	13	80	110
Total Coliform Bacteria	MPN/100ml	2,400	3,500	16,000	2,400	16,000	2,200	2,400	900

-- No duplicate samples are taken for field measurements.

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

* The analytical method used for chloropyrifos (diazinon/chlorpyrifos by GCMS, EPA 625) also tests for the following chemicals: diazinon, sulprofos, demeton, dichlorvos, disulfoton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malathion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate. Samples for this quarter were all non-detect for these EPA 625 parameters.

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 the second quarter of 2005 are summarized in **Table 7**.

Table 7
Estimated Flows for 2nd Quarter 2005

Sampling Date	Flow (cubic feet per second)		
	Outlet of Big Tujunga Ponds	Haines Canyon Creek leaving the site	Big Tujunga Wash
6/30/2005	13.3	20.3	18.2

Comparison of Results with Baseline Data

Water quality in June 2005 was similar to baseline conditions for some parameters. Substantially higher bacteria and turbidity were observed in the 4/18/00 samples. Phosphorus levels were also higher in the April 2000 samples than in June 2005, perhaps due to release from sediments. Observed values for pH in Big Tujunga Wash and Haines Canyon Creek leaving the site were higher in June 2005 than April 2000.

Comparison of Results with Aquatic Life Criteria

Tables 8 and **12** present objectives established by the Los Angeles Regional Water Quality Control Board (Regional Board) for protection of beneficial uses in Big Tujunga Wash including wildlife habitat. EPA's criteria for freshwater aquatic life are also presented in **Tables 8, 9, 10, 11** and **13.**

Table 8
National and Local Recommended Water Quality Criteria - Freshwaters

Parameter	Basin Plan Objectives[a]	EPA Criteria		
		CMC	CCC	Human Health
Temperature (°C)	b	See Table 11	See Table 11	--
Dissolved oxygen (mg/L)	>7.0 mean >5.0 min	5.0[c] (warmwater, early life stages, 1-day minimum)	6.0[c] (warmwater, early life stages, 7-day mean)	--
pH	6.5 - 8.5	--	6.5-9.0[d,e]	5.0-9.0[d,e]
Total residual chlorine (mg/L)	0.1	0.019[d,e]	0.011[d,e]	4.0 (maximum residual disinfectant level goal)
Fecal coliform (MPN/100 ml)	200[f] (water contact recreation)	--	--	Swimming stds: 33[g] (geometric mean for enterococci) 126[g] (geometric mean for *E. coli*)
Ammonia-nitrogen (mg/L)	See Table 12	See Tables 9, 10, and 11	See Tables 9, 10, and 11	--
Nitrite-nitrogen (mg/L)	1	--	--	1 (primary drinking water std.)
Nitrate-nitrogen (mg/L)	10	--	--	10 (primary drinking water std.)
Total phosphorus (mg/L)	--	<0.05 – 0.1[e] (recommendation for streams, no criterion)		--
Turbidity (NTU)	h	i	i	5 (secondary drinking water standard) 0.5 – 1.0 (std. for systems that filter)

Notes:

-- No criterion

CMC Criteria Maximum Concentration or acute criterion

CCC Criteria Continuous Concentration or chronic criterion

a Source: California Regional Water Quality Control Board, Los Angeles Region. 1994. Water Quality Control Plan (Basin Plan).

b Narrative criterion: "The natural receiving water temperature of all regional waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses."

c Source: USEPA. 1986. Ambient Water Quality Criteria for Dissolved Oxygen. EPA 440-5-86-003. Washington, D.C.

d Source: USEPA. 1999. National Recommended Water Quality Criteria – Correction. EPA 822-Z-99-001. Washington, D.C.

e Source: USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

f Standard based on a minimum of not less than four samples for any 30-day period, 10% of total samples during any 30-day period shall not exceed 400/100ml.

g Source: USEPA. 1986. Ambient Water Quality Criteria for Bacteria – 1986. EPA 440-5-84-002. Washington, D.C.

h Narrative criterion: "Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses."

i Narrative criterion for freshwater fish and other aquatic life: "Settleable and suspended solids should not reduce the depth of the compensation point for photosynthetic activity by more than 10 percent from the seasonally established norm for aquatic life."

Table 9
Numeric Values of the Criterion Maximum Concentration (CMC) with Salmonids Present and Absent and the Criterion Continuous Concentration (CCC) for Ammonia Nitrogen (mg/L)

pH	CMC with Salmonids Present	CMC with Salmonids Absent	CCC
6.5	32.6	48.8	3.48
6.6	31.3	46.8	3.42
6.7	29.8	44.6	3.36
6.8	28.1	42.0	3.28
6.9	26.2	39.1	3.19
7.0	24.1	36.1	3.08
7.1	22.0	32.8	2.96
7.2	19.7	29.5	2.81
7.3	17.5	26.2	2.65
7.4	15.4	23.0	2.47
7.5	13.3	19.9	2.28
7.6	11.4	17.0	2.07
7.7	9.65	14.4	1.87
7.8	8.11	12.1	1.66
7.9	6.77	10.1	1.46
8.0	5.62	8.4	1.27
8.1	4.64	6.95	1.09
8.2	3.83	5.72	0.935
8.3	3.15	4.71	0.795
8.4	2.59	3.88	0.673
8.5	2.14	3.2	0.568
8.6	1.77	2.65	0.480
8.7	1.47	2.2	0.406
8.8	1.23	1.84	0.345
8.9	1.04	1.56	0.295
9.0	0.885	1.32	0.254

Source: USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 10
Temperature and pH-Dependent Values of the Ammonia-Nitrogen CCC (Chronic Criterion) for Fish Early Life Stages Absent

CCC for Fish Early Life Stages Absent, mg N/L										
	Temperature (°Celsius)									
pH	0-7	8	9	10	11	12	13	14	15*	16*
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	5.72
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	5.37
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49	5.15
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	4.90
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	4.61
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	4.30
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	3.97
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	3.61
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	3.25
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	2.54
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	2.21
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	1.91
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74	1.63
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	0.990
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892	0.836
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754	0.707
8.8	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684	0.641	0.601
8.9	0.917	0.860	0.806	0.756	0.709	0.664	0.623	0.584	0.548	0.513
9.0	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471	0.442

* At 15° C and above, the criterion for fish ELS absent is the same as the criterion for fish ELS present.

Source: USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 11
Temperature and pH-Dependent Values of the Ammonia-Nitrogen CCC (Chronic Criterion) for Fish Early Life Stages Present

CCC for Fish Early Life Stages Present, mg N/L										
pH	Temperature (° Celsius)									
	0	14	16	18	20	22	24	26	28	30
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

Source: USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 12
Maximum One-Hour Average Concentration for Total Ammonia ($mg/L\ NH_3$)

pH	Temperature (°Celsius)						
	0	5	10	15	20	25	30
6.50	35	33	31	30	29	20	14.3
6.75	32	30	28	27	27	18.6	13.2
7.00	28	26	25	24	23	16.4	11.6
7.25	23	22	20	19.7	19.2	13.4	9.5
7.50	17.4	16.3	15.5	14.9	14.6	10.2	7.3
7.75	12.2	11.4	10.9	10.5	10.3	7.2	5.2
8.00	8.0	7.5	7.1	6.9	6.8	4.8	3.5
8.25	4.5	4.2	4.1	4.0	3.9	2.8	2.1
8.50	2.6	2.4	2.3	2.3	2.3	1.71	1.28
8.75	1.47	1.40	1.37	1.38	1.42	1.07	0.83
9.00	0.86	0.83	0.83	0.86	0.91	0.72	0.58

Source: California Regional Water Quality Control Board, Los Angeles Region. 1994. Water Quality Control Plan (Basin Plan). Taken from USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

Table 13
Example Calculated Values for Maximum Weekly Average Temperature for Growth and Short-Term Maxima for Survival of Juvenile and Adult Fishes During the Summer

Species	Growth (°Celsius)	Maxima (°Celsius)
Black crappie	27	--
Bluegill	32	35
Channel catfish	32	35
Emerald shiner	30	--
Largemouth bass	32	34
Brook trout	19	24

Source: USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

DISCUSSION

Results from the second quarter of the 2005 sampling program are described by parameter in **Table 14**.

Table 14
Discussion of 2nd Quarter 2005 Big Tujunga Wash Sampling Results

Parameter	Discussion
Temperature	• Observed temperatures were below levels of concern for growth and survival of warmwater fish species; although temperature in Big Tujunga Wash was near levels of concern [Note, samples are once per quarter and therefore not directly comparable to maximum weekly average criteria.] Temperatures in June 2005 were generally similar to previous second quarter sampling periods (late-June to early July of 2001, 2002, 2003 and 2004).
Dissolved oxygen	• Dissolved oxygen levels at all stations were above the recommended minimum for warmwater species of 5.0 mg/L. • The oxygen levels in the inflow to Tujunga Ponds in June 2005 were approximately 2 mg/L higher than the second quarter sampling periods for 2001 and 2003, and similar to the second quarters of 2002 and 2004. • The oxygen levels in the outflow from Tujunga Ponds in June 2005 were approximately 3 mg/L lower than the second quarter sampling periods for 2002, 2003 and 2004, and the same as the second quarter of 2001. • The oxygen levels in Haines Canyon Creek in June 2005 were 0.7 to 2.8 mg/L lower than the second quarters for 2002, 2003 and 2004, and approximately 0.5mg/L higher than the second quarter of 2001.
pH	• The pH measurements at all stations were within the 6.5 to 8.5 range identified in the Basin Plan.
Total residual chlorine	• No residual chlorine was detected at any station.
Nitrogen	• Nitrate-nitrogen at all stations was below the drinking water standard of 10 mg/L. • Ammonia was not detected at any station.
Phosphorus	• Total phosphorus and orthophosphate were present in very low levels at all sampling stations. Total phosphorus levels were within EPA's recommended range for streams to prevent excess algae growth (<0.05 – 0.1 mg/L).
Glyphosate	• No glyphosate was detected at any station.
Chloropyrifos	• Chloropyrifos was added to the list of sampling parameters in the fourth quarter of 2004. Chloropyrifos and the other pesticides tested using EPA's analytical method 625 were not detected at any station in the second quarter of 2005.
Turbidity	• Turbidity levels were low and similar (0.2 to 0.3 NTU) at all stations.
Bacteria	• Fecal coliform levels at all stations were below the water contact recreation standard of 200 MPN and in general similar to previous second quarter samples..

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.

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.

Kjeldahl Nitrogen – Named for the laboratory technique used for detection, Kjeldahl nitrogen includes organic nitrogen and ammonia nitrogen.

Nitrate-Nitrogen – $NO3^-$-N is an essential nutrient for many photosynthetic autotrophs.

Nitrite-Nitrogen – $NO2^-$-N is an intermediate oxidation state of nitrogen, both in the oxidation of ammonia to nitrate and in the reduction of nitrate.

Orthophosphorus – the reactive form of phosphorus, commonly used as fertilizer.

pH – the hydrogen ion activity of water (pH) is measured on a logarithmic scale, ranging from 0 to 14. The pH of "pure" water at 25°C is 7.0 (neutral). Low pH is acidic; high pH is basic or alkaline.

Total Phosphorus – In natural waters, phosphorus occurs almost solely as orthophosphates, condensed phosphates, and organically bound phosphate. Phosphorus is essential to the growth of organisms.

Turbidity – attributable to the suspended and colloidal matter in water, including clay, silt, finely divided organic and inorganic matter, soluble colored organic compounds, and plankton and other microscopic organisms. The reduction of clearness in turbid waters diminishes the penetration of light and therefore can adversely affect photosynthesis.

APPENDIX A

BIG TUJUNGA WASH MITIGATION BANK
WATER QUALITY MONITORING PROGRAM

LABORATORY RESULTS

MWH Laboratories
A Division of MWH Americas, Inc.

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

Applied Research Dept, MWH (Darren Giles)
327 West Maple Avenue

Monrovia , CA 91016

Attention: Darren Giles
Fax: (626) 359-3593

DATE OF ISSUE
JUL 21 2005
Linda Geddes
MWH LABORATORIES

LXG Linda Geddes
Project Manager

ACCREDITED IN ACCORDANCE WITH nelac
01114CA

Report#: 151123
BIG-TJ

Laboratory certifies that the test results meet all **NELAC** requirements unless noted in the Comments section or the Case Narrative. Following the cover page are Comments,QC Report,QC Summary,Data Report,Hits Report, totaling 22 page[s].

151103

MWH Laboratories

CHAIN OF CUSTODY RECORD

750 Royal Oaks Drive Suite 100
Monrovia Ca 91016 (626) 386-1100

MWHLABS USE ONLY:

LOGIN COMMENTS:

SAMPLES CHECKED/LOGGED IN BY: MHD

SAMPLE TEMP, RECEIPT AT LAB 13°C (Compliance: 4 +/- 2*C)

SAMPLES RECEIVED DAY OF COLLECTION? ☐ (check for yes)

BLUE ICE: FROZEN X PARTIALLY FROZEN ___ THAWED ___ (check for yes)

TO BE COMPLETED BY SAMPLER:

TAT requested: STANDARD

COMPLIANCE SAMPLES - Requires state forms

NON-COMPLIANCE SAMPLES

REGULATION: ____________ (SDWA, Phase V, NPDES, FDA, ...)

PROJECT CODE	PROJECT JOB # / P.O.#	CLIENT CODE
Big TJ Sampling	1342289.5620.051801	ARD-DG

SAMPLER(S): PRINTED NAME AND SIGNATURE

Darren Giles

REFER TO ATTACHED BOTTLE ORDER FOR ANALYSES ☐ (check for yes)

ANALYSES REQUIRED (mark an 'X' in all tests required for each sample line)

TIME	DATE	SITE NAME or LOCATION	IDENTIFIER, STATE ID #	MATRIX	GRAB	COMP	T-P	O-PO4	TKN	NO2	NO3	Turbidity	Fecal Coli	Total Coli	Ammonia	Glyphosate	Diazinon					SAMPLER COMMENTS
1230	30-Jun	SITE 1	Inflow to TJ Pond #1		X		X	X	X	X	X	X	X	X	X	X	X					
1240	30-Jun	SITE 1	Inflow to TJ Pond #2		X		X	X	X	X	X	X	X	X	X	X	X					
[illegible]	30-Jun	SITE 2	Outflow from TJ Pond #1		X		X	X	X	X	X	X	X	X	X	X	X					
[illegible]	30-Jun	SITE 2	Outflow from TJ Pond #2		X		X	X	X	X	X	X	X	X	X	X	X					
1330	30-Jun	SITE 3	Big TJ Wash #1		X		X	X	X	X	X	X	X	X	X	X	X					
1340	30-Jun	SITE 3	Big TJ Wash #2		X		X	X	X	X	X	X	X	X	X	X	X					
1000	30-Jun	SITE 4	Haines Canyon Creek #1		X		X	X	X	X	X	X	X	X	X	X	X					
1015	30-Jun	SITE 4	Haines Canyon Creek #2		X		X	X	X	X	X	X	X	X	X	X	X					
															DE 6-30-05 (8)							

* MATRIX TYPES:

Reported by Volume:

RSW = Raw Surface Water
RGW = Raw Ground Water
FW = Other Finished Water
CFW = Chlor(am)inated Finished Water
SW = Storm Water
WW = Other Waste Water
CWW = Chlorinated Waste Water

Reported by Weight:

SO = Soil
SL = Sludge

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
RELINQUISHED BY:		DARREN GILES	MWH ARD	6/30/05	1348
RECEIVED BY:		M. [illegible]	MWH	6-30-5	1348

SPECIAL INSTRUCTIONS

SCANNED

MWH Laboratories
750 Royal Oaks Drive, Monrovia, CA 91016
PHONE: 626-386-1100/FAX: 626-386-1101

ACKNOWLEDGMENT OF SAMPLES RECEIVED

Applied Research Dept, MWH (Darren Giles)
327 West Maple Avenue
Monrovia, CA 91016
Attn: Darren Giles
Phone: (626) 303-5945

Customer Code: ARD-DG
PO#: 1342289.5620.051801
Group#: 151123
Project#: BIG-TJ
Proj Mgr: Linda Geddes
Phone: (626) 386-1163

The following samples were received from you on **06/30/05**. They have been scheduled for the tests listed beside each sample. If this information is incorrect, please contact your service representative. Thank you for using MWH Laboratories.

Sample#	Sample Id / Tests Scheduled	Matrix	Sample Date
2506300315	SITE 1 INFLOW TO TJ POND 1 @DIAZEDD FECCOL GLYPHOS NH3 NO2-N NO3 NO3A OPO4 SIO2 T-P TKN TOTCOL TURB	Water	30-jun-2005 12:30:00
2506300321	SITE 1 INFLOW TO TJ POND 2 @DIAZEDD FECCOL GLYPHOS NH3 NO2-N NO3 NO3A OPO4 SIO2 T-P TKN TOTCOL TURB	Water	30-jun-2005 12:40:00
2506300322	SITE 2 OUTFLOW FROM TJ POND 1 @DIAZEDD FECCOL GLYPHOS NH3 NO2-N NO3 NO3A OPO4 SIO2 T-P TKN TOTCOL TURB	Water	30-jun-2005 11:00:00
2506300323	SITE 2 OUTFLOW FROM TJ POND 2 @DIAZEDD FECCOL GLYPHOS NH3 NO2-N NO3 NO3A OPO4 SIO2 T-P TKN TOTCOL TURB	Water	30-jun-2005 11:15:00
2506300324	SITE 3 BIG TJ WASH 1 @DIAZEDD FECCOL GLYPHOS NH3 NO2-N NO3 NO3A OPO4 SIO2 T-P TKN TOTCOL TURB	Water	30-jun-2005 13:30:00
2506300325	SITE 3 BIG TJ WASH 2 @DIAZEDD FECCOL GLYPHOS NH3 NO2-N NO3 NO3A OPO4 SIO2 T-P TKN TOTCOL TURB	Water	30-jun-2005 13:40:00
2506300326	SITE 4 HAINES CYN CRK 1 @DIAZEDD FECCOL GLYPHOS NH3 NO2-N NO3 NO3A OPO4 SIO2 T-P TKN TOTCOL TURB	Water	30-jun-2005 10:00:00
2506300327	SITE 4 HAINES CYN CRK 2 @DIAZEDD FECCOL GLYPHOS NH3 NO2-N NO3 NO3A OPO4 SIO2 T-P TKN TOTCOL TURB	Water	30-jun-2005 10:15:00

Test Acronym Description

Test Acronym	Description

Applied Research Dept, MWH (Darren Giles)
327 West Maple Avenue
Monrovia, CA 91016
Attn: Darren Giles
Phone: (626) 303-5945

Customer Code: ARD-DG
PO#: 1342289.5620.051801
Group#: 151123
Project#: BIG-TJ
Proj Mgr: Linda Geddes
Phone: (626) 386-1163

Test Acronym Description

Test Acronym	Description
@DIAZEDD	Diazinon/Chlorpyrifos by GCMS
FECCOL	Fecal Coliform Bacteria
GLYPHOS	Glyphosate
NH3	Ammonia Nitrogen
NO2-N	Nitrite, Nitrogen by IC
NO3	Nitrate as Nitrogen by IC
NO3A	Nitrate as NO3 by IC (calc)
OPO4	Orthophosphate-P
SIO2	Silica
T-P	Total phosphorus-P
TKN	Kjeldahl Nitrogen
TOTCOL	Total Coliform Bacteria
TURB	Turbidity

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Report Comments #151123

Group Comments

Analytical results for Diazinon/Chlorpyrifos by GCMS are submitted by CRG Marine Laboratories, Torrance, CA. ELAP 2261

MWH Laboratories
A Division of MWH Americas, Inc.

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 Hits Report #151123

Applied Research Dept, MWH (Darren Giles)
Darren Giles
327 West Maple Avenue
Monrovia , CA 91016

Samples Received

30-jun-2005 17:13:27

Analyzed	Sample#	Sample ID	Result	Federal MCL	UNITS	MRL
	2506300315	**SITE 1 INFLOW TO TJ POND 1**				
06/30/05	Fecal Coliform Bacteria		50		MPN/100 mL	2.0
07/07/05	Kjeldahl Nitrogen		0.24		mg/l	0.20
06/30/05	Nitrate as NO3 by IC (calc)		20	45	mg/l	0.88
06/30/05	Nitrate as Nitrogen by IC		4.6	10	mg/l	0.20
06/30/05	Orthophosphate-P		0.024		mg/l	0.010
07/06/05	Silica		34		mg/l	0.50
06/30/05	Total Coliform Bacteria		2400		MPN/100 mL	2.0
07/06/05	Total phosphorus-P		0.042		mg/l	0.010
07/01/05	Turbidity		0.20		NTU	0.050
	2506300321	**SITE 1 INFLOW TO TJ POND 2**				
06/30/05	Fecal Coliform Bacteria		17		MPN/100 mL	2.0
07/07/05	Kjeldahl Nitrogen		0.21		mg/l	0.20
06/30/05	Nitrate as NO3 by IC (calc)		21	45	mg/l	0.88
06/30/05	Nitrate as Nitrogen by IC		4.7	10	mg/l	0.20
06/30/05	Orthophosphate-P		0.024		mg/l	0.010
07/06/05	Silica		34		mg/l	0.50
06/30/05	Total Coliform Bacteria		3500		MPN/100 mL	2.0
07/06/05	Total phosphorus-P		0.012		mg/l	0.010
07/01/05	Turbidity		0.30		NTU	0.050
	2506300322	**SITE 2 OUTFLOW FROM TJ POND 1**				
06/30/05	Fecal Coliform Bacteria		170		MPN/100 mL	2.0
06/30/05	Nitrate as NO3 by IC (calc)		12	45	mg/l	0.88
06/30/05	Nitrate as Nitrogen by IC		2.6	10	mg/l	0.20
06/30/05	Orthophosphate-P		0.028		mg/l	0.010
07/06/05	Silica		30		mg/l	0.50

SUMMARY OF POSITIVE DATA ONLY.

MWH Laboratories
A Division of MWH Americas, Inc.

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 Hits Report #151123

Applied Research Dept, MWH (Darren Giles)
Darren Giles
327 West Maple Avenue
Monrovia , CA 91016

Samples Received
30-jun-2005 17:13:27

Analyzed	Sample#	Sample ID	Result	Federal MCL	UNITS	MRL
	2506300322	**SITE 2 OUTFLOW FROM TJ POND 1**				
06/30/05	Total Coliform Bacteria		16000		MPN/100 mL	2.0
07/06/05	Total phosphorus-P		0.025		mg/l	0.010
07/01/05	Turbidity		0.25		NTU	0.050
	2506300323	**SITE 2 OUTFLOW FROM TJ POND 2**				
06/30/05	Fecal Coliform Bacteria		170		MPN/100 mL	2.0
07/07/05	Kjeldahl Nitrogen		0.34		mg/l	0.20
06/30/05	Nitrate as NO3 by IC (calc)		12	45	mg/l	0.88
06/30/05	Nitrate as Nitrogen by IC		2.6	10	mg/l	0.20
06/30/05	Orthophosphate-P		0.029		mg/l	0.010
07/06/05	Silica		30		mg/l	0.50
06/30/05	Total Coliform Bacteria		2400		MPN/100 mL	2.0
07/06/05	Total phosphorus-P		0.040		mg/l	0.010
07/01/05	Turbidity		0.25		NTU	0.050
	2506300324	**SITE 3 BIG TJ WASH 1**				
06/30/05	Fecal Coliform Bacteria		2		MPN/100 mL	2.0
07/06/05	Silica		26		mg/l	0.50
06/30/05	Total Coliform Bacteria		16000		MPN/100 mL	2.0
07/06/05	Total phosphorus-P		0.013		mg/l	0.010
07/01/05	Turbidity		0.20		NTU	0.050
	2506300325	**SITE 3 BIG TJ WASH 2**				
06/30/05	Fecal Coliform Bacteria		13		MPN/100 mL	2.0
07/07/05	Kjeldahl Nitrogen		0.36		mg/l	0.20
07/06/05	Silica		26		mg/l	0.50

SUMMARY OF POSITIVE DATA ONLY.

MWH Laboratories
A Division of MWH Americas, Inc.

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
Hits Report
#151123

Applied Research Dept, MWH (Darren Giles)
Darren Giles
327 West Maple Avenue
Monrovia , CA 91016

Samples Received

30-jun-2005 17:13:27

Analyzed	Sample#	Sample ID	Result	Federal MCL	UNITS	MRL
	2506300325	**SITE 3 BIG TJ WASH 2**				
06/30/05	Total Coliform Bacteria		2200		MPN/100 mL	2.0
07/01/05	Turbidity		0.30		NTU	0.050
	2506300326	**SITE 4 HAINES CYN CRK 1**				
06/30/05	Fecal Coliform Bacteria		80		MPN/100 mL	2.0
07/07/05	Kjeldahl Nitrogen		0.23		mg/l	0.20
06/30/05	Nitrate as NO3 by IC (calc)		10	45	mg/l	0.88
06/30/05	Nitrate as Nitrogen by IC		2.3	10	mg/l	0.20
06/30/05	Orthophosphate-P		0.032		mg/l	0.010
07/06/05	Silica		29		mg/l	0.50
06/30/05	Total Coliform Bacteria		2400		MPN/100 mL	2.0
07/06/05	Total phosphorus-P		0.033		mg/l	0.010
07/01/05	Turbidity		0.25		NTU	0.050
	2506300327	**SITE 4 HAINES CYN CRK 2**				
06/30/05	Fecal Coliform Bacteria		110		MPN/100 mL	2.0
07/07/05	Kjeldahl Nitrogen		0.21		mg/l	0.20
07/01/05	Nitrate as NO3 by IC (calc)		9.9	45	mg/l	0.88
07/01/05	Nitrate as Nitrogen by IC		2.3	10	mg/l	0.20
06/30/05	Orthophosphate-P		0.031		mg/l	0.010
07/06/05	Silica		30		mg/l	0.50
06/30/05	Total Coliform Bacteria		900		MPN/100 mL	2.0
07/06/05	Total phosphorus-P		0.030		mg/l	0.010
07/01/05	Turbidity		0.20		NTU	0.050

SUMMARY OF POSITIVE DATA ONLY.

MWH Laboratories
A Division of MWH Americas, Inc.

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 Data Report #151123

Applied Research Dept, MWH (Darren Giles)
Darren Giles
327 West Maple Avenue
Monrovia , CA 91016

Samples Received

06/30/05

SITE 1 INFLOW TO TJ POND 1 (2506300315) Sampled on 06/30/05 12:30

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	06/30/05 15:33		(ML/SM9221C)	Fecal Coliform Bacteria	50	MPNM	2.0	1
	07/05/05 00:00	277837	(ML/EPA 547)	Glyphosate	ND	ug/l	6.0	1
	07/06/05 00:00	277821	(ML/EPA 350.1)	Ammonia Nitrogen	ND	mg/l	0.050	1
	06/30/05 21:20	277404	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.20	2
	06/30/05 21:20	277407	(E 300.0/SW9056)	Nitrate as Nitrogen by IC	4.6	mg/l	0.20	2
	06/30/05 21:20	277399	(ML/EPA 300.0)	Nitrate as NO3 by IC (calc)	20	mg/l	0.88	2
	06/30/05 18:30	277413	(4500P-E/365.2)	Orthophosphate-P	0.024	mg/l	0.010	1
	07/06/05 00:00	277772	(EPA/ML 200.7)	Silica	34	mg/l	0.50	1
	07/06/05 17:33	278169	(S4500PE/ 365.1)	Total phosphorus-P	0.042	mg/l	0.010	1
	07/07/05 16:59	278159	(ML/EPA 351.2)	Kjeldahl Nitrogen	0.24	mg/l	0.20	1
	06/30/05 15:33		(ML/SM9221B)	Total Coliform Bacteria	2400	MPNM	2.0	1
	07/01/05 19:49	277688	(ML/EPA 180.1)	Turbidity	0.20	NTU	0.050	1

Diazinon/Chlorpyrifos by GCMS

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	07/15/05 00:00		(EPA 625 MODSUB)	Diazinon	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Bolstar (Sulprofos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Chlorpyrifos	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Demeton	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Dichlorvos	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Disulfoton	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Dimethoate	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Ethoprop (Ethoprophos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fenchlorophos (Ronnel)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fensulfothion	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fenthion	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Merphos	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Mevinphos (Phosdrin)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Malathion	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Parathion-methyl	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Phorate	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Tokuthion	ND	ng/l	10	1

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	07/15/05 00:00		(EPA 625 MODSUB)	Tetrachlorovinphos (Stirophos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Trichloronate	ND	ng/l	10	1

SITE 1 INFLOW TO TJ POND 2 (2506300321) Sampled on 06/30/05 12:40

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	06/30/05 15:38		(ML/SM9221C)	Fecal Coliform Bacteria	17	MPNM	2.0	1
	07/05/05 00:00	277837	(ML/EPA 547)	Glyphosate	ND	ug/l	6.0	1
	07/06/05 00:00	277821	(ML/EPA 350.1)	Ammonia Nitrogen	ND	mg/l	0.050	1
	06/30/05 21:32	277404	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.20	2
	06/30/05 21:32	277407	(E 300.0/SW9056)	Nitrate as Nitrogen by IC	4.7	mg/l	0.20	2
	06/30/05 21:32	277399	(ML/EPA 300.0)	Nitrate as NO3 by IC (calc)	21	mg/l	0.88	2
	06/30/05 18:30	277413	(4500P-E/365.2)	Orthophosphate-P	0.024	mg/l	0.010	1
	07/06/05 00:00	277772	(EPA/ML 200.7)	Silica	34	mg/l	0.50	1
	07/06/05 17:33	278169	(S4500PE/ 365.1)	Total phosphorus-P	0.012	mg/l	0.010	1
	07/07/05 16:59	278159	(ML/EPA 351.2)	Kjeldahl Nitrogen	0.21	mg/l	0.20	1
	06/30/05 15:38		(ML/SM9221B)	Total Coliform Bacteria	3500	MPNM	2.0	1
	07/01/05 19:49	277688	(ML/EPA 180.1)	Turbidity	0.30	NTU	0.050	1

Diazinon/Chlorpyrifos by GCMS

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	07/15/05 00:00		(EPA 625 MODSUB)	Diazinon	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Bolstar (Sulprofos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Chlorpyrifos	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Demeton	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Dichlorvos	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Disulfoton	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Dimethoate	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Ethoprop (Ethoprophos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fenchlorophos (Ronnel)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fensulfothion	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fenthion	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Merphos	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Mevinphos (Phosdrin)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Malathion	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Parathion-methyl	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Phorate	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Tokuthion	ND	ng/l	10	1

MWH Laboratories
A Division of MWH Americas, Inc.

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
Data Report
#151123

Applied Research Dept, MWH (Darren Giles)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	07/15/05 00:00		(EPA 625 MODSUB)	Tetrachlorovinphos (Stirophos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Trichloronate	ND	ng/l	10	1

SITE 2 OUTFLOW FROM TJ POND 1 (2506300322) Sampled on 06/30/05 11:00

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	06/30/05 15:49		(ML/SM9221C)	Fecal Coliform Bacteria	170	MPNM	2.0	1
	07/05/05 00:00	277837	(ML/EPA 547)	Glyphosate	ND	ug/l	6.0	1
	07/06/05 00:00	277821	(ML/EPA 350.1)	Ammonia Nitrogen	ND	mg/l	0.050	1
	06/30/05 22:07	277404	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.20	2
	06/30/05 22:07	277407	(E 300.0/SW9056)	Nitrate as Nitrogen by IC	2.6	mg/l	0.20	2
	06/30/05 22:07	277399	(ML/EPA 300.0)	Nitrate as NO3 by IC (calc)	12	mg/l	0.88	2
	06/30/05 18:30	277413	(4500P-E/365.2)	Orthophosphate-P	0.028	mg/l	0.010	1
	07/06/05 00:00	277772	(EPA/ML 200.7)	Silica	30	mg/l	0.50	1
	07/06/05 17:33	278169	(S4500PE/ 365.1)	Total phosphorus-P	0.025	mg/l	0.010	1
	07/07/05 16:59	278159	(ML/EPA 351.2)	Kjeldahl Nitrogen	ND	mg/l	0.20	1
	06/30/05 15:49		(ML/SM9221B)	Total Coliform Bacteria	16000	MPNM	2.0	1
	07/01/05 19:49	277688	(ML/EPA 180.1)	Turbidity	0.25	NTU	0.050	1

Diazinon/Chlorpyrifos by GCMS

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	07/15/05 00:00		(EPA 625 MODSUB)	Diazinon	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Bolstar (Sulprofos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Chlorpyrifos	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Demeton	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Dichlorvos	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Disulfoton	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Dimethoate	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Ethoprop (Ethoprophos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fenchlorophos (Ronnel)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fensulfothion	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fenthion	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Merphos	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Mevinphos (Phosdrin)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Malathion	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Parathion-methyl	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Phorate	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Tokuthion	ND	ng/l	10	1

MWH Laboratories
A Division of MWH Americas, Inc.

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
Data Report
#151123

Applied Research Dept, MWH (Darren Giles)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	07/15/05 00:00		(EPA 625 MODSUB)	Tetrachlorovinphos (Stirophos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Trichloronate	ND	ng/l	10	1

SITE 2 OUTFLOW FROM TJ POND 2 (2506300323) Sampled on 06/30/05 11:15

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	06/30/05 15:53		(ML/SM9221C)	Fecal Coliform Bacteria	170	MPNM	2.0	1
	07/05/05 00:00	277837	(ML/EPA 547)	Glyphosate	ND	ug/l	6.0	1
	07/06/05 00:00	277821	(ML/EPA 350.1)	Ammonia Nitrogen	ND	mg/l	0.050	1
	06/30/05 22:41	277404	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.20	2
	06/30/05 22:41	277407	(E 300.0/SW9056)	Nitrate as Nitrogen by IC	2.6	mg/l	0.20	2
	06/30/05 22:41	277399	(ML/EPA 300.0)	Nitrate as NO3 by IC (calc)	12	mg/l	0.88	2
	06/30/05 18:30	277413	(4500P-E/365.2)	Orthophosphate-P	0.029	mg/l	0.010	1
	07/06/05 00:00	277772	(EPA/ML 200.7)	Silica	30	mg/l	0.50	1
	07/06/05 17:33	278169	(S4500PE/ 365.1)	Total phosphorus-P	0.040	mg/l	0.010	1
	07/07/05 16:59	278159	(ML/EPA 351.2)	Kjeldahl Nitrogen	0.34	mg/l	0.20	1
	06/30/05 15:53		(ML/SM9221B)	Total Coliform Bacteria	2400	MPNM	2.0	1
	07/01/05 19:49	277688	(ML/EPA 180.1)	Turbidity	0.25	NTU	0.050	1

Diazinon/Chlorpyrifos by GCMS

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	07/15/05 00:00		(EPA 625 MODSUB)	Diazinon	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Bolstar (Sulprofos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Chlorpyrifos	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Demeton	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Dichlorvos	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Disulfoton	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Dimethoate	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Ethoprop (Ethoprophos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fenchlorophos (Ronnel)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fensulfothion	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fenthion	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Merphos	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Mevinphos (Phosdrin)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Malathion	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Parathion-methyl	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Phorate	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Tokuthion	ND	ng/l	10	1

MWH Laboratories
A Division of MWH Americas, Inc.

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
Data Report
#151123

Applied Research Dept, MWH (Darren Giles)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	07/15/05 00:00		(EPA 625 MODSUB)	Tetrachlorovinphos (Stirophos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Trichloronate	ND	ng/l	10	1
SITE 3 BIG TJ WASH 1 (2506300324) Sampled on 06/30/05 13:30								
	06/30/05 15:57		(ML/SM9221C)	Fecal Coliform Bacteria	2	MPNM	2.0	1
	07/05/05 00:00	277837	(ML/EPA 547)	Glyphosate	ND	ug/l	6.0	1
	07/06/05 00:00	277821	(ML/EPA 350.1)	Ammonia Nitrogen	ND	mg/l	0.050	1
	06/30/05 22:53	277404	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.20	2
	06/30/05 22:53	277407	(E 300.0/SW9056)	Nitrate as Nitrogen by IC	ND	mg/l	0.20	2
	06/30/05 22:53	277399	(ML/EPA 300.0)	Nitrate as NO3 by IC (calc)	ND	mg/l	0.88	2
	06/30/05 18:30	277413	(4500P-E/365.2)	Orthophosphate-P	ND	mg/l	0.010	1
	07/06/05 00:00	277772	(EPA/ML 200.7)	Silica	26	mg/l	0.50	1
	07/06/05 17:33	278169	(S4500PE/ 365.1)	Total phosphorus-P	0.013	mg/l	0.010	1
	07/07/05 16:59	278159	(ML/EPA 351.2)	Kjeldahl Nitrogen	ND	mg/l	0.20	1
	06/30/05 15:57		(ML/SM9221B)	Total Coliform Bacteria	16000	MPNM	2.0	1
	07/01/05 19:49	277688	(ML/EPA 180.1)	Turbidity	0.20	NTU	0.050	1
			Diazinon/Chlorpyrifos by GCMS					
	07/15/05 00:00		(EPA 625 MODSUB)	Diazinon	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Bolstar (Sulprofos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Chlorpyrifos	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Demeton	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Dichlorvos	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Disulfoton	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Dimethoate	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Ethoprop (Ethoprophos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fenchlorophos (Ronnel)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fensulfothion	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fenthion	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Merphos	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Mevinphos (Phosdrin)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Malathion	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Parathion-methyl	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Phorate	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Tokuthion	ND	ng/l	10	1

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	07/15/05 00:00		(EPA 625 MODSUB)	Tetrachlorovinphos (Stirophos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Trichloronate	ND	ng/l	10	1

SITE 3 BIG TJ WASH 2 (2506300325) Sampled on 06/30/05 13:40

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	06/30/05 16:01		(ML/SM9221C)	Fecal Coliform Bacteria	13	MPNM	2.0	1
	07/05/05 00:00	277837	(ML/EPA 547)	Glyphosate	ND	ug/l	6.0	1
	07/06/05 00:00	277832	(ML/EPA 350.1)	Ammonia Nitrogen	ND	mg/l	0.050	1
	06/30/05 23:05	277404	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.20	2
	06/30/05 23:05	277407	(E 300.0/SW9056)	Nitrate as Nitrogen by IC	ND	mg/l	0.20	2
	07/07/05 22:51		(ML/EPA 300.0)	Nitrate as NO3 by IC (calc)	ND	mg/l	0.44	1
	06/30/05 18:30	277413	(4500P-E/365.2)	Orthophosphate-P	ND	mg/l	0.010	1
	07/06/05 00:00	277772	(EPA/ML 200.7)	Silica	26	mg/l	0.50	1
	07/06/05 17:33	278169	(S4500PE/ 365.1)	Total phosphorus-P	ND	mg/l	0.010	1
	07/07/05 16:59	278159	(ML/EPA 351.2)	Kjeldahl Nitrogen	0.36	mg/l	0.20	1
	06/30/05 16:01		(ML/SM9221B)	Total Coliform Bacteria	2200	MPNM	2.0	1
	07/01/05 19:49	277688	(ML/EPA 180.1)	Turbidity	0.30	NTU	0.050	1

Diazinon/Chlorpyrifos by GCMS

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	07/15/05 00:00		(EPA 625 MODSUB)	Diazinon	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Bolstar (Sulprofos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Chlorpyrifos	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Demeton	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Dichlorvos	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Disulfoton	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Dimethoate	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Ethoprop (Ethoprophos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fenchlorophos (Ronnel)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fensulfothion	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fenthion	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Merphos	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Mevinphos (Phosdrin)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Malathion	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Parathion-methyl	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Phorate	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Tokuthion	ND	ng/l	10	1

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	07/15/05 00:00		(EPA 625 MODSUB)	Tetrachlorovinphos (Stirophos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Trichloronate	ND	ng/l	10	1

SITE 4 HAINES CYN CRK 1 (2506300326) Sampled on 06/30/05 10:00

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	06/30/05 16:06		(ML/SM9221C)	Fecal Coliform Bacteria	80	MPNM	2.0	1
	07/05/05 00:00	277837	(ML/EPA 547)	Glyphosate	ND	ug/l	6.0	1
	07/06/05 00:00	277832	(ML/EPA 350.1)	Ammonia Nitrogen	ND	mg/l	0.050	1
	06/30/05 23:16	277404	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.20	2
	06/30/05 23:16	277407	(E 300.0/SW9056)	Nitrate as Nitrogen by IC	2.3	mg/l	0.20	2
	06/30/05 23:16	277399	(ML/EPA 300.0)	Nitrate as NO3 by IC (calc)	10	mg/l	0.88	2
	06/30/05 18:30	277413	(4500P-E/365.2)	Orthophosphate-P	0.032	mg/l	0.010	1
	07/06/05 00:00	277772	(EPA/ML 200.7)	Silica	29	mg/l	0.50	1
	07/06/05 17:33	278169	(S4500PE/ 365.1)	Total phosphorus-P	0.033	mg/l	0.010	1
	07/07/05 16:59	278159	(ML/EPA 351.2)	Kjeldahl Nitrogen	0.23	mg/l	0.20	1
	06/30/05 16:06		(ML/SM9221B)	Total Coliform Bacteria	2400	MPNM	2.0	1
	07/01/05 19:21	277687	(ML/EPA 180.1)	Turbidity	0.25	NTU	0.050	1

Diazinon/Chlorpyrifos by GCMS

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	07/15/05 00:00		(EPA 625 MODSUB)	Diazinon	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Bolstar (Sulprofos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Chlorpyrifos	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Demeton	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Dichlorvos	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Disulfoton	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Dimethoate	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Ethoprop (Ethoprophos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fenchlorophos (Ronnel)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fensulfothion	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fenthion	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Merphos	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Mevinphos (Phosdrin)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Malathion	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Parathion-methyl	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Phorate	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Tokuthion	ND	ng/l	10	1

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	07/15/05 00:00		(EPA 625 MODSUB)	Tetrachlorovinphos (Stirophos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Trichloronate	ND	ng/l	10	1

SITE 4 HAINES CYN CRK 2 (2506300327) Sampled on 06/30/05 10:15

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	06/30/05 16:11		(ML/SM9221C)	Fecal Coliform Bacteria	110	MPNM	2.0	1
	07/05/05 00:00	277837	(ML/EPA 547)	Glyphosate	ND	ug/l	6.0	1
	07/06/05 00:00	277832	(ML/EPA 350.1)	Ammonia Nitrogen	ND	mg/l	0.050	1
	07/01/05 02:57	277405	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.20	2
	07/01/05 02:57	277408	(E 300.0/SW9056)	Nitrate as Nitrogen by IC	2.3	mg/l	0.20	2
	07/01/05 02:57	277400	(ML/EPA 300.0)	Nitrate as NO3 by IC (calc)	9.9	mg/l	0.88	2
	06/30/05 18:30	277413	(4500P-E/365.2)	Orthophosphate-P	0.031	mg/l	0.010	1
	07/06/05 00:00	277772	(EPA/ML 200.7)	Silica	30	mg/l	0.50	1
	07/06/05 17:33	278169	(S4500PE/ 365.1)	Total phosphorus-P	0.030	mg/l	0.010	1
	07/07/05 16:59	278159	(ML/EPA 351.2)	Kjeldahl Nitrogen	0.21	mg/l	0.20	1
	06/30/05 16:11		(ML/SM9221B)	Total Coliform Bacteria	900	MPNM	2.0	1
	07/01/05 19:21	277687	(ML/EPA 180.1)	Turbidity	0.20	NTU	0.050	1

Diazinon/Chlorpyrifos by GCMS

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	07/15/05 00:00		(EPA 625 MODSUB)	Diazinon	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Bolstar (Sulprofos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Chlorpyrifos	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Demeton	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Dichlorvos	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Disulfoton	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Dimethoate	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Ethoprop (Ethoprophos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fenchlorophos (Ronnel)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fensulfothion	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Fenthion	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Merphos	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Mevinphos (Phosdrin)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Malathion	ND	ng/l	5.0	1
	07/15/05 00:00		(EPA 625 MODSUB)	Parathion-methyl	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Phorate	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Tokuthion	ND	ng/l	10	1

MWH Laboratories
A Division of MWH Americas, Inc.

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
Data Report
#151123

Applied Research Dept, MWH (Darren Giles)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	07/15/05 00:00		(EPA 625 MODSUB)	Tetrachlorovinphos (Stirophos)	ND	ng/l	10	1
	07/15/05 00:00		(EPA 625 MODSUB)	Trichloronate	ND	ng/l	10	1

Laboratory
QC Summary
#151123

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)

QC Ref #277399 - Nitrate as NO3 by IC (calc) Analysis Date: 06/30/2005

2506300315	SITE 1 INFLOW TO TJ POND	Analyzed by: gdt
2506300321	SITE 1 INFLOW TO TJ POND	Analyzed by: gdt
2506300322	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: gdt
2506300323	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: gdt
2506300324	SITE 3 BIG TJ WASH 1	Analyzed by: gdt
2506300326	SITE 4 HAINES CYN CRK 1	Analyzed by: gdt

QC Ref #277400 - Nitrate as NO3 by IC (calc) Analysis Date: 07/01/2005

2506300327	SITE 4 HAINES CYN CRK 2	Analyzed by: gdt

QC Ref #277404 - Nitrite, Nitrogen by IC Analysis Date: 06/30/2005

2506300315	SITE 1 INFLOW TO TJ POND	Analyzed by: gdt
2506300321	SITE 1 INFLOW TO TJ POND	Analyzed by: gdt
2506300322	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: gdt
2506300323	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: gdt
2506300324	SITE 3 BIG TJ WASH 1	Analyzed by: gdt
2506300325	SITE 3 BIG TJ WASH 2	Analyzed by: gdt
2506300326	SITE 4 HAINES CYN CRK 1	Analyzed by: gdt

QC Ref #277405 - Nitrite, Nitrogen by IC Analysis Date: 07/01/2005

2506300327	SITE 4 HAINES CYN CRK 2	Analyzed by: gdt

QC Ref #277407 - Nitrate as Nitrogen by IC Analysis Date: 06/30/2005

2506300315	SITE 1 INFLOW TO TJ POND	Analyzed by: gdt
2506300321	SITE 1 INFLOW TO TJ POND	Analyzed by: gdt
2506300322	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: gdt
2506300323	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: gdt
2506300324	SITE 3 BIG TJ WASH 1	Analyzed by: gdt
2506300325	SITE 3 BIG TJ WASH 2	Analyzed by: gdt
2506300326	SITE 4 HAINES CYN CRK 1	Analyzed by: gdt

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

QC Ref #277408 - Nitrate as Nitrogen by IC **Analysis Date: 07/01/2005**

2506300327	SITE 4 HAINES CYN CRK 2	Analyzed by: gdt

QC Ref #277413 - Orthophosphate-P **Analysis Date: 06/30/2005**

2506300315	SITE 1 INFLOW TO TJ POND	Analyzed by: jle
2506300321	SITE 1 INFLOW TO TJ POND	Analyzed by: jle
2506300322	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: jle
2506300323	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: jle
2506300324	SITE 3 BIG TJ WASH 1	Analyzed by: jle
2506300325	SITE 3 BIG TJ WASH 2	Analyzed by: jle
2506300326	SITE 4 HAINES CYN CRK 1	Analyzed by: jle
2506300327	SITE 4 HAINES CYN CRK 2	Analyzed by: jle

QC Ref #277687 - Turbidity **Analysis Date: 07/01/2005**

2506300326	SITE 4 HAINES CYN CRK 1	Analyzed by: dyh
2506300327	SITE 4 HAINES CYN CRK 2	Analyzed by: dyh

QC Ref #277688 - Turbidity **Analysis Date: 07/01/2005**

2506300315	SITE 1 INFLOW TO TJ POND	Analyzed by: dyh
2506300321	SITE 1 INFLOW TO TJ POND	Analyzed by: dyh
2506300322	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: dyh
2506300323	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: dyh
2506300324	SITE 3 BIG TJ WASH 1	Analyzed by: dyh
2506300325	SITE 3 BIG TJ WASH 2	Analyzed by: dyh

QC Ref #277772 - Silica **Analysis Date: 07/06/2005**

2506300315	SITE 1 INFLOW TO TJ POND	Analyzed by: wbh
2506300321	SITE 1 INFLOW TO TJ POND	Analyzed by: wbh
2506300322	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: wbh
2506300323	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: wbh
2506300324	SITE 3 BIG TJ WASH 1	Analyzed by: wbh
2506300325	SITE 3 BIG TJ WASH 2	Analyzed by: wbh

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

2506300326	SITE 4 HAINES CYN CRK 1	Analyzed by: wbh
2506300327	SITE 4 HAINES CYN CRK 2	Analyzed by: wbh

QC Ref #277821 - Ammonia Nitrogen **Analysis Date: 07/06/2005**

2506300315	SITE 1 INFLOW TO TJ POND	Analyzed by: nina
2506300321	SITE 1 INFLOW TO TJ POND	Analyzed by: nina
2506300322	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: nina
2506300323	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: nina
2506300324	SITE 3 BIG TJ WASH 1	Analyzed by: nina

QC Ref #277832 - Ammonia Nitrogen **Analysis Date: 07/06/2005**

2506300325	SITE 3 BIG TJ WASH 2	Analyzed by: nina
2506300326	SITE 4 HAINES CYN CRK 1	Analyzed by: nina
2506300327	SITE 4 HAINES CYN CRK 2	Analyzed by: nina

QC Ref #277837 - Glyphosate **Analysis Date: 07/05/2005**

2506300315	SITE 1 INFLOW TO TJ POND	Analyzed by: phk
2506300321	SITE 1 INFLOW TO TJ POND	Analyzed by: phk
2506300322	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: phk
2506300323	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: phk
2506300324	SITE 3 BIG TJ WASH 1	Analyzed by: phk
2506300325	SITE 3 BIG TJ WASH 2	Analyzed by: phk
2506300326	SITE 4 HAINES CYN CRK 1	Analyzed by: phk
2506300327	SITE 4 HAINES CYN CRK 2	Analyzed by: phk

QC Ref #278159 - Kjeldahl Nitrogen **Analysis Date: 07/07/2005**

2506300315	SITE 1 INFLOW TO TJ POND	Analyzed by: mal
2506300321	SITE 1 INFLOW TO TJ POND	Analyzed by: mal
2506300322	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: mal
2506300323	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: mal
2506300324	SITE 3 BIG TJ WASH 1	Analyzed by: mal
2506300325	SITE 3 BIG TJ WASH 2	Analyzed by: mal
2506300326	SITE 4 HAINES CYN CRK 1	Analyzed by: mal
2506300327	SITE 4 HAINES CYN CRK 2	Analyzed by: mal

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

QC Ref #278169 - Total phosphorus-P **Analysis Date: 07/06/2005**

2506300315	SITE 1 INFLOW TO TJ POND	Analyzed by: mal
2506300321	SITE 1 INFLOW TO TJ POND	Analyzed by: mal
2506300322	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: mal
2506300323	SITE 2 OUTFLOW FROM TJ PO	Analyzed by: mal
2506300324	SITE 3 BIG TJ WASH 1	Analyzed by: mal
2506300325	SITE 3 BIG TJ WASH 2	Analyzed by: mal
2506300326	SITE 4 HAINES CYN CRK 1	Analyzed by: mal
2506300327	SITE 4 HAINES CYN CRK 2	Analyzed by: mal

MWH Laboratories
A Division of MWH Americas, Inc.

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
QC Report
#151123

Applied Research Dept, MWH (Darren Giles)

QC Ref #277404 Nitrite, Nitrogen by IC

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	06300293	MGL	0.0	(0-0)	
LCS1	Nitrite, Nitrogen by IC	1.0	1.04	MGL	104.0	(90-110)	
LCS2	Nitrite, Nitrogen by IC	1.0	1.03	MGL	103.0	(90-110)	0.97
MBLK	Nitrite, Nitrogen by IC	ND	<0.10	MGL			
MS	Nitrite, Nitrogen by IC	1.0	0.993	MGL	99.3	(90-110)	
MSD	Nitrite, Nitrogen by IC	1.0	0.995	MGL	99.5	(90-110)	0.20

QC Ref #277405 Nitrite, Nitrogen by IC

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	06300319	MGL	0.0	(0-0)	
LCS1	Nitrite, Nitrogen by IC	1.0	1.04	MGL	104.0	(90-110)	
LCS2	Nitrite, Nitrogen by IC	1.0	1.04	MGL	104.0	(90-110)	0.00
MBLK	Nitrite, Nitrogen by IC	ND	<0.10	MGL			
MS	Nitrite, Nitrogen by IC	1.0	1.02	MGL	102.0	(90-110)	
MSD	Nitrite, Nitrogen by IC	1.0	1.03	MGL	103.0	(90-110)	0.98

QC Ref #277407 Nitrate as Nitrogen by IC

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	06300293	MGL	0.0	(0-0)	
LCS1	Nitrate as Nitrogen by IC	2.5	2.49	MGL	99.6	(90-110)	
LCS2	Nitrate as Nitrogen by IC	2.5	2.5	MGL	100.0	(90-110)	0.40
MBLK	Nitrate as Nitrogen by IC	ND	<0.10	MGL			
MS	Nitrate as Nitrogen by IC	2.5	2.42	MGL	96.8	(90-110)	
MSD	Nitrate as Nitrogen by IC	2.5	2.42	MGL	96.8	(90-110)	0.00

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.

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

QC Ref #277408 Nitrate as Nitrogen by IC

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	06300319	MGL	0.0	(0-0)	
LCS1	Nitrate as Nitrogen by IC	2.5	2.5	MGL	100.0	(90-110)	
LCS2	Nitrate as Nitrogen by IC	2.5	2.51	MGL	100.4	(90-110)	0.40
MBLK	Nitrate as Nitrogen by IC	ND	<0.10	MGL			
MS	Nitrate as Nitrogen by IC	2.5	2.33	MGL	93.2	(90-110)	
MSD	Nitrate as Nitrogen by IC	2.5	2.37	MGL	94.8	(90-110)	1.7

QC Ref #277413 Orthophosphate-P

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	06300176	MGL		(0-0)	
LCS1	Orthophosphate-P	0.5	0.497	MGL	99.4	(90-110)	
LCS2	Orthophosphate-P	0.5	0.498	MGL	99.6	(90-110)	0.20
MBLK	Orthophosphate-P	ND	<0.010	MGL			
MS	Orthophosphate-P	0.5	0.513	MGL	102.6	(80-120)	
MSD	Orthophosphate-P	0.5	0.516	MGL	103.2	(80-120)	0.58

QC Ref #277687 Turbidity

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
DUP	Turbidity	0.111	0.112	NTU		(0-20)	0.9

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.

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

QC Ref #277688 Turbidity

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
DUP	Turbidity	0.023	0.025	NTU		(0-20)	8.3

QC Ref #277772 Silica

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	06300195	MGL		(0-0)	
LCS1	Silica	21.4	20.8	MGL	97.2	(85-115)	
LCS2	Silica	21.4	21.0	MGL	98.1	(85-115)	0.96
MBLK	Silica	ND	<0.50	MGL			
MS	Silica	21.4	21.0	MGL	98.1	(70-130)	
MSD	Silica	21.4	20.8	MGL	97.2	(70-130)	0.96

QC Ref #277821 Ammonia Nitrogen

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	06300176	MGL		(0-0)	
LCS1	Ammonia Nitrogen	1.00	1.04	MGL	104.0	(90-110)	
LCS2	Ammonia Nitrogen	1.00	1.04	MGL	104.0	(90-110)	0.00
MBLK	Ammonia Nitrogen	ND	<0.050	MGL			
MS	Ammonia Nitrogen	1.00	1.06	MGL	106.0	(90-110)	
MSD	Ammonia Nitrogen	1.00	1.06	MGL	106.0	(90-110)	0.00

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.

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

QC Ref #277832 Ammonia Nitrogen

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	06300325	MGL		(0-0)	
LCS1	Ammonia Nitrogen	1.00	1.03	MGL	103.0	(90-110)	
LCS2	Ammonia Nitrogen	1.00	1.03	MGL	103.0	(90-110)	0.00
MBLK	Ammonia Nitrogen	ND	<0.050	MGL			
MS	Ammonia Nitrogen	1.00	1.01	MGL	101.0	(90-110)	
MSD	Ammonia Nitrogen	1.00	0.985	MGL	98.5	(90-110)	2.5

QC Ref #277837 Glyphosate

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	06300274	UGL		(0-0)	
LCS1	Glyphosate	10	9.09	UGL	90.9	(70-130)	
MBLK	Glyphosate	ND	<6.0	UGL			
MS	Glyphosate	10	9.55	UGL	95.5	(70-130)	
MSD	Glyphosate	10	9.88	UGL	98.8	(70-130)	3.4

QC Ref #278159 Kjeldahl Nitrogen

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	06300321	MGL		(0-0)	
LCS1	Kjeldahl Nitrogen	4	4.20	MGL	105.0	(90-110)	
LCS2	Kjeldahl Nitrogen	4	3.80	MGL	95.0	(90-110)	10
MBLK	Kjeldahl Nitrogen	ND	<0.20	MGL			
MS	Kjeldahl Nitrogen	4	4.08	MGL	102.0	(90-110)	
MSD	Kjeldahl Nitrogen	4	3.94	MGL	98.5	(90-110)	3.5
RPD_LCS	Kjeldahl Nitrogen	105.000	95.000	MGL	10.0	(0-20)	
RPD_MS	Kjeldahl Nitrogen	102.000	98.500	MGL	3.5	(0-10)	

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.

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

QC Ref #278169 Total phosphorus-P

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	06300315	MGL		(0-0)	
LCS1	Total phosphorus-P	0.4	0.420	MGL	105.0	(90-110)	
LCS2	Total phosphorus-P	0.4	0.390	MGL	97.5	(90-110)	7.4
MBLK	Total phosphorus-P	ND	<0.010	MGL			
MS	Total phosphorus-P	0.4	0.390	MGL	97.5	(90-110)	
MSD	Total phosphorus-P	0.4	0.390	MGL	97.5	(90-110)	0.00
RPD_LCS	Total phosphorus-P	105.000	97.500	MGL	7.4	(0-10)	
RPD_MS	Total phosphorus-P	97.500	97.500	MGL	0.0	(0-10)	

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.

CRG
Marine Laboratories, Inc.
2020 Del Amo Blvd. Suite 200, Torrance, CA 90501 • (310) 533-5190 • FAX (310) 533-5003 • mmercier@crglabs.com

July 18, 2005

MWH Laboratories
70 Royal Oaks Dr., Suite 100
Monrovia, CA 91016-3629

Re:	CRG Project ID:	P2502ay
	MWH Project:	151123
	MWH Sub PO:	99-17413

ATTN: Mr. Michael Lettona

CRG Laboratories is pleased to provide you with the enclosed analytical data report for your 151123 Project. According to the chain-of-custody, 8 wastewater samples were received intact and cool at CRG on June 5, 2005. Per your instructions, the samples were analyzed for:

- Organophosphorus Pesticides By GCMS Using EPA Method 625

Please don't hesitate to call if you have any questions and thank you very much for using our laboratory for your analytical needs.

Regards,
Misty B. Mercier
Project Manager

Reviewed and Approved ______________________________

DATA REPORT

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: ***MWH Laboratories*** **CRG Project ID:** ***2502ay***

CRG ID#:	***26191***	**Sample Description:**	2506300315 SITE 1 INFLOW TO TJ POND 1 Project #151123 / PO #99-17413	**Date Sampled:**	30-Jun-05 12:30
Replicate #:	R1			**Date Received:**	05-Jul-05
Batch ID:	2502-14033	**Matrix:**	Wastewater	**Date Processed:**	07-Jul-05
Instrument:	GC/MS #2 Shimadzu QP2010	**Analyst:**	D. Gonsman	**Date Analyzed:**	15-Jul-05

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625	105	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625	102	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625	100	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625	103	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: ***MWH Laboratories*** **CRG Project ID:** ***2502ay***

CRG ID#:	***26192***	**Sample Description:**	2506300321 SITE 1 INFLOW TO TJ POND 2	**Date Sampled:**	30-Jun-05 12:40
Replicate #:	R1		Project #151123 / PO #99-17413	**Date Received:**	05-Jul-05
Batch ID:	2502-14033	**Matrix:**	Wastewater	**Date Processed:**	07-Jul-05
Instrument:	GC/MS #2 Shimadzu QP2010	**Analyst:**	D. Gonsman	**Date Analyzed:**	15-Jul-05

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625	96	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625	98	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625	96	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625	96	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

California ELAP Certificate # 2261

26192 R1

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: *MWH Laboratories* **CRG Project ID:** *2502ay*

CRG ID#:	*26193*	**Sample Description:**	2506300322 SITE 2 OUTFLOW FR TJ POND1 Project #151123 / PO #99-17413	**Date Sampled:**	30-Jun-05 11:00
Replicate #:	R1			**Date Received:**	05-Jul-05
Batch ID:	2502-14033	**Matrix:**	Wastewater	**Date Processed:**	07-Jul-05
Instrument:	GC/MS #2 Shimadzu QP2010	**Analyst:**	D. Gonsman	**Date Analyzed:**	15-Jul-05

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625	93	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625	98	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625	92	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625	92	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

CRG Marine Laboratories, Inc.
2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: ***MWH Laboratories*** **CRG Project ID:** ***2502ay***

CRG ID#: ***26194***
Replicate #: R1
Batch ID: 2502-14033
Instrument: GC/MS #2 Shimadzu QP2010
Sample Description: 2506300323 SITE 2 OUTFLOW FR TJ POND2
Project #151123 / PO #99-17413
Matrix: Wastewater
Analyst: D. Gonsman
Date Sampled: 30-Jun-05 11:15
Date Received: 05-Jul-05
Date Processed: 07-Jul-05
Date Analyzed: 15-Jul-05

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625	95	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625	98	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625	94	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625	95	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: ***MWH Laboratories*** **CRG Project ID:** ***2502ay***

CRG ID#:	***26195***	**Sample Description:**	2506300324 SITE 3 BIG TJ WASH 1	**Date Sampled:**	30-Jun-05 13:30
Replicate #:	R1		Project #151123 / PO #99-17413	**Date Received:**	05-Jul-05
Batch ID:	2502-14033	**Matrix:**	Wastewater	**Date Processed:**	07-Jul-05
Instrument:	GC/MS #2 Shimadzu QP2010	**Analyst:**	D. Gonsman	**Date Analyzed:**	15-Jul-05

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625	97	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625	100	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625	96	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625	98	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: *MWH Laboratories* **CRG Project ID:** *2502ay*

CRG ID#:	*26196*	**Sample Description:**	2506300325 SITE 3 BIG TJ WASH 2 / Project #151123 / PO #99-17413	**Date Sampled:**	30-Jun-05 13:40
Replicate #:	R1			**Date Received:**	05-Jul-05
Batch ID:	2502-14033	**Matrix:**	Wastewater	**Date Processed:**	07-Jul-05
Instrument:	GC/MS #2 Shimadzu QP2010	**Analyst:**	D. Gonsman	**Date Analyzed:**	15-Jul-05

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625	92	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625	98	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625	96	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625	92	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: ***MWH Laboratories*** **CRG Project ID:** ***2502ay***

CRG ID#:	***26197***	**Sample Description:**	2506300326 SITE 4 HAINES CYN CRK 1 Project #151123 / PO #99-17413	**Date Sampled:**	30-Jun-05 10:00
Replicate #:	R1			**Date Received:**	05-Jul-05
Batch ID:	2502-14033	**Matrix:**	Wastewater	**Date Processed:**	07-Jul-05
Instrument:	GC/MS #2 Shimadzu QP2010	**Analyst:**	D. Gonsman	**Date Analyzed:**	15-Jul-05

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625	99	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625	100	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625	98	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625	98	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

CRG Marine Laboratories, Inc.
2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: ***MWH Laboratories*** **CRG Project ID:** ***2502ay***

CRG ID#: ***26198***
Replicate #: R1
Batch ID: 2502-14033
Instrument: GC/MS #2 Shimadzu QP2010

Sample Description: 2506300327 SITE 4 HAINES CYN CRK 2
Project #151123 / PO #99-17413
Matrix: Wastewater
Analyst: D. Gonsman

Date Sampled: 30-Jun-05 10:15
Date Received: 05-Jul-05
Date Processed: 07-Jul-05
Date Analyzed: 15-Jul-05

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625	94	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625	99	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625	100	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625	97	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

QUALITY CONTROL REPORT

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: ***MWH Laboratories*** **CRG Project ID:** ***2502ay***

CRG ID#: ***26190***
Replicate #: B1
Batch ID: 2502-14033
Instrument: GC/MS #2 Shimadzu QP2010

Sample Description: QAQC Procedural Blank
Project #151123 / PO #99-17413
Matrix: DI Water
Analyst: D. Gonsman

Date Sampled:
Date Received:
Date Processed: 07-Jul-05
Date Analyzed: 15-Jul-05

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625	100	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625	100	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625	99	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625	100	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

CHAIN-OF-CUSTODY

MWH Laboratories
A Division of MWH Americas,Inc.
750 Royal Oaks Drive Suite 100
Monrovia, CA 91016-3629
Ph (626) 386-1100 Fax (626) 386-1095

Date 07/05/05

Submittal Form & Purchase Order 99-17413

REPORTING REQUIREMENTS:** ***Do Not Combine Report with any other samples submitted under different MWH project numbers!
Report & Invoice must have the MWH Project Number **151123** Sub PO# **99-17413** and Job #

Report all quality control data according to Method. Include dates analyzed, date extracted (if extracted) and Method reference on the report.
Results must have Complete data & QC with Approval Signature. See reverse side for List of Terms and Conditions

Ship To **Misty B. Mercier**
CRG MARINE

2020 Del Amo Blvd
Suite 200
Torrance, CA 90501-1206

(310) 533-5190 x106 Fax (310) 533-5003

Reports: Michael Lettona Sub-contracting Administrator
EMAIL TO: Michael.Lettona@mwhglobal.com
MWH Laboratories 750 Royal Oaks Dr. Monrovia, CA 91016
Phone (626) 386-1137 Fax (626) 386-1095
Invoices to: MWH LABORATORIES
Accounts Payable PO BOX 7009, Pasadena, CA 91109-7009

Provide in each Report the Specified State Certification # & Exp Date for requested tests + matrix

CA ELAP WW

HOLDING TIME IS UP ON THURSDAY, 7/7. *Please analyze ASAP.* THANKS!

MWH Project #	Report Due:	Sub PO#
151123	07/20/05	99-17413

mg¬

		Use MWH Lab # for ID	Client Sample ID for reference only	Analysis Requested	Sample Date & Time	Matrix	Container
1	@DIAZEDD	2506300315	SITE 1 INFLOW TO TJ POND 1	DIAZINON & CHLORPYRIFOS by 625	06/30/05 12:30	ww	3 1L amber glass+ buffer+ascorbic+EDTA+DZU
2	@DIAZEDD	2506300321	SITE 1 INFLOW TO TJ POND 2	DIAZINON & CHLORPYRIFOS by 625	06/30/05 12:40	ww	3 1L amber glass+ buffer+ascorbic+EDTA+DZU
3	@DIAZEDD	2506300322	SITE 2 OUTFLOW FROM TJ POND1	DIAZINON & CHLORPYRIFOS by 625	06/30/05 11:00	ww	3 1L amber glass+ buffer+ascorbic+EDTA+DZU
4	@DIAZEDD	2506300323	SITE 2 OUTFLOW FROM TJ POND2	DIAZINON & CHLORPYRIFOS by 625	06/30/05 11:15	ww	3 1L amber glass+ buffer+ascorbic+EDTA+DZU
5	@DIAZEDD	2506300324	SITE 3 BIG TJ WASH 1	DIAZINON & CHLORPYRIFOS by 625	06/30/05 13:30	ww	3 1L amber glass+ buffer+ascorbic+EDTA+DZU
6	@DIAZEDD	2506300325	SITE 3 BIG TJ WASH 2	DIAZINON & CHLORPYRIFOS by 625	06/30/05 13:40	ww	3 1L amber glass+ buffer+ascorbic+EDTA+DZU
7	@DIAZEDD	2506300326	SITE 4 HAINES CYN CRK 1	DIAZINON & CHLORPYRIFOS by 625	06/30/05 10:00	ww	3 1L amber glass+ buffer+ascorbic+EDTA+DZU
8	@DIAZEDD	2506300327	SITE 4 HAINES CYN CRK 2	DIAZINON & CHLORPYRIFOS by 625	06/30/05 10:15	ww	3 1L amber glass+ buffer+ascorbic+EDTA+DZU

P2502ay

26191-26198

Relinquished by: Sample Control Date 07/05/05 Time 1017 MUST HAVE NOTIFICAION IF TEMP IS GREATER THAN 6 OR LESS THAN 2 CELSIUS

Page 1

Received by: Date 7/5/05 Time 16:00 An Acknowledgement of Receipt is requested to attn: Michael Lettona

CRG
Marine Laboratories, Inc.

SAMPLE RECEIPT FORM

CRG Project ID P2502ay

CLIENT NAME MWH

DATE RECEIVED 7/5/05

COURIER INFORMATION		
☐ CRG	☐ FEDEX	TRACKING NUMBER
☑ OTHER*	☐ UPS	

TEMPERATURE		Chain-of-Custody	SAMPLE MATRIX
6 °C	☑ BLUE ICE	☑ INCLUDED	☑ LIQUID
	☐ WET ICE	☑ SIGNED	☐ SOLID
	☐ NO ICE	☐ NOT INCLUDED	☐ OTHER*

CONDITION OF SAMPLES UPON ARRIVAL

	YES	NO*	NA
All sample containers intact and good condition	☑	☐	☐
All samples listed on COC are present	☑	☐	☐
Sample ID on containers consistent with COC	☑	☐	☐
Correct containers used for analyses requested	☑	☐	☐
All samples received within method holding time	☑	☐	☐

***NOTES**

COMPLETED BY: [signature]

County of Los Angeles
Department of Public Works

Water Quality Monitoring Report
3rd Quarter 2005

for the

Master Mitigation Plan
for the Big Tujunga Wash Mitigation Bank

December 2005

MWH

Water Quality Monitoring Report
3rd Quarter 2005

for

Master Mitigation Plan
for the Big Tujunga Wash Mitigation Bank

December 2005

Prepared For:

Chambers Group, Inc.
17671 Cowan Avenue, Suite 100
Irvine, California 92614

Prepared By:

MWH
301 North Lake Avenue, Suite 600
Pasadena, California 91101

Table of Contents

Section Name **Page Number**

LIST OF FIGURES

Figure Number **Page**

LIST OF TABLES

Table Number **Page**

Distribution

Quarterly and annual water quality monitoring reports are distributed to the following agencies:

Los Angeles County Department of Public Works
Ms. Belinda Kwan
Water Resources Division, Dams Section
900 South Fremont Avenue
Alhambra, California 91803-1331

California Department of Fish and Game
Ms. Mary Meyer
402 West Ojai Avenue, Suite 101, PMB 501
Ojai, California 93023

Mr. Scott Harris
1508 N. Harding Ave.
Pasadena, California 91104

Regional Water Quality Control Board, Los Angeles Region (4)
Ms. Valerie Carrillo
320 West 4th Street, Suite 200
Los Angeles, California 90013

U.S. Fish and Wildlife Service
Mr. Jesse Bennett
6010 Hidden Valley Road
Carlsbad, California 92009

U.S. Army Corps of Engineers
Mr. Aaron Allen
P.O. Box 532711
Los Angeles, California 90053-2325

Interested Party
Mr. William Eick
2604 Foothill Boulevard, Suite C
La Crescenta, California 91214

Water Quality Monitoring
3rd Quarter 2005

BACKGROUND

The County of Los Angeles Department of Public Works (LADPW) purchased a 207-acre parcel in Big Tujunga Wash as a mitigation bank for County flood control projects throughout Los Angeles. In coordination with local agencies, the County defined a number of measures to improve habitat quality at the site. A Master Mitigation Plan (MMP) was prepared to guide the implementation of these enhancements. The MMP also includes a 5-year monitoring program to gather data on conditions at the site during implementation of the improvements. The MMP was prepared and is being implemented by Chambers Group, Inc. MWH, a subconsultant to Chambers Group, is responsible for the water quality monitoring program described in the MMP. This is the twentieth quarterly report on water quality. The 5-year program began in the fourth quarter of 2000.

The project site is located just east of Hansen Dam in the Shadow Hills area of the City of Los Angeles. Both Big Tujunga Wash, an intermittent stream, and Haines Canyon Creek, a perennial stream, traverse the project site in an east-to-west direction. The two Tujunga ponds are located at the far eastern portion of the site.

Project Site Activities

A timeline of project-related activities that could influence water quality is presented in **Table 1**.

Table 1
Major Activities to Date at the Big Tujunga Wash Mitigation Bank

Month/Year	Activity
4/00	Baseline water quality sampling
11/00 to 11/01	Arundo, tamarisk, and pepper tree removal Chemical (Rodeo®) application
12/00 to 11/02	Water hyacinth removal
12/00	Fish Sampling at Haines Canyon Creek
12/14/00	Water quality sampling
1/01 to present	Exotic aquatic wildlife (non-native fish, crayfish, bullfrog, and turtle) removal – conducted quarterly
2/01	Partial riparian planting
3/01	Selective clearing at Canyon Trails Golf Club
3/12/01	Water quality sampling
6/19/01	Water quality sampling
7/01	Fish Sampling at Haines Canyon Creek
9/11/01	Water quality sampling
10/01 to 11/01	Fish Sampling at Haines Canyon Creek

Table 1 (Continued)
Major Activities to Date at the Big Tujunga Wash Mitigation Bank

Month/Year	Activity
12/12/01	Water quality sampling
1/02	Final riparian planting
2/02	Upland replacement planting
3/26/02	Water quality sampling
6/25/02	Water quality sampling
7/02	Fish Sampling at Haines Canyon Creek
9/12/02	Water quality sampling
10/02	Grading at Canyon Trails Golf Club begins
11/02	Fish Sampling at Haines Canyon Creek
12/19/02	Water quality sampling
3/20/03	Water quality sampling
4/1/03	Meeting with Canyon Trails Golf Club to discuss future use of herbicides and fertilizers
6/23/03	Water quality sampling
8/03	Fish Sampling at Haines Canyon Creek
9/30/03	Water quality sampling
Fall 2003	Completion of the golf course construction
12/17/03	Water quality sampling
1/04	Fish Sampling at Haines Canyon Creek
4/2/04	Water quality sampling
4/3/04	Rock Dam Removal Day
6/04	Angeles National Golf Club (previously named Canyon Trails) opens to the public
7/2/04	Water quality sampling
10/5/04	Water quality sampling
12/9/04	Water quality sampling
4/7/05	Water quality sampling
6/30/05	Water quality sampling
10/25/05	Water quality sampling

Water Quality Monitoring Program

In order to establish water quality upstream and downstream of the site, quarterly sampling and analysis will be performed for 5 years, for a total of 21 individual sampling days (4 quarters a year for 5 years plus the first sampling period in December 2001). The monitoring program has been designed to specifically address inputs to the site from upstream land uses such as the Angeles National Golf Club (previously named Canyon Trails Golf Club). Potential impacts to aquatic species from run-on to the site that contains excessive nutrients or pesticides are of primary concern.

The golf course has been operating since June 2004. Additional construction at the club house building is in progress and is scheduled for completion in spring of 2006 (J. Reidinger, Angeles National Golf Club, pers. comm. to A. Kawaguchi, MWH, December 2, 2004).

In March 2004, the golf course maintenance staff indicated that the following chemicals may be used on an as needed basis: Primo™ (a grass growth inhibitor used for turf management; active ingredient – trinexapac-ethyl) and Rodeo® (an herbicide used to control aquatic weeds; active ingredient – glyphosate) (J. Reidinger, pers. comm. to M. Chimienti, LADPW, March 18, 2004). Based on this information, glyphosate was added to the list of sampling parameters starting in the first quarter of 2004.

In December 2004 and February 2005, the Golf Club provided MWH with the golf course's monthly pesticide use reports. The reports indicate that 10 types of chemical products (seven herbicides, one insecticide, one fungicide, and one grass growth inhibitor) were applied as summarized in **Table 2**. No further data were provided as a result of requests made in August 2005 (by telephone) and December 2005 (by telephone and fax).

In December 2004, the Golf Club also provided MWH with the golf course's water quality monitoring reports to date. The results were summarized and presented in the 2004 Annual Report for the Big Tujunga Wash Mitigation Bank Water Quality Monitoring Program (distributed in February 2005).

Table 2
Pesticide Applications at the Angeles National Golf Course
(June – November 2004)

Active Ingredient	Manufacturer and Product Name	Applications
Chlorpyrifos	Dow AgroSciences Dursban Pro (insecticide)	One application (145,000 sq. ft.) in August
Diquat dibromide	Syngenta Reward (herbicide)	Two applications (43,000 sq. ft. and not recorded) in August, one application (87,000 sq. ft.) in September, and one application in November
Flutolanil	Bayer Prostar 70 WP (fungicide)	One application (120,000 sq. ft.) in July and one application (140,000 sq. ft.) in August
Glyphosate	Lesco Prosecutor (herbicide)	Three applications (one 86,000 sq. ft. and two not recorded) in August
Glyphosate and Diquat dibromide	Monsanto QuickPRO (herbicide)	Three applications (20,000 to 30,000 sq. ft.) in June and one application (20,000 sq. ft.) in July
Imazapyr	BASF Stalker (herbicide)	Two applications in November
Oryzalin	Dow AgroSciences Surflan (herbicide)	One application (87,000 sq. ft.) in September
Pelargonic acid	Mycogen Scythe (herbicide)	One application (86,000 sq. ft.) in August
Prodiamine	Syngenta Barricade (herbicide)	Three applications (two 86,000 sq. ft. and one not recorded) in August
Trinexapac-ethyl	Syngenta Primo Maxx (grass growth inhibitor)	One application (120,000 sq. ft.) in June, three applications (76,000 to 120,000 sq. ft.) in July, two applications (140,000 and 156,000 sq. ft.) in August, and two applications (60,000 and 128,000 sq. ft.) in September

Source: Angeles National Golf Course Monthly Summary Pesticide Use Reports for June through November 2004.
sq. ft. – square feet

MATERIALS AND METHODS

Sampling Stations

Four sampling locations have been identified for the 5-year monitoring program for the Big Tujunga Wash Mitigation Bank (**Figure 1**). **Table 3** summarizes sampling locations and the conditions observed on October 25, 2005. The coordinates of the sampling stations were determined by a hand-held Global Positioning System.

Sampling Parameters

Water Quality. Table 4 summarizes the sampling parameters included in the water quality monitoring program. The following meters were used in the field:

- Dissolved oxygen and temperature – HACH SensION 6 DO meter
- Total residual chlorine – HACH DR 700
- pH – Orion 230A with HACH 51935 electrode

All other analyses were performed in duplicate at MWH Laboratories, Monrovia, California. Samples were taken at mid-depth, along a transect perpendicular to the stream channel alignment. Quality assurance/quality control (QA/QC) procedures in the laboratory followed the methods described in the MWH Laboratories *Quality Assurance Manual.*

Table 3
Water Quality Sampling Locations and Conditions for the 3rd Quarter 2005

Date	October 25, 2005		
Air Temperature	Approximately 68 degrees Fahrenheit		
Skies	Overcast		
Sampling Locations	**Latitude**	**Longitude**	**Time of sample**
Haines Canyon Creek	N 34° 16' 2.9"	W 118° 21' 22.2"	10:00
Haines Canyon Creek, inflow to Tujunga Ponds	N 34° 16' 6.9"	W 118° 20' 18.7"	11:30
Haines Canyon Creek, outflow from Tujunga Ponds	N 34° 16' 7.1"	W 118° 20' 28.3"	12:30
Big Tujunga Wash	N 34° 16' 11.7"	W 118° 21' 4.0"	13:20

Table 4
Water Quality Sampling Parameters

Parameter	Analysis Location	Analytical Method
total Kjeldahl nitrogen (TKN)	laboratory	EPA 351.2
nitrite (NO_2)	laboratory	EPA 300.0 by IC
nitrate (NO_3)	laboratory	EPA 300.0 by IC
ammonia (NH_4)	laboratory	EPA 350.1
orthophosphate - P	laboratory	Standard Methods 4500P-E
total coliform	laboratory	Standard Methods 9221B
fecal coliform	laboratory	Standard Methods 9221C
total organic halogens (organochlorides)	not sampled this date	--
total phosphorus - P	laboratory	Standard Methods 4500PE/EPA 365.1
organophosphate (total P minus ortho-P)	calculation	--
turbidity	laboratory	EPA 180.1
glyphosate (Roundup/Rodeo)[1]	laboratory	EPA 547
chlorpyrifos[2]	laboratory	EPA 625
1 golf course fungicide	not sampled this date	--
dissolved oxygen	field	Standard Methods 4500-O G
total residual chlorine	field	Standard Methods 4500-Cl D
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 (diazinon/chlorpyrifos by GCMS, EPA 625) tests for the following chemicals: diazinon, sulprofos, chlorpyrifos, demeton, dichlorvos, disulfoton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malathion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate.

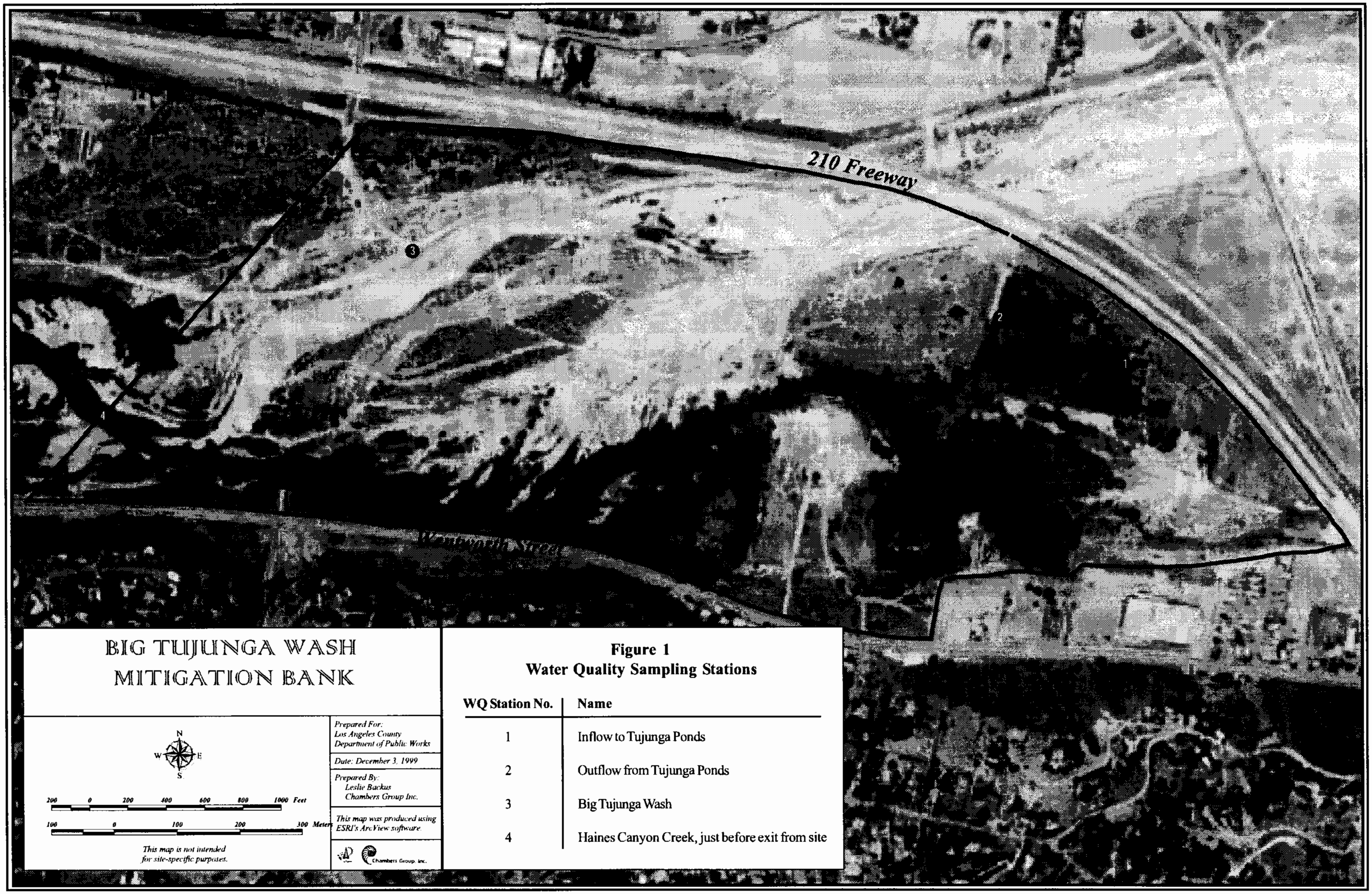


Figure 1
Water Quality Sampling Stations

WQ Station No.	Name
1	Inflow to Tujunga Ponds
2	Outflow from Tujunga Ponds
3	Big Tujunga Wash
4	Haines Canyon Creek, just before exit from site

Discharge Measurements. In addition to the water quality monitoring, flows in the outlet from Big Tujunga Ponds, in Haines Canyon Creek leaving the site, and in Big Tujunga Wash were estimated using a simple field procedure. The technique uses a float (a small plastic ball) 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 ft)

C = A coefficient or correction factor (0.8 for rocky-bottom streams or 0.9 for muddy-bottom streams). This allows you to correct for the fact that water at the surface travels faster than near the stream bottom due to resistance from gravel, cobble, etc. Multiplying the surface velocity by a correction coefficient decreases the value and gives a better measure of the stream's overall velocity.

T = Time, in seconds, for the float to travel the length of L

RESULTS

Baseline Water Quality

Sampling and analysis conducted by LADPW prior to implementation of the MMP is considered the baseline for water quality conditions at the site. The results of analyses conducted in April 2000 are presented in **Table 5**. Higher bacteria and turbidity observed in the 4/18/00 samples are attributable to a rain event. Phosphorus levels were also high in the 4/18/00 samples, perhaps due to release from sediments.

Third Quarter 2005 Results

Water Quality

Results of analyses conducted by MWH 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 except the matrix spikes and matrix spike duplicates for nitrite-nitrogen and Kjeldahl nitrogen. Since Laboratory Control Standards (LCSs) were within control limits for these parameters, data are deemed acceptable as reported.

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
3rd Quarter 2005 (10/25/05)

Parameter	Units	Inflow to Tujunga Ponds 1	Inflow to Tujunga Ponds 2 (duplicate)	Outflow from Tujunga Ponds 1	Outflow from Tujunga Ponds 2 (duplicate)	Big Tujunga Wash 1	Big Tujunga Wash 2 (duplicate)	Haines Cyn Creek exiting site 1	Haines Cyn Creek exiting site 2 (duplicate)
Temperature	°C	19.0	--	19.0	--	19.9	--	18.5	--
Dissolved Oxygen	mg/L	4.5	--	4.8	--	8.3	--	8.3	--
pH	std units	6.9	--	6.9	--	8.6	--	7.9	--
Total residual chlorine	mg/L	ND	--	ND	--	ND	--	ND	--
Ammonia-Nitrogen	mg/L	0.08	0.09	0.09	0.09	ND	ND	ND	ND
Kjeldahl Nitrogen	mg/L	0.35	0.31	0.30	0.28	0.24	0.24	0.34	0.27
Nitrite-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-Nitrogen	mg/L	2.8	2.8	2.9	2.9	ND	ND	2.8	2.8
Orthophosphate-P	mg/L	0.040	0.039	0.040	0.040	ND	ND	0.044	0.042
Total phosphorus-P	mg/L	ND	0.031	ND	ND	ND	ND	ND	ND
Glyphosate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Chloropyrifos*	ng/L	ND	ND	ND	ND	ND	ND	ND	ND
Turbidity	NTU	0.50	0.60	0.65	0.70	3.5	3.6	1.7	0.50
Fecal Coliform Bacteria	MPN/100ml	50	13	50	50	17	13	80	130
Total Coliform Bacteria	MPN/100ml	1,400	1,100	3,000	500	700	1,600	1,600	2,200

-- No duplicate samples are taken for field measurements.

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

* The analytical method used for chloropyrifos (diazinon/chlorpyrifos by GCMS, EPA 625) also tests for the following chemicals: diazinon, sulprofos, demeton, dichlorvos, disulfoton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malathion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate. Samples for this quarter were all non-detect for these EPA 625 parameters.

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 the third quarter of 2005 are summarized in **Table** 7.

Table 7
Estimated Flows for 3rd Quarter 2005

Sampling Date	Flow (cubic feet per second)		
	Outlet of Big Tujunga Ponds	Haines Canyon Creek leaving the site	Big Tujunga Wash
10/25/2005	12.7	16.5	0.8

Comparison of Results with Baseline Data

Water quality in October 2005 was similar to baseline conditions for some parameters. Substantially higher bacteria and turbidity levels were observed in the 4/18/00 samples due to a rain event. Phosphorus levels were also higher in the April 2000 samples than in October 2005, perhaps, due to release from sediments.

Comparison of Results with Aquatic Life Criteria

Tables 8 and **12** present objectives established by the Los Angeles Regional Water Quality Control Board (Regional Board) for protection of beneficial uses in Big Tujunga Wash including wildlife habitat. EPA's criteria for freshwater aquatic life are also presented in **Tables 8, 9, 10, 11** and **13**.

Table 8
National and Local Recommended Water Quality Criteria - Freshwaters

Parameter	Basin Plan Objectives[a]	EPA Criteria		
		CMC	CCC	Human Health
Temperature (°C)	b	See Table 11	See Table 11	--
Dissolved oxygen (mg/L)	>7.0 mean >5.0 min	5.0[c] (warmwater, early life stages, 1-day minimum)	6.0[c] (warmwater, early life stages, 7-day mean)	--
pH	6.5 - 8.5	--	6.5-9.0[d,e]	5.0-9.0[d,e]
Total residual chlorine (mg/L)	0.1	0.019[d,e]	0.011[d,e]	4.0 (maximum residual disinfectant level goal)
Fecal coliform (MPN/100 ml)	200[f] (water contact recreation)	--	--	Swimming stds: 33[g] (geometric mean for enterococci) 126[g] (geometric mean for *E. coli*)
Ammonia-nitrogen (mg/L)	See Table 12	See Tables 9, 10, and 11	See Tables 9, 10, and 11	--
Nitrite-nitrogen (mg/L)	1	--	--	1 (primary drinking water std.)
Nitrate-nitrogen (mg/L)	10	--	--	10 (primary drinking water std.)
Total phosphorus (mg/L)	--	<0.05 – 0.1[e] (recommendation for streams, no criterion)		--
Turbidity (NTU)	h	i	i	5 (secondary drinking water standard) 0.5 – 1.0 (std. for systems that filter)

Notes:

-- No criterion

CMC Criteria Maximum Concentration or acute criterion

CCC Criteria Continuous Concentration or chronic criterion

a Source: California Regional Water Quality Control Board, Los Angeles Region. 1994. Water Quality Control Plan (Basin Plan).

b Narrative criterion: "The natural receiving water temperature of all regional waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses."

c Source: USEPA. 1986. Ambient Water Quality Criteria for Dissolved Oxygen. EPA 440-5-86-003. Washington, D.C.

d Source: USEPA. 1999. National Recommended Water Quality Criteria – Correction. EPA 822-Z-99-001. Washington, D.C.

e Source: USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

f Standard based on a minimum of not less than four samples for any 30-day period, 10% of total samples during any 30-day period shall not exceed 400/100ml.

g Source: USEPA. 1986. Ambient Water Quality Criteria for Bacteria – 1986. EPA 440-5-84-002. Washington, D.C.

h Narrative criterion: "Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses."

i Narrative criterion for freshwater fish and other aquatic life: "Settleable and suspended solids should not reduce the depth of the compensation point for photosynthetic activity by more than 10 percent from the seasonally established norm for aquatic life."

Table 9
Numeric Values of the Criterion Maximum Concentration (CMC) with Salmonids Present and Absent and the Criterion Continuous Concentration (CCC) for Ammonia Nitrogen (mg/L)

pH	CMC with Salmonids Present	CMC with Salmonids Absent	CCC
6.5	32.6	48.8	3.48
6.6	31.3	46.8	3.42
6.7	29.8	44.6	3.36
6.8	28.1	42.0	3.28
6.9	26.2	39.1	3.19
7.0	24.1	36.1	3.08
7.1	22.0	32.8	2.96
7.2	19.7	29.5	2.81
7.3	17.5	26.2	2.65
7.4	15.4	23.0	2.47
7.5	13.3	19.9	2.28
7.6	11.4	17.0	2.07
7.7	9.65	14.4	1.87
7.8	8.11	12.1	1.66
7.9	6.77	10.1	1.46
8.0	5.62	8.4	1.27
8.1	4.64	6.95	1.09
8.2	3.83	5.72	0.935
8.3	3.15	4.71	0.795
8.4	2.59	3.88	0.673
8.5	2.14	3.2	0.568
8.6	1.77	2.65	0.480
8.7	1.47	2.2	0.406
8.8	1.23	1.84	0.345
8.9	1.04	1.56	0.295
9.0	0.885	1.32	0.254

Source: USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 10
Temperature and pH-Dependent Values of the Ammonia-Nitrogen CCC (Chronic Criterion) for Fish Early Life Stages Absent

CCC for Fish Early Life Stages Absent, mg N/L										
	Temperature (°Celsius)									
pH	0-7	8	9	10	11	12	13	14	15*	16*
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	5.72
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	5.37
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49	5.15
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	4.90
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	4.61
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	4.30
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	3.97
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	3.61
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	3.25
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	2.54
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	2.21
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	1.91
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74	1.63
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	0.990
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892	0.836
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754	0.707
8.8	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684	0.641	0.601
8.9	0.917	0.860	0.806	0.756	0.709	0.664	0.623	0.584	0.548	0.513
9.0	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471	0.442

* At 15° C and above, the criterion for fish ELS absent is the same as the criterion for fish ELS present.

Source: USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 11
Temperature and pH-Dependent Values of the Ammonia-Nitrogen CCC (Chronic Criterion) for Fish Early Life Stages Present

CCC for Fish Early Life Stages Present, mg N/L										
pH	Temperature (° Celsius)									
	0	14	16	18	20	22	24	26	28	30
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

Source: USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 12
Maximum One-Hour Average Concentration for Total Ammonia ($mg/L\ NH_3$)

pH	Temperature (°Celsius)						
	0	5	10	15	20	25	30
6.50	35	33	31	30	29	20	14.3
6.75	32	30	28	27	27	18.6	13.2
7.00	28	26	25	24	23	16.4	11.6
7.25	23	22	20	19.7	19.2	13.4	9.5
7.50	17.4	16.3	15.5	14.9	14.6	10.2	7.3
7.75	12.2	11.4	10.9	10.5	10.3	7.2	5.2
8.00	8.0	7.5	7.1	6.9	6.8	4.8	3.5
8.25	4.5	4.2	4.1	4.0	3.9	2.8	2.1
8.50	2.6	2.4	2.3	2.3	2.3	1.71	1.28
8.75	1.47	1.40	1.37	1.38	1.42	1.07	0.83
9.00	0.86	0.83	0.83	0.86	0.91	0.72	0.58

Source: California Regional Water Quality Control Board, Los Angeles Region. 1994. Water Quality Control Plan (Basin Plan). Taken from USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

Table 13
Example Calculated Values for Maximum Weekly Average Temperature for Growth and Short-Term Maxima for Survival of Juvenile and Adult Fishes During the Summer

Species	Growth (°Celsius)	Maxima (°Celsius)
Black crappie	27	--
Bluegill	32	35
Channel catfish	32	35
Emerald shiner	30	--
Largemouth bass	32	34
Brook trout	19	24

Source: USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

DISCUSSION

Results from the third quarter of the 2005 sampling program are described by parameter in **Table 14**.

Table 14
Discussion of 3rd Quarter 2005 Big Tujunga Wash Sampling Results

Parameter	Discussion
Temperature	• Observed temperatures were below levels of concern for growth and survival of warmwater fish species. Temperatures in October 2005 were generally 1 to 3°C lower than previous third quarter sampling periods (late-September to early October of 2001, 2002, 2003 and 2004), likely due to the later sampling date (10/25) in 2005.
Dissolved oxygen	• The oxygen level in the inflow to Tujunga Ponds in October 2005 (4.5 mg/L) was 0.5 mg/L lower than the recommended minimum for warmwater species (5.0 mg/L), and was 0.6 to 4.0 mg/L lower than the third quarter sampling periods for 2001, 2002, 2003 and 2004. • The oxygen level in the outflow from Tujunga Ponds in October 2005 (4.8 mg/L) was 0.2 mg/L lower than the recommended minimum for warmwater species (5.0 mg/L), and was 3.5 to 5.7 mg/L lower than the third quarter sampling periods for 2001, 2002, 2003 and 2004. • The oxygen level in Haines Canyon Creek in October 2005 (8.3 mg/L) was 2.4 to 2.7 mg/L lower than the third quarters for 2003 and 2004, same as the third quarter of 2002, and 1 mg/L higher than the third quarter of 2001.
pH	• For three stations, the pH measurements were within the 6.5 to 8.5 range identified in the Basin Plan. Data from Big Tujunga Wash indicate a pH of 8.6, slightly above the upper range of the Basin Plan objective. Higher pH values (close to or exceeding 8.5) have been previously observed in Big Tujunga Wash (3/12/2001, 3/20/2003, 12/9/2004, 4/7/2005, 6/29/2005 and 6/30/2005).
Total residual chlorine	• No residual chlorine was detected at any station.
Nitrogen	• Nitrate-nitrogen at all stations was below the drinking water standard of 10 mg/L. • Low levels of ammonia were detected in inflow to and outflow from Tujunga Ponds. Observed levels (0.08 – 0.09 mg/L) are below acute and chronic criteria (see Tables 9 through 12.
Phosphorus	• Orthophosphate was present in low levels at all sampling stations except Big Tujunga Wash. Orthophosphate levels were within EPA's recommended range for streams to prevent excess algae growth (<0.05 – 0.1 mg/L as Total Phosphorus).
Glyphosate	• No glyphosate was detected at any station.
Chloropyrifos	• Chloropyrifos was added to the list of sampling parameters in the fourth quarter of 2004. Chloropyrifos and the other pesticides tested using EPA's analytical method 625 were not detected at any station in the third quarter of 2005.
Turbidity	• Turbidity levels were low (0.50 to 3.6 NTU) at all stations.
Bacteria	• Fecal coliform levels at all stations were below the water contact recreation standard of 200 MPN and in general similar to previous third quarter samples. Total coliform levels in the third quarter of 2005 were generally low.

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.

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.

Kjeldahl Nitrogen – Named for the laboratory technique used for detection, Kjeldahl nitrogen includes organic nitrogen and ammonia nitrogen.

Nitrate-Nitrogen – $NO3^-$-N is an essential nutrient for many photosynthetic autotrophs.

Nitrite-Nitrogen – $NO2^-$-N is an intermediate oxidation state of nitrogen, both in the oxidation of ammonia to nitrate and in the reduction of nitrate.

Orthophosphorus – the reactive form of phosphorus, commonly used as fertilizer.

pH – the hydrogen ion activity of water (pH) is measured on a logarithmic scale, ranging from 0 to 14. The pH of "pure" water at 25°C is 7.0 (neutral). Low pH is acidic; high pH is basic or alkaline.

Total Phosphorus – In natural waters, phosphorus occurs almost solely as orthophosphates, condensed phosphates, and organically bound phosphate. Phosphorus is essential to the growth of organisms.

Turbidity – attributable to the suspended and colloidal matter in water, including clay, silt, finely divided organic and inorganic matter, soluble colored organic compounds, and plankton and other microscopic organisms. The reduction of clearness in turbid waters diminishes the penetration of light and therefore can adversely affect photosynthesis.

APPENDIX A

BIG TUJUNGA WASH MITIGATION BANK WATER QUALITY MONITORING PROGRAM

LABORATORY RESULTS

MWH Laboratories
A Division of MWH Americas, Inc.

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

Applied Research Dept, MWH (Darren Giles)
327 West Maple Avenue

Monrovia , CA 91016

Attention: Darren Giles
Fax: (626) 359-3593

DATE OF ISSUE
NOV 2 8 2005
Linda Geddes
MWH LABORATORIES

LXG Linda Geddes
Project Manager

ACCREDITED IN ACCORDANCE WITH
nelac
01114CA

Report#: 159681
BIG-TJ

Laboratory certifies that the test results meet all **NELAC** requirements unless noted in the Comments section or the Case Narrative. Following the cover page are Comments,QC Report,QC Summary,Data Report,Hits Report, totaling 20 page[s].

MWH Laboratories

CHAIN OF CUSTODY RECORD

750 Royal Oaks Drive Suite 100
Monrovia Ca 91016 (626) 386-1100

MWHLABS USE ONLY: 159681

LOGIN COMMENTS:

SAMPLES CHECKED/LOGGED IN BY:

SAMPLE TEMP, RECEIPT AT LAB 16°C (Compliance: 4 +/- 2*C)

SAMPLES RECEIVED DAY OF COLLECTION? (check for yes)

BLUE ICE: FROZEN ___ PARTIALLY FROZEN ___ THAWED ___

TO BE COMPLETED BY SAMPLER: (check for yes)

TAT requested: STANDARD

COMPLIANCE SAMPLES - Requires state forms

NON-COMPLIANCE SAMPLES

REGULATION: (SDWA, Phase V, NPDES, FDA, ...)

PROJECT CODE	PROJECT JOB # / P.O.#	CLIENT CODE
Big TJ Sampling	1342289.5620.051801	ARD-DG

REFER TO ATTACHED BOTTLE ORDER FOR ANALYSES (check for yes)

SAMPLER(S): PRINTED NAME AND SIGNATURE: Darren Giles

ANALYSES REQUIRED (mark an 'X' in all tests required for each sample line)

TIME	DATE	SITE NAME or LOCATION	IDENTIFIER, STATE ID #	MATRIX	GRAB	COMP	T-P	O-PO4	TKN	NO2	NO3	Turbidity	Fecal Coli	Total Coli	Ammonia	Glyphosate	Diazinon					SAMPLER COMMENTS
11:30	10/25	SITE 1	Inflow to TJ Pond #1		X		X	X	X	X	X	X	X	X	X	X	X					
11:40	10/25	SITE 1	Inflow to TJ Pond #2		X		X	X	X	X	X	X	X	X	X	X	X					Bottle marked as outflow TJ POND 2
12:30	10/25	SITE 2	Outflow from TJ Pond #1		X		X	X	X	X	X	X	X	X	X	X	X					
12:40	10/25	SITE 2	Outflow from TJ Pond #2		X		X	X	X	X	X	X	X	X	X	X	X					
13:20	10/25	SITE 3	Big TJ Wash #1		X		X	X	X	X	X	X	X	X	X	X	X					
13:30	10/25	SITE 3	Big TJ Wash #2		X		X	X	X	X	X	X	X	X	X	X	X					RECEIVED 10/25/05 15:18
10:00	10/25	SITE 4	Haines Canyon Creek #1		X		X	X	X	X	X	X	X	X	X	X	X					
10:15	10/25	SITE 4	Haines Canyon Creek #2		X		X	X	X	X	X	X	X	X	X	X	X					

DLS 10/25/05 15:16 8

8 10/25/05

* MATRIX TYPES:

Reported by Volume:
RSW = Raw Surface Water
RGW = Raw Ground Water
FW = Other Finished Water
CFW = Chlor(am)inated Finished Water
SW = Storm Water
WW = Other Waste Water
CWW = Chlorinated Waste Water

Reported by Weight:
SO = Soil
SL = Sludge

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
RELINQUISHED BY:		D. GILES	MWH ARD	10/25/05	
RECEIVED BY:		Mike R	MWH	10/25/05	10:00

SPECIAL INSTRUCTIONS

MWH Laboratories
750 Royal Oaks Drive, Monrovia, CA 91016
PHONE: 626-386-1100/FAX: 626-386-1101

ACKNOWLEDGMENT OF SAMPLES RECEIVED

Applied Research Dept, MWH (Darren Giles)
327 West Maple Avenue
Monrovia, CA 91016
Attn: Darren Giles
Phone: (626) 303-5945

Customer Code: ARD-DG
PO#: 1341410.5620.011801
Group#: 159681
Project#: BIG-TJ
Proj Mgr: Linda Geddes
Phone: (626) 386-1163

The following samples were received from you on **10/25/05**. They have been scheduled for the tests listed beside each sample. If this information is incorrect, please contact your service representative. Thank you for using MWH Laboratories.

Sample#	Sample Id / Tests Scheduled			Matrix		Sample Date	
2510250143	SITE 1 INFLOW TO TJ POND 1			Water		25-oct-2005 11:30:00	
	@DIAZEDD	FECCOL		GLYPHOS	NH3	NO2-N	NO3
	NO3A	OPO4		T-P	TKN	TOTCOL	TURB
2510250149	SITE 1 INFLOW TO TJ POND 2			Water		25-oct-2005 11:45:00	
	@DIAZEDD	FECCOL		GLYPHOS	NH3	NO2-N	NO3
	NO3A	OPO4		T-P	TKN	TOTCOL	TURB
2510250150	SITE 2 OUTFLOW FRM TJ POUND 1			Water		25-oct-2005 12:30:00	
	@DIAZEDD	FECCOL		GLYPHOS	NH3	NO2-N	NO3
	NO3A	OPO4		T-P	TKN	TOTCOL	TURB
2510250151	SITE 2 OUTFLOW FRM TJ POUND 2			Water		25-oct-2005 12:40:00	
	@DIAZEDD	FECCOL		GLYPHOS	NH3	NO2-N	NO3
	NO3A	OPO4		T-P	TKN	TOTCOL	TURB
2510250152	SITE 3 BIG TJ WASH 1			Water		25-oct-2005 13:20:00	
	@DIAZEDD	FECCOL		GLYPHOS	NH3	NO2-N	NO3
	NO3A	OPO4		T-P	TKN	TOTCOL	TURB
2510250153	SITE 3 BIG TJ WASH 2			Water		25-oct-2005 13:30:00	
	@DIAZEDD	FECCOL		GLYPHOS	NH3	NO2-N	NO3
	NO3A	OPO4		T-P	TKN	TOTCOL	TURB
2510250154	SITE 4 HAINES CANYON CREEK 1			Water		25-oct-2005 10:00:00	
	@DIAZEDD	FECCOL		GLYPHOS	NH3	NO2-N	NO3
	NO3A	OPO4		T-P	TKN	TOTCOL	TURB
2510250155	SITE 4 HAINES CANYON CREEK 2			Water		25-oct-2005 10:15:00	
	@DIAZEDD	FECCOL		GLYPHOS	NH3	NO2-N	NO3
	NO3A	OPO4		T-P	TKN	TOTCOL	TURB

Test Acronym Description

Test Acronym	Description
@DIAZEDD	Diazinon/Chlorpyrifos by GCMS
FECCOL	Fecal Coliform Bacteria
GLYPHOS	Glyphosate
NH3	Ammonia Nitrogen
NO2-N	Nitrite, Nitrogen by IC

Applied Research Dept, MWH (Darren Giles)
327 West Maple Avenue
Monrovia, CA 91016
Attn: Darren Giles
Phone: (626) 303-5945

Customer Code: ARD-DG
PO#: 1341410.5620.011801
Group#: 159681
Project#: BIG-TJ
Proj Mgr: Linda Geddes
Phone: (626) 386-1163

Test Acronym Description

Test Acronym	Description
NO3	Nitrate as Nitrogen by IC
NO3A	Nitrate as NO3
OPO4	Orthophosphate-P
T-P	Total phosphorus-P
TKN	Kjeldahl Nitrogen
TOTCOL	Total Coliform Bacteria
TURB	Turbidity

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Report Comments #159681

Group Comments

Analytical results for Diazinon/Chlorpyrifos by GCMS are submitted by CRG Marine Laboratories, Torrance, CA. ELAP 2261

(QC Ref#: 2510250149)

Test: Total phosphorus-P (S4500PE/ 365.1)

M1 - Matrix spike recovery was high, the method control sample recovery was acceptable.

(QC Ref#: 292533)

Test: Nitrite, Nitrogen by IC (ML/EPA 300.0)

QC Type: MS

Recovery above method limits. Default to LCS1, LCS2.

QC Type: MSD

Recovery above method limits. Default to LCS1, LCS2.

(QC Ref#: 293698)

Test: Kjeldahl Nitrogen (ML/EPA 351.2)

QC Type: MS

Recovery above method limits. Default to LCS1, LCS2.

QC Type: MSD

Recovery above method limits. Default to LCS1, LCS2.

MWH Laboratories
A Division of MWH Americas, Inc.

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
Hits Report
#159681

Applied Research Dept, MWH (Darren Giles)
Darren Giles
327 West Maple Avenue
Monrovia , CA 91016

Samples Received

25-oct-2005 15:45:58

Analyzed	Sample#	Sample ID	Result	Federal MCL	UNITS	MRL
	2510250143	**SITE 1 INFLOW TO TJ POND 1**				
11/09/05	Ammonia Nitrogen		0.08		mg/l	0.05
10/25/05	Fecal Coliform Bacteria		50		MPN/100 mL	2
11/02/05	Kjeldahl Nitrogen		0.35		mg/l	0.2
10/25/05	Nitrate as NO3 (calc)		12	45	mg/l	0.88
10/25/05	Nitrate as Nitrogen by IC		2.8	10	mg/l	0.2
10/25/05	Orthophosphate-P		0.040		mg/l	0.01
10/25/05	Total Coliform Bacteria		1400		MPN/100 mL	2
10/25/05	Turbidity		0.50	5	NTU	0.05
	2510250149	**SITE 1 INFLOW TO TJ POND 2**				
11/09/05	Ammonia Nitrogen		0.09		mg/l	0.05
10/25/05	Fecal Coliform Bacteria		13		MPN/100 mL	2
11/02/05	Kjeldahl Nitrogen		0.31		mg/l	0.2
10/25/05	Nitrate as NO3 (calc)		12	45	mg/l	0.88
10/25/05	Nitrate as Nitrogen by IC		2.8	10	mg/l	0.2
10/25/05	Orthophosphate-P		0.039		mg/l	0.01
10/25/05	Total Coliform Bacteria		1100		MPN/100 mL	2
11/07/05	Total phosphorus-P		0.031		mg/l	0.01
10/25/05	Turbidity		0.60	5	NTU	0.05
	2510250150	**SITE 2 OUTFLOW FRM TJ POUND 1**				
11/09/05	Ammonia Nitrogen		0.09		mg/l	0.05
10/25/05	Fecal Coliform Bacteria		50		MPN/100 mL	2
11/02/05	Kjeldahl Nitrogen		0.30		mg/l	0.2
10/25/05	Nitrate as NO3 (calc)		13	45	mg/l	0.88
10/25/05	Nitrate as Nitrogen by IC		2.9	10	mg/l	0.2
10/25/05	Orthophosphate-P		0.040		mg/l	0.01

SUMMARY OF POSITIVE DATA ONLY.

MWH Laboratories
A Division of MWH Americas, Inc.

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 Hits Report #159681

Applied Research Dept, MWH (Darren Giles)
Darren Giles
327 West Maple Avenue
Monrovia , CA 91016

Samples Received
25-oct-2005 15:45:58

Analyzed	Sample#	Sample ID	Result	Federal MCL	UNITS	MRL
	2510250150	**SITE 2 OUTFLOW FRM TJ POUND 1**				
10/25/05	Total Coliform Bacteria		3000		MPN/100 mL	2
10/25/05	Turbidity		0.65	5	NTU	0.05
	2510250151	**SITE 2 OUTFLOW FRM TJ POUND 2**				
11/09/05	Ammonia Nitrogen		0.09		mg/l	0.05
10/25/05	Fecal Coliform Bacteria		50		MPN/100 mL	2
11/02/05	Kjeldahl Nitrogen		0.28		mg/l	0.2
10/25/05	Nitrate as NO3 (calc)		13	45	mg/l	0.88
10/25/05	Nitrate as Nitrogen by IC		2.9	10	mg/l	0.2
10/25/05	Orthophosphate-P		0.040		mg/l	0.01
10/25/05	Total Coliform Bacteria		500		MPN/100 mL	2
10/25/05	Turbidity		0.70	5	NTU	0.05
	2510250152	**SITE 3 BIG TJ WASH 1**				
10/25/05	Fecal Coliform Bacteria		17		MPN/100 mL	2
11/02/05	Kjeldahl Nitrogen		0.24		mg/l	0.2
10/25/05	Total Coliform Bacteria		700		MPN/100 mL	2
10/25/05	Turbidity		3.5	5	NTU	0.05
	2510250153	**SITE 3 BIG TJ WASH 2**				
10/25/05	Fecal Coliform Bacteria		13		MPN/100 mL	2
11/02/05	Kjeldahl Nitrogen		0.24		mg/l	0.2
10/25/05	Total Coliform Bacteria		1600		MPN/100 mL	2
10/25/05	Turbidity		3.6	5	NTU	0.05
	2510250154	**SITE 4 HAINES CANYON CREEK 1**				

SUMMARY OF POSITIVE DATA ONLY.

MWH Laboratories
A Division of MWH Americas, Inc.

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 Hits Report #159681

Applied Research Dept, MWH (Darren Giles)
Darren Giles
327 West Maple Avenue
Monrovia , CA 91016

Samples Received

25-oct-2005 15:45:58

Analyzed	Sample#	Sample ID	Result	Federal MCL	UNITS	MRL
	2510250154	**SITE 4 HAINES CANYON CREEK 1**				
10/25/05	Fecal Coliform Bacteria		80		MPN/100 mL	2
11/02/05	Kjeldahl Nitrogen		0.34		mg/l	0.2
10/25/05	Nitrate as NO3 (calc)		12	45	mg/l	0.88
10/25/05	Nitrate as Nitrogen by IC		2.8	10	mg/l	0.2
10/25/05	Orthophosphate-P		0.044		mg/l	0.01
10/25/05	Total Coliform Bacteria		1600		MPN/100 mL	2
10/25/05	Turbidity		1.7	5	NTU	0.05
	2510250155	**SITE 4 HAINES CANYON CREEK 2**				
10/25/05	Fecal Coliform Bacteria		130		MPN/100 mL	2
11/02/05	Kjeldahl Nitrogen		0.27		mg/l	0.2
10/25/05	Nitrate as NO3 (calc)		12	45	mg/l	0.88
10/25/05	Nitrate as Nitrogen by IC		2.8	10	mg/l	0.2
10/25/05	Orthophosphate-P		0.042		mg/l	0.01
10/25/05	Total Coliform Bacteria		2200		MPN/100 mL	2
10/25/05	Turbidity		0.50	5	NTU	0.05

SUMMARY OF POSITIVE DATA ONLY.

MWH Laboratories
A Division of MWH Americas, Inc.

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
Data Report
#159681

Applied Research Dept, MWH (Darren Giles)
Darren Giles
327 West Maple Avenue
Monrovia , CA 91016

Samples Received

10/25/05

SITE 1 INFLOW TO TJ POND 1 (2510250143) Sampled on 10/25/05 11:30

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	10/25/05 15:58		(ML/SM9221C)	Fecal Coliform Bacteria	50	MPNM	2	1
	10/26/05 00:00	292801	(ML/EPA 547)	Glyphosate	ND	ug/l	6	1
	11/09/05 00:00	294348	(ML/EPA 350.1)	Ammonia Nitrogen	0.08	mg/l	0.05	1
	10/25/05 18:35	292532	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.2	2
	10/25/05 18:35	292535	(EPA/MW 300.0)	Nitrate as Nitrogen by IC	2.8	mg/l	0.2	2
	10/25/05 18:35	292527	( )	Nitrate as NO3 (calc)	12	mg/l	0.88	2
	10/25/05 17:30	292617	(4500P-E/365.2)	Orthophosphate-P	0.040	mg/l	0.01	1
	11/07/05 00:00	294153	(S4500PE/ 365.1)	Total phosphorus-P	ND	mg/l	0.01	1
	11/02/05 00:00	293698	(ML/EPA 351.2)	Kjeldahl Nitrogen	0.35	mg/l	0.2	1
	10/25/05 15:58		(ML/SM9221B)	Total Coliform Bacteria	1400	MPNM	2	1
	10/25/05 16:11	292521	(ML/EPA 180.1)	Turbidity	0.50	NTU	0.05	1

Diazinon/Chlorpyrifos by GCMS

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	11/08/05 00:00		(EPA 625 MODSUB)	Diazinon	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Bolstar (Sulprofos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Chlorpyrifos	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Demeton	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Dichlorvos	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Disulfoton	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Dimethoate	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Ethoprop (Ethoprophos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fenchlorophos (Ronnel)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fensulfothion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fenthion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Merphos	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Mevinphos (Phosdrin)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Malathion	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Parathion-methyl	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Phorate	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Tokuthion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Tetrachlorovinphos (Stirophos)	ND	ng/l	10	1

MWH Laboratories
A Division of MWH Americas, Inc.

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
Data Report
#159681

Applied Research Dept, MWH (Darren Giles)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	11/08/05 00:00		(EPA 625 MODSUB)	Trichloronate	ND	ng/l	10	1

SITE 1 INFLOW TO TJ POND 2 (2510250149) Sampled on 10/25/05 11:45

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	10/25/05 15:58		(ML/SM9221C)	Fecal Coliform Bacteria	13	MPNM	2	1
	10/26/05 00:00	292801	(ML/EPA 547)	Glyphosate	ND	ug/l	6	1
	11/09/05 00:00	294348	(ML/EPA 350.1)	Ammonia Nitrogen	0.09	mg/l	0.05	1
	10/25/05 18:58	292532	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.2	2
	10/25/05 18:58	292535	(EPA/MW 300.0)	Nitrate as Nitrogen by IC	2.8	mg/l	0.2	2
	10/25/05 18:58	292527	( )	Nitrate as NO3 (calc)	12	mg/l	0.88	2
	10/25/05 17:30	292617	(4500P-E/365.2)	Orthophosphate-P	0.039	mg/l	0.01	1
	11/07/05 00:00	294153	(S4500PE/ 365.1)	Total phosphorus-P	0.031(M1)	mg/l	0.01	1
	11/02/05 00:00	293698	(ML/EPA 351.2)	Kjeldahl Nitrogen	0.31	mg/l	0.2	1
	10/25/05 15:58		(ML/SM9221B)	Total Coliform Bacteria	1100	MPNM	2	1
	10/25/05 16:11	292521	(ML/EPA 180.1)	Turbidity	0.60	NTU	0.05	1

Diazinon/Chlorpyrifos by GCMS

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	11/08/05 00:00		(EPA 625 MODSUB)	Diazinon	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Bolstar (Sulprofos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Chlorpyrifos	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Demeton	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Dichlorvos	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Disulfoton	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Dimethoate	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Ethoprop (Ethoprophos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fenchlorophos (Ronnel)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fensulfothion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fenthion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Merphos	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Mevinphos (Phosdrin)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Malathion	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Parathion-methyl	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Phorate	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Tokuthion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Tetrachlorovinphos (Stirophos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Trichloronate	ND	ng/l	10	1

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
SITE 2 OUTFLOW FRM TJ POUND 1 (2510250150) Sampled on 10/25/05 12:30								
	10/25/05 15:58		(ML/SM9221C)	Fecal Coliform Bacteria	50	MPNM	2	1
	10/26/05 00:00	292801	(ML/EPA 547)	Glyphosate	ND	ug/l	6	1
	11/09/05 00:00	294348	(ML/EPA 350.1)	Ammonia Nitrogen	0.09	mg/l	0.05	1
	10/25/05 19:10	292532	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.2	2
	10/25/05 19:10	292535	(EPA/MW 300.0)	Nitrate as Nitrogen by IC	2.9	mg/l	0.2	2
	10/25/05 19:10	292527	( )	Nitrate as NO3 (calc)	13	mg/l	0.88	2
	10/25/05 17:30	292617	(4500P-E/365.2)	Orthophosphate-P	0.040	mg/l	0.01	1
	11/07/05 00:00	294153	(S4500PE/ 365.1)	Total phosphorus-P	ND	mg/l	0.01	1
	11/02/05 00:00	293698	(ML/EPA 351.2)	Kjeldahl Nitrogen	0.30	mg/l	0.2	1
	10/25/05 15:58		(ML/SM9221B)	Total Coliform Bacteria	3000	MPNM	2	1
	10/25/05 16:11	292521	(ML/EPA 180.1)	Turbidity	0.65	NTU	0.05	1
			Diazinon/Chlorpyrifos by GCMS					
	11/08/05 00:00		(EPA 625 MODSUB)	Diazinon	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Bolstar (Sulprofos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Chlorpyrifos	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Demeton	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Dichlorvos	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Disulfoton	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Dimethoate	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Ethoprop (Ethoprophos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fenchlorophos (Ronnel)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fensulfothion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fenthion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Merphos	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Mevinphos (Phosdrin)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Malathion	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Parathion-methyl	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Phorate	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Tokuthion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Tetrachlorovinphos (Stirophos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Trichloronate	ND	ng/l	10	1

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
SITE 2 OUTFLOW FRM TJ POUND 2 (2510250151)					**Sampled on**	**10/25/05 12:40**		
	10/25/05 15:58		(ML/SM9221C)	Fecal Coliform Bacteria	50	MPNM	2	1
	10/26/05 00:00	292801	(ML/EPA 547)	Glyphosate	ND	ug/l	6	1
	11/09/05 00:00	294348	(ML/EPA 350.1)	Ammonia Nitrogen	0.09	mg/l	0.05	1
	10/25/05 19:22	292532	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.2	2
	10/25/05 19:22	292535	(EPA/MW 300.0)	Nitrate as Nitrogen by IC	2.9	mg/l	0.2	2
	10/25/05 19:22	292527	( )	Nitrate as NO3 (calc)	13	mg/l	0.88	2
	10/25/05 17:30	292617	(4500P-E/365.2)	Orthophosphate-P	0.040	mg/l	0.01	1
	11/07/05 00:00	294153	(S4500PE/ 365.1)	Total phosphorus-P	ND	mg/l	0.01	1
	11/02/05 00:00	293698	(ML/EPA 351.2)	Kjeldahl Nitrogen	0.28	mg/l	0.2	1
	10/25/05 15:58		(ML/SM9221B)	Total Coliform Bacteria	500	MPNM	2	1
	10/25/05 16:11	292521	(ML/EPA 180.1)	Turbidity	0.70	NTU	0.05	1
			Diazinon/Chlorpyrifos by GCMS					
	11/08/05 00:00		(EPA 625 MODSUB)	Diazinon	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Bolstar (Sulprofos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Chlorpyrifos	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Demeton	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Dichlorvos	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Disulfoton	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Dimethoate	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Ethoprop (Ethoprophos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fenchlorophos (Ronnel)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fensulfothion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fenthion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Merphos	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Mevinphos (Phosdrin)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Malathion	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Parathion-methyl	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Phorate	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Tokuthion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Tetrachlorovinphos (Stirophos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Trichloronate	ND	ng/l	10	1

MWH Laboratories
A Division of MWH Americas, Inc.

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
Data Report
#159681

Applied Research Dept, MWH (Darren Giles)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
SITE 3 BIG TJ WASH 1 (2510250152) Sampled on 10/25/05 13:20								
	10/25/05 15:58		(ML/SM9221C)	Fecal Coliform Bacteria	17	MPNM	2	1
	10/26/05 00:00	292801	(ML/EPA 547)	Glyphosate	ND	ug/l	6	1
	11/09/05 00:00	294348	(ML/EPA 350.1)	Ammonia Nitrogen	ND	mg/l	0.05	1
	10/25/05 19:33	292532	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.2	2
	10/25/05 19:33	292535	(EPA/MW 300.0)	Nitrate as Nitrogen by IC	ND	mg/l	0.2	2
	10/25/05 19:33	292527	( )	Nitrate as NO3 (calc)	ND	mg/l	0.88	2
	10/25/05 17:30	292617	(4500P-E/365.2)	Orthophosphate-P	ND	mg/l	0.01	1
	11/07/05 00:00	294153	(S4500PE/ 365.1)	Total phosphorus-P	ND	mg/l	0.02	2
	11/02/05 00:00	293698	(ML/EPA 351.2)	Kjeldahl Nitrogen	0.24	mg/l	0.2	1
	10/25/05 15:58		(ML/SM9221B)	Total Coliform Bacteria	700	MPNM	2	1
	10/25/05 16:11	292521	(ML/EPA 180.1)	Turbidity	3.5	NTU	0.05	1
			Diazinon/Chlorpyrifos by GCMS					
	11/08/05 00:00		(EPA 625 MODSUB)	Diazinon	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Bolstar (Sulprofos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Chlorpyrifos	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Demeton	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Dichlorvos	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Disulfoton	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Dimethoate	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Ethoprop (Ethoprophos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fenchlorophos (Ronnel)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fensulfothion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fenthion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Merphos	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Mevinphos (Phosdrin)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Malathion	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Parathion-methyl	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Phorate	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Tokuthion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Tetrachlorovinphos (Stirophos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Trichloronate	ND	ng/l	10	1

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
SITE 3 BIG TJ WASH 2 (2510250153)			**Sampled on 10/25/05 13:30**					
	10/25/05 15:58		(ML/SM9221C)	Fecal Coliform Bacteria	13	MPNM	2	1
	10/27/05 00:00	292805	(ML/EPA 547)	Glyphosate	ND	ug/l	6	1
	11/09/05 00:00	294348	(ML/EPA 350.1)	Ammonia Nitrogen	ND	mg/l	0.05	1
	10/25/05 19:45	292532	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.2	2
	10/25/05 19:45	292535	(EPA/MW 300.0)	Nitrate as Nitrogen by IC	ND	mg/l	0.2	2
	10/25/05 19:45	292527	( )	Nitrate as NO3 (calc)	ND	mg/l	0.88	2
	10/25/05 17:30	292617	(4500P-E/365.2)	Orthophosphate-P	ND	mg/l	0.01	1
	11/07/05 00:00	294153	(S4500PE/ 365.1)	Total phosphorus-P	ND	mg/l	0.02	2
	11/02/05 00:00	293698	(ML/EPA 351.2)	Kjeldahl Nitrogen	0.24	mg/l	0.2	1
	10/25/05 15:58		(ML/SM9221B)	Total Coliform Bacteria	1600	MPNM	2	1
	10/25/05 16:11	292521	(ML/EPA 180.1)	Turbidity	3.6	NTU	0.05	1
			Diazinon/Chlorpyrifos by GCMS					
	11/08/05 00:00		(EPA 625 MODSUB)	Diazinon	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Bolstar (Sulprofos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Chlorpyrifos	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Demeton	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Dichlorvos	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Disulfoton	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Dimethoate	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Ethoprop (Ethoprophos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fenchlorophos (Ronnel)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fensulfothion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fenthion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Merphos	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Mevinphos (Phosdrin)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Malathion	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Parathion-methyl	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Phorate	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Tokuthion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Tetrachlorovinphos (Stirophos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Trichloronate	ND	ng/l	10	1

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution

SITE 4 HAINES CANYON CREEK 1 (2510250154) Sampled on 10/25/05 10:00

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	10/25/05 15:58		(ML/SM9221C)	Fecal Coliform Bacteria	80	MPNM	2	1
	10/27/05 00:00	292805	(ML/EPA 547)	Glyphosate	ND	ug/l	6	1
	11/09/05 00:00	294348	(ML/EPA 350.1)	Ammonia Nitrogen	ND	mg/l	0.05	1
	10/25/05 21:41	292533	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.2	2
	10/25/05 21:41	292536	(EPA/MW 300.0)	Nitrate as Nitrogen by IC	2.8	mg/l	0.2	2
	10/25/05 21:41	292528	( )	Nitrate as NO3 (calc)	12	mg/l	0.88	2
	10/25/05 17:30	292617	(4500P-E/365.2)	Orthophosphate-P	0.044	mg/l	0.01	1
	11/07/05 00:00	294153	(S4500PE/ 365.1)	Total phosphorus-P	ND	mg/l	0.01	1
	11/02/05 00:00	293698	(ML/EPA 351.2)	Kjeldahl Nitrogen	0.34	mg/l	0.2	1
	10/25/05 15:58		(ML/SM9221B)	Total Coliform Bacteria	1600	MPNM	2	1
	10/25/05 16:11	292521	(ML/EPA 180.1)	Turbidity	1.7	NTU	0.05	1

Diazinon/Chlorpyrifos by GCMS

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
	11/08/05 00:00		(EPA 625 MODSUB)	Diazinon	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Bolstar (Sulprofos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Chlorpyrifos	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Demeton	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Dichlorvos	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Disulfoton	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Dimethoate	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Ethoprop (Ethoprophos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fenchlorophos (Ronnel)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fensulfothion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fenthion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Merphos	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Mevinphos (Phosdrin)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Malathion	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Parathion-methyl	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Phorate	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Tokuthion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Tetrachlorovinphos (Stirophos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Trichloronate	ND	ng/l	10	1

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

Prepared	Analyzed	QC Ref#	Method	Analyte	Result	Units	MRL	Dilution
SITE 4 HAINES CANYON CREEK 2 (2510250155)				**Sampled on 10/25/05 10:15**				
	10/25/05 15:58		(ML/SM9221C)	Fecal Coliform Bacteria	130	MPNM	2	1
	10/27/05 00:00	292805	(ML/EPA 547)	Glyphosate	ND	ug/l	6	1
	11/09/05 00:00	294348	(ML/EPA 350.1)	Ammonia Nitrogen	ND	mg/l	0.05	1
	10/25/05 19:56	292532	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.2	2
	10/25/05 19:56	292535	(EPA/MW 300.0)	Nitrate as Nitrogen by IC	2.8	mg/l	0.2	2
	10/25/05 19:56	292527	( )	Nitrate as NO3 (calc)	12	mg/l	0.88	2
	10/25/05 17:30	292617	(4500P-E/365.2)	Orthophosphate-P	0.042	mg/l	0.01	1
	11/07/05 00:00	294153	(S4500PE/ 365.1)	Total phosphorus-P	ND	mg/l	0.01	1
	11/02/05 00:00	293698	(ML/EPA 351.2)	Kjeldahl Nitrogen	0.27	mg/l	0.2	1
	10/25/05 15:58		(ML/SM9221B)	Total Coliform Bacteria	2200	MPNM	2	1
	10/25/05 16:11	292521	(ML/EPA 180.1)	Turbidity	0.50	NTU	0.05	1
				Diazinon/Chlorpyrifos by GCMS				
	11/08/05 00:00		(EPA 625 MODSUB)	Diazinon	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Bolstar (Sulprofos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Chlorpyrifos	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Demeton	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Dichlorvos	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Disulfoton	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Dimethoate	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Ethoprop (Ethoprophos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fenchlorophos (Ronnel)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fensulfothion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Fenthion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Merphos	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Mevinphos (Phosdrin)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Malathion	ND	ng/l	5	1
	11/08/05 00:00		(EPA 625 MODSUB)	Parathion-methyl	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Phorate	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Tokuthion	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Tetrachlorovinphos (Stirophos)	ND	ng/l	10	1
	11/08/05 00:00		(EPA 625 MODSUB)	Trichloronate	ND	ng/l	10	1

MWH Laboratories
A Division of MWH Americas, Inc.

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
QC Summary
#159681

Applied Research Dept, MWH (Darren Giles)

QC Ref #292521 - Turbidity **Analysis Date: 10/25/2005**

2510250143	SITE 1 INFLOW TO TJ POND	Analyzed by: sar
2510250149	SITE 1 INFLOW TO TJ POND	Analyzed by: sar
2510250150	SITE 2 OUTFLOW FRM TJ PO	Analyzed by: sar
2510250151	SITE 2 OUTFLOW FRM TJ POU	Analyzed by: sar
2510250152	SITE 3 BIG TJ WASH 1	Analyzed by: sar
2510250153	SITE 3 BIG TJ WASH 2	Analyzed by: sar
2510250154	SITE 4 HAINES CANYON CREE	Analyzed by: sar
2510250155	SITE 4 HAINES CANYON CREE	Analyzed by: sar

QC Ref #292527 - Nitrate as NO3 (calc) **Analysis Date: 10/25/2005**

2510250143	SITE 1 INFLOW TO TJ POND	Analyzed by: gdt
2510250149	SITE 1 INFLOW TO TJ POND	Analyzed by: gdt
2510250150	SITE 2 OUTFLOW FRM TJ PO	Analyzed by: gdt
2510250151	SITE 2 OUTFLOW FRM TJ POU	Analyzed by: gdt
2510250152	SITE 3 BIG TJ WASH 1	Analyzed by: gdt
2510250153	SITE 3 BIG TJ WASH 2	Analyzed by: gdt
2510250155	SITE 4 HAINES CANYON CREE	Analyzed by: gdt

QC Ref #292528 - Nitrate as NO3 (calc) **Analysis Date: 10/25/2005**

2510250154	SITE 4 HAINES CANYON CREE	Analyzed by: gdt

QC Ref #292532 - Nitrite, Nitrogen by IC **Analysis Date: 10/25/2005**

2510250143	SITE 1 INFLOW TO TJ POND	Analyzed by: gdt
2510250149	SITE 1 INFLOW TO TJ POND	Analyzed by: gdt
2510250150	SITE 2 OUTFLOW FRM TJ PO	Analyzed by: gdt
2510250151	SITE 2 OUTFLOW FRM TJ POU	Analyzed by: gdt
2510250152	SITE 3 BIG TJ WASH 1	Analyzed by: gdt
2510250153	SITE 3 BIG TJ WASH 2	Analyzed by: gdt
2510250155	SITE 4 HAINES CANYON CREE	Analyzed by: gdt

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

QC Ref #292533 - Nitrite, Nitrogen by IC Analysis Date: 10/25/2005

2510250154	SITE 4 HAINES CANYON CREE	Analyzed by: gdt

QC Ref #292535 - Nitrate as Nitrogen by IC Analysis Date: 10/25/2005

2510250143	SITE 1 INFLOW TO TJ POND	Analyzed by: gdt
2510250149	SITE 1 INFLOW TO TJ POND	Analyzed by: gdt
2510250150	SITE 2 OUTFLOW FRM TJ PO	Analyzed by: gdt
2510250151	SITE 2 OUTFLOW FRM TJ POU	Analyzed by: gdt
2510250152	SITE 3 BIG TJ WASH 1	Analyzed by: gdt
2510250153	SITE 3 BIG TJ WASH 2	Analyzed by: gdt
2510250155	SITE 4 HAINES CANYON CREE	Analyzed by: gdt

QC Ref #292536 - Nitrate as Nitrogen by IC Analysis Date: 10/25/2005

2510250154	SITE 4 HAINES CANYON CREE	Analyzed by: gdt

QC Ref #292617 - Orthophosphate-P Analysis Date: 10/25/2005

2510250143	SITE 1 INFLOW TO TJ POND	Analyzed by: dis
2510250149	SITE 1 INFLOW TO TJ POND	Analyzed by: dis
2510250150	SITE 2 OUTFLOW FRM TJ PO	Analyzed by: dis
2510250151	SITE 2 OUTFLOW FRM TJ POU	Analyzed by: dis
2510250152	SITE 3 BIG TJ WASH 1	Analyzed by: dis
2510250153	SITE 3 BIG TJ WASH 2	Analyzed by: dis
2510250154	SITE 4 HAINES CANYON CREE	Analyzed by: dis
2510250155	SITE 4 HAINES CANYON CREE	Analyzed by: dis

QC Ref #292801 - Glyphosate Analysis Date: 10/26/2005

2510250143	SITE 1 INFLOW TO TJ POND	Analyzed by: phk
2510250149	SITE 1 INFLOW TO TJ POND	Analyzed by: phk
2510250150	SITE 2 OUTFLOW FRM TJ PO	Analyzed by: phk
2510250151	SITE 2 OUTFLOW FRM TJ POU	Analyzed by: phk
2510250152	SITE 3 BIG TJ WASH 1	Analyzed by: phk

MWH Laboratories
A Division of MWH Americas, Inc.

750 Royal Oaks Drive, Suite 100
Monrovia, California 91016-3829
Tel: 626 386 1100
Fax: 626 386 1101
1 800 566 LABS (1 800 566 5227)

Applied Research Dept, MWH (Darren Giles)
(continued)

QC Ref #292805 - Glyphosate **Analysis Date: 10/27/2005**

2510250153	SITE 3 BIG TJ WASH 2	Analyzed by: phk
2510250154	SITE 4 HAINES CANYON CREE	Analyzed by: phk
2510250155	SITE 4 HAINES CANYON CREE	Analyzed by: phk

QC Ref #293698 - Kjeldahl Nitrogen **Analysis Date: 11/02/2005**

2510250143	SITE 1 INFLOW TO TJ POND	Analyzed by: bxr
2510250149	SITE 1 INFLOW TO TJ POND	Analyzed by: bxr
2510250150	SITE 2 OUTFLOW FRM TJ PO	Analyzed by: bxr
2510250151	SITE 2 OUTFLOW FRM TJ POU	Analyzed by: bxr
2510250152	SITE 3 BIG TJ WASH 1	Analyzed by: bxr
2510250153	SITE 3 BIG TJ WASH 2	Analyzed by: bxr
2510250154	SITE 4 HAINES CANYON CREE	Analyzed by: bxr
2510250155	SITE 4 HAINES CANYON CREE	Analyzed by: bxr

QC Ref #294153 - Total phosphorus-P **Analysis Date: 11/07/2005**

2510250143	SITE 1 INFLOW TO TJ POND	Analyzed by: bxr
2510250149	SITE 1 INFLOW TO TJ POND	Analyzed by: bxr
2510250150	SITE 2 OUTFLOW FRM TJ PO	Analyzed by: bxr
2510250151	SITE 2 OUTFLOW FRM TJ POU	Analyzed by: bxr
2510250152	SITE 3 BIG TJ WASH 1	Analyzed by: bxr
2510250153	SITE 3 BIG TJ WASH 2	Analyzed by: bxr
2510250154	SITE 4 HAINES CANYON CREE	Analyzed by: bxr
2510250155	SITE 4 HAINES CANYON CREE	Analyzed by: bxr

QC Ref #294348 - Ammonia Nitrogen **Analysis Date: 11/09/2005**

2510250143	SITE 1 INFLOW TO TJ POND	Analyzed by: clv
2510250149	SITE 1 INFLOW TO TJ POND	Analyzed by: clv
2510250150	SITE 2 OUTFLOW FRM TJ PO	Analyzed by: clv
2510250151	SITE 2 OUTFLOW FRM TJ POU	Analyzed by: clv
2510250152	SITE 3 BIG TJ WASH 1	Analyzed by: clv
2510250153	SITE 3 BIG TJ WASH 2	Analyzed by: clv
2510250154	SITE 4 HAINES CANYON CREE	Analyzed by: clv
2510250155	SITE 4 HAINES CANYON CREE	Analyzed by: clv

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

MWH Laboratories
A Division of MWH Americas, Inc.

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
QC Report
#159681

Applied Research Dept, MWH (Darren Giles)

QC Ref #292521 Turbidity

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
DUP	Turbidity	0.15	0.15	NTU		(0-20)	0.0
MRL_CHK	Turbidity	0.0500	0.048	NTU	96.0	(50-150)	

QC Ref #292532 Nitrite, Nitrogen by IC

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	10250296	MGL		(0-0)	
LCS1	Nitrite, Nitrogen by IC	1.0	1.08	MGL	108.0	(90-110)	
LCS2	Nitrite, Nitrogen by IC	1.0	1.07	MGL	107.0	(90-110)	0.93
MBLK	Nitrite, Nitrogen by IC	ND	<0.1	MGL			
MS	Nitrite, Nitrogen by IC	1.0	1.06	MGL	106.0	(90-110)	
MSD	Nitrite, Nitrogen by IC	1.0	1.06	MGL	106.0	(90-110)	0.00

QC Ref #292533 Nitrite, Nitrogen by IC

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	10250154	MGL		(0-0)	
LCS1	Nitrite, Nitrogen by IC	1.0	1.08	MGL	108.0	(90-110)	
LCS2	Nitrite, Nitrogen by IC	1.0	1.06	MGL	106.0	(90-110)	1.9
MBLK	Nitrite, Nitrogen by IC	ND	<0.1	MGL			
MS	Nitrite, Nitrogen by IC	1.0	1.14	MGL	<u>114.0</u>	(90-110)	
MSD	Nitrite, Nitrogen by IC	1.0	1.41	MGL	<u>141.0</u>	(90-110)	21

QC Ref #292535 Nitrate as Nitrogen by IC

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	10250296	MGL		(0-0)	
LCS1	Nitrate as Nitrogen by IC	2.5	2.61	MGL	104.4	(90-110)	
LCS2	Nitrate as Nitrogen by IC	2.5	2.61	MGL	104.4	(90-110)	0.00

Spikes which exceed Limits and Method Blanks with positive results are highlighted by <u>Underlining.</u>
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.

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

MBLK	Nitrate as Nitrogen by IC	ND	<0.1	MGL			
MS	Nitrate as Nitrogen by IC	2.5	2.33	MGL	93.2	(90-110)	
MSD	Nitrate as Nitrogen by IC	2.5	2.31	MGL	92.4	(90-110)	0.86

QC Ref #292536 Nitrate as Nitrogen by IC

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
AASPKSMP	Spiked sample	Lab # 25	10250154	MGL		(0-0)	
LCS1	Nitrate as Nitrogen by IC	2.5	2.65	MGL	106.0	(90-110)	
LCS2	Nitrate as Nitrogen by IC	2.5	2.62	MGL	104.8	(90-110)	1.1
MBLK	Nitrate as Nitrogen by IC	ND	<0.1	MGL			
MS	Nitrate as Nitrogen by IC	2.5	2.5	MGL	100.0	(90-110)	
MSD	Nitrate as Nitrogen by IC	2.5	2.49	MGL	99.6	(90-110)	0.40

QC Ref #292617 Orthophosphate-P

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	10250301	MGL		(0-0)	
LCS1	Orthophosphate-P	0.5	0.518	MGL	103.6	(90-110)	
LCS2	Orthophosphate-P	0.5	0.514	MGL	102.8	(90-110)	0.78
MBLK	Orthophosphate-P	ND	<0.01	MGL			
MRL_CHK	Orthophosphate-P	0.010	0.012	MGL	120.0	(50-150)	
MS	Orthophosphate-P	0.5	0.504	MGL	100.8	(80-120)	
MSD	Orthophosphate-P	0.5	0.501	MGL	100.2	(80-120)	0.60

QC Ref #292801 Glyphosate

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	10240019	UGL		(0-0)	
LCS1	Glyphosate	10	10.5	UGL	105.0	(82-115)	
MBLK	Glyphosate	ND	<6	UGL			
MRL_CHK	Glyphosate	6.00	4.89	UGL	81.5	(50-150)	

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.

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

MS	Glyphosate	10	10.3	UGL	103.0	(82-115)	
MSD	Glyphosate	10	10.5	UGL	105.0	(82-115)	1.9

QC Ref #292805 Glyphosate

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	10250153	UGL		(0-0)	
LCS1	Glyphosate	10	10.7	UGL	107.0	(82-115)	
MBLK	Glyphosate	ND	<6	UGL			
MRL_CHK	Glyphosate	6.00	5.20	UGL	86.7	(50-150)	
MS	Glyphosate	10	10.2	UGL	102.0	(82-115)	
MSD	Glyphosate	10	10.1	UGL	101.0	(82-115)	0.99

QC Ref #293698 Kjeldahl Nitrogen

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	10250635	MGL		(0-0)	
LCS1	Kjeldahl Nitrogen	4	4.28	MGL	107.0	(90-110)	
LCS2	Kjeldahl Nitrogen	4	4.35	MGL	108.7	(90-110)	1.6
MBLK	Kjeldahl Nitrogen	ND	<0.2	MGL			
MS	Kjeldahl Nitrogen	4	4.55	MGL	<u>113.8</u>	(90-110)	
MSD	Kjeldahl Nitrogen	4	4.54	MGL	<u>113.5</u>	(90-110)	0.22
RPD_LCS	Kjeldahl Nitrogen	107.000	108.750	MGL	1.6	(0-20)	
RPD_MS	Kjeldahl Nitrogen	113.750	113.500	MGL	0.2	(0-10)	

QC Ref #294153 Total phosphorus-P

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	10250319	MGL		(0-0)	
LCS1	Total phosphorus-P	0.4	0.395	MGL	98.8	(90-110)	
LCS2	Total phosphorus-P	0.4	0.419	MGL	104.7	(90-110)	5.9
MBLK	Total phosphorus-P	ND	<0.01	MGL			

Spikes which exceed Limits and Method Blanks with positive results are highlighted by <u>Underlining.</u>
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.

MWH Laboratories
A Division of MWH Americas, Inc.

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)

Applied Research Dept, MWH (Darren Giles)
(continued)

MS	Total phosphorus-P	0.4	0.415	MGL	103.7	(90-110)	
MSD	Total phosphorus-P	0.4	0.432	MGL	108.0	(90-110)	4.0
RPD_LCS	Total phosphorus-P	98.750	104.750	MGL	5.9	(0-10)	
RPD_MS	Total phosphorus-P	103.750	108.000	MGL	4.0	(0-10)	

QC Ref #294348 Ammonia Nitrogen

QC	Analyte	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPD (%)
MS	Spiked sample	Lab # 25	10210217	MGL		(0-0)	
LCS1	Ammonia Nitrogen	1.00	0.99	MGL	99.0	(90-110)	
LCS2	Ammonia Nitrogen	1.00	0.97	MGL	97.0	(90-110)	2.0
MBLK	Ammonia Nitrogen	ND	<0.05	MGL			
MS	Ammonia Nitrogen	1.00	0.97	MGL	97.0	(90-110)	
MSD	Ammonia Nitrogen	1.00	0.92	MGL	92.0	(90-110)	5.3

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.

159681
ARD-DG

CRG
Marine Laboratories, Inc.

2020 Del Amo Blvd. Suite 200, Torrance, CA 90501 • (310) 533-5190 • FAX (310) 533-5003 • mmercier@crglabs.com

November 12, 2005

MWH Laboratories
750 Royal Oaks Dr., Suite 100
Monrovia, CA 91016-3629

Re:	CRG Project ID:	P2502as
	MWH Project:	159681
	MWH Sub PO:	99-19196

ATTN: Mr. Michael Lettona

CRG Laboratories is pleased to provide you with the enclosed analytical data report for your 159681 Project. According to the chain-of-custody, 8 wastewater samples were received intact and cool at CRG on October 27, 2005. Per your instructions, the samples were analyzed for:

- Organophosphorus Pesticides By GCMS Using EPA Method 625

Please don't hesitate to call if you have any questions and thank you very much for using our laboratory for your analytical needs.

Regards,
Misty B. Mercier
Project Manager

Misty B. Mercier
Digitally signed by Misty B. Mercier
DN: CN = Misty B. Mercier, C = US, O = CRG Marine Laboratories, Inc., OU = Project Manager
Date: 2005.11.12 15:02:57 -08'00'

Reviewed and Approved

DATA REPORT

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: ***MWH Laboratories*** **CRG Project ID:** ***2502az***

CRG ID#:	***32503***	**Sample Description:**	2510250148 SITE 1 INFLOW TO TJ POND 1 Project #159681 / PO #99-19196	**Date Sampled:**	25-Oct-05 11:30
Replicate #:	R1			**Date Received:**	27-Oct-05
Batch ID:	2502az-15051	**Matrix:**	Wastewater	**Date Processed:**	28-Nov-05
Instrument:	GC/MS #2 Shimadzu QP2010	**Analyst:**	D. Gonsman	**Date Analyzed:**	08-Nov-05

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625(m)	89	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625(m)	89	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625(m)	97	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625(m)	83	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

California ELAP Certificate # 2261

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: ***MWH Laboratories*** **CRG Project ID:** ***2502az***

CRG ID#:	***32504***	**Sample Description:**	2510250149 SITE 1 INFLOW TO TJ POND 2 Project #159681 / PO #99-19196	**Date Sampled:**	25-Oct-05 11:45
Replicate #:	R1			**Date Received:**	27-Oct-05
Batch ID:	2502az-15051	**Matrix:**	Wastewater	**Date Processed:**	28-Nov-05
Instrument:	GC/MS #2 Shimadzu QP2010	**Analyst:**	D. Gonsman	**Date Analyzed:**	08-Nov-05

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625(m)	95	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625(m)	97	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625(m)	97	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625(m)	82	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

CRG Marine Laboratories, Inc.
2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: ***MWH Laboratories*** **CRG Project ID:** ***2502az***

CRG ID#: ***32505*** **Sample Description:** 2510250150 SITE 2 OUTFLOW FR TJ POND1 **Date Sampled:** 25-Oct-05 12:30
Replicate #: R1 Project #159681 / PO #99-19196 **Date Received:** 27-Oct-05
Batch ID: 2502az-15051 **Matrix:** Wastewater **Date Processed:** 28-Nov-05
Instrument: GC/MS #2 Shimadzu QP2010 **Analyst:** D. Gonsman **Date Analyzed:** 08-Nov-05

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625(m)	96	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625(m)	90	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625(m)	98	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625(m)	94	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

California ELAP Certificate # 2261
32505 R1

CRG Marine Laboratories, Inc.
2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: MWH Laboratories **CRG Project ID: 2502az**

CRG ID#:	***32506***	**Sample Description:**	2510250151 SITE 2 OUTFLOW FR TJ POND2 / Project #159681 / PO #99-19196	**Date Sampled:**	25-Oct-05 12:40
Replicate #:	R1			**Date Received:**	27-Oct-05
Batch ID:	2502az-15051	**Matrix:**	Wastewater	**Date Processed:**	28-Nov-05
Instrument:	GC/MS #2 Shimadzu QP2010	**Analyst:**	D. Gonsman	**Date Analyzed:**	08-Nov-05

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625(m)	90	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625(m)	89	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625(m)	97	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625(m)	85	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

California ELAP Certificate # 2261

32506 R1

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: ***MWH Laboratories*** **CRG Project ID:** ***2502az***

CRG ID#:	***32507***	**Sample Description:**	2510250152	SITE 3 BIG TJ WASH 1	**Date Sampled:**	25-Oct-05	13:20
Replicate #:	R1		Project #159681 / PO #99-19196		**Date Received:**	27-Oct-05	
Batch ID:	2502az-15051	**Matrix:**	Wastewater		**Date Processed:**	28-Nov-05	
Instrument:	GC/MS #2 Shimadzu QP2010	**Analyst:**	D. Gonsman		**Date Analyzed:**	08-Nov-05	

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625(m)	94	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625(m)	91	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625(m)	99	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625(m)	88	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

California ELAP Certificate # 2261

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: ***MWH Laboratories*** **CRG Project ID:** ***2502az***

CRG ID#:	***32508***	**Sample Description:**	2510250153 SITE 3 BIG TJ WASH 2 Project #159681 / PO #99-19196	**Date Sampled:**	25-Oct-05 13:30
Replicate #:	R1			**Date Received:**	27-Oct-05
Batch ID:	2502az-15051	**Matrix:**	Wastewater	**Date Processed:**	28-Nov-05
Instrument:	GC/MS #2 Shimadzu QP2010	**Analyst:**	D. Gonsman	**Date Analyzed:**	08-Nov-05

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625(m)	85	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625(m)	90	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625(m)	99	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625(m)	86	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

California ELAP Certificate # 2261

CRG Marine Laboratories, Inc.
2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: ***MWH Laboratories*** **CRG Project ID:** ***2502az***

CRG ID#:	***32509***	**Sample Description:**	2510250154 SITE 4 HAINES CYN CRK 1	**Date Sampled:**	25-Oct-05 10:00
Replicate #:	R1		Project #159681 / PO #99-19196	**Date Received:**	27-Oct-05
Batch ID:	2502az-15051	**Matrix:**	Wastewater	**Date Processed:**	28-Nov-05
Instrument:	GC/MS #2 Shimadzu QP2010	**Analyst:**	D. Gonsman	**Date Analyzed:**	08-Nov-05

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625(m)	85	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625(m)	86	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625(m)	97	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625(m)	85	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

California ELAP Certificate # 2261

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: ***MWH Laboratories*** **CRG Project ID:** ***2502az***

CRG ID#:	***32510***	**Sample Description:**	2510250155 SITE 4 HAINES CYN CRK 2	**Date Sampled:**	25-Oct-05 10:15
Replicate #:	R1		Project #159681 / PO #99-19196	**Date Received:**	27-Oct-05
Batch ID:	2502az-15051	**Matrix:**	Wastewater	**Date Processed:**	28-Nov-05
Instrument:	GC/MS #2 Shimadzu QP2010	**Analyst:**	D. Gonsman	**Date Analyzed:**	08-Nov-05

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625(m)	101	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625(m)	100	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625(m)	108	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625(m)	97	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

California ELAP Certificate # 2261

QUALITY CONTROL REPORT

CRG Marine Laboratories, Inc.

2020 Del Amo Blvd., Suite 200, Torrance, CA 90501-1206 (310) 533-5190 FAX (310) 533-5003 crglabs@sbcglobal.net

Organophosphorus Pesticides

Client: ***MWH Laboratories*** **CRG Project ID:** ***2502az***

CRG ID#:	***32502***	**Sample Description:**	QAQC Procedural Blank Project #159681 / PO #99-19196	**Date Sampled:**	
Replicate #:	B1			**Date Received:**	
Batch ID:	2502az-15051	**Matrix:**	DI Water	**Date Processed:**	28-Nov-05
Instrument:	GC/MS #2 Shimadzu QP2010	**Analyst:**	D. Gonsman	**Date Analyzed:**	08-Nov-05

CONSTITUENT	FRACTION	METHOD	RESULT	UNITS	MDL	RL	DILUTION FACTOR	ACCEPTANCE RANGE
(PCB030)	Total	EPA 625(m)	99	% Recovery			1	46 - 119%
(PCB112)	Total	EPA 625(m)	91	% Recovery			1	52 - 123%
(PCB198)	Total	EPA 625(m)	95	% Recovery			1	59 - 123%
(TCMX)	Total	EPA 625(m)	96	% Recovery			1	40 - 110%
Bolstar (Sulprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Chlorpyrifos	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Demeton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Diazinon	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Dichlorvos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Dimethoate	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Disulfoton	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Ethoprop (Ethoprofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenchlorphos (Ronnel)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fensulfothion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Fenthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Malathion	Total	EPA 625(m)	ND	ng/L	5	10	1	NA
Merphos	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Methyl Parathion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Mevinphos (Phosdrin)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Phorate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tetrachlorvinphos (Stirofos)	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Tokuthion	Total	EPA 625(m)	ND	ng/L	10	20	1	NA
Trichloronate	Total	EPA 625(m)	ND	ng/L	10	20	1	NA

MDL= Method Detection Limit (CFR 40 Part 136); RL= Minimum Level (SWRCB); E= Estimated Value below the RL and above the MDL; ND= Not Detected; NA= Not Applicable.

California ELAP Certificate # 2261

CHAIN-OF-CUSTODY

MWH Laboratories
A Division of MWH Americas,Inc.
750 Royal Oaks Drive Suite 100
Monrovia, CA 91016-3629
Ph (626) 386-1100 Fax (626) 386-1095

Date 10/26/05

Submittal Form & Purchase Order 99-19196

REPORTING REQUIREMENTS:** ***Do Not Combine Report with any other samples submitted under different MWH project numbers!
Report & Invoice must have the MWH Project Number **159681** Sub PO# **99-19196** and Job #

Report all quality control data according to Method. Include dates analyzed, date extracted (if extracted) and Method reference on the report.
Results must have Complete data & QC with Approval Signature. See reverse side for List of Terms and Conditions

Ship To **Misty B. Mercier**
CRG MARINE

2020 Del Amo Blvd
Suite 200
Torrance, CA 90501-1206

(310) 533-5190 x106 Fax (310) 533-5003

Reports: Michael Lettona Sub-contracting Administrator
EMAIL TO: Michael.Lettona@mwhglobal.com
MWH Laboratories 750 Royal Oaks Dr. Ste. 100, Monrovia, CA 91016
Phone (626) 386-1137 Fax (626) 386-1095
Invoices to: MWH LABORATORIES
Accounts Payable PO BOX 6610, Broomfield, CO 80021

Provide in each Report the Specified State Certification # & Exp Date for requested tests + matrix

CA ELAP WW

P250292
32503-32510

MWH Project #	Report Due:	Sub PO#
159681	11/10/05	99-19196

mg¬

		Use MWH Lab # for ID	Client Sample ID for reference only	Analysis Requested	Sample Date & Time	Matrix	Container
1	@DIAZEDD	2510250143	SITE 1 INFLOW TO TJ POND 1	DIAZINON & CHLORPYRIFOS by 625	10/25/05 11:30	WW	3 1L amber glass+ buffer+ascorbic+EDTA+DZU
2	@DIAZEDD	2510250149	SITE 1 INFLOW TO TJ POND 2	DIAZINON & CHLORPYRIFOS by 625	10/25/05 11:45	WW	3 1L amber glass+ buffer+ascorbic+EDTA+DZU
3	@DIAZEDD	2510250150	SITE 2 OUTFLOW FRM TJ POUND1	DIAZINON & CHLORPYRIFOS by 625	10/25/05 12:30	WW	3 1L amber glass+ buffer+ascorbic+EDTA+DZU
4	@DIAZEDD	2510250151	SITE 2 OUTFLOW FRM TJ POUND2	DIAZINON & CHLORPYRIFOS by 625	10/25/05 12:40	WW	3 1L amber glass+ buffer+ascorbic+EDTA+DZU
5	@DIAZEDD	2510250152	SITE 3 BIG TJ WASH 1	DIAZINON & CHLORPYRIFOS by 625	10/25/05 13:20	WW	3 1L amber glass+ buffer+ascorbic+EDTA+DZU
6	@DIAZEDD	2510250153	SITE 3 BIG TJ WASH 2	DIAZINON & CHLORPYRIFOS by 625	10/25/05 13:30	WW	3 1L amber glass+ buffer+ascorbic+EDTA+DZU
7	@DIAZEDD	2510250154	SITE 4 HAINES CANYON CREEK 1	DIAZINON & CHLORPYRIFOS by 625	10/25/05 10:00	WW	3 1L amber glass+ buffer+ascorbic+EDTA+DZU
8	@DIAZEDD	2510250155	SITE4 HAINES CANYON CREEK 2	DIAZINON & CHLORPYRIFOS by 625	10/25/05 10:15	WW	3 1L amber glass+ buffer+ascorbic+EDTA+DZU

Relinquished by: Sample Control Date 10/26/05 Time 1339 MUST HAVE NOTIFICAION IF TEMP IS GREATER THAN 6 OR LESS THAN 2 CELSIUS

Page 1

Received by: Date 10/27/05 Time 1650 An Acknowledgement of Receipt is requested to attn: Michael Lettona

County of Los Angeles
Department of Public Works

Water Quality Monitoring
2005 Annual Report

for the

Master Mitigation Plan
for the Big Tujunga Wash Mitigation Bank

January 2006

MWH

Water Quality Monitoring
2005 Annual Report

for

Master Mitigation Plan
for the Big Tujunga Wash Mitigation Bank

January 2006

Prepared For:

Chambers Group, Inc.
17671 Cowan Avenue, Suite 100
Irvine, California 92614

Prepared By:

MWH
301 North Lake Avenue, Suite 600
Pasadena, California 91101

Table of Contents

LIST OF FIGURES

LIST OF TABLES

Distribution

Quarterly and annual water quality monitoring reports are distributed to the following agencies:

Los Angeles County Department of Public Works
Ms. Belinda Kwan
Water Resources Division, Dams Section
900 South Fremont Avenue
Alhambra, California 91803-1331

California Department of Fish and Game
Ms. Mary Meyer
402 West Ojai Avenue, Suite 101, PMB 501
Ojai, California 93023

Mr. Scott Harris
1508 N. Harding Ave.
Pasadena, California 91104

Regional Water Quality Control Board, Los Angeles Region (4)
Ms. Valerie Carrillo
320 West 4th Street, Suite 200
Los Angeles, California 90013

U.S. Fish and Wildlife Service
Mr. Jesse Bennett
6010 Hidden Valley Road
Carlsbad, California 92009

U.S. Army Corps of Engineers
Mr. Aaron Allen
P.O. Box 532711
Los Angeles, California 90053-2325

Interested Party
Mr. William Eick
2604 Foothill Boulevard, Suite C
La Crescenta, California 91214

SUMMARY

Water quality sampling was conducted at four sampling stations at the County of Los Angeles Department of Public Works (LADPW) Big Tujunga Wash mitigation bank for four quarters of 2005. Samples were collected at three points along Haines Canyon Creek (inflow to the Tujunga Ponds, the outflow from the ponds, and in Haines Canyon Creek leaving the mitigation bank site) and in Big Tujunga Wash in April, June, October and December of 2005 (**Figure 1**). Parameters monitored included temperature, dissolved oxygen (DO), pH, nutrients, turbidity, bacteria levels, an insecticide (chlorpyrifos) and a herbicide (glyphosate). Both field meters and laboratory analyses were used in the water quality sampling program. This is the fifth annual report for a 5-year water quality monitoring program that began in the fourth quarter of 2000.

For most parameters, observed water quality met Los Angeles Regional Water Quality Control Board (Regional Board) Basin Plan objectives and water quality criteria for freshwater recommended by the U.S. Environmental Protection Agency (EPA). Temperatures were cool enough and DO concentrations generally high enough for growth and survival of warmwater fish species. Observed pH values ranged from 6.8 to 9.0 units, and turbidity levels were low. Residual chlorine and pesticides were not detected. Excessive nutrient conditions were not noted. A degree of nitrogen reduction was observed between inflow and outflow from the Tujunga Ponds. Measured fecal coliform levels were consistently below the water contact recreation standard.

BACKGROUND

LADPW purchased a 207-acre parcel in Big Tujunga Wash as a mitigation bank for County flood control projects throughout Los Angeles. In coordination with local agencies, the County defined a number of measures to improve habitat quality at the site. A Master Mitigation Plan (MMP) was prepared to guide the implementation of these enhancements. The MMP also includes a 5-year monitoring program to gather data on conditions at the site during implementation of the improvements. The MMP was prepared and is being implemented by Chambers Group, Inc. MWH, a subconsultant to Chambers Group, is responsible for the water quality monitoring program described in the MMP. This is the fifth annual report of the 5-year water quality monitoring program that began in the fourth quarter of 2000.

The project site is located just east of Hansen Dam in the Shadow Hills area of the City of Los Angeles (**Figure 1**). Both Big Tujunga Wash (an intermittent stream) and Haines Canyon Creek (a perennial stream) traverse the project site in an east-to-west direction. The two Tujunga Ponds are located at the far eastern portion of the site.

Figure 1
Water Quality Sampling Stations

This page to be replaced with Figure 1

Project Site Activities

A timeline of project-related activities that could influence water quality is presented in **Table 1**.

Table 1
Major Activities to Date at the Big Tujunga Wash Mitigation Bank

Date	Activity
4/00	Baseline water quality sampling
11/00 to 11/01	Arundo, tamarisk, and pepper tree removal Chemical (Rodeo®) application
12/00 to 11/02	Water hyacinth removal
12/00	Fish Sampling at Haines Canyon Creek
12/14/00	Water quality sampling
1/01 to present	Exotic aquatic wildlife (non-native fish, crayfish, bullfrog, and turtle) removal – conducted quarterly
2/01	Partial riparian planting
3/01	Selective clearing at Canyon Trails Golf Club
3/12/01	Water quality sampling
6/19/01	Water quality sampling
7/01	Fish Sampling at Haines Canyon Creek
9/11/01	Water quality sampling
10/01 to 11/01	Fish Sampling at Haines Canyon Creek
12/12/01	Water quality sampling
1/02	Final riparian planting
2/02	Upland replacement planting
3/26/02	Water quality sampling
6/25/02	Water quality sampling
7/02	Fish Sampling at Haines Canyon Creek
9/12/02	Water quality sampling
10/02	Grading at Canyon Trails Golf Club begins
11/02	Fish Sampling at Haines Canyon Creek
12/19/02	Water quality sampling
3/20/03	Water quality sampling
4/1/03	Meeting with Canyon Trails Golf Club to discuss future use of herbicides and fertilizers
6/23/03	Water quality sampling
8/03	Fish Sampling at Haines Canyon Creek
9/30/03	Water quality sampling
Fall 2003	Completion of the golf course construction
12/17/03	Water quality sampling
1/04	Fish Sampling at Haines Canyon Creek
4/2/04	Water quality sampling
4/3/04	Rock Dam Removal Day
6/04	Angeles National Golf Club (previously named Canyon Trails) opens to the public

Table 1 (Continued)
Major Activities to Date at the Big Tujunga Wash Mitigation Bank

Date	Activity
7/2/04	Water quality sampling
10/5/04	Water quality sampling
12/9/04	Water quality sampling
4/7/05	Water quality sampling
6/30/05	Water quality sampling
10/25/05	Water quality sampling
12/22/05	Water quality sampling

Water Quality Monitoring Program

In order to establish water quality upstream and downstream of the site, quarterly sampling and analysis has been performed for 5 years, for a total of 21 individual sampling days (four quarters a year for 5 years plus the first sampling period in December 2000). The monitoring program has been designed to specifically address inputs to the site from upstream land uses such as the Angeles National Golf Club (previously named Canyon Trails Golf Club). Potential impacts to aquatic species from run-on to the site that contains excessive nutrients or pesticides are of primary concern.

The golf course has been operating since June 2004. Additional construction at the club house building is in progress and is scheduled for completion in 2006 (Angeles National Golf Course staff, personal communication to A. Kawaguchi, MWH, January 18, 2006).

In March 2004, the golf course maintenance staff indicated that the following chemicals may be used on an as needed basis: Primo™ (a grass growth inhibitor used for turf management; active ingredient – trinexapac-ethyl) and Rodeo® (an herbicide used to control aquatic weeds; active ingredient – glyphosate) (J. Reidinger, pers. comm. to M. Chimienti, LADPW, March 18, 2004). Based on this information, glyphosate was added to the list of sampling parameters starting in the first quarter of 2004.

In December 2004 and February 2005, the Golf Club provided MWH with the golf course's monthly pesticide use reports. The reports indicate that 10 types of chemical products (seven herbicides, one insecticide, one fungicide, and one grass growth inhibitor) were applied as summarized in **Table 2**. Based on this information, chlorpyrifos (an insecticide) was added to the list of sampling parameters starting in the fourth quarter of 2004.

In December 2004, the Golf Club also provided MWH with the golf course's water quality monitoring reports to date. The results were summarized and presented in the 2004 Annual Report for the Big Tujunga Wash Mitigation Bank Water Quality Monitoring Program (distributed in February 2005).

No further data regarding the Golf Club's pesticide application or water quality monitoring activities were provided as a result of requests made in August 2005, December 2005 and January 2006.

Table 2
Pesticide Applications at the Angeles National Golf Course
(June – November 2004)

Active Ingredient	Manufacturer and Product Name	Applications
Chlorpyrifos	Dow AgroSciences Dursban Pro (insecticide)	One application (145,000 sq. ft.) in August
Diquat dibromide	Syngenta Reward (herbicide)	Two applications (43,000 sq. ft. and not recorded) in August, one application (87,000 sq. ft.) in September, and one application in November
Flutolanil	Bayer Prostar 70 WP (fungicide)	One application (120,000 sq. ft.) in July and one application (140,000 sq. ft.) in August
Glyphosate	Lesco Prosecutor (herbicide)	Three applications (one 86,000 sq. ft. and two not recorded) in August
Glyphosate and Diquat dibromide	Monsanto QuickPRO (herbicide)	Three applications (20,000 to 30,000 sq. ft.) in June and one application (20,000 sq. ft.) in July
Imazapyr	BASF Stalker (herbicide)	Two applications in November
Oryzalin	Dow AgroSciences Surflan (herbicide)	One application (87,000 sq. ft.) in September
Pelargonic acid	Mycogen Scythe (herbicide)	One application (86,000 sq. ft.) in August
Prodiamine	Syngenta Barricade (herbicide)	Three applications (two 86,000 sq. ft. and one not recorded) in August
Trinexapac-ethyl	Syngenta Primo Maxx (grass growth inhibitor)	One application (120,000 sq. ft.) in June, three applications (76,000 to 120,000 sq. ft.) in July, two applications (140,000 and 156,000 sq. ft.) in August, and two applications (60,000 and 128,000 sq. ft.) in September

Source: Angeles National Golf Course Monthly Summary Pesticide Use Reports for June through November 2004
sq. ft. – square feet

MATERIALS AND METHODS

Sampling Stations

Four sampling locations have been identified for the 5-year monitoring program for the Big Tujunga Wash Mitigation Bank (**Figure 1** and **Table 3**). The coordinates of the sampling stations were determined by a hand-held Global Positioning System. **Table 4** summarizes sampling conditions observed on the four sampling dates in 2005.

Sampling Parameters

Water Quality. Table 5 summarizes the sampling parameters included in the water quality monitoring program. The following meters were used in the field:

- DO and temperature – HACH SensION 6 DO meter
- Total residual chlorine – HACH DR 700
- pH – Orion 230A with HACH 51935 electrode

All other analyses except chlorpyrifos were performed in duplicate at MWH Laboratories, Monrovia, California. Analysis for chlorpyrifos was conducted in duplicate at CRG Laboratories, Torrance, California. Samples were taken at mid-depth, along a transect perpendicular to the stream channel alignment. Quality assurance/quality control (QA/QC) procedures in the laboratory followed the methods described in the MWH Laboratories *Quality Assurance Manual.*

Table 3
Water Quality Sampling Locations

Sampling Locations	Latitude	Longitude
Haines Canyon Creek, just before exit from site	N 34° 16' 2.9"	W 118° 21' 22.2"
Haines Canyon Creek, inflow to Tujunga Ponds	N 34° 16' 6.9"	W 118° 20' 18.7"
Haines Canyon Creek, outflow from Tujunga Ponds	N 34° 16' 7.1"	W 118° 20' 28.3"
Big Tujunga Wash	N 34° 16' 11.7"	W 118° 21' 4.0"

Table 4
Water Quality Sampling Conditions

Description	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Date	4/7/2005	6/30/2005	10/25/2005	12/22/2005
Approximate Air Temperature	70°F	75°F	68°F	72°F
Skies	Sunny	Sunny / hazy	Overcast	Sunny
Water Volume / Notes	High flows in Haines Canyon Creek – Two additional streams had been created due to heavy rains, and much of the surrounding vegetation had been washed out.	Dense algae in inflow to Tujunga Ponds	(See page 21)	(See page 21)
Time of Sample				
Haines Canyon Creek Exiting the Site	10:15 a.m.	10:00 a.m.	10:00 a.m.	8:30 a.m.
Inflow to Tujunga Ponds	12:40 p.m.	12:30 p.m.	11:30 a.m.	10:00 a.m.
Outflow from Tujunga Ponds	1:25 p.m.	11:00 a.m.	12:30 p.m.	11:00 a.m.
Big Tujunga Wash	11:35 a.m.	1:30 p.m.	1:20 p.m.	12:30 p.m.

Table 5
Water Quality Sampling Parameters

Parameter	Analysis Location	Analytical Method
total Kjeldahl nitrogen (TKN)	laboratory	EPA 351.2
nitrite (NO_2)	laboratory	EPA 300.0 by IC
nitrate (NO_3)	laboratory	EPA 300.0 by IC
ammonia (NH_4)	laboratory	EPA 350.1
orthophosphate - P	laboratory	Standard Methods 4500P-E
total coliform	laboratory	Standard Methods 9221B
fecal coliform	laboratory	Standard Methods 9221C
total organic halogens (organochlorides)	not sampled in 2005	--
total phosphorus - P	laboratory	Standard Methods 4500PE/EPA 365.1
organophosphate (total P minus ortho-P)	calculation	--
turbidity	laboratory	EPA 180.1
glyphosate (Roundup/Rodeo)[1]	laboratory	EPA 547
chlorpyrifos[2]	laboratory	EPA 625
1 golf course fungicide	not sampled in 2005	--
dissolved oxygen	field	Standard Methods 4500-O G
total residual chlorine	field	Standard Methods 4500-Cl D
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 (diazinon/chlorpyrifos by GCMS, EPA 625) tests for the following chemicals: diazinon, sulprofos, chlorpyrifos, demeton, dichlorvos, disulfoton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malathion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate.

Discharge Measurements. In addition to the water quality monitoring, flows in the outlet from 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.

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 ft)

C = A coefficient or correction factor (0.8 for rocky-bottom streams or 0.9 for muddy-bottom streams). This allows you to correct for the fact that water at the surface travels faster than near the stream bottom due to resistance from gravel, cobble, etc. Multiplying the surface velocity by a correction coefficient decreases the value and gives a better measure of the stream's overall velocity.

T = Time, in seconds, for the float to travel the length of L

RESULTS

Baseline Water Quality

Sampling and analysis conducted by LADPW prior to implementation of the MMP is considered the baseline for water quality conditions at the site. The results of analyses conducted in April 2000 are presented in **Table 6**. Higher bacteria and turbidity observed in the 4/18/00 samples are attributable to a rain event. Phosphorus levels were also high in the 4/18/00 samples, perhaps due to release from sediments.

2005 Results

Water Quality

Results of analyses for the four quarters of 2005 conducted by MWH Laboratories and CRG Laboratories are appended to this report (**Appendix A**) and summarized in **Table 7** through **Table 10**. Note that the yields (percent recoveries) of QC samples in 2005 were within acceptable limits (percentages) for all samples except: 1) the matrix spikes and matrix spike duplicates for nitrite-nitrogen and Kjeldahl nitrogen in the third quarter [Since Laboratory Control Standards (LCSs) were within control limits for these parameters, data are deemed acceptable as reported]; and 2) LCSs for nitrite-nitrogen in the fourth quarter [Results were high-biased; however, the data were not affected since all results for nitrite-nitrogen were non-detect].

Water quality results for five years of sampling are depicted in **Figure 2** through **Figure 8**. Where duplicate analyses were conducted, the average value is graphed.

Table 6
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 7
Summary of Water Quality Results
1st Quarter 2005 (4/7/05)

Parameter	Units	Inflow to Tujunga Ponds 1	Inflow to Tujunga Ponds 2 (duplicate)	Outflow from Tujunga Ponds 1	Outflow from Tujunga Ponds 2 (duplicate)	Big Tujunga Wash 1	Big Tujunga Wash 2 (duplicate)	Haines Cyn Creek exiting site 1	Haines Cyn Creek exiting site 2 (duplicate)
Temperature	°C	19.0	--	17.8	--	17.0	--	15.3	--
Dissolved Oxygen	mg/L	7.4	--	7.7	--	11.5	--	11.4	--
pH	std units	7.2	--	7.3	--	9.0	--	9.0	--
Total residual chlorine	mg/L	ND	--	ND	--	ND	--	ND	--
Ammonia-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Kjeldahl Nitrogen	mg/L	0.44	0.31	0.27	0.30	0.23	0.24	0.21	0.54
Nitrite-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-Nitrogen	mg/L	5.4	5.4	3.2	3.6	ND	ND	ND	ND
Orthophosphate-P	mg/L	0.022	0.021	0.025	0.026	0.011	0.012	ND	ND
Total phosphorus-P	mg/L	0.021	0.024	0.022	0.022	0.010	ND	ND	0.012
Glyphosate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Chlorpyrifos*	ng/L	ND	ND	ND	ND	ND	ND	ND	ND
Turbidity	NTU	0.50	0.70	0.60	0.50	1.6	1.3	1.4	1.3
Fecal Coliform Bacteria	MPN/100ml	2	2	8	13	2	2	8	4
Total Coliform Bacteria	MPN/100ml	500	220	500	700	170	21	500	21

-- No duplicate samples are taken for field measurements.

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

* The analytical method used for chlorpyrifos (diazinon/chlorpyrifos by GCMS, EPA 625) also tests for the following chemicals: diazinon, sulprofos, demeton, dichlorvos, disulfoton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malathion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate. Samples for this quarter were all non-detect for these EPA 625 parameters.

Table 8
Summary of Water Quality Results
2nd Quarter 2005 (6/30/05)

Parameter	Units	Inflow to Tujunga Ponds 1	Inflow to Tujunga Ponds 2 (duplicate)	Outflow from Tujunga Ponds 1	Outflow from Tujunga Ponds 2 (duplicate)	Big Tujunga Wash 1	Big Tujunga Wash 2 (duplicate)	Haines Cyn Creek exiting site 1	Haines Cyn Creek exiting site 2 (duplicate)
Temperature	°C	20.5	--	19.5	--	26.3	--	19.5	--
Dissolved Oxygen	mg/L	7.5	--	5.1	--	5.2	--	7.8	--
pH	std units	6.8	--	6.9	--	8.4	--	7.8	--
Total residual chlorine	mg/L	ND	--	ND	--	ND	--	ND	--
Ammonia-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Kjeldahl Nitrogen	mg/L	0.24	0.21	ND	0.34	ND	0.36	0.23	0.21
Nitrite-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-Nitrogen	mg/L	4.6	4.7	2.6	2.6	ND	ND	2.3	2.3
Orthophosphate-P	mg/L	0.024	0.024	0.028	0.029	ND	ND	0.032	0.031
Total phosphorus-P	mg/L	0.042	0.012	0.025	0.040	0.013	ND	0.033	0.030
Glyphosate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Chlorpyrifos*	ng/L	ND	ND	ND	ND	ND	ND	ND	ND
Turbidity	NTU	0.20	0.30	0.25	0.25	0.20	0.30	0.25	0.20
Fecal Coliform Bacteria	MPN/100ml	50	17	170	170	2	13	80	110
Total Coliform Bacteria	MPN/100ml	2,400	3,500	16,000	2,400	16,000	2,200	2,400	900

-- No duplicate samples are taken for field measurements.

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

* The analytical method used for chlorpyrifos (diazinon/chlorpyrifos by GCMS, EPA 625) also tests for the following chemicals: diazinon, sulprofos, demeton, dichlorvos, disulfoton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malathion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate. Samples for this quarter were all non-detect for these EPA 625 parameters.

Table 9
Summary of Water Quality Results
3rd Quarter 2005 (10/25/05)

Parameter	Units	Inflow to Tujunga Ponds 1	Inflow to Tujunga Ponds 2 (duplicate)	Outflow from Tujunga Ponds 1	Outflow from Tujunga Ponds 2 (duplicate)	Big Tujunga Wash 1	Big Tujunga Wash 2 (duplicate)	Haines Cyn Creek exiting site 1	Haines Cyn Creek exiting site 2 (duplicate)
Temperature	°C	19.0	--	19.0	--	19.9	--	18.5	--
Dissolved Oxygen	mg/L	4.5	--	4.8	--	8.3	--	8.3	--
pH	std units	6.9	--	6.9	--	8.6	--	7.9	--
Total residual chlorine	mg/L	ND	--	ND	--	ND	--	ND	--
Ammonia-Nitrogen	mg/L	0.08	0.09	0.09	0.09	ND	ND	ND	ND
Kjeldahl Nitrogen	mg/L	0.35	0.31	0.30	0.28	0.24	0.24	0.34	0.27
Nitrite-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-Nitrogen	mg/L	2.8	2.8	2.9	2.9	ND	ND	2.8	2.8
Orthophosphate-P	mg/L	0.040	0.039	0.040	0.040	ND	ND	0.044	0.042
Total phosphorus-P	mg/L	ND	0.031	ND	ND	ND	ND	ND	ND
Glyphosate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Chlorpyrifos*	ng/L	ND	ND	ND	ND	ND	ND	ND	ND
Turbidity	NTU	0.50	0.60	0.65	0.70	3.5	3.6	1.7	0.50
Fecal Coliform Bacteria	MPN/100ml	50	13	50	50	17	13	80	130
Total Coliform Bacteria	MPN/100ml	1,400	1,100	3,000	500	700	1,600	1,600	2,200

-- No duplicate samples are taken for field measurements.

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

* The analytical method used for chlorpyrifos (diazinon/chlorpyrifos by GCMS, EPA 625) also tests for the following chemicals: diazinon, sulprofos, demeton, dichlorvos, disulfoton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malathion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate. Samples for this quarter were all non-detect for these EPA 625 parameters.

Table 10
Summary of Water Quality Results
4th Quarter 2005 (12/22/05)

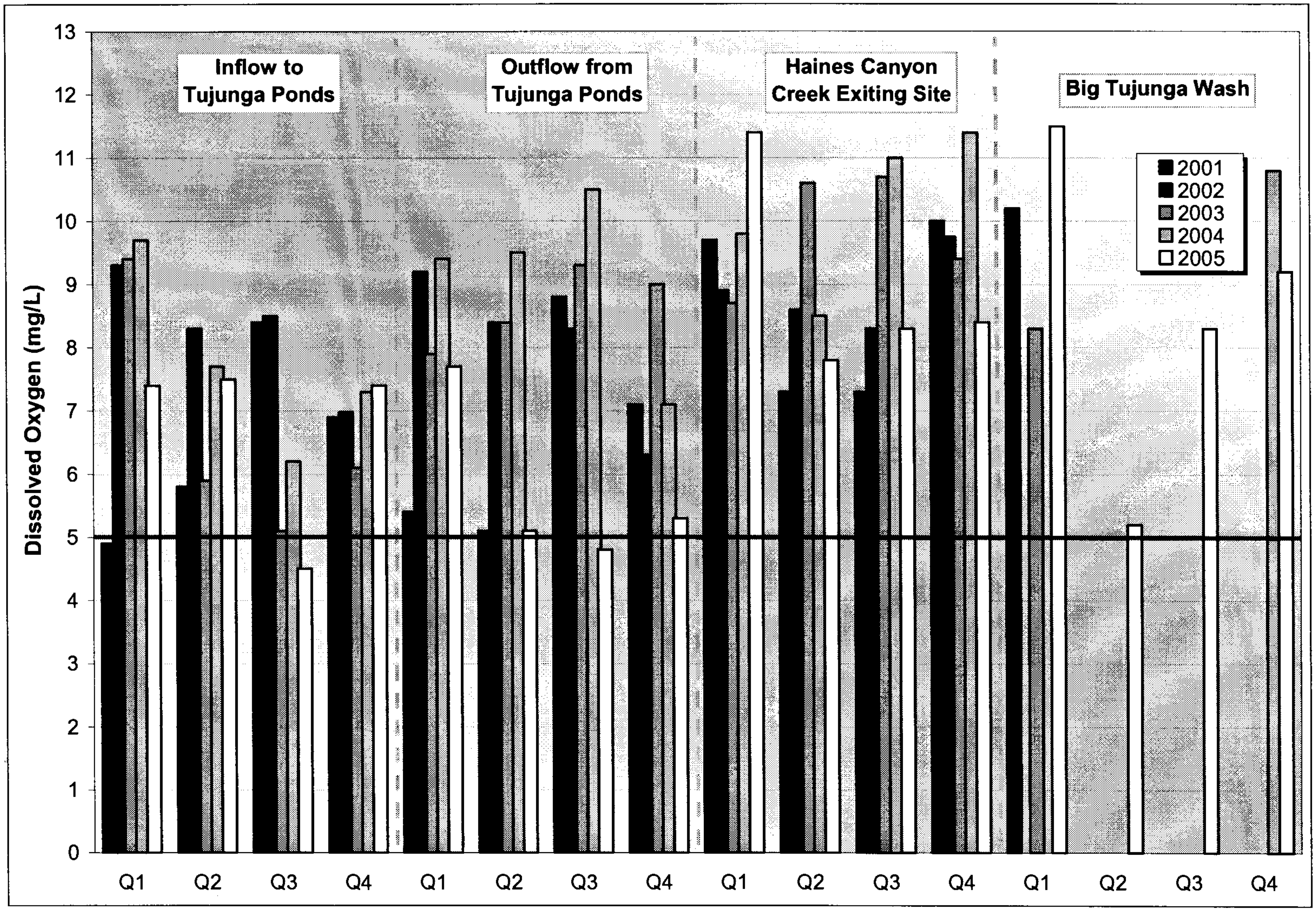
Parameter	Units	Inflow to Tujunga Ponds 1	Inflow to Tujunga Ponds 2 (duplicate)	Outflow from Tujunga Ponds 1	Outflow from Tujunga Ponds 2 (duplicate)	Big Tujunga Wash 1	Big Tujunga Wash 2 (duplicate)	Haines Cyn Creek exiting site 1	Haines Cyn Creek exiting site 2 (duplicate)
Temperature	°C	17.4	--	18.0	--	13.0	--	15.0	--
Dissolved Oxygen	mg/L	7.4	--	5.3	--	9.2	--	8.4	--
pH	std units	6.8	--	6.9	--	8.6	--	7.7	--
Total residual chlorine	mg/L	ND	--	ND	--	ND	--	ND	--
Ammonia-Nitrogen	mg/L	ND	0.06	0.08	0.07	0.17	0.16	0.15	0.08
Kjeldahl Nitrogen	mg/L	0.23	0.37	0.56	0.25	0.25	0.21	0.26	0.27
Nitrite-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-Nitrogen	mg/L	3.9	3.9	3.4	3.4	ND	ND	3.4	3.4
Orthophosphate-P	mg/L	0.027	0.028	0.028	0.027	ND	ND	0.030	0.032
Total phosphorus-P	mg/L	0.086	0.083	0.051	0.083	0.067	0.010	0.054	0.083
Glyphosate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND
Chlorpyrifos*	ng/L	ND	ND	ND	ND	ND	ND	ND	ND
Turbidity	NTU	0.55	0.60	0.50	0.35	0.90	0.95	0.6	0.9
Fecal Coliform Bacteria	MPN/100ml	30	13	2	13	2	7	11	8
Total Coliform Bacteria	MPN/100ml	500	2,800	7,000	16,000	2,200	1,700	260	280

-- No duplicate samples are taken for field measurements.

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

* The analytical method used for chlorpyrifos (diazinon/chlorpyrifos by GCMS, EPA 625) also tests for the following chemicals: diazinon, sulprofos, demeton, dichlorvos, disulfoton, dimethoate, ethoprop, fenchlorophos, fensulfothion, fenthion, merphos, mevinphos, malathion, parathion-methyl, phorate, tokuthion, tetrachlorovinphos, and trichloronate. Samples for this quarter were all non-detect for these EPA 625 parameters.

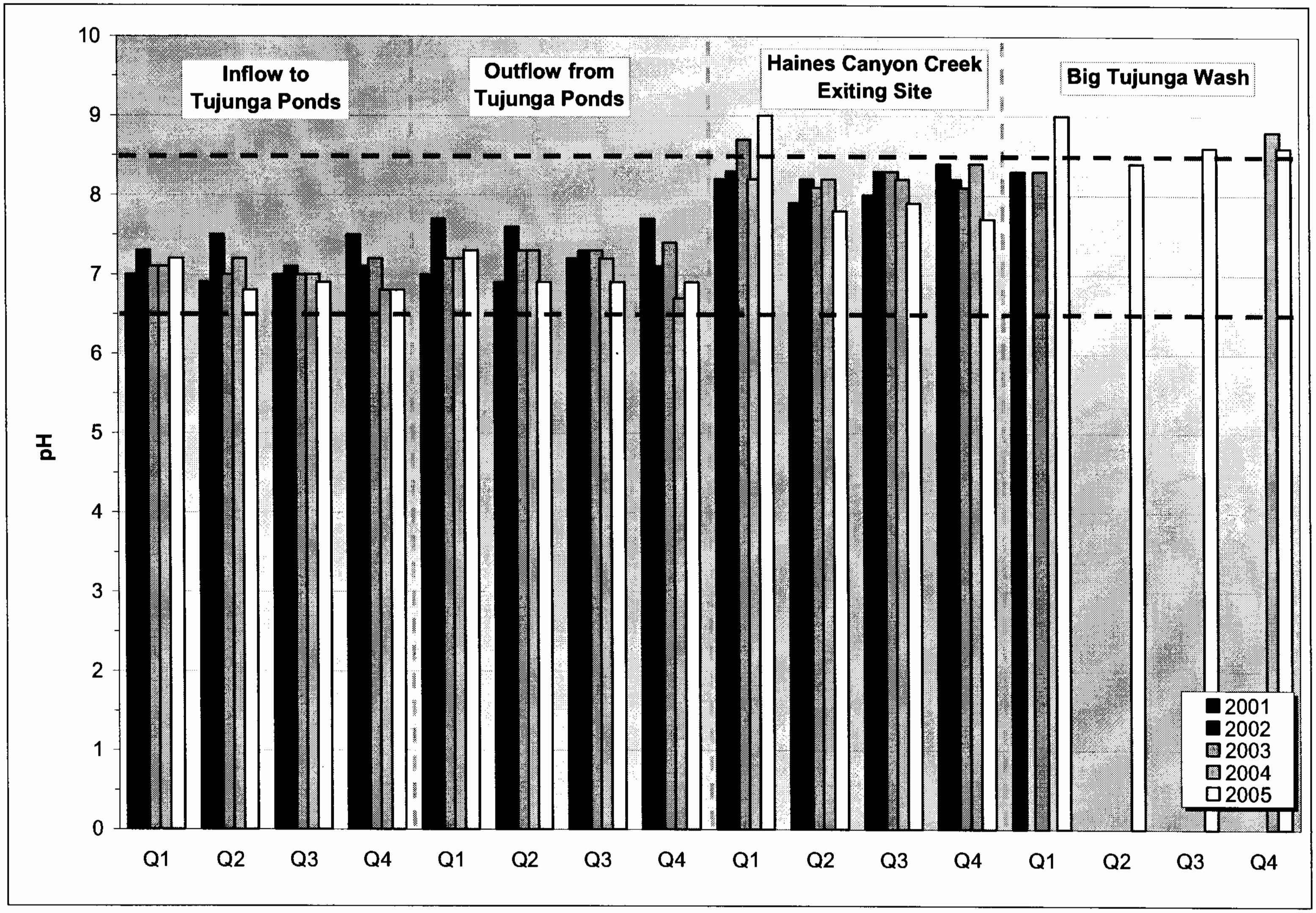
Figure 2
Dissolved Oxygen – 2001, 2002, 2003, 2004 and 2005



Notes:

- Flows observed in Big Tujunga Wash in the first quarters of 2001 and 2003, in the fourth quarter of 2004, and all four quarters of 2005.
- The red line indicates the Basin Plan objective and EPA criterion for minimum dissolved oxygen level (warmwater fish species), which is 5 mg/L (see **Table 12**).

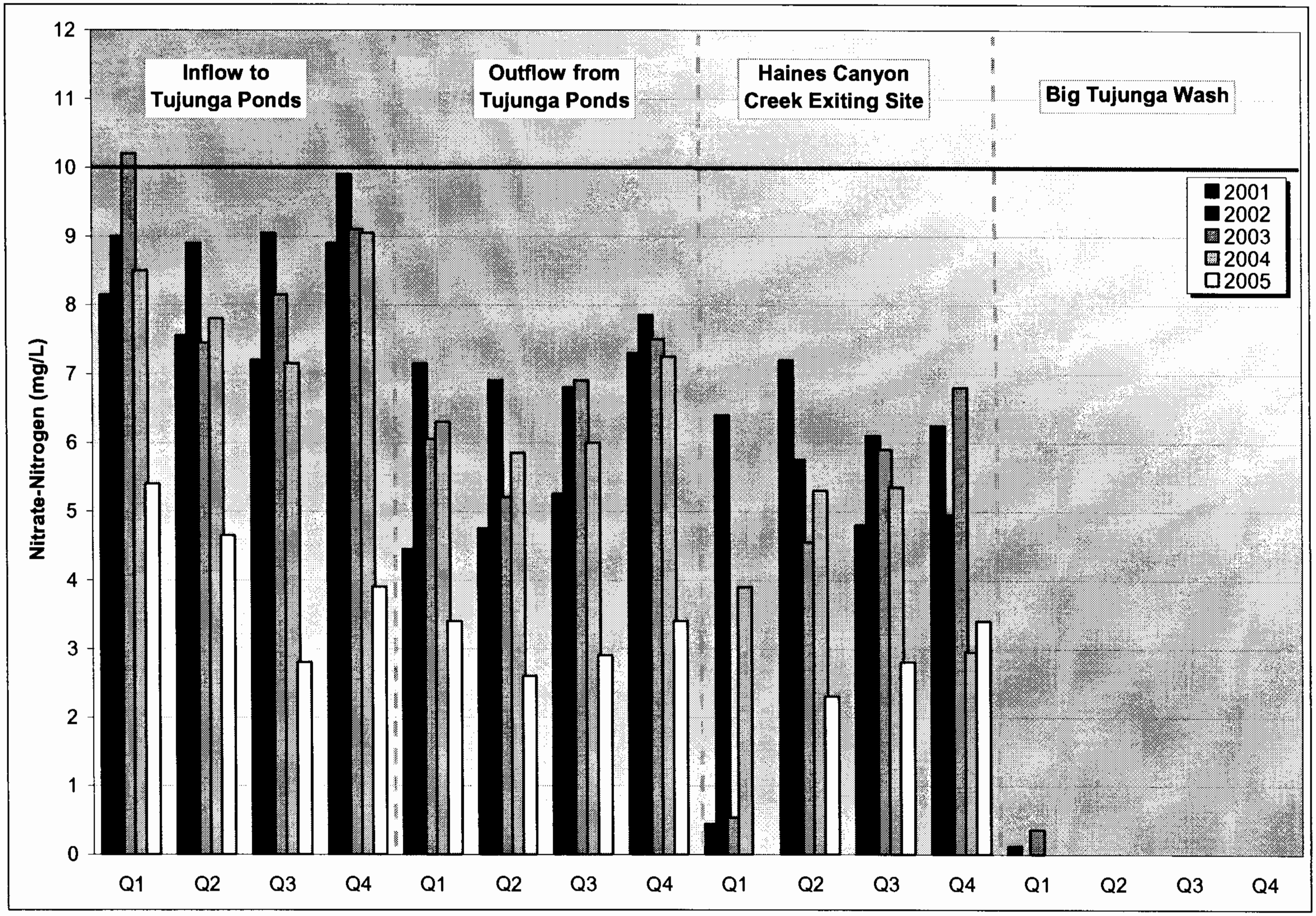
Figure 3
pH – 2001, 2002, 2003, 2004 and 2005



Notes:

- Flows observed in Big Tujunga Wash in the first quarters of 2001 and 2003, in the fourth quarter of 2004, and all four quarters of 2005.
- The red dashed lines indicate the upper and lower values of the Basin Plan objective for pH, which are 6.5 and 8.5, respectively (see **Table 12**).

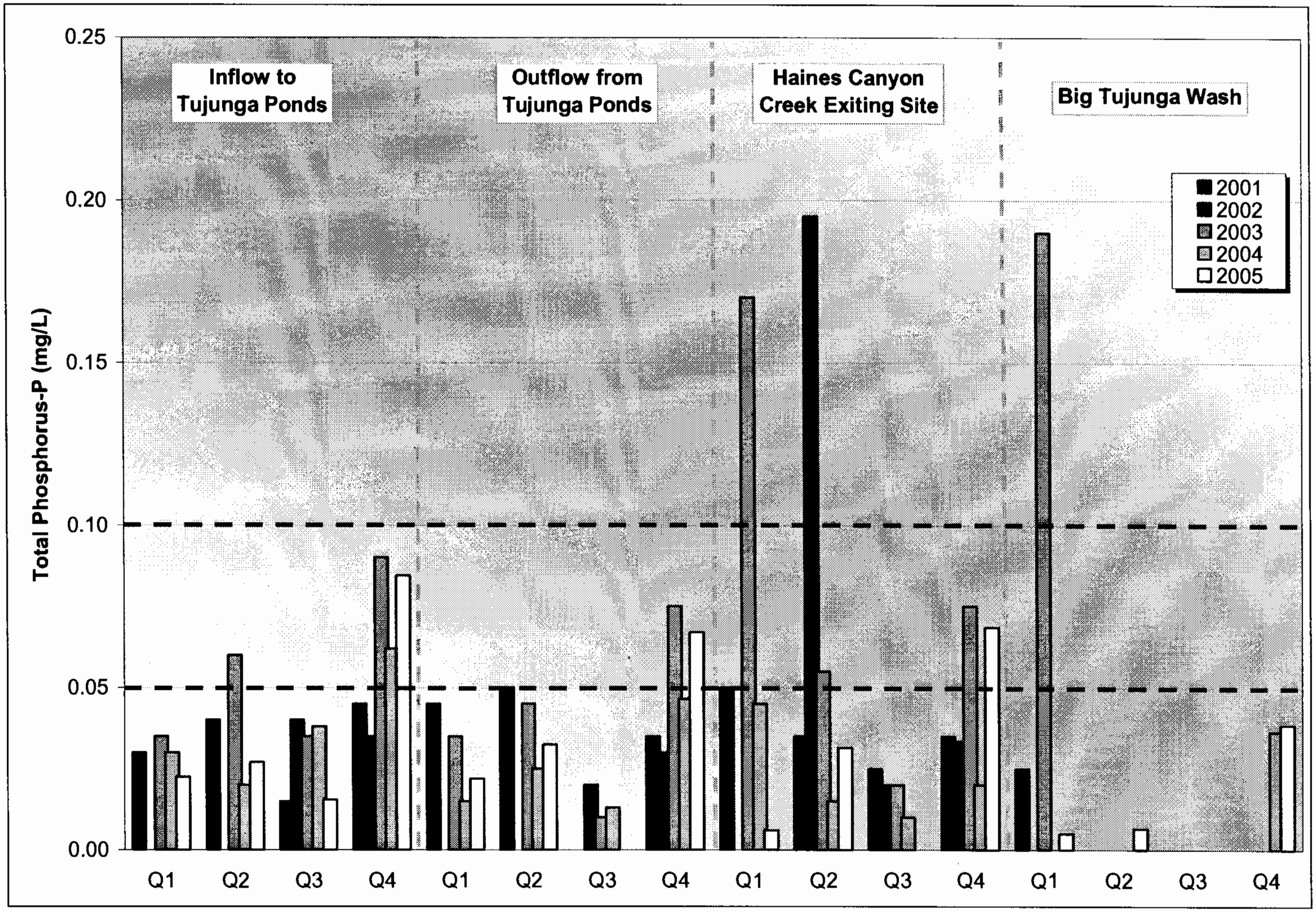
Figure 4
Nitrate as Nitrogen – 2001, 2002, 2003, 2004 and 2005



Notes:

- Flows observed in Big Tujunga Wash in the first quarters of 2001 and 2003, in the fourth quarter of 2004, and all four quarters of 2005.
- Each bar represents the average value of the duplicate samples taken on each date.
- The red line indicates the Basin Plan objective for nitrate-nitrogen, which is 10 mg/L (see **Table 12**).

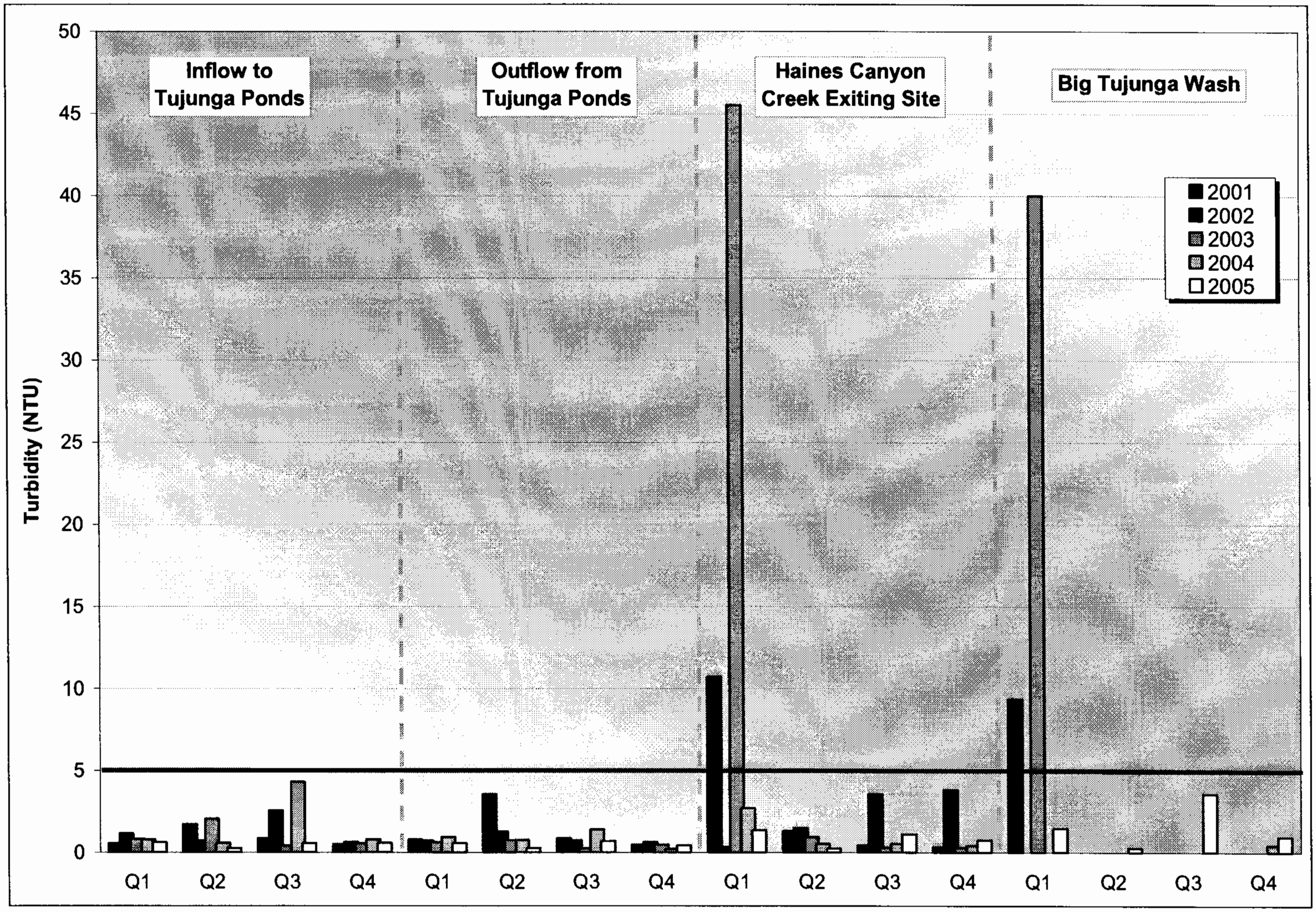
Figure 5
Total Phosphorus – 2001, 2002, 2003, 2004 and 2005



Notes:

- Flows observed in Big Tujunga Wash in the first quarters of 2001 and 2003, in the fourth quarter of 2004, and all four quarters of 2005.
- Each bar represents the average value of the duplicate samples taken on each date.
- The red dashed lines indicate the upper and lower values of EPA's recommended range for streams to prevent excess algae growth, which are 0.05 and 0.1 mg/L, respectively (see **Table 12**).

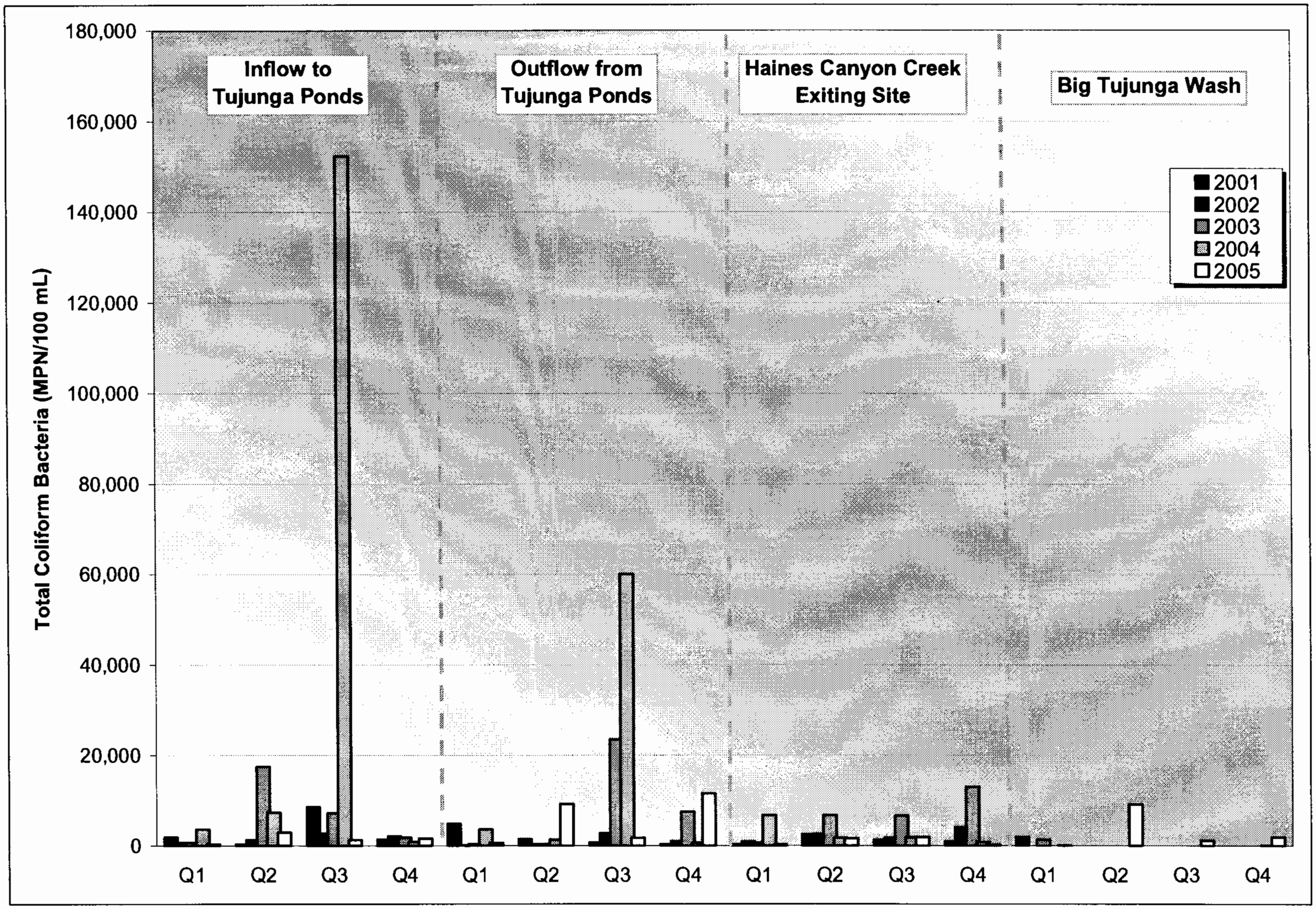
Figure 6
Turbidity – 2001, 2002, 2003, 2004 and 2005



Notes:

- Flows observed in Big Tujunga Wash in the first quarters of 2001 and 2003, in the fourth quarter of 2004, and all four quarters of 2005.
- Each bar represents the average value of the duplicate samples taken on each date.
- The red line indicates the secondary drinking water standard for turbidity, which is 5 NTU (see Table 12).

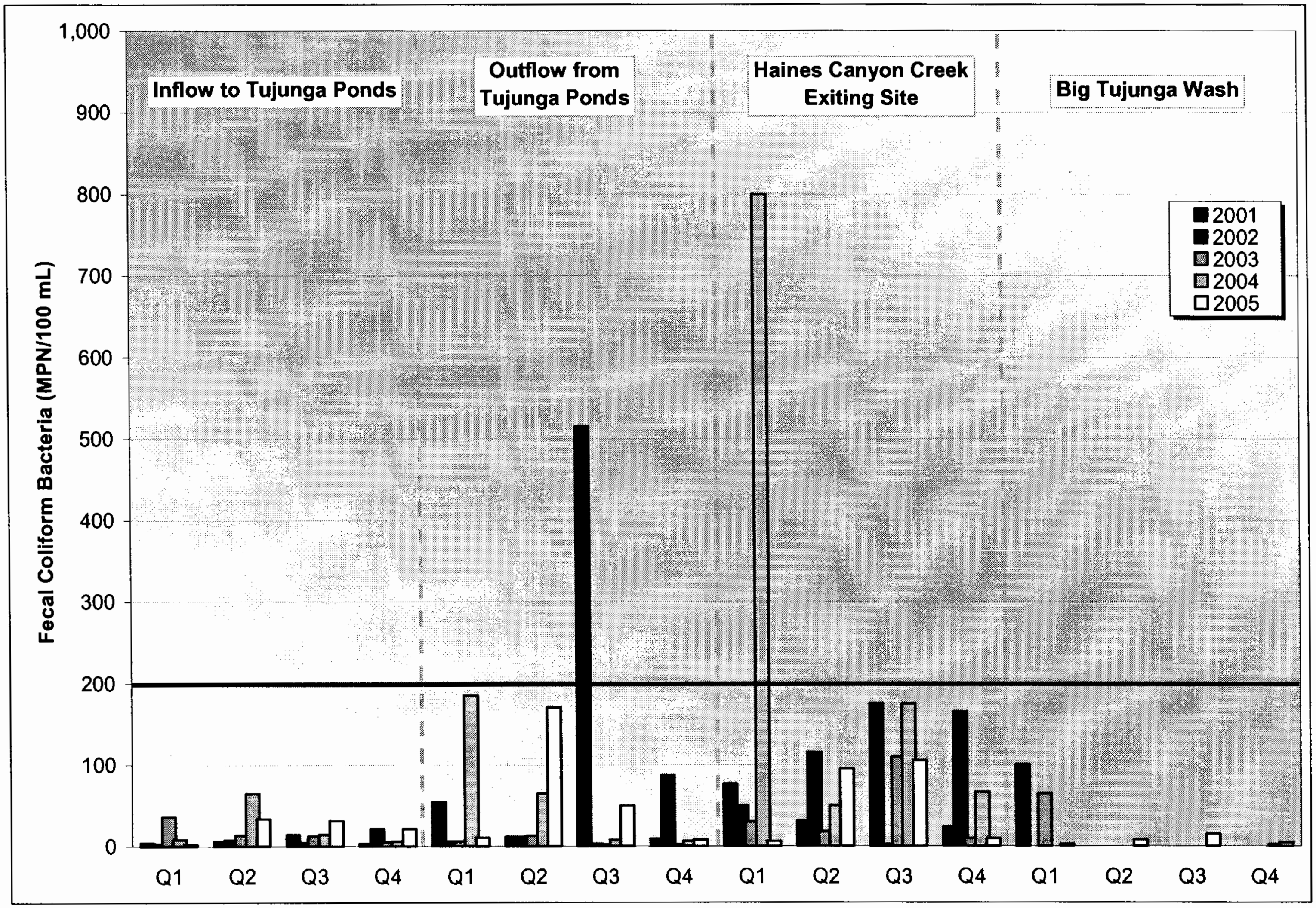
Figure 7
Total Coliform Bacteria – 2001, 2002, 2003, 2004 and 2005



Notes:

- Flows observed in Big Tujunga Wash in the first quarters of 2001 and 2003, in the fourth quarter of 2004, and all four quarters of 2005.
- Each bar represents the average value of the duplicate samples taken on each date.
- There are no numeric or narrative standards for total coliform.

Figure 8
Fecal Coliform Bacteria – 2001, 2002, 2003, 2004 and 2005



Notes:

- Flows observed in Big Tujunga Wash in the first quarters of 2001 and 2003, in the fourth quarter of 2004, and all four quarters of 2005.
- Each bar represents the average value of the duplicate samples taken on each date.
- The red line indicates the Basin Plan water contact recreation standard for fecal coliform, which is 200 MPN/100 mL (see **Table 12**).

Discharge Measurements

Using the field technique described above, flows in the outlet from Tujunga Ponds, in Haines Canyon Creek leaving the site, and in Big Tujunga Wash were approximated. Estimated flows for the four sampling dates in 2005 are summarized in **Table 11**.

Table 11
Estimated Flows – 2005

Sampling Date	Flow (cubic feet per second)		
	Outlet of Tujunga Ponds	Haines Canyon Creek leaving the site	Big Tujunga Wash
4/7/2005	14.8	94.9	151.2
6/30/2005	13.3	20.3	18.2
10/25/2005	12.7	16.5	0.8
12/22/2005	3.5	8.6	1.7

Comparison of Results with Baseline Data

Water quality in December 2005 was similar to baseline conditions for some parameters. Substantially higher bacteria and turbidity levels were observed in the 4/18/00 samples due to a rain event. Phosphorus levels were also higher in the 4/18/00 samples than in December 2005, perhaps due to release from sediments.

Comparison of Results with Aquatic Life Criteria

Table 12 and **Table 16** present objectives established by the Regional Board for protection of beneficial uses in Big Tujunga Wash including wildlife habitat. EPA's criteria for freshwater aquatic life are presented in **Table 12** through **Table 15** and **Table 17**.

Table 12
National and Local Recommended Water Quality Criteria - Freshwaters

Parameter	Basin Plan Objectives[a]	EPA Criteria		
		CMC	CCC	Human Health
Temperature (°C)	b	See Table 15	See Table 15	--
Dissolved oxygen (mg/L)	>7.0 mean >5.0 min	5.0[c] (warmwater, early life stages, 1-day minimum)	6.0[c] (warmwater, early life stages, 7-day mean)	--
pH	6.5 - 8.5	--	6.5-9.0[d,e]	5.0-9.0[d,e]
Total residual chlorine (mg/L)	0.1	0.019[d,e]	0.011[d,e]	4.0 (maximum residual disinfectant level goal)
Fecal coliform (MPN/100 ml)	200[f] (water contact recreation)	--	--	Swimming standards: 33[g] (geometric mean for enterococci) 126[g] (geometric mean for *E. coli*)
Ammonia-nitrogen (mg/L)	See Table 16	See Tables 13, 14, and 15	See Tables 13, 14, and 15	--
Nitrite-nitrogen (mg/L)	1	--	--	1 (primary drinking water std.)
Nitrate-nitrogen (mg/L)	10	--	--	10 (primary drinking water std.)
Total phosphorus (mg/L)	--	<0.05 – 0.1[e] (recommendation for streams, no criterion)		--
Turbidity (NTU)	h	i	i	5 (secondary drinking water standard) 0.5 – 1.0 (std. for systems that filter)

Notes:

-- No criterion

CMC Criteria Maximum Concentration or acute criterion

CCC Criteria Continuous Concentration or chronic criterion

a Source: California Regional Water Quality Control Board, Los Angeles Region. 1994. Water Quality Control Plan (Basin Plan).

b Narrative criterion: "The natural receiving water temperature of all regional waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses."

c Source: EPA. 1986. Ambient Water Quality Criteria for Dissolved Oxygen. EPA 440-5-86-003. Washington, D.C.

d Source: EPA. 1999. National Recommended Water Quality Criteria – Correction. EPA 822-Z-99-001. Washington, D.C.

e Source: EPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

f Standard based on a minimum of not less than four samples for any 30-day period, 10% of total samples during any 30-day period shall not exceed 400/100ml.

g Source: EPA. 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 13
Numeric Values of the Criterion Maximum Concentration (CMC) with Salmonids Present and Absent and the Criterion Continuous Concentration (CCC) for Ammonia Nitrogen (mg/L)

pH	CMC with Salmonids Present	CMC with Salmonids Absent	CCC
6.5	32.6	48.8	3.48
6.6	31.3	46.8	3.42
6.7	29.8	44.6	3.36
6.8	28.1	42.0	3.28
6.9	26.2	39.1	3.19
7.0	24.1	36.1	3.08
7.1	22.0	32.8	2.96
7.2	19.7	29.5	2.81
7.3	17.5	26.2	2.65
7.4	15.4	23.0	2.47
7.5	13.3	19.9	2.28
7.6	11.4	17.0	2.07
7.7	9.65	14.4	1.87
7.8	8.11	12.1	1.66
7.9	6.77	10.1	1.46
8.0	5.62	8.4	1.27
8.1	4.64	6.95	1.09
8.2	3.83	5.72	0.935
8.3	3.15	4.71	0.795
8.4	2.59	3.88	0.673
8.5	2.14	3.2	0.568
8.6	1.77	2.65	0.480
8.7	1.47	2.2	0.406
8.8	1.23	1.84	0.345
8.9	1.04	1.56	0.295
9.0	0.885	1.32	0.254

Source: EPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 14
Temperature and pH-Dependent Values of the Ammonia-Nitrogen CCC (Chronic Criterion) for Fish Early Life Stages Absent (mg N/L)

pH	Temperature (°Celsius)									
	0-7	8	9	10	11	12	13	14	15*	16*
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	5.72
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	5.37
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49	5.15
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	4.90
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	4.61
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	4.30
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	3.97
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	3.61
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	3.25
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	2.54
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	2.21
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	1.91
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74	1.63
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	0.990
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892	0.836
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754	0.707
8.8	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684	0.641	0.601
8.9	0.917	0.860	0.806	0.756	0.709	0.664	0.623	0.584	0.548	0.513
9.0	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471	0.442

* At 15° C and above, the criterion for fish ELS absent is the same as the criterion for fish ELS present.
Source: EPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 15
Temperature and pH-Dependent Values of the Ammonia-Nitrogen CCC (Chronic Criterion) for Fish Early Life Stages Present (mg N/L)

pH	Temperature (° Celsius)									
	0	14	16	18	20	22	24	26	28	30
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

Source: EPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 16
Maximum One-Hour Average Concentration for Total Ammonia ($mg/L\ NH_3$)

pH	Temperature (°Celsius)						
	0	5	10	15	20	25	30
6.50	35	33	31	30	29	20	14.3
6.75	32	30	28	27	27	18.6	13.2
7.00	28	26	25	24	23	16.4	11.6
7.25	23	22	20	19.7	19.2	13.4	9.5
7.50	17.4	16.3	15.5	14.9	14.6	10.2	7.3
7.75	12.2	11.4	10.9	10.5	10.3	7.2	5.2
8.00	8.0	7.5	7.1	6.9	6.8	4.8	3.5
8.25	4.5	4.2	4.1	4.0	3.9	2.8	2.1
8.50	2.6	2.4	2.3	2.3	2.3	1.71	1.28
8.75	1.47	1.40	1.37	1.38	1.42	1.07	0.83
9.00	0.86	0.83	0.83	0.86	0.91	0.72	0.58

Source: California Regional Water Quality Control Board, Los Angeles Region. 1994. Water Quality Control Plan (Basin Plan). Taken from EPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

Table 17
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: EPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

DISCUSSION

2005 Results

Results from the four quarters of sampling in 2005 are described by parameter in **Table 18**.

Table 18
Discussion of 2005 Sampling Results

Parameter	Discussion
Temperature	• As with all preceding years, temperatures observed in 2005 were below levels of concern for growth and survival of warmwater fish species (see **Table 17**). Highest temperatures were observed in Big Tujunga Wash in June. • Seasonal fluctuations of up to 4 degrees were observed. December readings were generally lowest, and June readings were the highest.
Dissolved oxygen	• DO readings in 2005 were above the recommended minimum for warmwater fish species of 5.0 mg/L, except at the inflow to and outflow from the Tujunga Ponds in the third quarter (4.5 and 4.8 mg/L, respectively). • Seasonal fluctuations of up to 6.3 mg/L in DO were observed. Highest DO readings were generally observed in the first quarter (April).
pH	• The pH values in 2005 were within the 6.5 to 8.5 range identified in the Basin Plan except at Haines Canyon Creek in the first quarter (9.0) and at Big Tujunga Wash in the first, third and fourth quarters (9.0, 8.6 and 8.6, respectively). • For any given sampling date in 2005, the pH of waters flowing into and out of the Tujunga Ponds varied by 0.1 unit or less. • The maximum seasonal pH fluctuation at any station in 2005 was 1.3 units.
Total residual chlorine	• As in all preceding years, residual chlorine was not detected in any samples.
Nitrogen	• All nitrate-nitrogen readings in 2005 were below the drinking water standard of 10 mg/L. • Nitrite-nitrogen was not detected in samples during 2005. • Ammonia-nitrogen was not detected in the first and second quarters. In the third quarter, ammonia-nitrogen was detected in low concentrations (<0.1 mg/L) in the inflow to and outflow from the Tujunga Ponds. In the fourth quarter, ammonia-nitrogen was detected at all sites in concentrations ranging from 0.06 to 0.17 mg/L. All observed concentrations were below levels of concern for fish (chronic and acute toxicity) (see **Table 13** through **Table 15**). • Kjeldahl nitrogen (organic nitrogen plus ammonia) readings were consistently low (<1 mg/L) at all stations on all dates. • Nitrate-nitrogen was higher in waters flowing into the Tujunga Ponds than in the outflow (up to approximately 2 mg/L difference) except in the third quarter when the values for inflow and outflow were similar (2.8 and 2.9 mg/L, respectively). Nitrate levels in Haines Canyon Creek were similar to or lower than the levels in the outflow from the ponds.

Table 18 (Continued)
Discussion of 2005 Sampling Results

Parameter	Discussion
Phosphorus	• In the fourth quarter of 2005, total phosphorus levels in the inflow to and outflow from Tujunga Ponds and in Haines Canyon Creek exceeded 0.05 mg/L, the lower value of EPA's recommendation for streams (<0.05 – 0.1 mg/L). However, total phosphorus values were below 0.1 mg/L at all stations for all four quarters of 2005.
Glyphosate	• Glyphosate readings on all sampling dates were below the detection limit.
Chlorpyrifos	• Chlorpyrifos and the other pesticides tested using EPA's analytical method 625 were not detected at any station in 2005.
Turbidity	• Turbidity values in 2005 were generally similar to those of 2001, 2002, 2003 and 2004, and were below the secondary drinking water standard of 5 NTU.
Bacteria	• Fecal coliform levels in 2005 ranged from 2 to 170 MPN/100 mL, and were below the water contact recreation standard of 200 MPN/100 mL for all four quarters at all stations. • Total coliform levels were much higher than fecal coliform levels (up to 16,000 MPN/100 mL), but total coliform spikes (over 50,000 – 100,000 MPN/100 mL) were not observed in 2005.

Results for the Five-year Monitoring Period (2001 – 2005)

The following summarizes the water quality trends observed over the 5-year monitoring period. During the 5-year period, a total of 71 samples (not counting the duplicate samples for parameters analyzed in the laboratories) were taken:

- 21 samples from the inflow to Tujunga Ponds (four quarters for 5 years)
- 21 samples from the outflow from Tujunga Ponds (four quarters for 5 years)
- 21 samples from Haines Canyon Creek exiting the site (four quarters for 5 years)
- 8 samples when flow was observed in Big Tujunga Wash (first quarters of 2001 and 2003, fourth quarter of 2004 and all four quarters of 2005)

Temperatures

Observed temperatures have ranged from approximately 11 to 26 °C. Seasonal fluctuations in any given year ranged from 4 to 9 degrees; highest temperatures were generally observed during the second quarter (June/July), followed by the third (September/October), first (March/April), and fourth (December) quarters. Temperatures in the inflow to and outflow from Tujunga Ponds were similar. Temperatures in Haines Canyon Creek exiting the site were typically lower than in Tujunga Ponds by approximately 1 degree during the warmer periods (second and third quarters) and by approximately 3 degrees during the cooler periods (first and fourth quarters).

During the period of the sampling program, temperatures observed at the mitigation bank sampling sites supported the growth and survival of warmwater fish species.

Dissolved Oxygen

Observed DO levels at the four sampling stations ranged from 4.5 to 11.5 mg/L. Only three DO readings below 5.0 mg/L have been recorded (in the inflow to the ponds in March 2001 and in the inflow to and outflow from the ponds in the third quarter of 2005). In Haines Canyon Creek leaving the site, DO and temperature appear to have a negative correlation (higher DO values are observed on dates with lower temperature). In addition, DO levels at Haines Canyon Creek exiting the site are approximately 2 mg/L higher than in the Tujunga Ponds.

During the period of the sampling program, DO levels observed at the mitigation bank sampling sites supported the minimal survival requirements of most warmwater fish species. DO levels in Haines Canyon Creek leaving the site and in Big Tujunga Wash were consistently (with one exception) above 7.0 mg/L and therefore supported the requirements of early life stages of warmwater fish species. DO levels in the Tujunga Ponds were not consistently at this level. Lower flow conditions and oxygen-consuming algal die-off result in periodic lower DO levels in the ponds.

pH

Levels of pH in excess of Basin Plan standards were observed in Haines Canyon Creek exiting the site in the first quarters of 2003 and 2005 (8.7 and 9.0, respectively) and in Big Tujunga Wash in the first, third and fourth quarters of 2005 (9.0, 8.6 and 8.6, respectively). Observed pH levels were not below 6.5 at any station on any sampling date.

In general, pH values observed in Haines Canyon Creek leaving the site (overall average of 8.2 and ranging from 7.7 to 9.0) were approximately 1 unit higher than values observed in the ponds (overall average of 7.1 and ranging from 6.8 to 7.5 in the inflow, and overall average of 7.2 and ranging from 6.7 to 7.7 in the outflow). Based on the limited number of samples taken from Big Tujunga Wash (seven samples total), pH values in the wash are similar to those in Haines Canyon Creek exiting the site.

During the period of the sampling program, pH levels observed at the mitigation bank sampling sites were generally within the 6.5 to 8.5 range identified in the Basin Plan and protective of aquatic life. Levels of pH in Haines Canyon Creek leaving the site and in Big Tujunga Wash are high compared to many freshwater systems, perhaps reflecting alkaline soils and/or specific algal conditions at the time of sampling.

Nutrients

Ammonia-nitrogen levels were generally below the detection limit. Ammonia-nitrogen levels above the detection limit were observed in the third quarter of 2001 in Haines Canyon Creek exiting the site (0.093 mg/L in one sample, non-detect in the duplicate sample), in the third quarter of 2005 in the Tujunga Ponds (0.08 to 0.09 mg/L), and in the fourth quarter of 2005 at all stations (0.06 to 0.17 mg/L and one non-detect in a duplicate sample from the inflow to Tujunga Ponds).

Nitrite-nitrogen levels were also generally below the detection limit. Nitrite-nitrogen levels above the detection limit were observed in the inflow to Tujunga Ponds in the second quarters of 2001, 2003 and 2004 (0.10 mg/L, 0.11 mg/L in one sample and non-detect in the duplicate sample, and 0.35 mg/L in one sample and non-detect in the duplicate sample).

Nitrate-nitrogen levels were generally below the drinking water standard of 10 mg/L. Nitrate-nitrogen concentrations approached or exceeded 10 mg/L in the inflow to Tujunga Ponds in the first quarter of 2003 (10.2 mg/L) and in the fourth quarter of 2002 (9.9 mg/L). Nitrate levels were generally higher in the inflow to the Tujunga Ponds (overall average of 7.6 mg/L, ranging from 2.8 to 10.2 mg/L) than in the outflow from the ponds (overall average of 5.7 mg/L, ranging from 2.6 to 7.9 mg/L), and generally higher in the ponds than in Haines Canyon Creek exiting the site (overall average of 4.5 mg/L, ranging from 0.44 to 7.2 mg/L). Nitrate levels observed in 2005 were generally lower (by 2 to 4 mg/L on average) than the levels observed in the previous four years.

Total phosphorus values were generally below 0.1 mg/L, the upper value EPA's recommendation for streams (<0.05 – 0.1 mg/L). Higher values of up to 0.19 mg/L were observed in the first quarter of 2003 from Big Tujunga Wash and in Haines Canyon Creek (possibly associated with the higher flows due to releases from the Big Tujunga Dam preceding the sampling date).

During the period of the sampling program, excessive nutrient levels were not observed at the mitigation bank sampling sites. Ammonia levels were below levels of concern for fish toxicity (acute and chronic standards for all life stages). Nitrate levels were always (with one exception) below primary drinking water standards but were not low for freshwater systems. [Note, there is no aquatic health guideline for nitrate since it does not represent a direct threat to stream organisms.] Phosphorus levels were generally below the level (0.1 mg/L) associated with nuisance growth of algae. An increase in nutrient concentrations since the beginning of operations at the upstream golf course (June 2004) was not observed.

Turbidity

Turbidity levels were generally below the drinking water standard of 5 NTU. Higher levels (up to 48 NTU) were observed during periods of high flows in the first quarters of 2001 and 2003 in Haines Canyon Creek and Big Tujunga Wash. In addition, turbidity of 5.4 NTU was detected in one sample in the third quarter of 2004 in the inflow to Tujunga Ponds, although the duplicate sample was 3.2 NTU. During the period of the sampling program, turbidity levels which adversely affected beneficial uses were not observed.

Bacteria

During the period of the sampling program, fecal coliform levels were generally safe for body-contact recreation (i.e., below the water contact recreation standard of 200 MPN/100 mL). Higher levels (up to 900 MPN/100 mL) were observed as follows: the third quarter of 2001 in one sample from the Tujunga Ponds outflow and in one sample from Haines Canyon Creek leaving the site; fourth quarter of 2002 in one sample from Haines Canyon Creek leaving the site; first quarter of 2004 in one sample from Tujunga Ponds outflow and in both duplicate samples in Haines Canyon Creek; and third quarter of 2004 in one sample from Haines Canyon Creek. As an average of the two duplicate samples, 200 MPN/100 mL was exceeded only twice, in the third quarter of 2001 in the outflow from Tujunga Ponds and in the first quarter of 2004 in Haines Canyon Creek. [It should be noted that the 200 MPN/100 mL standard for fecal coliform is used for reference only. Sufficient samples were not taken as part of this program since the standard calls for not less than four samples for any 30-day period.]

Chlorine and Pesticides

Total residual chlorine readings were below the detection limit at all stations for all sampling dates. Similarly, glyphosate and chlorpyrifos (added to the list of sampling parameters starting in the first and fourth quarters of 2004, respectively) were not detected at any station.

Conclusion

Overall, water quality conditions at the mitigation bank generally support warmwater aquatic life and are protective of human health during body-contact recreation. Seasonal and flow-related fluctuations were observed for some parameters, and nitrate concentrations were substantially lower in 2005 compared to other years, but overall water quality conditions were relatively stable over the 5-year sampling program.

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.

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.

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.