

**DRAFT
2003 ANNUAL REPORT FOR THE
BIG TUJUNGA WASH
MITIGATION BANK**

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**

TABLE OF CONTENTS

	<u>Page</u>
SECTION 1.0 – INTRODUCTION.....	1-1
1.1 PURPOSE/GOALS	1-1
1.2 SITE DESCRIPTION AND LOCATION	1-1
1.3 SUMMARY OF THE ANNUAL REPORT.....	1-4
1.4 STATUS OF PERMITS.....	1-7
1.5 RESPONSIBLE PARTIES	1-7
SECTION 2.0 – NATIVE HABITAT RESTORATION PROGRAM	2-1
2.1 INTRODUCTION.....	2-1
2.1.1 Purposed and Goals	2-1
2.1.2 Vegetation Descriptions	2-1
2.2 METHODOLOGY/DATE OF IMPLEMENTATION.....	2-2
2.3 PROJECT MONITORING STATUS	2-5
2.4 RESULTS.....	2-5
2.5 SITE EVALUATION AND RECOMMENDATIONS	2-7
SECTION 3.0 – COAST LIVE OAK/SYCAMORE WOODLAND REVEGETATION PROGRAM	3-1
3.1 INTRODUCTION.....	3-1
3.2 METHODOLOGY/DATE OF IMPLEMENTATION.....	3-1
3.3 RESULTS.....	3-5
3.4 SITE EVALUATION AND RECOMMENDATIONS	3-7
3.5 PROJECT MONITORING STATUS	3-8
SECTION 4.0 – EXOTIC PLANT REMOVAL PROGRAM	4-1
4.1 INTRODUCTION.....	4-1
4.1.1 Purposed and Goals	4-1
4.2 METHODS	4-1
4.2.1 Giant Reed Removal	4-1
4.2.2 Water Hyacinth Eradication.....	4-1
4.2.3 Tamarisk Eradication	4-4
4.3 STATUS/RESULTS	4-4
4.4 MONITORING SCHEDULE	4-4
SECTION 5.0 – EXOTIC WILDLIFE REMOVAL & NATIVE FISH SAMPLING PROGRAMS.....	5-1
5.1 INTRODUCTION.....	5-1
5.1.1 Purpose and Goals.....	5-1
5.2 METHODOLOGY	5-2
5.2.1 Native Fish Sampling in Haines Canyon Creek.....	5-2
5.2.2 Exotic Wildlife Removal in the Tujunga Ponds and Haines Canyon Creek	5-2
5.3 RESULTS.....	5-2
5.3.1 Results of Native Fish Sampling	5-2
5.3.2 Results of Exotic Wildlife Removal.....	5-6

TABLE OF CONTENTS (Continued)

	<u>Page</u>
5.4 DISCUSSION	5-7
5.5 PROBLEMS ENCOUNTERED AND RECOMMENDATIONS	5-7
5.5.1 Rock Dams	5-7
5.5.2 Sources of Non-Natives	5-7
SECTION 6.0 – BROWN-HEADED COWBIRD PROGRAM	6-1
6.1 INTRODUCTION.....	6-1
6.2 PURPOSE AND GOALS	6-1
6.2.1 Cowbird Trapping Methodology	6-1
6.2.2 Trap Location.....	6-2
6.3 TRAP MONITORING.....	6-2
6.4 RESULTS.....	6-2
6.5 RECOMMENDATIONS	6-6
6.5.1 Procedural Recommendations.....	6-6
6.5.2 Securing Cowbird Decoys.....	6-8
6.5.3 Vandalism.....	6-8
6.5.4 Trap Relocation Recommendations	6-8
6.5.4.1 Onsite traps	6-8
6.5.4.2 Offsite traps	6-8
SECTION 7.0 – WILDLIFE SUCCESS MONITORING	7-1
7.1 PURPOSE AND GOALS	7-1
7.2 LEAST BELL’S VIREO	7-1
7.2.1 Methodology	7-1
7.2.2 Status/Results.....	7-1
7.3 SOUTHWESTERN WILLOW FLYCATCHER.....	7-1
7.3.1 Methodology	7-1
7.3.2 Results	7-2
7.4 ARROYO TOAD	7-2
7.4.1 Methodology	7-2
7.4.2 Results	7-2
SECTION 8.0 – TRAILS PROGRAM	8-1
8.1 INTRODUCTION.....	8-1
8.1.1 Purpose/Goals	8-1
8.1.2 Location.....	8-1
8.2 METHODOLOGY.....	8-3
8.3 IMPLEMENTED TASKS	8-3
8.3.1 Trails Enhancement and General Site Conditions	8-3
8.4 PROBLEMS ENCOUNTERED AND CORRECTIVE ACTIONS	8-5
8.4.1 Signs/Kiosks	8-5
8.4.2 Erosion Issues.....	8-5
8.5 FUTURE TRAIL IMPLEMENTATION MEASURES.....	8-5

TABLE OF CONTENTS (Continued)

	<u>Page</u>
SECTION 9.0 – PUBLIC AWARENESS AND OUTREACH PROGRAM	9-1
9.1 INTRODUCTION.....	9-1
9.1.1 Purpose and Goals.....	9-1
9.2 ACTIONS TAKEN	9-4
9.2.1 Community Advisory Committee Meetings	9-4
9.2.2 Newsletters	9-4
9.2.3 Elected Official Contact.....	9-4
9.2.4 Project Fact Sheets	9-6
9.3 STATUS	9-6
 SECTION 10.0 – WATER QUALITY MONITORING PROGRAM	 10-1
10.1 INTRODUCTION.....	10-1
10.2 PURPOSE/GOALS	10-1
10.3 METHODOLOGY	10-1
10.3.1 Location of Sampling Sites.....	10-1
10.3.2 Description of Analyses.....	10-4
10.4 RESULTS.....	10-4
10.4.1 Comparison of Quarterly Monitoring.....	10-4
10.5 RECOMMENDATIONS	10-4
 SECTION 11.0 – REFERENCES	 11-1
 SECTION 12.0 – LIST OF PREPARERS	 12-1
 APPENDIX A – 2003 FUNCTIONAL ANALYSIS REPORT	
APPENDIX B – RIPARIAN PLANTING AREA PHOTOGRAPHS	
APPENDIX C – DATA SHEETS	
APPENDIX D – 2003 QUARTERLY AND SEMI-ANNUAL MAINTENANCE MONITORNG REPORTS	
APPENDIX E – UPLAND RESTORATION AREA PHOTOGRAPHS	
APPENDIX F – EXOTIC AQUATIC WILDLIFE REMOVAL 2003 REPORT	
APPENDIX G – 2003 ANNUAL BROWN-HEADED COWBIRD TRAPPING AND REMOVAL PROGRAM	
APPENDIX H – COMPLETE REPORT OF FINDINGS AND FIELD DATA SHEETS FOR THE 2003 SOUTHWESTERN WILLOW FLYCATCHER, LEAST BELL’S VIREO AND ARROYO TOAD SURVEYS	
APPENDIX I – 2003 CAC MEETING MINUTES, ATTENDANCE, AND WALL GRAPHICS	
APPENDIX J – MARCH AND SEPTEMBER ISSUES OF THE 2003 BIG T WASH LINE NEWSLTTERS	
APPENDIX K – RESULTS FROM THE 2003 WATER SAMPLING EFFORTS	

LIST OF FIGURES

Figure		Page
1-1	Vicinity Map.....	1-2
1-2	Project Location Map	1-3
1-3	Aerial Photo Map	1-5
2-1	Native Riparian Habitat Enhancement Plan Checklist.....	2-4
3-1	Upland Restoration Revegetation Areas Map	3-2
3-2	Upland Native Habitat Restoration Program Checklist.....	3-4
4-1	Exotic Plant Species Eradication Program Checklist	4-2
5-1	Exotic Wildlife Species Eradication Program Checklist	5-3
5-2	Exotic Wildlife Maintenance and Monitoring Checklist	5-5
6-1	Cowbird Trap Locations	6-3
6-2	Cowbird Trap Locations	6-4
6-3	Brown-Headed Cowbird Eradication Program Checklist	6-7
8-1	Trails Map	8-2
8-2	Trails Enhancement Program Checklist.....	8-4
8-3a	Railroad ties used to repair the erosion gully below the Cottonwood bluff	8-6
8-3b	Erosion gully near the upland area	8-6
8-4	Trail Monitoring Checklist	8-7
9-1	Current Key Stakeholders/Mailing List.....	9-2
9-2	Community Awareness and Involvement Program Checklist.....	9-3
10-1	Sampling Locations.....	10-2
10-2	Water Quality Monitoring Program Checklist.....	10-3

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1-1	MMP Implementation Schedule 1-8
2-1	Survival and Cover Standards 2-3
2-2	Tree Height Standards 2-3
2-3	Density, Dominance, and Relative Frequency..... 2-5
2-4	Percent Organic Cover, Annual Grass Cover, Average Tree Height, and Average Number of Topographic Features 2-6
2-5	Annual Rainfall Totals At Big Tujunga Dam and in Big Tujunga Canyon 2-7
3-1	Survival and Cover Standards 3-5
3-2	Tree Height Standards 3-5
3-3	Surviving Container Tree Plantings 3-6
3-4	Surviving Container Shrub Plantings 3-6
3-5	Average Tree Height 3-6
3-6	Annual Rainfall Totals at Big Tujunga Dam and in Big Tujunga Canyon..... 3-7
3-7	Maintenance and Success Monitoring Schedule and Reporting Requirements..... 3-8
5-1	Results of Native Fish Sampling Conducted During 2003 5-6
5-2	Non-Native Aquatic Wildlife Removal Conducted During 2003..... 5-6
6-1	Numbers of Cowbirds Trapped and Total Trapping Efficiency at Each Trapping Location for the 2003 Trapping Season..... 6-5
6-2	Number of Non-Target Bird Species Captured in Each Trap 6-6
9-1	Elected Official Briefing Contacts 9-5
10-1	Big Tujunga Wash 2003 Water Quality Sampling Locations and Dates 10-2
10-2	Big Tujunga Wash Summary of 2003 Water Quality Sampling Results 10-5
10-3	Big Tujunga Wash Baseline Water Quality (2000)..... 10-6
10-4	Summary of Big Tujunga Wash Water Quality Results 1 st Quarter 2003 (3/20/03)..... 10-7
10-5	Summary of Big Tujunga Wash Water Quality Results 2 nd Quarter 2003 (6/23/03) 10-8
10-6	Summary of Big Tujunga Wash Water Quality Results 3 rd Quarter 2003 (9/30/03)..... 10-9
10-7	Summary of Big Tujunga Wash Water Quality Results 4 th Quarter 2003 (12/17/03) 10-10

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 (*Poliophtila 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 6.0 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 maintenance and remedial actions for 2003.

1.2 SITE DESCRIPTION AND 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 general vicinity can be found on Figure 1-1. The site is bordered by the 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 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 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 – Vicinity Map

Figure 1-2 – Project Location Map

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 210 Freeway and are currently under the jurisdiction of the Los Angeles County Department of Recreation and Parks (LACDRP). An aerial photograph showing Big Tujunga Wash, Haines Canyon Creek, and the Tujunga Ponds can be found on Figure 1-3. LACDRP had no active management plan in place for these ponds, and as a result the pond habitat was severely degraded. LADPW 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 2003. Table 1-1, at the end of this section, shows the implementation dates and projected completion schedules 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 third Functional Analysis success monitoring survey was conducted in August 2003, and a success monitoring survey was also conducted in November 2003. The results of the monitoring surveys are 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 will include semi-annual monitoring. The progress of the program for 2003 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 a sycamore-oak woodland. The program also includes five years of maintenance and monitoring of the revegetation success. Quarterly maintenance inspections were conducted from November 2001 through November 2002. The semi-annual maintenance inspection was conducted in May 2003. The third annual success monitoring inspection was conducted in November 2003. Section 3.0 describes the implementation and status of the coast live oak-sycamore woodland program.

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 LACDRP 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. Section 4.0 describes the exotic plant removal methods and progress

Figure 1-3 – Aerial Photo Map

for the year 2003. Exotic wildlife removal occurred in March, May, July, and August 2003. Section 5.0 describes the exotic wildlife removal program and progress. Brown-headed cowbird removal was conducted from March 15, 2003 to June 19, 2003. Section 6.0 describes the brown-headed cowbird trapping and removal program, and provides the results for 2003.

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. Native fish sampling surveys were conducted on March 25, April 4 & 29, May 15, June 4 & 11, and August 9/11. The results of the surveys for 2003 are summarized in Section 5.0. Seven surveys for the least Bell's vireo and five surveys for the southwestern willow flycatcher took place during April, May, June, and July 2003. The results of the surveys for 2003 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 2003 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. Quarterly CAC meetings were held in March, June, September, and December 2003. Section 9.0 describes the Public Awareness and Outreach Program.

Regular Patrolling of the Mitigation Bank

This measure consists of LACDPW employing local equestrian groups by means of a partnership agreement to provide daily patrols to discourage vandalism and unauthorized activities on the site. This measure is proposed as an option because additional information and coordination with law enforcement authorities are needed to determine the feasibility and effectiveness of using citizen patrols.

Entrance to Marybell Avenue

An equestrian step-over access was installed in May 2002, just west of the existing entrance. The new entrance is located at the junction of Wentworth and Mary Bell.

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 2003 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 2003.

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 (Corps) 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 United States Fish and Wildlife Service (USFWS) does require that the project not result in negative impacts to this species. An explanation of the permitting process with USFWS is described in the Exotic Wildlife Removal section of this report.

1.5 RESPONSIBLE PARTIES

The LADPW 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. The contact person is:

Ms. Mari Schroeder
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	LADPW	04/11/2000	06/30/2000
Water Quality Monitoring	LADPW & Consultant	03/15/2000	04/04/2005
Trails Enhancement	LADPW & Consultant	07/01/2000	12/01/2005
Trails Reclamation	Consultant	07/02/2000	11/30/2002
Exotic Species Removal (Initial)	Consultant	08/15/2000	2/28/2001
Riparian Habitat Enhancement (Excluding Optional Cottonwood Avenue Area and Tujungu Ponds)	Consultant	12/01/2000	12/01/2005
Site Inspection and Maintenance (Trails, Erosion Control, Exotics Control)	Consultant	12/01/2000	12/01/2005
Annual Success Monitoring - Wildlife	Consultant	07/01/2000	08/04/2005
Annual Success Monitoring - Vegetation	Consultant	05/01/2001	08/31/2005
Annual Documentation	LADPW & Consultant	12/01/2000	01/07/2006
Community Awareness Program	LADPW & Consultant	07/15/2000	12/31/2005
Mitigation Banking Agreement	LADPW & Consultant	07/15/2000	12/15/2002

Optional Elements			
Sycamore - Oak Woodland Enhancement	Consultant	10/10/2000	11/31/2005
Obtain Additional Mitigation Credits	LADPW	04/15/2001	07/15/2001
Implementation and Success Monitoring	Consultant	07/15/2001	08/31/2006
Obtain Prelim. Estimate of Additional Mitigation Credits	LADPW	05/01/2000	06/30/2000
Feasibility Study and Selection of Modification Option	Consultant	09/01/2000	07/15/2001
Obtain Additional Mitigation Credits	LADPW & Consultant	07/15/2001	12/31/2001
Regular Patrolling	LADPW & Consultant	11/15/2000	12/31/2005
Marybell Avenue Entrance	LADPW & 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 Purposed 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 to 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 eupatorium (*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 preplanting 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* sp.) and mule fat (*Baccharis salicifolia*) 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 3.0 and 4.0. Additional container and liner plants were installed, including Fremont Cottonwood (*Populus fremontii*), 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. A major factor for the alteration of planting container sizes 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 1.0 and 2.0. 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 2003 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 second annual functional analysis was conducted on August 17 and 18, 2003, by Chambers Group botanists Ken McDonald and Jen Funk. The full text of the 2003 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 Ken McDonald and Todd Chapman on November 25, 2003. Vegetation cover in the riparian areas was estimated visually. Tree survival data were collected by walking through each planting area and assessing each installed cottonwood tree. Photographs of the riparian planting areas are shown in Appendix B. Copies of all data sheets and raw data are included in Appendix C. Figure 2-1 shows the checklist for the tasks that have been completed thus far.

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 Year¹
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 Alteration 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 LADPW and Resource Agencies.

2.3 PROJECT MONITORING STATUS

Maintenance, Monitoring and Reports

Monitoring visits for the enhancement area were conducted quarterly in 2003. Monitoring summaries for the riparian planting areas were produced as a separate report and included in the semi-annual monitoring report for the Oak/Sycamore Woodland Restoration area for the month of August 2003 (Appendix D). Semi-annual maintenance monitoring visits of the riparian planting areas will begin in late May of 2004. The next Functional Analysis will be conducted in August 2004.

2.4 RESULTS

Functional Analysis

Approximately 76 trees and 180 shrubs per acre were found in the riparian habitat at Big Tujunga Wash Mitigation Bank. Approximately 63 percent of the shrubs and 88 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 80 percent cover overall), and shrubs form a sparser understory cover of approximately 25 percent. The relative frequency of trees to shrubs was approximately 52 percent trees to 48 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.

**Table 2-3
Density, Dominance, and Relative Frequency**

	Density (# plants/acre)	Dominance (Percent Cover)	Relative Frequency (% of total community)
Native Species			
Trees	58	41.1	-
Shrubs	107	5.7	-
Non-Native Species			
Trees	8	9.6	-
Shrubs	73	0.2	-
Summary All Species			
Trees	66	50.4	49.7
Shrubs	180	4.6	50.3

Overall organic cover was relatively high at approximately 83 percent, and the presence of annual grasses was low at approximately 3.3 percent cover. The average number of topographic features encountered per 100 meters was approximately 35. The average tree height analysis indicated that most trees on the site are greater than 4 meters in height, with some falling into the 2 to 4 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)
85.3	6.5	2.68	17.5

For the riparian system, the FU is calculated to be 0.90 per acre.

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:

$$FCU_{\text{Big T}} = (0.88_{\text{FUwillows}})(76 \text{ acres of willows}) = 68.40$$

The Functional Capacity Unit 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. This is an increase of approximately 2 percent from 2002 to 2003 and 11 percent from 1997 to 2003. The overall functional unit capacity increase is a result of increases in four different variables since 1997. Increases were noted in the variables for Structural Diversity, Percent Exotic Invasive Species/Vegetation, Topographic Complexity, Terrestrial Wildlife (Vertebrate) Species Richness, and SPE (Terrestrial Vertebrate Wildlife). These increases resulted in greater Functional Unit and Capacity values. Details of the results of the Functional Analysis are found in Appendix A.

Enhancement/Trails Reclamation

Only minor enhancements to the trails were required during 2003. 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 barrier. The removal of the connecting bridge has reduced the amount of foot traffic, but has not stopped it. The bridge has been replaced by trail users using logs and branches several times. The contractor removed the make-shift bridge each time it was erected during regular maintenance visits to the site. 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.

Seeding and Planting in Revegetation Areas

The partial planting within the revegetation areas has had varied success. In some areas, willow (*Salix* sp.) and mule fat (*Baccharis salicifolia*) cuttings grew vigorously, while in other areas few cuttings survived. The cuttings that did well were generally in fairly close proximity to the creek or close to the water table level. The installed California rose (*Rosa californica*) and California blackberry (*Rubus ursinus*) also varied in their success due to the same reasons, at nine percent and 6 percent survival, respectively. The installed pads of coast prickly pear cactus (*Opuntia littoralis*) had greater than 100 percent survival, as 2 naturally recruited individuals were observed. Overall survival of the cottonwood trees installed in the riparian planting area was low at approximately 29 percent, due to lack of sufficient water. Of the original 231 cottonwoods, only 66 living trees were located. No seeding was implemented in the riparian revegetation areas.

Cover

Vegetation cover in the riparian planting areas was low for 2003, with an overall estimate of 20 percent cover. Installed cuttings were not well developed in most of the areas. The thick layer of giant reed mulch covering much of the planting areas has decreased in volume by more than 80 percent since the initial reed removal and a few naturally recruited plants were observed emerging from the mulch.

2.5 SITE EVALUATION AND RECOMMENDATIONS

Overall Site Conditions

The site has been very dry for most of the year, which has affected plantings. Vegetation cover in the riparian planting areas was still low, as installed cuttings were not well developed in most of the areas, although a few naturally recruited plants have emerged. As the mulch breaks down, an increased number of naturally recruited plants are expected to germinate. Low survivorship of cottonwood trees in the riparian planting areas was attributed to lack of sufficient water.

Table 2-5 lists the annual rainfall totals for Big Tujunga Dam and Big Tujunga Canyon, which are both located upstream of the Big Tujunga Mitigation Bank site. These annual rainfall totals show the variation in rainfall amounts over the last 5 years. The average annual precipitation for the City of Sunland, which is the closest city to the site, is 17.49 inches. The data in Table 2-5 show that the average annual rainfall in Tujunga Canyon has fallen below the annual average each year since 1999. These low rainfall totals, especially in 2001/2002, have had a negative impact on the plantings in the riparian areas because no supplemental irrigation was utilized to get the plantings established. The cottonwood trees experienced the lowest survival rate because they are highly dependent upon having sufficient water available during the establishment period.

**Table 2-5
Annual Rainfall Totals At Big Tujunga Dam and in Big Tujunga Canyon**

Rainfall Year (May – April)	Big Tujunga Dam	Big Tujunga Canyon
1999/2000	21.21	12.05
2000/2001	19.78	15.00
2001/2002	1.84	4.06
2002/2003	23.12	15.86
2003/2004	13.03	9.63

The contractor controlled weeds during maintenance activities throughout the year. A low cover of winter annual weeds was noted during the last inspection. Giant reed resprouts and saplings of tree of heaven (*Ailanthus altissima*) were observed throughout the site.

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. Mule fat cuttings had a lower survival rate and are not recommended for use in replacement planting. Approximately 50 cottonwood trees in 5-gallon containers and 50 willows in 1-gallon containers (or 100 willow cuttings) should be installed to increase the survivorship standard that will be required for the third year after implementation. 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 fall months of 2004 to take advantage of the winter rains. If the replacement plantings are installed earlier in the year, they will require irrigation in order to establish properly.

Supplementary seeding of the riparian planting areas should be considered for implementation in fall to offset the low amount of cover observed. A riparian habitat seeding mix palette will be developed upon request.

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

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

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 1998b). 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 U.S. Army Corps of Engineers 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 is 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 LADPW 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, Cooper's hawk, 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 1.0 through 5.0 are the woodland revegetation areas, and Sections 6.0 and 7.0 are the coastal sage scrub areas. Figure 3-1 shows the locations and types of restoration and enhancement areas on the site.

Restoration Areas

Maintenance of the mitigation site was performed by Natures Image, 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. Replacement planting took place in February 2002. Installed shrubs included California sagebrush (*Artemisia californica*), California brittlebush (*Encelia californica*), hoary leaf ceanothus (*Ceanothus crassifolia*), and spiny redberry (*Rhamnus crocea*).

Figure 3-1 – Upland Restoration Revegetation Areas Map

Semi-annual monitoring visits were conducted by a Chambers Group restoration specialist in May 2003. After each monitoring visit, the Chambers Group Restoration Specialist produced a letter report describing site conditions and providing recommendations for changes in maintenance activities. A copy of the semi-annual maintenance monitoring report is provided in Appendix D.

Enhancement/Trails Reclamation

No additional trails were reclaimed or closed during 2003. 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 Ken McDonald, Jen Funk, and Todd Chapman on November 19, 20, and 25, 2003. 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 unvegetated ground was estimated within each quadrat. Cover estimates were averaged to find 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, Upland restoration area photographs. 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. Height data of oaks and sycamore trees was also collected. Height data on cottonwood trees will be collected in the third year after installation. 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 oaks (*Quercus agrifolia*) and sycamores (*Platanus racemosa*) are shown in Table 3-2.

Figure 3-2

BIG TUJUNGA WASH MITIGATION BANK

UPLAND NATIVE HABITAT RESTORATION PROGRAM CHECKLIST

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

**Table 3-1
Survival and Cover Standards**

Species	1 st Year	3 rd Year	5 th 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, reseeded may be necessary.			

**Table 3-2
Tree Height Standards**

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

3.3 RESULTS

Cover and Density

The overall upland vegetation cover for the third year has increased since the second annual inspection, at approximately 74 percent. Cover of installed or seeded native species increased to 34 percent. Cover of non-native plants was approximately 66 percent. Density of native plants increased slightly from 2002, and was high at approximately 1.21 native plants per square meter overall, or about 4,900 plants per acre.

Survival Rates

Overall survival of the installed upland container plants was high. A total of 812 plants were counted in November 2003, which is an increase from the 701 trees and shrubs counted in 2002. The sycamore trees declined slightly with 42 trees counted, a loss of 4 sycamores since the previous inspection. Oak trees also declined slightly with 124 trees counted, a loss of three oaks since the 2002 inspection. A total of 166 trees were counted, or 86 percent survival for 2003, which is slightly below the requirement for the third year of monitoring. Overall shrub survival has increased since the previous inspection, with greater than the third year 90 percent survival requirement. A total of 646 shrubs were observed, or greater than 100 percent survival. This was due to the large increase in the number of naturally recruited sagebrush and buckwheat shrubs that could not be easily distinguished from installed shrubs, although there were decreases in the survival of other installed shrubs. Fuchsia-flowered gooseberry (*Ribes speciosum*) experienced the greatest losses with only 2 individuals observed, at 4 percent survival. Chaparral whitethorn (*Ceanothus leucodermis*), toyon (*Heteromeles arbutifolia*), and coastal prickly pear (*Opuntia littoralis*) also declined, at 31, 31 and 46 percent survival respectively. Natural recruitment of native species was observed in several sections. Container plantings survivorship for the upland planting area is summarized in Table 3-3 and Table 3-4.

**Table 3-3
Surviving Container Tree Plantings**

Common Name	Species	Number Required for 90% Survival	2002 Observed Numbers	2003 Observed Numbers	2003 Percent Survival
Coast live oak	<i>Quercus agrifolia</i>	152	127	124	73
California sycamore	<i>Platanus racemosa</i>	41	46	42	93
	Total	193	173	166	86

**Table 3-4
Surviving Container Shrub Plantings**

Common Name	Species	Number Required for 90% Survival	2002 Observed Numbers	2003 Observed Numbers	2003 Percent Survival
California buckwheat	<i>Eriogonum fasciculatum</i>	83	89*	389*	>100
Fuchsia-flowered gooseberry	<i>Ribes speciosum</i>	41	2	2	4
Chaparral whitethorn	<i>Ceanothus leucodermis</i>	23	8	8	31
California sagebrush	<i>Artemisia californica</i>	78	97*	162*	>100
Coastal prickly pear	<i>Opuntia littoralis</i>	41	19	21	46
Nevin's barberry	<i>Berberis nevinii</i>	2	1	1	50
Toyon	<i>Heteromeles arbutifolia</i>	46	18	16	31
California bush sunflower	<i>Encelia farinose</i>	14	6	10	63
Spiny redberry	<i>Rhamnus crocea</i>	7	8	10	>100
Laurel sumac	<i>Malosma laurina</i>	35	31	27	69
	Total	370	279	646	>100
* - large number of observed plants attributed to natural recruitment.					

Tree Heights

Although natural recruitment of native trees was observed in the upland planting area, only installed trees were included in the tally. The height standards for the third year of monitoring for installed oak and sycamore trees have been exceeded. The mean height of each tree species is shown in Table 3-5.

**Table 3-5
Average Tree Height**

Common Name	Scientific Name	Average Height For 3 rd Year	
		Minimum	2003
Sycamore	<i>Platanus racemosa</i>	7	11
Oak	<i>Quercus agrifolia</i>	3	6

3.4 SITE EVALUATION AND RECOMMENDATIONS

Overall Site Conditions

The overall site was in good condition as of the last maintenance-monitoring visit in November 2003. The overall cover of vegetation has increased for the third year, but native vegetation was still lower than anticipated, most likely due to lack of sufficient precipitation. Table 3-6 lists the annual rainfall totals for Big Tujunga Dam and Big Tujunga Canyon, which are both located upstream of the Big Tujunga Mitigation Bank site. These annual rainfall totals show the variation in rainfall amounts over the last 5 years. The average annual precipitation for the City of Sunland, which is the closest city to the site, is 17.49 inches. The data in Table 3-6 show that the average annual rainfall in Tujunga Canyon has fallen below the annual average each year since 1999. The particularly low rainfall total in 2001/2002 did have a negative effect on the plantings because only the container plants were irrigated. The seeded areas were not irrigated so germination in the seeded areas was very low during the early years of the restoration project. Fortunately, rainfall totals have been higher since the 2001/2002 low, but they continue to be below the annual average. Even though the site has experienced low rainfall since it was initially planted, the overall cover and survival rates for the restoration site are very close to what was expected for the third year after planting.

Table 3-6
Annual Rainfall Totals at Big Tujunga Dam and in Big Tujunga Canyon

Rainfall Year (May – April)	Big Tujunga Dam	Big Tujunga Canyon
1999/2000	21.21	12.05
2000/2001	19.78	15.00
2001/2002	1.84	4.06
2002/2003	23.12	15.86
2003/2004	13.03	9.63

A greater amount of native germination was observed in the third year than in the second year. 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.

Most of the installed container plants were found alive during the annual monitoring inspection. Mortality in container plantings was due to various causes such as herbivory and extreme temperatures, which also affected many of the seeded species. Loss of some of the container stock is attributed to insufficient water due to breaks in the irrigation lines.

The irrigation system for the container plants sustained frequent damage from coyotes. Breaks in the line due to chewed hoses were reported in restoration areas on a regular basis. The contractor was advised immediately each time and advised that the system required repair. The irrigation system for the site operated adequately where it was undamaged.

Weed cover remains low overall, although numerous weed seedlings were observed. Many native species seedlings were also seen throughout the site.

Some minor problems were noted during the 2003 maintenance inspections. Recommendations for remedial actions are discussed below in Maintenance Recommendations.

Maintenance Recommendations

- The trial herbivory control of gas “gopher bombs” that was implemented in 2002 appeared to have a positive effect, as herbivory has decreased in 2003. This method should be continued if necessary to reduce the gopher population on the site if losses in native vegetation are observed.

- Replacement planting of oak trees should be implemented. A total of 27 coast live oaks should be installed as directed by the Restoration Specialist, bringing the number of installed trees up to the required 90 percent survival standard.
- Weed cover remains low overall, although numerous seedlings, primarily weed species, were observed. A greater amount of seeded native species would aid in deterring non-native weeds. Remedial seeding throughout the areas of the revegetation area should be considered, particularly where trails have been closed. 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 2003 began in May 2003 and continued through November 2003. After each monitoring visit, the Chambers Group Restoration Specialist produced a letter report describing site conditions and providing recommendations for changes in maintenance activities. A copy of the 2003 maintenance monitoring report is provided in Appendix D.

The third annual performance monitoring survey was conducted in November 2003. Semi-annual monitoring will be continued in the oak/sycamore area through November 2005. Table 3-6 shows the maintenance and performance monitoring inspection schedule for the site, and reporting requirements.

**Table 3-7
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, ACOE
2 (2002)	Quarterly (February, May, August, November) – LACDPW	Annual (December 2002) – LACDPW, CDFG, ACOE
3 (2003)	Semiannually (May, November) – LACDPW	Annual (December 2003) – LACDPW, CDFG, ACOE
4 (2004)	Semiannually (May, November) – LACDPW	Annual (December 2004) – LACDPW, CDFG, ACOE
5 (2005)	Semiannually (May, November) – LACDPW	Annual (December 2005) – LACDPW, CDFG, ACOE

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 avoid 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 (*Arundo donax*), water hyacinth, and tamarisk. Other weed species to be removed include eucalyptus (*Eucalyptus* sp.), pepper trees (*Schinus molle* and *S. terebinthifolius*), castor bean (*Ricinus communis*), umbrella sedge (*Cyperus involucratus*), mustards (*Brassica* spp.), and tree tobacco (*Nicotiana glauca*), among others.

4.1.1 Purposed 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 are minimized through project scheduling and construction monitoring. Construction on the site began after the end of the nesting season (approximately August 30) to minimize impacts on nesting bird species and breeding activities of amphibians; and avoid violations of the Migratory Bird Treaty Act. Biological monitors 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 November 2003.

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. Figure 4-1 shows the checklist for the exotic plant removal program tasks that have been completed thus far.

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 2003, resprouts of giant reed were treated with a highly concentrated (up to 100 percent) solution of Rodeo[®] 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.

No water hyacinth was observed during the 2003 maintenance period. Any reoccurrence of this species is identified during the maintenance monitoring visits and 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. Rodeo®).
- Locate the vehicle containing Rodeo® adjacent to the site.
- Use existing access areas that are devoid of vegetation.
- Treat Rodeo® with dye.
- Apply 2 to 5 percent Rodeo® solution to giant reed at a rate of .5 to 1 liter per hectare.
- Apply Rodeo® 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. Rodeo®).
- 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 Rodeo® to the entire stump surface immediately after cutting.
- Cover the entire circumference of the stump with Rodeo®.
- Inspect treated plants in the third and seventh week following the completion of the initial eradication.
- If any treated stumps show signs of new growth, or any new plants are found, then perform subsequent treatment as described above.
- Conduct quarterly inspections for a minimum of five years.

Water Hyacinth

- Notify CDFG.
- Purchase all supplies/equipment (e.g. Rodeo®).
- Determine offsite location for disposal.
- August 30—Begin eradication of water hyacinth.
- 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.
- If water hyacinth is rooted in the mud, an application of undiluted herbicide (Rodeo®) 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.
- Ensure dead material is not left onsite.
- 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.
- 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.
- 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.

No tamarisk was observed during the 2003 maintenance period. Any regrowth or new individuals of this species is identified during the maintenance monitoring visits and 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 2003 maintenance period. No regrowth of tamarisk was observed during the 2003 maintenance period.

4.4 MONITORING SCHEDULE

Monitoring of exotic plants in the restoration areas during maintenance periods will continue on a quarterly basis beginning in May of 2004.

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 March, April, May, and June, July, and August 2003 and January 2004.

5.1.1 Purpose and Goals

Swift et al. (1993) note “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 Tujung 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 (*Rana catesbeiana*), and crayfish (*Procambarus clarkii*) from Haines Canyon Creek and the Tujung 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. Camm Swift. 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

Visual observations were made on March 25, April 4, April 29, May 15, June 4, June 11, and August 9-11, 2003. Transects for native fish sampling within Haines Canyon Creek were conducted on August 8-10, 2003 and January 6-14, 2004. The transects normally conducted in November or December were completed in January 2004. The transects were established in December 2000 with random methods over the 1600 meters of stream, an approximately 20 percent sample. At each native fish collection, the transect was blocked at the upper and lower end with an eighth-inch mesh seine. This was done with minimal disturbance to the transect. Then, two persons seined for at least one hour with a variety of techniques to exhaustively sample all of the fishes. Native fishes were held in large buckets and oxygenated frequently. At the end of each collection, the native fishes were counted, their sizes were estimated to the nearest 10 centimeters, and then were 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 were also measured and recorded. Data were taken from the surface and bottom at two or three places in each pond and once in the flowing portion of the stream.

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

Exotic wildlife collection and removal in the Tujunga Ponds and Haines Canyon Creek occurred on March 24-28, May 21-23, May 27-31, July 21-25, July 28-August 1, August 4-7, 2003 and January 6-14, 2004. The transects normally conducted in November or December were completed in January 2004. 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. Seining techniques were only used during the second quarter in the West Pond. "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. Additionally, gigging of bullfrogs at night was conducted during the third quarter. Traps were baited with small cans of mackerel in tomato sauce, and "seafood grill" catfood 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 2003 followed a similar pattern to previous sampling periods in that the native species, Santa Ana sucker (*Catostomus santaanae*), Santa Ana speckled dace (*Rhinichthys osculus* ssp.), and arroyo chub (*Gila orcutti*), were the most abundant in the downstream transects. While the numbers of Santa Ana sucker during the winter 2003 sampling were higher than fall collections in 2002, they were still below the numbers in the late fall of 2000 and 2001. Santa Ana speckled dace and arroyo chub are still present in very low numbers. Table 5-1 summarizes the results from the native fish sampling conducted during 2003.

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.

Gill Netting in Tujunga Ponds

- 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.

Seining

- 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.

Electroshocking (optional sampling method based on consultation with USFWS)

- 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.

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 Giggling of Bullfrogs (optional method if other control methods are ineffective)

- Perform giggling 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 MONITORING 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.

Monitoring Checklist

- 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 2003**

Quarter	Santa Ana Sucker	Arroyo Chub	Santa Ana Speckled Dace	Other
1 st (Jan. – March)	0	0	0	0
2 nd (April – June)	22 adults 496 YOY* 640 larvae	15 larvae	1 YOY*	1 rainbow trout 300 western toad larvae 1 two-striped garter snake
3 rd (July – Sept.)	70	5	6	0
4 th (Oct. – Dec.)**	63	5	2	0
Totals	1,291	25	9	1 rainbow trout 300 western toad larvae 1 two-striped garter snake
* young of the year				
** transects were conducted in January 2004				

5.3.2 Results of Exotic Wildlife Removal

The primary accomplishments of the 2003 sampling efforts were the maintenance of a decline in the numbers of crayfish in the ponds, moderate declines of crayfish in the stream, increased catches of young bass (*Micropterus salmoides*) in the ponds, and the removal of adult, juvenile, and egg masses of bullfrogs. Approximately 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 2003, included as Appendix F. Table 5-2 summarizes the results from the non-native aquatic wildlife removal conducted during 2003.

**Table 5-2
Non-Native Aquatic Wildlife Removal Conducted During 2003**

Quarter	Largemouth Bass	Sunfish	Crayfish	Bullfrog Larvae	Other
1 st (Jan. – March)	30	11	470	10	1 goldfish 1 red-eared slider
2 nd (April – June)	226	16	947	1,382	1 red-eared slider
3 rd (July – Sept.)	440	8	2,094	10,561	1 mosquito fish 1 red-eared slider 1 Mississippi map turtle
4 th (Oct. – Dec.)*	64	1	1,278	1	15 mosquito fish 1 fathead minnow
Totals	760	36	4,789	11,954	1 goldfish 3 red-eared slider 1 Mississippi map turtle 16 mosquito fish 1 fathead minnow
* transects were conducted in January 2004.					
Totals include all non-natives removed by all methods.					

5.4 DISCUSSION

The numbers of native fishes continues to be lower than in the first three series of transect collections during 2000-2001. Specifically, the numbers of native fish since July 2002 has remained at approximately one-fifth the numbers of the 2000 and 2001 collections. Despite the lower numbers of native fish, the fact that all age classes of Santa Ana suckers were found in the January 2004 sampling indicates that recruitment is still taking place. In contrast, very few adult arroyo chubs and Santa Ana speckled dace were observed and no young of the year fish were taken. The decreased numbers of the latter two native fish indicate that either there is little recruitment or that winter storms washed them out. It is possible that the winter storms did not affect Santa Ana sucker as dramatically because the young suckers are able to reach a larger size earlier in the season.

With the exception of the first sampling period, the number of crayfish have generally remained steady over the past few years. Specifically, the first sampling conducted in December 2000 resulted in the highest catches (2,322) and since then, crayfish numbers have ranged from approximately 860 to 1,980.

Although the numbers of crayfish seem to be declining, the numbers are not drastic enough to indicate complete elimination anytime in the near future. There does not appear to be an easy way to remove crayfish from the stream without greatly altering the habitat. The only time the numbers of crayfish are greatly reduced is following storm flows that flush out the system or in areas where large numbers of bass occur and apparently prey on smaller crayfish. Therefore, a new approach to crayfish removal may include intense removal efforts immediately following storm events.

5.5 PROBLEMS ENCOUNTERED AND RECOMMENDATIONS

5.5.1 Rock Dams

In several areas, artificial damming of the stream with boulders and rocks caused ponding of the stream and eliminated stretches that would otherwise be run or riffle habitat. These rock dams continue to be an issue of concern. As identified in the 2001 annual report, 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 quarterly Community Advisory Committee (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

The fish biologists have documented largemouth bass entering the system from the ponds and from upstream and downstream in Big Tujunga Wash. A barrier placed at the outlet of the west pond could prevent bass from entering the stream habitat. This barrier should also prevent winter the storm flows in Haines Canyon Creek from entering the ponds. Another source of non-native species comes from people releasing unwanted aquatic pets into the pond habitat. Bilingual informational signs installed around the ponds during the first quarter of 2004 should help to decrease this detrimental activity.

SECTION 6.0 – BROWN-HEADED COWBIRD PROGRAM

6.1 INTRODUCTION

The brown-headed cowbird (*Molothrus ater*) 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 (*Poliophtila californica californica*), least Bell's vireo (*Vireo bellii pusillus*), and southwestern willow flycatcher (*Empidonax traillii extimus*). 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 2003 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. The four onsite trap locations for 2003 were the same locations that were used in 2002. As a result of the permitting process, the USFWS required Public Works to run 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. Two of the three offsite trap locations were new locations and the third location at the Hansen Dam Equestrian Center was the same location that has been used for the past three years. 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). The cowbird trap locations are shown on Figures 6-1 and 6-2.

6.3 TRAP MONITORING

The lack of available decoys (due to a cowbird shortage in the region) resulted in nonstandard decoy ratios during the first month of trapping. Thus, the decoy ratio of 2:3 (male: female) cowbirds was not achieved in the seven traps until the second month of trapping. A total of 21 male and four female decoy cowbirds were obtained from the brown-headed cowbird trapping and removal program at the Orange County Water District, Prado Dam field office on March 14, 2003. The seven traps were supplied with the decoy cowbirds on March 14, 2003, but the top slot openings were covered until March 15, 2003, the first day of the 2003 trapping season. All seven traps were fully operational on March 15, 2003.

Prado Dam was contacted throughout the first month to track the availability of decoys. Female decoys became available mid-April and were evenly distributed throughout the seven traps. A total of 15 female decoys were brought in from Prado Dam's trapping program on April 18, 2003. The additional cowbirds brought the female decoy ratio up to the standard three females per trap. However, the male decoy ratio was left higher than normal for a few weeks in order to produce higher bird activity, which often times results in higher capture numbers. Because the offsite traps were in the vicinity of high cowbird activity, the decoy ratios in these traps were kept higher than the standard 2:3 (male: female).

Traps were checked daily from March 15 through June 19, 2003, including 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 entered into a palmtop computer and was also recorded by hand on datasheets.

6.4 RESULTS

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 – 2003 Annual Brown-headed Cowbird Trapping and Removal Program (Chambers Group 2003) for detailed information regarding the 2003 cowbird program.

Figure 6-1 – Cowbird Trap Locations

Figure 6-2 – Cowbird Trap Locations

A total of 20 cowbirds, consisting of 9 males, 11 females, and 0 juveniles, were trapped within the Big Tujunga Wash Mitigation Bank site and vicinity between March 15 and June 19, 2003. Of the 20 cowbirds, one was trapped within the onsite traps in the Big Tujunga Wash Mitigation Bank and 19 cowbirds were trapped in the offsite traps. This is a significant decrease in the number of trapped cowbirds from the 2002 and 2001 trapping seasons (173 total cowbirds, consisting of 66 males, 105 females, and two juveniles were trapped in 2002 and 70 total cowbirds, consisting of 37 males, 24 females, and 9 juveniles were trapped in 2001).

Ninety-five percent of all trapped cowbirds were captured within offsite traps located directly within active stable areas. The Sommer Hawk trap was the most productive, capturing 45 percent of all cowbirds. The trap efficiency for this trap was 0.093, which represents the highest per trap per day capture rate. The second most productive trap was the Equestrian B trap, which caught 40 percent of all trapped cowbirds and had a 0.082 trap efficiency rate. The third most productive trap was the Esko trap, which caught 10 percent of all cowbirds and had a 0.021 trap efficiency rate. The Restoration trap caught five percent of all cowbirds and had a 0.010 trap efficiency rate. The Cottonwood, Upland, and Alluvial traps did not capture any cowbirds during the 2003 season. Juvenile cowbirds were not captured in any of the traps this season.

Female captures outnumbered male captures by three in April. Male captures outnumbered female captures by one in May. Therefore, the male to female capture rate for 2003 was 0.82, compared to 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 2003 trapping season. The 2003 capture totals were the lowest since trapping began in 2001. The decrease in total captures can be attributed to a combination of the early program closure resulting in fewer total trap days, in addition to the possibility that there are fewer cowbirds in the region.

**Table 6-1
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

There were a total of two instances of vandalism during the 2003 trapping season. All of the vandalism occurred during the first two months and was limited to two traps, the Sommer Hawk and Cottonwood traps. Decoys and nontarget birds were not harmed, no birds escaped, and the traps were repaired either the same or the following day. Trap vandalism during 2003 was not as severe as it was during the 2002 and 2001 seasons due to the relocation of the problem trap locations. Trap days were not lost due to the incidences of vandalism in 2003. In comparison, a total of four days in 2002 and 12 days in 2001, were lost due to vandalism events.

A total of 176 birds from six nontarget species were captured during the 2003 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 banded birds or 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.

**Table 6-2
Number of Non-Target Bird Species Captured in Each Trap**

Bird Species	Trap 1		Trap 2		Trap 3		Trap 4		Trap 5		Trap 6		Trap 7		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 CATO = 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																

No decoy cowbirds and a total of 10 nontarget birds died in the traps during the 2003 trapping season, all of which appeared to have died due to pecking by cowbirds that were also in the traps. Additionally, a total of 21 house sparrows (6 males and 15 females) were euthanized during the 2003 trapping season per CDFG's authorization letter. One house sparrow escaped during the trapping program.

The nontarget mortality rate for the 2003 trapping season totaled 5.7 percent, which is much higher than the standard two percent mortality rate considered acceptable by the USFWS and discussed in Griffith Wildlife Reports (GWB 1994b) on nontarget birds. The unusually high incidence of nontarget mortality seems to have been caused by the smaller ¼-inch mesh trap design. 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 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 was higher than normal and resulted in early closure of the 2003 trapping program (under USFWS guidance). There were no signs of predation in any of the nontarget mortalities (e.g. feathers outside of the trap). Refer to Appendix G for details on the nontarget mortality rate.

6.5 RECOMMENDATIONS

6.5.1 Procedural Recommendations

Logistically, the 2003 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 throughout the five-year implementation.

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.
- June 19 (usually 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).

6.5.2 Securing Cowbird Decoys

The lack of available decoys, due to a cowbird shortage in the region, resulted in nonstandard decoy ratios during the first month and a half of trapping. 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 last week of February 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 only a minor problem in 2003. Vandalism was anticipated and is expected to continue throughout the five-year implementation because of the heavy trail use. Informing community members of the importance of the program is ongoing and will continue throughout the five-year implementation.

6.5.4 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.

6.5.4.1 Onsite traps

Onsite trap locations for 2004 may change following the agency meeting regarding nontarget mortality. However, it may be difficult to find additional suitable trap locations due to heavy trail use and high incidence of vandalism within the mitigation bank. Based on recommendations made following the 2001 trapping season, traps should not be placed near Haines Canyon Creek or the Tujunga Ponds.

6.5.4.2 Offsite traps

The Sommer Hawk trap was by far the most productive trap during 2003. The equestrian center and Esko traps were the second and third most productive traps, 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 2004. If the exact locations are not available in 2004, then efforts should be made in the two 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 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

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 (*Vireo bellii pusillus*). 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 18, 28, May 12, 22, June 3, 24, July 8, and 17, 2003. Weather conditions during the surveys ranged from 100 percent overcast to clear skies with temperatures ranging from 47°F to 83°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 habitat 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.

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. Southwestern willow flycatchers (*Empidonax traillii extimus*) and western yellow-billed cuckoos (*Coccyzus americanus occidentalis*) 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

Five focused surveys for the southwestern willow flycatcher were conducted by Brian Leatherman (USFWS permit # TE 827493-4; CDFG MOU), a wildlife biologist with over 10 years of field experience in southern California. Survey methods followed the mandatory protocol developed by Sogge et. al (1997) and the subsequent revised protocol developed by USFWS (USFWS 2000). Surveys were conducted on May 16, June 3, 23, July 10, and 17, 2003. Sogge et.al (1997) recommend that surveys be conducted between dawn and 1000 hours. However, surveys at Big Tujunga Wash were conducted between dawn and 1200 hours because of the large size and complex shape of the mitigation bank habitat. Weather conditions during the surveys ranged from 100 percent overcast to clear skies with temperatures ranging from 49°F-86°F. 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. All wildlife species observed or detected during the surveys were documented.

7.3.2 Results

Southwestern willow flycatchers were not observed or detected during the focused surveys and no nesting southwestern willow flycatchers were reported in the vicinity. Additionally, western yellow-billed cuckoos were not seen or heard during any of the flycatcher surveys. Appendix H contains the report and field data sheets from each of the surveys.

7.4 ARROYO TOAD

7.4.1 Methodology

Surveys were conducted by a qualified biologist familiar with the habits, appearance, and vocalizations of the arroyo toad (*Bufo californicus*). Surveys follow the 1999 USFWS Survey Protocol Guidelines for the arroyo toad. 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 included both daytime and nighttime components conducted within the same 24-hour period (except when arroyo toads were detected in the survey area).

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 (assuming eggs, larvae, and/or juveniles have not been detected) 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 is 55 degrees Fahrenheit or greater.

7.4.2 Results

Due to the moderate amount of rainfall this season, the 2003 surveys were the first year that arroyo toad surveys were conducted. However, the arroyo toad was not detected on the mitigation bank site. Appendix H contains the report and field data sheets from each of the surveys.

SECTION 8.0 – TRAILS PROGRAM

8.1 INTRODUCTION

This program will 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, it's 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 second 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.

Figure 8-1 – Trails Map

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 2003 primarily consisted of keeping the trails safe for pedestrians and equestrians. This program is exempt from 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. Figure 8-2 shows the checklist for the trails implementation tasks that have been completed thus far.

8.3.1 Trails Enhancement and General Site Conditions

Bilingual signage around the ponds was installed in March 2003 and explains the importance of not releasing pets and other non-native species into the ponds and aquatic habitats. Trash receptacles with lids and portable toilets were placed at the designated locations (Figure 8-1) and were maintained on a regular basis. Due to the high volume of trash within the site, a second trashcan was added at the Wheatland/210 gate. Additionally, CAC members had been requesting more frequent trash pick up. Therefore, in order to coincide with the weekly trash removal conducted by CAC members, LACDPW requested that Flood Maintenance pick up the trash twice a week, on Wednesdays and Fridays. CAC members have been very satisfied with the additional trashcan and more frequent trash pick up implemented in 2003. The removal of large stones (over 4" diameter) was conducted along the Water Trail, Pond Trail, and secondary trails within the riparian areas when necessary. Overhanging branches and plant materials that obstructed the trails were trimmed back as necessary. Additionally, several rock dams were dismantled during maintenance visits. The unauthorized footbridge installed along the western edge of the Tujung Ponds still exists, however the board has been missing for several months.

Figure 8-2

BIG TUJUNGA WASH MITIGATION BANK

TRAILS ENHANCEMENT PROGRAM CHECKLIST

- ~~Coordinate with Corps and CDFG regarding Nationwide Permit and Streambed Alteration Agreement.~~
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).
- 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)

8.4 PROBLEMS ENCOUNTERED AND CORRECTIVE ACTIONS

8.4.1 Signs/Kiosks

New, reader-friendly kiosk display boards were installed during the first quarter of 2003. Program fact sheets were also installed in each of the kiosks during the first quarter. However, the kiosk on the haul road was vandalized in early June 2003. The display boards were salvaged, but the kiosk was irreparable. Due to ongoing vandalism of the haul road kiosk, it is unclear whether or not this will be replaced. If it is repaired, then the design may include plexi-glass material placed flush against the display board. This improved design would not include doors or space between the board and plexi-glass that could be vandalized.

Although a few of the signs have been moved, the bilingual signage installed around the ponds in March 2003 is still intact. Installation of general trail signage is still being coordinated with a community group.

8.4.2 Erosion Issues

The erosion gully located below the Cottonwood bluff was repaired during the fall of 2003. The Flood Maintenance department used railroad ties to block off the gully from trail use. The erosion gullies in the upland area have not been repaired yet. Figure 8-3 shows the condition of the repaired Cottonwood gully and the upland erosion issues. Figure 8-4 shows the checklist for the trails monitoring tasks that have been completed thus far.

8.5 FUTURE TRAIL IMPLEMENTATION MEASURES

Temporary closures on portions of a few trails may be necessary if minor replacement planting is conducted. Signs will be posted and trail users will be notified of the work areas. In addition, maintenance of the existing trails will occur on a monthly basis. This includes removal of trash and debris, trimming of branches, and posting of signs along the four main recreational trails.



Figure 8-3a: Railroad ties used to repair the erosion gully below the Cottonwood bluff.



Figure 8-3b: Erosion gully near the upland area.

Figure 8-4

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 LADPW. 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 area is deemed successful by Restoration Specialist.

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 91. Figure 92 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

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 – to be inserted by WP

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 on site. 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) (ongoing).
- 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

Quarterly CAC meetings were held on March 6, June 5, September 4, and December 4, 2003. 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 2003 CAC meetings:

- General Site Signage: The project team is working with CAC members on finalizing trail signs.
- Tamayo Property: Public Works is still working with the Mapping and Property Management division and is still waiting for finalization on the acquisition of this property. Public Works is working to purchase the land from the city. Pat Davenport, a CAC member and a city employee, will help to see the purchase through.
- 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: A site patrol may be underway. A meeting was held with the Office of Public Safety (Los Angeles County) on Oct. 28, 2003 to discuss the issue with the County Public Police. A proposal was received and money for the site patrol is available, but the frequency of patrols is still to be decided. There is also the possibility of a Fire Dept. Horse Fire Watch patrol as well.
- Pond Crossing/Footbridge: A new footbridge on the west side was installed by site users without the necessary permits. The agencies were contacted and a resolution will be discussed. The second area of concern is where site users are still stacking up wood debris to cross between the ponds. This causes the water to back up and become stagnant. Once the illegal footbridge is resolved, Public Works and Chambers Group will look into the area surrounding the old footbridge. LA Parks and Recreation will need to be contacted for any changes to the ponds.
- Canyon Trails Golf Course: A meeting took place on April 1, 2003 with the Director of Golf Development, Public Works, and Chambers Group to discuss the plan of herbicide and fertilizer uses and any activities that may affect Big T due to the golf course development. The golf course has been conducting water quality monitoring for the past year and a half and would share the water quality data with Public Works. If any chemical is applied, the Golf Club will keep records of their application and inform Public Works.

9.2.2 Newsletters

The "Big T Wash Line" is the project newsletter that was published bi-annually in 2003. The newsletters supplement the CAC meetings in that they provide detail on the various enhancement activities and are distributed to all identified key stakeholders. Appendix J contains the March and September issues of the 2003 Big T Wash Line newsletters.

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 for the offices of City Council members Joel Wachs, Alex Padilla, and Wendy Gruel; State Assembly Representative 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. Individual briefings of the elected officials' offices were conducted before the March and June CAC meetings. Table 9-1 contains the elected official briefing contacts for 2003.

**Table 9-1
Elected Official Contacts
Big Tujunga Wash Mitigation Bank
Elected Official Briefing Contacts
Updated March 2003**

Name	Phone	Contact/Issues
Dave Vannatta (Interim) Supervisor Antonovich (Supervisory District 5) 869 Kenneth Hahn Hall of Administration 500 West Temple Street Los Angeles, CA 90012	(213) 974-5555	March 4, 2003: Informed of meeting/left message.
Patricia Davenport Council Member Joel Wachs (Council District 2) 7747 Foothill Blvd. Tujunga, CA 91042	(818) 352-3287 pdavenpo@council.lacity.org	March 4, 2003: Informed of meeting. Left message.
James Wilson Council Member Alex Padilla (Council District 7) 13630 Van Nuys Bl. Pacoima, CA 91331	Sylmar Office (818) 756-8409 (818) 362-4857 (fax) (818) 756-9115 (818) 756-9270(fax) jwilson@council.lacity.org	March 4, 2003: Informed of meeting and faxed copy of material. Left message.
Mark Dierking, Legislative Deputy	(213) 847-7777 (213) 847-0707 (fax) mdierkin@c07.ci.la.ca.us	March 4, 2003: Informed of meeting/left message.
Miguel Santiago/Ruth Luevanos Assemblyperson Cindy Montanez (Assembly District 39) 11541 Laurel Canyon Boulevard, Suite C Mission Hills, CA 91345	(818) 838-3939 (818) 838-3931 (fax)	March 4, 2003: Informed of meeting and faxed copy of material. Left message.

**Big Tujunga Wash Mitigation Bank
Elected Official Contacts
Updated June 6, 2003**

Name	Phone	Contact/Issues
Paul Novak, Planning Deputy Supervisor Antonovich (Supervisorial District 5) 869 Kenneth Hahn Hall of Administration 500 West Temple Street Los Angeles, CA 90012	(213) 974-5555	June 2, 2003 Informed of meeting. Cannot attend but would like to be contacted regarding future meetings
Patti Friedman Supervisor Antonovich (Supervisorial District 5) 21949 Plummer Street Chatsworth, CA 91311	(818) 993-5170	June 2, 2003 Informed of meeting/left message
James Wilson Council Member Alex Padilla (Council District 7) 13630 Van Nuys Bl. Pacoima, CA 91331 Mark Dierking, Legislative Deputy	Sylmar Office (818) 756-8409 (818) 362-4857 (fax) (818) 756-9115 (818) 756-9270(fax) jwilson@council.lacity.org (213) 847-7777 (213) 847-0707 (fax) mdierkin@c07.ci.la.ca.us	June 2, 2003 Informed of meeting June 2, 2003 Informed of meeting/left message
Patricia Davenport Councilmember Wendy Greul (Council District 2) 7747 Foothill Blvd. Tujunga, CA 91402	(818) 352-3287	June 2, 2003 Informed of meeting/left message
Steve Veres, Senior Aid Assemblyperson Cindy Montanez (Assembly District 39) 11541 Laurel Canyon Boulevard Suite C Mission Hills, CA 91345	(818) 838-3939 (818) 838-3931 (fax)	June 2, 2003 Informed of meeting/left message

9.2.4 Project Fact Sheets

Project fact sheets are brief descriptions of each of the MMP programs. New fact sheets were posted in the kiosks during 2003; however, the haul road kiosk was vandalized and is currently out of order.

9.3 STATUS

During 2004 and 2005, the CAC meetings will be held on a bi-annual basis. The next CAC meeting will be held on Thursday, April 29, 2004 at the Hansen Dam Equestrian Center. A meeting reminder and

agenda will be mailed to all CAC members and stakeholders. The next edition of the Big T Wash Line will be published in Spring 2004. Elected officials will continue to be contacted and briefed on current events on a regular basis.

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 Canyon Trails Golf Course.

10.2 PURPOSE/GOALS

The proposed 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 ($^{\circ}\text{C}$)
Total Phosphorus	pH (pH units)

10.3 METHODOLOGY

An experienced Water Quality Specialist sampled on March 20, June 23, September 30, and December 17, 2003. 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. Table 10-1 lists locations of the four water quality monitoring sites and the 2003 sampling dates.

10.3.1 Location of Sampling Sites

Water quality monitoring sites were permanently established with a Global Positioning System (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.

Figure 10-1 – Sampling Locations

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 10-1
Big Tujunga Wash
2003 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"	March 20, June 23, September 30, December 17
Haines Canyon Creek, inflow to Tujunga Ponds	N 34 16' 6.9"	W 118 20' 18.7"	March 20, June 23, September 30, December 17
Haines Canyon Creek, outflow from Tujunga Ponds	N 34 16' 7.1"	W 118 20' 28.3"	March 20, June 23, September 30, December 17
Big Tujunga Wash	N 34 16' 11.7"	W 118 21' 4.0"	March 20

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 2003 water quality sampling efforts. Detailed descriptions of the analyses are located in Appendix K.

10.4.1 Comparison of Quarterly Monitoring

In general, the water quality on the site was relatively good. Water quality in 2003 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 March sampling. Sampling during 2003 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 2003 are summarized in Tables 10-4 through 10-7. Where duplicate analyses were conducted, the average value is graphed.

10.5 RECOMMENDATIONS

The water quality at the mitigation bank during 2003 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.

Table 10-2
Big Tujunga Wash
Summary of 2003 Water Quality Sampling Results

Parameter	Summary
Temperature	Temperatures leaving the site in Haines Canyon Creek were generally (up to 6°C) cooler than temperatures in the Tujunga Ponds. As expected, seasonal fluctuations (up to 8°C) were observed, with the September readings the highest and the December readings the lowest. As with all preceding years, observed temperatures were below levels of concern for growth and survival of warm water fish species.
Dissolved Oxygen (DO)	DO levels in the inflow to the ponds during June, September, and December, were 2 to 3 mg/L lower than the outflow from the ponds. As expected, DO fluctuations generally followed seasonal temperature changes, with the highest DO recorded during the September sampling. All DO readings in 2003 were well above the recommended minimum for warm water species of 5.0 mg/L. During the past 3 monitoring years, only one DO reading below 5.0 mg/L has been recorded (in the inflow to the ponds in March 2001).
pH	In general, the pH values in Haines Canyon Creek were approximately 1 unit higher than the pH values in the ponds, which has been the regular pattern in all 3 monitoring years. For all sampling dates in 2003, the pH of waters flowing into and out of the ponds varied by 0.3 units or less. The maximum seasonal pH fluctuation at any station in 2003 was 0.6 units. Except at Haines Canyon Creek leaving the site in March (8.7 units), the pH value of water from all stations was within the 6.5 to 8.5 range identified in the basin plan.
Total Residual Chlorine	As with all preceding years, total residual chlorine readings were below the detection limit.
Nitrogen	Ammonia-nitrogen and nitrite-nitrogen were not detected in any samples in 2003. Kjeldahl nitrogen (organic plus ammonia) readings were consistently low (<1 mg/L) at all stations on all dates. Nitrate-nitrogen was consistently higher (up to 4.15 mg/L) for the inflow to versus the outflow from the ponds. Nitrate-nitrogen values in the ponds were lower (up to 0.4 to 1.7 mg/L) in 2003 than 2002, but were generally higher (0.1 to 2.1 mg/L) than in 2001. Except for the inflow to the Tujunga Ponds in March (12 mg/L), nitrate-nitrogen at all other stations was below the drinking standard of 10mg/L.
Phosphorus	The proportion of total phosphorus present as reactive orthophosphate ranged from all to approximately 20 percent. Baseline total phosphorus observed in April 2000 was significantly higher than most 2001, 2002, and 2003 readings. This may be attributed to releases from sediment disturbances caused by a rain event in 2000. Except in Big Tujunga Wash and Haines Canyon Creek during the March sampling, total phosphorus levels were below the EPA recommendations for streams of <0.05-0.1 mg/L total phosphates. The high phosphorus levels observed in March (up to 0.19 mg/L) can be attributed to the releases from the Big Tujunga Dam resulting in high flows prior to sampling.
Turbidity	Except for the March sampling in Big Tujunga Wash and Haines Canyon Creek (when turbidity levels of up to 48 NTU were observed due to high flows), the turbidity readings were below the drinking water standards of 5 NTU and were not excessive for aquatic life. The higher values can be attributed to the releases from the Big Tujunga Dam resulting in high flows prior to sampling. Overall, turbidity values in 2003 were similar to 2002 and 2001 readings.
Bacteria	Fecal coliform levels in 2003 ranged from <2 to 170 MPN/100 mL. Total coliforms were much higher (up to 36,000 MPN/100 mL). As previously mentioned, due to the rain event, baseline coliform data from April 2000 showed the highest total coliform levels (170,000 MPN/100 mL) in the outflow from the ponds. Fecal coliform levels were below the water contact recreation standard of 200 MPN/100 mL at all stations in 2003.

**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 2003 (3/20/03)

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	--	17.0	--	13.0	--	11.2	--
Dissolved Oxygen	mg/L	9.4	--	7.9	--	10.0	--	10.5	--
pH	std units	7.1	--	7.2	--	8.3	--	8.7	--
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	0.60	0.31	0.31	0.36	0.76	0.85	0.76	0.74
Nitrite-Nitrogen	mg/L	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate-Nitrogen	mg/L	8.4	12	6.1	6.0	0.36	0.36	0.54	0.53
Orthophosphate-P	mg/L	ND	0.013	0.023	0.023	0.039	0.044	0.045	0.051
Total phosphorus -P	mg/L	0.03	0.04	0.03	0.04	0.19	0.19	0.18	0.16
Turbidity	NTU	102	0.40	0.75	0.55	41	39	43	48
Fecal Coliform Bacteria	MPN/100ml	50	22	4	8	80	50	30	30
Total Coliform Bacteria	MPN/100ml	450	1,100	300	500	1,100	1,700	330	900
NTU	nephelometric turbidity units								
MPN	most probable number								
ND	non-detect								

Table 10-5
Summary of Big Tujunga Wash Water Quality Results
2nd Quarter 2003 (6/23/03)

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	17.5	--	18.0	--	*	--	17.0	--
Dissolved Oxygen	mg/L	5.9	--	8.4	--	*	--	10.6	--
pH	std units	7.0	--	7.3	--	*	--	8.1	--
Total residual chlorine	mg/L	ND	--	ND	--	*	--	ND	--
Ammonia-Nitrogen	mg/L	ND	ND	ND	ND	*	*	ND	ND
Kjeldahl Nitrogen	mg/L	0.49	0.24	0.29	0.23	*	*	0.22	0.28
Nitrite-Nitrogen	mg/L	0.11	ND	ND	ND	*	*	ND	ND
Nitrate-Nitrogen	mg/L	7.3	7.6	5.2	5.2	*	*	4.6	4.5
Orthophosphate-P	mg/L	0.027	0.029	0.011	ND	*	*	0.020	0.021
Total phosphorus -P	mg/L	0.07	0.05	0.04	0.05	*	*	0.06	0.05
Turbidity	NTU	3.2	0.90	0.70	0.75	*	*	0.85	1.0
Fecal Coliform Bacteria	MPN/100ml	23	4	8	18	*	*	23	13
Total Coliform Bacteria	MPN/100ml	30,000	5,000	260	600	*	*	2,400	11,000
* No sample on this date - station dry NTU nephelometric turbidity units MPN most probable number ND non-detect									

Table 10-6
Summary of Big Tujunga Wash Water Quality Results
3rd Quarter 2003 (9/30/03)

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	--	20.4	--	*	--	19.7	--
Dissolved Oxygen	mg/L	5.1	--	9.3	--	*	--	10.7	--
pH	std units	7.0	--	7.3	--	*	--	8.3	--
Total residual chlorine	mg/L	ND	--	ND	--	*	--	ND	--
Ammonia-Nitrogen	mg/L	ND	ND	ND	ND	*	*	ND	ND
Kjeldahl Nitrogen	mg/L	0.44	0.41	0.37	0.28	*	*	0.43	0.50
Nitrite-Nitrogen	mg/L	ND	ND	ND	ND	*	*	ND	ND
Nitrate-Nitrogen	mg/L	8.1	8.2	6.9	6.9	*	*	5.9	5.9
Orthophosphate-P	mg/L	0.017	0.017	ND	ND	*	*	ND	ND
Total phosphorus -P	mg/L	0.04	0.03	0.01	ND	*	*	0.02	0.02
Turbidity	NTU	0.50	0.30	0.25	0.20	*	*	0.25	0.35
Fecal Coliform Bacteria	MPN/100ml	11	14	2	2	*	*	170	50
Total Coliform Bacteria	MPN/100ml	3,500	11,000	36,000	11,000	*	*	11,000	2,200
* No sample on this date - station dry									
NTU nephelometric turbidity units									
MPN most probable number									
ND non-detect									

Table 10-7
Summary of Big Tujunga Wash Water Quality Results
4th Quarter 2003 (12/17/03)

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	15.5	--	15.0	--	*	--	12.0	--
Dissolved Oxygen	mg/L	6.1	--	9.0	--	*	--	9.4	--
pH	std units	7.2	--	7.4	--	*	--	8.1	--
Total residual chlorine	mg/L	ND	--	ND	--	*	--	ND	--
Ammonia-Nitrogen	mg/L	ND	ND	ND	ND	*	*	ND	ND
Kjeldahl Nitrogen	mg/L	ND	ND	0.23	ND	*	*	0.26	ND
Nitrite-Nitrogen	mg/L	ND	ND	ND	ND	*	*	ND	ND
Nitrate-Nitrogen	mg/L	9.1	9.1	7.5	7.5	*	*	6.8	6.8
Orthophosphate-P	mg/L	0.045	0.046	0.025	0.023	*	*	0.023	0.026
Total phosphorus -P	mg/L	0.09	0.09	0.08	0.07	*	*	0.07	0.08
Turbidity	NTU	0.60	0.50	0.45	0.45	*	*	0.30	0.25
Fecal Coliform Bacteria	MPN/100ml	2.0	8.0	<2.0	2.0	*	*	11	8.0
Total Coliform Bacteria	MPN/100ml	700	3,000	1,100	14,000	*	*	17,000	9,000
* No sample on this date - station dry									
NTU nephelometric turbidity units									
MPN most probable number									
ND non-detect									

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SECTION 12.0 – LIST OF PREPARERS

Chambers Group, Inc.
17671 Cowan Avenue, Suite 100
Irvine, CA 92618
(949) 261-5414

Mari Schroeder
Sophie Chiang
Ken McDonald
Lisa Allen
David Carr

Los Angeles Department of Public Works
Water Resources Division
900 S. Fremont Avenue
Alhambra, CA 91803-1381
(949) 452-6135

Pat Wood
Belinda Kwan

Brian Leatherman
White & Leatherman Bio Services
99 East C Street, No. 206
Upland, CA 91786

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

Nature's Image
20381 Lake Forest Dr.
Lake Forest, CA 92630
(949) 454-1225

Moore, Iacofano, & Goltsman, Inc.
169 North Marengo Aveune
Pasadena, CA 91101
(626) 744-9872

Pat McLaughlin
Visuart
17500 Redhill Avenue, Suite 180
Irvine, CA 92614
(949) 756-8700

Eric Carlisle
Mike Neeman