2019 ANNUAL REPORT FOR THE BIG TUJUNGA WASH MITIGATION AREA LOS ANGELES COUNTY, CALIFORNIA

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GUIDE TO COMPLIANCE WITH STREAMBED ALTERATION AGREEMENT

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

A draft Streambed Alteration Agreement (SAA) (#1600-2008-0253-R5) was issued to Los Angeles County Public Works (Public Works) from California Department of Fish and Wildlife (CDFW) on January 29, 2009 (Appendix A). The SAA remained in effect through March 31, 2014. Since the expiration of the SAA, activities conducted at the Big Tujunga Wash Mitigation Area (Mitigation Area) have been under the direct supervision of CDFW Biologist Matthew Chirdon. The following key provides a quick reference as to how the conditions were addressed and where the explanations of activities associated with the conditions are located in this document.

Resource Protection

Condition 1: Vegetation removal activities occurred between March 27 and May 27, 2019, and between August 26 and November 22, 2019. Breeding bird pre-activity surveys were conducted prior to each exotic vegetation removal activity occurring within nesting bird breeding season (March 1 through September 15) in 2019. In addition, a qualified biological monitor was present during all exotic vegetation removal activities during the breeding season to ensure that no impacts to nesting birds occurred (see Section 4.0). As a result, no negative impacts occurred to breeding/nesting birds within the Mitigation Area.

Condition 2: Nesting raptor surveys were conducted prior to all vegetation removal activities occurring within the Mitigation Area in 2019. A red-shouldered hawk (*Buteo lineatus*) nest was observed during a pre-activity survey; and, although it was located outside the work area, a 500-foot avoidance buffer was established and enforced as the buffer extended into the work area. No negative impacts occurred to nesting raptors, and the fencing of nests was not required in 2019 (see Section 4.0).

Condition 3: Active bird nests were neither destroyed nor disturbed during the 2019 breeding season, in accordance with the Migratory Bird Treaty Act (MBTA) of 1918. Appropriate measures, such as pre-activity surveys and biological monitoring, were taken to prevent impacts to breeding/nesting birds protected under the MBTA.

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

Condition 5: CDFW was notified of the presence of all listed and sensitive species occurring within the Mitigation Area.

Condition 6: A qualified biological monitor was on site during clearing, enhancement, and restoration activities (see Section 8.0). The biological monitor conducted the appropriate pre-activity surveys on site prior to each activity occurring in an area.

Condition 7: All native vertebrate species encountered during clearing, enhancement, and restoration activities were safely relocated, as necessary. No native wildlife vertebrate species were harmed as a

result of activities occurring in the Mitigation Area. No wildlife exclusionary devices were necessary; thus, none were constructed. The existing exotic fish exclusionary screens were inspected on September 12, 2019, in order to identify any necessary repairs. No repairs were required at the time of the inspection. No work was conducted on site without the presence of a biological monitor (see Sections 4.0, 6.0, and 8.0).

Condition 8: An updated Contractor Education Brochure was created with information in both English and Spanish and was distributed to all contractors and subcontractors working on the site. This updated brochure also served as an informational brochure that was handed out to recreational user groups as part of the public outreach program (see Section 10.0). In addition, the biological monitor conducted tailgate worker education sessions prior to exotic vegetation activities occurring on the site. A copy of the updated Contractor Education Brochure is included as Appendix B.

Condition 9: A copy of the 2019 annual report will be submitted to CDFW.

Condition 10: CDFW did not determine that any threatened or endangered species will be affected by the implementation of the Master Mitigation Plan (MMP); therefore, an application for a State Incidental Take Permit was not prepared.

Condition 11: One wildlife-proof trash receptacle at the northwest corner of the Mitigation Area near Interstate 210 was burned during the Creek Fire but was replaced in 2018. An additional trash receptacle is located at the Cottonwood Avenue site entrance.

Condition 12: Hunting was neither permitted nor authorized within the Mitigation Area in 2019.

Work Areas and Vegetation Removal

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

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

Condition 15: Live vegetation with a diameter at breast height (dbh) larger than 3 inches was not removed, except as stated in the MMP and approved by CDFW.

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

Equipment and Access

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

Condition 18: Access to the site occurred solely via existing roads and established trails for all site maintenance and monitoring activities with the exception of approved trail realignment activities that required off-trail activity during the creation of the realigned trail segments (see Section 8.2).

Fill and Spoil

Condition 19: Fill was not placed in any area of the Mitigation Area in 2019 as it is not authorized per the SAA.

Structures

Condition 20: Materials associated with the MMP activities were not placed in any seasonally dry portions of the stream in 2019.

Condition 21: Installation of erosion control structures was not conducted during 2019, nor was there a need for such structures.

Condition 22: Bridges, culverts, and other structures were not constructed in 2019 as part of activities associated with the MMP.

Condition 23: No construction of any temporary or permanent dams, structures, or flow restrictions occurred as part of the activities associated with the MMP. However, recreational users of the site periodically built rock dams in the creek to create pools. Chambers Group biologists or properly trained Public Works Flood Maintenance workers carefully removed them when encountered to restore the natural flow in Haines Canyon Creek (see Sections 10.0 and 12.3)

Pollution, Sedimentation, and Litter

Condition 24: All litter and pollution laws were adhered to by the contractors, subcontractors, and employees of Public Works. Trash pickup was conducted regularly by the site users, the restoration contractor, and volunteers during an organized Trail Cleanup Day (see Section 8.3).

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

Condition 26: No hazardous spills of any kind occurred in the Mitigation Area during 2019.

Condition 27: Activities conducted within the Mitigation Area in 2019 did not result in any turbid water (from dewatering or other activities) entering existing water courses.

Condition 28: Activities involving equipment washing (or other similar activities) that would have resulted in the production of water containing mud, silt, or other pollutants were not conducted in the Mitigation Area in 2019.

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

Condition 30: As stated under Condition 24, the only movement of rocks within the bed or banks of the stream occurred during the removal of rock dams created by recreational site users. Removal of the rock dams was conducted by biologists who are familiar with the sensitive fishes in the stream or by properly

trained Public Works flood maintenance workers (see Sections 10.0 and 12.3). These activities were conducted with as little silt generation as possible, and the rocks were placed back into the stream in a natural arrangement. Removal of the rock dams is critical for the federally listed (threatened) and California Species of Special Concern (SSC) Santa Ana sucker (*Catostomus santaanae*) that occurs in Haines Canyon Creek. Rock dam removal eliminates habitat that is better suited for exotic wildlife (e.g., American bullfrogs [*Lithobates catesbeianus*], largemouth bass [*Micropterus salmoides*]) that pose a threat to this species.

Permitting and Safeguards

Condition 31: The CDFW, United States Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB) were consulted very early in the development of the implementation plan for the Mitigation Area (referred to in the SAA as the Big Tujunga Conservation Area). The USACE stated that they did not need to issue a permit because there would not be any fill within their jurisdiction. The continued implementation of the MMP for the Mitigation Area is not expected to have any impact on USACE jurisdiction, nor will it have any water quality impacts. No additional permits or certifications are required from the RWQCB or the USACE.

Condition 32: Public Works submitted the Conservation Easement (CE) on December 23, 2010. Additional work on the CE was not conducted in 2019.

Administrative and Miscellaneous

Condition 33: No amendments to the SAA were submitted to CDFW during the 2019 reporting period. CDFW did not identify any breaches of the SAA during the 2019 period.

Condition 34: No violations of any terms or conditions of the SAA occurred during the 2019 period.

Condition 35: Copies of the SAA were provided to all the biologists, subcontractors, and workers who conducted activities in the Mitigation Area in 2019.

Condition 36: A pre-enhancement restoration meeting/briefing was held on November 11, 2009, prior to any exotic vegetation removal activities occurring in the Mitigation Area. Additional meetings were not necessary during 2019.

Condition 37: CDFW was notified prior to the start of exotic vegetation removal activities occurring within the Mitigation Area during the breeding bird season in 2019 (see Section 4.0).

Conditions 38 and 39: CDFW department employees Steve Gibson and Victoria Tang conducted a site visit on April 16, 2019.

Conditions 40 through 42: CDFW did not issue a suspension or cancellation of the SAA in 2019.

SECTION 1.0 – INTRODUCTION

1.1 PURPOSE

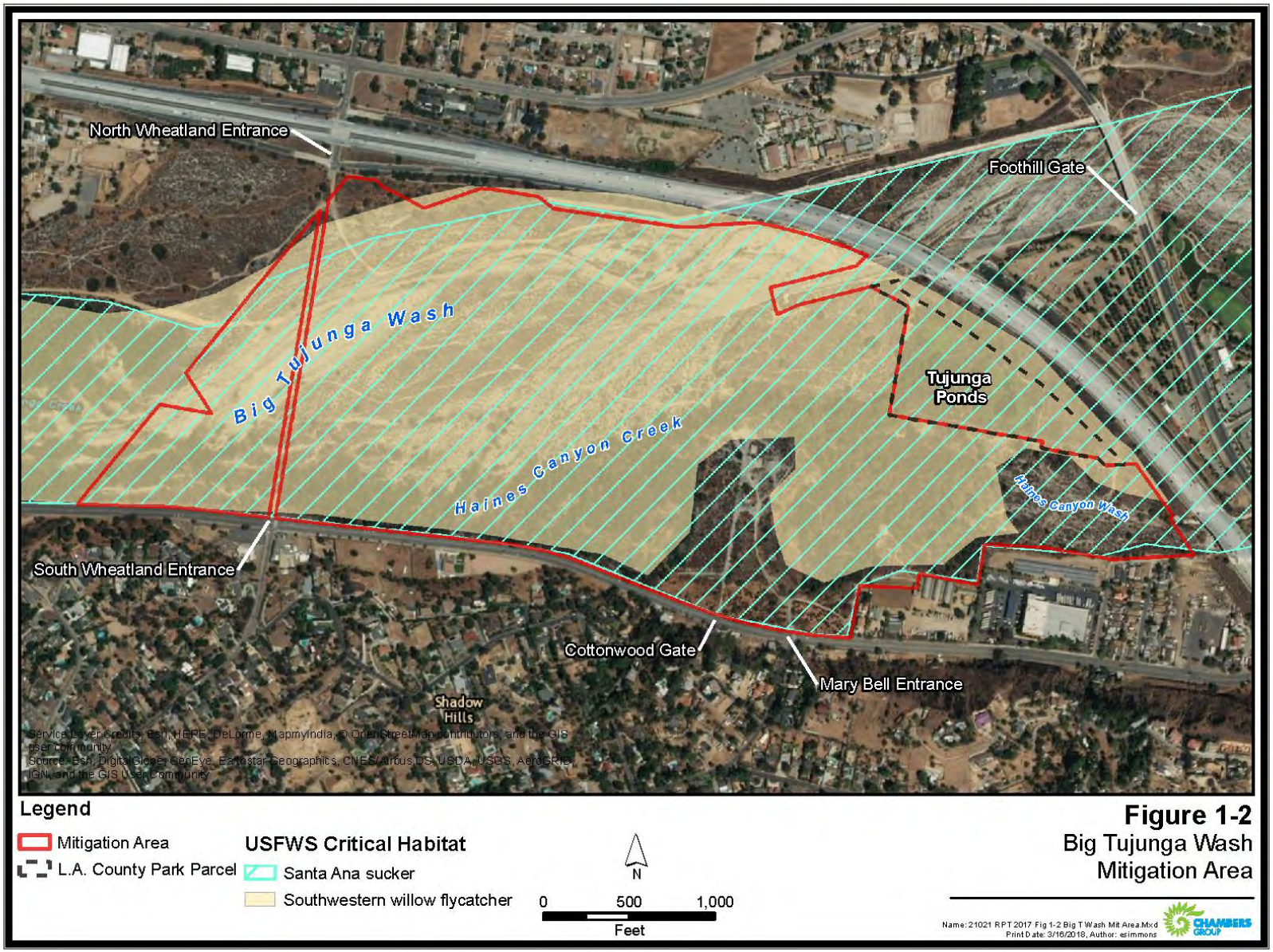
The purpose of this report is to provide a summary of the management activities conducted at the Big Tujunga Wash Mitigation Area (Mitigation Area) from March to December 2019. These activities were conducted in accordance with the Master Mitigation Plan (MMP) for the Mitigation Area (Chambers Group 2000). The MMP was first created in 2000 to serve as a five-year guide for implementation of various enhancement programs and to fulfill the California Department of Fish and Wildlife (CDFW) requirement for the preparation of a management plan for the site. The ultimate goal of the Mitigation Area is to provide for long-term preservation, management, and enhancement of biological resources for the benefit of the state's fish and wildlife resources. The MMP encompasses strategies to enhance and protect existing habitat for wildlife and to create additional natural areas that could be used by native wildlife and numerous user (recreational) groups. In addition, the MMP includes programs for the removal of exotic fishes and reptiles, American bullfrogs (*Lithobates catesbeianus*), and red swamp crayfish (*Procambarus clarkii*) from the Tujunga Ponds; removal of exotic and invasive plants; trapping to control brown-headed cowbirds (*Molothrus ater*); development of a formal trails system; and development of a public awareness and education program at the site. Implementation of the MMP began in August 2000 and was completed five years later. An additional year of limited maintenance and surveys was added between late summer 2006 and late summer 2007. ECORP Consulting, Inc. (ECORP) was contracted by the Los Angeles County Public Works (Public Works) in July 2007 to continue the implementation of MMP activities. In June of 2017 Chambers Group, Inc. (Chambers Group) was again contracted by Public Works to continue the implementation of MMP. This report summarizes all activities conducted in the Mitigation Area by Chambers Group between March and December 2019.

1.2 LOCATION AND SETTING

The Mitigation Area is located in Big Tujunga Wash, just downstream of the Interstate (I-) 210 Freeway overcrossing, near the City of Los Angeles' Sunland community in the San Fernando Valley, Los Angeles County. The site is bordered on the north by I-210, on the east by I-210 and the County of Los Angeles Department of Parks and Recreation (LACDPR) Tujunga Ponds, and on the south by Wentworth Street (Figure 1-1). The west side of the site is contiguous with the downstream portion of Big Tujunga Wash. The Mitigation Area supports two watercourses: Big Tujunga Wash and Haines Canyon Creek. Big Tujunga Wash, in the northern portion of the site, is partially controlled by Big Tujunga Dam (Dam). Flow is intermittent based on rainfall amounts and water releases from the Dam. Haines Canyon Creek, located in the southern portion of the site, is a tributary that conveys water flow from Haines Canyon to Big Tujunga Wash. Flow is perennial and may be fed by groundwater and/or runoff from adjacent residential areas. The two drainages merge near the western boundary of the property and continue into the Hansen Dam Flood Control Basin, located approximately 0.5 mile downstream of the site. The site is located within a state-designated Significant Natural Area (LAX-018) and a Los Angeles County Significant Ecological Area (Designation No. 25, Tujunga Valley/Hansen Dam); and the biological resources found on the site are of local, regional, and statewide significance (Safford and Quinn 1998; CDFW 2016). The Mitigation Area also falls within designated Critical Habitat for the federally listed Santa Ana sucker and the federally and state listed southwestern willow flycatcher (*Empidonax traillii extimus*). The nearby Tujunga Ponds and surrounding habitat are located adjacent to the northeast corner of the site. An aerial photograph showing Big Tujunga Wash, Haines Canyon Creek, the Tujunga Ponds, and other geographic features as well as designated Critical Habitat in the Mitigation Area can be found in Figure 1-2.

Figure 1-1. Project Location

Figure 1-2. Big Tujunga Wash Mitigation Area



1.3 SUMMARY OF THE ANNUAL REPORT

Table 1-1 provides a list of the tasks described in the MMP that were implemented between January and December 2019. Certain tasks in the MMP were not conducted in 2019 because the scope of work requires that they be done once during a three-year period and that they be conducted during an average or better than average rainfall year. Examples of these include the focused surveys for sensitive native fishes, arroyo toad (*Anaxyrus californicus*), least Bell's vireo (*Vireo bellii pusillus*), and southwestern willow flycatcher. This suite of surveys was last conducted in 2015 and, under typical conditions, would have occurred in 2018; however, due to the loss of habitat for these species following the Creek Fire which occurred in December of 2017, the schedule for these surveys remains tentative with the exception of native fish surveys which are planned to be conducted in 2020. No water lettuce (*Pistia stratiotes*) was observed in the Mitigation Area during 2019; and, thus, no Water Lettuce Control Program tasks were conducted in 2019. Trail realignment efforts were conducted in 2019, as part of the Trails Monitoring Program, to abandon sections of trails that cut through sensitive riparian habitat, thus eliminating several creek crossings that were in areas where sensitive fish species were known to occur. New trails were then established in more appropriate areas where visitor traffic will be less invasive to sensitive habitats and wildlife in the Mitigation Area. The application for Notice of Completion of the Lake or Streambed Alteration Agreement (LSAA) for the trail realignment work was received by CDFW on March 21, 2019. The LSAA completion notification (Notification No. 1600-2019-0077-R5) was received by LACDPW on April 16, 2019, and the trail realignment work was allowed to commence on May 21, 2019. The LSAA completion notification is included in Appendix I.

A post-fire assessment was conducted in February 2018 in order to assess and map the extent and severity of fire damage within the Mitigation Area after the Creek Fire (Chambers Group 2019, Appendix N). In 2019, vegetation mapping was conducted using a small Unmanned Aircraft Systems (sUAS) device, and the results were compared with 2018 post-fire aerial maps to assess the reestablishment of native vegetation communities and to provide analysis and site enhancement recommendations. (Section 11.0). Three special assessment tasks were conducted in 2019 that are described below and are included in Table 1-1.

- A post-fire tree assessment was conducted in December 2018, as part of the Trails Maintenance and Monitoring task, to assess the damage caused to native trees along the existing and proposed new trail alignments due to the Creek Fire (Chambers 2019, Appendix I). In April 2019, Chambers Group staff monitored the removal of many of the snag trees identified during the 2018 post-fire tree assessment as well as other snag trees within the Mitigation Area that were identified as being a potential public safety risk.

- In July 2019, Chambers Group staff conducted fuel reduction efforts in response to a Notice of Non-compliance issued by the City of Los Angeles Fire Department (LAFD) on March 8, 2015. A modified version of fuel reduction was conducted that fulfilled both public safety goals and that was consistent with the restoration goals of the Mitigation Area.

- Ongoing incidents with individuals who had been continually putting sensitive wildlife at risk by damming, wading, and swimming in Haines Canyon Creek; damaging and removing native vegetation; and building (and rebuilding after it was removed by Public Works) a "cabana-like" structure along the creek, despite being told multiple times that their actions were not permitted, were tracked and recorded throughout 2019. These incidents were summarized and included in

a memo report provided to Public Works to help secure the support of law enforcement in addressing these ongoing, prohibited activities.

- Compendia of all plant and wildlife species observed in the Mitigation Area in 2019 are included as Appendix C.

Table 1-1. Mitigation and Monitoring Tasks Implemented and/or Continued in 2019

Implemented and/or Continued in 2019	Task
	TASK 1 – Continue Brown-headed Cowbird Trapping Program
✓	Brown-headed Cowbird Trapping Program
✓	Final Trapping Report
	TASK 2 – Continue Exotic Plant Eradication Program
✓	Combined Exotic Plant Removal and Maintenance Program
✓	Exotic Plant Memos
	TASK 3 – Water Lettuce Control Program
-	Water Lettuce Herbicide Application
-	Water Lettuce Removal Memos
	TASK 4 – Continue Exotic Wildlife Eradication Program
✓	Exotic Wildlife Removal Efforts
✓	Exotic Wildlife Memos
	TASK 5 – Water Quality Monitoring Program
✓	Water Quality Monitoring
✓	Water Quality Results Report
	TASK 6 – Trails Monitoring Program
✓	Trails Maintenance and Monitoring Site Visits
✓	Trails Maintenance and Monitoring Memos
✓	Trail Realignment (as part of the Trails Monitoring task)
✓	Trail Realignment Memo (as part of the Trails Monitoring task)
✓	Trails Cleanup Day Announcement Flyer
✓	Trails Cleanup Day
	TASK 7 – Community Awareness Program
✓	Spring and Winter Newsletters
✓	Community Advisory Committee Meeting Agenda
✓	Community Advisory Committee Meeting
✓	Community Advisory Committee Meeting Minutes
✓	Mitigation Area Incident Map, January 2018 through December 2018
	TASK 8 – Public Outreach Program
✓	Public Outreach Weekend Site Visits
✓	Distribute Educational Brochures
✓	Public Outreach Memo
	TASK 9 – Post-Fire sUAS Vegetation Mapping
✓	Post-Fire sUAS Vegetation Mapping

Table 1-1. Mitigation and Monitoring Tasks Implemented and/or Continued in 2019

Implemented and/or Continued in 2019	Task
✓	Post-Fire Assessment and Site Enhancement Recommendations Memo
	TASK 10 – Special Assessments
✓	Snag Removal Monitoring
✓	Snag Removal Monitoring Report
✓	Fuel Reduction
✓	Fuel Reduction Memo Report
✓	Incident Tracking and Coordination
✓	Special Incident Memo Report
	TASK 11 – Annual Report
✓	2019 Draft Annual Report
-	2019 Final Annual Report
	TASK 12 – Meetings
✓	Meetings with Public Works, Agencies, the Public, and Consultants
	TASK 13 – Coordination with LACDPR
✓	Coordination with LACDPR

1.3.1 Continuation of Brown-headed Cowbird Trapping Program

Brown-headed cowbird trapping was conducted in and around the Mitigation Area in 2019. This program is outlined in the MMP as a method to enhance the ecological value of the site by reducing and ultimately eliminating the occurrence of brood parasitism of native riparian bird species. Brown-headed cowbird trapping did not occur in 2018 due to lack of nesting habitat after the Creek Fire but was continued in 2019 after it was determined that vegetation regrowth sufficient to accommodate nesting birds had occurred. Details of the brown-headed cowbird trapping program can be found in Section 2.0.

1.3.2 Continuation of Exotic Plant Eradication Program

This task consists of ongoing monitoring of past exotic plant removal efforts and continued removal of exotic and invasive vegetation. Periodic site visits were conducted to determine the locations of exotic plant species removal efforts, to strategize the best course of action, and to determine if and where additional removal efforts were necessary. The removal of exotic plants was conducted throughout the year to ensure that removal techniques would coincide with the exotic plant species' growth cycles. The major focus of this task for the 2019 period was treating exotic plants such as mustard species, castor bean (*Ricinus communis*), non-native thistles, and non-native brome grasses with CDFW-approved herbicides through April 23, 2019, and thereafter by mechanical removal methods only. In November and December 2019, the focus of efforts shifted to the mechanical removal of eupatory (*Ageratina adenophora*) and umbrella plant (*Cyperus involucratus*) from along Haines Canyon Creek and around the Tujunga Ponds. The exotic plant species eradication activities that were conducted in 2019 are summarized in Section 4.0.

1.3.3 Water Lettuce Control Program

Water lettuce removal was added to the Exotic Plant Eradication Program in 2011 due to an infestation of this aquatic, non-native plant in the Tujunga Ponds. Following manual removal in early January 2012, remaining patches of water lettuce were treated with CDFW-approved herbicide in January, July, August, and September 2012 and again in July and August 2013. A small amount of water lettuce was observed on site in June and August 2016 but was manually removed from the ponds by biologists and maintenance crews and did not require herbicide treatments. No water lettuce was observed at the Tujunga Ponds during any of the site visits conducted in 2017 or 2018. The Tujunga Ponds were searched for water lettuce during several exotic wildlife removal efforts in 2019, and no water lettuce was observed. Details of the water lettuce program are summarized in Section 5.0.

1.3.4 Continuation of Exotic Wildlife Eradication Program

This task consists of the continued removal of non-native, invasive wildlife species. Efforts were focused on removal of exotic aquatic wildlife species, primarily bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), largemouth bass, Mozambique tilapia (*Oreochromis mossambicus*), red swamp crayfish, and western mosquitofish (*Gambusia affinis*) from perennial waters at the Tujunga Ponds and Haines Canyon Creek. Exotic wildlife removal efforts target all life stages of exotic fishes and amphibians (such as American bullfrogs) in an effort to maximize the efficiency of the removal program. Exotic wildlife removal methods were revised in 2016 to increase effectiveness through the addition of removal efforts. A total of 10 exotic wildlife removal efforts occurred during the 2019 reporting period. Exotic wildlife removal tasks implemented in 2019 are summarized in Section 6.0.

1.3.5 Water Quality Monitoring Program

Water quality sampling for the Mitigation Area was conducted by Chambers Group on October 30, 2019. All samples were tested by Enthalpy Analytical, LLC and Test America. This task is discussed in Section 7.0.

1.3.6 Trails Monitoring Program

The Trails Monitoring Program aims to allow recreational use of the Mitigation Area while still preserving sensitive wildlife and their habitats. Trail maintenance efforts were conducted in the months of March through July, September, October, and December 2019 to look for areas that might qualify for trail closures; identify and clear areas where trails were blocked by fallen trees, branches, trash or other debris; and identify and clear locations of extensive stands of poison oak (*Toxicodendron diversilobum*) and other vegetation overgrowing the trails. Substantial trail maintenance work was required in 2019, as snag trees (trees burned in the Creek Fire) continued to come down throughout the season, and due to increased efforts to clear and delineate authorized trails and block off unauthorized trails. Trail areas needing extensive maintenance and/or problematic trail areas were mapped and reported to Public Works for maintenance or repair at a later time, if needed. The Thirteenth Annual Trail Cleanup Day was held on Saturday, October 5, 2019. Trail maintenance tasks implemented in 2019 and further information about the Trail Cleanup Day are summarized in Section 8.0.

Trail Realignment

Trail realignment efforts were conducted in 2019 as part of the Trails Monitoring Program. The trail realignment effort focused on abandoning approximately 1,580 feet of authorized trail and eliminating

three points where the trail required visitors to cross Haines Canyon Creek. The abandoned trail section was offset by the creation of two new trails with a combined distance greater than the abandoned trail sections. In addition, the new trail realignment facilitated the closure and bypass of three stream crossings, which will reduce potential disturbance and negative impacts to the sensitive species in and around Haines Canyon Creek. The creation of new trails also facilitated the closure of multiple sections of unauthorized trails (totaling approximately 500 feet in length) that were lengthened by public use after the Creek Fire and prior to trail reestablishment, when much of the trail network was ambiguous (due to lack of vegetation and the trails being obscured by ash and debris). The trail realignment crew incorporated unauthorized trails into the new trail alignment wherever possible to minimize further disturbance and encourage habitat recovery in these areas. Details of the Trail Realignment efforts can be found in Section 8.2.

1.3.7 Community Awareness Program

This program consists of the continued implementation of the Community Advisory Committee (CAC) meeting. The meetings were previously held semiannually, in spring and fall of each year, but changed in 2014 to be held only in the spring. Chambers Group continues to assist Public Works with developing meeting agendas and any supporting handouts (such as Mitigation Area Incident Maps), summarizing CAC meeting minutes, and producing biannual newsletters (typically distributed in the spring and fall) for distribution by Public Works. The status of the Community Awareness Program and activities conducted in 2019 are summarized in Section 9.0.

1.3.8 Public Outreach Program

The community outreach program was implemented in 2009 to educate the various types of recreational user groups about the sensitivity of plant communities and wildlife species present in the Mitigation Area. This program was continued in 2019 due to its past success. On-site interviews and education about the Mitigation Area were conducted on three occasions by Chambers Group's bilingual biologists in 2019. The biologists handed out bilingual brochures describing the ecological purpose of the Mitigation Area, the importance of protecting sensitive biological resources, and approved recreational uses and prohibited activities within the Mitigation Area. While on site, the biologists documented any unusual observations or circumstances such as the presence of rock dams in Haines Canyon Creek or other unauthorized activities. A full description of the outreach efforts and notable incidents documented in 2019 is included in Section 10.0.

1.3.9 Post-Fire sUAS Vegetation Mapping and Analysis

A post-fire assessment was conducted in February 2018 in order to assess and map the extent and severity of fire damage within the Mitigation Area after the Creek Fire (Chambers Group 2019, Appendix N). In 2019, vegetation mapping was conducted using a small Unmanned Aircraft System (sUAS), and the results were compared with the 2018 post-fire aerial maps to assess the reestablishment of native vegetation communities and to provide analysis and site enhancement recommendations. This task is discussed in Section 11.0.

1.3.10 Special Assessments

Chambers Group staff are available to provide special assessments on an on-call basis. Special assessments include damage assessments (e.g., fire damage, vandalism) and other site issue assessments and the subsequent coordination and response.

Snag Removal Monitoring

Snag removal monitoring was conducted by Chambers Group in April 2019, during snag removal efforts conducted by Los Angeles Conservation Corps (LACC) and Northern California Construction Training (NCCT). Qualified Chambers Group biologists monitoring dead tree snag removal activities within the Mitigation Area worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the snag removal monitoring effort can be found in Section 12.0.

Fuel Reduction

Fuel reduction efforts were conducted by Chambers Group in July 2019 in response to the Notice of Non-compliance issued by LAFD on March 8, 2015, and the brush clearance requirements established by the County of Los Angeles Department of Agricultural Commissioner/Weights and Measures. The main focus of the July fuel reduction efforts was to perform the required deferred maintenance, recover a defensible firebreak for first-responders, and help support safety measures for the Mitigation Area and the surrounding structures and public spaces that neighbor the property. Due to the sensitive nature of the site and high potential for erosion to occur, a scaled-down version of fuel reduction was performed to substantially reduce the chance of negative effects on wildlife and habitats within the Mitigation Area. Details of fuel reduction efforts can be found in Section 12.0.

Special Incident Tracking and Coordination

Ongoing incidents with individuals who had been continually putting sensitive wildlife at risk by damming, wading, and swimming in Haines Canyon Creek; damaging and removing native vegetation, and building (and rebuilding after it was removed by Public Works) a “cabana-like” structure along the creek, despite being informed on several occasions that their actions were not permitted, were tracked and recorded throughout 2019. These incidents were summarized and included in a memo report provided to help secure the support of law enforcement in addressing these ongoing, prohibited activities (Section 12.0).

1.3.11 Preparation and Submittal of Annual Report

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

1.3.12 Attendance at Meetings with Agencies, Public, and Consultants

Chambers Group attended meetings with Public Works, agencies, the general public, and consultants as necessary regarding various aspects of the MMP implementation. Details of meetings attended in 2019 are discussed in Section 13.0.

1.3.13 Coordination with LACDPR

Chambers Group staff informed and coordinated with LACDPR concerning activities that took place within the Mitigation Area and the Tujunga Ponds LACDPR parcel. On September 12, 2019, Chambers Group biologists coordinated and worked with LACDPR employees to inspect (and repair, if necessary) the fish exclusionary screens located in Haines Canyon Creek just downstream from the Tujunga Ponds.

SECTION 2.0 – CONTINUATION OF BROWN-HEADED COWBIRD TRAPPING PROGRAM

The brown-headed cowbird trapping program was established at the Mitigation Area to decrease and ultimately eliminate nest parasitism on sensitive songbird species present or potentially present in the Mitigation Area, such as least Bell's vireo and southwestern willow flycatcher. Trapping and eradicating brown-headed cowbirds increases the ecological value of the site by enhancing the reproductive success of these sensitive riparian songbirds and promoting general breeding activity within the Mitigation Area. Trapping was initiated in the Mitigation Area in 2001 and was conducted yearly between 2001 and 2006 and again between 2009 and 2017. Trapping was not conducted in 2007 and 2008, as it was one of the tasks originally scheduled to occur once every three years. CDFW requested that this task be completed every year in the most recent Streambed Alteration Agreement (SAA) issued for the site (dated January 29, 2009). Brown-headed cowbird trapping was not conducted for the Mitigation Area during 2018 due to lack of suitable nesting habitat after the Creek Fire. It was decided that the continuation of the trapping program would be commensurate with the reestablishment of suitable nesting habitat as determined by qualified Chambers Group avian biologists or as required by CDFW. As suitable habitat had established within the year immediately following the Creek Fire (2018) the brown-headed cowbird trapping program was continued in 2019. Griffith Wildlife Biology operated two cowbird traps within the Mitigation Area and two traps adjacent to the Mitigation Area between March 29 and July 1, 2019 (13 weeks). The methods, results, and discussion of the 2019 trapping program are presented below; and a full copy of the report is included as Appendix D.

2.1 BROWN-HEADED COWBIRD NATURAL HISTORY

Brown-headed cowbirds are brood parasites. Cowbirds do not make a nest of their own, nor do they contribute to raising their young. This species parasitizes the nests of native host species by laying their larger egg(s) in the host species' nests and leaving the egg(s) and chick(s) to be reared by the native host. Brown-headed cowbird young are often larger and more demanding than their host's offspring, resulting in the host birds raising the cowbird chick and neglecting their own young. Female cowbirds can lay more than 40 eggs during the breeding season (Scott and Ankney 1983; Holford and Roby 1993; Smith and Arcese 1994), which can last between two and four months.

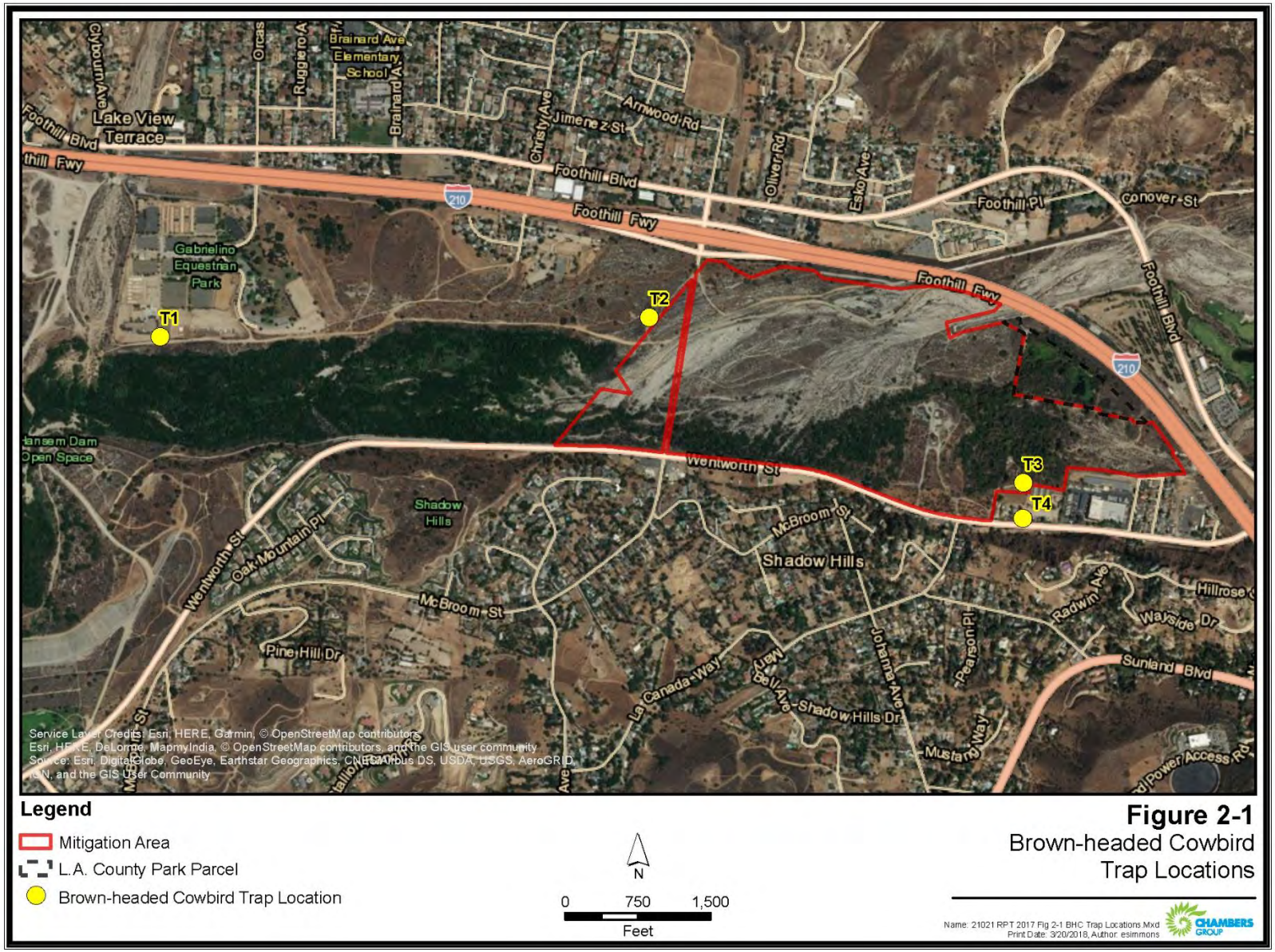
Population declines of sensitive native songbirds such as the least Bell's vireo and the southwestern willow flycatcher can be partially attributed to high nest parasitism rates by brown-headed cowbirds. In many areas, the reduction or elimination of brown-headed cowbirds through trapping has been directly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

2.2 METHODS

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

The traps measure approximately 6 feet wide, 8 feet long, and 6 feet tall, and were constructed at each trap site. Food, water, perches, and shade were provided inside each trap. A sign was prominently placed

Figure 2-1. Brown-headed Cowbird Trap Locations



outside each trap explaining the significance of the trap and urging recreational users of the area to refrain from tampering with the trap. Each trap contained the minimum preferred ratio of male to female decoys (two males and three females) by April 12, 2019, with three males and five to six females. Trap operation began March 29 and operated every day (including holidays) until July 1, 2019. Each trap was serviced daily by a qualified biologist, and servicing activities included:

- Replenishing and/or cleaning the water source
- Refilling the feed tray with bait seed
- Repairing the perches, foraging pad, sign, shade cloth, or lock as needed
- Repairing damage as needed
- Wing clipping newly captured female cowbirds
- Adding/removing decoy cowbirds to maintain the appropriate male to female ratio (2:3)
- Removing and releasing non-target native bird species in the traps
- Recording all activities and appropriate data on a data sheet

Traps were disassembled and returned to storage after July 1, 2019. Cowbirds not used as decoys were humanely euthanized and were provided as forage to raptor rehabilitation/reintroduction facilities.

2.3 RESULTS

A total of 55 cowbirds were removed during the 2019 trapping season (26 males, 28 females, and 1 juvenile). The male cowbird capture peak occurred between week 2 and week 5 (April 8 to May 5) with 16 of the 26 male cowbirds captured. The female cowbird capture peak occurred between week 2 and week 6 (April 8 to May 12) with 23 of the 28 female cowbirds captured. In 2019, no traps were vandalized, no decoys escaped, and no trapping days were lost.

A total of 70 non-target birds (i.e., all species except brown-headed cowbirds) of 4 bird species were captured in the traps. The four non-target species that were captured included California towhee (*Pipilo crissalis*), house finch (*Carpodacus mexicanus*), house sparrow (*Passer domesticus*), and black-headed grosbeak (*Pheucticus melanocephalus*). No banded cowbirds or banded non-target species were captured during the trapping season. All non-target birds (70 individuals) captured during the trapping period were released unharmed. No mortalities of decoy or non-target birds occurred inside the traps during the 13 weeks of trapping.

2.4 DISCUSSION

The number of brown-headed cowbirds trapped during the 2019 season is within the range of 2001-2017 numbers. The 2019 capture numbers (55 individuals) fall well below the 133 captured in 2016 and are nearly identical to the 2017 capture numbers (54 individuals). The 2017 and 2019 trapping years had the lowest number of cowbirds captured since 2006 (56 individuals). It is expected that the number of cowbirds trapped will rebound close to the 16-year average (2001 through 2017) of approximately 53 males, 55 females and 4 juveniles, possibly by the 2020 trapping season.

Locally raised juvenile cowbirds are relatively easy to capture within their natal habitat and can be a good indication of the success of a trapping program. Only one juvenile cowbird was captured during the 2019 trapping season, indicating that cowbird parasitism was essentially eliminated in the study area in 2019.

Yearly trapping has been effective at reducing nest parasitism on native host species present in the riparian habitat at the Mitigation Area; however, targeted topical trapping in the Mitigation Area has not affected or reduced the regional cowbird population. If the regional cowbird population had been reduced, the number of cowbirds captured at each site would decrease over time. Instead, the number of cowbirds captured at each site has remained fairly consistent over time (notwithstanding typical annual fluctuations). Unless and until cowbirds are absent from the study area for several years, by regional cowbird control or other means, topical cowbird trapping will be required in the Mitigation Area indefinitely to control local brood parasitism and allow native birds to reproduce naturally.

Griffith Wildlife Biology recommended no change to the protocol, the number of traps (four), the trap locations, or the dates and duration of cowbird trapping (13 weeks, April 1 to June 30).

SECTION 3.0 – HABITAT RESTORATION PROGRAM

The habitat restoration program was originally established to preserve, improve, and create habitat for Santa Ana sucker, Santa Ana speckled dace (*Rhinichthys osculus* ssp. 3), arroyo chub (*Gila orcuttii*), arroyo toad, least Bell's vireo, and southwestern willow flycatcher; all are sensitive and/or listed species either known to occur or that have a high potential to occur on site. These species are associated with aquatic and/or riparian habitats; therefore, the habitat restoration program focused on the restoration of cottonwood-willow riparian habitat. The goal of the initial habitat restoration plan was to remove invasive, non-native, and weedy species, such as giant reed (*Arundo donax*), and to replant these areas with native riparian species. The enhancement plan consisted of various tasks designed to remove the non-native species, prepare the areas prior to planting, install cuttings and container plant materials, and monitor the success of the plantings. Initial installation of cottonwood-willow riparian habitat along Haines Canyon Creek occurred in 2000 and 2001. The habitat restoration program was ongoing through the first part of 2007, when the last plantings were installed. Failure of the plantings due to environmental conditions and vandalism initiated a reevaluation of the restoration program in late 2007.

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

3.1 SUMMARY OF THE ORIGINAL HABITAT RESTORATION EFFORTS

The original habitat restoration efforts conducted in the Mitigation Area are addressed in detail in Section 2.2 of the 2009 Annual Report for the Big Tujunga Wash Mitigation Area (ECORP 2010). During the first five years following implementation of the original MMP, habitat restoration efforts within the Mitigation Area focused on planting new riparian woodland overstory and understory plants in existing canopy openings or in openings that were created after extensive stands of invasive exotic species were removed. Container plantings and cuttings of native plant species were placed throughout the Mitigation Area and watered on a regular basis to promote survival. In 2004, the cuttings and container plantings were found to have a low survival rate, presumably due to the lack of naturally available water. It was concluded at that time that natural recruitment was more effective at filling openings in the riparian canopy than the active planting program, so no new planting efforts were conducted until 2007.

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

3.2 CURRENT STATUS OF THE HABITAT RESTORATION PROGRAM

The planting and maintenance portions of the habitat restoration program were terminated in 2010 (ECORP 2011); however, the exotic plant removal component of the habitat restoration program was continued, and the exotic plant removal task was absorbed into the new exotic plant eradication and maintenance program during the contract revision in 2012. The exotic plant eradication and maintenance program activities conducted in 2019 are discussed in Section 4.0.

SECTION 4.0 – CONTINUATION OF EXOTIC PLANT ERADICATION AND MAINTENANCE PROGRAM

The purpose of the exotic plant eradication and maintenance program at the Mitigation Area is to increase the ecological value of the existing native vegetation communities. The original exotic plant removal program targeted the riparian communities in and around Haines Canyon Creek, Big Tujunga Wash, and the Tujunga Ponds. This program was expanded in 2012 due to a contract revision and now encompasses the cottonwood-willow restoration area maintenance and oak-sycamore woodland weeding activities. By removing exotic plant species and continually performing maintenance in restoration areas throughout the Mitigation Area, native plant species are able to flourish due to reduced competition for resources such as light and water. This ultimately allows for natural recovery of native plant communities and increased chances of success within the restoration areas, which results in an improvement in the ecological function of the entire area. Improved habitat function benefits both common and sensitive species of plants and wildlife that either occur or have the potential to occur at the Mitigation Area. Table 4-1 lists the exotic plant species targeted for eradication.

Table 4-1. Target Non-Native Weed Species

Common Name	Scientific Name
eupatory*	*Ageratina adenophora*
palm species*	*Arecastrum* sp., *Washingtonia* sp., etc.
giant reed*	*Arundo donax*
mustard species*	*Brassica* spp., *Hirschfeldia incana, Sisymbrium* spp.
Italian thistle*	*Carduus pycnocephalus*
non-native thistle*	*Cirsium* spp.
umbrella-plant*	*Cyperus involucratus*
water hyacinth	*Eichhornia crassipes*
gum tree*	*Eucalyptus* spp.
fennel	*Foeniculum vulgare*
white sweetclover*	*Melilotus albus*
tree tobacco*	*Nicotiana glauca*
common plantain	*Plantago major*
castor-bean*	*Ricinus communis*
pepper tree*	*Schinus terebinthifolius, S. molle*
milk thistle*	*Silybum marianum*
Mediterranean tamarisk	*Tamarix ramosissima*
Non-Native Annual Grasses	
wild oat*	*Avena fatua*
slender wild oat	*Avena barbata*
foxtail chess*	*Bromus madritensis* subsp. *madritensis*
ripgut grass*	*Bromus diandrus*
soft chess	*Bromus hordeaceus*
glaucous foxtail barley*	*Hordeum murinum*
annual beard grass	*Polypogon monspeliensis*
Non-Native Perennial Grasses	
pampas grass	*Cortaderia selloana*
Bermuda grass	*Cynodon dactylon*
Italian ryegrass*	*Festuca perennis*
fountain grass*	*Pennisetum setaceum*
smilo grass*	*Stipa miliacea* var. *miliacea*

*Observed in 2019

Table 4-2 lists additional exotic plant species observed within the Mitigation Area in 2019.

Table 4-2. Additional Exotic Plant Species Observed in the Mitigation Area in 2019

Common Name	Scientific Name
tree of heaven	*Ailanthus altissima*
black mustard	*Brassica nigra*
crimson bottlebrush	*Callistemon citrinus*
tocalote	*Centaurea melitensis*
giant elephant ear	*Colocasia esculenta*
poison hemlock	*Conium maculatum*
bindweed	*Convolvulus arvensis*
flax-leaved horseweed	*Erigeron bonariensis*
red-stemmed filaree	*Erodium cicutarium*
shortpod mustard	*Hirschfeldia incana*
sweet-alyssum	*Lobularia maritima*
horehound	*Marrubium vulgare*
marvel of Peru	*Mirabilis jalapa*
garden pea	*Pisum sativum*
Himalayan blackberry	*Rubus armeniacus*
Russian thistle	*Salsola* sp.
tamarisk	*Tamarix* sp.
Non-Native Annual Grasses	
barley	*Hordeum vulgare*

The revised approach to the exotic plant eradication and maintenance program also includes a more aggressive program for targeting and eliminating large, non-native trees that can create a dense overstory within the Mitigation Area. While most of the trees in the Mitigation Area were burned during the Creek Fire in 2017, the continued and diligent removal of these exotic tree species as they develop will allow more sunlight to reach the native plant species growing beneath the redeveloping native tree canopy. The tree species targeted under the exotic plant eradication and maintenance program are listed in Table 4-3.

Table 4-3. Target Invasive Exotic Tree Species

Common Name	Scientific Name
acacia species*	*Acacia dealbata and Acacia* spp.
southern catalpa*	*Catalpa bignonioides*
gum tree*	*Eucalyptus* spp.
edible fig*	*Ficus carica*
shamel ash	*Fraxinus uhdei*
Japanese privet	*Ligustrum japonicum*
sweetgum	*Liquidambar stryraciflua*
white mulberry	*Morus alba*
tree tobacco*	*Nicotiana glauca*
castor-bean*	*Ricinus communis*
Peruvian pepper tree*	*Schinus molle*
Brazilian pepper tree	*Schinus terebinthifolius*
Chinese elm*	*Ulmus parvifolia*
palm species*	*Washingtonia* sp., *Phoenix canariensis,* etc.

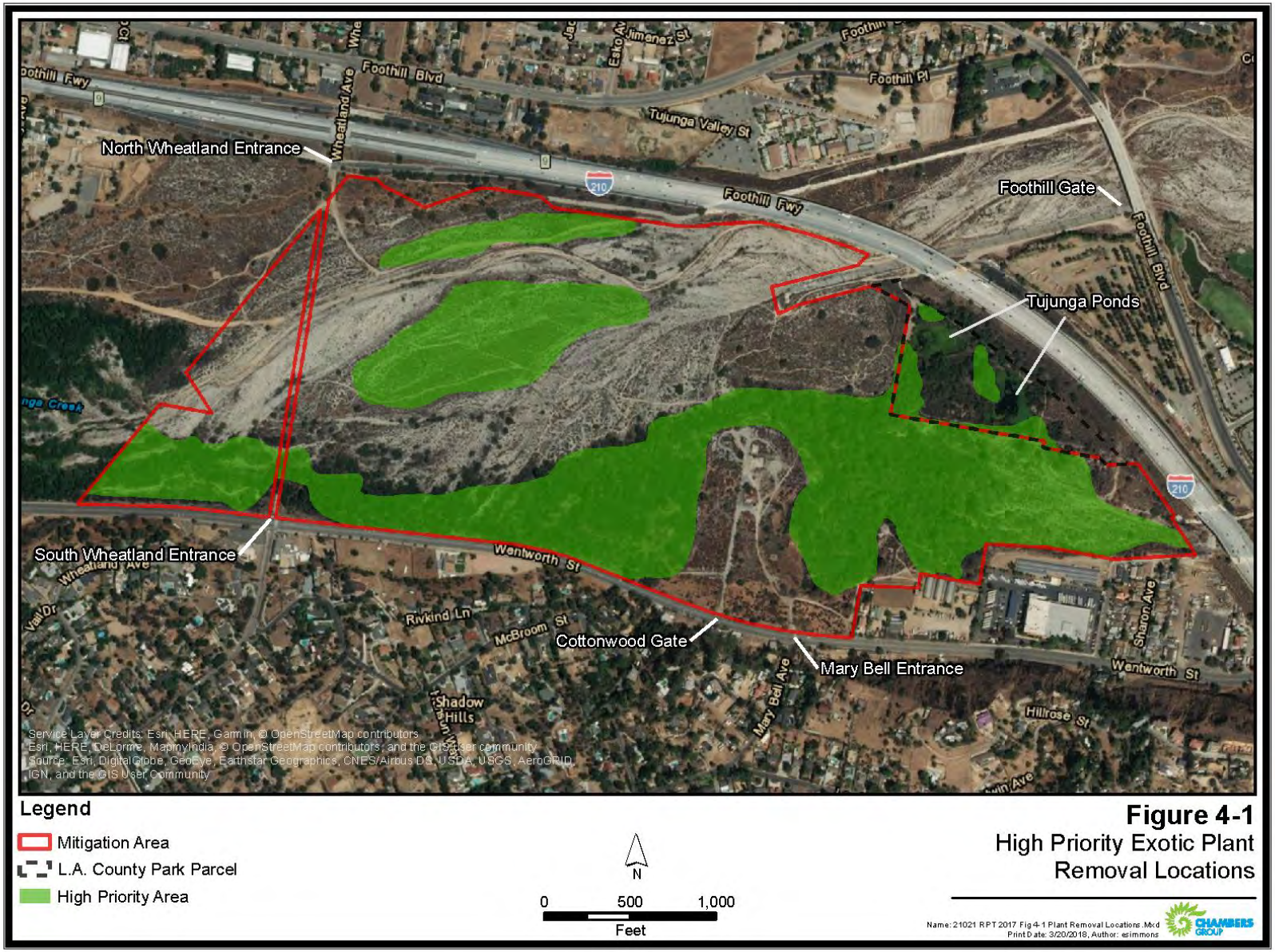
*Observed in 2019

4.1 METHODS

Exotic plant eradication activities took place throughout the Mitigation Area, focusing on riparian and upland portions of the site and around the Tujunga Ponds. These eradication activities also included weeding in the upland area between Big Tujunga Wash and the northern boundary of the Mitigation Area. Before 2012, this area was not part of the sections that were actively weeded on a regular basis, but infestations of invasive exotic plant species (fountain grass [*Pennisetum setaceum*]) and weedy species (thistle [*Cirsium* spp.] and mustard [*Brassica* spp.]) reached levels that needed to be controlled and continue to be included in regular exotic plant removal efforts. Although exotic plant eradication efforts were conducted throughout the entire Mitigation Area in 2019, Figure 4-1 shows the areas that are considered high priority for targeting exotic plant species.

Notification to commence planned exotic plant removal and maintenance activities was sent to CDFW on March 7, 2019 (Appendix E). Pre-activity surveys were conducted by qualified biologists prior to each exotic plant eradication effort to document exotic plant locations and any sensitive biological resources to avoid during the removal efforts. During the pre-activity surveys, the biologists conducted a walkthrough of all trails in the riparian and upland areas. Coordinates of new exotic plant species locations or sensitive biological resources (such as active bird nests) were recorded with Collector for ArcGIS mobile application (Collector; an Esri-based application) on either a tablet or personal smart phone. All captured points, including but not limited to sensitive species observations, nesting bird locations, boundaries of environmentally sensitive areas, authorized and unauthorized trails, and photographs, are geo-referenced (GPS coordinate associated with a point), time-stamped for accurate inventory, and catalogued. The data is automatically posted to the server and is available for all field crew to review throughout the eradication efforts. CDFW was notified prior to the commencement of removal activities, in accordance with the Mitigation Area's SAA.

Figure 4-1. High Priority Exotic Plant Removal Locations



During the exotic plant eradication efforts, a biological monitor was present to monitor that crews conducted work within the appropriate pre-defined work areas and that the removal activities did not result in negative impacts to sensitive biological resources, such as nesting birds. The biological monitor also participated in morning tailgate sessions to remind the crews about the sensitive biological resources present in the Mitigation Area. A bilingual worker education brochure (updated and redesigned in spring 2019) that contained general information and guidelines pertaining to the site was distributed to all new workers entering the site (Appendix B). The biological monitor was responsible for showing crew members locations of exotic plant species that had been recorded during previous site visits and pre-activity surveys. Newly identified stands of exotic vegetation were treated with herbicide or manually removed as they were discovered or were mapped with Collector for treatment on a subsequent day when necessary. All treated areas were documented by the biological monitor or habitat restoration foreman Tim Wood, and digital photographs were taken to document removal efforts. Following the completion of each eradication effort or at the end of each month in which eradication efforts were conducted, a memo was prepared that documented the date, locations, and details of the eradication activities conducted and the presence and locations of any sensitive biological resources (Appendix E). All exotic plant removal efforts were conducted according to the terms and conditions of the SAA.

Prior to April 23, 2019, exotic plants and trees were either removed manually (by cutting, sawing, or hand digging) or by herbicide treatment. Hand-saws and hand tools (e.g., machetes) were used for cutting small exotic trees. All herbicides used during exotic plant eradication efforts were California-approved aquatic herbicides approved for use within 15 feet of any water source, including permanent (Haines Canyon Creek, Tujunga Ponds) and temporary (Big Tujunga Wash, ephemeral ponds from rains) sources. Large stands of exotic grasses were treated with a monocot-specific herbicide mixture that contained 0.003 percent Fusilade® II, 0.005 percent No Foam® A (an aquatically approved penetrant, deposition, and drift control agent), and 0.5 ounce of Turf Trax® (a blue indicator dye) per gallon of herbicide mixture. Similar alternative brands of monocot-specific herbicides were also used to treat large stands of exotic grasses. Alternative herbicide mixtures contained 0.00325 percent Envoy Plus®, 0.0033 percent No Foam® A, and 0.5 ounce of Turf Trax®, or 0.004 percent Fusilade® DX, 0.00375 percent No Foam® A, and 0.5 ounce of Turf Trax®. Herbicide treatments applied to the developing exotic forb species contained California-approved aquatic herbicide and surfactant approved for use within 15 feet of water sources and contained 1.5 percent Polaris™, 1 percent Activator 90 (an aquatically approved penetrant, deposition, and drift control agent), and 0.5 ounce of Turf Trax®. Spraying equipment including manual-pump backpacks and a gasoline-powered, motorized pump tank were used to apply the herbicide. The herbicide was applied by hand-directed spray nozzles to control herbicide distribution and to avoid non-target species. Hand tools and gasoline-powered weed whackers were also used to remove exotic species.

In March 2019, a moratorium (and ultimately a ban) on the use of glyphosate on County property by the Los Angeles County Board of Supervisors was enacted. After April 23, 2019, the use of herbicide treatments within the Mitigation Area ceased. Only manual removal methods (e.g., hand pulling or hand tools) were used to eradicate weeds within the Mitigation Area thereafter. During the spring, the cut materials from large exotic plant species were not removed from the site but were arranged in a manner that would prevent re-growth or establishment of new stands. The cuttings were placed in areas that would not impede visitor traffic, pose a safety hazard, or affect the aesthetics of the site.

During summer months exotic species had accelerated in development and were prolific throughout the property. Efforts to reduce future germination and generations of exotic weed species required focusing removal efforts on the existing mature and viable seeds observed throughout the Mitigation Area. Manual removal methods were coupled with the implementation of seed head collection and solarization

methods as means to decrease the future germination of exotic species and reduce the fire fuel present within the target areas. Mature and potentially viable seed heads for all types of non-native species were collected and contained into 3-millimeter black contractor bags. Collection barrels were used to help manage the large volumes of seed heads and vegetation. Collected materials were condensed in the barrels to maximize density without compromising the plastic and were later transferred into the contractor bags for solarization or removal from the site. Solarization is a mechanical weed control method that is used to eliminate viable seeds by exposing them to higher temperatures than the seeds are able to withstand by creating an acute greenhouse effect. A small amount of water was added to each bag to help generate heat and sustain high temperatures, essentially baking the seeds to a point that they are no longer viable.

The solarization method, while a viable option, was abandoned after the August removal effort due to the high volume of dry, woody, non-native, annual vegetation (fuel) that was present on site; and removal methods were adjusted to include the removal of collected materials from the site. With the solarization method, once seeds are assumed non-viable, vegetative materials are removed from solarization bags and left to decompose on site. These adjusted methods fulfilled eradication efforts by way of seed head collection but also furthered fuel reduction efforts, helping to support and sustain the goals of the Mitigation Area.

4.2 NON-NATIVE EXOTIC PLANT ERADICATION EFFORTS IN 2019

Chambers Group conducted site-wide exotic plant eradication during seven different efforts in 2019: March 27 through 29, April 1 through 30, May 1 through 27, August 26 through 30, September 12 through 30, October 1 through 31, and November 4 through 22. Chambers Group biologists Alisa Muniz, Jacob Lloyd Davies, Austin Burke, Mauricio Gomez, Corey Jacobs, or habitat restoration foreman Tim Wood conducted the pre-activity surveys and/or the biological monitoring for all exotic plant eradication efforts.

Substantially more weeds were present in the Mitigation Area this year due to the considerable amount of rainfall during the 2018/2019 rainy season and the advantageous spreading of weeds into open spaces made available by the destruction of native vegetation from the Creek Fire that burned through the Mitigation Area in December 2017. Alternating warm and cool weather patterns and occasional small rain showers continued to encourage the germination and development of new exotic plants throughout the Mitigation Area during the spring. Relatively mild summer conditions continued to encourage the advantageous germination, development, and spreading of exotic plants into open spaces throughout the summer months. However, these conditions also favored the accelerated regeneration of native tree species such as willow species (*Salix* spp.), Fremont cottonwood (*Populus fremontii*), coast live oak (*Quercus agrifolia*), and western [or California] sycamore (*Platanus racemosa*). By the end of summer 2019, many of the larger specimens had recovered from the dormancy period induced by the fire damage, had produced leaves, and were filling out their canopies. Trees that experienced a complete loss of crown or canopy but were able to persist by basal growth production are now tall enough to provide some refuge (i.e., shade and cover) and have developed lower limbs wide enough that they are beginning to create low canopies. As a result, substantial amounts of exotic species were emerging and developing in locations where these opportunities for refuge and resources are now available. These conditions facilitate longer growth and developmental periods which give rise to plentiful seed production and, ultimately, an increase in direct competition with native species that tend to reclaim open spaces more slowly. Qualitative observations of regenerating and developing native understory species such as mulefat (*Baccharis salicifolia*) and laurel sumac (*Malosma laurina*) indicated that understory species are being hindered and are less productive than the larger native tree species. These observations are correlated

with the direct competition and rapid growth of exotic annual and perennial species. Only exotic species removal methods that do not inhibit the regeneration of the native tree species and/or further hinder the growth of the native understory species were used in 2019 and will be considered for future efforts in these areas.

The exotic plant eradication activities did not result in negative impacts to any sensitive biological resources in 2019. Active bird nests, potential bird nests, and/or birds behaving territorially or exhibiting nesting behaviors were documented during exotic plant removal activities occurring within nesting bird season (March1 through September 15). Thirteen active nests were discovered during pre-activity sweeps and exotic plant removal monitoring occurring between March and May 2019 and were determined to belong to Bewick's wren (*Thryomanes bewickii*), bushtit (*Psaltriparus minimus*; two individual nests), California scrub-jay (*Aphelocoma californica*), great-tailed grackle (*Quiscalus mexicanus*), lesser goldfinch (*Spinus psaltria*; three individual nests), lesser nighthawk (*Chordeiles acutipennis*), mallard (*Anas platyrhynchos*), mourning dove (*Zenaida macroura*), Nuttall's woodpecker (*Dryobates nuttallii*), and red-shouldered hawk (nest was located outside the work area, but the established 500-foot avoidance buffer extended into the work area and was enforced). These nests were flagged for avoidance by the biological monitor. Potential nests were also recorded in areas where birds were observed carrying nesting materials (e.g., grass, twigs) into shrubs or trees or where pairing or territorial behaviors were observed. Bird species observed displaying pairing and/or territorial behaviors included American kestrel (*Falco sparverius*), California gnatcatcher (*Polioptila californica*), California scrub-jay, and house finch (*Haemorhous mexicanus*). No-work buffers were established around all active and potential bird nests until it could be determined that the nestlings had fledged and the nest was no longer being used (active nests) or that no nest was present (potential nests). The biological monitors were present during all work activities occurring outside the buffers to monitor that the adults and young associated with each nest were not negatively affected. No active bird nests were identified, and no breeding or nesting behaviors were observed prior to or during the August and September exotic plant eradication efforts. The October and November exotic plant eradication efforts took place outside the nesting bird season.

Two other notable observations occurred while monitoring exotic plant removal activities: on December 9, Chambers Group biologist Alisa Muniz detected a single California gnatcatcher calling from a patch of sage scrub habitat on the northern bluff of the Mitigation Area (GPS coordinates: 34.269699, -118.342773), and on November 4, Chambers Group biologist Erik Olmos discovered the carcass of a softshell turtle (family Trionychidae, species unknown) near the bank of the Tujunga Ponds (GPS coordinates: 34.26321, -118.33304).

Notes and representative site photographs were taken, and the coordinates of exotic plant locations were recorded using Collector on either smart phones or tablets.

Copies of all memos documenting pre-activity surveys, exotic plant removal, CDFW notifications, and photographs taken during removal efforts can be found in Appendix E.

SECTION 5.0 – WATER LETTUCE CONTROL PROGRAM

During an exotic wildlife removal effort in March 2011, aquatic biologists noticed that the Tujunga Ponds were becoming infested with water lettuce, an invasive plant commonly used in aquariums and ponds. Within one month of the initial observation, the entire East Tujunga Pond was completely covered with the surface-growing plant. Within two months the entire West Tujunga Pond was covered. The infestation was so great that the waterways between the ponds and Haines Canyon Creek became suffocated. Water lettuce is listed under the United States Department of Agriculture's Plant Database as a B-List noxious weed in California, and it is thought to spread via the dumping of aquariums (USDA NRCS 2019). Without management, water lettuce at the Tujunga Ponds has the potential to threaten the habitat and endangered species in Haines Canyon Creek, such as the Santa Ana sucker, as well as negatively impact the native turtle and bird species that use the ponds as habitat. ECORP and Public Works created a plan for water lettuce removal from the Mitigation Area waterways.

Intensive water lettuce removal efforts were immediately initiated to control the infestation. Physical removal efforts were conducted between June and December 2011 and between January and September 2012. Detailed descriptions of the physical removal efforts can be found in the 2011 and 2012 Annual Reports for the Big Tujunga Wash Mitigation Area (ECORP 2012, 2013).

Following the initial physical removal of the water lettuce, a monitoring and maintenance program was established in 2012 to keep the water lettuce populations in check and prevent another infestation from occurring in the Tujunga Ponds and the channel that connects the ponds. The program consisted of monthly herbicide applications conducted on an as-needed basis paired with follow-up site inspections to monitor the success of the herbicide application. Four herbicide application efforts were conducted in 2012 after the physical removal effort, and two additional applications were conducted in 2013 (ECORP 2013, 2014). Renovate®, an herbicide designed for use within aquatic environments and approved by CDFW for use within the Mitigation Area, was applied to patches of hard-to-reach water lettuce within southern cattails (*Typha domingensis*) and other vegetation around the pond perimeters. During regular site visits following the treatments, biologists did not observe any evidence of water lettuce. The absence of water lettuce during the site visit provided evidence that the herbicide applications to the water lettuce were successful. Water lettuce was again observed in the East Tujunga Pond on two occasions during 2016. On both occasions, on-site biologists and exotic plant removal crews were able to remove the small patches of water lettuce by hand. The ponds were monitored regularly during subsequent site visits between 2016 and 2018, and no other water lettuce was observed.

In 2019 the Tujunga Ponds were inspected for water lettuce during both exotic plant eradication efforts and exotic wildlife removal efforts at the Tujunga Ponds. The Tujunga Ponds were searched extensively for water lettuce during these visits, and no water lettuce was observed. The Tujunga Ponds will continue to be monitored in 2020 for any reoccurrence of water lettuce.

SECTION 6.0 – CONTINUATION OF EXOTIC WILDLIFE ERADICATION PROGRAM

The purpose of the exotic wildlife removal program is to restore, create, and maintain suitable habitat for native aquatic species and to remove and eliminate ecological pressures resulting from the presence of exotic species. The program consists of the removal of non-native wildlife species including fishes, turtles, American bullfrogs, and red swamp crayfish from the Tujunga Ponds (East Pond and West Pond) and Haines Canyon Creek.

In an ongoing effort to protect and enhance the existing habitat at the Mitigation Area for native wildlife species, Chambers Group continued the exotic aquatic species removal effort as described in the MMP. The MMP provides direction for the eradication of exotic wildlife from the Tujunga Ponds and Haines Canyon Creek to relieve some of the potentially negative impacts to native species. Due to the fecund nature of exotic species and their ability to inhabit various habitat types while tolerating extreme environmental conditions, exotic species can outcompete natives for available space and food resources. Exotics can also directly affect native species through predation of adults and their young, or indirectly through the transmission of pathogens or parasites.

During the 2015 Native Fishes Survey in Haines Canyon Creek, the number of Santa Ana sucker was observed to have declined from 119 to 17 individuals between May and October 2015. The decline during this period was largely attributed to the absence of juveniles. During the previous Native Fishes Survey in Haines Canyon Creek in 2012, 592 Santa Ana sucker (502 adults and 90 juveniles) were detected. Despite ongoing exotic wildlife removal efforts, the exotic aquatic species remained widespread throughout Haines Canyon Creek with source populations located both upstream (Tujunga Ponds) and downstream (Hansen Dam). The 2015 Native Fishes report noted a greater abundance of exotic wildlife species nearest the Tujunga Ponds with fewer individuals detected further away from the Tujunga Ponds. At the time, the distribution of Santa Ana sucker in Haines Canyon Creek was patchy and restricted to the lower half of the Mitigation Area below the Cottonwood Avenue equestrian trail crossing.

Based on declining numbers of native species and increasing number of exotic species, the exotic wildlife removal program was reevaluated and modified in 2016. The modification of the exotic wildlife removal program increased the level of effort with fewer days between each visit. Other than the increase in frequency, the methods and techniques of exotic wildlife removal remained the same as in previous efforts.

In addition, a Santa Ana Sucker Working Group was formed which included representatives from CDFW and USFWS. The goal of this group is to discuss issues pertaining to the Santa Ana sucker in Haines Canyon Creek and brainstorm on solutions to better aid in the species' recovery. After some discussion within the group, a decision was made to allow electrofishing as a removal method for capturing exotic aquatic species in Haines Canyon Creek in 2016, a technique which had not been previously allowed for exotic wildlife removal in the Mitigation Area.

In June 2016, a fish exclusionary screen was installed downstream of the Tujunga Ponds to limit the potential for migration of exotic aquatic species from the Tujunga Ponds into Haines Canyon Creek. The fish exclusionary screen was funded through a USFWS grant (Cooperative Agreement F15AC 00800).

The data presented in this section of the annual report summarize the results of the exotic wildlife removal efforts conducted in 2019.

6.1 METHODS

The 2019 removal of exotic aquatic species from the Mitigation Area was conducted monthly by Chambers Group from March through December 2019, under the direction of Chambers Group wildlife biologist Paul Morrissey (Santa Ana sucker specialist; USFWS permit 182550-1). Each effort consisted of one to four days for each month. Removal methods used in the Tujunga Ponds included dip-netting, hand capture, seining (most often seines were deployed from a small, non-motorized boat), and rod-and-reel. Bow-fishing methods were also employed during efforts in July and December as a means to target larger fish in the deeper areas of the Tujunga Ponds. The July bow-fishing effort was unsuccessful, as reduced visibility due to algal cover in the ponds impeded the effort. The December bow-fishing effort was more successful and resulted in the capture and removal of largemouth bass from the East Tujunga Pond. Dip-netting, two-person seining, and rod-and-reel fishing were conducted at the confluence with Haines Canyon Creek and the West Tujunga Pond. Hand capturing was conducted when necessary in conjunction with other methods. Removal efforts in Haines Canyon Creek included dip-netting, hand capturing, and two-person seining. The electrofishing removal method was not used during wildlife removal efforts in 2019. Prior to using any specific gear types, reconnaissance surveys (visual surveys from banks) were conducted to identify the locations and relative abundance of both invasive target species and native non-target species.

Exotic species removal did not occur in occupied Santa Ana sucker reaches between March 1 and July 31, 2019, in order to avoid disturbing the species during the breeding season and potential negative impacts to juvenile individuals. After July 31, when Santa Ana sucker were absent within a reach, or were present with non-native species within a reach, the less invasive seining and dip-netting removal methods were used. Any native species that was incidentally captured during exotic species removal efforts was immediately released unharmed. All wetted portions of the Mitigation Area were surveyed to locate and remove exotic wildlife during 2019 (Figure 6-1).

6.2 RESULTS

A total of 14,839 individuals consisting of eight exotic aquatic species (seven fishes and one invertebrate) were captured and removed from the Mitigation Area during the 2019 removal efforts (Table 6-1). Of the total individuals captured and removed, 88.17 percent (number of individuals [n]=13,069) were red swamp crawfish, 6.25 percent (n=926) were western mosquitofish, and 4.41 percent (n=654) were largemouth bass. Green sunfish (n=127), bluegill (n=44), Mozambique tilapia (n=2), and black bullhead (*Ameiurus melas*; n=1) totaled less than 1 percent each of the total individuals captured and removed. Haines Canyon Creek accounted for 32.60 percent of the total exotic species captured (n=4,832), while the remaining 67.40 percent of exotic species were captured in the Tujunga Ponds and West Tujunga Pond outlet to Haines Canyon Creek. Table 6-2 shows the number of exotic aquatic species captured by month.

Table 6-1. Species Captured During the Exotic Aquatic Species Removal Efforts, 2019

Exotic Species		
Common Name	**Scientific Name**	**Total**
black bullhead	*Ameiurus melas*	1
bluegill	*Lepomis macrochirus*	44
green sunfish	*Lepomis cyanellus*	127
largemouth bass	*Micropterus salmoides*	654
Mozambique tilapia	*Oreochromis mossambicus*	2
red swamp crayfish	*Procambarus clarkii*	13,069
unknown carp species	*unknown*	16
unknown softshell turtle species*	*unknown* – family Trionychidae	1
western mosquitofish	*Gambusia affinis*	926
TOTAL		**14,840**

*Incidental observation during exotic plant removal efforts

Figure 6-1. Exotic Aquatic Wildlife Survey Locations

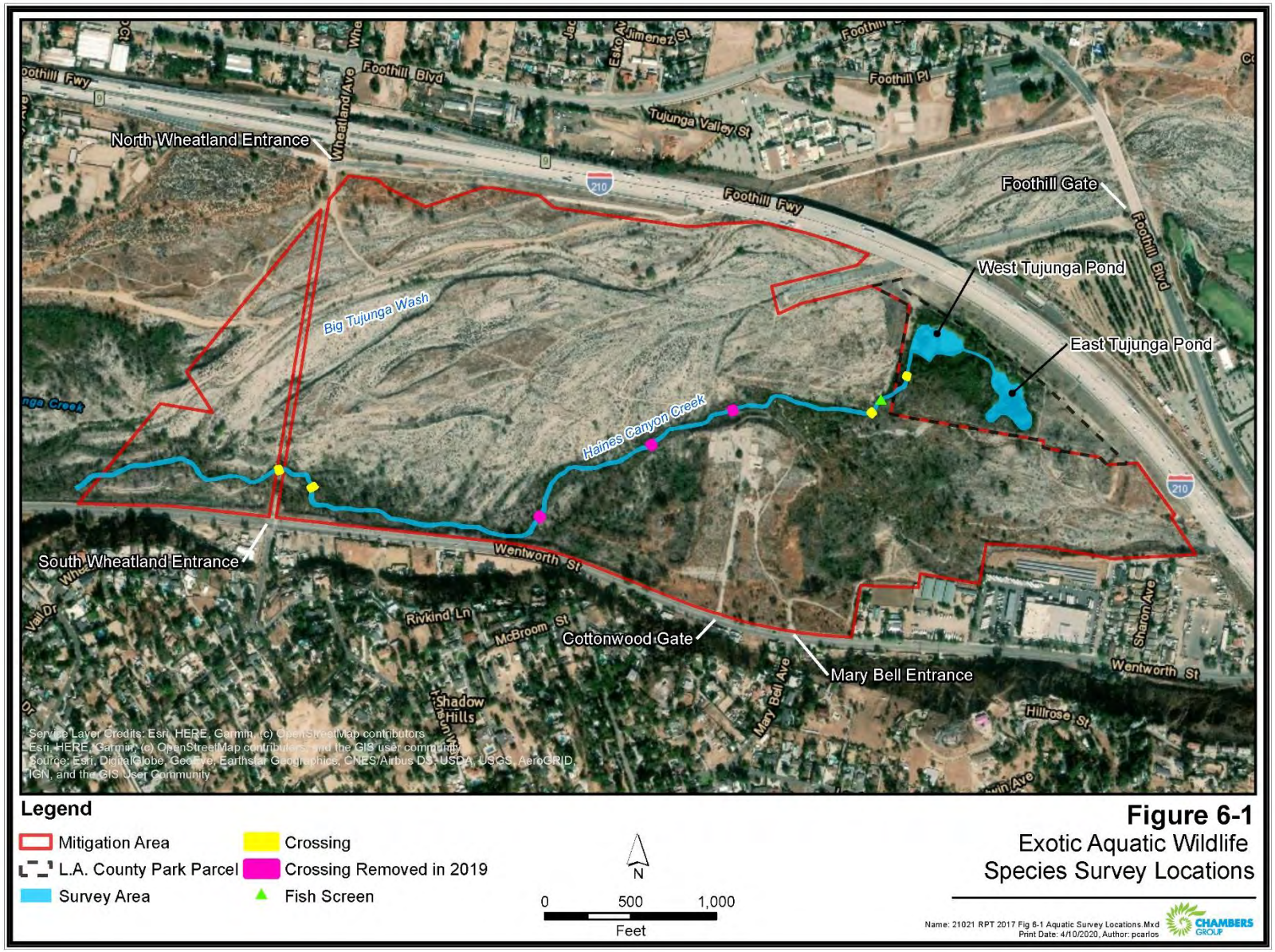


Table 6-2. Exotic Aquatic Species Captured by Month, 2019

Species Captured	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
black bullhead	0	0	1	0	0	0	0	0	0	0	1
bluegill	20	3	1	8	1	0	11	0	0	0	44
green sunfish	3	4	0	91	15	0	7	7	0	0	127
largemouth bass	21	14	0	177	372	1	44	22	1	2	654
Mozambique tilapia	0	0	0	1	1	0	0	0	0	0	2
red swamp crayfish	0	3,502	619	211	604	1,267	2,115	2,361	135	2,255	13,069
unknown carp species	0	0	0	16	0	0	0	0	0	0	16
unknown softshell turtle species*									1		
western mosquitofish	16	83	46	22	9	0	227	385	32	106	926
TOTAL	60	3,606	667	510	1,002	1,268	2,404	2,775	169	2,363	**14,840**

*Incidental observation during exotic plant removal efforts

Very few exotic aquatic species were observed or removed from the West Tujunga Pond and outlet or the East Tujunga Pond between March and May due to a lack of vegetation (which provides cover for aquatic species) growing in the ponds. The exotic species in the ponds were concentrated in the deeper areas which could not be accessed by the seines. More exotic aquatic species were observed in and removed from the East Tujunga Pond in June and July than in the previous months due to high algal cover (which provides cover for aquatic species) in the ponds. The high algal cover brought fish from the deeper areas of the ponds to shallower depths where they were more accessible for capture with seines.

In August, a large man-made dam was observed near the south Wheatland Avenue entrance. The dam was created by positioning large sections of felled trees, large rocks, cobble/gravel and sand to create a berm that inhibited native fish from migrating upstream and downstream. During the September effort, biologists removed the dam and lowered a sand and gravel berm near the dam to allow water to flow more freely through that portion of the creek. It appeared that a hut-like structure (cabana) that was constructed along the creek near the south Wheatland Avenue entrance (first observed in 2018) was still being maintained, but no individuals associated with its construction were present at the time of the effort. Approximately 500 arroyo chub and 20 Santa Ana sucker, ranging in size from 2 to 5 inches, were observed trapped in a pool that had formed as result of a dam that had been constructed in association with the cabana. The fish were observed flashing, a sign of parasites and decreased water quality due to the illegal dam. In addition, two Santa Ana speckled dace were observed downstream of the south Wheatland Avenue entrance.

Five additional dams were encountered and carefully deconstructed by biologists during September efforts. On September 12, 2019, Chambers Group biologists coordinated and worked with LACDPR employees to inspect the fish exclusionary screens located in Haines Canyon Creek just downstream from the Tujunga Ponds in order to identify any necessary repairs. No repairs were required at the time of the inspection.

During the October efforts, three Santa Ana speckled dace were observed upstream of the south Wheatland Avenue entrance. Approximately 300 arroyo chub and 20 Santa Ana sucker, ranging in size from 2 to 6 inches, were observed in the pool that was associated with the cabana. The dam associated with the cabana had not been rebuilt, and native fish were free to swim downstream from the pooled

area. Native fish were observed flashing, likely due to the presence of the illegal dam in previous months. Santa Ana sucker and arroyo chub fish were observed in other portions of the creek upstream of this area. Adult Santa Ana sucker were mainly observed in pooled areas with undercut banks. Younger sucker and arroyo chub were observed in wider portions of the creek where riffle/run areas existed. These areas were avoided during the exotic removal efforts. A total of four dams were encountered in the creek and were deconstructed by the biologists during the October effort.

Very few adult red swamp crayfish were observed during the November effort, and it is likely that the majority of the adults were burrowed under the root overhangs along the banks of the creek. A few of the larval stage red swamp crayfish were removed from under the lifted bark of a submerged log. The single juvenile largemouth bass that was removed from the creek in November was located near the large pooled area near the south Wheatland Avenue entrance to the Mitigation Area.

During November exotic plant removal activities an incidental observation of a non-native softshell turtle occurred; Chambers Group biologist Erik Olmos discovered the carcass of the turtle near the bank of the Tujunga ponds on November 4. The cause of death was not determined but was not a result of exotic wildlife removal efforts.

During the December effort, approximately 500 arroyo chub and 20 Santa Ana sucker, ranging in size from 2 to 5 inches, were observed in the pooled area. Again, native fish were observed flashing; indicating that decreased water quality caused by the presence of the illegal dam continued to persist months after the biologist removed the dam. In addition, approximately 400 Santa Ana sucker (ranging in size from 2 to 4 inches) and arroyo chub fish were observed in other portions of the creek upstream from the pooled area. Adult Santa Ana sucker were mainly observed in pooled areas with undercut banks. Younger sucker and arroyo chub were observed in wider portions of the creek where riffle/run areas exist. These areas were avoided during the exotic species removal efforts. Memos and photographs documenting each exotic species removal effort can be found in Appendix F.

SECTION 7.0 – WATER QUALITY MONITORING PROGRAM

Chambers Group qualified biologists conducted the annual water quality sampling for the Mitigation Area on October 30, 2019. The monitoring program has been designed to specifically address inputs to the site from upstream land uses such as the Angeles National Golf Club (previously named Canyon Trails Golf Club). Potential impacts to aquatic species from run-on to the site that contains excessive nutrients or pesticides are of primary concern. A series of sampling parameters was collected in the field from three sampling locations (one sampling location in the Tujunga Wash was dry and therefore was not sampled) using a Milwaukee MW102 PRO+ 2-in-1 Temperature and pH Meter to sample temperature and pH, a Milwaukee MW600 PRO Dissolved Oxygen Meter to sample dissolved oxygen, and a Hanna Instruments HI98703 Turbidity Portable Meter to sample turbidity. Water samples were taken at mid-depth, along a transect perpendicular to the stream channel alignment. All analyses were either performed by Enthalpy Analytical, LLC, located in Orange, California, or Test America, located in Savannah, Georgia. Quality assurance/quality control (QA/QC) procedures followed the methods described in their respective quality assurance manuals.

7.1 BASELINE WATER QUALITY

Sampling and analysis conducted by Public Works prior to implementation of the MMP is considered the baseline for water quality conditions at the site. The results of baseline analyses conducted in April 2000 are listed in Table 7-1 and are provided in the 2019 Water Quality Monitoring Report that is included as Appendix G. Higher bacteria and turbidity observed in the April 18, 2000, baseline samples were attributed to a rain event. Phosphorus levels were also high in the April 18, 2000, samples, perhaps due to release from sediments.

Table 7-1. Baseline Water Quality Sampling Results (2000)

Parameter	Units	Date	Haines Canyon Creek, inflow to Tujunga Ponds	Haines Canyon Creek, outflow from Tujunga Ponds	Big Tujunga Wash	Haines Canyon Creek, just before exit from site
pH	standard units	4/12/00	7.78	7.68	7.96	7.91
		4/18/00	7.18	7.47	7.45	7.06
Ammonia-N	mg/L	4/12/00	0	0	0	0
		4/18/00	0	0	0	0
Kjeldahl-N	mg/L	4/12/00	0	0.1062	0.163	0
		4/18/00	0	0.848	0.42	0.428
Nitrite-N	mg/L	4/12/00	0.061	0	0	0
		4/18/00	0.055	0	0	0
Nitrate-N	mg/L	4/12/00	8.38	5.19	0	3.73
		4/18/00	8.2	3.91	0.253	0.438
Dissolved phosphorus	mg/L	4/12/00	0.078	0.056	0	0.063
		4/18/00	0.089	0.148	0.111	0.163
Total phosphorus	mg/L	4/12/00	0.086	0.062	0	0.066
		4/18/00	0.113	0.153	0.134	0.211

Table 7-1. Baseline Water Quality Sampling Results (2000)

Parameter	Units	Date	Haines Canyon Creek, inflow to Tujunga Ponds	Haines Canyon Creek, outflow from Tujunga Ponds	Big Tujunga Wash	Haines Canyon Creek, just before exit from site
Turbidity	NTU	4/12/00	1.83	0.38	1.75	0.6
		4/18/00	4.24	323	4070	737
Fecal coliform	MPN/ 100 ml	4/12/00	500	300	40	80
		4/18/00	500	30,000	2,400	50,000
Total coliform	MPN/ 100 ml	4/12/00	3,000	5,000	170	1,700
		4/18/00	2,200	170,000	2,400	70,000

MPN – most probable number **NTU** – nephelometric turbidity units

7.2 WATER QUALITY SAMPLING RESULTS FOR 2019

Results of laboratory analyses conducted by Enthalpy Analytical are summarized in Table 7-2 and are provided in the 2019 Water Quality Monitoring Report included as Appendix G. Note that the yields (percent recoveries) of quality control samples were within acceptable limits (percentages) for all samples. In addition, some of the water quality constituents that are tested on an annual basis after the implementation of the MMP were not included in the baseline water quality sampling. Tests for herbicides and pesticides were added to determine whether or not these chemicals were being transported downstream to the Mitigation Area.

Table 7-2. Summary of Water Quality (October 30, 2019)

Parameter	Units	Haines Canyon Creek, inflow to Tujunga Ponds	Haines Canyon Creek, outflow from Tujunga Ponds	Big Tujunga Wash	Haines Canyon Creek, just before exit from site
Dissolved Oxygen	mg/L	3.6	4.9	NA	9.6
pH	std units	5.06	5.92	NA	5.45
Total residual chlorine	mg/L	ND	ND	NA	ND
Ammonia-Nitrogen	mg/L	ND	ND	NA	ND
Kjeldahl Nitrogen	mg/L	0.635	ND	NA	ND
Nitrite-Nitrogen	mg/L	ND	ND	NA	ND
Nitrate-Nitrogen	mg/L	8.07	5.78	NA	5.17
Orthophosphate-P (dissolved phosphorus)	mg/L	0.0220	ND	NA	0.0220
Total phosphorus-P	mg/L	0.036	0.024	NA	0.028
Glyphosate	µg/L	ND	ND	NA	ND

Table 7-2. Summary of Water Quality (October 30, 2019)

Parameter	Units	Haines Canyon Creek, inflow to Tujunga Ponds	Haines Canyon Creek, outflow from Tujunga Ponds	Big Tujunga Wash	Haines Canyon Creek, just before exit from site
Chloropyrifos* (and other Organophosphorus Pesticides)	µg/L	ND	ND	NA	ND
Pesticides (EPA 608)** (Organochlorine Pesticides)	µg/L	ND	ND	NA	ND
Turbidity	NTU	0.22	0.31	NA	0.53
Fecal Coliform Bacteria	(MPN/100 ml)	79	240	NA	130
Total Coliform Bacteria	(MPN/100 ml)	540	1600	NA	240

NA – data not available; station dry on the sample date **NTU** – nephelometric turbidity units
MPN – most probable number **ND** – non-detect

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

** EPA method 608 tests for aldrin, BHC, Chlordane, DDD, DDE, DDT, dieldrin, endrin, endosulfan, heptaclor, methoxychlor, and toxaphene. Water samples for these pesticides were collected on November 14, 2019.

7.2.1 Comparison of Results with Aquatic Life Criteria

Table 7-3 provides the results of the December 2019 water quality sampling when compared to objectives established by the Los Angeles Regional Water Quality Control Board for protection of beneficial uses in Big Tujunga Wash (including wildlife habitat) and the Environmental Protection Agency (EPA) criteria for freshwater aquatic life.

Table 7-3. Discussion of October 2019 Big Tujunga Wash Sampling Results

Parameter	Discussion
Dissolved oxygen (DO)	▪ DO levels were 3.6 mg/L at the inflow to the Tujunga Ponds, 4.9 mg/L at the outflow from the Tujunga Ponds, and 9.6 mg/L where Haines Canyon Creek exits the site. DO levels at two of the sample stations were below the minimum recommended level (5.0 mg/L) for Basin Plan objectives and EPA's criteria for warmwater fish species.
pH	▪ pH readings were 5.06 at the inflow to the Tujunga Ponds, 5.92 at the outflow from the Tujunga Ponds, and 5.45 where Haines Canyon Creek exits the site. pH readings in all three sample stations were below the recommended range of 6.5 to 8.5 identified in the Basin Plan objectives, and were within the recommended range of 5.0 to 9.0 for EPA's criteria for human health.

Table 7-3. Discussion of October 2019 Big Tujunga Wash Sampling Results

Parameter	Discussion
Total residual chlorine	▪ No residual chlorine was detected at any sample station.
Nitrogen	▪ Nitrate-Nitrogen measurements at all sample stations were below the drinking water maximum standard of 10 mg/L for both Basin Plan standards and EPA criteria for human health. ▪ Nitrite-Nitrogen was not detected at any sample station. ▪ Ammonia-Nitrogen was not detected at any sample station.
Phosphorus	▪ The observed Total Phosphorus-P concentrations were 0.036 mg/L at the inflow to the Tujunga Ponds, 0.024 mg/L at the outflow to the Tujunga Ponds, and 0.028 mg/L where Haines Canyon Creek exits the site. Total Phosphorus-P concentrations were below the lower end of the EPA's recommended maximum range of 0.05 to 0.10 mg/L for the desired goal of preventing plant nuisances in streams.
Glyphosate	▪ Glyphosate was not detected at any sample station.
Chloropyrifos and other Organophosphorous Pesticides	▪ Organophosphorus Pesticides including Chlorpyrifos, that were analyzed by EPA method 8141A were not detected at any sample station.
Organochlorine Pesticides	▪ Organochlorine pesticides analyzed by EPA Method 608 were not detected at any sample station.
Turbidity	▪ Turbidity readings were 0.31 NTU at the inflow to the Tujunga Ponds, 0.22 NTU at the outflow from the Tujunga Ponds, and 0.53 NTU where Haines Canyon Creek exits the site. Turbidity levels were below or within the drinking water maximum range of 0.5 to 1.0 NTU for the EPA's criteria for human health at all sample stations.
Coliform Bacteria	▪ Per the Basin Plan objectives, the fresh water bacteria standard for water contact recreation is for E. coli (126 MPN/100 ml geometric mean, 235 MPN/100 ml single sample limits). Fecal coliform levels detected were below the standard geometric mean at the inflow to the Tujunga Ponds (79 MPN/100 ml) but were above the standard geometric mean at the outflow from the Tujunga Ponds (240 MPN/100 ml) and where Haines Canyon Creek exits the site 130 MPN/100ml). Sampling specifically for E. coli was not conducted. ▪ Total coliform levels were 540 MPN/100 ml at the inflow to the Tujunga Ponds, 1600 MPN/100 ml at the outflow from the Tujunga Ponds and 240 MPN/100 ml where Haines Canyon Creek exits the site. [Note that recreation standards are for *E. coli*. Per the Basin Plan, total coliform standards apply to marine waters and waterbodies where shellfish can be harvested for human consumption.]

mg/L – milligrams per liter **NTU** – nephelometric turbidity units **MPN** – most probable number

SECTION 8.0 – TRAILS MONITORING PROGRAM

8.1 TRAILS SYSTEM MAINTENANCE

The goal of maintaining a formal trails system at the Mitigation Area is to allow recreational use of the Mitigation Area while still preserving sensitive wildlife and their habitats. The Mitigation Area contains trails for both equestrian use and hiking trails. Figure 8-1 depicts the trail alignment prior to the 2019 trail realignment efforts that are discussed in detail in Section 8.2. The preservation of authorized trails is an essential component in the success of the original restoration and enhancement of the site. This program has been continued in order to discourage the establishment of unauthorized trails in the Mitigation Area. By monitoring that the authorized trails are kept clear and can be readily used by equestrians and hikers, the creation of new, unauthorized trails and illegal use of the Mitigation Area (e.g., camping, making fires) will be reduced. The maintenance and monitoring of the trail system are necessary components of the overall restoration and enhancement program.

Seven regular trails maintenance efforts were conducted in 2019. These efforts occurred on April 4, 18, and 23; May 28 through 31; June 3, 4 through 6, and 12; July 1, 8, and 10 through 12; September 30; October 1 through 4 and 11; November 14 through 28; and December 4 through 21. All pre-activity site sweeps were conducted by Chambers Group biologists Jacob Lloyd Davies, Omar Moquit, or Alisa Muniz. Subsequent trail maintenance was conducted by Chambers Group's restoration department and was supervised by habitat restoration foreman Tim Wood and/or Alisa Muniz and biologists who were on site during all maintenance efforts.

The focus of these site visits was to look for areas that might qualify for trail closure, identify areas where trails were blocked by trash or debris and restore them to a safe condition, block off any unauthorized trails, and trim back extensive stands of poison oak found in proximity to the trails. Substantial trail maintenance work was required in 2019, as snag trees (trees burned in the Creek Fire) continued to come down throughout the season and efforts to clear and delineate authorized trails and block off unauthorized trails were increased. Assessment of trail signs, portable toilets, site fencing, and gated entrances was included in each effort. Any minor repairs were remedied during the site visits or in combination with site visits for other maintenance tasks. More extensive problem areas were mapped for repair at a later time or were reported to Public Works for repair if necessary.

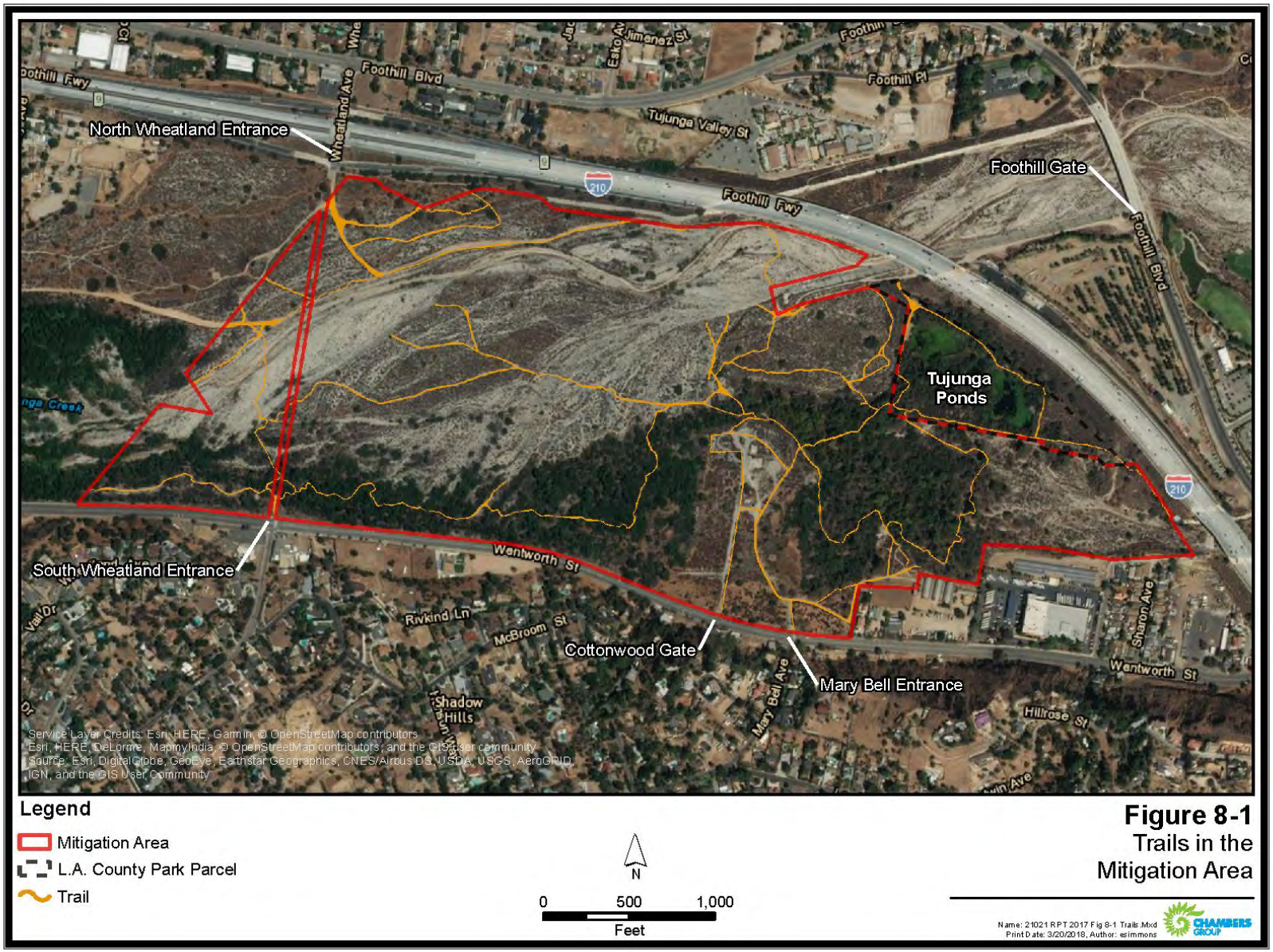
During the site visits, the restoration specialists and biologists assessed trail conditions and identified locations that were in need of maintenance. Examples of maintenance issues identified and addressed in 2019 included:

- Removing trees and branches obstructing trails
- Removing large dead trees or loose branches with the potential to fall on the trail
- Removing snag roots (trip hazards) from authorized trails
- Trimming dense native and non-native vegetation crowding authorized trails
- Repairing washed out sections of authorized trails
- Directionally pruning shrubs to grow away from the authorized trails
- Trimming back dense stands of poison oak from along authorized trails
- Removing rock dams and log dams constructed in Haines Canyon Creek
- Widening narrow trails to allow equestrians to safely pass each other
- Removing loose rocks from authorized trails
- Grading and delineating trails for safer passage

- Blocking off unauthorized trails
- Trash removal
- Addressing general safety concerns

The restoration specialists and biologists immediately reported to Public Works any homeless encampments they encountered during the site visits. Maintenance activities to address the trail issues were monitored by Chambers Group biologists during each effort. Prior to any work, all members of the trail maintenance crew received on-site orientation and instruction on the Mitigation Area's regulations and concerns relating to the area's sensitive species and habitats by a qualified Chambers Group biologist. These efforts were summarized in memo reports following each of the trail maintenance efforts and are included as Appendix H.

Figure 8-1. Trails in the Mitigation Area (Pre-Realignment)



8.2 TRAIL REALIGNMENT

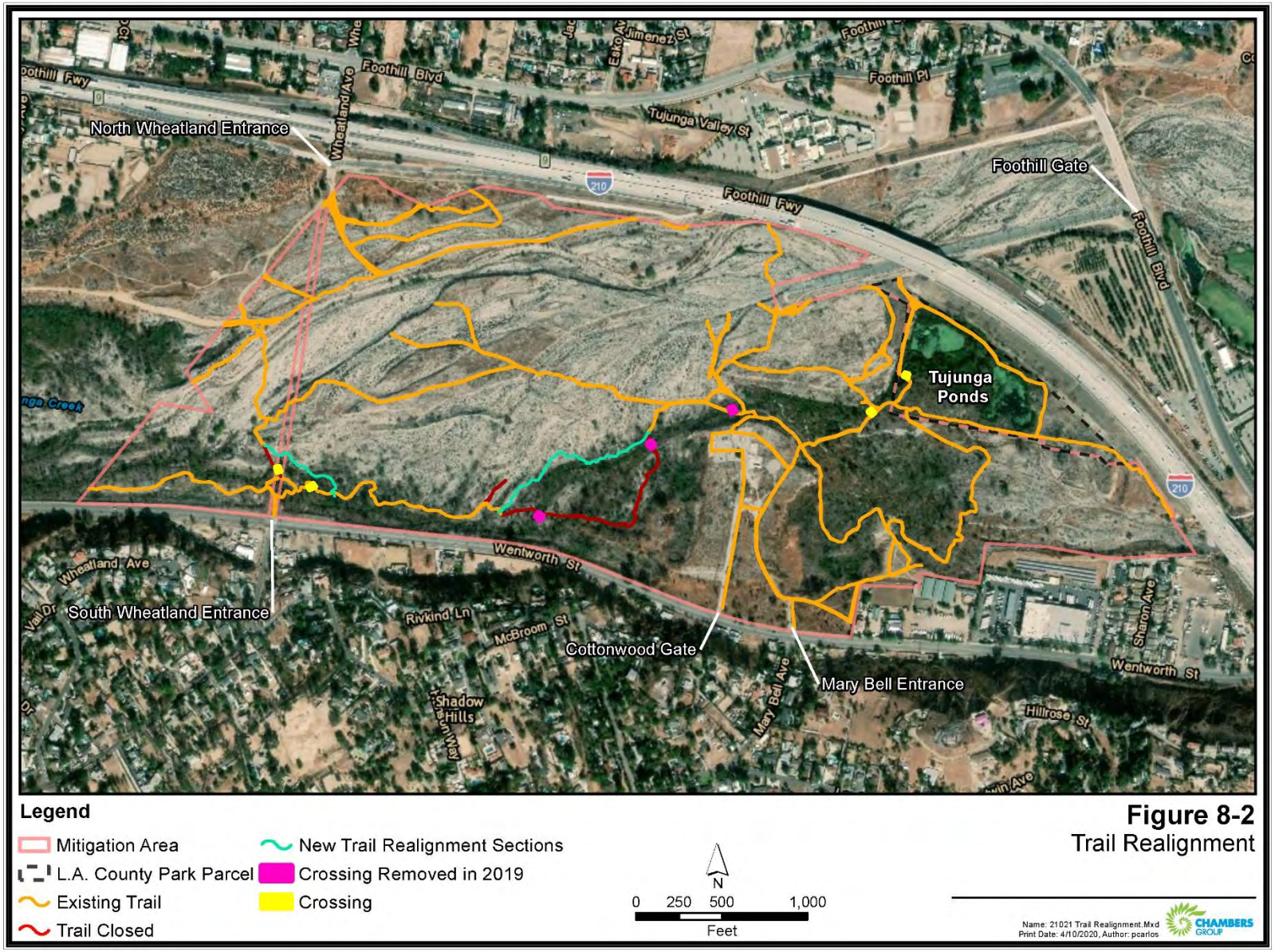
The trail realignment effort focused on abandoning approximately 1,580 feet of previously authorized trail and eliminating three points where the trail required visitors to cross Haines Canyon Creek. The abandoned trail section was offset by the creation of two new trails with a combined distance of approximately 1,770 linear feet; the final eastern trail realignment section is approximately 1,210 linear feet, and the final western trail section is approximately 560 linear feet (Figure 8-2). In addition, the new trail realignment facilitated the closure and bypass of three stream crossings, which will reduce potential disturbance and negative impacts to the sensitive species in and around Haines Canyon Creek. The creation of new trails has also facilitated the closure of multiple sections of unauthorized trails that were lengthened by public use after the Creek Fire and prior to trail reestablishment, when much of the trail network was ambiguous (due to lack of vegetation and the trails being obscured by ash and debris). These sections of unauthorized trails total approximately 500 feet in length. Since their routes were not clearly defined, visitors would wander through the habitat randomly and without a dedicated path, making the negative effects of unauthorized trail use on the surrounding habitat substantial. The trail realignment crew incorporated unauthorized trails into the new trail alignment wherever possible to minimize further disturbance and encourage the habitat recovery in these areas.

Trail realignment efforts took place on June 4 through 7, June 10 through 14, June 26, July 1, and July 26 through 31, 2019. Trail construction consisted of felling snags that were determined to pose a safety risk to visitors along areas where the new trails would be constructed, removing and trimming vegetation from the new trail routes, grading and removing large stones from the new trail routes, and delineating the trail boundaries using felled snag material and stones removed from the trail. Felled snag materials and stones were also used to block off unauthorized and abandoned trail sections. T-posts and three-wire fencing were installed to block off abandoned creek crossings, and tree cuttings from nearby native trees were planted at the abandoned creek crossings to help restore habitat and to deter continued creek crossing in these areas.

Permanent signs were installed at the four creek crossing closures. These signs inform the public of the new trail directions and that the areas beyond those closures are part of “Active Habitat Restoration” efforts. A three-way merger sign was also installed where the west trail realignment section and an authorized trail merge to help guide visitors to other trails on the property. In addition to the trail realignment signs, five signs were installed at the high-traffic entry points of the Mitigation Area including the equestrian entrance from Gibson Ranch, the two trail heads located on the Cottonwood Avenue bluff, the south Wheatland Avenue trail head, and a trail merger point near the north Wheatland Avenue entrance where two authorized trails join the street entrance trail and a trail from the Hansen Dam area. These signs inform the public that the entire property is an “Environmentally Sensitive Area” and list many of the rules they are to follow as site visitors.

All trail realignment activities were supervised by habitat restoration foreman Tim Wood, who monitored that regulations and requirements were closely followed. During the trail realignment efforts, care was taken to avoid damaging native vegetation. No birds showed signs of stress during trail realignment efforts, and no sensitive biological resources including nesting birds were disturbed. General maintenance and safety monitoring of the new trail realignment sections will be included with all other trail maintenance and monitoring efforts to provide public safety and enjoyment. Throughout the trail realignment process, several equestrian users mentioned their contentment and satisfaction regarding the new trail alignment, the high visibility of the trail, the grading and removal of trip hazards for safe horse passage, and signs to help direct travel and protect the environment. Further details regarding the trail realignment efforts can be found as Appendix I – Trail Realignment Memo Report.

Figure 8-2. Trail Realignment Map



8.3 TRAIL CLEANUP DAY

In 2012, the official name of the annual volunteer event held at the Mitigation Area changed to Trail Cleanup Day (previously named Trail Maintenance Day). The Thirteenth Annual Trail Cleanup Day was held on Saturday, October 5, 2019. Chambers Group worked together with Public Works to modify the flyers that provided the information for the Thirteenth Annual Trail Cleanup Day. The flyer was posted on Public Works' website and was also distributed to other interested parties. The flyer was mailed to the individuals and organizations on the mailing list that is used for the CAC meetings and biannual newsletters. A copy of the flyer that was distributed to the public is included below as Figure 8-3.

The Trail Cleanup Day event was attended by approximately 18 volunteers including 3 Public Works employees, 11 Chambers Group employees, and 4 members of the public. Four biologists and one habitat restoration specialist from Chambers Group attended the event to monitor that sensitive resources were not negatively affected by the activities. Various portions of the site were targeted for trash removal during the event, including Haines Canyon Creek and all trails throughout the Mitigation Area. A large amount of trash was removed from the Mitigation Area, including several shopping carts, mattress springs, lawn chairs, clothing items, tarps, tires, several large pieces of scrap metal, and approximately 40 large bags of smaller trash items. Photographs taken during the event are included as Figure 8-4.

Figure 8-3. Trail Clean-up Day Flyer 2019

Join us for the 13th annual

Big Tujunga Wash Mitigation Area

TRAIL CLEANUP DAY

October 5, 2019 | 8 a.m.

Water, snacks, and trash bags will be provided.

PLEASE BRING:

- Comfortable shoes
- Closed-toe shoes
- Gloves
- Hat
- Sun block
- Bug repellent

If there is rain or poor weather on October 5, the event will be rescheduled.

For more information call (626) 458-6327 or e-mail btwma@pw.lacounty.gov

ADA and Title VI Accommodations: Individuals requiring reasonable accommodations, interpretation services, and materials in other languages or in an alternate format may contact the Public Works coordinator at (626) 458-7901. Requests must be made one week in advance of the scheduled meeting date. Individuals with hearing or speech impairment may use California Relay Service 711.

Public Works
LOS ANGELES COUNTY

COUNTY OF LOS ANGELES FLOOD CONTROL DISTRICT

Figure 8-4. Trail Cleanup Day 2019 Photographs

Photo 1: Volunteers work together to unearth a shopping cart from cottonwood-willow riparian habitat along Haines Canyon Creek on November 5, 2019.

Photo 2: Group photo of a Public Works project managers and Chambers Group volunteers with some of the collected debris items from the cleanup effort on November 5, 2019.

SECTION 9.0 – COMMUNITY AWARENESS PROGRAM

The CAC was formed in early 2001 as part of MMP requirements for a community awareness program. Between 2001 and 2013, the CAC met semiannually to update the community on the progress of ongoing restoration activities, ongoing exotic eradication activities, and upcoming scheduled activities at the Mitigation Area and to discuss any issues that the community would like to see addressed. In 2014, the CAC meetings changed from being held on a semiannual basis to being held annually in the spring. In July 2007 ECORP assumed the responsibilities of preparing the spring and fall newsletters, assisting with preparation of meeting agendas and handouts and recording meeting minutes. In June 2017 Chambers Group assumed these responsibilities once again and has continued this role through 2019. All deliverables were submitted to Public Works electronically for posting on the Public Works web page (http://pw.lacounty.gov/wrd/Projects/BTWMA).

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

9.1 NEWSLETTERS (SPRING, WINTER)

Two newsletters were drafted by Chambers Group during 2019. The spring edition was distributed to the public in April, 2019 and the winter edition was distributed to the public in December 2019. Electronic versions of these newsletters were submitted to Public Works for distribution to the public and stakeholders, and to incorporate on their web page. Hard copies of the newsletters were also mailed to stakeholders and organizations. Copies of the newsletters are included in Appendix K.

9.2 CAC MEETING

The CAC meeting was held on Thursday, April 25, 2019. The meeting was held from 6:30 to 8:30 p.m. at Public Works' Hansen Yard, 10179 Glenoaks Boulevard, Sun Valley, California 91352. The meeting reminder/invitation, meeting agenda, and minutes from the previous meeting were mailed to the most recent CAC mailing list approximately two weeks prior to the scheduled meeting. In addition, the meeting agenda and the minutes from the previous CAC meeting (April 26, 2018) were posted to the Mitigation Area website. Approximately one week prior to the CAC meeting, a final meeting reminder was sent via email that included a link to the materials posted on the Mitigation Area web page.

Chambers Group representatives Paul Morrissey and Tim Wood attended the meeting and provided a sign-in sheet for all attendees. Chambers Group biologist Paul Morrissey reviewed the 2018 implementation efforts with the group, discussed the current status and implementation of the enhancement programs for 2019, and led an open discussion regarding various site issues. Notes were recorded by Public Works representative Melanie Morita during the meeting in order to prepare the official meeting minutes summarizing the general proceedings. Chambers Group distributed a map that documented the location and nature of all observed incidents that occurred within the Mitigation Area between January and December 2018 (Figure 9-1). The map included locations of rock dams, prohibited activities observed (such as fishing and swimming), vandalism, and public safety concerns. Chambers Group submitted draft meeting minutes to Public Works for review and commenting prior to posting on the Public Works web page. The proceedings at the 2019 CAC meeting were summarized in the meeting

minutes, which were submitted to Public Works in draft form on May 13, 2019, and are included as Appendix L. Below is a summarized list of agenda items discussed during the 2019 CAC meeting.

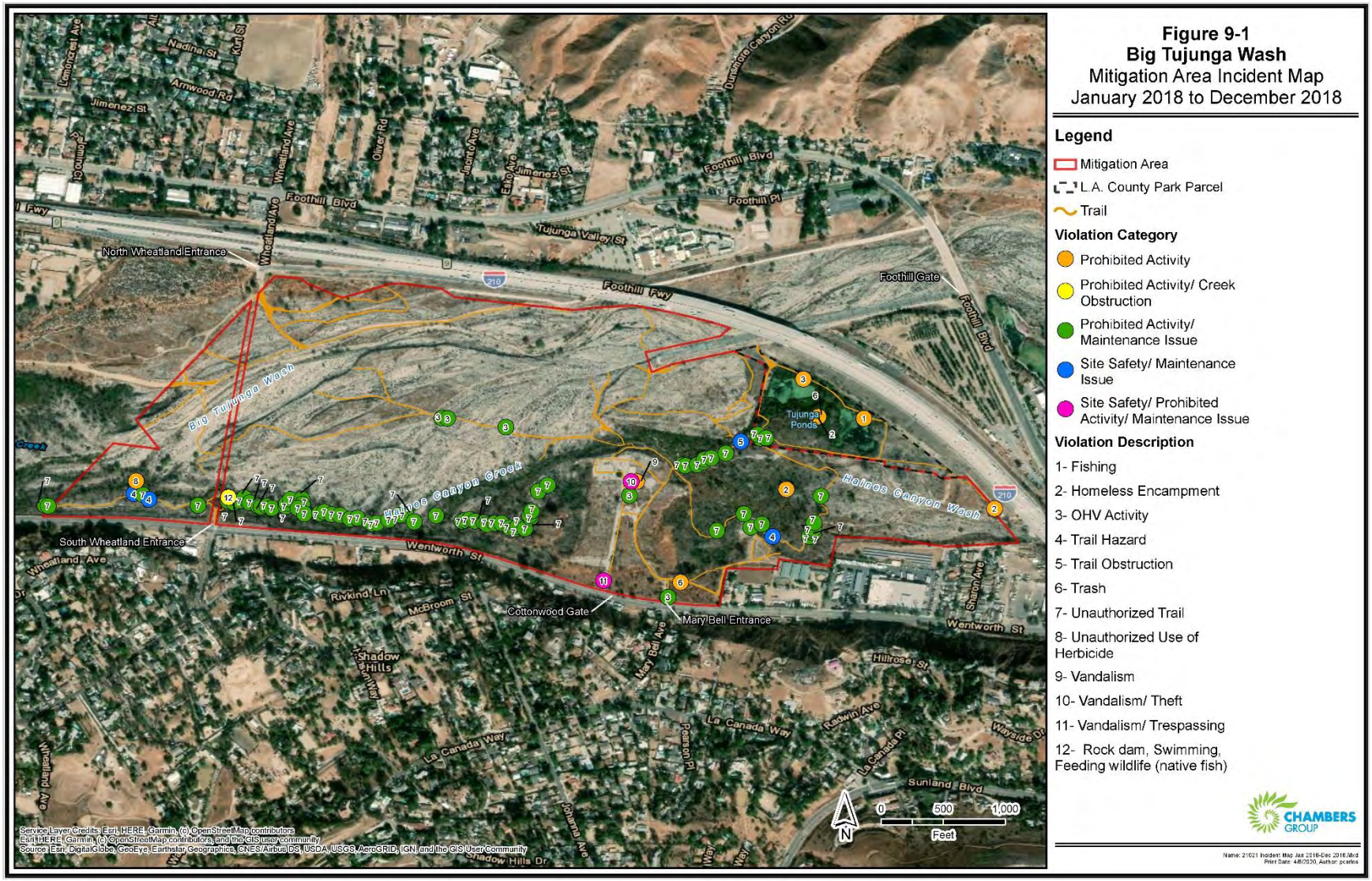
- **Site Maintenance Issues from 2018**
  - 2018 action items discussed.

- **Summary of Maintenance Programs in 2018**
  - Exotic Plant Removal
  - Exotic Wildlife Removal
  - Water Quality Monitoring
  - Trails Monitoring
  - Annual Trails Cleanup Day
  - Public Outreach

- **Current Status of Maintenance Programs for 2019**
  - Creek Fire Assessment and Site Recovery
  - Fuel Reduction Activities
  - Snag Removal
  - Exotic Plant Eradication
  - Exotic Wildlife Removal
  - Brown-headed Cowbird Trapping
  - Water Quality Monitoring
  - Trails Maintenance and Monitoring/Restoration
  - Public Outreach Program

- **Comments, Questions, and Answers**

Figure 9-1. Big Tujunga Wash Mitigation Area Incident Map, January 2018 to December 2018



SECTION 10.0 – PUBLIC OUTREACH PROGRAM

In an ongoing effort to enhance and protect existing wildlife and habitats at the Mitigation Area, the Public Outreach Program was developed and implemented during the 2009 contract year and has continued through 2019. This task was the direct result of increasing evidence of problematic areas associated with recreational use throughout the Mitigation Area. ECORP and Public Works developed new public outreach efforts to educate all types of recreational user groups about the importance of the Mitigation Area as a conservation area as well as to inform users of approved and prohibited types of recreational activities. This task was continued into the 2019 contract year because of its success in the years from 2009 to 2018.

During site visits in the spring and summer of 2009, ECORP biologists observed increasing problems with visitors using the waterways (Haines Canyon Creek and the Tujunga Ponds) in the Mitigation Area for recreational activities such as picnicking, fishing, swimming, and wading. In rare cases, cooking, barbequing, and alcohol consumption were observed. In areas popular for swimming, recreational users were using rocks, large boulders, and branches from nearby dead trees to dam the creek to create larger and deeper pools for swimming. Not only are these types of recreational activities prohibited on site, but they can result in damage to the waterways and native riparian habitats, which has the potential to reduce the ecological value of the site as a Mitigation Area. After observing and understanding the various problems associated with the recreational user groups in the Mitigation Area, ECORP and Public Works created and implemented a bilingual recreational user education program to expand public outreach for the Mitigation Area. The program consisted of site visits conducted by a bilingual biologist on peak use weekends in the spring and summer to educate the various user groups about the approved and prohibited activities within the Mitigation Area. A bilingual educational brochure was developed and distributed to the various user groups during the weekend site visits. The bilingual educational brochure was updated by Chambers Group in the spring of 2019 in order to highlight current issues and to revise the overall appearance and language in the brochure. The updated educational brochure can be found as Appendix B.

10.1 OUTREACH EFFORTS 2019

Onsite interviews and education about the Mitigation Area were conducted on five occasions in 2019 by Chambers Group bilingual biologists Erik Olmos, Alisa Muniz, and Mauricio Gomez. Outreach efforts took place on June 30, July 28, August 25, September 14, and September 28, 2019. All outreach efforts took place during the peak site use hours of 8:45 a.m. to 1:00 p.m. The June 30 outreach effort took place at the Foothill Trails District Neighborhood Council Equine Fair (Equine Fair) in conjunction with Public Works between the hours of 9:45 a.m. to 2:45 p.m. During public outreach visits at the Mitigation Area, Chambers Group biologists walked the authorized trails system and visited popular swimming/wading locations along Haines Canyon Creek and around the Tujunga Ponds, speaking with visitors they encountered. Visitors that were interviewed fell into one of two groups: non-equestrian user groups or equestrian user groups.

During the five outreach visits, all non-equestrian and equestrian visitors encountered were offered an educational brochure outlining Public Works' conservation goals for the Mitigation Area. The educational brochure contained the Mitigation Area's rules and regulations, as well as a list of the sensitive species found on the site. During each outreach event, Chambers Group biologists provided information on why specific activities are prohibited in the Mitigation Area and the extent of their negative impacts on the sensitive species. Most outreach events consisted of informal interviews and short question and answer sessions. Questions from the visitors were primarily about the purpose of the Mitigation Area's rules and

regulations and the types of sensitive resources found in the Mitigation Area. Most equestrian users expressed appreciation towards the outreach efforts and agreed with the information presented in the educational brochure. In general, equestrian and non-equestrian users were responsive to the public outreach efforts.

10.2 NON-EQUESTRIAN USER GROUPS

A total of nine non-equestrian site users were encountered during the five public outreach visits in 2019. All nine of the non-equestrian site users interviewed were local residents. Seven of the nine non-equestrian site users were encountered at the Equine Fair, and two individuals were encountered along the trails around the creek and the ponds. All site users were offered an educational brochure about the site, were informed about activities that are prohibited in the Mitigation Area, and were asked if they had any questions on any of the information presented. Some of the issues observed by the biologists during the outreach included the building of dams and swimming in the creek and removal of vegetation adjacent to the creek.

Individuals encountered during the outreach visits were generally receptive to the information provided on the sensitive resources and rules within the Mitigation Area. Individuals that were unaware of and/or violating rules were generally respectful and receptive to the information provided by the biologists. Interactions with individuals that were observed violating the rules of the Mitigation Area are detailed in in the 2019 Public Outreach Memo Report (Appendix M).

Primary usage of the Mitigation Area as described by the non-equestrian users interviewed included hiking/walking, walking dogs, exercise, and general recreation. Concerns raised by non-equestrian users interviewed included: trash, vandalism, the presence of snags along trails, and the homeless population. The biologist asked the individuals to contact local law enforcement and Public Works if suspicious or illegal activities are observed in the Mitigation Area. Recommendations provided by non-equestrian users interviewed included placing more trash cans and signage throughout the Mitigation Area, increasing oversight and security within the Mitigation Area, and removing homeless encampments.

The most substantial impacts on sensitive habitat by non-equestrian user groups are caused by swimming and building rock dams within the creek. Rock dams are constructed by individuals to make swimming areas deeper. A few unauthorized swimming areas have become popular spots for non-equestrian users to congregate, picnic, and swim. The most popular location is the unauthorized swimming area situated approximately 280 feet northwest of the south Wheatland Avenue entrance. Several rock dams, both large and small, were encountered in the creek and were removed during 2019 public outreach and exotic wildlife removal efforts. Rock dams are usually constructed with boulders and tree branches and were often found reinforced with tarps and other materials that reduce the natural flow of the creek and create a buildup of water. The changes to the natural flow of the creek can be detrimental to the sensitive species of fish within the creek. Rock dams reduce the flow of the creek and create large pools of water that are favorable habitat for the exotic, invasive aquatic species including the red swamp crayfish and American bullfrog that prey on native species such as the federally listed threatened Santa Ana sucker. These pools reduce suitable breeding habitat for sensitive fish species as well. In an effort to reduce these effects, non-equestrian user groups were approached and educated during the outreach site visits. All rock dams encountered during site visits were documented, and the larger rock dams were reported to Public Works for removal.

10.3 EQUESTRIAN USER GROUPS

A total of 33 equestrian users were approached and interviewed during the 5 public outreach visits in 2019. Sixteen of the 33 equestrian users were encountered at the Equine Fair, and 17 equestrian users were encountered along the authorized trails of the Mitigation Area along the creek and near the ponds. All 33 of the equestrian users interviewed were local residents. Equestrian users were offered an educational brochure and were informed about various aspects of the Mitigation Area. Outreach events with equestrian users were usually brief, as most of the equestrian site visitors were frequent users of the Mitigation Area and were receptive to the outreach efforts. Many equestrian users commended the outreach efforts and contributed information to the biologists. Most of the questions asked by equestrian users were about the trail maintenance and trail realignment efforts taking place at the Mitigation Area.

Secondary usage of the Mitigation Area as described by the equestrian users interviewed included hiking and walking. Concerns raised by the equestrian users interviewed included trail maintenance (particularly vegetation overgrowth and relocating rocks on the trails), the presence of snags/logs along trails, trash, the lack of shaded areas and fewer creek crossings along the newly realigned trails, the realigned trails being too sandy and dusty, the low visibility of wire fencing blocking old trails, illegal dumping, the presence of poison oak along trails, off-highway vehicle use on the trails, and the homeless population. Equestrian users reported observations of individuals camping in the Mitigation Area and cooking along the creek. The biologists asked the equestrian users to contact local law enforcement and Public Works if suspicious or illegal activities are observed in the Mitigation Area. Recommendations provided by the equestrian users interviewed included placing more trash cans throughout the Mitigation Area, more clean-up events, more community meetings regarding the Mitigation Area and the realignment of the trails, increasing oversight and security in the Mitigation Area, widening the trails, removing large rocks and snags from the trails to eliminate safety issues for horses, attaching flagging to the wire fences blocking the old trails for better visibility, and fining individuals that are observed misusing the Mitigation Area.

Additional interactions with equestrian users that occurred outside of Public Outreach efforts usually consisted of equestrian users thanking the work crews for maintaining and beautifying the site and trails and their acknowledgment that they understood the importance of restoring native habitat. Some interactions consisted of specific requests from equestrian users, such as clearing vegetation from the trails (specifically poison oak and the burs from cocklebur (*Xanthium strumarium*) that get stuck in their horses' coats); widening the trails; and opening the old, abandoned trail sections back up. Chambers Group biologists responded to requests to reopen the abandoned trail sections by educating site users on creek ecology and the importance of restoring habitat in the abandoned trail areas.

One equestrian user was observed off-trail during the 2019 outreach efforts. The biologists did not have an opportunity to speak to the equestrian user, as she was on the phone.

Equestrian site users can affect sensitive terrestrial habitat by traveling off the established trail systems and can disturb sensitive aquatic habitat when traveling through the creek. Riders were reminded to cross the creek single-file to minimize erosion along the banks and to stay on the authorized trails. The creation of new trails and traveling off the authorized trails can be minimized with continued trail maintenance and equestrian site user education. Further details regarding the 2019 efforts can be found in Appendix M.

SECTION 11.0 – POST-FIRE SUAS VEGETATION MAPPING AND ANALYSIS

Field surveys were conducted on August 22 and December 30 and 31, 2019, to record the current conditions of the Mitigation Area (photos and aerial imagery) 20 months after the Creek Fire in December 2017, to map the recovery of vegetation following the Creek Fire, and to identify ways to enhance the Mitigation Area for the greatest mitigation potential.

11.1 2018 POST-FIRE ASSESSMENT BACKGROUND SUMMARY

This effort followed a survey conducted in 2018 that assessed the burn severity of the Mitigation Area within the first year post-fire. Fire severity was rated on a 0 (deeply burned) to 3 (unburned) scale and was mapped within the Mitigation Area with post-burn basemap imagery from February 2018 (Appendix N, Figure 1). Through the 2018 post-burn mapping effort, it was determined that almost all of the existing vegetation was damaged or destroyed by the fire. It appeared that the areas with the highest density of plants, mostly along Haines Canyon Creek, were deeply burned or showed signs of severe surface burns. Almost 75 percent of the site exhibited signs of severe surface burns, including most of the riparian area along Haines Canyon Creek, and more than half of the area surrounding the Big Tujunga Wash. In some of the riparian areas, the fire burned intensely enough to sterilize the soil (destroy the seed bank in the topsoil), while in other areas the fire was less intense, with the seed bank surviving and the resprouting species showing recruitment/regrowth during 2018. Seedlings observed to be recruiting within burned areas covered much of the open areas; however, most of those seedlings were non-native and invasive species. Some of the most commonly observed emergent species were non-native grasses, castor bean, red-stemmed filaree (*Erodium cicutarium*), and shortpod mustard (*Hirschfeldia incana*). The fire had created an ideal environment for germinating weeds by creating an open canopy, alkaline soil, and nutrient-rich ash that soaks up rainfall and retains soil moisture.

The lightly scorched and unburned areas were mainly concentrated within and directly adjacent to Big Tujunga Wash, likely due to less dense vegetation present to spread the fire. The areas with a lower density of vegetation had a greater number of individual plants that survived the fire. During incidental surveys conducted in the early part of 2017, alluvial scrub areas associated with the Big Tujunga Wash had a low amount of non-native grass coverage, which could also be a factor contributing to burn severity.

11.2 2019 POST-FIRE ASSESSMENT SUMMARY AND RECOVERY EFFORTS

The site assessment utilizing a sUAS device was performed by Clark Austin in August 2019. The assessment encompassed the entire Mitigation Area and included the fire-damaged areas within the Big Tujunga Wash, Haines Canyon Creek, and the Tujunga Ponds as well as areas that had been previously treated during non-native plant eradication efforts. Figure 11-2 depicts 2019 sUAS imagery with the fire severity data overlay, for comparison with the 2018 imagery presented in Figure 11-1. Recovery efforts in 2019 included the trail realignment effort discussed in Section 8.2, the snag removal effort discussed in Section 12.1, and exotic plant removal efforts discussed in Section 4.1. Results of these recovery efforts in conjunction with the 2019 sUAS vegetation mapping effort were used to assess the overall recovery of the Mitigation Area post Creek Fire and to revise the recommendations for site enhancement provided in the 2018 Conceptual Mitigation Plan (Chambers Group 2018) based on current data.

Figure 11-1. sUAS Aerial Imagery with Burn Severity 2018

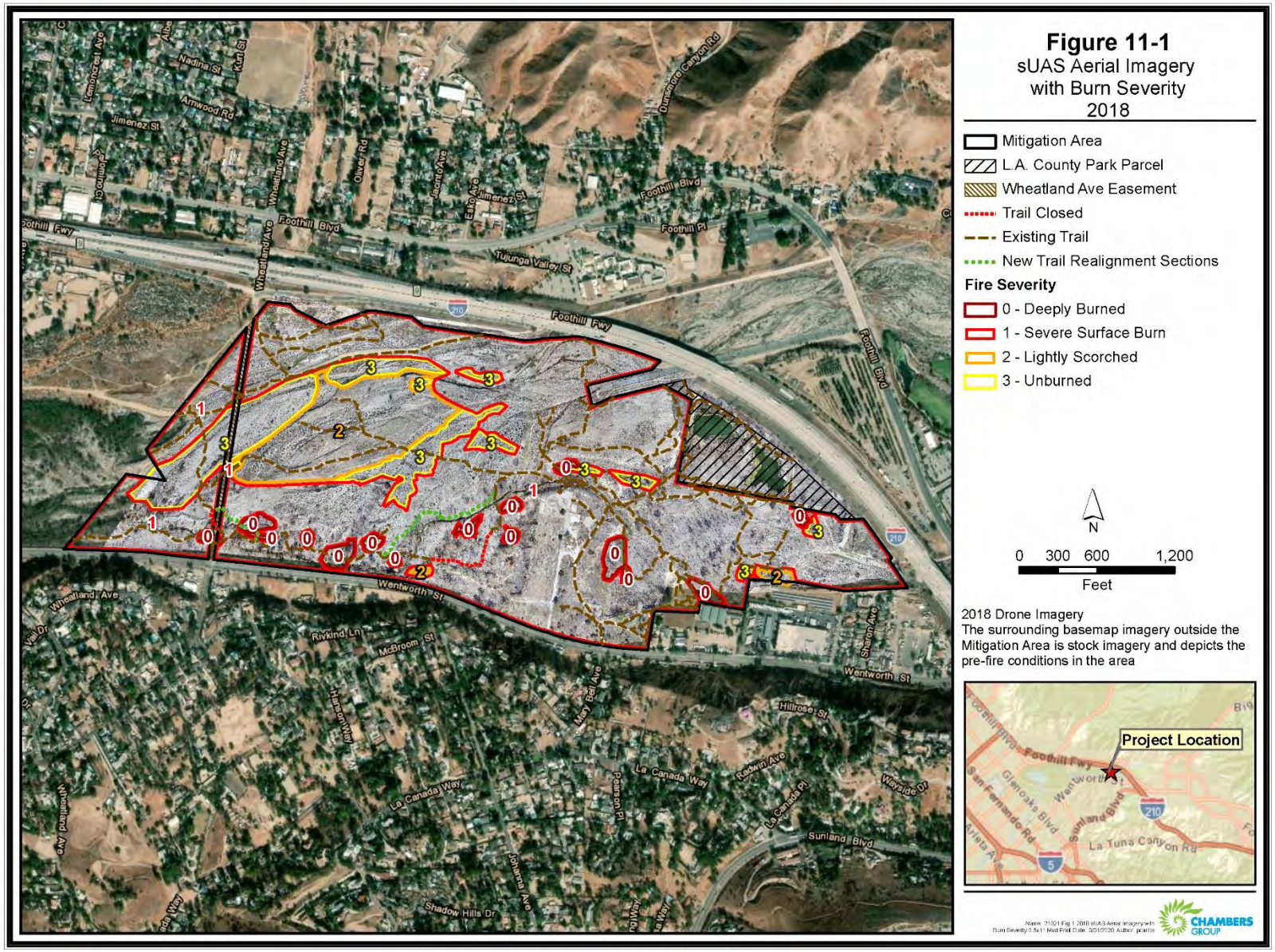
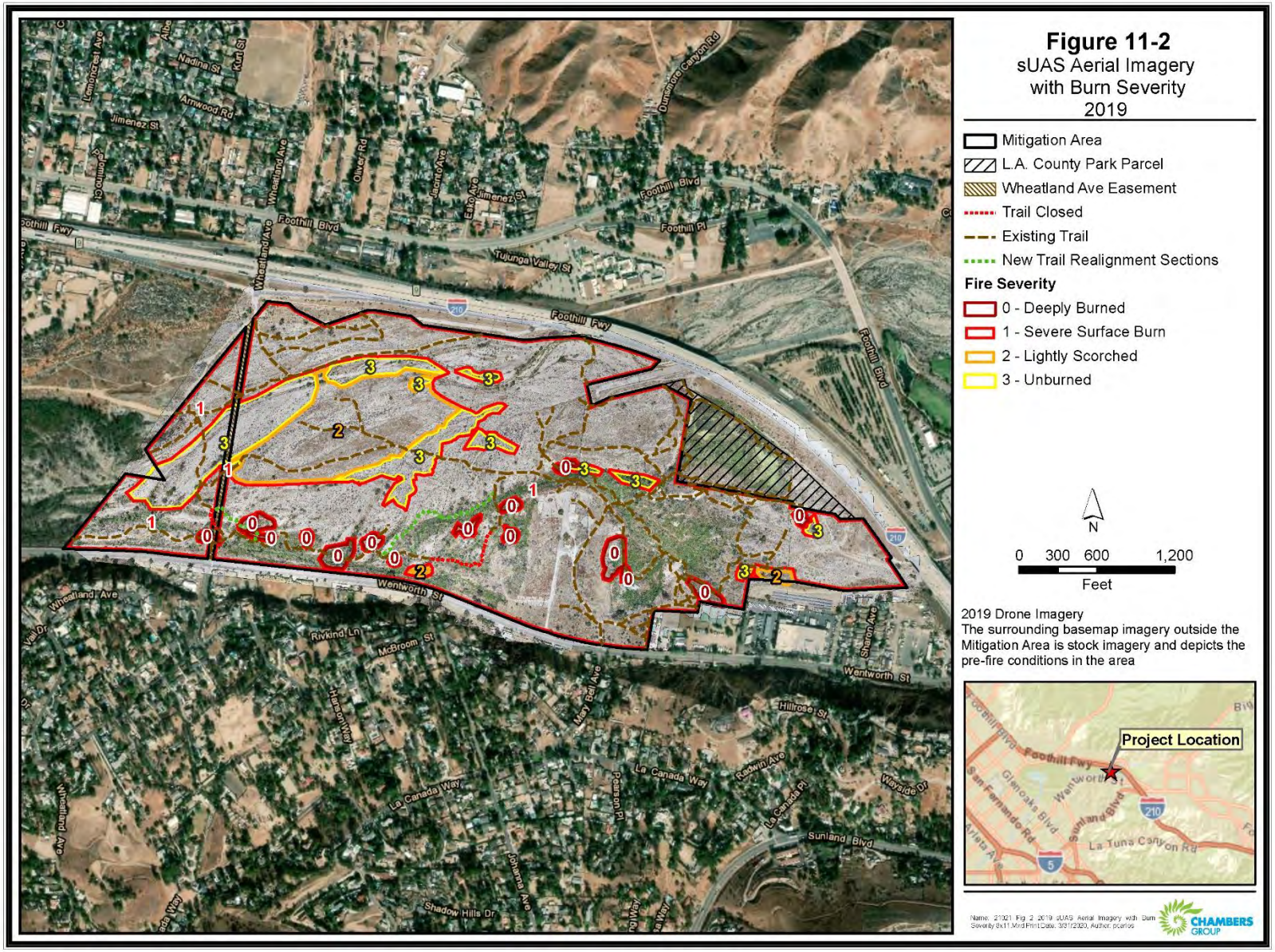


Figure 11-2. sUAS Aerial Imagery with Burn Severity 2019

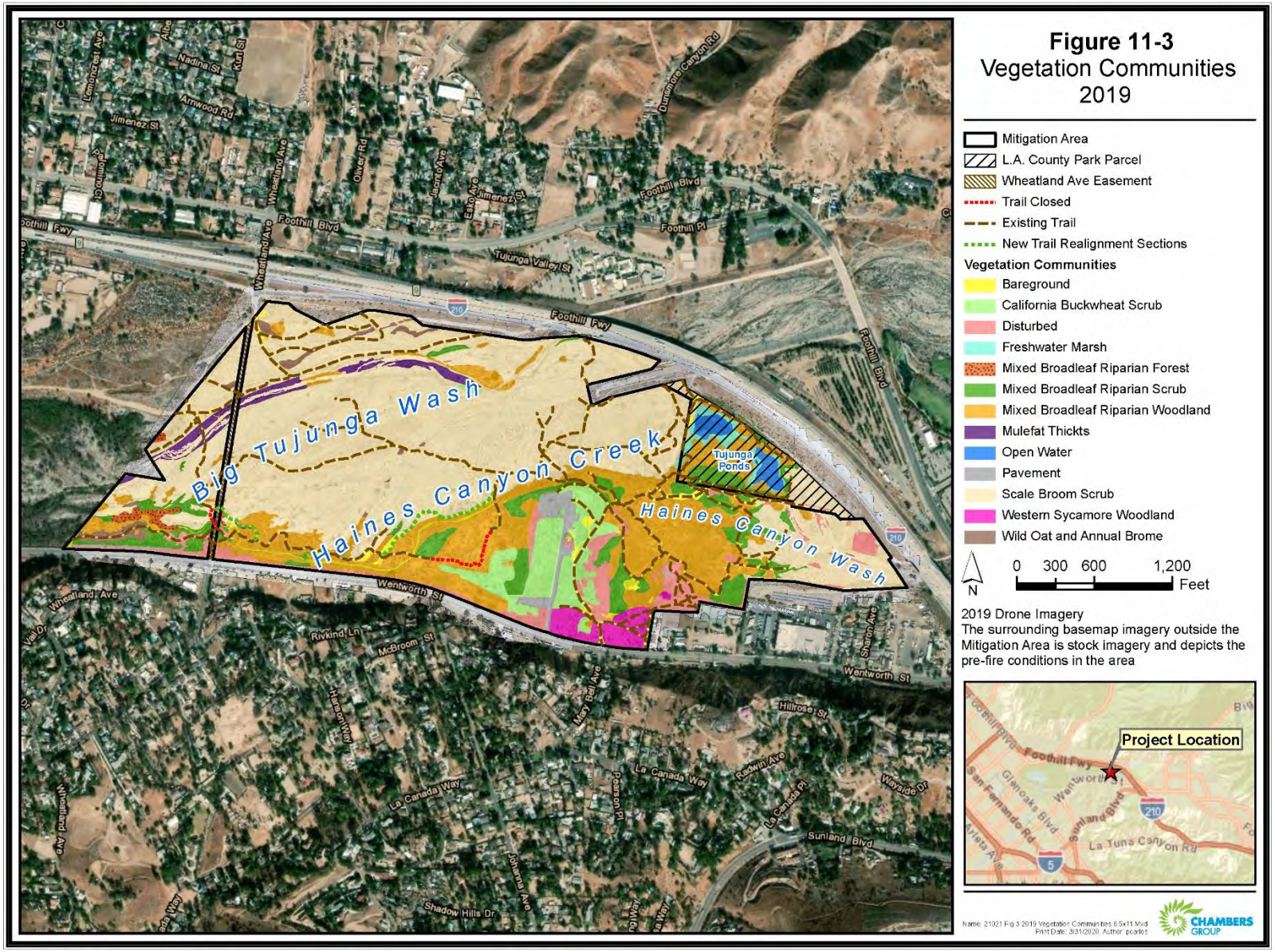


11.3 2019 VEGETATION MAPPING RESULTS

Although much of the vegetation burned during the Creek Fire, many areas are returning to their pre-fire vegetation community types, either through crown or underground root burl sprouting from plant tissue that survived the fire or through seeds in the soil that survived the fire. Recovery of vegetation communities is affected by a number of factors and has resulted in a mosaic of vegetation densities and communities through the Mitigation Area. Vegetation surrounding the Tujunga Ponds has appeared to recover quicker than other areas of the Mitigation Area, potentially due to soil moisture levels surrounding the ponds. Acreages of each of these vegetation communities and other non-vegetated areas were mapped in August 2019 and are included in Appendix N, Table 1.

A majority of the severely burned areas are associated with recovering riparian systems that display a high degree of species dominance fragmentation and plasticity and may result in a variety of successional and climax communities based on a number of variables, including but not limited to invasive species dominance and composition, future climatic variables, ground water levels, and/or new or existing pests or diseases. These highly fragmented forms of riparian woodland were combined into a new, more encompassing vegetation community called Broadleaf Riparian Woodland to act as an umbrella community to address the similar management needs of fire-recovering riparian systems dominated by deciduous tree species. This vegetation community was further broken down into scrub, woodland, and forest cover classes to further optimize the mitigation potential within the larger Mitigation Area. Trees that survived the Creek Fire in the Broadleaf Riparian Woodland communities may not have yet achieved pre-fire heights or cover but remain important species in the overall tree/shrub canopy and contribute to the vegetative cover of their respective communities. Vegetation communities mapped within the Mitigation Area and the adjacent LACDPR parcel in August 2019 are included in the 2019 Post Fire Vegetation Communities Map (Figure 11-3).

Figure 11-3. Post Fire Vegetation Communities 2019



2019 Vegetation Mapping Analysis

The 2018 Conceptual Mitigation Plan outlined three key components for post-fire restoration: controlling early successional invasive plants, hydroseeding open areas with native species to slow the establishment of non-native species, and planting riparian and upland vegetation in two phases. Thus far, a majority of the post-fire restoration efforts have been devoted to controlling early successional invasive plants. While these efforts have been critical in helping native vegetation to reestablish, and early signs of recovery have been observed, much untapped recovery potential still exists in the hydroseeding and replanting of key areas with native species.

Based on the burn severity of the Mitigation Area, some habitat areas may not recover on their own or will recover so slowly that they should be supplemented with native seed and/or container plants to reestablish native vegetation more quickly. A phased approach to seeding, installation of cuttings, and planting was recommended in the 2018 Conceptual Mitigation Plan (Chambers Group 2018) to enhance the habitat as rapidly as possible and minimize overall recovery time. This approach was reevaluated in 2019 based on the 2019 vegetation mapping analysis to identify areas and native species within the Mitigation Area that exhibited minimal signs of recovery. Recommendations for enhancement were provided and have also been updated based on the 2019 vegetation mapping analysis (Appendix N, Table 2).

Based on the results of the post-fire assessment, status of the non-native plant species removal efforts, trail realignment efforts, and the 2019 sUAS survey, additional recommendations were provided to maximize the mitigation potential of the Mitigation Area and are included below:

- The sUAS technology is able to detect new unauthorized footpaths before they become heavily used trails and should be utilized on a periodic basis to assess vegetation recovery and assess the trail system. The imagery from these updates can also be used to enhance dynamic community engagement efforts and for Mitigation Area progress update purposes.

- Additional refinements to the existing trail network may be derived from future sUAS basemap updates. While additional trail closures or extensions are not expected, continued public use of the Mitigation Area during the post-fire recovery effort may result in new unauthorized trails being created and other preferred trails abandoned. Additional trail realignment efforts may limit fragmentation of core habitat and maximize mitigation potential.

- Native species, such as mulefat, along Haines Canyon Creek are showing minimal signs of recovery due to competition from recruiting invasive species and decreased water availability. Mulefat is an early successional species which is typically able to recolonize disturbed sites quickly. The slow recovery of this species at the Mitigation Area is concerning and must be addressed soon. The burn severity in this area was high, but continued removal of non-native species and supplemental planting of locally sourced native seed or cuttings into a first and second mid-story canopy will reduce the potential for further recruitment of non-native species within the Mitigation Area and will increase the overall habitat quality.

- Non-native species removal activities should be focused on areas of Riparian Scrub and Riparian Woodland communities where the sparse native canopy cover results in higher sunlight penetration to the ground level and increases the potential for recruitment/establishment of non-native species. By encouraging early successional native communities to develop into Riparian Forest habitat through increased plantings, the overall Mitigation Area is much more likely to

provide suitable nesting habitat for protected wildlife species such as least Bell's vireo or the southwestern willow flycatcher much sooner than if left to recover on its own. In addition, well-developed Riparian Forest habitat will help moderate the water temperature of Haines Canyon Creek to provide a higher-quality and more resilient stream chemistry for sensitive fish species including the federally listed threatened Santa Ana sucker, the arroyo chub, and the Santa Ana speckled dace, which are all California Species of Special Concern.

- Continued focus on non-native species control within the eastern portion of the Mitigation Area will benefit areas downstream by limiting non-native seed production and dispersal to the west which will minimize the need for future removal efforts.

- The White Alder Forest that was present before the Creek Fire has not shown signs of recovery. It is suggested that a similar broadleaf riparian tree species, such as Fremont cottonwood, be planted in this area to enhance habitat connectivity and increase the potential for hosting listed wildlife species. Leaving a gap in the upper canopy layer by not replanting white alder or another broadleaf riparian tree species leads to homogeneity and low diversity of the habitat which is not suitable nesting habitat for listed wildlife species such as least Bell's vireo and southwestern willow flycatcher.

- Focus on converting isolated patches of non-native grassland associated with upland areas within the Big Tujunga Wash and along existing trails in the western portion of the Mitigation Area to native grasslands. These areas could be inoculated with native perennial grass species that survive periodic mowing to create niche native habitat areas that can be utilized by a diverse range of wildlife species and would contribute to an overall increase in native species richness in the general area.

- Continued monitoring to prevent the establishment of non-native grass species that may naturalize within the Scale Broom Scrub is recommended. If any non-native grasses naturalize within the inter-shrub matrix of this vegetation community, it could degrade the overall habitat quality quickly and provide a conduit for fire to spread in the future.

- Supplementing the upland scrub areas with native plantings including cactus will reduce competition from non-native grasses and mustard and encourage the return of sensitive avian coastal sage scrub species such as the California gnatcatcher and cactus-specialized avian species such as the coastal cactus wren (*Campylorhynchus brunneicapillus*).

- Introducing cuttings of western sycamore and Fremont cottonwood would help in providing competition to non-native species and provide shade to increase public utilization of the space within the small basin to the east of the north Wheatland Avenue entrance. These areas are currently filled with an extensive mulefat population intermixed with a large number of non-native species. During snag removal efforts, blue elderberry and holly-leaf cherry that were dead or had been fire-damaged to the point where regrowth was not expected were removed from the area; reintroduction of these species would increase local species richness and potentially provide foraging habitat and habitat connectivity for least Bell's vireo and other listed sensitive species.

SECTION 12.0 – SPECIAL ASSESSMENTS

Chambers Group staff is available to provide special assessments on an on-call basis. Special assessments include damage assessments (e.g., fire damage, vandalism) and other site issue assessments and the subsequent coordination and response. Three special assessments conducted in 2019 included Snag Removal Monitoring (Section 12.1), Fuel Reduction efforts (Section 12.2), and Special Incident Tracking and Coordination (Section 12.3). Summaries of these special assessments are provided below.

12.1 SNAG REMOVAL MONITORING

A post-fire tree assessment for the Mitigation Area was conducted in December 2018 as part of the Trail Maintenance and Monitoring task. The field survey was conducted on December 14, 2018, to assess and map burned native trees (burned during the Creek Fire in December 2017), located along or in close proximity to the existing authorized trail system and the anticipated alternative trail system, that may pose potential public safety concerns due to the compromised integrity of the burned trees and the continuing deterioration of these trees over time. This effort served to supplement and aid in the Snag Removal Project that occurred in April 2019 as part of a larger 2017 Creek Fire cleanup project paid for by a National Dislocated Worker's Grant. San Gabriel Valley Conservation Corps (SGVCC), Los Angeles Conservation Corps (LACC), Northern California Construction Training (NCCT), and Chambers Group collaborated with Public Works staff to facilitate the safe removal of the designated pre-approved snag trees.

During the snag removal effort, three main areas of the Mitigation Area were targeted including the area around the Cottonwood Avenue entrance, the riparian area near the south Wheatland Avenue entrance, and the northwestern portion of the site near the north Wheatland Avenue entrance; snags of both native and non-native species were removed from these areas. Native tree species that had suffered the most damage and were removed included western sycamore from around the Cottonwood Avenue entrance area, willows, white alders (*Alnus rhombifolia*) and Fremont cottonwoods from the south Wheatland Avenue entrance area, and western sycamores from the north Wheatland Avenue entrance area. Details of the snag removal monitoring efforts can be found in the Snag Removal Monitoring Report included as Appendix O.

12.2 FUEL REDUCTION

Fuel reduction efforts were conducted on July 9 and 10, 2019, in response to the Notice of Non-compliance issued by the LAFD on March 8, 2015, and the brush clearance requirements established by the County of Los Angeles Department of Agricultural Commissioner/Weights and Measures. The main focus of the fuel reduction efforts was to perform the required deferred maintenance, recover a defensible firebreak for first-responders, and help support safety measures for the Mitigation Area and the surrounding structures and public spaces that neighbor the property. Chambers Group biologists and the fuel reduction crew focused on areas of concern identified during the reconnaissance site visit conducted by ECORP and Natures Image on October 13, 2015, and by the representing inspector from LAFD on October 14, 2015, including areas adjacent to Gibson Ranch and along the Wentworth Avenue property boundary. Most of the existing fuel (old-growth vegetation) that was present on site during the 2015 reconnaissance site visits burned during the 2017 Creek Fire. Due to the elimination of on-site fuel, many of the recommendations and guidelines made in 2015 were no longer applicable. Due to the sensitive nature of the site and high potential for erosion to occur, the absolute removal of vegetation in the fuel modifications zones was not appropriate. Instead of complete vegetation removal in these areas, a scaled-down version of fuel reduction was performed, substantially reducing the potential for negative effects to wildlife and native habitats within the Mitigation Area. All mapped locations were inspected, and maintenance was performed if required.

In all of the fuel reduction areas addressed, gasoline-powered weed-whackers were used to cut down grasses and small forbs that required clearing and/or maintenance and thinning. Throughout these areas, steel grading rakes were used to clear existing trails and move cut debris into spaces where it is permitted to decompose. For large forbs and exotic species that required removal, either hand-pulling or digging (with shovels) methods were used; and the debris was reduced in bulk by using bypass pruning loppers and small hand saws. Snags were felled and bucked with a chainsaw, and all debris was pulled away from the firebreak and scattered flush on the ground for decomposition on site. Trees and large shrubs were limbed with bypass hand pruners, bypass pruning loppers, and/or handsaws to meet the 6-foot ground clearance requirement.

On July 9, fuel reduction efforts focused on establishing the 10-foot firebreak that is required along public roads. Crew members removed developing forbs and weeds and cut down grasses along the entire length of the property boundary adjacent to Wentworth Avenue; all vegetation within the easement between the fence and the curb was cleared. In addition, crew members established the 30-foot firebreak required at the west end of Gibson Ranch and the residential structure neighboring the Mitigation Area. In these areas all grasses were reduced to less than 2 inches in height, forbs were removed from a gate access area and along a section where emergency access might be necessary, and all weeds and brush were removed from the fence line shared between the properties. The trees in and around these areas were limbed up to 6 feet from the ground, and all vegetative debris was cleared from the 30-foot firebreak and left to decompose elsewhere on site.

On July 10, fuel reduction and brush clearance efforts were performed on the bluff north of Gibson Ranch and areas adjacent to the stable complex on the east side of the ranch. Crew members cut down and removed weeds and brush within the 30-foot firebreak area and removed dead vegetation and debris. On the bluff and around the equestrian entrance to the Mitigation Area and outside the 30-foot firebreak perimeter (where vegetation is permitted to remain), crew members cut down or removed non-native grasses and forbs to inhibit the fire ladder between the ground and the canopies of native vegetation. Trees and large shrubs were limbed up to 6 feet from the ground or one-third of their height, respectively. Snag trees still present as a result of the 2017 Creek Fire were cut down and cleared from the area. All debris was reduced in bulk and scattered in areas where dead and decomposing materials are allowed to remain on site.

In the area north and east of Gibson Ranch that adjoins the southern bluffs of Haines Canyon Wash, it was discovered that the private property owners/occupants had already conducted brush clearance efforts. This section of land was inspected along the southeastern site boundary, and no areas were found to require further maintenance. Additional details of the fuel reduction efforts can be found in the Fuel Reduction Memo (Appendix P).

12.3 SPECIAL INCIDENT TRACKING AND COORDINATION

Ongoing incidents with individuals who had been continually damming, wading, and swimming in Haines Canyon Creek, damaging and removing native vegetation, putting sensitive wildlife at risk, and who built (and rebuilt after it was removed by Public Works) a “cabana-like” structure along the creek, despite being informed on several occasions that their actions were not permitted, were tracked and recorded by Chambers Group staff throughout 2019. A memo was prepared detailing five incidents involving the above-mentioned individuals that occurred between September 2018 and August 2019. This memo served to help secure the support of the Los Angeles County Sheriff’s Department Parks Bureau Trails Team when dealing with potential future offences. Details of the incident memo report can be found as Appendix Q.

SECTION 13.0 – ATTENDANCE AT MEETINGS WITH AGENCIES, PUBLIC, AND CONSULTANTS

Chambers Group was available on an on-call basis to attend meetings with agencies, the general public, and other consultants as a representative of Public Works. Additional conference calls, meetings, and email correspondence were held on an as-needed basis throughout the year between Public Works and Chambers Group.

On April 16, 2019, Chambers Group representative Paul Morrissey joined Steve Gibson and Victoria Tang with CDFW during a site visit to the Mitigation Area. The CDFW representatives were provided a walkthrough of the Mitigation Area to see how the site was recovering post Creek Fire. Current efforts and plans to fulfill the implementation of the MMP were discussed, including the restoration plans that Chambers Group presented in the 2018 Conceptual Mitigation Plan (Chambers Group 2018) which would help maximize the mitigation value of the site

On June 6, 2019, Chambers Group representative Tim Wood joined Public Works' staff Sterling Klippel, Melanie Morita, Dudek consultant biologist Eric Hanson, and photographer Russel Marquez during a site visit to the Mitigation Area by Public Works' Director Mark Pestrella. Director Pestrella was provided a tour of the site and was briefed on Public Works' restoration and maintenance efforts and future plans for mitigation credits.

SECTION 14.0 – REFERENCES

California Department of Fish and Wildlife (CDFW)

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1994 Brown-Headed Cowbirds and an Island Population of Song Sparrows: A 16-Year Study. The Condor, 96(4), 916-934. doi:10.2307/1369102.

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United States Department of Agriculture, Natural Resources Conservation Service (USDA NRCS)

2019 The PLANTS Database. National Plant Data Team, Greensboro, NC 27401-4901 USA. First accessed at http://plants.usda.gov in 2011 and reviewed in November 2019.

APPENDIX A – STREAMBED ALTERATION AGREEMENT #1600-2008-0253-R5

Big T Draft 1600

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

January 29, 2009

Notification No. 1600-2008-0253-R5

AGREEMENT REGARDING PROPOSED STREAM OR LAKE ALTERATION

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

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

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

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

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

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

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

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

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

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

Project Location:

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

Project Description:

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

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

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

- Conservation Credits Remaining.

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

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

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

- Existing Public Use

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

- Functional Analysis Ratings

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

- Invasive Plants

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

- Patrolling

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

- Water Quality Monitoring

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

- Section 3.4- Contingency Measures-wildfire related

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

- Site Maintenance Issues:

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

- Arroyo toad surveys:

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

- Santa Ana Sucker

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

- Cowbird trapping

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

- Reporting

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

- Costs

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

IMPACTS

Temporary Impacts:

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

MITIGATION

Mitigation for all Temporary Impacts:

The Applicant shall implement the FMMP as proposed.

CONDITIONS

Resource Protection:

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

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

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

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

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

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

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

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

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

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

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

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

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

Work Areas and Vegetation Removal:

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

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

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

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

Equipment and Access:

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

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

Fill and Spoil:

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

Structures:

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

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

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

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

Pollution, Sedimentation, and Litter:

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

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

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

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

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

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

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

Permitting and Safeguards:

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

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

Administrative:

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

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

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

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

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

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

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

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

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

a. The Department determines that the information provided by the Applicant in support of this Agreement/Notification is incomplete or inaccurate;

b. The Department obtains new information that was not known to it in preparing the terms and conditions of this Agreement;

c. The condition of, or affecting fish and wildlife resources change; and

d. The Department determines that project activities have resulted in a substantial adverse effect on the environment.

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

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

CONCURRENCE

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

_____
Name (signature) Date

_____
Name (printed)

_____
Title

California Department of Fish and Game

_____
Helen R. Birss Date
Environmental Program Manager
South Coast Region

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

APPENDIX B – PUBLIC OUTREACH AND WORKER EDUCATION BROCHURE

Big T's future depends on you!

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

Protect Big T for future generations.

When people who visit Big T act to protect its animals and their habitat, everyone wins. Help safeguard Big T's future by sharing this information with a friend or becoming involved in community projects to preserve Big T. Check the county website for Big T updates and volunteer opportunities.

¡El futuro de Big-T depende de usted!

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

Proteja Big-T para las futuras generaciones.

¡Cuando las personas que visitan Big T siguen las regulaciones que lo protegen, les comunican a otros acerca de la importancia de las regulaciones, o participan en proyectos comunitarios para preservar este lugar, los animales que viven en Big T y la gente que lo visita ganan! Revise el sitio web del condado por anuncios de Big T y oportunidades para ser voluntario.

¿Preguntas? / Questions?

LACPW: Melanie Morita
(626) 458-6183
Water Resources Division Los Angeles County Public Works
P.O. Box 1460
Alhambra, CA 91802
dpw.lacounty.gov/wrd/Projects/BTWMA

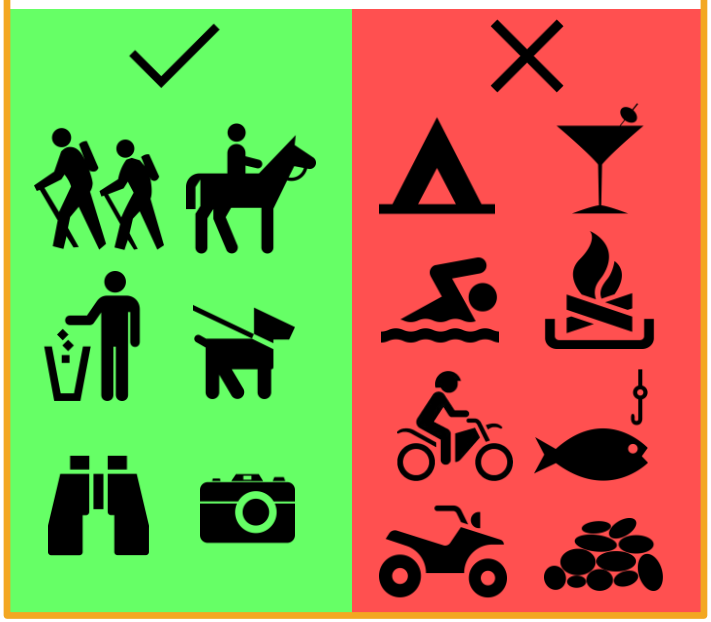
Regulations/Reglas

All visitors must obey these regulations or a citation will be given:

- Hours of Operation: sunrise to sunset
- No fires of any kind
- No swimming
- No wheeled vehicles
- No camping
- Dogs must be on leashes
- No fishing in the creek or ponds
- No damming of the creek to create swimming ponds
- No hiking or equestrian riding off trail

Todos los visitantes del Big T deben obedecer todas las reglas, los que no observan las re las serán multados:

- Horas de visita: amanecer al atardecer
- No fogatas de ningún tipo
- No nadar
- No vehículos
- No acampar
- Los perros deben estar con correas
- No pescar en el arroyo o lagos
- No represar el arroyo para crear estanques de natacion
- No excursionismo o montage a caballo fuera de los caminos



Big Tujunga Wash Mitigation Area (Big T)

Did you know that Big T is protected?

Big T, as we like to call it, is maintained by the **Los Angeles County Public Works** (Public Works). Big T is so unique that there are regulations to protect it from destruction and abuse. We hope that by learning more about Big T, you'll agree that these regulations make sense.

¿Sabía usted que Big T esta protegida?

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

Public Works
LOS ANGELES COUNTY

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

Big T is like a small island

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

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

Over time the island has gotten smaller and smaller. Big T is sensitive to changes that come from altering or changing the habitat such as increased wildfires due to human activities, pollution, damming or swimming in the creek, and traveling off from authorized trails – trampling native plants and spreading invasive weeds.

These changes can cause important habitat to disappear. When habitat disappears, animals disappear.

Big T es como una isla pequeña

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

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

Con el tiempo la isla se ha hecho más pequeña. Big T es sensible a los cambios que surgen al alterar y cambiar el hábitat, como un aumento en los fuegos silvestres causados por las actividades humanas, la contaminación, el represar o nadar en el arroyo, y el viajar fuera de los caminos autorizados – que causa el pisoteo de plantas nativas y el esparcimiento de hierbas malas.

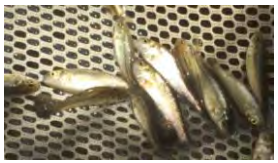
Estos cambios pueden causar que un hábitat tan importante desaparezca. Cuando esto sucede los animales y las plantas también pueden desaparecer.

There is no place like Big T

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

Santa Ana sucker
(*Catostomus santaanae*)

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



Arroyo chub
(*Gila orcutti*)

Jim Rorabaugh/USFWS

Southwestern willow flycatcher
(*Empidonax traillii extimus*)

Steve Maslowski/USFWS

least Bell's vireo
(*Vireo bellii pusillus*)

2016 Zoya Akulova

California Sycamore
(*Platanus racemosa*)

2015 Richard Spellenberg

Goodding's black willow
(*Salix gooddingii*)

No hay lugar como Big T

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

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

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

El represar y nadar en el arroyo es estrictamente prohibido en Big T. Represar el arroyo evita que las especies nativas de peces naden libremente en su hábitat. Con ningún lugar para escaper, las especies de peces pequeñas caen victima de especies más grandes, depredadoras e invasoras como la lobina. Especies nativas de peces necesitan agua corriente para mantenerse sanos y libres de parásitos. Agua estancada alberga parásitos y bacterias que son perjudiciales para la salud de los peces nativos. Nadando en el arroyo contribuye a las bacterias dañinas en el agua y trastorna el lecho del arroyo al agitar el sedimento, y descargar nutrientes que pueden causar una falta de oxígeno en el agua. Tan divertido que nadar en el arroyo puede ser para las personas, puede causar la muerte de los peces nativos que llaman Big T su hogar.

Damming and swimming in the creek is strictly prohibited at Big T. Damming the creek prevents native fish species from swimming freely in their habitat. With nowhere to escape, small native fish often fall victim to larger, predatory, invasive species such as largemouth bass. Native fish species need flowing water to stay healthy and free of parasites. Ponded water harbors parasites and bacteria that are detrimental to the health of native fish. Swimming in the creek contributes harmful bacteria to the water and disrupts the stream bed by churning up sediment, and releasing nutrients that can lead to a lack of oxygen in the water. As fun as a swimming hole can be for people, it can mean death for the sensitive native fish species that call Big T home.

APPENDIX C – PLANT AND WILDLIFE COMPENDIA

APPENDIX C – PLANT SPECIES LIST

Scientific Name	Common Name
GYMNOSPERMS	
CUPRESSACEAE	**CYPRESS FAMILY**
*Cedrus deodara**	deodar cedar
PINACEAE	**PINE FAMILY**
*Pinus halepensis**	Aleppo pine
ANGIOSPERMS (EUDICOTS)	
ADOXACEAE	**MUSKROOT FAMILY**
Sambucus nigra subsp. *caerulea*	blue elderberry
AMARANTHACEAE	**AMARANTH FAMILY**
*Amaranthus albus**	tumbling pigweed
ANACARDIACEAE	**SUMAC OR CASHEW FAMILY**
Malosma laurina	laurel sumac
Rhus integrifolia	lemonadeberry
*Schinus molle**	Peruvian pepper tree
*Schinus terebinthifolius**	Brazilian pepper tree
Toxicodendron diversilobum	poison oak
APIACEAE	**CARROT FAMILY**
*Conium maculatum**	poison hemlock
*Foeniculum vulgare**	fennel
APOCYNACEAE	**DOGBANE FAMILY**
*Vinca major**	greater periwinkle
ARALIACEAE	**GINSENG FAMILY**
*Hedera helix**	English ivy
ASTERACEAE	**SUNFLOWER FAMILY**
*Ageratina adenophora**	eupatory
Ambrosia acanthicarpa	annual bur-sage
Ambrosia artemisiifolia	common ragweed
Artemisia californica	California sagebrush
Artemisia douglasiana	mugwort
Artemisia dracunculus	tarragon
Baccharis salicifolia subsp. *salicifolia*	mulefat
Carduus pycnocephalus subsp. *pycnocephalus**	Italian thistle
*Centaurea melitensis**	tocalote
Cirsium occidentale var. *occidentale*	cobwebby thistle
Cirsium sp.*	non-native thistle
*Erigeron bonariensis**	flax-leaved horseweed
Erigeron canadensis	horseweed
Heterotheca grandiflora	telegraph weed
Heterotheca sessiliflora	hairy golden-aster
*Hypochaeris glabra**	smooth cat's-ear

Scientific Name	Common Name
*Lactuca serriola**	prickly lettuce
*Lactuca virosa**	poison wild lettuce
Lepidospartum squamatum	scale-broom
Malacothrix saxatilis	cliff malacothrix
Pluchea odorata var. *odorata*	salt marsh fleabane
Pseudognaphalium biolettii	bicolored cudweed
Pseudognaphalium canescens	felty everlasting
Rafinesquia californica	California chicory
Senecio flaccidus var. *douglasii*	sand-wash butterweed
*Silybum marianum**	milk thistle
Sonchus asper subsp. *asper**	prickly sow thistle
*Sonchus oleraceus**	common sow thistle
Stephanomeria pauciflora	wire lettuce
*Tanacetum parthenium**	feverfew
*Taraxacum officinale**	common dandelion
BETULACEAE	**BIRCH FAMILY**
Alnus rhombifolia	white alder
BIGNONIACEAE	**BIGNONIA FAMILY**
*Catalpa bignonioides**	southern catalpa
BORAGINACEAE	**BORAGE FAMILY**
*Echium candicans**	pride of Madeira
Eriodictyon crassifolium	thick-leaved yerba santa
Phacelia ramosissima	branching phacelia
BRASSICACEAE	**MUSTARD FAMILY**
*Brassica nigra**	black mustard
*Hirschfeldia incana**	shortpod mustard
*Lepidium latifolium**	peppergrass
*Lobularia maritima**	sweet-alyssum
Nasturtium officinale	water-cress
*Raphanus sativus**	radish
*Sisymbrium altissimum**	tumble mustard
*Sisymbrium irio**	London rocket
CACTACEAE	**CACTUS FAMILY**
Cylindropuntia sp.	cholla
Opuntia littoralis	coastal prickly pear
CARYOPHYLLACEAE	**PINK FAMILY**
*Stellaria media**	common chickweed
CHENOPODIACEAE	**GOOSEFOOT FAMILY**
*Chenopodium album**	lamb's quarters
Chenopodium sp.	goosefoot
Salsola sp.*	Russian thistle
CONVOLVULACEAE	**MORNING-GLORY FAMILY**

Scientific Name	Common Name
*Convolvulus arvensis**	bindweed
Cuscuta sp.	dodder
CRASSULACEAE	**STONECROP FAMILY**
Dudleya lanceolata	lance-leaved dudleya
CUCURBITACEAE	**GOURD FAMILY**
*Cucurbita pepo**	pumpkin
*Cucurbita*sp.*	squash
Marah macrocarpa	wild cucumber
EUPHORBIACEAE	**SPURGE FAMILY**
Croton californicus	California croton
*Euphorbia maculata**	spotted spurge
*Euphorbia peplus**	petty spurge
*Ricinus communis**	castor-bean
FABACEAE	**LEGUME FAMILY**
Acmispon glaber	deerweed
*Medicago sativa**	alfalfa
*Melilotus albus**	white sweetclover
*Parkinsonia aculeata**	Mexican palo verde
*Pisum sativum**	garden pea
*Spartium junceum**	Spanish broom
FAGACEAE	**OAK FAMILY**
Quercus agrifolia	coast live oak
Quercus berberidifolia	scrub oak
GERANIACEAE	**GERANIUM FAMILY**
*Erodium cicutarium**	red-stemmed filaree
*Geranium rotundifolium**	roundleaf geranium
GROSSULARIACEAE	**GOOSEBERRY FAMILY**
Ribes aureum	golden currant
HALORAGACEAE	**WATER-MILFOIL FAMILY**
*Myriophyllum spicatum**	Eurasian milfoil
HAMAMELIDACEAE	**WITCH-HAZEL FAMILY**
*Liquidambar styraciflua**	sweet gum
JUGLANDACEAE	**WALNUT FAMILY**
Juglans californica	California black walnut
LAMIACEAE	**MINT FAMILY**
*Marrubium vulgare**	horehound
Salvia apiana	white sage
Salvia mellifera	black sage
Stachys sp.	hedge-nettle
LOASACEAE	**LOASA FAMILY**
Mentzelia laevicaulis	smoothstem blazingstar
MALVACEAE	**MALLOW FAMILY**

Scientific Name	Common Name
Malacothamnus davidsonii	Davidson's bush mallow
*Malva parviflora**	cheeseweed
*Malva sylvestris**	high mallow
MONTIACEAE	**MINER'S LETTUCE FAMILY**
Claytonia parviflora	miner's lettuce
MORACEAE	**MULBERRY FAMILY**
*Ficus carica**	edible fig
*Ficus nitida**	Indian fig
Ficus sp.*	fig
*Morus alba**	white mulberry
MYRSINACEAE	**MYRSINE FAMILY**
*Anagallis arvensis**	scarlet pimpernel
MYRTACEAE	**MYRTLE FAMILY**
*Callistemon citrinus**	crimson bottlebrush
Eucalyptus sp.*	gum tree
NYCTAGINACEAE	**FOUR O'CLOCK FAMILY**
*Mirabilis jalapa**	marvel of Peru
OLEACEAE	**OLIVE FAMILY**
*Fraxinus uhdei**	shamel ash
Fraxinus velutina	velvet ash
*Ligustrum japonicum**	Japanese privet
*Ligustrum lucidum**	glossy privet
ONAGRACEAE	**EVENING PRIMROSE FAMILY**
Camissoniopsis bistorta	California sun cup
Clarkia unguiculata	elegant clarkia
Epilobium brachycarpum	parched fireweed
Eulobus californicus	California evening primrose
Oenothera elata	evening primrose
PAPAVERACEAE	**POPPY FAMILY**
Argemone munita	prickly poppy
Eschscholzia californica	California poppy
PASSIFLORACEAE	**PASSION FLOWER FAMILY**
*Passiflora caerulea**	bluecrown passionflower
PHRYMACEAE	**LOPSEED FAMILY**
Erythranthe guttata	yellow monkey flower
Mimulus cardinalis	scarlet monkey flower
PLANTAGINACEAE	**PLANTAIN FAMILY**
*Plantago arenaria**	Indian plantain
*Plantago major**	common plantain
*Veronica anagallis-aquatica**	water speedwell
PLATANACEAE	**SYCAMORE FAMILY**
Platanus racemosa	western sycamore

Scientific Name	Common Name
POLYGONACEAE	**BUCKWHEAT FAMILY**
Eriogonum fasciculatum	California buckwheat
Eriogonum gracile	slender woolly buckwheat
Persicaria hydropiperoides	water pepper
Pterostegia drymarioides	California thread-stem
*Rumex crispus**	curly dock
Rumex pulcher	fiddle dock
Rumex sp.	dock
RANUNCULACEAE	**BUTTERCUP FAMILY**
Delphinium cardinale	scarlet larkspur
RHAMNACEAE	**BUCKTHORN FAMILY**
Ceanothus sp.	ceanothus
ROSACEAE	**ROSE FAMILY**
Heteromeles arbutifolia	toyon
Prunus ilicifolia subsp. *ilicifolia*	islay, holly-leaf cherry
Rosa californica	California wild rose
*Rubus armeniacus**	Himalayan blackberry
Rubus ursinus	California blackberry
SALICACEAE	**WILLOW FAMILY**
Populus fremontii subsp. *fremontii*	Fremont cottonwood
Salix exigua	narrow-leaved willow
Salix gooddingii	black willow
Salix laevigata	red willow
Salix lasiolepis	arroyo willow
SAPINDACEAE	**SOAPBERRY FAMILY**
Acer negundo	California box-elder
SCROPHULARIACEAE	**FIGWORT FAMILY**
*Verbascum virgatum**	wand mullein
SIMAROUBACEAE	**QUASSIA FAMILY**
*Ailanthus altissima**	tree of heaven
SOLANACEAE	**NIGHTSHADE FAMILY**
Datura wrightii	jimson weed
*Lycopersicon esculentum**	tomato
Nicotiana attenuata	coyote tobacco
*Nicotiana glauca**	tree tobacco
Solanum americanum	small-flowered nightshade
TAMARICACEAE	**TAMARISK FAMILY**
*Tamarix ramosissima**	Mediterranean tamarisk
Tamarix sp.*	tamarisk
ULMACEAE	**ELM FAMILY**
*Ulmus parvifolia**	Chinese elm
URTICACEAE	**NETTLE FAMILY**

Scientific Name	Common Name
Urtica dioica	stinging nettle
VITACEAE	**GRAPE FAMILY**
*Parthenocissus quinquefolia**	Virginia creeper
Vitis girdiana	desert wild grape
ZYGOPHYLLACEAE	**CALTROP FAMILY**
*Tribulus terrestris**	puncture vine
ANGIOSPERMS (MONOCOTS)	
AGAVACEAE	**AGAVE FAMILY**
*Agave americana**	century plant
Hesperoyucca whipplei	our Lord's candle
AMARYLLIDACEAE	**AMARYLLIS FAMILY**
*Amaryllis belladonna**	belladonna-lily
ARACEAE	**PHILODENDRON FAMILY**
*Colocasia gigantea**	giant elephant ear
ARECACEAE	**PALM FAMILY**
*Arecastrum romanzoffianum**	queen palm
*Phoenix canariensis**	Canary Island date palm
Washingtonia sp.	fan palm
ASPHODELACEAE	**ASPHODEL FAMILY**
Aloe sp.*	aloe
CYPERACEAE	**SEDGE FAMILY**
Cyperus eragrostis	tall cyperus
*Cyperus involucratus**	umbrella-plant
Cyperus odoratus	fragrant flatsedge
Cyperus sp.	sedge
POACEAE	**GRASS FAMILY**
*Agrostis stolonifera**	redtop
*Agrostis viridis**	water bentgrass
*Arundo donax**	giant reed
*Avena barbata**	slender wild oat
*Avena fatua**	wild oat
*Bromus diandrus**	ripgut grass
*Bromus hordeaceus**	soft chess
Bromus madritensis subsp. *madritensis**	foxtail chess
Bromus madritensis subsp. *rubens**	red brome
*Cortaderia selloana**	pampas grass
*Cynodon dactylon**	Bermuda grass
*Echinochloa crus-galli**	barnyard grass
*Ehrharta calycina**	perennial veldt grass
*Eleusine indica**	goose grass
*Festuca myuros**	rattail sixweeks grass
*Festuca perennis**	Italian ryegrass

Scientific Name	Common Name
*Hordeum murinum**	foxtail barley
*Hordeum vulgare**	barley
Panicum dichotomiflorum subsp. *dichotomiflorum**	fall panicgrass
*Pennisetum setaceum**	fountain grass
*Polypogon monspeliensis**	annual beard grass
*Polypogon viridis**	water beard grass
*Schismus barbatus**	Mediterranean schismus
Stipa miliacea var. *miliacea**	smilo grass
*Triticum aestivum**	wheat
PONTEDERIACEAE	**PICKEREL-WEED FAMILY**
*Eichhornia crassipes**	water hyacinth
TYPHACEAE	**CATTAIL FAMILY**
Typha angustifolia	narrow-leaved cattail
Typha latifolia	broad-leaved cattail
Typha sp.	cattail

*Non-Native Species

APPENDIX C – WILDLIFE SPECIES LIST

Scientific Name	Common Name
CLASS MALACOSTRACA	**CRUSTACEANS**
CAMBARIDAE	**CRAYFISH**
Procambarus clarkii	red swamp crawfish
CLASS INSECTA	**INSECTS**
DIPTERA	**FLIES**
Culicidae family	mosquito sp.
HYMENOPTERA	**ANTS, BEES, AND WASPS**
Apis mellifera	honey bee
Xylocopa sp.	carpenter bee sp.
ODONATA	**DRAGONFLIES AND DAMSELFLIES**
Anisoptera suborder	dragonfly sp.
PAPILIONIDAE	**PARNASSIANS, SWALLOWTAILS**
Papilio rutulus	western tiger swallowtail
PIERIDAE	**WHITES & SULPHURS**
Pieris rapae	cabbage white
CLASS OSTEICTHYES	**BONY FISH**
ATHERINOPSIDAE	**SILVERSIDES**
Menidia beryllina	inland silverside
CYPRINIDAE	**CARPS AND MINNOWS**
Carassius auratus	goldfish
Cyprinus carpio	common carp
Gila orcutti	arroyo chub
Micropterus salmoides	largemouth bass
Rhinichthys osculus ssp.	Santa Ana speckled dace
CATOSTOMIDAE	**SUCKERS**
Catostomus santaanae	Santa Ana sucker
CENTRARCHIDAE	**SUNFISHES**
Lepomis cyanellus	green sunfish
Lepomis macrochirus	bluegill
CICHLIDAE	**CICHLIDS**
Oreochromis mossambicus	Mozambique tilapia
ICTALURIDAE	**BULLHEAD CATFISHES**
Ameiurus melas	black bullhead
Ameiurus natalis	yellow bullhead
POECILIIDAE	**TOOTH-CARPS**
Gambusia affinis	western mosquitofish
CLASS AMPHIBIA	**AMPHIBIANS**
BUFONIDAE	**TRUE TOADS**
Anaxyrus boreas	western toad

Scientific Name	Common Name
HYLIDAE	**TREEFROGS**
Pseudacris hypochondriaca	Baja California chorus frog
RANIDAE	**TRUE FROGS**
Lithobates catesbeianus	bullfrog
CLASS REPTILIA	**REPTILES**
CHELYDRIDAE	**SNAPPING TURTLES**
Chelydra serpentina	common snapping turtle
EMYDIDAE	**BOX AND WATER TURTLES**
Trachemys scripta elegans	red-eared slider
TRIONYCHIDAE	**SOFTSHELL TURTLES**
species unknown	softshell turtle
PHRYNOSOMATIDAE	**ZEBRA-TAILED, EARLESS, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, AND HORNED LIZARDS**
Phrynosoma blainvillii	coast horned lizard
Sceloporus occidentalis	western fence lizard
Uta stansburiana	side-blotched lizard
TEIIDAE	**WHIPTAIL LIZARDS**
Aspidoscelis tigris	western whiptail
CLASS AVES	**BIRDS**
PODICIPEDIDAE	**GREBES**
Podilymbus podiceps	pied-billed grebe
PHALACROCORACIDAE	**CORMORANTS**
Phalacrocorax auritus	double-crested cormorant
ARDEIDAE	**HERONS AND BITTERNS**
Ardea alba	great egret
Ardea herodias	great blue heron
Butorides virescens	green heron
Egretta thula	snowy egret
ANATIDAE	**DUCKS, GEESE, AND SWANS**
Anas americana	American wigeon
Anas clypeata	northern shoveler
Anas crecca	green-winged teal
Anas cyanoptera	cinnamon teal
Anas platyrhynchos	mallard
Aythya collaris	ring-necked duck
Aythya valisineria	canvasback
Branta canadensis	Canada goose
Lophodytes cucullatus	hooded merganser
Oxyura jamaicensis	ruddy duck
CATHARTIDAE	**NEW WORLD VULTURES**
Cathartes aura	turkey vulture

Scientific Name	Common Name
ACCIPITRIDAE	**HAWKS, KITES, AND EAGLES**
Accipiter cooperii	Cooper's hawk
Accipiter striatus	sharp-shinned hawk
Buteo jamaicensis	red-tailed hawk
Buteo lineatus	red-shouldered hawk
FALCONIDAE	**FALCONS**
Falco peregrinus	peregrine falcon
Falco sparverius	American kestrel
ODONTOPHORIDAE	**NEW WORLD QUAIL**
Callipepla californica	California quail
RALLIDAE	**RAILS, GALLINULES, AND COOTS**
Fulica americana	American coot
Porzana carolina	sora
SCOLOPACIDAE	**SANDPIPERS**
Gallinago delicata	Wilson's snipe
COLUMBIDAE	**PIGEONS AND DOVES**
Columba livia	rock pigeon
Patagioenas fasciata	band-tailed pigeon
Streptopelia decaocto	Eurasian Collared-Dove
Zenaida macroura	mourning dove
CAPRIMULGIDAE	**NIGHTHAWKS**
Chordeiles acutipennis	lesser nighthawk
APODIDAE	**SWIFTS**
Aeronautes saxatalis	white-throated swift
TROCHILIDAE	**HUMMINGBIRDS**
Archilochus alexandri	black-chinned hummingbird
Calypte anna	Anna's hummingbird
Selasphorus sasin	Allen's hummingbird
ALCEDINIDAE	**KINGFISHERS**
Megaceryle alcyon	belted kingfisher
PICIDAE	**WOODPECKERS**
Colaptes auratus	northern flicker
Dryobates nuttallii	Nuttall's woodpecker
Dryobates pubescens	downy woodpecker
Melanerpes formicivorus	acorn woodpecker
TYRANNIDAE	**TYRANT FLYCATCHERS**
Empidonax traillii	willow flycatcher
Empidonax wrightii	gray flycatcher
Myiarchus cinerascens	ash-throated flycatcher
Sayornis nigricans	black phoebe
Sayornis saya	Say's phoebe

Scientific Name	Common Name
Tyrannus vociferans	Cassin's kingbird
HIRUNDINIDAE	**SWALLOWS**
Hirundo rustica	barn swallow
Petrochelidon pyrrhonota	cliff swallow
Stelgidopteryx serripennis	northern rough-winged swallow
Tachycineta bicolor	tree swallow
CORVIDAE	**JAYS AND CROWS**
Aphelocoma californica	California scrub-jay
Corvus brachyrhynchos	American crow
Corvus corax	common raven
PARIDAE	**CHICKADEES AND TITMICE**
Baeolophus inornatus	oak titmouse
AEGITHALIDAE	**BUSHTITS**
Psaltriparus minimus	bushtit
TROGLODYTIDAE	**WRENS**
Campylorhynchus brunneicapillus	cactus wren
Cistothorus palustris	marsh wren
Salpinctes obsoletus	rock wren
Thryomanes bewickii	Bewick's wren
Troglodytes aedon	house wren
SYLVIIDAE	**OLD WORLD WARBLERS**
Chamaea fasciata	wrentit
POLIOPTILIDAE	**GNATCATCHERS**
Polioptila caerulea	blue-gray gnatcatcher
Polioptila californica	California gnatcatcher
TURDIDAE	**THRUSHES**
Catharus guttatus	hermit thrush
Sialia mexicana	western bluebird
MIMIDAE	**MOCKINGBIRDS AND THRASHERS**
Mimus polyglottos	northern mockingbird
Toxostoma redivivum	California thrasher
BOMBYCILLIDAE	**WAXWINGS**
Bombycilla cedrorum	cedar waxwing
PTILOGONATIDAE	**SILKY-FLYCATCHERS**
Phainopepla nitens	phainopepla
STURNIDAE	**STARLINGS**
Sturnus vulgaris	European starling
VIREONIDAE	**VIREOS**
Vireo huttoni	Hutton's vireo
PARULIDAE	**WOOD WARBLERS**
Cardellina pusilla	Wilson's warbler

Scientific Name	Common Name
Geothlypis trichas	common yellowthroat
Leiothlypis celata	orange-crowned warbler
Setophaga coronata	yellow-rumped warbler
Setophaga nigrescens	black-throated gray warbler
ICTERIDAE	**BLACKBIRDS**
Agelaius phoeniceus	red-winged blackbird
Euphagus cyanocephalus	Brewer's blackbird
Icterus cucullatus	hooded oriole
Icterus bullockii	Bullock's oriole
Molothrus ater	brown-headed cowbird
Quiscalus mexicanus	great-tailed grackle
Sturnella neglecta	western meadowlark
Xanthocephalus xanthocephalus	yellow-headed blackbird
EMBERIZIDAE	**EMBERIZIDS**
Junco hyemalis	dark-eyed junco
Melospiza lincolnii	Lincoln's sparrow
Melospiza melodia	song sparrow
Melozone crissalis	California towhee
Passerculus sandwichensis	savannah sparrow
Pipilo maculatus	spotted towhee
Zonotrichia atricapilla	golden-crowned sparrow
Zonotrichia leucophrys	white-crowned sparrow
CARDINALIDAE	**CARDINALS**
Piranga ludoviciana	western tanager
Pheucticus melanocephalus	black-headed grosbeak
FRINGILLIDAE	**FINCHES**
Haemorhous mexicanus	house finch
Spinus psaltria	lesser goldfinch
Spinus tristis	American goldfinch
PASSERIDAE	**OLD WORLD SPARROWS**
Passer domesticus	house sparrow
CLASS MAMMALIA	**MAMMALS**
LEPORIDAE	**HARES & RABBITS**
Sylvilagus audubonii	desert cottontail
SCIURIDAE	**SQUIRRELS**
Spermophilus beecheyi	California ground squirrel
MURIDAE	**MICE, RATS, AND VOLES**
Neotoma fuscipes	dusky-footed woodrat
CANIDAE	**WOLVES AND FOXES**
Canis familiaris	domestic dog
Canis latrans	coyote

Scientific Name	Common Name
EQUIDAE	**HORSES AND BURROS**
Equus caballus	horse

APPENDIX D – BROWN-HEADED COWBIRD TRAPPING REPORT

2019 BIG TUJUNGA WASH MITIGATION AREA

BROWN-HEADED COWBIRD CONTROL PROGRAM

GRIFFITH WILDLIFE BIOLOGY

2019 BIG TUJUNGA WASH MITIGATION AREA

BROWN-HEADED COWBIRD CONTROL PROGRAM

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EXECUTIVE SUMMARY

Four cowbird traps were operated in the vicinity of the Big Tujunga Wash Mitigation Area near Hansen Dam in 2019. The purpose of the trapping was to reduce the incidence of brown-headed cowbird (*Molothrus ater*) brood parasitism among local native host species, particularly endangered, threatened, or sensitive host species including the least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), and California gnatcatcher (*Polioptila californica californica*). The traps were operated from 29 March to 1 July (93 days, 13 weeks). Each trap contained live decoy cowbirds by 4 April, and 2-3 males and 5-6 female decoys as of 12 April and subsequently.

Fifty-five (55) cowbirds were removed, including 26 males, 28 females, and 1 juvenile. The 2001-2017; 2019 average was 133.5, including 51.3 males (r=9-103), 53.7 females (r=11-111), and 3.4 juveniles (r=0-18). Trapping was not conducted in 2018 due to the Creek Fire that burned through the Mitigation Area in December of 2017 and the complete loss of vegetation within the Mitigation Area post-fire.

The 2019 male: female capture ratio was 0.93:1. The male capture peak was Weeks 2-5 (8 April to 5 May) with 16/26 males (62%) removed, while the female capture peak was Weeks 2-6 (8 April to 12 May) when 23/28 females (82%) were removed. No banded cowbirds or other banded birds were captured. The traps were not vandalized in 2019; no decoys escaped and no trap days were lost. In addition to cowbirds, local birds of 4 non-target species were captured, released, and recaptured a total of 70 times; all were released unharmed (0 preyed upon). No sensitive or endangered, threatened, or candidate non-target species were captured.

The least Bell's vireo declined due to habitat loss but became endangered due to cowbird parasitism, and would not be recovering without cowbird trapping. The only stable or growing vireo populations exist where cowbird trapping has been consistently performed. Topical trapping (multiple traps placed about 1 mile apart along linear riparian habitat plus at nearby foraging areas, during the host nesting season) is the only method proven to eliminate cowbird parasitism. Full-density topical trapping removes nearly all cowbirds present and allows all local host species (not just the endangered host target) to increase productivity and populations. So few areas are trapped (any site ½ mile or more from a trap is "untrapped"), annual topical trapping has a negligible effect on the regional cowbird population; about the same number of cowbirds disperse to and are removed from trapped areas every year. In the absence of proven regional cowbird control (resulting in the elimination of cowbirds from vireo breeding habitat), topical trapping will be required indefinitely.

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

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

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INTRODUCTION

The objective of this study was to remove brown-headed cowbirds (*Molothrus ater*, cowbird) from riparian habitat at Big Tujunga Wash Mitigation Area (Mitigation Area) near Hansen Dam to decrease or eliminate cowbird brood parasitism among the federally endangered least Bell's vireo (*Vireo bellii pusillus*, vireo) and southwestern willow flycatcher (*Empidonax traillii extimus*), and other riparian host species present including the indicator species yellow-breasted chat (*Icteria virens*) and yellow warbler (*Setophaga petechia)*. Similar mitigation trapping was previously performed in 2001-2006 and 2009-2017. Trapping was not performed in 2018 due to the Creek Fire that burned through the Mitigation Area in December of 2017.

Least Bell's Vireo

The least Bell's vireo is a small gray and white migratory songbird that winters in the Cape District of Baja California Sur, Mexico and nests in willow-dominated riparian (streamside) habitat in northwestern Baja California, Mexico and southern California. Vireos arrive in breeding habitat in mid March through early April, initiate most nests by mid to late April, and fledge most young by late May to mid June. Nest building usually takes 4 days. The typical clutch of 3-4 eggs is incubated for 14 days; the young fledge 12 days after hatching. Double brooding (re-nesting after fledging young) is not uncommon. Vireos are quite fecund (90% of pairs produce 4-8 young per year); they are not endangered due to low reproduction ability. Multiple nesting attempts (up to 7) after nest failure are common. Very few nests are initiated after June. Young vireos can forage on their own after 2-3 weeks, although family groups may remain associated into August or September, after which they depart to points south (Griffith and Griffith 2000).

The vireo was formerly abundant and bred as far north as Red Bluff in Tehama County (about 130 miles north of Sacramento) (Cooper 1874), but due to habitat loss (agriculture, flood control, livestock) (Smith 1977, USFWS 1986, Wilbur 1981) and brood parasitism by the brown-headed cowbird, by the 1940's there was "a noticeable decline in numbers... apparently coincident with an increase of cowbirds" (Grinnell and Miller 1944). In 1978, only 90 vireo territories could be found, mostly in San Diego and Riverside Counties and none in the Central Valley, which had supported upwards of 80% of the historic population (Goldwasser et al. 1980, Franzreb 1989). Because of the persistent cowbird parasitism and associated low reproductive success causing local extirpations of populations already reduced and fragmented by habitat loss, the least Bell's vireo was declared endangered by the California Department of Fish and Wildlife (CDFW) in 1980 and by the United States Fish and Wildlife Service (USFWS) in 1986.

After listing and with habitat protection and cowbird trapping, vireo populations at each drainage expanded to carrying capacity, then became source populations as excess first-year emigrants began to reoccupy drainages and habitat that had been vacant for decades, expanding slowly northward, with colonizers usually settling within 10 km of their natal home ranges (Griffith and Griffith 2000). New colonizers in suitable habitat established new populations, existed in low numbers, or were extirpated within a few years, depending upon two factors:

distance from source populations, and more importantly, whether or not cowbird trapping was implemented. Without trapping, vireo colonizers are re-extirpated.

Willow-dominated vireo habitat at the Santa Ana River.

Former vireo habitat at the lower Santa Ana River

Adult male vireo on nest.

Vireo nest hung in mulefat (*Bacharis salicifolia*)

Hatch-day vireo chick

Hatch-day cowbird chick in vireo nest

Habitat is a critical component for any species, and habitat loss decidedly decimated the historic vireo population. However, throughout the decades-long decline, at the time the vireo was listed as endangered, and today, there were and are thousands of acres of vacant, vireo-quality riparian habitat available. Habitat loss caused the initial decline of the vireo, but persistent cowbird parasitism extirpated the species from all but a few locations and caused the vireo to become endangered, and cowbird trapping (in suitable/ protected habitat) is the primary cause of the ongoing recovery. The goal of the vireo recovery plan is the re-establishment of the vireo in the Central Valley, the center of the vireo's historic range (USFWS 1998); it won't happen without cowbird trapping.


Vireo nestlings 3 days after hatching


12 day-old vireo chicks ready to fledge.

Southwestern Willow Flycatcher

The southwestern willow flycatcher (swfl) was listed as endangered by the USFWS in February 1995 for reasons similar to those cited for the least Bell's vireo: severe habitat loss and degradation exacerbated (though to a lesser degree) by cowbird brood parasitism.

The swfl is one of four *Empidonax traillii* subspecies that occur in the United States and one of three that occur in Southern California during migration. The only reliable way to discern between the three subspecies in the field is by breeding chronology and geography: if a willow flycatcher breeds in Southern California or is reliably territorial after 21 June, it is *E. t. extimus*. All other sightings before or after could be, and likely are (based upon their much larger populations) northbound or southbound migratory *E. t. brewsteri* or *E. t. adastus*.

In southern California, swfl's nest in habitat similar to that of the least Bell's vireo, although usually near running water and with larger canopy trees, and their general breeding biology is similar but 1-2 months "behind" the vireo. Willow flycatchers arrive on breeding grounds from late April through mid-June. Nests are active from mid to late May through early August. Double brooding is uncommon. Extensive information regarding flycatcher natural history and legal status is available in Tibbetts et al (1994) and USFWS (1995).

Southwestern willow flycatcher (image courtesy of Utah Dept. of Natural Resources)

Yellow-breasted Chat and Yellow Warbler

The yellow-breasted chat and yellow warbler are migratory songbirds that breed in willow-dominated riparian woodland in southern California. Both are listed by the CDFW as California Bird Species of Special Concern (CDFW 2009) due to declining numbers and local extirpations, again associated with habitat loss and cowbird brood parasitism. The USFWS and CDFWS consider the chat and yellow-warbler as "indicator species" for the vireo and to a lesser extent, the flycatcher. That is, their presence indicates that the habitat is of a type and quality suitable for use by the vireo and flycatcher.

yellow-breasted chat nest

yellow-breasted chat nestlings

Brown-headed Cowbird

The brown-headed cowbird (cowbird) is an obligate brood parasite; they never make nests or raise young. Cowbirds lay eggs in the nests of other birds, called hosts, which then incubate and raise the cowbird. Female cowbirds defend breeding territories (Darley 1968, 1983; Raim 2000) and can lay 40-60 eggs each spring (Scott and Ankney 1983, Holford and Roby 1993, Smith and Arces 1994). Like many birds, cowbirds lay 3-5 egg clutches, but each year they lay 10-15 clutches each separated by only a few days. Cowbirds may remove or puncture host eggs during parasitism events, and may kill older host nestlings to initiate host re-nesting and create parasitism opportunities. Cowbirds are extreme generalists and parasitize nearly every species (at least 220) with which they are sympatric (Friedmann 1963, Friedmann and Kiff 1985). Most cowbird young are fledged from similar-sized hosts (such as red-winged blackbirds). *This lack of host specificity allows the extirpation or extinction of rare species (like the vireo) without harm to the cowbird.*

Brown-headed cowbirds (males dark, females light).

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

Cowbirds are native to the Great Plains and were closely associated with bison. It is possible that brood parasitism developed because cowbirds traveled with bison and seldom remained in one locale long enough to build a nest, lay and incubate a clutch of eggs, raise nestlings, and care for fledglings. Host species that co-evolved with cowbirds on the Great Plains and margins have behavioral defense mechanisms against parasitism, including cowbird egg recognition, cowbird egg removal, cowbird egg covering, nest abandonment, and re-clutching. Hosts in the Far West generally do not.

Cowbirds were first documented in California at Borrego Springs in 1896; the first cowbird egg found in California was in a vireo nest on the San Gabriel River (Unitt 1984). By 1930, cowbirds were "well established" throughout the region (Willett 1933); by 1955 they had reached British Columbia (Flahaut and Schultz 1955). Cowbirds may or may not have reached the Far West without the unwitting aid of man. Regardless, massive anthropogenic landscape alteration, particularly the provision of year-round cowbird forage by agricultural and livestock operations and the coincident wholesale destruction of native habitats, allowed the establishment of an artificially large cowbird population, and the resulting devastating impact upon local hosts.

In contrast to the increase in distribution and abundance of cowbirds in California over the last century, populations of most native birds are in decline, primarily due to their dependence upon increasingly reduced, fragmented, and degraded native habitats in which they are less productive and more susceptible to predation and parasitism (Gaines 1974, Goldwasser et al 1980). Thus there is an inverse relationship between the amount of native habitat and associated avian populations, such as the vireo and flycatcher, and the number and subsequent impact of brown-headed cowbirds and predators upon such populations.

Cowbird eggs hatch sooner than host eggs and the young are larger and more aggressive. Therefore cowbird chicks are able to outcompete their host nest-mates; small host chicks are often simply smothered or starved to death. Large host species can raise a cowbird without significant harm to their own reproductive effort (Weatherhead 1989, Robinson et al. 1995). Small host species like the endangered vireo, flycatcher, and California gnatcatcher (*Polioptila californica californica*) can raise only a cowbird chick, if that, and none of their own young from parasitized nests (Grzybowski 1995). For these small hosts, parasitism and predation have the same result (no young produced), but after predation the host pair often successfully re-nests in 2-14 days, while a parasitism event consumes the time and energy of an entire breeding season (Griffith and Griffith 2000). Decreased productivity caused by persistent cowbird parasitism caused or contributed to the endangered/threatened status of these host species (USFWS 1986, 1993, 1995, 1998).


Cowbird chick in California gnatcatcher nest.


Cowbird chick and smothered/starved gnatcatcher chick.

Cowbird Trapping

The recipe for least Bell's vireo recovery is simple: habitat protection (including land acquisition, exclusion of motorized vehicles and domestic/feral animals, and removal of invasive plants such as *Arundo donax* and *Tamarisk* spp.) combined with cowbird trapping. Without habitat, cowbird trapping is not worthwhile. Without trapping, vireo habitat is vacant. Cowbird parasitism can be eliminated from any targeted area by topical trapping; operating about one cowbird trap per mile along a typical riparian corridor and at nearby cowbird foraging areas (dairies, stables, golf courses) during the vireo breeding season (typically 1 April – 30 June

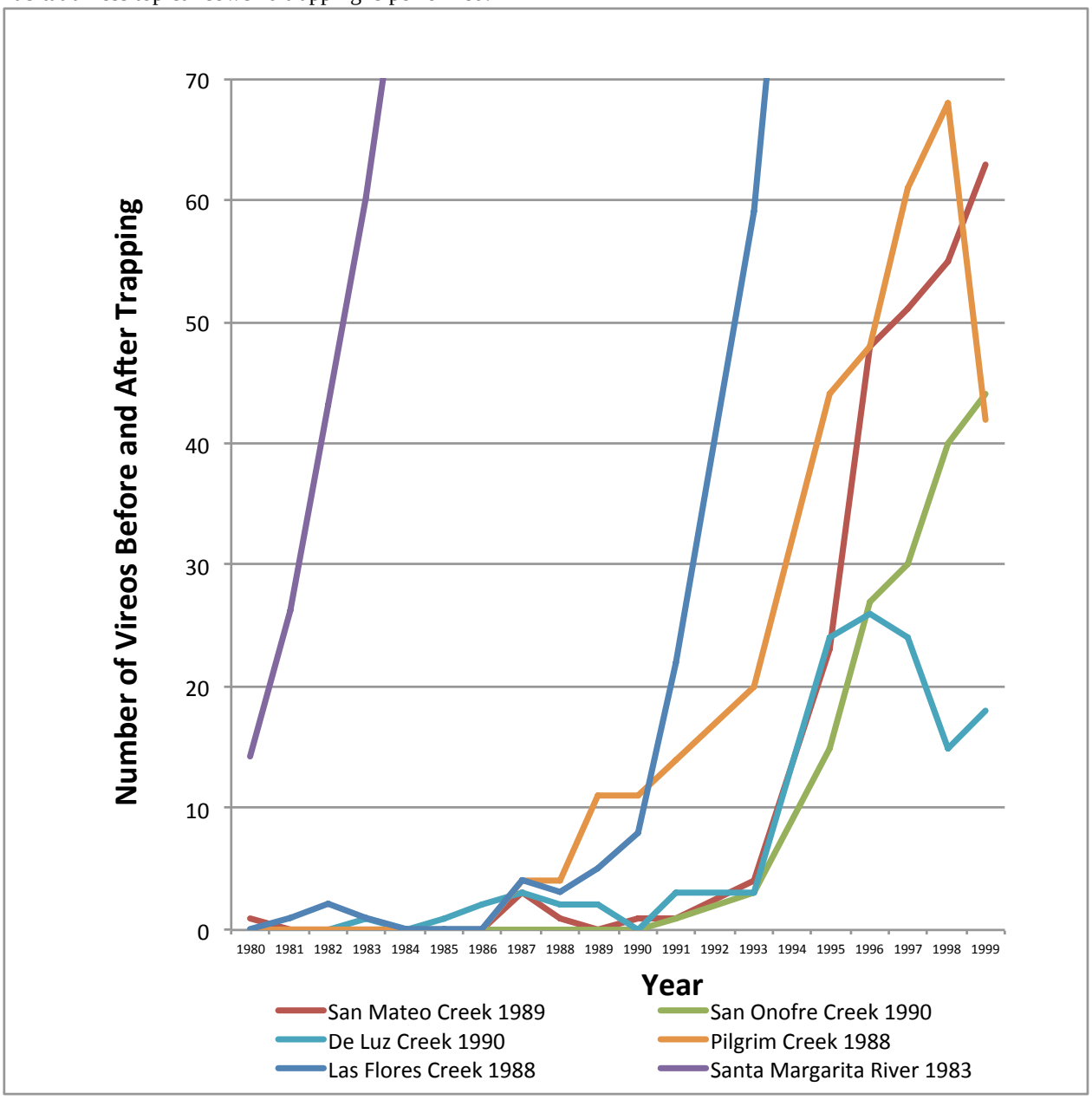
although non-breeding season trapping can also be helpful).

Topical trapping reduces parasitism rates among the vireo from pre-trapping levels of 50%-100% to at or near 0%, and unlike vireo nest-monitoring and cowbird egg removal, trapping benefits the entire avian host community. For vireos, cowbird trapping increases per-pair productivity from ~1.3 young per pair to ~3.5 per pair; the difference between decreasing populations/ extinction and increasing populations/ recovery (Griffith and Griffith 2000).

"Cowbird Control" has not been accomplished unless 1) Few or no cowbirds are detected during the breeding season in trapped areas during formal or informal surveys, censuses, and point counts, and 2) The parasitism rate among the endangered host species decreases from pre-trapping levels to near zero, as evidenced by finding few to no cowbird eggs or young in host nests, few to no cowbird fledglings in host family groups, and few to no juvenile cowbirds are captured in the trapped area in June, and 3) Host per-pair productivity increases and host populations begin to grow and expand. If the three consequences noted above are not recorded (the first two immediately), then efforts to reduce cowbird parasitism (non-topical trapping, shooting, netting) may have been performed, to some positive effect, but "cowbird control" has not been accomplished (Griffith and Griffith 2000).

The effectiveness of topical trapping (as well as the limited range of each trap) is best illustrated with 1980-1999 data from Marine Corps Base Camp Pendleton, California, during which period the location and fate of every individual and pair of vireo and nearly every vireo nest was known, and where the number and location of cowbird traps grew from 5 traps on one drainage to 40 traps on 6 drainages (Griffith and Griffith 2000). Data from the vireo distribution and abundance and cowbird parasitism data, combined with the de facto experiments in trap placement and density, established that about one trap per mile eliminates parasitism and fewer traps does not (e.g., the effective range of each trap is about ½ mile radius). These comprehensive data conclusively demonstrate that without trapping, vireos are absent or sporadically present in low numbers in suitable habitat for years (e.g. Las Flores Creek), even when quite near to occupied habitat where parasitism has been eliminated and the vireo population is large and growing (e.g. the Santa Margarita River). Conversely, with trapping, vireos grow to habitat carrying capacity then become source populations (produce more fledglings each year than settle in the drainage), and the overflow colonizes vacant habitat (closest first and in highest numbers) where the growth/ capacity/ source-population cycle is repeated.

The best illustration of how cowbird trapping increases vireo numbers and allows for vireo recovery (=increase in number and expand into vacant historic habitat) comes from Camp Pendleton, California (since repeated at many locales, and repeatable at any site with vireo habitat) (Griffith and Griffith 2000). From 1980-1999, all suitable vireo habitat on 6 separate drainages was surveyed, and the number, location, and fate of every vireo and nearly all vireos nests was recorded (by Jane and John Griffith, 1987-1999). During the same period, the number, location, and density of cowbird traps was experimentally altered, increasing from 5 on the Santa Margarita River (SMR) in 1983 to, ultimately, 40 traps Base-wide. At each drainage, vireo numbers grew (at remarkably similar rates, see slopes) to habitat carrying capacity, *but only after full density topical trapping was initiated* (trap initiation dates shown for each drainage). The number of vireos increased from 15 on 2 drainages in 1980 to 779 on 6 drainages in 1999. These data show 1) the effective range of each trap is a radius of about ½ mile (leading to the "about 1 trap per mile long the river/ topical trapping" rule) and 2) vireos simply do not and will not recover or expand into vacant habitat unless topical cowbird trapping is performed.



Male cowbird interacts with decoys before entering trap.

Cowbirds foraging for seed and insects at a dairy.

The traps are baited with live decoy cowbirds, abundant bait seed and clean water, shade, and perches to attract cowbirds whether they are seeking food, water, shelter, companionship, and/or sex. Since female cowbirds lay the eggs, they are the primary targets of trapping programs. Males are also important as they may participate in egg removal and host nest destruction activities, and are required to fertilize each egg before it is laid. The sex ratio of the at-large cowbird population is assumed to be 1:1. The goal of trapping programs is to capture as many females as possible and achieve a capture sex ratio at or below 1:1.

Male cowbirds are more active and vocal (and therefore more attractive as decoys) when at least 2 are present; female cowbirds are more likely to enter traps containing more females than males (GWB 1992). Therefore, at least 2 male and 3 female decoy cowbirds are utilized in each trap, and often 3m/5-6f if available; the small flock attracts more cowbirds and also discourages or prevents some non-target birds from entering the trap.

The capture of non-target birds (non-cowbirds) is undesirable yet unavoidable. Many non-target birds are less hardy than cowbirds. To reduce non-target mortality and per state live-trap law, the traps are checked daily and non-target species are handled with care and released immediately. To reduce non-target captures, the capture slot is only 1 3/8 inches wide (large enough for cowbirds, small enough to exclude many non-target species), 1-inch hardware cloth is used for the trap panels (small enough to contain cowbirds yet large enough to allow smaller species to exit), and bait seed without sunflower seed is utilized (sunflower seed attracts some non-target species but not cowbirds; cowbirds prefer millet).

The goal of trapping programs is to achieve 0% non-target species mortality. Rates below 2% (due to unavoidable intraspecific competition within the traps, and predation) are acceptable; rates above 2% are usually indicative of unacceptable trap conditions and poorly managed programs (GWB 1992).

Cowbird Trapping at Big Tujunga

The cowbird control project at the Mitigation Area was initiated in 2001 and performed in 2001-2006 and 2009-2017 (not performed in 2018 due to lack of vegetation and sensitive riparian bird nesting habitats). Its purpose is to enhance reproductive success among the least Bell's vireo and other host species by decreasing or eliminating cowbird brood parasitism by removing cowbirds from riparian habitat.

Additional cowbird traps were also operated downstream of the study area at Hansen Dam Basin (2 traps) in 1996, 1997, and 2001-2019 (GWB 2019), and upstream of Interstate 210 at Angeles National Golf Course (3 traps) in 2008-2019 (GWB 2019a).

STUDY AREA

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

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

A complete natural history of the study area is available in Big Tujunga Wash Master Mitigation Plan (Chambers Group, Inc. 2000).

METHODS

Four cowbird traps were placed, activated, operated, serviced, disassembled, and stored per the *Brown-headed Cowbird Trapping Protocol* (GWB 1992, updates) and state and federal permit requirements (Figure 2-4). Trap 1 (Hansen Dam Stables), Trap 2 (upstream of Hansen Dam Stables), Trap 3 (just outside Gibson Ranch), and Trap 4 (Gibson Ranch) were in foraging areas adjacent to riparian habitat. The traps were placed, assembled, and activated on March 29, then operated until July 1 (93 days, 13 weeks).

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

Transporting cowbird trap panels to the trap site.

Cowbird trap placed and "flowered" for easy assembly.

Each trap was aligned in the field on a north-south axis. A foraging tray was placed on the front portion of the floor panel centered under the capture slot. Four perches made of dead giant reed or ½" diameter dowel were installed in each trap: one in each trap corner at chest height (except above the door) and one in a rear corner at knee height (for subordinate birds). A warning/ informational sign was stapled to the front of each trap (Appendix 1). Shade cloth was applied to the west-facing side panel. Finally, a one-gallon water guzzler, approximately 1 lb. of sunflower-free wild birdseed (on the foraging tray), and live decoy cowbirds were added to each trap, and the trap was locked.

Each trap contained 2 male live decoys as of 4 April, and 3 males/ 5-6 females as of 12 April and subsequently. The right primary wing feathers of each female decoy were kept clipped to ensure their demise upon accidental release or escape. Most of the live decoys used to stock the traps in the early season were captured on site.

Trap assembly supplies.

Bait seed ready to be added through the capture slot.


Shade cloth on the west-facing panel.


Adding live decoy cowbirds to trap from transport cage.


Unclipped wing.


Clipped wing.

The traps were serviced daily from March 29 to July 01. Daily servicing consisted of releasing all non-target birds, adding bait seed, adding water and/or cleaning the water guzzler as needed, wing-clipping newly captured female cowbirds, adding or removing decoy cowbirds to maintain the preferred decoy ratio, repairing or replacing the perches, foraging pad, sign, shade cloth, slotboard wire, or lock as needed, repairing damage from vandals, if any, and recording all activities on a data sheet. Data sheets were submitted daily to the project manager. The traps were deactivated, disassembled, and transported to off-site storage on 01 July.

The number of cowbirds removed is a net number calculated by subtracting from the gross number of cowbirds captured: the number of banded cowbirds released, cowbirds released by vandals, cowbirds accidentally released, and unexplained missing decoy cowbirds. Captured cowbirds not utilized as decoys were humanely euthanized and provided as forage to raptor rehabilitation/reintroduction facilities.

A complete cowbird trapping protocol is available from Griffith Wildlife Biology (GWB 1992).

This project was performed under the authority of USFWS Federal Endangered Species Permit TE 758175-13 and a Letter Permit from the California Department of Fish & Wildlife. The Principal Investigator was K.T. Griffith. The Project Manager was J.C. Griffith. The Trap Technicians were M. Birney, J.C. Griffith, K. Griffith, and A.Veliz.

RESULTS

Cowbirds Removed Fifty-five (55) cowbirds were removed in 2019, including 26 males, 28 females, and 1 juvenile (Table 1, Table 2). The 2001-2017; 2019 average is 133.5, including 51.3 males (r=9-103), 53.7 females (r=11-111), and 3.4 juveniles (r=0-18). The 2019 male: female capture ratio was 0.93:1.

The first adult cowbird was captured on 4 April in Trap 2 (1 male); the only juvenile cowbird was captured 26 June in Trap 3. The male capture peak was Weeks 2-5 (8 April to 5 May) when 16/26 males (62%) and the female capture peak was Weeks 2-6 (8 April to 12 May) when 23/28 females (82%) were removed (Figure 5). No banded cowbirds or other banded birds were captured.

Non-Target Species In addition to cowbirds, local birds of 4 non-target species were captured, released, and recaptured a total of 70 times (Table 3). All were released unharmed (0 were preyed upon in the traps). No sensitive or endangered, threatened, or candidate non-target species were captured. No decoy or non-target birds died due to lack of food or water, or because of unclean conditions.

Trap Site Performance. All trap sites performed well and should be utilized in 2020. Traps 3 and 4 removed the most total cowbirds: Trap 3 removed 19 (8 males, 10 females, 1 juvenile), and Trap 4 removed 23 (11 males and 12 females).

Vandalism There was no trap vandalism in 2019, and no trap days were lost.

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

Trap Days The traps were operational for 372 (4 traps x 93 days) of the 364 (4 traps x 91 days) contracted trap days (103%).

DISCUSSION AND CONCLUSIONS

The number of cowbirds removed from each trap site and each program varies year-to-year, sometimes independently. The 2019 capture numbers (55 total; 26m,28f,1j) were almost

identical to the 2017 capture numbers (54 total; 27m, 26f, 1j) and follow the 133 removed in 2016 (47m,86f,0j). Both 2017 and 2019 capture numbers were the lowest since the 56 recorded in 2006 (30m/24f/2j). 2006 was bracketed by 137 in 2005 (53m,66f,18j) and 192 in 2007 (78m,11f,3j). GWB expects the numbers to rebound to back near the 2001-2017 average of 53.0 males (r=9-103), 55.4 females (r=11-111), and 3.6 juveniles (r=0-18) possibly in 2020. Because cowbirds were not trapped at Big T in 2018, it is not known if that year would have been had higher or lower capture numbers (as noted previously the Creek Fire burned the Mitigation Area riparian in late 2017, so it is possible that all 2018 bird numbers in the area, including cowbirds, were reduced because of lack of vegetation post-fire in spring 2018).

Even in this below-average year, the removal of 28 cowbird females precluded up to 1,120-1,680 parasitism events (40-60 eggs per female) allowing the production of as many as 4,480-6,720 songbird young (4 per otherwise parasitized nest) in the immediate area. Because not all parasitism events are viable and not all cowbird eggs are laid in the nests of small hosts, the actual numbers of cowbird eggs and songbird young are likely much lower but still significant, especially for the disproportionately targeted least Bell's vireo.

It is good to be reminded that the objective of cowbird trapping is to reduce or eliminate brood parasitism among targeted host species, not (necessarily) to capture large numbers of cowbirds. If the latter were the primary goal, traps would be operated only at dairies and stables (where large numbers of cowbirds can be captured, with little effect on parasitism rates = Traps 3 and 4) and not along the river (where cowbird density is low, but where the females captured are those breeding in the immediate area = Traps 1 and 2). The Mitigation Area foraging area traps are immediately adjacent to the riparian habitat, so they are also de facto riparian area traps so their abundant captures are hugely impactful.

Locally raised cowbirds are easily and quickly captured after fledging, and are therefore good indicators of the efficacy of a trapping program. Only 1 juvenile cowbird was captured in 2019, indicating that cowbird parasitism was essentially eliminated in the study.

Trapping at Big Tujunga Wash and elsewhere has reduced or eliminated cowbird parasitism in targeted habitat and increased the reproductive success of host species present. Targeted topical trapping has not, however, impacted the regional cowbird population, primarily because cowbirds are removed from so few sites where cowbirds breed. If the regional cowbird population had been reduced, the number of cowbirds captured at each site would decrease over time. Instead, the number of cowbirds captured at each site has remained fairly consistent over time (notwithstanding typical annual fluctuations; see Table 1 and the previous comments).

Unless and until cowbirds are absent from the study area for several years, by regional cowbird control or other means, the Big Tujunga Wash topical cowbird trapping program will be required indefinitely to control local brood parasitism and allow native birds to reproduce naturally.

MANAGEMENT RECOMMENDATIONS

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

2. No changes to trap locations are recommended.

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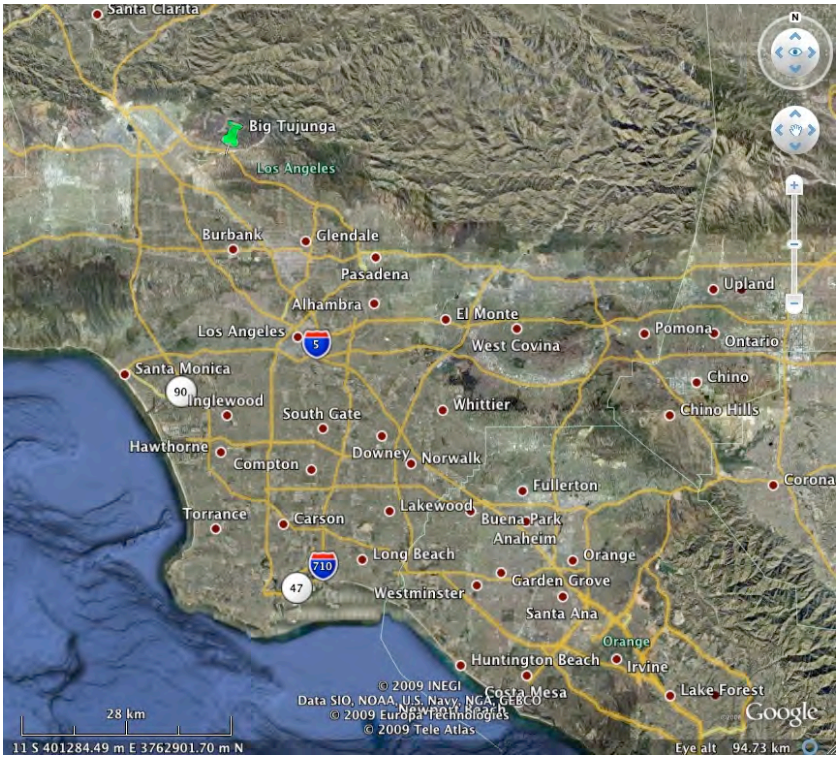
Figure 1. 2019 Big Tujunga Wash Mitigation Area brown-headed cowbird control project study area.



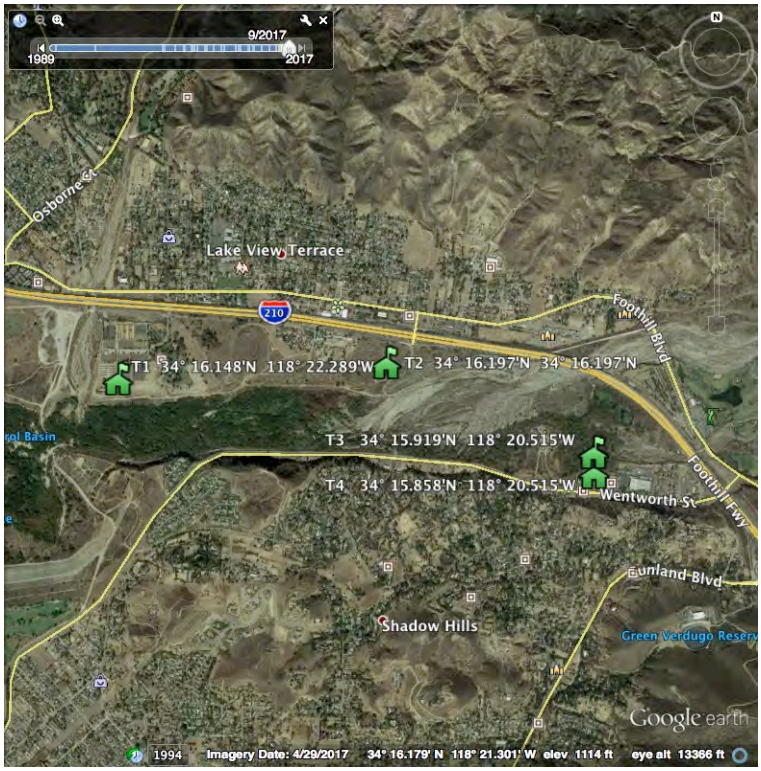


Figure 2. 2019 Big Tujunga Wash Mitigation Area brown-headed cowbird Trap 1 location.

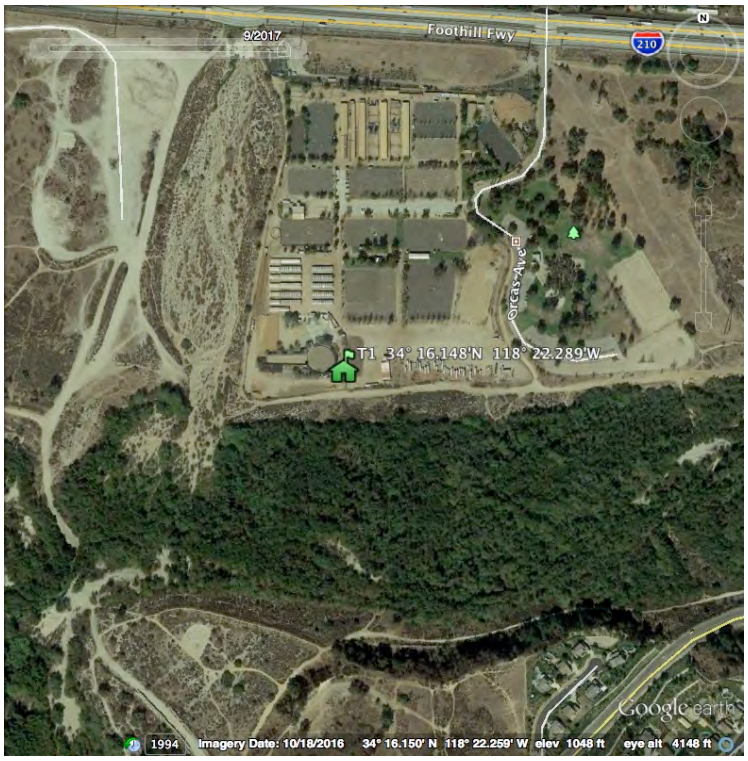


Figure 3. 2019 Big Tujunga Wash Mitigation Area brown-headed cowbird Trap 2 location.

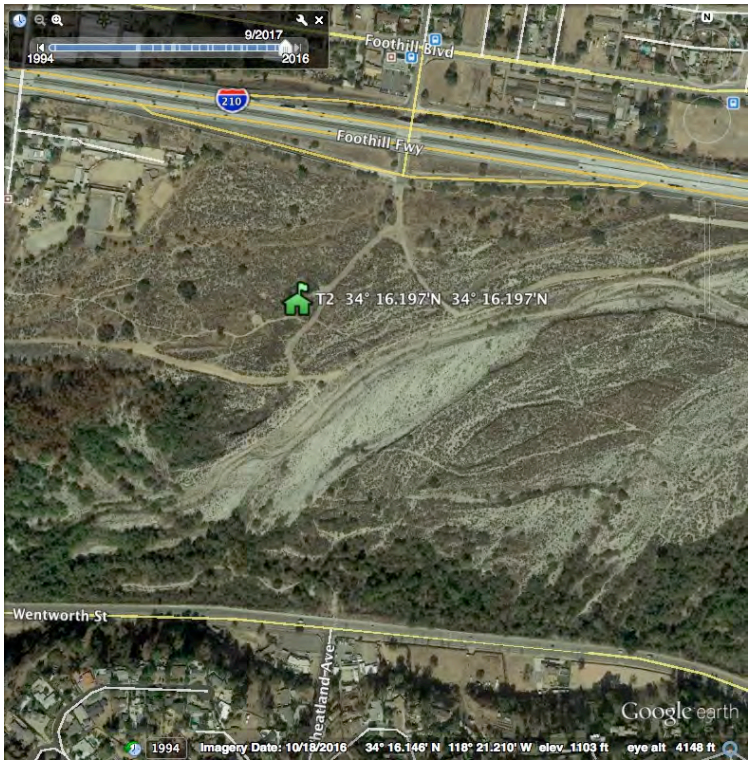
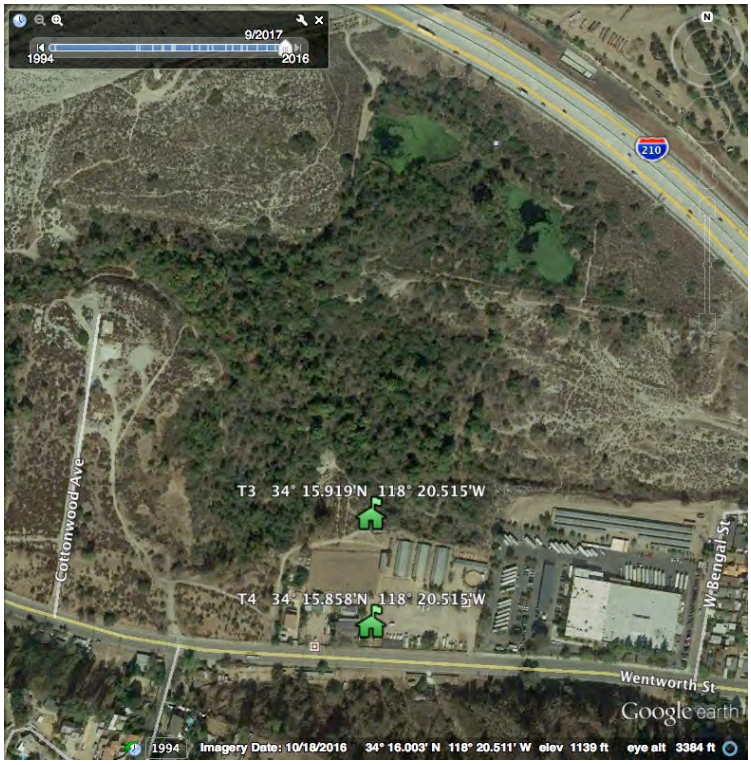


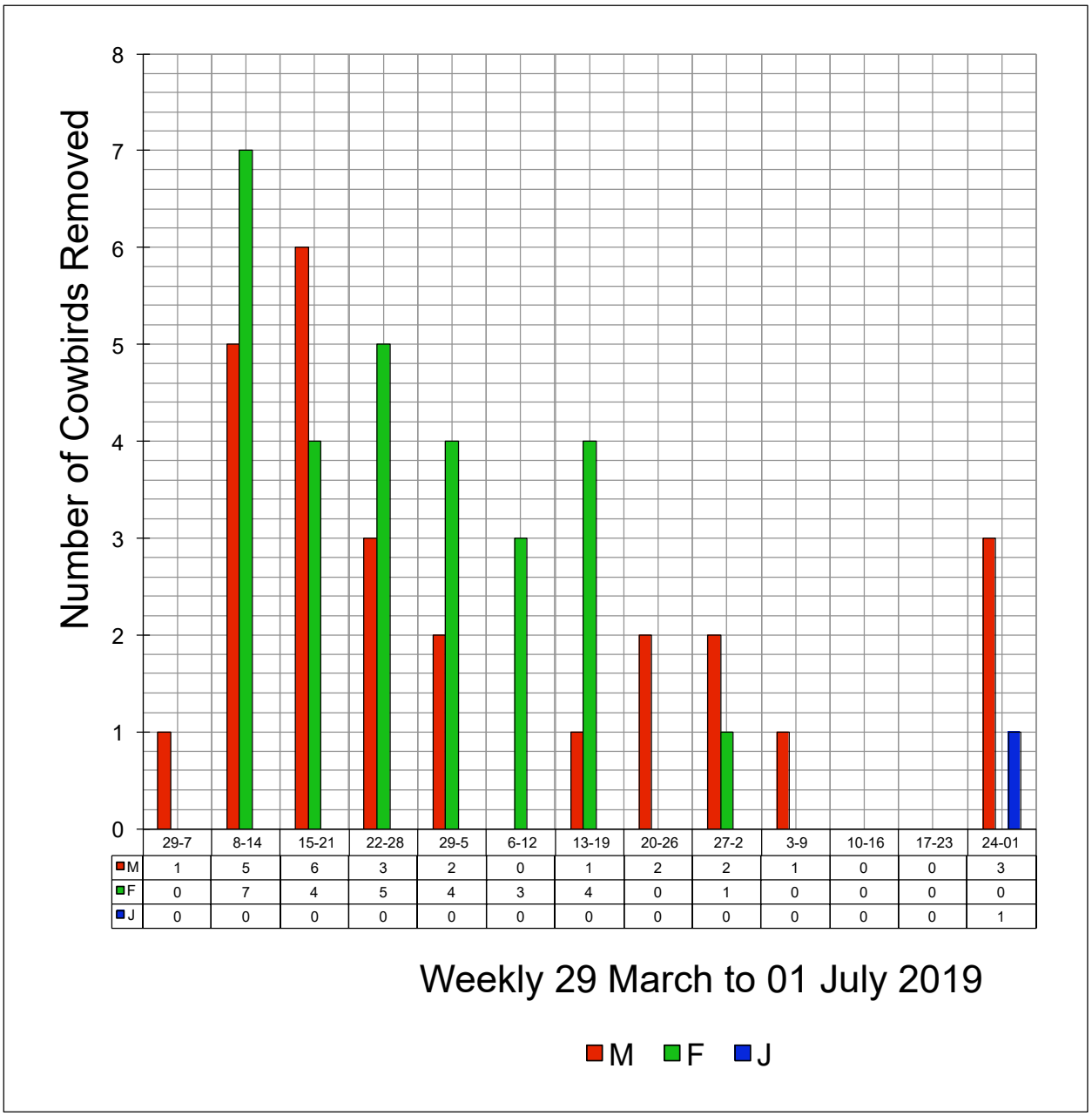
Figure 4. 2019 Big Tujunga Wash Mitigation Area brown-headed cowbird Traps 3-4 locations.



T3

T4

Figure 5. Number of male (M), female (F), and juvenile (J) cowbirds removed per week at and in the Vicinity of Big Tujunga Wash Mitigation Area in 2019.



	29-7	8-14	15-21	22-28	29-5	6-12	13-19	20-26	27-2	3-9	10-16	17-23	24-01
M	1	5	6	3	2	0	1	2	2	1	0	0	3
F	0	7	4	5	4	3	4	0	1	0	0	0	0
J	0	0	0	0	0	0	0	0	0	0	0	0	1

Table 1. Number of brown-headed cowbirds captured at and in the vicinity of Big Tujunga Wash Mitigation Area, 2001-2017; 2019.

Year	Number of Traps	Trapping Period	Number of Cowbirds Captured				Number Per Trap	M:F Ratio
			Male	Female	Juvenile	Total		
2001	7	3/15 - 7/15	37	24	9	70	10.00	1.54
2002	7	3/15 - 7/16	66	105	2	173	24.71	0.63
2003	7	3/15 - 6/19	9	11	0	20	2.86	0.82
2004	7	3/15 - 7/15	46	37	6	89	12.71	1.24
2005	7	3/30 - 8/1	53	66	18	137	19.57	0.80
2006	4	4/6 - 6/29	30	24	2	56	14.00	1.25
2009	4	4/1 - 6/30	78	111	3	192	48.00	0.70
2010	4	4/1 - 6/30	78	67	1	146	36.50	1.16
2011	4	4/1 - 6/30	103	99	9	211	52.75	1.04
2012	4	4/2 - 6/30	68	68	1	137	34.25	1.00
2013	4	4/1 - 6/30	54	42	1	97	24.25	1.29
2014	4	4/1 - 6/30	51	24	0	75	18.75	2.13
2015	4	3/30 - 6/29	48	41	1	90	22.50	1.17
2016	4	3/30 - 6/29	47	86	0	133	33.25	0.55
2017	4	3/30 - 6/29	27	26	1	54	13.50	1.04
2019	4	03/29 - 7/01	26	28	1	55	13.75	0.93
TOTAL	79	16	821	859	55	1735	21.96	0.96
AVG	4.9		51.3	53.7	3.4	133.5	27.0	0.96

2001-2005: Chambers Group, Inc. 2005
2006-2017: Griffith Wildlife Biology (GWB) 2016

Table 2. Number of male (M), female (F), and juvenile (J) cowbirds captured per day, per week, per trap, and total at and in the vicinity of Big Tujunga Wash Mitigation Area in 2019.

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

Table 3. Number of non-target species captured & released (C&R) or preyed upon (PU) in cowbird traps at and in the vicinity of Big Tujunga Wash Mitigation Area in 2019.

Species	Week 1		Week 2		Week 3		Week 4		Week 5		Week 6		Week 7	
	C&R	PU	C&R	PU	C&R	PU	C&R	PU	C&R	PU	C&R	PU	C&R	PU
BHGR					1		1							
CATO							1		2		2		2	
HOFI	1													
HOSP	7		2		5		4		6		2		1	
TOTAL	8	0	2	0	6	0	6	0	8	0	4	0	3	0

Species	Week 8		Week 9		Week 10		Week 11		Week 12		Week 13		**TOTAL**	
	C&R	PU	C&R	PU	C&R	PU	C&R	PU	C&R	PU	C&R	PU	**C&R**	**PU**
BHGR													**2**	**0**
CATO	3				2				1		1		**14**	**0**
HOFI							2		5		1		**9**	**0**
HOSP	10		3		2		1		1		1		**45**	**0**
TOTAL	13	0	3	0	4	0	3	0	7	0	3	0	**70**	**0**

BHGR black-headed grosbeak
CATO California towhee
HOFI house finch
HOSP house sparrow

Appendix 1. Warning/informational sign placed on cowbird traps at Big Tujunga Wash Mitigation Area in 2019.

COWBIRD TRAP

PLEASE DO NOT DISTURB

This trap removes *non-native* brown-headed cowbirds so that *native* songbirds can reproduce naturally.

***Cowbirds NEVER make their own nests; they ONLY lay eggs in the nests of other birds.**

***Each female cowbird lays 40-60 eggs each spring; the cowbird eggs hatch first and the cowbird chick smothers the songbird young as they hatch.* Each female cowbird removed = 160-240 more songbird young in this area.**

To attract other cowbirds, this trap contains live male (shiny black body, brown head) and female (plain brown) decoy cowbirds.

***THIS TRAP IS SERVICED DAILY* to care for the live decoy birds, release non-cowbirds, and add fresh seed & water.**

If you have questions about the operation of this trap, please call 906.337.0782 or visit www.griffithwildlifebiology.com

Operated by GWB under authority of the U.S. Fish & Wildlife Service and the California Department of Fish & Wildlife.

THE LOCAL SONGBIRDS THANK YOU FOR YOUR COOPERATION

2 cowbird eggs in songbird nest.

Cowbird chick, smothered songbird chick.

Songbird adult feeding cowbird chick.

GRIFFITH WILDLIFE BIOLOGY

APPENDIX E – EXOTIC PLANT REMOVAL MEMOS AND CDFW NOTIFICATION

Notice to Proceed: Notification No. 1600-2008-0253-R5 – Big Tujunga Wash Mitigation Area Exotic Plant Removal and Maintenance Activities

California Department of Fish and Wildlife

March 7, 2019

Steve Gibson
California Department of Fish and Wildlife
4665 Lampson Ave. suite C
Los Alamitos, CA 90720

Site: Big Tujunga Wash Mitigation Area, City of Sunland, Los Angeles County, California

Dear Steve Gibson,

The purpose of this letter is to provide notification that exotic plant removal and maintenance activities will be conducted beginning in March 2019 at the Los Angeles County Public Works' Big Tujunga Wash Mitigation Area near the City of Sunland in Los Angeles County. The activities will begin with the biologists conducting a pre-activity survey for nesting birds and identifying areas where weeds, non-native grasses, and invasive exotic plant species will need to be removed. The pre-activity survey is planned for March 11, 2019. Pre-activity sweeps will occur prior to each day's removal effort through the end of nesting bird season (September 15). In addition, the biologists will walk the trails to identify potential trail maintenance issues that will be addressed during scheduled trail maintenance which is also planned to begin in March. The locations of all sensitive biological resources that are found will be recorded using a Global Positioning System (GPS) unit. If active bird nests are identified, then an appropriately-sized buffer will be established as a "no work" zone. Areas that will require maintenance will also be recorded using a GPS unit. A biological monitor will be on site during all site maintenance and exotic plant removal activities, and will discuss sensitive biological resources and avoidance measures with the work crew(s) prior to the start of work each day.

Please do not hesitate to contact me to discuss any questions or concerns.

Sincerely,
CHAMBERS GROUP, INC.

Paul Morrissey
Principal | Director of Biology
pmorrissey@chambersgroupinc.com
(949) 261-5414 ext. 7288
5 Hutton Centre Drive, Suite 750
Santa Ana, CA 92707

April 14, 2019

Melanie Morita
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

RE: Memorandum for March 2019 Exotic Plant Eradication Program Throughout the Riparian and Uplands of the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Morita,

This memorandum summarizes the exotic plant eradication effort conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA) at the end of March 2019. This memo shows the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek, which are named tributaries to the Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group qualified biologists and restoration specialists participating in exotic plant removal efforts within the BTWMA worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the first exotic plant eradication effort including, dates, names of participants, locations and descriptions of eradication activities performed, sensitive resources encountered, and mitigation actions taken are discussed below.

PRE-ACTIVITY SURVREY

A pre-activity nesting bird survey was conducted by Biologist Alisa Muniz on March 25, 2019, prior to the start of exotic plant removal activities. The biologist surveyed within and adjacent-to planned work areas documenting the locations of any active bird nests, nesting activities, courtship or mating behaviors, and territorial behaviors. Locations of any active nests, and other notable bird activities were recorded using Collector for ArcGIS (Collector), a Geographic Information Systems (GIS) application. Any active passerine (perching bird) or raptor (bird of prey) nest identified was provided either a 250-foot or 500-foot buffer respectively, and was flagged for avoidance.

No active passerine nests were observed within the work area during the pre-activity nesting bird survey. Potential nesting behaviors by passerines included paired activity and courtship displays. One red-shouldered hawk (*Buteo lineatus*) nest was discovered outside of the immediate work area near the top of a Fremont cottonwood (*Populus fremontii*) snag, approximately 50 feet high. It is a compact stick nest placed within a fork in the center of the crown, southwest of the base of the tree (GPS coordinates: 34.266076, -118.341045). An adult bird was seen sitting low within the nest for the extent of the nest observation, approximately 55 minutes, while another adult bird foraged nearby. The bird that was sitting within the nest appeared stressed whenever the biologist moved close enough to view the bird clearly. These observations suggest that the nest was in active incubation at the time of the pre-activity survey. The nest was flagged for avoidance and 500-foot no-work buffer was established. The work crew was alerted to the nest's presence and was instructed to avoid the nest and 500-foot buffer.

In addition, one pair of American kestrels (*Falco sparverius*) were observed investigating a potential nest cavity in a snag along the western side of Cottonwood Avenue. Female and male American kestrels were seen perched within the snag on separate occasions. The male was seen investigating a large potential nest cavity that extends through the trunk and is located approximately halfway up the snag. The male flew into the cavity once, but no further nesting activity was observed. The female was not observed near the cavity. All active and potential nest sites will be regularly

monitored until the nest is determined to be inactive by a qualified biologist, or until the end of nesting bird season (September 15).

METHODS

Prior to the start of work each day, the crew received onsite orientation and instruction regarding safety, permit and mitigation regulations, results of any pre-activity sweeps, and sensitive species that may be encountered in work areas. The meetings were conducted by Habitat Restoration Foreman Tim Wood. In addition, Tim Wood traveled with work crews each day to monitor efforts so that no native plant or wildlife species were negatively impacted by work activities.

The exotic plant eradication team focused on several areas of the BTWMA including Big Tujunga Wash, Haines Canyon Creek, the Tujunga Ponds and all authorized trails as well as areas that had been treated during the previous eradication efforts. High-density areas of exotic plants that were previously mapped with Collector, were inspected and herbicide treatments were applied to new or re-sprouting exotic plants.

The herbicide mixture used for cut-stump treatments included a California aquatically approved herbicide and surfactant approved for use within 15 feet of water sources. The herbicide, surfactant, and indicator dye mixture used for this method contained 50 percent Polaris, 5 percent No Foam A (an aquatically approved penetrant, deposition, and drift control agent), and 1 ounce of Turf Trax, respectively. This mixture was applied by hand to control the exact location and coverage of application, and to maximize the amount of active ingredient to be translocated throughout the stump and root system. The crew treated large stands of exotic grasses with a monocot-specific herbicide mixture that contained 0.003 percent Fusilade II, 0.005 percent No Foam A, and 0.5 ounces of Turf Trax per gallon of herbicide mixture.

RESULTS

Substantially more weeds are present this year due to the considerable amount of rainfall this past winter, and the advantageous spreading of weeds into open spaces made available by the destruction of native vegetation from the Creek Fire that burned through the BTWMA in December 2017. Exotic plant removal and suppression efforts were performed on March 27 through March 29, 2019 and will continue through April 2019. The crew averaged four members per day during exotic plant eradication efforts and was led by Habitat Restoration Foreman Tim Wood.

Exotic plant treatment began on March 27 with the hand removal of two giant elephant ear (*Colocasia gigantea*), and the cut-stump treatment of one crimson bottlebrush (*Callistemon citrinus*) and one Spanish broom (*Spartium junceum*) that were observed during the initial site-walk. On March 28 and 29, removal efforts shifted to the exotic grasses dominating the open spaces on the bluffs surrounding Cottonwood Avenue. The most prevalent weeds and target, non-native grasses included, rattail sixweeks grass (*Festuca myuros*), red brome (*Bromus madritensis* subsp. *rubens*), wild oat (*Avena fatua*), foxtail barley (*Hordeum murinum*), and ripgut grass (*Bromus diandrus*).

SUMMARY

All exotic plant eradication activities were supervised by Habitat Restoration Foreman Tim Wood, to ensure regulations and requirements were closely followed. Chambers Group biologists were present on site during the start of plant eradication activities. No birds showed signs of stress during the effort. Only California-approved aquatic herbicides were used within 15 feet of any water source. Crew members used established trails and creek crossings as much as feasible to minimize disturbance to sensitive stream habitat and species residing in the creek.

Chambers Group staff will continue to support the ongoing effort to protect and enhance the BTWMA's native habitat through regular exotic plant eradication efforts. Chambers Group staff will continually assess the efficacy of eradication methods and adjust these methods as needed to best support mitigation goals. Exotic plant removal efforts are planned to continue through the month April.

Please feel free to contact me at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like further information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood
Habitat Restoration Foreman

SITE PHOTOS

Photo 1: Red-shouldered hawk nest identified during the pre-activity nesting bird survey.

Photo 2: Example of crimson bottlebrush prior to cut-stump treatment.

Photo 3: Example of crimson bottlebrush after cut-stump treatment.

Photo 4: Example of Spanish broom prior to cut-stump treatment.

Photo 5: Example of Spanish broom after cut-stump treatment.

Photo 6: Example of giant elephant ear prior to removal.

Photo 7: Giant elephant ear post-removal.

Photo 8: Spot-spraying monocot-specific herbicide on exotic grasses along the Cottonwood Avenue bluffs.

Photo 9: Broadcast spraying monocot-specific herbicide on exotic grasses on the Cottonwood Avenue bluffs.

May 10, 2019

Melanie Morita
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

RE: Memorandum for April 2019 Exotic Plant Eradication Program Throughout the Riparian and Uplands of the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Morita,

This memorandum summarizes the exotic plant eradication effort conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA) through April 2019. This memo shows the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek, which are named tributaries to the Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group qualified biologists and restoration specialists participating in exotic plant removal efforts within the BTWMA worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the April exotic plant eradication effort including, dates, names of participants, locations and descriptions of eradication activities performed, sensitive resources encountered, and mitigation actions taken are discussed below.

METHODS

Pre-activity sweeps for sensitive plant and wildlife species including nesting birds, were conducted each work day by Biologist Jacob Lloyd Davies. In addition, the biologist traveled with the work crew each day to monitor that no native plant or wildlife species were negatively impacted by work activities. Prior to the start of work each day, the crew received onsite orientation and instruction regarding safety, permit and mitigation regulations, and sensitive species that may be encountered in work areas. The meetings were conducted by Habitat Restoration Foreman Tim Wood and Biologist Jacob Lloyd Davies.

The exotic plant eradication team focused on several areas of the BTWMA including, Big Tujunga Wash, Haines Canyon Creek, the Tujunga Ponds, and all authorized trails as well as areas that had been treated during the previous eradication efforts. Prior to April 23, high-density areas of exotic plants that were previously mapped with Collector for ArcGIS (Collector), a Geographic Information Systems (GIS) application, were inspected and herbicide treatments were applied to new or re-sprouting exotic plants. After April 23, all exotic plant eradication efforts were made with mechanical removal methods (e.g., hand pulling or hand tools) and continued to target the high-density weed areas throughout the site.

The crew continued efforts that had begun in March by treating large stands of exotic grasses with a monocot-specific herbicide mixture that contained 0.003 percent Fusilade II, 0.005 percent No Foam A (an aquatically approved penetrant, deposition, and drift control agent), and 0.5 ounces of Turf Trax (a blue indicator dye) per gallon of herbicide mixture. Similar alternative brands of monocot-specific herbicides were also used to treat large stands of exotic grasses. Alternative herbicide mixtures contained 0.00325 percent Envoy Plus, 0.0033 percent No-Foam A, and 0.5 ounces of Turf Trax, or 0.004 percent Fusilade DX, 0.00375 percent No Foam A, and 0.5 ounces of Turf Trax. Herbicide treatments applied to the developing exotic forb species contained California aquatically approved herbicide and surfactant approved for use within 15 feet of water sources and contained 1.5 percent Polaris, 1 percent Activator 90 (an

aquatically approved penetrant, deposition, and drift control agent), and 0.5 ounces of Turf Trax. Spraying equipment including manual-pump backpacks and a gasoline-powered, motorized pump tank were used to apply the herbicide. The herbicide was applied by hand-directed spray nozzles to control herbicide distribution and to avoid non-target species. Hand tools and gasoline-powered weed whackers were also used to remove exotic species.

RESULTS

Substantially more weeds are present this year due to the considerable amount of rainfall this past winter, and the advantageous spreading of weeds into open spaces made available by the destruction of native vegetation from the Creek Fire that burned through the BTWMA in December 2017. Alternating warm and cool weather patterns and occasional small rain showers continue to encourage the germination and development of new exotic plants throughout the BTWMA this spring. Chemical herbicide applications were used in exotic plant removal and suppression efforts performed from April 1 through April 23. On April 23, Chambers Group ceased the use of all herbicides in the BTWMA. From April 24 through April 30, all exotic plant removal and suppression efforts were made by way of mechanical weed control methods. These efforts and mechanical weed control methods will continue into May 2019.

The crew averaged four members per day during exotic plant eradication efforts and was led by Habitat Restoration Foreman Tim Wood. On April 1 through April 8, removal efforts targeted the exotic grasses dominating the open spaces on the bluffs surrounding Cottonwood Avenue, Mary Bell Avenue public entrance, the equestrian trails and entrances, and the bluff embankments leading down to the Central Haines Canyon Creek section and the riparian areas to the east. The most prevalent weeds and target non-native grasses included, rattail sixweeks grass (*Festuca myuros*), red brome (*Bromus madritensis* subsp. *rubens*), wild oat (*Avena fatua*), foxtail barley (*Hordeum murinum*), and ripgut grass (*Bromus diandrus*).

On April 9 and 10, crew members used weed whackers to cut down dense non-native annual grasses along trail sections where the use of chemical herbicides would be inhibitive. These sections included the southeast trail between the equestrian center and the Cottonwood Avenue bluffs, and a narrow strip of grass along the Wentworth Avenue fence boundary that extends from the Cottonwood Avenue bluffs west to the Wheatland Avenue entrance. On these dates, crew members also used hand tools to remove developing castor bean (*Ricinus communis*) and tree tobacco (*Nicotiana glauca*) on the equestrian center entrance bluff and along the central portion of Haines Canyon Creek, north of the Cottonwood Avenue bluffs.

On April 11 through 15, the crew applied herbicide treatments to target non-native annual grasses and exotic forbs on the low-lying areas of the Cottonwood Avenue bluffs and around the east seep, along the central section of Haines Canyon Creek, and on the north-central bluffs west of the Tujunga Ponds. Targeted forb species included, but were not limited to, mustard species (*Brassica* sp., *Hirschfeldia incana*, *Sisymbrium* sp.), non-native thistle species (*Cirsium* sp., *Carduus pycnocephalus, Silybum marianum, Sonchus* sp.), sweet clover species (*Melilotus* spp.), and poison hemlock (*Conium maculatum*). On April 15, a pre-activity survey was conducted by the biological monitor prior to work efforts in the vicinity of a previously documented red-shouldered hawk (*Buteo lineatus*) nest located in the east riparian area. The hawk was observed nesting, preening, and surveying the area. In addition, numerous insects were observed flying around the nest. Initial concerns were that there was a casualty in the nest, but during follow-up observations the next day, the red-shouldered hawk continued to display normal behavior consistent with incubating a nest and the presence of flying insects had diminished. The flagged 30-foot perimeter around the nest was still intact, and prohibition of motorized equipment continued within the 500-foot buffer of the nest. The hand-pulling of exotic plants continued in the buffer area within up to 50 feet from the nest, with a biological monitor present at all times. The red-shouldered hawk was monitored for any signs of stress while workers were present within the buffer and no signs of stress were observed.

On April 17 through 19, herbicide treatment continued through the east riparian areas where the crew continued to target non-native annual grasses, mustard species, non-native thistles, sweet clover species, poison hemlock, castor bean, and tree tobacco. On April 19, the biological monitor discovered a mallard (*Anas platyrhynchos*) nest in the east

riparian area while monitoring work efforts. It was observed that the nest was active and in the incubation stage. The mallard built a flat, saucer-shaped nest made of flattened grasses and lined with down feathers. The nest is located at the base of a multi-trunk snag, and is hidden by grasses that bend over it. The nest is very well hidden and the monitor came upon it unexpectedly, flushing the incubating female at time of discovery. After flagging a buffer and documenting the nest, the monitor observed the female return to the nest. The nest was flagged with a 30-foot perimeter, and the use of motorized equipment was ceased within a 250-foot buffer of the nest. The hand-pulling of exotic plants continued in the buffer area within up to 50 feet from the nest, with a biological monitor present at all times. The mallard was monitored for any signs of stress while workers were present within the buffer, and no signs of stress were observed.

On April 22 and 23, herbicide treatment was focused on the north-central bluff and embankments west of the Tujunga Ponds. On April 24 and 25, mechanical removal efforts continued on the north-central bluff and included the embankments to the east of Big Tujunga Wash. Work was performed by hand pulling and with the use of hand tools. On April 24, the biological monitor observed a substantial amount of bird activity from numerous species. No nesting activities were observed; however, the biological monitor and foreman agreed that the use of motorized tools should be ceased in the high-activity areas, so that bird behaviors would not be disrupted.

On April 26 and 30, efforts focused on cutting down the stands of annual mustard around the north Wheatland Avenue entrance, in the basin area to the east of the entrance, and along the northern BTWMA boundary. On April 25, a Chambers Group biologist observed a great-tailed grackle (*Quiscalus mexicanus*) inside a mass of cattails in the northernmost corner of the West Tujunga Pond during the exotic aquatic species removal effort. The great-tailed grackle was seen repeatedly delivering grasses and pieces of herbaceous plants into the mass of the cattails. On April 26, similar nest building behavior was observed by the biological monitor in the same area. The nest is not fully visible from the shore, and no perimeter was flagged at the time of observation due to the nest being over water; however, the nest will be monitored regularly and measures will be taken to avoid disturbance to the nest during future work efforts.

SUMMARY

All exotic plant eradication activities were supervised by Habitat Restoration Foreman Tim Wood, to ensure regulations and requirements were closely followed. Biologists inspected work areas prior to the start of each workday and then traveled with the crew to monitor that native species were not disturbed. No birds showed signs of stress during the effort. Only California-approved aquatic herbicides were used within 15 feet of any water source. After April 23, 2019 the Chambers Group crew stopped the use of all herbicides on the BTWMA. From that day forward, all exotic plant removal and suppression efforts were and will continue to be performed with mechanical weed control methods. In areas where motorized tools were potentially disruptive to birds, less disruptive methods including hand pulling and the use of hand tools were applied. Variable weather conditions throughout the month, including wind events and rain showers, were a determining factor for safe and effective work dates and target locations. Crew members used established trails and creek crossings as much as feasible to minimize disturbance to sensitive stream habitat and species residing in the creek.

Chambers Group staff will continue to support the ongoing effort to protect and enhance the BTWMA's native habitat through regular exotic plant eradication efforts. Chambers Group staff will continually assess the efficacy of eradication methods and adjust these methods as needed to best support mitigation goals. Exotic plant removal efforts are planned to continue into May.

Please feel free to contact me at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like further information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood
Habitat Restoration Foreman

SITE PHOTOS

Photo 1: Monocot-specific herbicide treatment on the north end of the Cottonwood Avenue bluff, on April 2.

Photo 2: Monocot-specific herbicide treatment on the bluffs around the Mary Bell Avenue entrance, on April 3.

Photo 3: Hand removal of a castor bean on the entrance bluff from the equestrian center, on April 10.

Photo 4: Mechanically mowing non-native annual grasses along the Wentworth Avenue fence boundary, on April 10.

Photo 5: Herbicide treatment to exotic forb species along the central Haines Canyon Creek section, on April 12.

Photo 6: Herbicide treatment to exotic forbs on the north banks of the central Haines Canyon Creek section, on April 15.

Photo 7: Herbicide treatment to exotic forbs and annual grasses in the eastern riparian area, on April 19.

Photo 8: Herbicide treatment to exotic forbs on the north-central bluff, on April 22.

Photo 9: Mechanically mowing the stands of mustard in the basin east of the north Wheatland Avenue entrance, on April 26.

Photo 10: Mechanically mowing the stands of mustard along the north BTWMA boundary, on April 30.

June 3, 2019

Melanie Morita
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

RE: Memorandum for May 2019 Exotic Plant Eradication Program Throughout the Riparian and Uplands of the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Morita,

This memorandum summarizes the exotic plant eradication efforts conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA) through May 2019. This memo shows the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek, which are named tributaries to the Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group qualified biologists and restoration specialists participating in exotic plant removal efforts within the BTWMA worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the May exotic plant eradication effort including, dates, names of participants, locations and descriptions of eradication activities performed, sensitive resources encountered, and mitigation actions taken are discussed below.

METHODS

Pre-activity sweeps for sensitive plant and wildlife species including nesting birds, were conducted each work day by Biologist Jacob Lloyd Davies. In addition, the biologist traveled with the work crew each day to monitor that no native plant or wildlife species were negatively impacted by work activities. Prior to the start of work each day, the crew received onsite orientation and instruction regarding safety, permit and mitigation regulations, and sensitive species that may be encountered in work areas. The meetings were conducted by Habitat Restoration Foreman Tim Wood and Biologist Jacob Lloyd Davies.

The exotic plant eradication team focused on several areas of the BTWMA including, Big Tujunga Wash, Haines Canyon Creek, the Tujunga Ponds, and all authorized trails as well as areas where weed removal had been performed during the previous eradication efforts.

The crew continued the exotic plant eradication efforts that had begun in later part of April by exercising mechanical removal methods (e.g., hand pulling and hand or motorized tools), targeting high-density weed areas throughout the site. Large stands of annual weed species were either cut down or completely removed as a means to disrupt or end their growth cycle and suppress exotic plant species from producing seed in the future. All eradication efforts directed at perennial weed species required complete removal of the plant from the roots. In all cases of disruption, suppression, or full removal, plant material was left on the ground in the same area or was moved a safe distance away from Haines Canyon Creek to decompose onsite. Decomposing plant material acts as mulch and serves to reduce the potential for erosion.

The crew used cutting methods such as gasoline powered weed-whackers, or machetes when the stands of vegetation were too dense for the machinery. When full plant removal was required, the crew pulled plants by hand and/or dug them out with shovels. Upon assessment of target weeds in particular work areas, the crew members were divided into appropriate alternating task categories of “cutters” and “pullers”. Cutters would address the annual exotic plant species

when it was determined that disruption or suppression of their growth cycles by cutting was the most efficient and effective means to inhibit seed production. Pullers were responsible for addressing the biennial and perennial exotic plant species as complete removal of these species is the only means for effective control. The crew divisions of cutters and pullers would vary depending on the prevalence and type (annual versus perennial or biennial species) of target weeds. Adjustments were made by the crews as necessary to best address the exotic species composition of each area in the most efficient way possible. In all cases and regardless of removal method, crew members would sweep through areas in unison so that their work could be monitored appropriately, and so that safety and precautionary measures could be communicated.

RESULTS

Substantially more weeds are present this year due to the considerable amount of rainfall this past winter, mild weather patterns in late spring, and more recently, consistent rain showers. These conditions encourage the advantageous germination and spreading of exotic plants into open spaces made available by the destruction of native vegetation from the Creek Fire. All exotic plant removal efforts were continued through May 27 using only mechanical weed control methods. The crew averaged six members per day during exotic plant eradication efforts and was led by Habitat Restoration Foreman Tim Wood.

On May 1 through May 3, removal efforts targeted the large, dense stands of mustard species (*Brassica* sp., *Hirschfeldia incana*, *Sisymbrium* sp.) covering the west embankments of the Cottonwood bluff area and the embankments of the western Cottonwood bluff area. On these embankments, crew members were cautious to minimize the disturbance of the soil and aggregate rubble as much as feasible in order to reduce the potential for erosion, thereby reducing negative impacts to the native species already struggling to exist at these locations. Cutting annual mustards down as a means to disrupt their growth cycle was exercised on all embankments where hand-pulling would potentially cause unintended, negative impacts. During removal efforts on May 1, the biological monitor discovered a Bewick's wren (*Thryomanes bewickii*) nest at the bottom of the West Cottonwood Bluff embankments. The nest is located approximately 20 feet high in a snag cavity, with the cavity opening facing east. A Bewick's wren was observed delivering food to the cavity.

On May 6 and 7, crew members continued to target annual mustard species dominating the north-facing embankments of the bluffs north of the equestrian center, and the toe of the embankments leading into Haines Canyon Wash. The crew continued to take precautions to minimize soil disturbance and the potential for erosion on the embankments. Cutting methods were applied in areas where the potential for erosion is the greatest.

On May 8, crew members focused weed eradication efforts on the eastern bluff and embankments that join Haines Canyon Wash and the eastern side of the Tujunga Ponds area, respectively. Both cutters and pullers targeted mustard species, developing castor bean (*Ricinus communis*), fountaingrass (*Pennisetum setaceum*), and tree tobacco (*Nicotiana glauca*).

On May 9, the crew addressed stands of exotic species within Haines Canyon Wash. Cutters used weed whackers to address large stands of annual mustard species. Pullers used shovels to remove target perennial species, such as developing castor bean and tree tobacco.

On May 13, crew members focused weed eradication efforts on the dense stands of annual mustard species dominating the top of the western end of the Cottonwood bluff, and completed the embankment work that was started at the beginning of the month. The Bewick's wren nest was monitored during work activities and the birds showed no signs of stress.

On May 14 through 17, the crew focused weed eradication efforts throughout the seep below the northwestern end of the Cottonwood bluff, the riparian area west of the Cottonwood bluff, and the riparian areas along Wentworth Avenue. Work began south of Haines Canyon Creek progressing towards the south Wheatland Avenue entrance, and then continued north of the creek with crew members working both sides of the dense vegetation along the trail. Target

weed species throughout the riparian areas include mustard species, castor bean, tree tobacco, non-native thistle species (*Cirsium* sp., *Carduus pycnocephalus, Silybum marianum, Sonchus* sp.), sweetclover species (*Melilotus* sp.), and poison hemlock (*Conium maculatum*). Due to the density of the vegetation and the diversity of the species that occupy these riparian areas, it was determined that hand removal methods would be the least disruptive and most supportive measure ecologically. With the exception of isolated stands of annual mustard, all weed removal efforts were performed by hand or with hand tools. During removal efforts on May 14, the biological monitor discovered a California scrub-jay (*Aphelocoma californica*) building a nest in the area west of the Cottonwood bluff. The nest was being built in the regenerating basal growth of a boxelder (*Acer negundo*) snag, located approximately 6 feet from the ground and approximately 4 feet from the south side of Haines Canyon Creek. The nest is muddled arrangement of sticks and twigs, well-hidden against the trunk of the snag. The biological monitor determined that nest was nearly complete.

During removal efforts on May 15, the biological monitor discovered three lesser goldfinch (*Spinus psaltria*) nests and one bushtit (*Psaltriparus minimus*) nest while monitoring work activities. The first lesser goldfinch nest was discovered in the area west of the Cottonwood bluff near Haines Canyon Creek. The nest is in the regenerating basal growth of a boxelder snag, located approximately 6 feet from the ground and approximately 3 feet south of Haines Canyon Creek. The nest is a compact, open cup of woven grass and plant fibers. It was observed to be in the incubation stage with three eggs present. The second lesser goldfinch nest was also discovered in the riparian area west of the Cottonwood bluffs. The nest is in the basal growth of a boxelder snag, located approximately 5 feet from the ground, and approximately 6 feet north of Haines Canyon Creek. The nest is a compact, open cup of woven grass and plant fibers. The nest was found to have at least two nestlings. The third lesser goldfinch nest was discovered along Haines Canyon Creek near the first western stream crossing. The nest is located in the basal growth of a boxelder snag, approximately 5 feet from the ground, and approximately 3 feet south of Haines Canyon Creek. The nest is a compact, open cup of woven grass and plant fibers. The nest was found to be in the incubation stage with at least two eggs present. A bushtit nest was discovered in the riparian area west of Wheatland Avenue. The nest was in the regenerating basal growth of a small stand of boxelder snags, located 10 feet from the ground, and approximately 10 feet north of Haines Canyon Creek. The nest is gourd-shaped with a lateral opening near the top, and is woven from plant fibers and lichens. The nest was found to be in the incubation stage and the occupant birds were observed foraging nearby.

On May 20 and 21, crew members removed exotic plant species in the riparian area west of the Wheatland Avenue entrance, starting south of Haines Canyon Creek and then moving to the north side of the creek. Target weed species were consistent with other riparian areas and included mustard species, castor bean, tree tobacco, non-native thistle species, sweetclover species, and poison hemlock. Weed removal efforts through the dense vegetation continued with all crew members pulling by hand or with hand tools. During removal efforts on May 20, the biological monitor discovered a bushtit nest in this area, while monitoring ahead of the crew's progression. The nest was located just north of the trail, approximately 12 feet from the ground, near the BTWMA boundary. The nest is gourd-shaped with a lateral opening near the top, and is woven from plant fibers and lichens. It was found to be in the incubation stage and the occupant birds were observed foraging nearby. During removal efforts on May 21, the biological monitor discovered a Nuttall's woodpecker (*Dryobates nuttallii*) nest and a mourning dove (*Zenaida macroura*) nest. The Nuttall's woodpecker nest is located approximately 30 feet from the ground in a white alder (*Alnus rhombifolia*) snag at the final western Haines Canyon Creek crossing and the BTWMA boundary, just south of the trail. The nest was an excavated cavity located approximately 2 feet from the top of the snag. The adult birds were observed alternating between foraging, delivering food, and occupying the nest. This activity and small chirps emanating from the nest led the biologist to conclude that the nest was in the nestling stage. The mourning dove nest is located in the hollowed-out top of a willow (*Salix* sp.) snag, approximately 10 feet north of Haines Canyon Creek, densely surrounded by mugwort (*Artemisia douglasiana*). The adult bird was incubating one egg.

On May 22, the crew focused their efforts around the Tujunga Ponds. Target weed species in this area included mustard species, castor bean, tree tobacco, non-native thistle species, sweetclover species, poison hemlock, and field bindweed

(*Convolvulus arvensis*). Efforts in this area were cut short due to an unexpected hail storm, followed by rain on May 23, causing the work around the ponds to be suspended until May 24.

On May 24 and 27, crew members continued their efforts on the Cottonwood Avenue bluffs, along the central portion of Haines Canyon Creek, and in the riparian area east of the Cottonwood Avenue bluffs. These areas were treated with herbicide during initial efforts at the beginning of April, but due to the consistent rain showers throughout April and May there was a considerable amount of new germination and development of exotic plant species. Target species at these locations include, but are not limited to, mustard species, castor bean, tree tobacco, non-native thistle species, sweetclover species, and poison hemlock. During removal efforts on May 27, a lesser nighthawk (*Chordeiles acutipennis*) nest was discovered on the Cottonwood bluff. The biological monitor flushed the adult bird from the nest as he passed. The biological monitor located the nest approximately 10 feet north of the equestrian training circle, hidden within a stand of California buckwheat (*Eriogonum fasciculatum*). The nest consisted of a small depression on the ground with no nesting material used in its construction. The nest was determined to be in the nestling stage as two nestlings were occupying the depression. The biologist monitored the nest as the crew went about daily activities at the storage container. It was determined that the nest was outside of the line of sight to the work area, and no disruption of nesting activities was observed.

When an active nest was discovered in or near a work area, the biologist monitored the nest while the crew moved around and away from the area. All active bird nests encountered during May exotic plant removal efforts were flagged with a 30-foot avoidance buffer. No birds showed signs of stress and no disruption of nesting activities was observed by the biological monitor during May efforts. No immediate maintenance activities are required in the vicinity of any of the nests observed and documented throughout the month of May. The nests will be observed and assessed again prior to future efforts in these areas.

SUMMARY

All exotic plant eradication activities were supervised by Habitat Restoration Foreman Tim Wood, to ensure regulations and requirements were closely followed. Biologists inspected work areas prior to the start of each workday and then traveled with the crew to monitor that native species were not disturbed. No birds showed signs of stress during the effort. One parent lesser nighthawk flushed from a nest as a biologist walked by; however, the parent bird returned the nest. The nest area was flagged for avoidance during future work activities. Crew members used established trails and creek crossings as much as feasible to minimize disturbance to sensitive stream habitat and species residing in the creek. All exotic plant removal and suppression efforts were and will continue to be performed with mechanical weed control methods. In areas where motorized tools were potentially disruptive to birds, or where the density of native plant species would be prohibitive, less disruptive methods including hand pulling and the use of hand tools were applied. Rain showers and mild weather conditions continued to contribute to the germination and development of exotic plant species. Future efforts will focus on the resurgence of weeds species addressed in March, April, and May, and will address any new exotic plant species as they develop throughout the site.

Chambers Group staff will continue to support the ongoing effort to protect and enhance the BTWMA's native habitat through regular exotic plant eradication efforts. Chambers Group staff will continually assess the efficacy of eradication methods and adjust these methods as needed to best support mitigation goals. The next weed removing effort will be scheduled immediately following approval of the adjusted 2019 budget.

Please feel free to contact me at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like further information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood
Habitat Restoration Foreman

SITE PHOTOS

Photo 1: Removing annual mustard species on the west side of the Cottonwood bluff, on May 1.

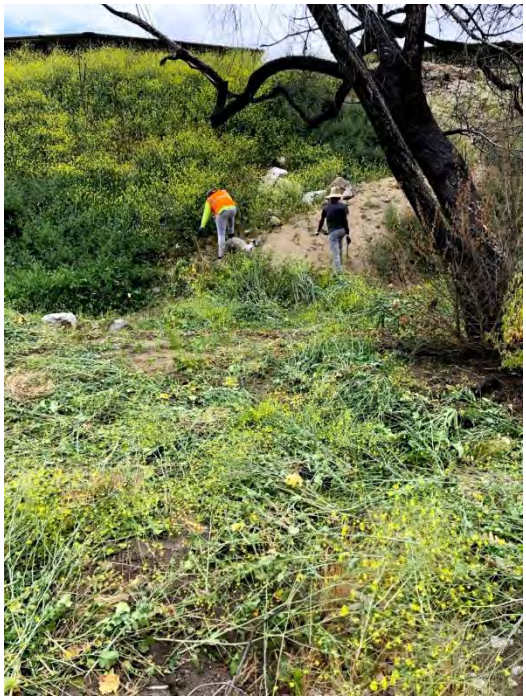


Photo 2: Removing annual mustard species on the embankments below the equestrian entrance, on May 6.

Photo 3: Removing fountaingrass from the embankments of the northeastern bluff, on May 8.

Photo 4: Mechanically mowing annual mustard stands within Haines Canyon Wash, on May 9.

Photo 5: Removing annual mustard species on the west side of the Cottonwood Avenue bluffs, on May 13.

Photo 6: Mechanically mowing annual mustard species in the riparian area east of Wheatland Avenue, on May 14.

Photo 7: Removing a poison hemlock stand in the riparian area west of the Cottonwood bluffs, on May 15.

Photo 8: Removing a poison hemlock stand in the riparian area west of the Wheatland Avenue entrance, on May 21.

Photo 9: Removing annual mustard species and bindweed around the Tujunga Ponds, on May 22.

Photo 10: Revisiting and removing developing weeds on the Cottonwood Avenue bluff embankments, on May 27.

September 13, 2019

Crystal Franco
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

RE: Memorandum for August 2019 Exotic Plant Eradication Program Throughout the Riparian and Uplands of the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Franco,

This memorandum summarizes the exotic plant eradication efforts conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA) through August 2019. This memo shows the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek, which are named tributaries to the Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group qualified biologists and restoration specialists participating in exotic plant removal efforts within the BTWMA worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the August exotic plant eradication effort including, dates, names of participants, locations and descriptions of eradication activities performed, sensitive resources encountered, and mitigation actions taken are discussed below.

Implementation

A pre-activity survey for sensitive plant and wildlife species including nesting birds was conducted by Biologists Corey Jacobs and Mauricio Gomez on August 23, 2019, prior to the commencement of the exotic plant eradication efforts. No sensitive species, active bird nests, or nesting behaviors were observed during the pre-activity survey. In addition, Biologist Austin Burke led the work progression conducting pre-activity sweeps ahead of the work crew and traveling with the work crew each day to monitor that no native plant or wildlife species were negatively impacted by work activities. Prior to the start of work each day, the crew received onsite orientation and instruction regarding safety, permit and mitigation regulations, and sensitive species that may be encountered in work areas. The meetings were conducted by Habitat Restoration Foreman Tim Wood and Biologist Austin Burke.

A prolonged temperate spring combined with late season rain events earlier this year has provided abundant resources and opportunities for the late germination and development of annual, biennial, and perennial exotic species. During summer months the development of these species has been accelerated and prolific throughout the property. Efforts to reduce future germination and generations of exotic weed species required focusing removal efforts on the existing mature and viable seeds observed throughout the BTWMA.

The exotic plant eradication team focused on the upper areas of the Cottonwood Avenue bluff and the contiguous areas surrounding the Mary Bell Avenue entrance. The crew continued mechanical removal methods, initiated earlier this year (e.g., hand pulling, digging out, and/or cutting) when addressing non-native weed species. These mechanical removal methods were coupled with the implementation of seed head collection and solarization methods as means to decrease the future germination of exotic species, and reduce the fire fuel present within the targeted areas. Details on these methods are described below.

Mature and potentially viable seed heads for all types of non-native species were collected and contained into 3-mil black contractor bags. Collection barrels were used to help manage the large volumes of seed heads and vegetation. Collected materials were condensed in these barrels to maximize density without compromising the plastic, and were later transferred into the contractor bags for solarization or removal from the site. Solarization is a mechanical weed control method that is used to eliminate viable seeds by exposing them to higher temperatures than the seeds are able to withstand by creating an acute greenhouse effect. A small amount of water was added to each bag to help generate heat and sustain high temperatures, essentially baking the seeds to a point that they are no longer viable.

The stands of annual weed species throughout the target work areas were discovered to be completely mature, in a dry, woody state, and still holding substantial quantities of their fully developed seeds. The seed heads were removed with hand pruners and transferred into barrels allowing the crew to continue activities without potentially spreading the seeds into non-target areas. The biennial and perennial weeds in the work areas were also found to be well into their seed development stage, and required seed heads to be removed and contained. The remaining vegetative portions of these species were removed with the root to eliminate future growth and redevelopment of seeds should seasonal conditions and resources favor this possibility. All of the collected seed heads were then transferred into the contractor bags for containment and solarization purposes. Due to sheer volume of bagged plant material, the bags were relocated to the concrete pad near the on-site container unit and stockpiled, so that they would not negatively impact native plant species or obstruct visitor traffic throughout the work areas.

Execution

On August 26, removal efforts targeted the exotic plant species throughout the southwestern portion of the Cottonwood Avenue bluff area. The predominate species in this area included matured stands of annual mustard species (*Brassica* spp., *Hirschfeldia incana*, *Sisymbrium* spp.) and perennial species such as developing castor bean (*Ricinus communis*). Crew members used shovels to remove the entire plant from the root when addressing perennial species (Photo 1).

On August 27, crew members continued to target annual mustard species throughout the western-central and northwestern portions of the Cottonwood Avenue bluff area. Target species included mustard species, castor bean, and non-native thistle species (*Cirsium* spp., *Carduus pycnocephalus*, *Silybum marianum*, *Sonchus* spp.; Photo 2).

On August 28, crew members focused weed eradication efforts on the northeastern and central portions of the Cottonwood Avenue bluff area. Target species continued to include non-native mustard species, castor bean, and thistle species. The seed heads from the annual species (e.g., mustard and non-native thistle species) were cut low to include all of the seed pods present and the cut portions were collected, condensed into barrels, and transferred into bags for the solarization process as removal activities progressed (Photo 3).

On August 29, the crew addressed stands of exotic species within the central and southeastern portions of the Cottonwood Avenue bluff area. Efforts targeted large stands of annual mustard species, castor bean, and tree tobacco (*Nicotiana glauca*). Hand pruners were used to cut the seed heads from annual exotic species, and shovels were used to remove target perennial species, such as developing castor bean and tree tobacco (Photo 4).

On August 30, crew members focused weed eradication efforts on the dense stands of annual mustard species dominating the areas surrounding the Mary Bell Avenue entrance (Photo 5). Other target species included castor bean, tree tobacco, and Russian thistle (*Salsola* sp.). At the end of the effort, all work areas were swept to collect solarization bags and the bags were moved to the stockpile area near the on-site container unit on the Cottonwood Avenue bluff (Photo 6).

Summary and Results

All exotic plant eradication activities were supervised by Habitat Restoration Foreman Tim Wood, who monitored that regulations and requirements were closely followed. The crew averaged eight members per day during exotic plant eradication efforts. Biologists inspected work areas prior to the start of each workday and then traveled with the crew to monitor that native species were not disturbed. No birds showed signs of stress during the effort. All exotic plant removal and suppression efforts were and will continue to be performed with mechanical weed control methods. Future efforts will continue to focus on the resurgence of target weed species and will address any new exotic plant species as they develop throughout the site.

Discussion

Substantially more weeds are present this year due to the considerable amount of rainfall this past winter. Mild weather patterns in late spring and relatively mild summer conditions have encouraged the advantageous germination, development, and spreading of exotic plants into open spaces, made available by the destruction of native vegetation from the Creek Fire. However, these conditions have also favored the accelerated regeneration of native tree species such as willow species (*Salix* spp.), Fremont cottonwood (*Populus fremontii*), coast live oak (*Quercus agrifolia*), and California sycamore (*Platanus racemosa*). Many of the larger specimens have recovered from the dormancy period induced by the fire damage, have produced leaves, and are filling out their canopies. Trees that experienced a complete loss of crown or canopy but were able to persist by basal growth production, are now tall enough to provide some refuge (i.e. shade and cover) and have developed lower limbs wide enough that they are beginning to create low canopies. As a result, substantial amounts of exotic species have been discovered emerging and developing in locations where these opportunities for refuge and resources are now available. These conditions facilitate longer growth and developmental periods which give rise to plentiful seed production, and ultimately, an increase in direct competition with native species that tend to reclaim open spaces more slowly. Qualitative observations of regenerating and developing native understory species such as mulefat (*Baccharis salicifolia*) and laurel sumac (*Malosma laurina*) indicate that understory species are being hindered and are less productive than the larger native tree species. These observations are correlated with the direct competition and rapid growth of exotic annual and perennial species. Currently, only exotic species removal methods that do not inhibit the regeneration of the native tree species and/or further hinder the growth of the native understory species are being used and will be considered for future efforts in these areas. Competition between recovering, native species and aggressive, non-native species will require increased preventative measures when determining the most appropriate exotic plant removal methods.

Non-native, annual plant species provide the greatest fuel load and fire risk to natural areas due the fact that they create connectivity between shrubs and act as kindling for the fire ladder. The prevalence of non-native, annual plant species and the abundance of seed heads that have been produced this year, warrants the adjustment of removal methods from the proposed solarization method to full removal efforts. The most prevalent annual weeds that are still holding seed are mustard species, which are currently dry and woody. The structure of mustard seeds heads is such that the majority of plant is removed during seed head collection. Considering the slower decomposition rates of woody organic material as opposed to green vegetation, and the volume of non-native, annual vegetation (fuel) that has been collected thus far (and has yet to be collected), it is recommended that eradication efforts be adjusted to include the removal of collected materials from the site rather than the solarization method in which, once seeds are assumed non-viable, vegetative materials would be removed from solarization bags and left to decompose on site. These adjusted methods will still fulfill eradication efforts by way of seed head collection, but will also further fuel reduction efforts, helping to support and sustain the goals of the BTWMA.

Chambers Group staff will continue to support the ongoing effort to protect and enhance the BTWMA's native habitat through regular exotic plant eradication efforts. Chambers Group staff will continually assess the efficacy of eradication methods and adjust these methods as needed to best support mitigation goals. After gearing up efforts to full capacity in August, weed removal efforts will continue into September with the appropriate allocation of personnel and resources necessary to continue the accelerated efforts required for the current site conditions and time of year.

Please feel free to contact me at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like further information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood
Habitat Restoration Foreman

SITE PHOTOS

Photo 1: Crew member removing caster bean seed heads on the southwestern portion of the Cottonwood Avenue bluff, on August 26.

Photo 2: Crew member bagging a mustard seed head (note the sheer size of the individual seed head) on the western portion of the Cottonwood Avenue bluff, on August 27.

Photo 3: Crew members cutting mustard seed heads on the northern-central portion of the Cottonwood Avenue bluff, on August 28.

Photo 4: Crew members removing mustard seed heads on the southern-central portion of the Cottonwood Avenue bluff, on August 29.

Photo 5: Crew members bagging mustard seed heads in the area surrounding the Mary Bell Avenue entrance, on August 30.

Photo 6: Solarization area for the collected seed heads totaling 131 contractor bags, on August 30.

October 7, 2019

Crystal Franco
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

Subject: Memorandum for September 2019 Exotic Plant Eradication Program Throughout the Riparian and Uplands of the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Franco,

This memorandum summarizes the exotic plant eradication efforts conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (Mitigation Area) through September 2019. This memo shows the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek, which are named tributaries to the Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group qualified biologists and restoration specialists participating in exotic plant removal efforts within the Mitigation Area worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the September exotic plant eradication effort including, dates, names of participants, locations and descriptions of eradication activities performed, sensitive resources encountered, and mitigation actions taken are discussed below.

Implementation

A pre-activity survey for sensitive plant and wildlife species was conducted by biologist Alisa Muniz on September 16, 2019, prior to the commencement of the exotic plant eradication efforts. No sensitive plant or wildlife species were observed during the pre-activity survey.

Biologist Alisa Muniz led the work progression, and pre-activity sweeps were conducted by biologists Alisa Muniz, Corey Jacobs and/or Austin Burke ahead of the work crew. In addition, a biologist traveled with the work crew each day to monitor that no native plant or wildlife species were negatively impacted by work activities. Prior to the start of work each day, the crew received onsite orientation and instruction regarding safety, permit and mitigation regulations, and sensitive species that may be encountered in work areas. The meetings were conducted by habitat restoration foreman Tim Wood and Alisa Muniz.

The exotic plant eradication team focused on the eastern half of Mitigation Area including the areas between the Cottonwood Avenue bluff and Haines Canyon Wash, the Tujunga Ponds, and all associated equestrian trails. The crew continued mechanical removal methods when addressing non-native weed species as outlined in the August memo, including hand pulling, digging out, and/or cutting, as well as using weed whackers to facilitate the removal of thick stands of weeds. In addition to mechanical removal methods, seed heads were collected in heavy-duty contractor bags to decrease future germination of exotic species and reduce the fire fuel present on the site.

Execution

On September 12, 13, and 16, Alisa Muniz focused on locating target exotic species, identifying stands to prioritize during removal, and planning extraction points for bagged seed heads. This information was documented in Collector for ArcGIS, a Geographic Information Systems (GIS) application, to help guide crew efforts throughout the site.

On September 17 and 18, removal efforts focused on the areas within the seep that is located below the eastern edge of the Cottonwood Avenue bluff and north of Mary Bell Avenue. These areas were filled with mature stands of annual

mustard species (*Brassica* spp., *Hirschfeldia incana*, *Sisymbrium* spp.), as well as annual/biennial sweet clover (*Melilotus albus*) and perennial castor bean (*Ricinus communis*). Because this area contains a seep and is seasonally very wet, mustard and sweet clover were able to form large stands along the edges of the seep (Photo 1). Mustard seed heads were collected in heavy-duty contractor bags before being extracted from the area (Photo 2).

On September 19 and 20, crew members continued removing weeds along the southern boundary of the site and targeted the area north of the equestrian center and along the southeastern portion of the equestrian trails. This area includes a small seep and contained large, dense stands of mustard. Weed whackers were used to increase efficiency of seed head collection. By using a weed whacker to trim mustard stems below the seed heads, crew members were able to collect large quantities of seed heads without having to trim every stem by hand (Photo 3).

On September 23, removal efforts shifted towards the northeastern portion of the site along the trails and arroyo located south and east of the Tujunga Ponds. Target species for this area included mustard stands, castor bean, and tree of heaven (*Ailanthus altissima*). Shovels were used when addressing perennial species in order to unearth the entire plant with the roots intact (Photo 4).

On September 24 and 25, the crew continued east along the arroyo that is located on the northern edge of the Haines Canyon Wash, focusing on thick stands of mustard (Photo 5). Crew members also removed exotic perennial plants in the area, including castor bean and a small stand of giant reed (*Arundo donax*), which required digging out the entire plant and root system using a shovel.

On September 26, the crew focused weed eradication efforts on the central and southern portions of the Haines Canyon Wash. This area included dispersed stands of annual mustard, tumbling pigweed (*Amaranthus albus*), Russian thistle (*Salsola* sp.), and castor bean (Photo 6).

On September 27, crew members targeted the areas along the southeastern border of the site located below the eastern side of the equestrian center bluff (Photo 7). Dense stands of annual mustard were removed from this area as well as castor bean and tree tobacco (*Nicotiana glauca*).

On September 30, crew members targeted perennial species along the central Haines Canyon Creek area. Because this area provides water throughout the year, castor bean and tree of heaven can colonize large areas in short periods of time making their removal, including mature and developing seeds, a priority. Removal of these species required using a shovel to extract the entire plant with the roots intact, and collecting mature and developing seeds (Photo 8). Once uprooted, the plants were left on site to decompose and the seeds were collected in heavy-duty contractor bags.

Summary and Results

All exotic plant eradication activities were supervised by Tim Wood and Alisa Muniz, who monitored that regulations and requirements were closely followed. The crew averaged eight members per day during exotic plant eradication efforts. Biologists Alisa Muniz, Corey Jacobs, and/or Austin Burke inspected work areas prior to the start of each workday and then traveled with the crew to monitor that native plants and sensitive wildlife species were not disturbed.

The prevalence of exotic species in the eastern half of Mitigation Area greatly exceeded expectations, mostly due to the density of annual mustard along arroyos and seasonal seeps, which resulted in substantially more effort needed to remove the exotic species from this area. In accordance with the additional goal of fuel reduction, care was taken to collect the bulk of the dried organic material of these species and store the bagged material at the stockpile area located on Cottonwood Avenue until the materials could be removed from the site. Large swaths of annual mustard were cleared from the site (Photos 9 and 10) and roughly 700 additional contractor bags of seed heads were collected during the September efforts.

Discussion

Substantially more weeds are present this year due to the considerable amount of rainfall this past winter. Mild weather patterns in late spring and relatively mild summer conditions have encouraged the advantageous germination, development, and spreading of exotic plants into open spaces, made available by the destruction of native vegetation from the Creek Fire.

However, these conditions have also favored the accelerated regeneration of native tree species such as willow species (*Salix* spp.), Fremont cottonwood (*Populus fremontii*), coast live oak (*Quercus agrifolia*), and California sycamore (*Platanus racemosa*). Many of the larger specimens have recovered from the dormancy period induced by the fire damage, have produced leaves, and are filling out their canopies. Trees that experienced a complete loss of crown or canopy but were able to persist by basal growth production, are now tall enough to provide some refuge (i.e. shade and cover) and have developed lower limbs wide enough that they are beginning to create low canopies. As a result, substantial amounts of exotic species have been discovered emerging and developing in locations where these opportunities for refuge and resources are now available. These conditions facilitate longer growth and developmental periods which give rise to plentiful seed production, and ultimately, an increase in direct competition with native species that tend to reclaim open spaces more slowly. Qualitative observations of regenerating and developing native understory species such as mulefat (*Baccharis salicifolia*) and laurel sumac (*Malosma laurina*) indicate that understory species are being hindered and are less productive than the larger native tree species. These observations are correlated with the direct competition and rapid growth of exotic annual and perennial species. Currently, only exotic species removal methods that do not inhibit the regeneration of the native tree species and/or further hinder the growth of the native understory species are being used and will be considered for future efforts in these areas. Competition between recovering, native species and aggressive, non-native species will require increased preventative measures when determining the most appropriate exotic plant removal methods.

Non-native, annual plant species provide the greatest fuel load and fire risk to natural areas due the fact that they create connectivity between shrubs and act as kindling for the fire ladder. Due to the prevalence of non-native, annual plant species and the abundance of seed heads that have been produced this year, removal methods were adjusted from the proposed solarization method to full removal efforts. The most prevalent annual weeds that are still holding seed are mustard species, which are currently dry and woody. The structure of mustard seeds heads is such that the majority of plant is removed during seed head collection. Considering the slower decomposition rates of woody organic material as opposed to green vegetation, and the volume of non-native, annual vegetation (fuel) that has been collected thus far (and has yet to be collected), eradication efforts have been adjusted to include the removal of collected materials from the site rather than the solarization method in which, once seeds are assumed non-viable, vegetative materials would be removed from solarization bags and left to decompose on site. These adjusted methods will still fulfill eradication efforts by way of seed head collection, but will also further fuel reduction efforts, helping to support and sustain the goals of the Mitigation Area.

Chambers Group staff will continue to support the ongoing effort to protect and enhance the Mitigation Area's native habitat through regular exotic plant eradication efforts. Chambers Group staff will continually assess the efficacy of eradication methods and adjust these methods as needed to best support mitigation goals. Weed removal efforts will continue into October with the appropriate allocation of personnel and resources necessary to continue the accelerated efforts required for the current site conditions and time of year.

Please feel free to contact me at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like further information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood

Habitat Restoration Foreman

SITE PHOTOS

Photo 1: Crew members collecting mustard seed heads from the seep, located below the eastern edge of Cottonwood Avenue bluff, on September 17. Seasonal water allows mustard to form large, contiguous stands in this area.

Photo 2: Crew members collecting mustard seed heads in contractor bags and preparing the bags for extraction from the area below the eastern edge of Cottonwood Avenue bluff, on September 18.

Photo 3: Crew member using a weed whacker to trim a thick stand of mustard to facilitate seed head collection, on September 20.

Photo 4: Crew member removing castor bean from along the trail southeast of Tujunga Ponds, on September 23.

Photo 5: Crew members bagging mustard seed heads along the northern portion of Haines Canyon Wash, on September 24.

Photo 6: Crew member collecting mustard seed heads within Haines Canyon Wash, on September 26.

Photo 7: Crew members collecting mustard seed heads along the southeastern border of the site, northeast of the equestrian center, on September 27.

Photo 8: Crew member removing a tree of heaven, including the root, from along the central Haines Canyon Creek area, on September 30.

Photo 9: The area north of the equestrian center before exotic plant removal and mustard seed head collection, on September 16.

Photo 10: The area north of the equestrian center after exotic plant removal and mustard seed head collection, on September 19.

November 6, 2019

Julianna Colwell
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

Subject: Memorandum for October 2019 Exotic Plant Eradication Program Throughout the Riparian and Uplands of the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Colwell,

This memorandum summarizes the exotic plant eradication efforts conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (Mitigation Area) through October 2019. This memo shows the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek, which are named tributaries to the Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group qualified biologists and restoration specialists participating in exotic plant removal efforts within the Mitigation Area worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the October exotic plant eradication effort including dates, names of participants, locations and descriptions of eradication activities performed, sensitive resources encountered, and mitigation actions taken are discussed below.

Implementation

Biologists Alisa Muniz and Austin Burke led the work progression, and pre-activity sweeps were conducted by Alisa Muniz, Austin Burke, and/or biologist Corey Jacobs ahead of the work crew. In addition, a biologist traveled with the work crew each day to monitor that no native plant or wildlife species were negatively impacted by work activities. Prior to the start of work each day, the crew received onsite orientation and instruction regarding safety, permit and mitigation regulations, and sensitive species that may be encountered in work areas. The meetings were conducted by Alisa Muniz and Austin Burke.

The exotic plant eradication team focused on the northern and western portions of the Mitigation Area, including Big Tujunga Wash, the western portion of Haines Canyon Creek and surrounding riparian areas, the Tujunga Ponds, and all associated equestrian trails. The crew continued mechanical removal methods when addressing non-native weed species as outlined in the August and September memos, including hand pulling, digging out, and/or cutting, as well as using weed whackers to facilitate the removal of thick stands of weeds. In addition to mechanical removal methods, seed heads were collected in heavy-duty contractor bags to decrease future germination of exotic species and reduce the fire fuel present on the site.

Execution

On October 1 and 2, exotic plant removal efforts focused on clearing the remaining stands of annual mustard species (*Brassica* spp., *Hirschfeldia incana*, *Sisymbrium* spp.) and castor bean (*Ricinus communis*) from the eastern riparian area. This included thick stands of mustard around the southern and eastern portions of the equestrian trail, as well as within seasonally flooded areas. Mustard seed heads were collected in trash bins before being transferred to contractor bags, allowing the seed heads to be collected and bagged more efficiently (Photo 1).

On October 3 and 4, the crew shifted efforts to the Tujunga Ponds and surrounding areas targeting large stands of biennial white sweetclover (*Melilotus albus*) and annual mustard. Because of the density of white sweetclover, and the fact that most of it had not yet gone to seed, weed whackers were used to trim most of the vegetative portions of the

white sweetclover plants (Photo 2). This allowed easier access to the roots, which were then unearthed and left in place to decompose. Any mature white sweetclover seeds were collected in contractor bags and the rest of the vegetation was left in the area to decompose. Prior to using the weed whacker, a biologist flagged all the native tree and shrub species within the white sweetclover stands and crew members left wide buffers around these plants. White sweetclover was then hand pulled from around the native vegetation (Photo 3).

On October 7 and 8, the crew targeted stands of mustard located on the northern bluff, west of the Tujunga Ponds. This area had large stands of mustard along the eastern rim of the bluff and the slope leading down to the ponds (Photo 4). Weed whackers were used to trim mature mustard plants below the seed heads which were collected in bins before being transferred to contractor bags.

On October 9, the crew focused on removing mustard, castor bean, and tree tobacco (*Nicotiana glauca*) from the bluffs located west of Cottonwood Avenue, as well as on and below the slopes (Photo 5). The areas below these bluffs are seasonal seeps, and the availability of water earlier in the year resulted in abundant castor bean and mustard stands.

On October 10, the crew began to clear multiple perennial species from along the western portion of Haines Canyon Creek, including castor bean, tree of heaven (*Ailanthus altissima*), and tree tobacco, as well as stands of white sweetclover. Due to the year-round availability of water along the creek, these species were able to grow large and abundant and required considerable effort to remove (Photo 6). Shovels and "Pulaski" pick-axes were used to uproot individuals which were dragged away from the creek and left to decompose. Removal efforts along the creek continued later in the month.

On October 11, the crew cleared the remaining mustard from the embankments west of Cottonwood Avenue. However, work was limited due to the proximity of the Saddle Ridge Fire in nearby Sylmar, California, which resulted in poor breathing conditions and threatened some of the crewmembers' personal vehicles.

On October 14, the crew continued to remove white sweetclover from around the Tujunga Ponds, before moving to perennial species along Haines Canyon Creek in the afternoon.

On October 15 through 18, and 21, the crew removed extensive stands of mature mustard from the northern edge of the Mitigation Area, east of the north Wheatland Avenue gate. This area consists of a seasonal drainage basin and the availability of water earlier in the year allowed mustard to grow in large and thick stands (Photo 7). Weed whackers were used to trim the stands mustard below the seed heads, allowing large amounts of seed heads to collected more efficiently (Photo 8). Castor bean and tree tobacco were also abundant in this area and required digging up the entire plant, including the root, in addition to collecting mature seed heads. The castor bean in this location contained numerous mature seed heads on each plant (Photo 9), and care was taken to collect all the seeds to limit the seed bank (Photo 10).

On October 22, the crew began removing mature stands of mustard and castor bean, as well as several patches of giant reed (*Arundo donax*), from the area north of Big Tujunga Creek. These species grew along the banks of the creek as well as in the dry rivulets adjacent to Big Tujunga Creek. Care was taken to remove the entire rhizome of the giant reeds due to the species' aggressive nature and ability to grow new shoots from any remaining rhizome material (Photo 11).

On October 23 and 24, efforts focused on the westernmost portion of Haines Canyon Creek. This section of the creek had abundant castor bean and tree tobacco, as well as occasional patches of fig (*Ficus* spp.). All perennial species required removing the entirety of the root (Photo 12). Most of these individuals were accessible from the creek banks; however, crewmembers occasionally wore waders and travelled along the creek to remove stands that would be otherwise difficult to access (Photo 13). A biologist was present during all creek travel to carefully monitor that the creek bottom (rocks and sediment), and native fish were not disturbed by the crew.

On October 25, the crew removed large stands of mustard from below the embankment along the southern border of the Mitigation Area, north of Wentworth Street, as well as the southern portion of Big Tujunga Wash (Photo 14).

On October 28 and 29, the crew finished clearing mustard and perennial species from the northern area of the Mitigation Area, north of Big Tujunga Creek. This included stands of mustard and patches of giant reed along the creek banks and high-water line. Most of these exotic species were located along the banks of the Big Tujunga Creek and within seasonally wet areas in the northern portion of the Big Tujunga Wash.

On October 30, crews focused on removing target species along the length of the western riparian trail including numerous stands of annual mustard and large castor bean, tree of heaven, and tree tobacco.

On October 31, the crew finished removing the thick stands of mustard from below the southern embankment of the Mitigation Area, north of Wentworth Street. The crew then shifted efforts to the southern portion of Big Tujunga Wash, targeting perennial species including giant reed and tree tobacco (Photo 15).

Summary and Results

All exotic plant eradication activities were supervised by Alisa Muniz, Austin Burke, and/or Corey Jacobs who monitored that regulations and requirements were closely followed. The crew averaged between seven and eight members per day during exotic plant eradication efforts. Alisa Muniz, Austin Burke, and/or Corey Jacobs inspected work areas prior to the start of each workday and then traveled with the crew to monitor that native plants and sensitive wildlife species were not disturbed. The bulk of the October exotic plant eradication efforts was spent removing large stands of mature mustard from the northern portion of the Mitigation Area, including Big Tujunga Wash, and established perennial species from Haines Canyon Creek and the surrounding riparian areas. Seasonal flooding along the arroyos and drainage basin north of Big Tujunga Wash, which resulted in temporary water availability earlier in the year, likely contributed to the density of mustard and castor bean removed from the northern portion of the Mitigation Area.

The year-round water supply provided by Haines Canyon Creek resulted in dense and abundant stands of exotic perennial species, including castor bean, tree of heaven, and tree tobacco. Concentrated removal efforts cleared large sections of exotic vegetation from the creek (Photos 16 and 17), reducing competition for sunlight and water for native plants. In accordance with the additional goal of fuel reduction, care was taken to collect the bulk of the dried organic material of these species and store the bagged material at the stockpile area located on Cottonwood Avenue until the materials could be removed from the site. Roughly 775 additional contractor bags of seed heads were collected during the October exotic plant removal efforts, for a total of approximately 1600 contractor bags of seed heads removed during August, September, and October efforts (Photo 18).

Discussion

Substantially more weeds are present this year due to the considerable amount of rainfall this past winter. Mild weather patterns in late spring and relatively mild summer conditions have encouraged the advantageous germination, development, and spreading of exotic plants into open spaces, made available by the destruction of native vegetation from the Creek Fire.

However, these conditions have also favored the accelerated regeneration of native tree species such as willow species (*Salix* spp.), Fremont cottonwood (*Populus fremontii*), coast live oak (*Quercus agrifolia*), and California sycamore (*Platanus racemosa*). Many of the larger specimens have recovered from the dormancy period induced by the fire damage, have produced leaves, and are filling out their canopies. Trees that experienced a complete loss of crown or canopy but were able to persist by basal growth production, are now tall enough to provide some refuge (i.e., shade and cover) and have developed lower limbs wide enough that they are beginning to create low canopies. As a result, substantial amounts of exotic species have been discovered emerging and developing in locations where these opportunities for refuge and resources are now available. These conditions facilitate longer growth and developmental periods which give rise to plentiful seed production, and ultimately, an increase in direct competition with native species that tend to reclaim open spaces more slowly. Qualitative observations of regenerating and developing native understory species such as mulefat (*Baccharis salicifolia*) and laurel sumac (*Malosma laurina*) indicate that understory

species are being hindered and are less productive than the larger native tree species. These observations are correlated with the direct competition and rapid growth of exotic annual and perennial species. Currently, only exotic species removal methods that do not inhibit the regeneration of the native tree species and/or further hinder the growth of the native understory species are being used and will be considered for future efforts in these areas. Competition between recovering, native species and aggressive, non-native species will require increased preventative measures when determining the most appropriate exotic plant removal methods.

Non-native, annual plant species provide the greatest fuel load and fire risk to natural areas due the fact that they create connectivity between shrubs and act as kindling for the fire ladder. Due to the prevalence of non-native, annual plant species and the abundance of seed heads that have been produced this year, removal methods were adjusted from the proposed solarization method to full removal efforts. The most prevalent annual weeds that are still holding seed are mustard species, which are currently dry and woody. The structure of mustard seeds heads is such that the majority of plant is removed during seed head collection. Considering the slower decomposition rates of woody organic material as opposed to green vegetation, and the volume of non-native, annual vegetation (fuel) that has been collected thus far (and has yet to be collected), eradication efforts have been adjusted to include the removal of collected materials from the site rather than the solarization method in which, once seeds are assumed non-viable, vegetative materials would be removed from solarization bags and left to decompose on site. These adjusted methods will still fulfill eradication efforts by way of seed head collection, but will also further fuel reduction efforts, helping to support and sustain the goals of the Mitigation Area.

Chambers Group staff will continue to support the ongoing effort to protect and enhance the Mitigation Area's native habitat through regular exotic plant eradication efforts. Chambers Group staff will continually assess the efficacy of eradication methods and adjust these methods as needed to best support mitigation goals. Weed removal efforts will continue into November with the appropriate allocation of personnel and resources necessary to continue the accelerated efforts required for the current site conditions and time of year.

Please feel free to contact me at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like further information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood

Habitat Restoration Foreman

SITE PHOTOS

Photo 1: Crew members collecting mustard seed heads in trash bins before transferring them to contractor bags.

Photo 2: Crew member using a weed whacker to trim white sweetclover near the Tujunga Ponds. Red flagging was used to identify native plant species, reducing the risk of accidental trimming.

Photo 3: Crew members collecting white sweetclover seeds and unearthing roots from around Tujunga Ponds.

Photo 4: Crew members working along the eastern slope of the northern bluff within the Mitigation Area, west of the Tujunga Ponds.

Photo 5: Crew member trimming mustard seed heads using a weed whacker beneath the bluffs west of Cottonwood Avenue.

Photo 6: Crew members uprooting castor bean plants along Haines Canyon Creek.

Photo 7: Crew member collecting mustard seed heads along the northern edge of the Mitigation Area.

Photo 8: Crew members using weed whackers to trim mustard seed heads along the northern edge of the Mitigation Area.

Photo 9: Example of one castor bean individual located in the northern portion of the Mitigation Area. Note the numerous mature seed heads.

Photo 10: Crew member collecting mature castor bean seed heads in the northern portion of the Mitigation Area.

Photo 11: Giant reed and its uprooted rhizome after removal. Care was taken to remove the entire rhizome, minimizing the potenial for new shoots to grow.

Photo 12: Castor bean, including the entire root, removed from along Haines Canyon Creek.

Photo 13: Crew members traveled alongHaines Canyon Creek to remove targetted exotic species that were difficult to access. A biologist was present during all creek travel.

Photo 14: Crew members removing mustard seed heads from beneath the southern embankment of the Mitigation Area.

Photo 15: Crew members removing castor bean and tree tobacco from the southern portion of Big Tujunga Wash.

Photo 16: Section of Haines Canyon Creek before exotic plant removal efforts. Note the extensive stand of castor bean.

Photo 17: Same section of Haines Canyon Creek after castor bean removal. Note the willow trees that now have increased access to sunlight and water

Photo 18: Contractor bags stored at Cottonwood Avenue before their removal from the Mitigation Area. A total of approximately 1,600 contractor bags were filled with exotic plant seed heads during August, September, and October efforts.

December 11, 2019

Julianna Colwell
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

Subject: Memorandum for November 2019 Exotic Plant Eradication Program Throughout the Riparian and Uplands of the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Colwell,

This memorandum summarizes the exotic plant eradication efforts conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (Mitigation Area) through November 2019. This memo shows the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek, which are named tributaries to the Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group qualified biologists and restoration specialists participating in exotic plant removal efforts within the Mitigation Area worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the November exotic plant eradication effort including, dates, names of participants, locations and descriptions of eradication activities performed, sensitive resources encountered, and mitigation actions taken are discussed below.

Implementation

Biologist Alisa Muniz led the work progression, and pre-activity sweeps were conducted by biologists Alisa Muniz, Corey Jacobs, Mauricio Gomez, and/or Erik Olmos ahead of the work crew. In addition, a biologist traveled with the work crew each day to monitor that no native plant or wildlife species were negatively impacted by work activities. Prior to the start of work each day, the crew received onsite orientation and instruction regarding safety, permit and mitigation regulations, and sensitive species that may be encountered in work areas. The meetings were conducted by habitat restoration foreman Tim Wood and/or Alisa Muniz.

The exotic plant eradication team focused on removing umbrella plant (*Cyperus involucratus*) and eupatory (*Ageratina adenophora*) along Haines Canyon Creek and the Tujunga Ponds. Because of the potentially greater ecological benefits to riparian habitat along the creek (e.g., return of natural water flow, enrichment of sensitive fish habitat), most of these efforts were spent removing exotic species from the creek rather than the ponds. The crew continued mechanical removal methods initiated earlier this year including hand pulling, digging out, and/or cutting exotic vegetation.

Crew members used shovels and “Pulaski” pick-axes to dig, chop, and pry rhizomes from the soil. When appropriate, the above ground vegetation of the umbrella plant was trimmed with machetes, hand-saws, and hedge trimmers to provide better access to the rhizomes. Care was taken to avoid/minimize soil disturbance along the creek banks as much as feasible during the removal of rhizomes. All vegetation and root matter of the exotic species were removed from the creek and dragged out of the flood plain to upland areas where plants and seeds would not be able to reestablish due to insufficient resources (e.g., water), and to reduce the potential buildup of debris within the creek when water levels rise from winter precipitation. Because umbrella plant and eupatory were most prevalent within and along the creek banks, travel and work within the creek was necessary. Crew members wore waders and rubber boots while working in the creek and a biologist was present during all creek travel to carefully monitor that the native fish were not negatively impacted by removal efforts.

Execution

On November 4 and 5, exotic plant removal efforts began at the Tujunga Ponds. The crew focused on the thick stands of umbrella plant that were established along the northern shoreline. As umbrella plant matures, it spreads laterally underground and forms a thick rhizome. The crew used shovels and pick-axes to cut and pry the rhizomes from the shores of the ponds (Photo 1).

On November 6 and 7, the crew removed umbrella plant and eupatory from the easternmost section of Haines Canyon Creek, starting at the area surrounding the exotic fish exclusionary fence near the Tujunga Ponds and progressing along the creek until reaching the creek crossing north of the Cottonwood Avenue bluff. This area contained large, thick stands of umbrella plant that filled sections of creek and impeded the natural flow of water. Crew members used shovels to dig out the rhizomes, taking care to minimize disturbance to the creek bed as much as feasible (Photo 2). Removing these stands of umbrella plant decreased competition for water and sunlight for native species and quickly returned the creek to its more natural course by filling out the creek banks and increasing water flow (Photo 3 and 4).

From November 8 through 18, crew members removed exotic plants from the section of the creek running from the creek crossing north of Cottonwood Avenue bluff to the creek crossing northeast of the south Wheatland Avenue gate. This portion of the creek contained stands of umbrella plants within the creek and established along the creek banks as well as extensive eupatory stands along the creek banks (Photo 5). Because both umbrella plant and eupatory can regrow from any root material left in the ground, care was taken to dig out the entire root system to minimize the likelihood of recolonization (Photo 6 and 7).

From November 19 through 22, the crew removed exotic plants from the remainder of the creek, from the creek crossing northeast of south Wheatland Avenue gate to the powerlines that border the western side of the Mitigation Area. This portion of the creek was dominated by thick stands of umbrella plant established along the creek banks. Hedge trimmers were used to trim away the vegetative portions of the umbrella plant, allowing easier access to the underground rhizome (Photo 8). Biologists flagged native plants to minimize the risk of accidently trimming non-target species. Shovels and pry-bars were used to dig out the rhizomes and all plant matter was hauled out of the flood plain (Photos 9 and 10).

Summary and Results

All exotic plant eradication activities were supervised by Alisa Muniz and Tim Wood, who monitored that regulations and requirements were closely followed. The crew averaged six members per day during exotic plant eradication efforts. Biologists Alisa Muniz, Corey Jacobs, Mauricio Gomez, and/or Erik Olmos inspected work areas prior to the start of each workday and then traveled with the crew to monitor that native plants and sensitive wildlife species were not disturbed.

The November exotic plant eradication efforts focused on removing umbrella plant and eupatory from Haines Canyon Creek and the Tujunga Ponds. These exotic species had formed large and established stands within and along the banks of the creek and displaced native plants from potential habitat, competing with them for water and light resources. Large sections of the creek were cleared of these species, resulting in more natural water flow and increased availability of water and sunlight for native species. In addition, large areas of the creek bank that had been previously been overwhelmed by these species were opened as potential habitat for native species, including willow species (*Salix* spp.), Fremont's cottonwood (*Populus fremontii*), and mulefat (*Baccharis salicifolia*) (Photos 11, 12, 13, and 14).

Umbrella plant had also solidified/cemented the sediment along the creek bank in a way that prevented the creek from naturally shifting its course with seasonal flooding. This lack of plasticity to the creek's course contributed to the channelizing of portions of the creek, resulting in deeper and faster moving water, fewer eddies in which smaller sensitive fish species can take refuge, as well as the formation of pools used by non-native fish species. With the removal

of umbrella plant, the creek will now have the opportunity to adjust its banks and course during seasonal flood events, deterring the reestablishment of exotic plant species (Photos 15 and 16).

Discussion

In addition to upland habitat, the riparian creek vegetation was also affected by the Creek Fire. Large sections of the creek were observed to be dominated by umbrella plant, which was able to quickly re-sprout from remaining rhizomes. The rapid regeneration from the remaining rhizomes dominated recovering native species and inhibited their recolonization of the creek banks. During the umbrella plant removal efforts, native tree and shrub species, including mulefat and Fremont's cottonwood, were commonly discovered in poor health (e.g., leafless and twisted branches) within patches of umbrella plant. Removing the rhizomes of the umbrella plant will allow the native plant species to recover without being enveloped and outcompeted by exotic vegetation.

Umbrella plant also affects the physical structure of the creek and riparian habitat, resulting in cascading ecological effects. Native riparian plant communities form a matrix of complex vegetation structure that provides foraging and nesting habitat for native wildlife species, including sensitive bird species like the southwestern willow flycatcher (*Empidonax trailii estimus*) and least Bell's vireo (*Vireo bellii pusillis*). When umbrella plant colonizes an area, it forms a homogenous stand of thick reed vegetation. This simplification of vegetation structure provides less suitable habitat for sensitive bird species within the Mitigation Area. The rhizomes of umbrella plant also stabilize the sediment along the creek in a way that inhibits natural water flow. Seasonal flooding allows the creek to shift its course, benefiting native fish species by adding structural complexity to the creek bed and opening habitat for native plant species which require the inundation of flood water in order to germinate. However, the density of umbrella plant along the banks of the creek had resulted in unchanging water flow and the formation of deep channels. This simplification of the creek's course resulted in a feedback loop with static and consistent water flow, encouraging more umbrella plant growth and further deepening the channels.

Because umbrella plant is perennial and produces seeds year-round, it was most effective for the crew to focus on removing the entire plant, including the underground rhizome, which had become densely established within the Mitigation Area. Most individuals were very large and were embedded in the sediment of the creek and creek bank; digging out the entire rhizome of each plant required extensive effort. While mechanical removal is labor intensive, past efforts to suppress the growth, development, and resprouting of umbrella plant from the rhizome with herbicides have not been 100 percent successful. Full removal of the plants provides greater ecological benefits by restoring the physical attributes of the habitat such as soil structure and resource availability for native plants. In addition, dense stands of umbrella plant along Haines Canyon Creek would require high concentrations of herbicide to ensure that an adequate amount of the chemical was absorbed into the plants to kill them (enough to kill the rhizome to prevent it from resprouting), and potentially multiple herbicide applications. While only aquatically approved herbicides would be considered for use along the creek and ponds (currently not approved by Public Works), the risk of overspray and herbicide drift to reestablishing native plant species would be counterproductive to the restoration of riparian habitat during this early stage of recovery. It is recommended that only mechanical removal methods continue to be used to control exotic perennial species along the creek in order to best restore habitat function and protect sensitive plant and aquatic species within the Mitigation Area.

Chambers Group staff will continue to support the ongoing effort to protect and enhance the Mitigation Area's native habitat through regular exotic plant eradication efforts. Chambers Group staff will continually assess the efficacy of eradication methods and adjust these methods as needed to best support mitigation goals.

Please feel free to contact me at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like further information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood

Habitat Restoration Foreman

SITE PHOTOS

Photo 1: Crew members using shovels to remove umbrella plant from the Tujunga Ponds.

Photo 2: Crew members using shovels to dig umbrella plant rhizomes from Haines Canyon Creek.

Photo 3: Section of Haines Canyon Creek before exotic plant removal. Note the stand of umbrella plant located in the center of the creek that is greater than seven feet tall.

Photo 4: After exotic plant removal in the same section of Haines Canyon Creek as Photo 3. Note the expansion of the creek banks and increased water flow.

Photo 5: Extensive eupatory along the bank of Haines Canyon Creek.

Photo 6: Eupatory that was removed from Haines Canyon Creek, including the root.

Photo 7: Portions of an umbrella plant rhizome after being dug out of the bank of Haines Canyon Creek.

Photo 8: Crew member using a hedge trimmer to reduce the umbrella plant allowing easier access to the rhizome. Native plants were marked with red flagging to minimize the risk of accidental trimming.

Photo 9: Crew members continuing to dig out the rhizomes of an umbrella plant stand. The removed rhizomes were dragged out of the flood plain to upland areas to prevent re-rooting.

Photo 10: Exotic vegetation was dragged out of the flood plain to reduce potential buildup of debris within the creek during flood events.

Photo 11: Section of Haines Canyon Creek that was filled with umbrella plant before exotic plant removal.

Photo 12: After exotic plant removal in the same section of Haines Canyon Creek as Photo 11. Note the willow, Fremont's cottonwood, and mulefat that are now free of competition from umbrella plant.

Photo 13: Section of Haines Canyon Creek that was impeded by umbrella plant before exotic plant removal.

Photo 14: After exotic plant removal in the same section of Haines Canyon Creek as Photo 13. Note the open creek banks that are now available for colonization by native plants.

Photo 15: Section of Haines Canyon Creek that was filled with umbrella plant before exotic plant removal. This section of creek had formed a deep channel as a result of thick umbrella plant established on both banks. Taken on November 12.

Photo 16: After exotic plant removal in the same section of Haines Canyon Creek as Photo 15. Following several rain events, the increased water level and flow scoured the banks and removed excess sediment, widening the creek and allowing more natural water flow. Taken on December 10.

December 30, 2019

Julianna Colwell
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

Subject: Memorandum for December 2019 Exotic Plant Eradication Program Throughout the Riparian and Uplands of the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Colwell,

This memorandum summarizes the exotic plant eradication efforts conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (Mitigation Area) through December 2019. This memo shows the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek, which are named tributaries to the Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group qualified biologists and restoration specialists participating in exotic plant removal efforts within the Mitigation Area worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the December exotic plant eradication effort including, dates, names of participants, locations and descriptions of eradication activities performed, sensitive resources encountered, and mitigation actions taken are discussed below.

Implementation

Restoration foreman Tim Wood and biologist Alisa Muniz led the work progression, and pre-activity sweeps were conducted by Alisa Muniz ahead of the work crew. In addition, a biologist traveled with the work crew each day to monitor that no native plant or wildlife species were negatively impacted by work activities. Prior to the start of work each day, the crew received onsite orientation and instruction regarding safety, permit and mitigation regulations, and sensitive species that may be encountered in work areas. The meetings were conducted by habitat restoration foreman Tim Wood and/or Alisa Muniz.

The exotic plant eradication team removed umbrella plant (*Cyperus involucratus*) and eupatory (*Ageratina adenophora*) from the headwaters of Haines Canyon Creek and the Tujunga Ponds. The crew continued mechanical removal methods initiated earlier this year including hand pulling, digging out, and/or cutting exotic vegetation.

Crew members used shovels and “Pulaski” pick-axes to dig, chop, and pry rhizomes from the soil. When appropriate, the above ground vegetation of the umbrella plant was trimmed with machetes, hand-saws, and hedge trimmers to provide better access to the rhizomes. Care was taken to avoid/minimize soil disturbance along the creek banks as much as feasible during the removal of rhizomes. All vegetation and root matter of the exotic species were removed from the creek and dragged out of the flood plain to upland areas where plants and seeds would not be able to reestablish due to insufficient resources (e.g., water), as well as to reduce the potential build-up of debris within the creek when water levels rise from winter precipitation. Because umbrella plant and eupatory were most prevalent within and along the banks of the creek and pond, travel and work within the water was necessary. Crew members wore waders and rubber boots while working in the creek and pond and a biologist was present to carefully monitor that the native fish were avoided during removal efforts.

Execution

On December 9, 10, and 17 through 19, the crew removed exotic plants from the headwaters of Haines Canyon Creek, where the creek exits the Tujunga Ponds. This area forms a wide drainage out of the ponds that was lined with umbrella plant along the water's edge and where the water spreads out and becomes shallow (Photo 1). The crew used shovels and pick-axes to dig the rhizomes of these individuals out of the sediment, and then dragged the entire plant out of the flood plain and lined the equestrian trail with the vegetation. Native plant species including mule fat (*Baccharis salicifolia*) and willows (*Salix* spp.) were revealed along the shoreline after the stand of umbrella plant was removed and shallow water re-filled the area (Photo 2). In the deeper water near the ponds, the umbrella plant and eupatory had become established along the shoreline and was firmly affixed in the sediment. These species had formed a thick wall of vegetation between the upland habitat and the native freshwater marsh. Crew members wore waders and entered the water to better access these plants for removal. Additional crew members assisted from the shore to clear large sections of these exotic plants from the area (Photos 3, 4, and 5).

On December 24 and 27, the crew removed exotic plants from the upper portion of Haines Canyon Creek, between the exotic fish exclusionary fence and the Tujunga Ponds. This area is thickly vegetated with native cattail plants (*Typha* sp.) and broadleaf riparian tree species including willows and boxelder (*Acer negundo*) and care was taken to avoid/minimize disturbance to these native species. The constant water supply draining from the ponds facilitated the growth of umbrella plant and eupatory which formed dense thickets along the edges of the creek; large areas of shoreline were cleared of these exotic species (Photos 6 and 7). The crew used shovels to dig out the roots of both species and dragged the vegetation above the flood plain to minimize the risk of re-rooting (Photos 8 and 9).

Summary and Results

All exotic plant eradication activities were supervised by Alisa Muniz and Tim Wood, who monitored that regulations and requirements were closely followed. The crew averaged six members per day during exotic plant eradication efforts. Alisa Muniz inspected work areas prior to the start of each workday and then traveled with the crew to monitor that native plants and sensitive wildlife species were not disturbed.

The December exotic plant eradication efforts focused on removing umbrella plant and eupatory from the headwaters of Haines Canyon Creek where it flows out of the Tujunga Ponds. These exotic species had colonized the shoreline of the ponds and creek outlet and displaced native plants from potential habitat. The exotic plants around the ponds also provide a source of exotic seeds that can spread downstream via Haines Canyon Creek. Large areas along the waterway were cleared of these species, relieving native species of competition and decreasing the amount of exotic plant seeds that could flow into Haines Canyon Creek.

Eupatory forms a vine-like habit as it grows and overtakes any available object that it can grow on, including other plant species. Because eupatory requires a constant water supply, it established along the banks of the ponds and creek, forming thick mats and outcompeting native plant species. Removing the large thickets of eupatory from around the Tujunga Ponds revealed many native plants that had been overtaken by the exotic vegetation, including blue elderberry (*Sambucus nigra*) and small-flowered nightshade (*Solanum americanum*; Photo 10). With the exotic vegetation removed, native species will be able to reestablish along the banks of the ponds and creek.

The umbrella plant around Tujunga Ponds and Haines Canyon Creek outlet had formed thick stands along water's edge and the shallow drainage, displacing native cattail and riparian tree species. The structure of umbrella plant is detrimental to the native marsh habitat that the Tujunga Ponds and creek outlet provide for marsh and water bird species. Native cattail species grow from single shoots, forming a labyrinth of vertical vegetation with spaces in between individual plants. Bird species like sora (*Porzana carolina*) and marsh wrens (*Cistothorus palustris*) that were observed in the marsh habitat around the Tujunga Ponds during umbrella plant removal, specialize on living in this thick, yet penetrable, vegetation. Because numerous umbrella plant shoots grow out of a single rhizome, and rhizomes grow laterally as they mature, established stands become too thick for these bird species to forage and take cover. Removing

umbrella plant from the ponds and creek outlet will allow cattail and other marsh plant species to fill in the shoreline, providing more suitable habitat for native wildlife species.

Umbrella plant had also solidified the sediment along the creek bank in a way that prevented the creek from naturally shifting its course with seasonal flooding. This lack of plasticity to the creek's course contributed to the channelizing of portions of the creek, resulting in deeper and faster moving water, fewer eddies in which smaller sensitive fish species can take refuge, as well as the formation of pools used primarily by non-native fish species. With the removal of umbrella plant, the creek will now have the opportunity to adjust its banks and course during seasonal flood events, allowing for increased sediment deposition, and providing additional areas along the banks for native species recruitment.

Discussion

In addition to upland habitat, the riparian creek vegetation was also affected by the Creek Fire. Large sections of the creek were observed to be dominated by umbrella plant, which was able to quickly re-sprout from remaining rhizomes. The rapid regeneration from the remaining rhizomes dominated recovering native species and inhibited their recolonization of the creek banks. During the umbrella plant removal efforts, native tree and shrub species, including mulefat and Fremont's cottonwood, were commonly discovered in poor health (e.g., leafless and twisted branches) within patches of umbrella plant. Removing the rhizomes of the umbrella plant will allow the native plant species to re-establish along the banks of the creek and ponds.

Umbrella plant also affects the physical structure of the creek and riparian habitat, resulting in cascading ecological effects. Native riparian plant communities form a matrix of complex vegetation structure that provides foraging and nesting habitat for native wildlife species, including sensitive riparian bird species like the southwestern willow flycatcher (*Empidonax trailii estimus*) and least Bell's vireo (*Vireo bellii pusillis*). When umbrella plant colonizes an area, it forms a homogenous stand of thick reed vegetation. This simplification of vegetation structure provides less suitable habitat for sensitive bird species within the Mitigation Area. The rhizomes of umbrella plant also stabilize the sediment along the creek in a way that inhibits natural water flow. Seasonal flooding allows the creek to shift its course, benefiting native riparian plant species, amphibians and fish species by adding structural complexity to the creek bed and opening habitat for native plant species which require the inundation of flood water in order to germinate. However, the density of umbrella plant along the banks of the creek had resulted in unchanging water flow and the formation of deep channels. This simplification of the creek's course resulted in a feedback loop, with static and consistent water flow encouraging more umbrella plant growth, further deepening the channels.

Because umbrella plant is perennial and produces seeds year-round, it was most effective for the crew to focus on removing the entire plant, including the underground rhizome, which had become densely established within the Mitigation Area. Most individuals were very large and were embedded in the sediment of the creek and creek bank; digging out the entire rhizome of each plant required extensive effort. While mechanical removal is labor intensive, past efforts to suppress the growth, development, and resprouting of umbrella plant from the rhizome with herbicides have not been 100 percent successful. Full removal of the plants provides greater ecological benefits by restoring the physical attributes of the habitat such as soil structure and resource availability for native plants. In addition, dense stands of umbrella plant along Haines Canyon Creek would require high concentrations of herbicide to ensure that an adequate amount of the chemical was absorbed into the plants to kill them (enough to kill the rhizome to prevent it from resprouting), and potentially multiple herbicide applications. While only aquatically approved herbicides would be considered for use along the creek and ponds (currently not approved by Public Works), the risk of overspray and herbicide drift to reestablishing native plant species would be counterproductive to the restoration of riparian habitat during this early stage of recovery. It is recommended that only mechanical removal methods continue to be used to control exotic perennial species along the creek in order to best restore habitat function and protect sensitive plant and aquatic species within the Mitigation Area.

Chambers Group staff will continue to support the ongoing effort to protect and enhance the Mitigation Area's native habitat through regular exotic plant eradication efforts. Chambers Group staff will continually assess the efficacy of eradication methods and adjust these methods as needed to best support mitigation goals.

Please feel free to contact me at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like further information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood

Habitat Restoration Foreman

SITE PHOTOS

Photo 1: Stand of umbrella plant in the process of being removed from the outlet of the Tujunga Ponds. Note that umbrella plant had colonized the entire shoreline, including the areas of shallow water, outcompeting the native cattail (seen on the right) and native riparian plants.

Photo 2: Same section of the Tujunga Ponds outlet as Photo 1, after exotic plant removal. Note the mulefat and willow that had previously been engulfed by umbrella plant.

Photo 3: Crew members removing umbrella plant from the outlet of Tujunga Ponds.

Photo 4: Section of the Tujunga Ponds outlet where umbrella plant and eupatory had colonized the shoreline, forming a wall of exotic vegetation between the upland (left foreground) and freshwater marsh (right background) habitats.

Photo 5: Same section of the Tujunga Ponds outlet as Photo 4, after exotic plant removal. The previously overgrown habitat is now available for native riparian plants to re-establish.

Photo 6: Section of upper Haines Canyon Creek where the bank had been overtaken by umbrella plant and eupatory.

Photo 7: Same section of upper Haines Canyon Creek as Photo 6, after exotic plant removal.

Photo 8: Crew member removing umbrella plant and eupatory from the bank of Haines Canyon Creek.

Photo 9: Exotic vegetation was dragged out of the flood plain after it was removed to minimize the risk of re-rooting.

Photo 10: Area along the Tujunga Ponds where eupatory had completely covered the adjacent upland habitat. Note the undergrown blue elderberry and small-flowered nightshade plants that are now relieved from exotic competition.

APPENDIX F – EXOTIC WILDLIFE REMOVAL MEMOS

April 2, 2019

Melanie Morita
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

RE: Memorandum for the March 2019 Exotic Wildlife Removal Effort in the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Morita,

This memorandum summarizes the exotic wildlife removal efforts conducted during the month of March by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA), and the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group biologists participating in exotic wildlife removal efforts were approved prior to the initiation of eradication activities within the BTWMA. The purpose of the Exotic Wildlife Removal Program is to remove exotic, aquatic wildlife from Big Tujunga Wash (Wash), Haines Canyon Creek (Creek), Eastern Tujunga Pond and Western Tujunga Pond (Ponds), thereby reducing negative impacts on sensitive native species. Potential negative impacts to sensitive native species include but are not limited to, resource competition, predation, and the transmission of harmful pathogens and parasites. Details of the March exotic wildlife removal effort are provided below.

METHODS

The March exotic wildlife removal effort was a two-day effort conducted on March 26 and 27, 2019, by Chambers Group Wildlife Biologists Paul Morrissey (Santa Ana sucker specialist; USFWS permit 182550-1), Heather Franklin, Corey Jacobs, Brian Cropper, and Kendal Blackmon (biologists). During the first day of the effort the biologists investigated the Eastern Tujunga Pond and the outlet of the Western Tujunga Pond for exotic aquatic species and used rod-and-reel, and seines deployed from a small boat to target any exotic species observed. The primary species targeted within the Ponds included, bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), western mosquitofish (*Gambusia affinis*), and largemouth bass (*Micropterus salmoides*). The biologists also checked the fish exclusionary screens, and cleared away any debris that had accumulated. During the second day of the effort the biologists focused on removing exotic species from the south end of the Eastern Tujunga Pond, targeting largemouth bass, bluegill, western mosquitofish, and green sunfish with seines deployed from a small boat, rod-and-reel, snorkeling, and fish-netting methods. Any target species captured during the effort was immediately euthanized and detailed notes documenting each day's removal effort were recorded on data sheets. All fish nets and other field equipment were thoroughly washed both prior-to and after the day's effort.

RESULTS

The exotic, aquatic species captured and removed from the Eastern Tujunga Pond during the March effort included, 16 juvenile western mosquitofish, 21 largemouth bass (10 young-of-the-year [YOY], 10 juveniles, 1 adult), 20 bluegill (2 YOY, 18 juveniles), and 3 juvenile green sunfish. No aquatic species were observed during the fish exclusionary screen check.

DISCUSSION AND CONCLUSIONS

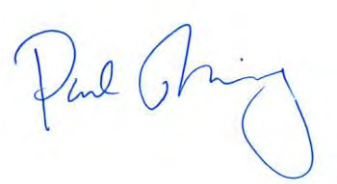
Very few exotic aquatic species were observed or removed from the Western Tujunga Pond outlet and Eastern Tujunga Pond due to a lack of vegetation (which provides cover for aquatic species) growing in the Ponds. The exotic species in the Ponds were concentrated in the deeper areas which could not be accessed by the seines. As a result, the March removal effort was limited to two days. In addition, no aquatic species were observed in the Creek by the fish exclusionary screens during the effort.

Chambers Group biologists will continue the ongoing effort to protect and enhance the Mitigation Area's native wildlife species by removing exotic, aquatic species such as non-native fishes, frogs, turtles, and red swamp crayfish on a monthly basis. Chambers Group biologists will continually assess the efficacy of exotic wildlife removal methods and adjust these methods as needed to best support mitigation goals. The next exotic wildlife removal effort is planned for April 2019.

Please do not hesitate to contact me at (949) 261-5414 or at pmorrissey@chambersgroupinc.com, to discuss any questions or concerns.

Sincerely,

CHAMBERS GROUP, INC.



Paul Morrissey
Principal | Director of Biology

SITE PHOTOS

Photo 1: Chambers Group biologists deploying a sein from a small boat, on March 27, 2019, in the Eastern Tujunga Pond.

Photo 2: The biologists swim with the sein bringing the ends together to form a purse shape, in order to capture and remove exotic aquatic species from the Ponds.

Photo 3: Example of a largemouth bass captured and removed from the Eastern Tujunga Pond on March 27, 2019.

May 3, 2019

Melanie Morita
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

RE: Memorandum for the April 2019 Exotic Wildlife Removal Effort in the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Morita,

This memorandum summarizes the exotic wildlife removal efforts conducted during the month of April by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA), and the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group biologists participating in exotic wildlife removal efforts were approved prior to the initiation of eradication activities within the BTWMA. The purpose of the Exotic Wildlife Removal Program is to remove exotic, aquatic wildlife from Big Tujunga Wash (Wash), Haines Canyon Creek (Creek), Eastern Tujunga Pond and Western Tujunga Pond (Ponds), thereby reducing negative impacts on sensitive native species. Potential negative impacts to sensitive native species include but are not limited to, resource competition, predation, and the transmission of harmful pathogens and parasites. Details of the April exotic wildlife removal effort are provided below.

METHODS

The April exotic wildlife removal effort was a two-day effort conducted on April 24 and 25, 2019, by Chambers Group Wildlife Biologists Paul Morrissey (Santa Ana sucker specialist; USFWS permit 182550-1), Heather Franklin, Corey Jacobs, Mauricio Gomez, Colin Durkin, and Jacob Lloyd Davies (biologists). During the first day of the effort the biologists investigated the Eastern Tujunga Pond for exotic aquatic species and used rod-and-reel, and seines deployed from a small boat to target any exotic species observed. The primary species targeted within the Ponds included, bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), western mosquitofish (*Gambusia affinis*), and largemouth bass (*Micropterus salmoides*). During the second day of the effort the biologists focused on removing exotic species from the Eastern Tujunga Pond, targeting largemouth bass, bluegill, western mosquitofish, green sunfish, and red swamp crayfish (*Procambarus clarkii*) with seines deployed from a small boat, rod-and-reel, snorkeling, and fish-netting methods. The biologists then used a beach sein to remove exotics at the outlet of the Western Tujunga Pond. The biologists also checked the fish exclusionary screens and cleared away any debris that had accumulated. Any target species captured during the effort was immediately euthanized and detailed notes documenting each day's removal effort were recorded on data sheets. All fish nets and other field equipment were thoroughly washed both prior-to and after the day's effort.

RESULTS

The exotic, aquatic species captured and removed from the Eastern Tujunga Pond during the April effort included, one juvenile western mosquitofish, nine largemouth bass (three young-of-the-year [YOY], six juveniles), three bluegill (two YOY, one juvenile), and one YOY green sunfish. The exotic aquatic species captured and removed from the Western Tujunga Pond and the outlet to the Western Tujunga Pond during the April effort included, 67 western

mosquitofish (35 YOY, 32 adults), 5 adult largemouth bass, 3 YOY green sunfish, and approximately 3,500 larval and 2 adult red swamp crayfish. No aquatic species were observed during the fish exclusionary screen check.

DISCUSSION AND CONCLUSIONS

Very few exotic aquatic species were observed or removed from the Western Tujunga Pond and outlet or the Eastern Tujunga Pond due to a lack of vegetation (which provides cover for aquatic species) growing in the Ponds. The exotic species in the Ponds were concentrated in the deeper areas which could not be accessed by the seines. As a result, the April removal effort was limited to two days. In addition, no aquatic species were observed in the Creek by the fish exclusionary screens during the effort.

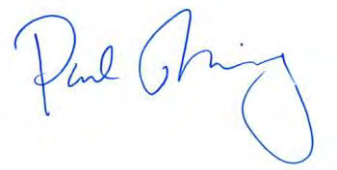
During the morning hours of April 24, a Federal- and State-listed endangered least Bell's vireo (*Vireo bellii pusillus*) was heard singing near the Ponds for approximately one hour. This individual was likely a migrant due to the early season timing of its presence on site.

Chambers Group biologists will continue the ongoing effort to protect and enhance the Mitigation Area's native wildlife species by removing exotic, aquatic species such as non-native fishes, frogs, turtles, and red swamp crayfish on a monthly basis. Chambers Group biologists will continually assess the efficacy of exotic wildlife removal methods and adjust these methods as needed to best support mitigation goals. The next exotic wildlife removal effort is planned for May 2019.

Please do not hesitate to contact me at (949) 261-5414 or at pmorrissey@chambersgroupinc.com, to discuss any questions or concerns.

Sincerely,

CHAMBERS GROUP, INC.



Paul Morrissey
Principal | Director of Biology

SITE PHOTOS

Photo 1: Chambers Group biologists preparing for exotic removal efforts at the Tujunga Ponds on April 25, 2019.

June 10, 2019

Melanie Morita
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

RE: Memorandum for the May 2019 Exotic Wildlife Removal Effort in the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Morita,

This memorandum summarizes the exotic wildlife removal efforts conducted during the month of May by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA), and the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group biologists participating in exotic wildlife removal efforts were approved prior to the initiation of eradication activities within the BTWMA. The purpose of the Exotic Wildlife Removal Program is to remove exotic, aquatic wildlife from Big Tujunga Wash (Wash), Haines Canyon Creek (Creek), Eastern Tujunga Pond and Western Tujunga Pond (Ponds), thereby reducing negative impacts on sensitive native species. Potential negative impacts to sensitive native species include but are not limited to, resource competition, predation, and the transmission of harmful pathogens and parasites. Details of the May exotic wildlife removal effort are provided below.

METHODS

The May exotic wildlife removal effort was a one-day effort conducted on May 29, 2019, by Chambers Group Wildlife biologists Heather Franklin, Corey Jacobs, and Jacob Lloyd Davies (biologists), and Habitat Restoration Foreman Tim Wood. Biologists investigated the Eastern Tujunga Pond for exotic aquatic species and used rod-and-reel, and seines deployed from a small boat to target any exotic species observed. The primary species targeted within the Ponds included, bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), western mosquitofish (*Gambusia affinis*), largemouth bass (*Micropterus salmoides*), and red swamp crayfish (*Procambarus clarkii*). The biologists then used a beach sein to remove exotics at the outlet of the Western Tujunga Pond. The biologists also checked the fish exclusionary screens and cleared away any debris that had accumulated. Any target species captured during the effort was immediately euthanized and detailed notes documenting each day's removal effort were recorded on data sheets. All fish nets and other field equipment were thoroughly washed both prior-to and after the day's effort.

RESULTS

The exotic, aquatic species captured and removed from the Eastern Tujunga Pond during the May effort included, 6 western mosquitofish (5 juveniles, 1 adult), 601 larval red swamp crayfish, 9 largemouth bass (8 young-of-the-year [YOY], 1 juvenile), and 1 adult bluegill. The exotic, aquatic species captured and removed from the outlet of the Western Tujunga Pond during the May effort included, 40 YOY western mosquitofish, and 2 adult largemouth bass. The exotic, aquatic species captured and removed from the Creek (up and down stream of the exclusionary screens) included 16 adult and 2 larval red swamp crayfish, and 1 adult black bullhead (*Ameiurus melas*).

DISCUSSION AND CONCLUSIONS

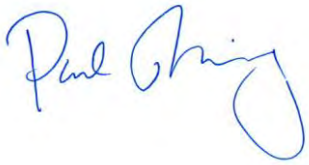
Very few exotic aquatic species were observed or removed from the Western Tujunga Pond and outlet or the Eastern Tujunga Pond due to a lack of vegetation (which provides cover for aquatic species) growing in the Ponds. The exotic species in the Ponds were concentrated in the deeper areas which could not be accessed by the seines. As a result, the May removal effort was limited to one day. Chambers Group biologists are looking into more effective ways to target exotic fish in the deeper areas of the Ponds. One alternative method being considered is the use of spearguns that can penetrate deep into the water in areas where exotic fish are known to congregate.

Chambers Group biologists will continue the ongoing effort to protect and enhance the Mitigation Area's native wildlife species by removing exotic, aquatic species such as non-native fishes, frogs, turtles, and red swamp crayfish on a monthly basis. Chambers Group biologists will continually assess the efficacy of exotic wildlife removal methods and adjust these methods as needed to best support mitigation goals. The next exotic wildlife removal effort is planned for June 2019.

Please do not hesitate to contact me at (949) 261-5414 or at pmorrissey@chambersgroupinc.com, to discuss any questions or concerns.

Sincerely,

CHAMBERS GROUP, INC.



Paul Morrissey
Principal | Director of Biology

SITE PHOTOS

Photo 1: Biologists preparing for a sein pull in the Eastern Tujunga Pond on May 29.

Photo 2: Example of a bluegill (left) and a largemouth bass (right) captured and removed from the Eastern Tujunga Pond on May 29.

Photo 3: Example of mosquitofish captured and removed from the outlet of the Western Tujunga Pond on May 29.

Photo 4: A black bullhead captured and removed from the Creek on May 29.

July 3, 2019

Melanie Morita
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

RE: Memorandum for the June 2019 Exotic Wildlife Removal Effort in the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Morita,

This memorandum summarizes the exotic wildlife removal efforts conducted during the month of June by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA), and the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group biologists participating in exotic wildlife removal efforts were approved prior to the initiation of eradication activities within the BTWMA. The purpose of the Exotic Wildlife Removal Program is to remove exotic, aquatic wildlife from Big Tujunga Wash (Wash), Haines Canyon Creek (Creek), Eastern Tujunga Pond and Western Tujunga Pond (Ponds), thereby reducing negative impacts on sensitive native species. Potential negative impacts to sensitive native species include but are not limited to, resource competition, predation, and the transmission of harmful pathogens and parasites. Details of the June exotic wildlife removal effort are provided below.

METHODS

The June exotic wildlife removal effort was a two-day effort conducted on June 13 and 14, 2019, by Chambers Group Wildlife Biologists Paul Morrissey (Santa Ana sucker specialist; USFWS permit 182550-1), Heather Franklin, Corey Jacobs, Erik Olmos, Mauricio Gomez, and Omar Moquit (biologists) and Habitat Restoration Foreman, Tim Wood. The biologists began their efforts by investigating the East Tujunga Pond for exotic aquatic species and used rod-and-reel, and seines deployed from a small boat to target any exotic species observed. Seine pulls were conducted by two biologists pulling the boat as the seine was being dished out the side of the boat by another biologist. The biologists then swam with the seine, pulling the ends together into a purse shape to trap fish. Additional biologists remained on the shore and helped to pull in the seines. During the seine pulls, large clumps of algae were removed from the pond and any exotic species that had become entrapped in the algae were collected and counted. The primary species targeted within the Ponds included, bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), western mosquitofish (*Gambusia affinis*), largemouth bass (*Micropterus salmoides*), and red swamp crayfish (*Procambarus clarkii*). Any target species captured during the effort was immediately euthanized and detailed notes documenting each day's removal effort were recorded on data sheets. All fish nets and other field equipment were thoroughly washed both prior-to and after the day's effort.

RESULTS

A total of seven seine pulls were conducted in the East Tujunga Pond during the June effort; three seine pulls were conducted on June 13, and four seine pulls were conducted on June 14 (three pulls on the north side, and one on the south side). The exotic, aquatic species captured and removed from the East Tujunga Pond during the June effort included 22 western mosquitofish (10 young-of-the-year [YOY], 12 adults), 211 red swamp crayfish (200 YOY, 11 adults),

177 largemouth bass (139 YOY, 23 Juveniles, 15 adults), 8 bluegill (3 YOY, 4 juveniles, 1 adult), 91 green sunfish (3 YOY, 44 juveniles, 44 adults), 1 adult Mozambique tilapia (*Oreochromis mossambicus*), and 16 YOY carp (species unknown).

DISCUSSION AND CONCLUSIONS

More exotic, aquatic species were observed in and removed from the East Tujunga Pond in June than in the previous months due to high algal cover (which provides cover for aquatic species) in the Ponds. The high algal cover brought fish from the deeper areas of the Ponds to more shallow depths where they were more accessible for capture with seines. Biologists continue to look into more effective ways to target the fish in the deeper areas of the Ponds including bowfishing and spearfishing.

Chambers Group biologists will continue the ongoing effort to protect and enhance the Mitigation Area's native wildlife species by removing exotic, aquatic species such as non-native fishes, frogs, turtles, and red swamp crayfish on a monthly basis. Chambers Group biologists will continually assess the efficacy of exotic wildlife removal methods and adjust these methods as needed to best support mitigation goals. The next exotic wildlife removal effort is planned for July 2019.

Please do not hesitate to contact me at (949) 261-5414 or at pmorrissey@chambersgroupinc.com, to discuss any questions or concerns.

Sincerely,

CHAMBERS GROUP, INC.

Paul Morrissey
Principal | Director of Biology

SITE PHOTOS

Photo 1: Example of Chambers Group biologists removing algae from the East Tujunga Pond, on June 13.

Photo 2: Example of Chambers Group biologists removing and counting exotic species that were entrapped in the algae that was removed from the East Tujunga Pond, on June 13.

Photo 3: Example of exotic species removed from the East Tujunga Pond, on June 13.

Photo 4: Example of Chambers Group biologists placing a seine while swimming with the boat during a seine pull, on June 14.

Photo 5: Example of Chambers Group biologists placing a seine during a seine pull, on June 14.

Photo 6: Example of exotic species that were captured and removed from the East Tujunga Pond being sorted by species and counted, on June 14.

August 9, 2019

Melanie Morita
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

RE: Memorandum for the July 2019 Exotic Wildlife Removal Effort in the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Morita,

This memorandum summarizes the exotic wildlife removal efforts conducted during the month of July by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA), and the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group biologists participating in exotic wildlife removal efforts were approved prior to the initiation of eradication activities within the BTWMA. The purpose of the Exotic Wildlife Removal Program is to remove exotic, aquatic wildlife from Big Tujunga Wash (Wash), Haines Canyon Creek (Creek), Eastern Tujunga Pond and Western Tujunga Pond (Ponds), thereby reducing negative impacts on sensitive native species. Potential negative impacts to sensitive native species include but are not limited to, resource competition, predation, and the transmission of harmful pathogens and parasites. Details of the July exotic wildlife removal effort are provided below.

METHODS

The July exotic wildlife removal effort was a one-day effort conducted on July 17, 2019, by Chambers Group Wildlife Biologists Paul Morrissey (Santa Ana sucker specialist; USFWS permit 182550-1), and supporting biologists Kendall Blackmon, Corey Jacobs, Erik Olmos, Phillip Carlos, and Mauricio Gomez. The biologists began their efforts by investigating the East Tujunga Pond for exotic aquatic species by deploying seines from a small boat to target any exotic species observed. Seine pulls were conducted by two biologists pulling the boat as the seine was being dished out the side of the boat by another biologist. The biologists then swam with the seine, pulling the ends together into a purse shape to trap fish. Additional biologists remained on the shore and helped to pull in the seines. During the seine pulls, large clumps of algae were removed from the pond and any exotic species that had become entrapped in the algae were collected and counted. Bow fishing methods were also employed. A recurve and a compound bow were outfitted with specific bow fishing equipment (retriever bow fishing reel, line, arrow safety slide kit) and positioned on the boat. Two archers and one captain/safety person surveyed the water for larger exotic fish species from the boat. The primary species targeted within the Ponds included, bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), western mosquitofish (*Gambusia affinis*), largemouth bass (*Micropterus salmoides*), Asian carp (*Cyprinus carpio*), and red swamp crayfish (*Procambarus clarkii*). Any target species captured during the effort was immediately euthanized and detailed notes documenting each day's removal effort were recorded on data sheets. All fish nets and other field equipment were thoroughly washed both prior-to and after the day's effort.

RESULTS

A total of four seine pulls were conducted on the north side of the East Tujunga Pond during the effort on July 17. The exotic, aquatic species captured and removed from the East Tujunga Pond during the July effort included, 9 young-of-the-year [YOY] western mosquitofish, 604 red swamp crayfish (600 larval, 2 juveniles, 2 adults), 372 largemouth bass (336 YOY, 17 Juveniles, 19 adults), 1 juvenile bluegill, 15 green sunfish (4 juveniles, 11 adults), and 1 YOY Mozambique tilapia (*Oreochromis mossambicus*).

DISCUSSION AND CONCLUSIONS

More exotic, aquatic species were observed in and removed from the East Tujunga Pond in July than in the previous months due to high algal cover (which provides cover for aquatic species) in the Ponds. The high algal cover brought fish from the deeper areas of the Ponds to more shallow depths where they were more accessible for capture with seines. The algae also provided cover (fish were less likely to see the seine) and trapped the fish during the seine pulls. Biologists made an attempt to target fish in the deeper areas of the Ponds by bowfishing but were unsuccessful. The high algal cover did not allow for clear visibility under the water making it difficult to spot and catch fish with other methods other than the seine pulls.

Chambers Group biologists will continue the ongoing effort to protect and enhance the Mitigation Area's native wildlife species by removing exotic, aquatic species such as non-native fishes, frogs, turtles, and red swamp crayfish on a monthly basis. Chambers Group biologists will continually assess the efficacy of exotic wildlife removal methods and adjust these methods as needed to best support mitigation goals. The next exotic wildlife removal effort is planned for August 2019.

Please do not hesitate to contact me at (949) 261-5414 or at pmorrissey@chambersgroupinc.com, to discuss any questions or concerns.

Sincerely,

CHAMBERS GROUP, INC.

Paul Morrissey
Principal | Director of Biology

SITE PHOTOS

Photo 1: Example of Chambers Group biologists placing a seine while swimming with the boat during a seine pull on July 17.

Photo 2: Example of exotic species removed from the East Tujunga Pond on July 17.

Photo 3: Example of Chambers Group biologists making an attempt to catch larger fish using bows on July 17.

Photo 4: Example of the north side of East Tujunga Pond after removing algae during seine pulls.

September 10, 2019

Melanie Morita
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

RE: Memorandum for the August 2019 Exotic Wildlife Removal Effort in the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Morita,

This memorandum summarizes the exotic wildlife removal efforts conducted during the month of August by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA), and the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group biologists participating in exotic wildlife removal efforts were approved prior to the initiation of eradication activities within the BTWMA. The purpose of the Exotic Wildlife Removal Program is to remove exotic, aquatic wildlife from Big Tujunga Wash (Wash), Haines Canyon Creek (Creek), Eastern Tujunga Pond and Western Tujunga Pond (Ponds), thereby reducing negative impacts on sensitive native species. Potential negative impacts to sensitive native species include but are not limited to, resource competition, predation, and the transmission of harmful pathogens and parasites. Details of the August exotic wildlife removal effort are provided below.

METHODS

The August exotic wildlife removal effort was a two-day effort conducted on August 28 and 29, 2019, by Chambers Group Wildlife Biologist Paul Morrissey (Santa Ana sucker specialist; USFWS permit 182550-1). The biologist began the effort on August 28 by setting up traps in the Creek in areas where largemouth bass (*Micropterus salmoides*) and red swamp crayfish (*Procambarus clarkii*) had previously been observed. Areas where Santa Ana sucker (*Catostomus santaanae*) and arroyo chub (*Gila orcuttii*) were located were avoided so as not to cause disturbance to the species. The biologist also hand removed algal mats, and lifted bark from submerged logs that were harboring red swamp crayfish. On August 29, the biologist checked the traps and removed any animals that had been captured. Algal mats that were hosting red swamp crayfish larva, were removed from the banks of the Creek. Any target species captured during the effort was immediately euthanized and detailed notes documenting removal effort were recorded on data sheets. All trapping equipment and other field equipment were thoroughly washed both prior-to and after the day's effort. The primary species targeted within the Creek included largemouth bass and red swamp crayfish.

RESULTS

The exotic, aquatic species captured and removed from the Creek during the August effort included 1,550 red swamp crayfish (1,450 larval, 99 adults) and 1 young-of-the-year largemouth bass. Of the exotic species captured and removed from the Creek, 1 juvenile largemouth bass, and 67 adult red swamp crayfish were removed from the traps and the remainder were removed from the Creek with the removal of the algal mats or by hand.

DISCUSSION AND CONCLUSIONS

A large man-made dam was observed near the south Wheatland Avenue entrance that will require several biologists to remove. The dam was created by positioning large portions of felled trees, large rocks, cobble/gravel and sand to

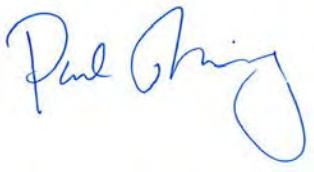
create a berm that does not allow native fish to migrate upstream or downstream. Our team will target the removal of this dam in September.

Chambers Group biologists will continue the ongoing effort to protect and enhance the Mitigation Area's native wildlife species by removing exotic, aquatic species such as non-native fishes, frogs, turtles, and red swamp crayfish on a monthly basis. Chambers Group biologists will continually assess the efficacy of exotic wildlife removal methods and adjust these methods as needed to best support mitigation goals. The next exotic wildlife removal effort is planned for September, 2019.

Please do not hesitate to contact me at (949) 261-5414 or at pmorrissey@chambersgroupinc.com, to discuss any questions or concerns.

Sincerely,

CHAMBERS GROUP, INC.



Paul Morrissey
Principal | Director of Biology

September 24, 2019

Crystal Franco
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

Subject: Memorandum for the September 2019 Exotic Wildlife Removal Effort in the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Franco,

This memorandum summarizes the exotic wildlife removal efforts conducted during the month of September by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (Mitigation Area), and the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group biologists participating in exotic wildlife removal efforts were approved prior to the initiation of eradication activities within the Mitigation Area. The purpose of the Exotic Wildlife Removal Program is to remove exotic, aquatic wildlife from Big Tujunga Wash (Wash), Haines Canyon Creek (Creek), Eastern Tujunga Pond and Western Tujunga Pond (Ponds), thereby reducing negative impacts on sensitive native species. Potential negative impacts to sensitive native species include but are not limited to, resource competition, predation, and the transmission of harmful pathogens and parasites. Details of the September exotic wildlife removal efforts are provided below.

Methods

The September exotic wildlife removal effort was conducted during three days on September 11 and 12, and September 20, 2019, by Chambers Group Wildlife Biologist Paul Morrissey (Santa Ana sucker specialist; USFWS permit 182550-1), and supporting biologists Corey Jacobs, Mauricio Gomez, Kaelin McAtee, Brian Cropper, Kendall Blackmon, Colin Durkin, Alisa Muniz, Erik Olmos, and Heather Franklin. The biologists began the effort on September 11 by investigating the Creek for exotic species. Dip nets were used to remove any exotic species observed. The biologist also hand removed algal mats, and lifted bark from submerged logs that were harboring red swamp crayfish.

On September 12, the biologists began their efforts by investigating the East Tujunga Pond for exotic aquatic species and then deployed seines from a small boat to target any exotic species observed. Seine pulls were conducted by two biologists pulling the boat through the water and dense algae mats as the seine was being dished out the side of the boat by another biologist. The biologists then swam with the seine, pulling the ends together into a purse shape to trap fish. Additional biologists remained on the shore and helped to pull in the seines. During the seine pulls, large mats of algae were removed from the pond and any exotic species that had become entrapped in the algae were collected and counted. The primary species targeted within the East Tujunga Pond included, bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), western mosquitofish (*Gambusia affinis*), largemouth bass (*Micropterus salmoides*), and red swamp crayfish (*Procambarus clarkii*).

On September 20, the biologists walked the Creek from the south Wheatland Avenue entrance to the Cottonwood Avenue entrance and used dip nets and beach seines to remove exotic wildlife. The primary species targeted within the Creek during September included largemouth bass, red swamp crayfish, and bluegill. Areas where Santa Ana sucker (*Catostomus santaanae*) and arroyo chub (*Gila orcuttii*) were located were avoided during all efforts in the Creek so as

not to cause disturbance to the species. Any target species captured during the effort was immediately euthanized and detailed notes documenting each day's removal effort were recorded on data sheets. All fish nets and other field equipment were thoroughly washed both prior-to and after the day's effort.

Results

The exotic, aquatic species captured and removed from the Creek and West Tujunga Pond outlet during the September effort included 1,939 red swamp crayfish (1,430 larval, 509 adults), 11 largemouth bass (4 juveniles, 7 adults), 83 western mosquitofish (39 young-of-the-year [YOY], 44 adults), and 10 juvenile bluegill. The exotic species captured and removed from the East Tujunga Pond during the September effort included 33 largemouth bass (22 YOY, 11 adults), 176 red swamp crayfish (150 larval, 26 adults), 144 western mosquitofish (129 YOY, 15 juveniles), 1 juvenile bluegill, and 7 adult green sunfish.

Discussion and Conclusions

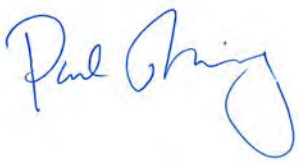
On September 11, two Santa Ana Speckled Dace (*Rhinichthys osculus* ssp. 3) were observed downstream of the Wheatland Avenue entrance. A total of six dams were encountered in the Creek and were deconstructed by the biologists during the effort. It appeared that a large cabana (hut-like structure) that was constructed along the Creek near the south Wheatland Avenue entrance was still being maintained, but no individuals associated with its construction were present at the time of the effort. Approximately 500 arroyo chub and 20 Santa Ana sucker ranging in size from 2-to-5 inches, were observed trapped in a pool that had formed as result of a dam that had been constructed in association with the cabana. The fish were observed flashing, a sign of parasites and decreased water quality due to the illegal dam. The biologists removed the dam that was constructed of large boulders, logs, and root balls. A sand and gravel berm near the dam was also lowered to allow water to flow more freely through that portion of the Creek.

Chambers Group biologists will continue the ongoing effort to protect and enhance the Mitigation Area's native wildlife species by removing exotic, aquatic species such as non-native fishes, frogs, turtles, and red swamp crayfish on a monthly basis. Chambers Group biologists will continually assess the efficacy of exotic wildlife removal methods and adjust these methods as needed to best support mitigation goals. The next exotic wildlife removal effort is planned for October, 2019.

Please do not hesitate to contact me at (949) 261-5414 or at pmorrissey@chambersgroupinc.com, to discuss any questions or concerns.

Sincerely,

CHAMBERS GROUP, INC.



Paul Morrissey

Principal | Director of Biology

SITE PHOTOS

Photo 1: Example of biologists using dip nets to remove exotic species from a ponded area of the Creek while another biologist works to deconstruct a rock dam on September 11.

Photo 2: Example of largemouth bass and red swamp crayfish removed from the Creek with a beach seine on September 11.

Photo 3: Biologists working to remove the dam associated with the cabana near the South Wheatland Avenue entrance on September 11.

Photo 4: Biologists working to remove and count exotic species trapped in algal mats that were pulled from the East Tujunga Pond on September 12.

Photo 5: Example of exotic species removed from algal mats on September 12.

Photo 6: Example of a female red swamp crayfish found carrying eggs that was removed from the Creek on September 20.

October 31, 2019

Julianna Colwell
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

Subject: Memorandum for the October 2019 Exotic Wildlife Removal Effort in the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Colwell,

This memorandum summarizes the exotic wildlife removal efforts conducted during the month of October by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (Mitigation Area), and the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group biologists participating in exotic wildlife removal efforts were approved prior to the initiation of eradication activities within the Mitigation Area. The purpose of the Exotic Wildlife Removal Program is to remove exotic, aquatic wildlife from Big Tujunga Wash (Wash), Haines Canyon Creek (Creek), Eastern Tujunga Pond and Western Tujunga Pond (Ponds), thereby reducing negative impacts on sensitive native species. Potential negative impacts to sensitive native species include but are not limited to, resource competition, predation, and the transmission of harmful pathogens and parasites. Details of the October exotic wildlife removal efforts are provided below.

Methods

The October exotic wildlife removal effort was conducted during three days on October 28 through 30, 2019, by Chambers Group biologist Paul Morrissey (Santa Ana sucker specialist; USFWS permit 182550-1), and supporting biologists Corey Jacobs, Mauricio Gomez, Colin Durkin, Erik Olmos, and Omar Moquit. The biologists began the effort on October 28 by investigating the Creek for exotic species. The biologists walked the Creek from the south Wheatland Avenue entrance to the West Tujunga Pond outlet and used dip nets and beach seines to remove exotic wildlife. The biologists also hand removed algal mats, and lifted bark from submerged logs that were harboring red swamp crayfish (*Procambarus clarkii*). The biologists continued using these methods to remove exotic wildlife in the Creek on October 29.

On October 30, the biologists began the effort by investigating the East Tujunga Pond and West Tujunga Pond outlet for exotic, aquatic species and then deployed seines from a small boat to target any exotic species observed. Seine pulls were conducted by two biologists pulling the boat through the water and dense algae mats as the seine was being dished out the side of the boat by another biologist. The biologists then swam with the seine, pulling the ends together into a purse shape to trap fish. Additional biologists remained on the shore and helped to pull in the seines. During the seine pulls, large mats of algae were removed from the pond and any exotic species that had become entrapped in the algae were collected and counted.

The primary species targeted within the East Tujunga Pond and West Tujunga Pond outlet included, bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), western mosquitofish (*Gambusia affinis*), largemouth bass (*Micropterus salmoides*), and red swamp crayfish.

The primary species targeted within the Creek during October included largemouth bass, red swamp crayfish, and western mosquitofish. Areas where Santa Ana sucker (*Catostomus santaanae*), arroyo chub (*Gila orcuttii*), or Santa Ana speckled dace (*Rhinichthys osculus* ssp. 3) were located were avoided during all efforts in the Creek so as not to cause disturbance to the species. Any target species captured during the effort was immediately euthanized and detailed notes documenting each day's removal effort were recorded on data sheets. All fish nets and other field equipment were thoroughly washed both prior-to and after the day's effort.

Results

The exotic, aquatic species captured and removed from the Creek during the October effort included 1,128 red swamp crayfish (847 larval, 9 young-of-the-year [YOY], 272 adults), 1 juvenile largemouth bass, and 45 western mosquitofish (5 YOY, 32 juveniles, 8 adults).

The exotic species captured and removed from the East Tujunga Pond and West Tujunga Pond outlet during the October effort included 21 largemouth bass (6 juveniles, 15 adults), 1,233 red swamp crayfish (1,220 larval, 13 adults), 340 western mosquitofish (295 YOY, 45 juveniles), and 7 green sunfish (3 juveniles, 4 adults).

Discussion and Conclusions

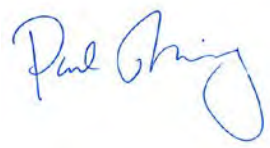
During efforts in the Creek, three Santa Ana speckled dace were observed upstream of the south Wheatland Avenue entrance. A total of four dams were encountered in the Creek and were deconstructed by the biologists during the effort. It appeared that a large cabana (hut-like structure) that was constructed along the Creek near the south Wheatland Avenue entrance was still being maintained, but no individuals associated with its construction were present at the time of the effort. Approximately 300 arroyo chub and 20 Santa Ana sucker ranging in size from 2-to-6 inches, were observed in a pool that was associated with the cabana. The dam associated with the cabana had not be rebuilt and native fish were free to swim downstream from the pooled area. Native fish were observed flashing, a sign of parasites and decreased water quality, likely due to the presence of the illegal dam from previous months. The water is still pooled in that area, but it is freely flowing. Santa Ana sucker and arroyo chub fish were observed in other portions of the Creek upstream of this area. Adult sucker were mainly observed in pooled areas with undercut banks. Younger sucker and arroyo chub were observed in wider portions of the creek where riffle/run areas existed. These areas were avoided during the exotic removal efforts.

Chambers Group biologists will continue the ongoing effort to protect and enhance the Mitigation Area's native wildlife species by removing exotic, aquatic species such as non-native fishes, frogs, turtles, and red swamp crayfish on a monthly basis. Chambers Group biologists will continually assess the efficacy of exotic wildlife removal methods and adjust these methods as needed to best support mitigation goals. The next exotic wildlife removal effort is planned for November, 2019.

Please do not hesitate to contact me at (949) 261-5414 or at pmorrissey@chambersgroupinc.com, to discuss any questions or concerns.

Sincerely,

CHAMBERS GROUP, INC.



Paul Morrissey

Principal | Director of Biology

SITE PHOTOS

Photo 1: Example of biologists carfully walking the Creek using dip nets and a beach seine to remove exotic wildlife on October 28.

Photo 2: Example of a red swamp crayfish removed from the Creek with a dip net on October 28.

Photo 3: Example of a Santa Ana speckled dace incidenatlly captured and released unharmed, upstream of the south Wheatland Avenue entrance on October 29.

Photo 4: Example of arroyo chub observed upstream of the south Wheatland Avenue entrance on October 29.

Photo 5: Example of largemouth bass captured in the seine from the East Tujunga Pond on October 30.

December 27, 2019

Julianna Colwell
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

Subject: Memorandum for the November 2019 Exotic Wildlife Removal Effort in the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Colwell,

This memorandum summarizes the exotic wildlife removal efforts conducted during the month of November by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (Mitigation Area), and the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group biologists participating in exotic wildlife removal efforts were approved prior to the initiation of eradication activities within the Mitigation Area. The purpose of the Exotic Wildlife Removal Program is to remove exotic, aquatic wildlife from Big Tujunga Wash (Wash), Haines Canyon Creek (Creek), Eastern Tujunga Pond and Western Tujunga Pond (Ponds), thereby reducing negative impacts on sensitive native species. Potential negative impacts to sensitive native species include but are not limited to, resource competition, predation, and the transmission of harmful pathogens and parasites. Details of the November exotic wildlife removal effort are provided below.

Methods

The November exotic wildlife removal effort was a two-day effort conducted on November 23 and 24, 2019, by Chambers Group wildlife biologist Paul Morrissey (Santa Ana sucker specialist; USFWS permit 182550-1). The biologist began the effort on November 23 by setting up six small minnow traps in the Creek in areas where largemouth bass (*Micropterus salmoides*) and red swamp crayfish (*Procambarus clarkii*) had previously been observed. The traps were weighted with rocks and baited with punctured cans of cat food (tuna in olive oil). Areas where Santa Ana sucker (*Catostomus santaanae*) and arroyo chub (*Gila orcuttii*) were located were avoided when placing traps so as not to cause disturbance to the species.

On August 29, the biologist checked the traps and removed any animals that had been captured. The biologist also checked for red swamp crayfish and crayfish larva under the lifted bark of submerged logs in the creek. Any target species captured during the effort was immediately euthanized and detailed notes documenting removal effort were recorded on data sheets. All trapping equipment and other field equipment were thoroughly washed both prior-to and after the day's effort. The primary species targeted within the Creek included largemouth bass and red swamp crayfish.

Results

The exotic, aquatic species captured and removed from the Creek during the November effort included 135 red swamp crayfish (120 larval, 15 juveniles), 1 juvenile largemouth bass, and 32 adult western mosquitofish (*Gambusia affinis*).

Discussion and Conclusions

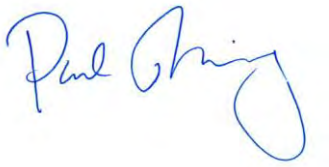
Very few adult red swamp crayfish were observed during the November effort, and it is likely they the majority of the adults were burrowed under the root overhangs along the banks of the Creek. A few of the larval stage red swamp crayfish were removed from under the lifted bark of a submerged log. The single juvenile largemouth bass that was removed from the Creek was located near the large pooled area near the south Wheatland Avenue entrance to the Mitigation Area.

Chambers Group biologists will continue the ongoing effort to protect and enhance the Mitigation Area's native wildlife species by removing exotic, aquatic species such as non-native fishes, frogs, turtles, and red swamp crayfish on a monthly basis. Chambers Group biologists will continually assess the efficacy of exotic wildlife removal methods and adjust these methods as needed to best support mitigation goals. The next exotic wildlife removal effort is planned for December, 2019.

Please do not hesitate to contact me at (949) 261-5414 or at pmorrissey@chambersgroupinc.com, to discuss any questions or concerns.

Sincerely,

CHAMBERS GROUP, INC.



Paul Morrissey
Principal | Director of Biology

December 31, 2019

Julianna Colwell
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

Subject: Memorandum for the December 2019 Exotic Wildlife Removal Effort in the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Colwell,

This memorandum summarizes the exotic wildlife removal efforts conducted during the month of December by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (Mitigation Area), and the compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group biologists participating in exotic wildlife removal efforts were approved prior to the initiation of eradication activities within the Mitigation Area. The purpose of the Exotic Wildlife Removal Program is to remove exotic, aquatic wildlife from Big Tujunga Wash (Wash), Haines Canyon Creek (Creek), Eastern Tujunga Pond and Western Tujunga Pond (Ponds), thereby reducing negative impacts on sensitive native species. Potential negative impacts to sensitive native species include but are not limited to, resource competition, predation, and the transmission of harmful pathogens and parasites. Details of the December exotic wildlife removal efforts are provided below.

Methods

The December exotic wildlife removal effort was conducted during two days on December 10 and 11, 2019, by Chambers Group biologist Paul Morrissey (Santa Ana sucker specialist; USFWS permit 182550-1), and supporting biologists Corey Jacobs, Mauricio Gomez, Colin Durkin, Erik Olmos, and Brian Cropper. The biologists began the effort on December 10 by investigating the Creek for exotic species. The biologists walked the Creek from the south Wheatland Avenue entrance to the West Tujunga Pond outlet and used dip nets and beach seines to remove exotic wildlife. The biologists also hand removed algal mats, and lifted bark from submerged logs that were harboring red swamp crayfish (*Procambarus clarkii*).

On December 11, the biologists began the effort by investigating the East Tujunga Pond for exotic, aquatic species and then deployed seines from a small boat to target any exotic species observed. Seine pulls were conducted by two biologists pulling the boat through the water and dense algae mats as the seine was being dished out the side of the boat by another biologist. The biologists then swam with the seine, pulling the ends together into a purse shape to trap fish. Additional biologists remained on the shore and helped to pull in the seines. During the seine pulls, large mats of algae were removed from the pond and any exotic species that had become entrapped in the algae were collected and counted. In addition to seine pulls, the biologists used a speargun to target larger fish in deeper areas of the pond. This method required one biologist to be in the pond fishing with a speargun while two other biologists remained in the boat to assist as needed. Other methods of exotic fish removal included spearfishing. Two biologists snorkeled in the ponds locating areas of exotic fish, while one biologist remained in the small boat for safety and communication. Once fish were located, a speargun was rigged and fish were targeted and removed.

The primary species targeted within the East Tujunga Pond, included bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), western mosquitofish (*Gambusia affinis*), largemouth bass (*Micropterus salmoides*), and red swamp crayfish.

The primary species targeted within the Creek during December included largemouth bass, red swamp crayfish, and western mosquitofish. Areas where Santa Ana sucker (*Catostomus santaanae*), and arroyo chub (*Gila orcuttii*) where located were avoided during all efforts in the Creek so as not to cause disturbance to the species. Any target species captured during the effort was immediately euthanized and detailed notes documenting each day's removal effort were recorded on data sheets. All fish nets and other field equipment were thoroughly washed both prior-to and after the day's effort.

Results

The exotic, aquatic species captured and removed from the Creek during the December effort included 153 red swamp crayfish (146 larval, 7 adults), and 20 adult western mosquitofish. The exotic species captured and removed from the East Tujunga Pond and West Tujunga Pond outlet during the December effort included 2 adult largemouth bass, 2,102 red swamp crayfish (2,100 larval, 2 juveniles), and 86 young-of-the-year western mosquitofish.

Discussion and Conclusions

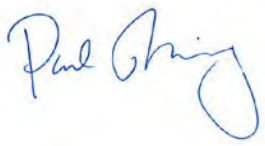
It appeared that a large cabana (hut-like structure) that was constructed along the Creek near the south Wheatland Avenue entrance was still being maintained, but no individuals associated with its construction were present at the time of the effort. Approximately 500 arroyo chub and 20 Santa Ana sucker ranging in size from 2-to-5 inches, were observed in a pool that was associated with the cabana. The dam associated with the cabana had not be rebuilt and native fish were free to swim downstream from the pooled area. Native fish were observed flashing, a sign of parasites and decreased water quality, likely due to the presence of the illegal dam from previous months. The water is still pooled in that area, but it is freely flowing. Approximately 400 Santa Ana sucker ranging in size from 2-to-4 inches, and arroyo chub fish were observed in other portions of the Creek upstream of this area. Adult sucker were mainly observed in pooled areas with undercut banks. Younger sucker and arroyo chub were observed in wider portions of the creek where riffle/run areas existed. These areas were avoided during the exotic removal efforts.

Chambers Group biologists will continue the ongoing effort to protect and enhance the Mitigation Area's native wildlife species by removing exotic, aquatic species such as non-native fishes, frogs, turtles, and red swamp crayfish on a monthly basis. Speargun techniques were utilized since the algal mats were no longer present (clear visibility), and the bass were found in debris and undercut banks, and deep areas of the pond where nets were no longer effective. Chambers Group biologists will continually assess the efficacy of exotic wildlife removal methods and adjust these methods as needed to best support mitigation goals.

Please do not hesitate to contact me at (949) 261-5414 or at pmorrissey@chambersgroupinc.com, to discuss any questions or concerns.

Sincerely,

CHAMBERS GROUP, INC.



Paul Morrissey

Principal | Director of Biology

SITE PHOTOS

Photo 1: Example of a biologist carfully loading the speargun during exotic wildlife removal efforts in the East Tujunga Pond on December 11.

Photo 2: Example of arroyo chub observed upstream of the south Wheatland Avenue entrance on December 10.

Photo 3: Example of largemouth bass captured with a speargun from the East Tujunga Pond on December 11.

Photo 4: Example of biologists scouting for fish on December 11.

APPENDIX G – 2019 WATER QUALITY MONITORING REPORT

2019 WATER QUALITY MONITORING REPORT FOR THE BIG TUJUNGA WASH MITIGATION AREA

Prepared for:

LOS ANGELES COUNTY PUBLIC WORKS
900 Fremont Avenue, 2nd Floor Annex
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Prepared by:

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December 2019

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Distribution

Water quality monitoring reports are distributed to the following agencies:

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Regional Water Quality Control Board, Los Angeles Region (4)
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U.S. Fish and Wildlife Service
Ms. Christine Medak
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Los Angeles, California 90053-2325

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SECTION 1.0 – EXECUTIVE SUMMARY

As part of a water quality monitoring program on-going since 2000, water quality sampling of the Big Tujunga Ponds and Haines Canyon Creek was conducted on October 30, 2019. Additional water samples were collected on November 14, 2019, to test for organochlorine pesticides. The water quality sampling results are summarized below:

- DO levels at two of the sample stations were below the minimum recommended level (5.0 mg/L) for Basin Plan objectives and EPA's criteria for warmwater fish species.
- pH readings in all three sample stations were below the recommended range of 6.5 to 8.5 identified in the Basin Plan objectives, and were within the recommended range of 5.0 to 9.0 for EPA's criteria for human health.
- Nitrate-Nitrogen was below the drinking water maximum standard of 10 mg/L for both Basin Plan standards and EPA criteria for human health at all sample stations. Nitrate-Nitrogen and Ammonia-Nitrogen were not detected at any of the sample stations.
- Nutrient levels were low at all sample stations. Total Phosphorus-P concentrations were below the lower end of the EPA's recommended maximum range of 0.05 to 0.10 mg/L for the desired goal of preventing plant nuisances in streams.
- No pesticides or residual chlorine were detected at any of the sample stations.
- Turbidity levels were below or within the drinking water maximum range of 0.5 to 1.0 NTU for the EPA's criteria for human health at all sample stations.
- Fecal coliform levels detected were below the standard geometric mean of 126 MPN/100 ml at the inflow to the Tujunga Ponds, but were above the standard geometric mean at the outflow from the Tujunga Ponds and where Haines Canyon Creek exits the site. However, the standards are for *E.coli* and the water quality results are for fecal coliform and total coliform.

SECTION 2.0 – BACKGROUND

Los Angeles County Public Works (Public Works) purchased an approximately 210-acre parcel in Big Tujunga Wash as a mitigation area for Los Angeles County Flood Control District (LACFCD) projects throughout Los Angeles County. In coordination with local agencies, Public Works defined a number of measures to improve habitat quality at the site. A Final Master Mitigation Plan (FMMP) was prepared to guide the implementation of these enhancements. The FMMP also includes a monitoring program to gather data on conditions at the site during implementation of the improvements. The FMMP was prepared and is currently being implemented by Chambers Group, Inc. (Chambers Group). Water quality monitoring was conducted on a quarterly basis from the fourth quarter of 2000 through the fourth quarter of 2005. In 2006, monitoring was conducted on a semi-annual basis. In 2007 through 2009 monitoring was conducted annually, in December. In 2010, monitoring was conducted in November and pesticide sampling was conducted in early December. In 2012, monitoring was conducted in February and November. From 2013 to present, monitoring has been conducted annually in the fall. This report presents the results of the water quality sampling for October 2019.

The Big Tujunga Wash Mitigation Area (Mitigation Area) is located just east of Hansen Dam in the Shadow Hills area of the City of Los Angeles. Both Big Tujunga Wash, an intermittent stream, and Haines Canyon Creek, a perennial stream, traverse the Mitigation Area in an east-to-west direction. The East Tujunga Pond and West Tujunga Pond are located outside of the Mitigation Area, at the far northeastern portion of the site.

2.1 PROJECT SITE ACTIVITIES

A timeline of project-related activities including water quality sampling events is presented in Table 1.

Table 1: Major Activities to Date at the Big Tujunga Wash Mitigation Area

Date	Activity
2000, April	Baseline water quality sampling
2000, November to 2001, November	Arundo, tamarisk, and pepper tree removal Chemical (Rodeo®) application
2000, December to 2000, November	Water hyacinth removal
2000, December	Fish Sampling at Haines Canyon Creek
2000, December	Water quality sampling
2001, January to present	Exotic aquatic wildlife (non-native fish, crayfish, bullfrog, and turtle) removal – conducted quarterly
2001, February	Partial riparian planting
2001, March	Selective clearing at Canyon Trails Golf Club
2001, March	Water quality sampling
2001, June	Water quality sampling
2001, July	Fish Sampling at Haines Canyon Creek
2001, September	Water quality sampling
2001, October to 2001, November	Fish Sampling at Haines Canyon Creek

Date	Activity
2001, December	Water quality sampling
2002, January	Final riparian planting
2002, July	Upland replacement planting
2002, March	Water quality sampling
2002, June	Water quality sampling
2002, July	Fish Sampling at Haines Canyon Creek
2002, September	Water quality sampling
2002, October	Grading at Canyon Trails Golf Club begins
2002, November	Fish Sampling at Haines Canyon Creek
2002, December	Water quality sampling
2003, March	Water quality sampling
2003, April	Meeting with Canyon Trails Golf Club to discuss future use of herbicides and fertilizers
2003, June	Water quality sampling
2003, August	Fish Sampling at Haines Canyon Creek
2003, September	Water quality sampling
2003, fall	Completion of the golf course construction
2003, December	Water quality sampling
2004, January	Fish Sampling at Haines Canyon Creek
2004, April	Water quality sampling
2004, April	Rock Dam Removal Day
2004, June	Angeles National Golf Club (previously named Canyon Trails) opens to the public
2004, July	Water quality sampling
2004, October	Water quality sampling
2004, December	Water quality sampling
2005, April	Water quality sampling
2005, June	Water quality sampling
2005, October	Water quality sampling
2005, December	Water quality sampling
2006, July	Water quality sampling
2006, December	Water quality sampling
2007, December	Water quality sampling
2008, December	Water quality sampling
2009, August to October	The Station Fire was the largest fire in the recorded history of Angeles National Forest and the 10th largest fire in California since 1933. The fire burned a total of 160,577 acres. The fire was fully contained on October 16, 2009. (Source: Angeles National Forest Incident Update available - http://www.inciweb.org/incident/1856/)
2009, December	Water quality sampling
2010, November	Water quality sampling
2010, December	Water quality sampling for pesticides
2011, September to 2012, January	Water lettuce removal
2012, February	Water quality sampling

Date	Activity
2012, November	Water quality sampling
2013, October	Water quality sampling
2014, October	Water quality sampling
2015, November	Water quality sampling
2016, November 7	Water quality sampling
2017, December	The Creek Fire began on December 5, 2017, approximately 4 miles east of Sylmar, California. The Creek Fire burned a total of 15,619 acres. Much of the Mitigation Area burned, and close to 75 percent of the entire site exhibited signs of severe surface burns, including approximately all of the riparian communities found along Haines Canyon Creek, and more than half of the vegetation within the Big Tujunga Wash area. The fire was fully contained on January 9, 2018. (Sources: Angeles National Forest Incident Update available - https://inciweb.nwcg.gov/incident/5669/; Chambers Group 2018 Post Fire Assessment Report)
2017, December 21	Water quality sampling
2018, December 17	Water quality sampling
2019, April 23	After April 23, 2019 Chambers Group stopped the use of all herbicides within the Mitigation Area. From April 23 forward, exotic plants were managed with mechanical weed control methods only.
2019, October 30	Water Quality Sampling

2.2 UPSTREAM LAND USES

The monitoring program has been designed to specifically address inputs to the site from upstream land uses such as the Angeles National Golf Club (previously named Canyon Trails Golf Club). The golf course has been operating since June 2004. Potential negative impacts to aquatic species from run-on to the site that contains excessive nutrients or pesticides are of primary concern. Pesticides potentially used at the Angeles National Golf Course include herbicides, insecticides, fungicides, and grass growth inhibitors (Table 2).

Actual use of pesticides is based on golf course maintenance needs. Based on the pesticide use information from the Angeles National Golf Club, analysis of water samples for glyphosate, chlorpyrifos, other organophosphorous pesticides, and organochlorine pesticides is included in the sampling program for the Mitigation Area.

Table 2: Pesticides Potentially Used at the Angeles National Golf Club

Manufacturer and Product Name	Active Ingredient	Use
Syngenta Primo Maxx	trinexapac-ethyl	grass growth inhibitor used for turf management
Syngenta Reward	diquat dibromide	landscape and aquatic herbicide
Syngenta Barricade	prodiamine	pre-emergent herbicide
Bayer Prostar 70 WP	flutolanil	fungicide
Monsanto QuikPRO	ammonium salt of glyphosphate and diquat dibromide	herbicide

Monsanto Rodeo® Verdicon Kleenup® Pro Lesco Prosecutor	glyphosate	emerged aquatic weed and brush herbicide
Valent ProGibb T&O	gibberellic acid	plant growth regulator
BASF Insignia 20 WG	pyraclostrobin	fungicide
BASF Stalker	Isopropylamine salt of Imazapyr	herbicide
Dow Agrosciences Surflan A.S.	oryzalin	herbicide
Dow Agrosciences Dursban Pro	chlorpyrifos	insecticide
Mycogen Scythe	pelargonic acid	herbicide

Source: J. Reidinger, Angeles National Golf Club, pers. comm. to M. Chimienti, LACDPW, March 18, 2004 and Angeles National Golf Club Monthly Summary Pesticide Use Reports (December 2004, February 2005 and April 2007).

SECTION 3.0 – MATERIALS AND METHODS

3.1 SAMPLING STATIONS

Four sampling locations have been identified for the monitoring program for the Mitigation Area (Figure 1). Table 3 summarizes sampling locations and the conditions observed on October 30, 2019.

Figure 1: Mitigation Area Water Quality Sampling Stations

Table 3: Water Quality Sampling Locations and Conditions for October 2019

Date	October 30, 2019		
Air Temperature	Between 15.0 and 19.4 (°Celsius) during sample collection period		
Skies	Clear		
Observations	Water was clear at all locations		
Sampling Locations	**Latitude**	**Longitude**	**Time of sample**
Outflow from Tujunga Ponds	34.26896 N	118.34189 W	0837
Inflow to Tujunga Ponds	34.26834 N	118.33961 W	0925
Haines Canyon Creek, before exit from the site	34.26669 N	118.35714 W	1020
Big Tujunga Wash	34.26989 N	118.35126 W	station dry

3.2 SAMPLING PARAMETERS

Table 4 summarizes the sampling parameters included in the water quality monitoring program. The following meters were used in the field:

- pH and temperature – Milwaukee MW102 PRO+ 2-in-1 Temperature and pH Meter
- Dissolved oxygen - Milwaukee MW600 PRO Dissolved Oxygen Meter
- Turbidity – Hanna Instruments HI98703 Turbidity Portable Meter

Analytical results were performed at Enthalpy Analytical, LLC, located in Orange, California and Test America, located in Savannah, Georgia. Samples were taken at mid-depth, along a transect perpendicular to the stream channel alignment. Quality assurance/quality control (QA/QC) procedures in each laboratory followed the methods described in their respective quality assurance manuals.

Table 4: Water Quality Sampling Parameters

Parameter	Analysis Location	Analytical Method
total Kjeldahl nitrogen (TKN)	laboratory	EPA 351.2
nitrite - nitrogen (NO_2-N)	laboratory	EPA 300.0 by IC
Nitrate - nitrogen (NO_3-N)	laboratory	EPA 300.0 by IC
ammonia (NH_4)	laboratory	EPA 350.1
orthophosphate - P	laboratory	Standard Methods 4500PE/EPA 365.1
total phosphorus - P	laboratory	Standard Methods 4500PE/EPA 365.1
total coliform	laboratory	Standard Methods 9221B
fecal coliform	laboratory	Standard Methods 9221C
turbidity	field	EPA 180.1
glyphosate (Roundup/Rodeo)[1]	laboratory	EPA 547
chlorpyrifos and organophosphorus pesticides[2]	laboratory	EPA 8141A
organochlorine pesticides[3]	laboratory	EPA 608
dissolved oxygen	field	Standard Methods 4500-O G
total residual chlorine	laboratory	Standard Methods 4500-Cl
temperature	field	Standard Methods 2550
pH	field	Standard Methods 4500-H+

Sources for analytical methods:
EPA. Method and Guidance for Analysis of Water.
American Public Health Association, American Waterworks Association, and Water Environment Federation. 1998. Standard Methods for the Examination of Water and Wastewater, 20th Edition. Washington D.C.

1 First analysis completed in the first quarter of 2004

2 First analysis completed in the fourth quarter of 2004. This analytical method tests for the following chemicals: azinphos- methyl, bolster, coumaphos, diazinon, chlorpyrifos, demeton, dichlorvos, disulfoton, ethoprop, fensulfothion, fenthion, mevinphos, naled, phorate, runnel, stirophos, parathion-methyl, tokuthion, and trichloronate.

3 First analysis completed in December 2007. EPA method 608 tests for aldrin, BHC, chlordane, DDD, DDE, DDT, dieldrin, endrin, endosulfan, heptaclor, methoxychlor, toxaphene and PCB.

SECTION 4.0 – RESULTS

4.1 BASELINE WATER QUALITY

Sampling and analysis conducted by Public Works prior to implementation of the FMMP is considered the baseline for water quality conditions at the Mitigation Area. The results of baseline analyses conducted in April 2000 are presented in Table 5. Higher bacteria and turbidity observed in the 4/18/2000 samples are attributable to a rain event. Phosphorus levels were also high in the 4/18/2000 samples, due to release from sediments.

Table 5: Baseline Water Quality (2000)

Parameter	Units	Date (2000)	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	3,000	5,000	170	1,700
		4/18	2,200	170,000	2,400	70,000
Fecal coliform	MPN/ 100 ml	4/12	500	300	40	80
		4/18	500	30,000	2,400	50,000
Ammonia-N	mg/L	4/12	0	0	0	0
		4/18	0	0	0	0
Nitrate-N	mg/L	4/12	8.38	5.19	0	3.73
		4/18	8.2	3.91	0.253	0.438
Nitrite-N	mg/L	4/12	0.061	0	0	0
		4/18	0.055	0	0	0
Kjeldahl-N	mg/L	4/12	0	0.1062	0.163	0
		4/18	0	0.848	0.42	0.428
Dissolved phosphorus	mg/L	4/12	0.078	0.056	0	0.063
		4/18	0.089	0.148	0.111	0.163
Total phosphorus	mg/L	4/12	0.086	0.062	0	0.066
		4/18	0.113	0.153	0.134	0.211
pH	std units	4/12	7.78	7.68	7.96	7.91
		4/18	7.18	7.47	7.45	7.06
Turbidity	NTU	4/12	1.83	0.38	1.75	0.6
		4/18	4.24	323	4070	737

MPN – most probable number **NTU** – nephelometric turbidity units

4.2 OCTOBER 2019 RESULTS

Results of analyses conducted by Enthalpy Analytical and Test America are appended to this report (Appendix A) and summarized in Table 6.

Table 6: Summary of Water Quality Results – October 30, 2019

Parameter	Units	Inflow to Tujunga Ponds	Outflow from Tujunga Ponds	Big Tujunga Wash	Haines Canyon Creek, just before exit from site
Dissolved Oxygen	mg/L	3.6	4.9	NA	9.6
pH	std units	5.06	5.92	NA	5.45
Total residual chlorine	mg/L	ND	ND	NA	ND
Ammonia-Nitrogen	mg/L	ND	ND	NA	ND
Kjeldahl Nitrogen	mg/L	0.635	ND	NA	ND
Nitrite-Nitrogen	mg/L	ND	ND	NA	ND
Nitrate-Nitrogen	mg/L	8.07	5.78	NA	5.17
Orthophosphate-P (dissolved phosphorus)	mg/L	0.0220	ND	NA	0.0220
Total phosphorus-P	mg/L	0.036	0.024	NA	0.028
Glyphosate	µg/L	ND	ND	NA	ND
Chlorpyrifos* (and other Organophosphorus Pesticides)	µg/L	ND	ND	NA	ND
Pesticides (EPA 608)** (Organochlorine Pesticides)	µg/L	ND	ND	NA	ND
Turbidity	NTU	0.22	0.31	NA	0.53
Fecal Coliform Bacteria	(MPN/100 ml)	79	240	NA	130
Total Coliform Bacteria	(MPN/100 ml)	540	1600	NA	240

NA – data not available; station dry on the sample date **NTU** – nephelometric turbidity units
MPN – most probable number **ND** – non-detect
***** The analytical method used for chlorpyrifos (EPA 8141A) also tests for the following chemicals: azinphos-methyl, bolster, coumaphos, demeton, diazinon, dichlorvos, disulfoton, ethoprop, fensulfothion, fenthion, merphos, methyl parathion, mevinphos, naled, phorate, ronnel, stirophos, tokuthion, and trichloronate.
****** EPA method 608 tests for aldrin, BHC, Chlordane, DDD, DDE, DDT, dieldrin, endrin, endosulfan, heptaclor, methoxychlor, and toxaphene. Water samples for these pesticides were collected on November 14, 2019.

4.3 COMPARISON OF RESULTS WITH AQUATIC LIFE CRITERIA

Tables 7 through 12 present objectives established by the United States Environmental Protection Agency (USEPA) and the Los Angeles Regional Water Quality Control Board (Regional Board) for protection of beneficial uses including freshwater aquatic life.

Table 7: National and Local Recommended Water Quality Criteria - Freshwaters

Parameter	Basin Plan Objectives[a]	EPA Criteria		
		CMC	CCC	Human Health
Temperature (^{O}C)	b	See Table 13	See Table 13	--
Dissolved oxygen (mg/L)	>7.0 mean >5.0 min	5.0[c] (warmwater, early life stages, 1-day minimum)	6.0[c] (warmwater, early life stages, 7-day mean)	--
pH	6.5 - 8.5	--	6.5-9.0[d,e]	5.0-9.0[d,e]
Total residual chlorine (mg/L)	0.1	0.019[d,e]	0.011[d,e]	4.0 (maximum residual disinfectant level goal)
Fecal coliform (MPN/100 ml)	126[f] (geometric mean for *E. coli*) (water contact recreation)	--	--	Swimming standards: 33[g] (geometric mean for enterococci) 126[g] (geometric mean for *E. coli*)
Ammonia-nitrogen (mg/L)	See Tables 11 and 12	See Table 9	See Table 10	--
Nitrite-nitrogen (mg/L)	1	--	--	1 (primary drinking water standard)
Nitrate-nitrogen (mg/L)	10	--	--	10 (primary drinking water standard)
Total phosphorus (mg/L)	--	<0.05 – 0.1[e] (recommendation for streams, no criterion)		--
Turbidity (NTU)	h	i	i	5 (secondary drinking water standard) 0.5 – 1.0 (standard for systems that filter)

Notes:
MPN most probable number
NTU nephelometric turbidity units
-- No criterion
CMC Criteria Maximum Concentration or acute criterion
CCC Criteria Continuous Concentration or chronic criterion
a Source: California Regional Water Quality Control Board, Los Angeles Region. 1994. Water Quality Control Plan (Basin Plan). As amended.

b Narrative criterion: "The natural receiving water temperature of all regional waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses."
c Source: USEPA. 1986. Ambient Water Quality Criteria for Dissolved Oxygen. EPA 440-5-86-003. Washington, D.C.
d Source: USEPA. 1999. National Recommended Water Quality Criteria – Correction. EPA 822-Z-99-001. Washington, D.C.
e Source: USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.
f Single sample limits – E. coli density shall not exceed 235/100 ml.
g Source: USEPA. 1986. Ambient Water Quality Criteria for Bacteria – 1986. EPA 440-5-84-002. Washington, D.C.
h Narrative criterion: "Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses."
i Narrative criterion for freshwater fish and other aquatic life: "Settleable and suspended solids should not reduce the depth of the compensation point for photosynthetic activity by more than 10 percent from the seasonally established norm for aquatic life."

Table 8: Temperature and pH-Dependent Values of the CMC (Acute Criterion) Mussels Absent

CMC: Mussels Absent, mg N/L										
pH	Temperature (°Celsius)									
	0	14	16	18	20	22	24	26	28	30
6.5	58.0	58.0	58.0	58.0	43.7	37.0	31.4	26.6	22.5	19.1
6.6	55.7	55.7	55.7	55.7	41.9	35.5	30.1	25.5	21.6	18.3
6.7	53.0	53.0	53.0	53.0	39.9	33.8	28.6	24.3	20.6	17.4
6.8	49.9	49.9	49.9	49.9	37.6	31.9	27.0	22.9	19.4	16.4
6.9	46.5	46.5	46.5	46.5	35.1	29.7	25.2	21.3	18.1	15.3
7.0	42.9	42.9	42.9	42.9	32.3	27.4	23.2	19.7	16.7	14.1
7.1	39.1	39.1	39.1	39.1	29.4	24.9	21.1	17.9	15.2	12.8
7.2	35.1	35.1	35.1	35.1	26.4	22.4	19.0	16.1	13.6	11.5
7.3	31.2	31.2	31.2	31.2	23.5	19.9	16.8	14.3	12.1	10.2
7.4	27.3	27.3	27.3	27.3	20.6	17.4	14.8	12.5	10.6	8.98
7.5	23.6	23.6	23.6	23.6	17.8	15.1	12.8	10.8	9.18	7.77
7.6	20.2	20.2	20.2	20.2	15.3	12.9	10.9	9.27	7.86	6.66
7.7	17.2	17.2	17.2	17.2	12.9	11.0	9.28	7.86	6.66	5.64
7.8	14.4	14.4	14.4	14.4	10.9	9.21	7.80	6.61	5.60	4.74
7.9	12.0	12.0	12.0	12.0	9.07	7.69	6.51	5.52	4.67	3.96
8.0	9.99	9.99	9.99	9.99	7.53	6.38	5.40	4.58	3.88	3.29
8.1	8.26	8.26	8.26	8.26	6.22	5.27	4.47	3.78	3.21	2.72
8.2	6.81	6.81	6.81	6.81	5.13	4.34	3.68	3.12	2.64	2.24
8.3	5.60	5.60	5.60	5.60	4.22	3.58	3.03	2.57	2.18	1.84
8.4	4.61	4.61	4.61	4.61	3.48	2.95	2.50	2.11	1.79	1.52
8.5	3.81	3.81	3.81	3.81	2.87	2.43	2.06	1.74	1.48	1.25
8.6	3.15	3.15	3.15	3.15	2.37	2.01	1.70	1.44	1.22	1.04
8.7	2.62	2.62	2.62	2.62	1.97	1.67	1.42	1.20	1.02	0.862

CMC: Mussels Absent, mg N/L										
pH	Temperature (°Celsius)									
	0	14	16	18	20	22	24	26	28	30
8.8	2.19	2.19	2.19	2.19	1.65	1.40	1.19	1.00	0.851	0.721
8.9	1.85	1.85	1.85	1.85	1.39	1.18	1.00	0.847	0.718	0.608
9.0	1.57	1.57	1.57	1.57	1.19	1.00	0.851	0.721	0.611	0.517

Note: Native species of freshwater mussels are not known for Big Tujunga Wash or Haines Canyon Creek. CMC – Criteria Maximum Concentration (ammonia)
Source: USEPA. 2009. Draft 2009 Update Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater. EPA 822-D-09-001. Washington, D.C

Table 9: Temperature and pH-Dependent Values of the CCC (Chronic Criterion) Mussels Absent and Early Fish Life Stages Present

CCC: Mussels Absent and Early Fish Life Stages Present, mg N/L										
pH	Temperature (°Celsius)									
	0	14	16	18	20	22	24	26	28	30
6.5	6.36	6.36	6.36	6.36	6.36	6.11	5.37	4.72	4.15	3.65
6.6	6.26	6.26	6.26	6.26	6.26	6.02	5.29	4.65	4.09	3.60
6.7	6.15	6.15	6.15	6.15	6.15	5.91	5.19	4.57	4.01	3.53
6.8	6.00	6.00	6.00	6.00	6.00	5.77	5.08	4.46	3.92	3.45
6.9	5.84	5.84	5.84	5.84	5.84	5.61	4.93	4.34	3.81	3.35
7.0	5.64	5.64	5.64	5.64	5.64	5.42	4.76	4.19	3.68	3.24
7.1	5.41	5.41	5.41	5.41	5.41	5.20	4.57	4.02	3.53	3.10
7.2	5.14	5.14	5.14	5.14	5.14	4.94	4.35	3.82	3.36	2.95
7.3	4.84	4.84	4.84	4.84	4.84	4.66	4.09	3.60	3.16	2.78
7.4	4.52	4.52	4.52	4.52	4.52	4.34	3.82	3.36	2.95	2.59
7.5	4.16	4.16	4.16	4.16	4.16	4.00	3.52	3.09	2.72	2.39
7.6	3.79	3.79	3.79	3.79	3.79	3.65	3.21	2.82	2.48	2.18
7.7	3.41	3.41	3.41	3.41	3.41	3.28	2.89	2.54	2.23	1.96
7.8	3.04	3.04	3.04	3.04	3.04	2.92	2.57	2.26	1.98	1.74
7.9	2.67	2.67	2.67	2.67	2.67	2.57	2.26	1.98	1.74	1.53
8.0	2.32	2.32	2.32	2.32	2.32	2.23	1.96	1.72	1.52	1.33
8.1	2.00	2.00	2.00	2.00	2.00	1.92	1.69	1.49	1.31	1.15
8.2	1.71	1.71	1.71	1.71	1.71	1.64	1.45	1.27	1.12	0.982
8.3	1.45	1.45	1.45	1.45	1.45	1.40	1.23	1.08	0.949	0.835
8.4	1.23	1.23	1.23	1.23	1.23	1.18	1.04	0.914	0.804	0.706
8.5	1.04	1.04	1.04	1.04	1.04	0.999	0.878	0.772	0.679	0.597
8.6	0.878	0.878	0.878	0.878	0.878	0.844	0.742	0.652	0.573	0.504
8.7	0.742	0.742	0.742	0.742	0.742	0.714	0.628	0.552	0.485	0.426
8.8	0.631	0.631	0.631	0.631	0.631	0.606	0.533	0.469	0.412	0.362
8.9	0.539	0.539	0.539	0.539	0.539	0.518	0.455	0.400	0.352	0.309
9.0	0.464	0.464	0.464	0.464	0.464	0.446	0.392	0.345	0.303	0.266

Note: Native species of freshwater mussels are not known for Big Tujunga Wash or Haines Canyon Creek. CCC – Criteria Continuous Concentration (ammonia)

Source: USEPA. 2009. Draft 2009 Update Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater. EPA 822-D-09-001. Washington, D.C.

Table 10: 30-Day Average Objective for Ammonia-N for Freshwaters Applicable to Waters Subject to the "Early Life Stage Present" Condition (mg N/L)

pH	Temperature (°Celsius)								
	14	16	18	20	22	24	26	28	30
6.5	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

Source: California Regional Water Quality Control Board, Los Angeles Region. 2005. Amendments to the Water Quality Control Plan – Los Angeles Region with Respect to Early Life Stage Implementation Provisions of the Inland Surface Water Ammonia Objectives for Freshwaters. Taken from USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 11: One-Hour Average Objective for Ammonia-N for Freshwaters (mg N/L)

pH	Waters Designated COLD and/or MIGR	Waters Not Designated COLD and/or MIGR
6.5	32.6	48.8
6.6	31.3	46.8
6.7	29.8	44.6
6.8	28.1	42.0
6.9	26.2	39.1
7.0	24.1	36.1
7.1	22.0	32.8
7.2	19.7	29.5
7.3	17.5	26.2
7.4	15.4	23.0
7.5	13.3	19.9
7.6	11.4	17.0
7.7	9.65	14.4
7.8	8.11	12.1
7.9	6.77	10.1
8.0	5.62	8.40
8.1	4.64	6.95
8.2	3.83	5.72
8.3	3.15	4.71
8.4	2.59	3.88
8.5	2.14	3.20
8.6	1.77	2.65
8.7	1.47	2.20
8.8	1.23	1.84
8.9	1.04	1.56
9.0	0.885	1.32

COLD – Beneficial use designation of Cold Freshwater Habitat
MIGR – Beneficial use designation of Migration of Aquatic Organisms
Source: California Regional Water Quality Control Board, Los Angeles Region. 2002. Amendments to the Water Quality Control Plan – Los Angeles Region with Respect to Inland Surface Water Ammonia Objectives. Taken from USEPA. 1999. 1999 Update of Ambient Water Quality Criteria for Ammonia. EPA 822-R-99-014. Washington, D.C.

Table 12: Example Calculated Values for Maximum Weekly Average Temperature for Growth and Short-Term Maxima for Survival of Juvenile and Adult Fishes During the Summer

Species	Growth (°Celsius)	Maxima (°Celsius)
Black crappie	27	--
Bluegill	32	35
Channel catfish	32	35
Emerald shiner	30	--
Largemouth bass	32	34
Brook trout	19	24

Source: USEPA. 1986. Quality Criteria for Water. EPA 440/5-86-001. Washington, D.C.

SECTION 5.0 – DISCUSSION

Results from the October 2019 sampling are described by parameter in Table 13.

Table 13: Discussion of October 2019 Water Quality Sampling Results

Parameter	Discussion
Dissolved oxygen	• DO levels were 3.6 mg/L at the inflow to the Tujunga Ponds, 4.9 mg/L at the outflow from the Tujunga Ponds, and 9.6 mg/L where Haines Canyon Creek exits the site. DO levels at two of the sample stations were below the minimum recommended level (5.0 mg/L) for Basin Plan objectives and EPA's criteria for warmwater fish species.
pH	• pH readings were 5.06 at the inflow to the Tujunga Ponds, 5.92 at the outflow from the Tujunga Ponds, and 5.45 where Haines Canyon Creek exits the site. pH readings in all three sample stations were below the recommended range of 6.5 to 8.5 identified in the Basin Plan objectives, and were within the recommended range of 5.0 to 9.0 for EPA's criteria for human health.
Total residual chlorine	• No residual chlorine was detected at any sample station.
Nitrogen	• Nitrate-Nitrogen measurements at all sample stations were below the drinking water maximum standard of 10 mg/L for both Basin Plan standards and EPA criteria for human health. • Nitrite-Nitrogen was not detected at any sample station. • Ammonia-Nitrogen was not detected at any sample station.
Phosphorus	• The observed Total Phosphorus-P concentrations were 0.036 mg/L at the inflow to the Tujunga Ponds, 0.024 mg/L at the outflow to the Tujunga Ponds, and 0.028 mg/L where Haines Canyon Creek exits the site. Total Phosphorus-P concentrations were below the lower end of the EPA's recommended maximum range of 0.05 to 0.10 mg/L for the desired goal of preventing plant nuisances in streams.
Glyphosate	• Glyphosate was not detected at any sample station.
Chlorpyrifos and other Organophosphorus Pesticides	• Organophosphorus Pesticides including Chlorpyrifos, that were analyzed by EPA method 8141A were not detected at any sample station.
Organochlorine Pesticides	• Organochlorine pesticides analyzed by EPA Method 608 were not detected at any sample station.
Turbidity	• Turbidity readings were 0.31 NTU at the inflow to the Tujunga Ponds, 0.22 NTU at the outflow from the Tujunga Ponds, and 0.53 NTU where Haines

Parameter	Discussion
	Canyon Creek exits the site. Turbidity levels were below or within the drinking water maximum range of 0.5 to 1.0 NTU for the EPA's criteria for human health at all sample stations.
Coliform Bacteria	• Per the Basin Plan objectives, the fresh water bacteria standard for water contact recreation is for *E. coli* (126 MPN/100 ml geometric mean, 235 MPN/100 ml single sample limits). Fecal coliform levels detected were below the standard geometric mean at the inflow to the Tujunga Ponds (79 MPN/100 ml) but were above the geometric mean at the outflow from the Tujunga Ponds (240 MPN/100 ml) and where Haines Canyon Creek exits the site 130 MPN/100ml). Sampling specifically for *E. coli* was not conducted. • Total coliform levels were 540 MPN/100 ml at the inflow to the Tujunga Ponds, 1600 MPN/100 ml at the outflow from the Tujunga Ponds and 240 MPN/100 ml where Haines Canyon Creek exits the site. [Note that recreation standards are for *E. coli*. Per the Basin Plan, total coliform standards apply to marine waters and waterbodies where shellfish can be harvested for human consumption.]

mg/L – milligrams per liter **NTU** – nephelometric turbidity units **MPN** – most probable number

SECTION 6.0 – GLOSSARY

Ammonia-Nitrogen – NH3-N is a gaseous alkaline compound of nitrogen and hydrogen that is highly soluble in water. Un-ionized ammonia (NH3) is toxic to aquatic organisms. The proportions of NH3 and ammonium (NH4+) and hydroxide (OH-) ions are dependent on temperature, pH, and salinity.

Chlorine, Residual – The chlorination of water supplies and wastewaters serves to destroy or deactivate disease-producing organisms. Residual chlorine in natural waters is an aquatic toxicant.

Chlorpyrifos - White crystal-like solid insecticide widely used in homes and on farms. Used to control cockroaches, fleas, termites, ticks crop pests.

Coliform Bacteria – Several genera of bacteria belonging to the family Enterobacteriaceae. Based on the method of detection, the coliform group is historically defined as facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria that ferment lactose with gas and acid formation within 48 hours at 35 C.

Coliform Bacteria, Fecal – Part of the intestinal flora of warm-blooded animals. Presence in surface waters is considered an indication of pollution.

Dissolved Oxygen - Dissolved oxygen (DO) is the amount of oxygen that is present in water. Water bodies receive oxygen from the atmosphere and from aquatic plants. Running water, such as that of a swift moving stream, dissolves more oxygen than the still water of a pond or lake.

Glyphosate - White compound broad-spectrum herbicide used to kill weeds.

Kjeldahl Nitrogen – Named for the laboratory technique used for detection, Kjeldahl nitrogen includes organic nitrogen and ammonia nitrogen.

Nitrate-Nitrogen – NO3--N is an essential nutrient for many photosynthetic autotrophs.

Nitrite-Nitrogen – NO2--N is an intermediate oxidation state of nitrogen, both in the oxidation of ammonia to nitrate and in the reduction of nitrate.

Organochlorine Pesticides – An older class of pesticides, that are effective against a variety of insects. These chemicals were introduced in the 1940s, and many of their uses have been cancelled or restricted by the U.S. EPA because of their environmental persistence and potential adverse effects on wildlife and human.

Organophosphorus Pesticides – These pesticides are active against a broad spectrum of insects and have accounted for a large share of all insecticides used in the United States. Although organophosphorus insecticides are still used for insect control on many food crops, most residential uses have been phased out in the United States. Certain organophosphorus insecticides are also registered for public health applications (e.g., mosquito control) in the United States.

Orthophosphorus – The reactive form of phosphorus, commonly used as fertilizer.

pH – The hydrogen ion activity of water (pH) is measured on a logarithmic scale, ranging from 0 to 14. The pH of “pure” water at 25° C is 7.0 (neutral). Low pH is acidic; high pH is basic or alkaline.

Phosphorus, Total – In natural waters, phosphorus occurs almost solely as orthophosphates, condensed phosphates, and organically bound phosphate. Phosphorus is essential to the growth of organisms.

Turbidity – Attributable to the suspended and colloidal matter in water, including clay, silt, finely divided organic and inorganic matter, soluble colored organic compounds, and plankton and other microscopic organisms. The reduction of clearness in turbid waters diminishes the penetration of light and therefore can adversely affect photosynthesis.

APPENDIX A – 2019 LABORATORY RESULTS

Enthalpy Analytical, LLC
931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900 Fax: (714)538-1209
www.enthalpy.com
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MONTROSE ENVIRONMENTAL

Client:	Chambers Group	Lab Request:	420782
Address:	5 Hutton Centre Drive Suite 750 Santa Ana, CA 92707	Report Date:	11/08/2019
		Date Received:	10/30/2019
		Client ID:	14294
Attn:	Heather Franklin		

Comments: Big Tujunga

See attached for Glyphosate and Organophosphorus Pesticide results.

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID
420782-001	Ponds Inlet
420782-002	Ponds Outlet
420782-003	Haines Creek Exit

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Diane M. Galvan

Report Review performed by: Diane Galvan, Project Manager

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 45 days from date received.

Matrix:	Water	**Client:**	Chambers Group	**Collector:**	Enthalpy Analytical
Sampled:	10/30/2019 09:25	**Site:**			
Sample #:	**420782-001**	**Client Sample #:**	Ponds Inlet	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**8.70**	1	0.5	mg/L		11/07/19	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1208289
Nitrate, as Nitrogen	**8.07**	1	0.1	mg/L	10/30/19	10/30/19 14:37	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	10/30/19	10/30/19 14:37	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1208472
Ammonia, as Nitrogen	ND	1	0.1	mg/L	11/06/19	11/06/19	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1208336
Total Kjeldahl Nitrogen	**0.635**	1	0.4	mg/L	11/01/19	11/01/19	TP	
Method: EPA 547	Prep Method: Method					QCBatchID:		
See Attached		1						
Method: EPA 8141A *NELAC*	Prep Method: EPA 3510C					QCBatchID:		
See Attached		1						
Method: SM 4500-Cl	Prep Method: Method					QCBatchID:		QC1208294
Chlorine, Total Residual	ND	1	0.1	mg/L		10/30/19 16:55	WW	T2
Method: SM 4500-P-B-5-E	Prep Method: 4500-P-B-5					QCBatchID:		QC1208424
Total Phosphorous as P	**0.036**	1	0.02	mg/L	11/05/19	11/05/19	TP	
Total Phosphorous as PO4	**0.110**	1	0.06	mg/L	11/05/19	11/05/19	TP	
Method: SM 4500-P-E	Prep Method: Method					QCBatchID:		QC1208418
Orthophosphate, as P	**0.0220**	1	0.02	mg/L	10/30/19 17:00	10/30/19 17:17	TP	
Orthophosphate, as PO4	**0.067**	1	0.06	mg/L	10/30/19 17:00	10/30/19 17:17	TP	
Method: SM 9221-B	Prep Method: Method					QCBatchID:		QC1208254
Coliform, Total	**540**	1		MPN/100ml	10/30/19 14:50	11/03/19 11:35	CO	
Method: SM 9221-E	Prep Method: Method					QCBatchID:		QC1208254
Coliform, Fecal	**79**	1		MPN/100ml	10/30/19 14:50	11/02/19 12:29	LH	

Matrix:	Water	**Client:**	Chambers Group	**Collector:**	Enthalpy Analytical
Sampled:	10/30/2019 08:37	**Site:**			
Sample #:	**420782-002**	**Client Sample #:**	Ponds Outlet	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**5.78**	1	0.5	mg/L		11/07/19	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1208289
Nitrate, as Nitrogen	**5.78**	1	0.1	mg/L	10/30/19	10/30/19 14:57	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	10/30/19	10/30/19 14:57	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1208472
Ammonia, as Nitrogen	ND	1	0.1	mg/L	11/06/19	11/06/19	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1208336
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	11/01/19	11/01/19	TP	
Method: EPA 547	Prep Method: Method					QCBatchID:		
See Attached		1						
Method: EPA 8141A *NELAC*	Prep Method: EPA 3510C					QCBatchID:		
See Attached		1						
Method: SM 4500-Cl	Prep Method: Method					QCBatchID:		QC1208294
Chlorine, Total Residual	ND	1	0.1	mg/L		10/30/19 16:55	WW	T2
Method: SM 4500-P-B-5-E	Prep Method: 4500-P-B-5					QCBatchID:		QC1208424
Total Phosphorous as P	**0.024**	1	0.02	mg/L	11/05/19	11/05/19	TP	
Total Phosphorous as PO4	**0.074**	1	0.06	mg/L	11/05/19	11/05/19	TP	
Method: SM 4500-P-E	Prep Method: Method					QCBatchID:		QC1208418
Orthophosphate, as P	ND	1	0.02	mg/L	10/30/19 17:00	10/30/19 17:17	TP	
Orthophosphate, as PO4	ND	1	0.06	mg/L	10/30/19 17:00	10/30/19 17:17	TP	
Method: SM 9221-B	Prep Method: Method					QCBatchID:		QC1208254
Coliform, Total	**1600**	1		MPN/100ml	10/30/19 14:50	11/03/19 11:35	CO	
Method: SM 9221-E	Prep Method: Method					QCBatchID:		QC1208254
Coliform, Fecal	**240**	1		MPN/100ml	10/30/19 14:50	11/02/19 12:29	LH	

Matrix:	Water	**Client:**	Chambers Group	**Collector:**	Enthalpy Analytical
Sampled:	10/30/2019 10:20	**Site:**			
Sample #:	**420782-003**	**Client Sample #:**	Haines Creek Exit	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: ALCH 4025	Prep Method: None					QCBatchID:		
Total Nitrogen	**5.17**	1	0.5	mg/L		11/07/19	SLL	
Method: EPA 300.0	Prep Method: Method					QCBatchID:		QC1208289
Nitrate, as Nitrogen	**5.17**	1	0.1	mg/L	10/30/19	10/30/19 15:17	JP	
Nitrite, as Nitrogen	ND	1	0.1	mg/L	10/30/19	10/30/19 15:17	JP	
Method: EPA 350.1	Prep Method: Method					QCBatchID:		QC1208472
Ammonia, as Nitrogen	ND	1	0.1	mg/L	11/06/19	11/06/19	TP	
Method: EPA 351.2	Prep Method: Method					QCBatchID:		QC1208336
Total Kjeldahl Nitrogen	ND	1	0.4	mg/L	11/01/19	11/01/19	TP	
Method: EPA 547	Prep Method: Method					QCBatchID:		
See Attached		1						
Method: EPA 8141A *NELAC*	Prep Method: EPA 3510C					QCBatchID:		
See Attached		1						
Method: SM 4500-Cl	Prep Method: Method					QCBatchID:		QC1208294
Chlorine, Total Residual	ND	1	0.1	mg/L		10/30/19 16:55	WW	T2
Method: SM 4500-P-B-5-E	Prep Method: 4500-P-B-5					QCBatchID:		QC1208424
Total Phosphorous as P	**0.028**	1	0.02	mg/L	11/05/19	11/05/19	TP	
Total Phosphorous as PO4	**0.086**	1	0.06	mg/L	11/05/19	11/05/19	TP	
Method: SM 4500-P-E	Prep Method: Method					QCBatchID:		QC1208418
Orthophosphate, as P	**0.0220**	1	0.02	mg/L	10/30/19 17:00	10/30/19 17:17	TP	
Orthophosphate, as PO4	**0.067**	1	0.06	mg/L	10/30/19 17:00	10/30/19 17:17	TP	
Method: SM 9221-B	Prep Method: Method					QCBatchID:		QC1208254
Coliform, Total	**240**	1		MPN/100ml	10/30/19 14:50	11/02/19 12:29	LH	
Method: SM 9221-E	Prep Method: Method					QCBatchID:		QC1208254
Coliform, Fecal	**130**	1		MPN/100ml	10/30/19 14:50	11/02/19 12:29	LH	

QCBatchID: QC1208289 **Analyst:** JParedes **Method:** EPA 300.0

Matrix: Water **Analyzed:** 10/30/2019 **Instrument:** AAICP (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes
QC1208289MB1					
Bromide	ND	mg/L		0.3	
Chloride	ND	mg/L		1	
Nitrate, as Nitrogen	ND	mg/L		0.1	
Nitrate, as NO3	ND	mg/L		0.44	
Nitrite, as Nitrogen	ND	mg/L		0.1	
Nitrite, as NO2	ND	mg/L		0.33	
Sulfate	ND	mg/L		0.5	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208289LCS1											
Bromide	15		15.0		mg/L	100			90-110		
Chloride	100		105		mg/L	105			90-110		
Nitrate, as Nitrogen	9.03		9.49		mg/L	105			90-110		
Nitrate, as NO3	40		42.0		mg/L	105			90-110		
Nitrite, as Nitrogen	9.15		9.46		mg/L	103			90-110		
Nitrite, as NO2	30		31.0		mg/L	103			90-110		
Sulfate	50		52.0		mg/L	104			90-110		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208289MS1, QC1208289MSD1												**Source: 420787-001**
Bromide	ND	15	15	15.1	15.2	mg/L	101	101	0.7	80-120	20	
Chloride	81.8	100	100	169	173	mg/L	87	91	2.3	80-120	20	
Nitrate, as Nitrogen	ND	9.03	9.03	9.40	9.52	mg/L	104	105	1.3	80-120	20	
Nitrate, as NO3	ND	40	40	41.6	42.2	mg/L	104	106	1.4	80-120	20	
Nitrite, as Nitrogen	ND	9.15	9.15	8.85	8.86	mg/L	97	97	0.1	80-120	20	
Nitrite, as NO2	ND	30	30	29.0	29.1	mg/L	97	97	0.3	80-120	20	
Sulfate	16.6	50	50	66.8	66.9	mg/L	100	101	0.1	80-120	20	
QC1208289MS2, QC1208289MSD2												**Source: 420800-004**
Bromide	ND	15	15	14.6	15.0	mg/L	97	100	2.7	80-120	20	
Chloride	174	100	100	249	247	mg/L	75	73	0.8	80-120	20	M
Nitrate, as Nitrogen	4.88	9.03	9.03	13.8	14.1	mg/L	99	102	2.2	80-120	20	
Nitrate, as NO3	21.6	40	40	61.1	62.4	mg/L	99	102	2.1	80-120	20	
Nitrite, as Nitrogen	ND	9.15	9.15	8.06	8.50	mg/L	88	93	5.3	80-120	20	
Nitrite, as NO2	ND	30	30	26.4	27.9	mg/L	88	93	5.5	80-120	20	
Sulfate	6.23	50	50	56.0	57.3	mg/L	100	102	2.3	80-120	20	

QCBatchID:	**QC1208294**	**Analyst:**	wei	**Method:**	SM 4500-Cl
Matrix:	Water	**Analyzed:**	10/30/2019	**Instrument:**	CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes	
QC1208294MB1						
Chlorine, Total Residual	ND	mg/L		0.1		

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208294LCS1											
Chlorine, Total Residual	1		1.04		mg/L	104			80-120		

Duplicate Summary

Analyte	Sample Amount	Duplicate Amount	Units	RPD	Limits RPD	Notes
QC1208294DUP1						**Source: 420789-002**
Chlorine, Total Residual	1.16	1.16	mg/L	0.0	20	

QCBatchID: QC1208336	**Analyst:** trinh		**Method:** EPA 351.2		
Matrix: Water	**Analyzed:** 11/01/2019		**Instrument:** CHEM (group)		

Blank Summary

Analyte	Blank Result	Units		RDL	Notes
QC1208336MB1					
Total Kjeldahl Nitrogen	ND	mg/L		0.4	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
	LCS	LCSD	LCS	LCSD		LCS	LCSD		%Rec	RPD	
QC1208336LCS1											
Total Kjeldahl Nitrogen	2.5		2.6		mg/L	104			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount		Spike Result		Units	Recoveries		RPD	Limits		Notes
		MS	MSD	MS	MSD		MS	MSD		%Rec	RPD	
QC1208336MS1, QC1208336MSD1												**Source: 420782-001**
Total Kjeldahl Nitrogen	0.635	12.5	12.5	11	8.4	mg/L	83	62	26.8	80-120	20	M,D

QCBatchID: QC1208418 **Analyst:** trinh **Method:** SM 4500-P-E

Matrix: Water **Analyzed:** 10/30/2019 **Instrument:** CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes
QC1208418MB1					
Orthophosphate, as P	ND	mg/L		0.02	
Orthophosphate, as PO4	ND	mg/L		0.06	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208418LCS1											
Orthophosphate, as P	0.4		0.3900		mg/L	98			80-120		
Orthophosphate, as PO4	1.2264		1.19		mg/L	97			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208418MS1, QC1208418MSD1												**Source: 420762-002**
Orthophosphate, as P	0.4220	0.8	0.8	1.17	1.17	mg/L	94	94	0.0	75-125	25	
Orthophosphate, as PO4	1.29	2.46	2.46	3.57	3.57	mg/L	93	93	0.0	75-125	25	

QCBatchID: QC1208424 **Analyst:** trinh **Method:** SM 4500-P-B-5-E

Matrix: Water **Analyzed:** 11/05/2019 **Instrument:** CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes
QC1208424MB1					
Total Phosphorous as P	ND	mg/L		0.02	
Total Phosphorous as PO4	ND	mg/L		0.06	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208424LCS1											
Total Phosphorous as P	0.4		0.386		mg/L	97			80-120		
Total Phosphorous as PO4	1.3		1.18		mg/L	91			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208424MS1, QC1208424MSD1												**Source: 420756-001**
Total Phosphorous as P	0.143	0.4	0.4	0.562	0.562	mg/L	105	105	0.0	75-125	20	
Total Phosphorous as PO4	0.438	1.3	1.3	1.72	1.72	mg/L	99	99	0.0	75-125	20	

QCBatchID: QC1208472 **Analyst:** Echavez **Method:** EPA 350.1

Matrix: Water **Analyzed:** 11/06/2019 **Instrument:** CHEM (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes
QC1208472MB1					
Ammonia, as Nitrogen	ND	mg/L		0.1	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208472LCS1											
Ammonia, as Nitrogen	2.5		2.56		mg/L	102			80-120		

Matrix Spike/Matrix Spike Duplicate Summary

Analyte	Sample Amount	Spike Amount MS	Spike Amount MSD	Spike Result MS	Spike Result MSD	Units	Recoveries MS	Recoveries MSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208472MS1, QC1208472MSD1												**Source: 420782-001**
Ammonia, as Nitrogen	ND	2.5	2.5	2.57	2.54	mg/L	103	102	1.2	80-120	20	

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
BQ4	Minor Dissolved Oxygen loss was observed in the blank water check, however, the LCS was within criteria, validating the batch.
BQ5	Minor Dissolved Oxygen loss was observed in the blank water check.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client's instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
IR	Inconclusive Result. Legionella is present, however, there is possible non-specific agglutination preventing specific identification.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
L2	LCS did not meet recovery criteria, however, the MS and/or MSD met LCS recovery criteria, validating the batch.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client's request.
T4	Sample was analyzed out of hold time per client's request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 420782

Page: of

Turn Around Time (rush by advanced notice only)

Standard:		5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

Enthalpy Analytical - Orange

931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: 15.2 (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	Chambers Group Inc.	Quote #:	
Report To:	Mauricio Gomez	Proj. Name:	Big Tujunga
Email:	mgomez@chambersgroupinc.com	Proj. #:	
Address:		P.O. #:	
		Address:	
Phone:	323-702-2826	Global ID:	
Fax:		Sampled By:	

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	total KJELDAHL nitrogen	nitrite - nitrogen	nitrite - nitrogen	ammonia	orthophosphate	total phosphorus	total coliform	fecal coliform	glyphosate	chlorpyrifos & oxyfluorfen	Total Residual chlorine	Test Instructions / Comments
1	Ponds Inlet	10/30/19	0925															
2	Ponds Outlet	10/30/19	0837															
3	Haines Creek Exit	10/30/19	10:20															
4																		
5																		
6																		
7																		
8																		Okay to run w/out ice
9																		
10																		

	Signature	Print Name	Company / Title	Date / Time
[1] Relinquished By:		James Navales	Chambers Group / Collections Manager	10/30/19 / 12:15 pm
[1] Received By:		G. Kim	CA	10/30/19 12:15
[2] Relinquished By:				
[2] Received By:				
[3] Relinquished By:				
[3] Received By:				

ENTHALPY ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: Chambers Group Project: Big Tujunga

Date Received: 10/30/19 Sampler's Name Present: ☐ Yes ☑ No

Section 2

Sample(s) received in a cooler? ☐ Yes, How many? _____ ☑ No (skip section 2) Sample Temp (°C) (No Cooler): 18.2

Sample Temp (°C), One from each cooler: #1: _____ #2: _____ #3: _____ #4: _____

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: _____

Section 3

Was the cooler packed with: ☐ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other _____

Cooler Temp (°C): #1: _____ #2: _____ #3: _____ #4: _____

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)			✓
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?	✓		
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials: _____ Date/Time _____

☐ Email (email sent to/on): _____ / _____

Project Manager's response:

Completed By: _____ Date: 10/30/19

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

Laboratory Job ID: 680-176222-1
Client Project/Site: 420782

For:
Enthalpy Analytical LLC
931 W. Barkley Ave
Orange, California 92868

Attn: Diane Galvan

Kathryn Smith

Authorized for release by:
11/8/2019 12:54:16 PM

Kathryn Smith, Manager of Project Management
(912)250-0275
kathy.smith@testamericainc.com

Definitions/Glossary

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 680-176222-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Sample Summary

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 680-176222-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-176222-1	Ponds Inlet (420782-001)	Water	10/30/19 09:25	10/31/19 09:45	
680-176222-2	Ponds Outlet (420782-002)	Water	10/30/19 08:37	10/31/19 09:45	
680-176222-3	Haines Creek Exit (420782-003)	Water	10/30/19 10:20	10/31/19 09:45	

Case Narrative

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 680-176222-1

Job ID: 680-176222-1

Laboratory: Eurofins TestAmerica, Savannah

Narrative

Job Narrative
680-176222-1

Comments
No additional comments.

Receipt
The samples were received on 10/31/2019 9:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.9º C.

HPLC/IC
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample Results

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 680-176222-1

Client Sample ID: Ponds Inlet (420782-001)

Lab Sample ID: 680-176222-1

Date Collected: 10/30/19 09:25
Matrix: Water
Date Received: 10/31/19 09:45

Method: 547 LL - Glyphosate (DAI HPLC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Glyphosate	ND		6.0		ug/L			11/07/19 23:51	1

Client Sample ID: Ponds Outlet (420782-002)

Lab Sample ID: 680-176222-2

Date Collected: 10/30/19 08:37
Matrix: Water
Date Received: 10/31/19 09:45

Method: 547 LL - Glyphosate (DAI HPLC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Glyphosate	ND		6.0		ug/L			11/08/19 00:48	1

Client Sample ID: Haines Creek Exit (420782-003)

Lab Sample ID: 680-176222-3

Date Collected: 10/30/19 10:20
Matrix: Water
Date Received: 10/31/19 09:45

Method: 547 LL - Glyphosate (DAI HPLC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Glyphosate	ND		6.0		ug/L			11/08/19 01:07	1

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 680-176222-1

Method: 547 LL - Glyphosate (DAI HPLC)

Lab Sample ID: MB 680-595184/2
Matrix: Water
Analysis Batch: 595184

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Glyphosate	ND		6.0		ug/L			11/07/19 18:06	1

Lab Sample ID: LCS 680-595184/3
Matrix: Water
Analysis Batch: 595184

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Glyphosate			200	201		ug/L		101	80 - 120		

Lab Sample ID: LCSD 680-595184/4
Matrix: Water
Analysis Batch: 595184

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Glyphosate			200	192		ug/L		96	80 - 120	4	20

Lab Sample ID: 680-176222-1 MS
Matrix: Water
Analysis Batch: 595184

Client Sample ID: Ponds Inlet (420782-001)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Glyphosate	ND		200	199		ug/L		100	80 - 120		

Lab Sample ID: 680-176222-1 MSD
Matrix: Water
Analysis Batch: 595184

Client Sample ID: Ponds Inlet (420782-001)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Glyphosate	ND		200	195		ug/L		98	80 - 120	2	20

QC Association Summary

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 680-176222-1

HPLC/IC

Analysis Batch: 595184

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-176222-1	Ponds Inlet (420782-001)	Total/NA	Water	547 LL	
680-176222-2	Ponds Outlet (420782-002)	Total/NA	Water	547 LL	
680-176222-3	Haines Creek Exit (420782-003)	Total/NA	Water	547 LL	
MB 680-595184/2	Method Blank	Total/NA	Water	547 LL	
LCS 680-595184/3	Lab Control Sample	Total/NA	Water	547 LL	
LCSD 680-595184/4	Lab Control Sample Dup	Total/NA	Water	547 LL	
680-176222-1 MS	Ponds Inlet (420782-001)	Total/NA	Water	547 LL	
680-176222-1 MSD	Ponds Inlet (420782-001)	Total/NA	Water	547 LL	

Lab Chronicle

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 680-176222-1

Client Sample ID: Ponds Inlet (420782-001)

Lab Sample ID: 680-176222-1

Date Collected: 10/30/19 09:25
Matrix: Water
Date Received: 10/31/19 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	547 LL		1	1 mL	1 mL	595184	11/07/19 23:51	EKB	TAL SAV
	Instrument ID: CLCR									

Client Sample ID: Ponds Outlet (420782-002)

Lab Sample ID: 680-176222-2

Date Collected: 10/30/19 08:37
Matrix: Water
Date Received: 10/31/19 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	547 LL		1	1 mL	1 mL	595184	11/08/19 00:48	EKB	TAL SAV
	Instrument ID: CLCR									

Client Sample ID: Haines Creek Exit (420782-003)

Lab Sample ID: 680-176222-3

Date Collected: 10/30/19 10:20
Matrix: Water
Date Received: 10/31/19 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	547 LL		1	1 mL	1 mL	595184	11/08/19 01:07	EKB	TAL SAV
	Instrument ID: CLCR									

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Accreditation/Certification Summary

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 680-176222-1

Laboratory: Eurofins TestAmerica, Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	SAVLAB	
Alabama	State	41450	06-30-20
Alaska	State	GA00006	06-30-20
Alaska (UST)	State	17-016	09-30-20
ANAB	Dept. of Defense ELAP	L2463	09-22-22
ANAB	DoD	L2463	09-22-22
ANAB	ISO/IEC 17025	L2463.01	09-22-22
ANAB	ISO/IEC 17025	L2463.01	09-22-22
Arizona	State	AZ0808	12-14-19
Arkansas DEQ	State	19-015-0	02-01-20
Arkansas DEQ	State Program	88-0692	02-01-20
California	State	2939	06-30-20
Colorado	State	GA00006	12-31-19
Connecticut	State	PH-0161	03-31-21
Florida	NELAP	E87052	06-30-20
GA Dept. of Agriculture	State Program	N/A	06-12-20
Georgia	State	E87052	06-30-20
Georgia	State Program	N/A	06-30-20
Georgia (DW)	State	803	06-30-20
Guam	State	19-007R	04-17-20
Hawaii	State	<cert No.>	06-30-20
Indiana	State	C-GA-02	06-30-20
Iowa	State	353	09-22-20
Kansas	NELAP	E-10322	10-15-20
Kentucky (DW)	State	KY90084	12-31-19
Kentucky (UST)	State	<cert No.>	06-30-20
Kentucky (UST)	State Program	18	06-30-20
Kentucky (WW)	State	KY90084	12-31-19
Kentucky (WW)	State Program	90084	12-31-19
Louisiana	NELAP	02011	06-30-20
Louisiana (DW)	State	LA009	12-31-19
Maine	State	GA00006	09-26-20
Maryland	State	250	12-31-19
Massachusetts	State	M-GA006	06-30-20
Massachusetts	State Program	M-GA006	06-30-20
Michigan	State	9925	06-30-20
Mississippi	State	<cert No.>	06-30-20
Mississippi	State Program	N/A	06-30-20
Nebraska	State	NE-OS-7-04	06-30-20
Nebraska	State Program	TestAmerica-Savannah	06-30-20
New Hampshire	NELAP	2096	05-29-20
New Hampshire	NELAP	2096	05-29-20
New Jersey	NELAP	GA769	06-30-20
New Mexico	State	GA00006	06-30-20
New York	NELAP	10842	04-01-20
North Carolina (DW)	State	13701	07-31-20
North Carolina (DW)	State Program	13701	07-31-20
North Carolina (WW/SW)	State	269	12-31-19
North Carolina (WW/SW)	State Program	269	12-31-19
Oklahoma	State	9984	08-31-20

Accreditation/Certification Summary

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 680-176222-1

Laboratory: Eurofins TestAmerica, Savannah (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Pennsylvania	NELAP	68-00474	06-30-20
Puerto Rico	State	GA00006	01-01-20
South Carolina	State	98001	06-30-20
Tennessee	State	02961	06-30-20
Texas	NELAP	T104704185-19-13	11-30-19 *
Texas	NELAP	T1047004185-19-3	11-30-19
Texas	TCEQ Water Supply	T104704185	09-23-20
US Fish & Wildlife	US Federal Programs	LE058448-0	07-31-20
USDA	US Federal Programs	P330-18-00313	10-29-21
Virginia	NELAP	10509	06-14-20
Washington	State	C805	06-10-20
West Virginia (DW)	State	9950C	12-31-19
West Virginia (DW)	State Program	9950C	12-31-19
West Virginia DEP	State	094	11-30-19
Wisconsin	State	999819810	08-31-20
Wyoming	State	8TMS-L	06-30-20 *
Wyoming	State Program	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 680-176222-1

Method	Method Description	Protocol	Laboratory
547 LL	Glyphosate (DAI HPLC)	EPA	TAL SAV

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Enthalpy Analytical
Formerly Associated Labs
1 Park Plaza, Suite 1000
Irvine, CA 92614
Tel: 714.771.6900 Fax: 714.538.1209
info-sc@enthalpy.com

MONTROSE

Subcontract Laboratory:

Test America - Savannah
5102 LaRoche Avenue
Savannah, GA 31404
912-354-7858
ATTN: Kathy Smith
PO#

Project: 420782 **Due:**
PM: Diane Galvan
Email: diane.galvan@enthalpy.com
CC: incomingreports@enthalpy.com
Require: ☑ EDD ☐ EDF ☐ EDT
Report To: ☐ MDL

Note:

Matrix	Sampled	Sample ID	Analysis	Comment
Water	10/30/19 09:25	Ponds Inlet (420782-001)	547 Out	Glyphosate
Water	10/30/19 08:37	Ponds Outlet (420782-002)	547 Out	Glyphosate
Water	10/30/19 10:20	Haines Creek Exit (420782-003)	547 Out	Glyphosate

Note:
Standard TAT.

Relinquished By	Received By:
Date/Time 10/30/19 1502	Date/Time 10/31/19 0945
Date/Time	Date/Time 2.8/2.9

680-176222 Chain of Custody

420782-01 10/30/19 13:51 DG

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ANALYTICAL REPORT

Eurofins Calscience LLC
7440 Lincoln Way
Garden Grove, CA 92841
Tel: (714)895-5494

Laboratory Job ID: 570-11454-1
Client Project/Site: 420782

For:
Enthalpy Analytical LLC
931 W Barkley Ave
Orange, California 92868

Attn: Incoming Reports

Authorized for release by:
11/6/2019 7:40:35 PM

Xuan Dang, Project Manager I
(714)895-5494
xuandang@eurofinsus.com

Table of Contents

Definitions/Glossary

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 570-11454-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
E	Result exceeded calibration range.
me	LCS Recovery is within Marginal Exdeedance (ME) control limit range (± 4 SD from the mean).

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 570-11454-1

Laboratory: Eurofins Calscience LLC

Narrative

Job Narrative
570-11454-1

Comments
No additional comments.

Receipt
The samples were received on 10/30/2019 4:01 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.0º C.

GC Semi VOA
Method 8141A: The continuing calibration verification (CCV) associated with batch 570-30510 recovered above the upper control limit for Merphos. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: Ponds Inlet (420782-001) (570-11454-1), Ponds Outlet (420782-002) (570-11454-2), Haines Creek Exit (420782-003) (570-11454-3) and (CCV 570-30510/18)

Method 8141A: The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for preparation batch 570-30026 and analytical batch 570-30510 recovered outside control limits for the following analytes: Azinphos-methyl, Fensulfothion and Merphos. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

Method 8141A: The closing continuing calibration verification (CCV) associated with batch 570-30510 recovered above the upper control limit for Azinphos-methyl, Chlorpyrifos, Coumaphos and Merphos. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: Ponds Inlet (420782-001) (570-11454-1), Ponds Outlet (420782-002) (570-11454-2), Haines Creek Exit (420782-003) (570-11454-3) and (CCV 570-30510/19).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
Method 3510C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 570-30026. LCS/LCSD performed to meet QC requirements.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 570-11454-1

Client Sample ID: Ponds Inlet (420782-001) — Lab Sample ID: 570-11454-1

No Detections.

Client Sample ID: Ponds Outlet (420782-002) — Lab Sample ID: 570-11454-2

No Detections.

Client Sample ID: Haines Creek Exit (420782-003) — Lab Sample ID: 570-11454-3

No Detections.

This Detection Summary does not include radiochemical test results.

Method: 8141A - Organophosphorous Pesticides (GC)

Client Sample ID: Ponds Inlet (420782-001)
Date Collected: 10/30/19 09:25
Date Received: 10/30/19 16:01

Lab Sample ID: 570-11454-1
Matrix: Water

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Azinphos-methyl	ND	*	0.0048		mg/L		10/31/19 20:29	11/04/19 22:34	1
Bolstar	ND		0.0048		mg/L		10/31/19 20:29	11/04/19 22:34	1
Chlorpyrifos	ND		0.0048		mg/L		10/31/19 20:29	11/04/19 22:34	1
Coumaphos	ND		0.0048		mg/L		10/31/19 20:29	11/04/19 22:34	1
Demeton-o/s	ND		0.0096		mg/L		10/31/19 20:29	11/04/19 22:34	1
Diazinon	ND		0.0048		mg/L		10/31/19 20:29	11/04/19 22:34	1
Dichlorvos	ND		0.0048		mg/L		10/31/19 20:29	11/04/19 22:34	1
Disulfoton	ND		0.0096		mg/L		10/31/19 20:29	11/04/19 22:34	1
Ethoprop	ND		0.0048		mg/L		10/31/19 20:29	11/04/19 22:34	1
Fensulfothion	ND	*	0.0048		mg/L		10/31/19 20:29	11/04/19 22:34	1
Fenthion	ND		0.0048		mg/L		10/31/19 20:29	11/04/19 22:34	1
Merphos	ND	*	0.0048		mg/L		10/31/19 20:29	11/04/19 22:34	1
Methyl parathion	ND		0.0048		mg/L		10/31/19 20:29	11/04/19 22:34	1
Mevinphos	ND		0.0048		mg/L		10/31/19 20:29	11/04/19 22:34	1
Naled	ND		0.038		mg/L		10/31/19 20:29	11/04/19 22:34	1
Phorate	ND		0.0048		mg/L		10/31/19 20:29	11/04/19 22:34	1
Ronnel	ND		0.0048		mg/L		10/31/19 20:29	11/04/19 22:34	1
Stirophos	ND		0.019		mg/L		10/31/19 20:29	11/04/19 22:34	1
Tokuthion	ND		0.0048		mg/L		10/31/19 20:29	11/04/19 22:34	1
Trichloronate	ND		0.0048		mg/L		10/31/19 20:29	11/04/19 22:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tributyl phosphate	*104*		*30 - 130*	*10/31/19 20:29*	*11/04/19 22:34*	*1*

Client Sample ID: Ponds Outlet (420782-002)
Date Collected: 10/30/19 08:37
Date Received: 10/30/19 16:01

Lab Sample ID: 570-11454-2
Matrix: Water

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Azinphos-methyl	ND	*	0.0049		mg/L		10/31/19 20:29	11/04/19 23:22	1
Bolstar	ND		0.0049		mg/L		10/31/19 20:29	11/04/19 23:22	1
Chlorpyrifos	ND		0.0049		mg/L		10/31/19 20:29	11/04/19 23:22	1
Coumaphos	ND		0.0049		mg/L		10/31/19 20:29	11/04/19 23:22	1
Demeton-o/s	ND		0.0097		mg/L		10/31/19 20:29	11/04/19 23:22	1
Diazinon	ND		0.0049		mg/L		10/31/19 20:29	11/04/19 23:22	1
Dichlorvos	ND		0.0049		mg/L		10/31/19 20:29	11/04/19 23:22	1
Disulfoton	ND		0.0097		mg/L		10/31/19 20:29	11/04/19 23:22	1
Ethoprop	ND		0.0049		mg/L		10/31/19 20:29	11/04/19 23:22	1
Fensulfothion	ND	*	0.0049		mg/L		10/31/19 20:29	11/04/19 23:22	1
Fenthion	ND		0.0049		mg/L		10/31/19 20:29	11/04/19 23:22	1
Merphos	ND	*	0.0049		mg/L		10/31/19 20:29	11/04/19 23:22	1
Methyl parathion	ND		0.0049		mg/L		10/31/19 20:29	11/04/19 23:22	1
Mevinphos	ND		0.0049		mg/L		10/31/19 20:29	11/04/19 23:22	1
Naled	ND		0.039		mg/L		10/31/19 20:29	11/04/19 23:22	1
Phorate	ND		0.0049		mg/L		10/31/19 20:29	11/04/19 23:22	1
Ronnel	ND		0.0049		mg/L		10/31/19 20:29	11/04/19 23:22	1
Stirophos	ND		0.019		mg/L		10/31/19 20:29	11/04/19 23:22	1
Tokuthion	ND		0.0049		mg/L		10/31/19 20:29	11/04/19 23:22	1
Trichloronate	ND		0.0049		mg/L		10/31/19 20:29	11/04/19 23:22	1

Method: 8141A - Organophosphorous Pesticides (GC) (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tributyl phosphate	*99*		*30 - 130*	*10/31/19 20:29*	*11/04/19 23:22*	*1*

Client Sample ID: Haines Creek Exit (420782-003)
Date Collected: 10/30/19 10:20
Date Received: 10/30/19 16:01

Lab Sample ID: 570-11454-3
Matrix: Water

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Azinphos-methyl	ND	*	0.0048		mg/L		10/31/19 20:29	11/05/19 00:09	1
Bolstar	ND		0.0048		mg/L		10/31/19 20:29	11/05/19 00:09	1
Chlorpyrifos	ND		0.0048		mg/L		10/31/19 20:29	11/05/19 00:09	1
Coumaphos	ND		0.0048		mg/L		10/31/19 20:29	11/05/19 00:09	1
Demeton-o/s	ND		0.0097		mg/L		10/31/19 20:29	11/05/19 00:09	1
Diazinon	ND		0.0048		mg/L		10/31/19 20:29	11/05/19 00:09	1
Dichlorvos	ND		0.0048		mg/L		10/31/19 20:29	11/05/19 00:09	1
Disulfoton	ND		0.0097		mg/L		10/31/19 20:29	11/05/19 00:09	1
Ethoprop	ND		0.0048		mg/L		10/31/19 20:29	11/05/19 00:09	1
Fensulfothion	ND	*	0.0048		mg/L		10/31/19 20:29	11/05/19 00:09	1
Fenthion	ND		0.0048		mg/L		10/31/19 20:29	11/05/19 00:09	1
Merphos	ND	*	0.0048		mg/L		10/31/19 20:29	11/05/19 00:09	1
Methyl parathion	ND		0.0048		mg/L		10/31/19 20:29	11/05/19 00:09	1
Mevinphos	ND		0.0048		mg/L		10/31/19 20:29	11/05/19 00:09	1
Naled	ND		0.039		mg/L		10/31/19 20:29	11/05/19 00:09	1
Phorate	ND		0.0048		mg/L		10/31/19 20:29	11/05/19 00:09	1
Ronnel	ND		0.0048		mg/L		10/31/19 20:29	11/05/19 00:09	1
Stirophos	ND		0.019		mg/L		10/31/19 20:29	11/05/19 00:09	1
Tokuthion	ND		0.0048		mg/L		10/31/19 20:29	11/05/19 00:09	1
Trichloronate	ND		0.0048		mg/L		10/31/19 20:29	11/05/19 00:09	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tributyl phosphate	*101*		*30 - 130*	*10/31/19 20:29*	*11/05/19 00:09*	*1*

Surrogate Summary

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 570-11454-1

Method: 8141A - Organophosphorous Pesticides (GC)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)								
Lab Sample ID	Client Sample ID	TBPH1 (30-130)								
570-11454-1	Ponds Inlet (420782-001)	104								
570-11454-2	Ponds Outlet (420782-002)	99								
570-11454-3	Haines Creek Exit (420782-003)	101								
LCS 570-30026/2-A	Lab Control Sample	114								
LCSD 570-30026/3-A	Lab Control Sample Dup	109								
MB 570-30026/1-A	Method Blank	106								

Surrogate Legend

TBPH = Tributyl phosphate

Method: 8141A - Organophosphorous Pesticides (GC)

Lab Sample ID: MB 570-30026/1-A
Matrix: Water
Analysis Batch: 30510

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 30026

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Azinphos-methyl	ND		0.0050		mg/L		10/31/19 20:29	11/04/19 20:12	1
Bolstar	ND		0.0050		mg/L		10/31/19 20:29	11/04/19 20:12	1
Chlorpyrifos	ND		0.0050		mg/L		10/31/19 20:29	11/04/19 20:12	1
Coumaphos	ND		0.0050		mg/L		10/31/19 20:29	11/04/19 20:12	1
Demeton-o/s	ND		0.010		mg/L		10/31/19 20:29	11/04/19 20:12	1
Diazinon	ND		0.0050		mg/L		10/31/19 20:29	11/04/19 20:12	1
Dichlorvos	ND		0.0050		mg/L		10/31/19 20:29	11/04/19 20:12	1
Disulfoton	ND		0.010		mg/L		10/31/19 20:29	11/04/19 20:12	1
Ethoprop	ND		0.0050		mg/L		10/31/19 20:29	11/04/19 20:12	1
Fensulfothion	ND		0.0050		mg/L		10/31/19 20:29	11/04/19 20:12	1
Fenthion	ND		0.0050		mg/L		10/31/19 20:29	11/04/19 20:12	1
Merphos	ND		0.0050		mg/L		10/31/19 20:29	11/04/19 20:12	1
Methyl parathion	ND		0.0050		mg/L		10/31/19 20:29	11/04/19 20:12	1
Mevinphos	ND		0.0050		mg/L		10/31/19 20:29	11/04/19 20:12	1
Naled	ND		0.040		mg/L		10/31/19 20:29	11/04/19 20:12	1
Phorate	ND		0.0050		mg/L		10/31/19 20:29	11/04/19 20:12	1
Ronnel	ND		0.0050		mg/L		10/31/19 20:29	11/04/19 20:12	1
Stirophos	ND		0.020		mg/L		10/31/19 20:29	11/04/19 20:12	1
Tokuthion	ND		0.0050		mg/L		10/31/19 20:29	11/04/19 20:12	1
Trichloronate	ND		0.0050		mg/L		10/31/19 20:29	11/04/19 20:12	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tributyl phosphate	*106*		*30 - 130*	*10/31/19 20:29*	*11/04/19 20:12*	*1*

Lab Sample ID: LCS 570-30026/2-A
Matrix: Water
Analysis Batch: 30510

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 30026

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Azinphos-methyl			0.0400	0.05520	* me	mg/L		138	30 - 130		
Bolstar			0.0400	0.04481		mg/L		112	30 - 130		
Chlorpyrifos			0.0400	0.04605		mg/L		115	30 - 130		
Coumaphos			0.0400	0.05014		mg/L		125	30 - 130		
Diazinon			0.0400	0.05102		mg/L		128	30 - 130		
Disulfoton			0.0400	0.04951		mg/L		124	30 - 130		
Ethoprop			0.0400	0.05104		mg/L		128	30 - 130		
Fensulfothion			0.0400	0.05415	* me	mg/L		135	30 - 130		
Fenthion			0.0400	0.04922		mg/L		123	30 - 130		
Merphos			0.0400	0.1021	E *	mg/L		255	30 - 130		
Methyl parathion			0.0400	0.04713		mg/L		118	30 - 130		
Phorate			0.0400	0.04723		mg/L		118	30 - 130		
Ronnel			0.0400	0.04364		mg/L		109	30 - 130		
Stirophos			0.0400	0.04702		mg/L		118	30 - 130		
Tokuthion			0.0400	0.04541		mg/L		114	30 - 130		
Trichloronate			0.0400	0.04881		mg/L		122	30 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tributyl phosphate	*114*		*30 - 130*

Method: 8141A - Organophosphorous Pesticides (GC)

Lab Sample ID: LCSD 570-30026/3-A
Matrix: Water
Analysis Batch: 30510

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 30026

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Azinphos-methyl			0.0400	0.05449	* me	mg/L		136	30 - 130	1	30
Bolstar			0.0400	0.04435		mg/L		111	30 - 130	1	30
Chlorpyrifos			0.0400	0.03996		mg/L		100	30 - 130	14	30
Coumaphos			0.0400	0.04676		mg/L		117	30 - 130	7	30
Diazinon			0.0400	0.04830		mg/L		121	30 - 130	5	30
Disulfoton			0.0400	0.04874		mg/L		122	30 - 130	2	30
Ethoprop			0.0400	0.04958		mg/L		124	30 - 130	3	30
Fensulfothion			0.0400	0.05310	* me	mg/L		133	30 - 130	2	30
Fenthion			0.0400	0.04821		mg/L		121	30 - 130	2	30
Merphos			0.0400	0.09537	E *	mg/L		238	30 - 130	7	30
Methyl parathion			0.0400	0.04235		mg/L		106	30 - 130	11	30
Phorate			0.0400	0.04636		mg/L		116	30 - 130	2	30
Ronnel			0.0400	0.04397		mg/L		110	30 - 130	1	30
Stirophos			0.0400	0.04629		mg/L		116	30 - 130	2	30
Tokuthion			0.0400	0.04430		mg/L		111	30 - 130	2	30
Trichloronate			0.0400	0.04511		mg/L		113	30 - 130	8	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Tributyl phosphate	*109*		*30 - 130*

Marginal Exceedance (ME) Summary

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 570-11454-1

Method: 8141A - Organophosphorous Pesticides (GC)

Lab Sample ID: LCS 570-30026/2-A
Matrix: Water

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	%Rec	%Rec. Limits	ME %Rec. Limits	Marginal Exceedance Status
Azinphos-methyl	0.0400	0.05520	* me	mg/L	138	30 - 130	13 - 147	ME¹
Bolstar	0.0400	0.04481		mg/L	112	30 - 130	13 - 147	
Chlorpyrifos	0.0400	0.04605		mg/L	115	30 - 130	13 - 147	
Coumaphos	0.0400	0.05014		mg/L	125	30 - 130	13 - 147	
Diazinon	0.0400	0.05102		mg/L	128	30 - 130	13 - 147	
Disulfoton	0.0400	0.04951		mg/L	124	30 - 130	13 - 147	
Ethoprop	0.0400	0.05104		mg/L	128	30 - 130	13 - 147	
Fensulfothion	0.0400	0.05415	* me	mg/L	135	30 - 130	13 - 147	ME¹
Fenthion	0.0400	0.04922		mg/L	123	30 - 130	13 - 147	
Merphos	0.0400	0.1021	E *	mg/L	255	30 - 130	13 - 147	X
Methyl parathion	0.0400	0.04713		mg/L	118	30 - 130	13 - 147	
Phorate	0.0400	0.04723		mg/L	118	30 - 130	13 - 147	
Ronnel	0.0400	0.04364		mg/L	109	30 - 130	13 - 147	
Stirophos	0.0400	0.04702		mg/L	118	30 - 130	13 - 147	
Tokuthion	0.0400	0.04541		mg/L	114	30 - 130	13 - 147	
Trichloronate	0.0400	0.04881		mg/L	122	30 - 130	13 - 147	

Summary

Number of Analytes Reported	Number of Marginal Exceedances Allowed	Number of Marginal Exceedances Found
16	1	2

ME¹ = Marginal Exceedance and number of ME's found greater than allowed
X = % Recovery is greater than widest possible limit

Lab Sample ID: LCSD 570-30026/3-A
Matrix: Water

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	%Rec	%Rec. Limits	ME %Rec. Limits	Marginal Exceedance Status
Azinphos-methyl	0.0400	0.05449	* me	mg/L	136	30 - 130	13 - 147	ME¹
Bolstar	0.0400	0.04435		mg/L	111	30 - 130	13 - 147	
Chlorpyrifos	0.0400	0.03996		mg/L	100	30 - 130	13 - 147	
Coumaphos	0.0400	0.04676		mg/L	117	30 - 130	13 - 147	
Diazinon	0.0400	0.04830		mg/L	121	30 - 130	13 - 147	
Disulfoton	0.0400	0.04874		mg/L	122	30 - 130	13 - 147	
Ethoprop	0.0400	0.04958		mg/L	124	30 - 130	13 - 147	
Fensulfothion	0.0400	0.05310	* me	mg/L	133	30 - 130	13 - 147	ME¹
Fenthion	0.0400	0.04821		mg/L	121	30 - 130	13 - 147	
Merphos	0.0400	0.09537	E *	mg/L	238	30 - 130	13 - 147	X
Methyl parathion	0.0400	0.04235		mg/L	106	30 - 130	13 - 147	
Phorate	0.0400	0.04636		mg/L	116	30 - 130	13 - 147	
Ronnel	0.0400	0.04397		mg/L	110	30 - 130	13 - 147	
Stirophos	0.0400	0.04629		mg/L	116	30 - 130	13 - 147	
Tokuthion	0.0400	0.04430		mg/L	111	30 - 130	13 - 147	
Trichloronate	0.0400	0.04511		mg/L	113	30 - 130	13 - 147	

Summary

Number of Analytes Reported	Number of Marginal Exceedances Allowed	Number of Marginal Exceedances Found
16	1	2

Marginal Exceedance (ME) Summary

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 570-11454-1

ME¹ = Marginal Exceedance and number of ME's found greater than allowed
X = % Recovery is greater than widest possible limit

QC Association Summary

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 570-11454-1

GC Semi VOA

Prep Batch: 30026

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-11454-1	Ponds Inlet (420782-001)	Total/NA	Water	3510C	
570-11454-2	Ponds Outlet (420782-002)	Total/NA	Water	3510C	
570-11454-3	Haines Creek Exit (420782-003)	Total/NA	Water	3510C	
MB 570-30026/1-A	Method Blank	Total/NA	Water	3510C	
LCS 570-30026/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 570-30026/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	

Analysis Batch: 30510

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-11454-1	Ponds Inlet (420782-001)	Total/NA	Water	8141A	30026
570-11454-2	Ponds Outlet (420782-002)	Total/NA	Water	8141A	30026
570-11454-3	Haines Creek Exit (420782-003)	Total/NA	Water	8141A	30026
MB 570-30026/1-A	Method Blank	Total/NA	Water	8141A	30026
LCS 570-30026/2-A	Lab Control Sample	Total/NA	Water	8141A	30026
LCSD 570-30026/3-A	Lab Control Sample Dup	Total/NA	Water	8141A	30026

Lab Chronicle

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 570-11454-1

Client Sample ID: Ponds Inlet (420782-001)

Lab Sample ID: 570-11454-1
Matrix: Water
Date Collected: 10/30/19 09:25
Date Received: 10/30/19 16:01

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			1040.1 mL	10 mL	30026	10/31/19 20:29	SP7J	ECL 1
Total/NA	Analysis	8141A		1			30510	11/04/19 22:34	UJ3K	ECL 1
	Instrument ID: GC69									

Client Sample ID: Ponds Outlet (420782-002)

Lab Sample ID: 570-11454-2
Matrix: Water
Date Collected: 10/30/19 08:37
Date Received: 10/30/19 16:01

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			1030.8 mL	10 mL	30026	10/31/19 20:29	SP7J	ECL 1
Total/NA	Analysis	8141A		1			30510	11/04/19 23:22	UJ3K	ECL 1
	Instrument ID: GC69									

Client Sample ID: Haines Creek Exit (420782-003)

Lab Sample ID: 570-11454-3
Matrix: Water
Date Collected: 10/30/19 10:20
Date Received: 10/30/19 16:01

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			1034.9 mL	10 mL	30026	10/31/19 20:29	SP7J	ECL 1
Total/NA	Analysis	8141A		1			30510	11/05/19 00:09	UJ3K	ECL 1
	Instrument ID: GC69									

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

Accreditation/Certification Summary

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 570-11454-1

Laboratory: Eurofins Calscience LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arizona	State	AZ0781	03-13-20
California	SCAQMD LAP	17LA0919	11-30-19
California	State	2944	09-29-20
Hawaii	State	<cert No.>	07-02-20
Nevada	State	CA00111	07-31-20
Oregon	NELAP	CA300001	01-29-20

Method Summary

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 570-11454-1

Method	Method Description	Protocol	Laboratory
8141A	Organophosphorous Pesticides (GC)	SW846	ECL 1
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	ECL 1

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

Sample Summary

Client: Enthalpy Analytical LLC
Project/Site: 420782

Job ID: 570-11454-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
570-11454-1	Ponds Inlet (420782-001)	Water	10/30/19 09:25	10/30/19 16:01	
570-11454-2	Ponds Outlet (420782-002)	Water	10/30/19 08:37	10/30/19 16:01	
570-11454-3	Haines Creek Exit (420782-003)	Water	10/30/19 10:20	10/30/19 16:01	

11454

Enthalpy Analytical
Formerly Associated Labs
1 Park Plaza, Suite 1000
Irvine, CA 92614
Tel: 714.771.6900 Fax: 714.538.1209
info-sc@enthalpy.com

MONTROSE

Subcontract Laboratory:

Eurofins CalScience - Sub
7440 Lincoln Way
Garden Grove, CA 92841

ATTN: Xuan Dang
PO# 1041647

570-11454 Chain of Custody

Project: 420782 **Due:**
PM: Diane Galvan
Email: diane.galvan@enthalpy.com
CC: incomingreports@enthalpy.com
Require: ☑ EDD ☐ EDF ☐ EDT
Report To: ☐ MDL

Note:

Matrix	Sampled	Sample ID	Analysis	Comment
Water	10/30/19 09:25	Ponds Inlet (420782-001)	8141_Out	Organophosphorus Pesticides
Water	10/30/19 08:37	Ponds Outlet (420782-002)	8141_Out	Organophosphorus Pesticides
Water	10/30/19 10:20	Haines Creek Exit (420782-003)	8141_Out	Organophosphorus Pesticides

Note:
Standard TAT.

Relinquished By	**Received By:**
	Danuyle EL
Date/Time	Date/Time 10/30/19 16:01
10-30-19 / 16:01	
Date/Time	Date/Time

2.5/3.0 SC6

Login Sample Receipt Checklist

Client: Enthalpy Analytical LLC

Job Number: 570-11454-1

Login Number: 11454
List Number: 1
Creator: Ramos, Maribel

List Source: Eurofins Calscience

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Enthalpy Analytical, LLC
931 W. Barkley Ave - Orange, CA 92868
Tel: (714)771-6900 Fax: (714)538-1209
www.enthalpy.com
info-sc@enthalpy.com

MONTROSE ENVIRONMENTAL

Client:	Chambers Group
Address:	5 Hutton Centre Drive Suite 750 Santa Ana, CA 92707
Attn:	Heather Franklin

Lab Request:	421379
Report Date:	11/26/2019
Date Received:	11/14/2019
Client ID:	14294

Comments: Big Tujunga

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods. Methods accredited by NELAC are indicated on the report. This cover letter is an integral part of the final report.

Sample #	Client Sample ID
421379-001	Ponds Inlet
421379-002	Ponds Outlet
421379-003	Haines Creek Exit

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

Diane M. Galvan

Report Review performed by: Diane Galvan, Project Manager

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 45 days from date received.

Matrix:	Water	**Client:**	Chambers Group	**Collector:**	client
Sampled:	11/14/2019 08:57	**Site:**			
Sample #:	**421379-001**	**Client Sample #:**	Ponds Inlet	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 608	Prep Method: 3510C					QCBatchID: QC1208963		
4,4'-DDD	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
4,4'-DDE	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
4,4'-DDT	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
a-BHC	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Aldrin	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
b-BHC	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Chlordane (technical)	ND	1	1	ug/L	11/19/19	11/20/19	CBR	
d-BHC	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Dieldrin	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endosulfan I	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endosulfan II	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endosulfan sulfate	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endrin	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endrin aldehyde	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endrin Ketone	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Heptachlor	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Heptachlor epoxide	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Lindane (Gamma-BHC)	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Methoxychlor	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
PCB-1016	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	L
PCB-1221	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
PCB-1232	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
PCB-1242	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
PCB-1248	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
PCB-1254	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
PCB-1260	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
Toxaphene	ND	1	2	ug/L	11/19/19	11/20/19	CBR	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*62*	*31-150*	
Tetrachloro-m-xylene TCMX (SUR)	*51*	*30-145*	

Matrix:	Water	**Client:**	Chambers Group	**Collector:**	client
Sampled:	11/14/2019 08:48	**Site:**			
Sample #:	**421379-002**	**Client Sample #:**	Ponds Outlet	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 608	Prep Method: 3510C					QCBatchID: QC1208963		
4,4'-DDD	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
4,4'-DDE	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
4,4'-DDT	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
a-BHC	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Aldrin	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
b-BHC	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Chlordane (technical)	ND	1	1	ug/L	11/19/19	11/20/19	CBR	
d-BHC	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Dieldrin	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endosulfan I	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endosulfan II	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endosulfan sulfate	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endrin	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endrin aldehyde	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endrin Ketone	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Heptachlor	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Heptachlor epoxide	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Lindane (Gamma-BHC)	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Methoxychlor	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
PCB-1016	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	L
PCB-1221	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
PCB-1232	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
PCB-1242	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
PCB-1248	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
PCB-1254	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
PCB-1260	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
Toxaphene	ND	1	2	ug/L	11/19/19	11/20/19	CBR	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*67*	*31-150*	
Tetrachloro-m-xylene TCMX (SUR)	*52*	*30-145*	

Matrix:	Water	**Client:**	Chambers Group	**Collector:**	client
Sampled:	11/14/2019 08:09	**Site:**			
Sample #:	**421379-003**	**Client Sample #:**	Haines Creek Exit	**Sample Type:**	

Analyte	Result	DF	RDL	Units	Prepared	Analyzed	By	Notes
Method: EPA 608	Prep Method: 3510C					QCBatchID: QC1208963		
4,4'-DDD	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
4,4'-DDE	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
4,4'-DDT	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
a-BHC	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Aldrin	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
b-BHC	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Chlordane (technical)	ND	1	1	ug/L	11/19/19	11/20/19	CBR	
d-BHC	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Dieldrin	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endosulfan I	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endosulfan II	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endosulfan sulfate	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endrin	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endrin aldehyde	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Endrin Ketone	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Heptachlor	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Heptachlor epoxide	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Lindane (Gamma-BHC)	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
Methoxychlor	ND	1	0.1	ug/L	11/19/19	11/20/19	CBR	
PCB-1016	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	L
PCB-1221	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
PCB-1232	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
PCB-1242	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
PCB-1248	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
PCB-1254	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
PCB-1260	ND	1	0.5	ug/L	11/19/19	11/20/19	CBR	
Toxaphene	ND	1	2	ug/L	11/19/19	11/20/19	CBR	

Surrogate	*% Recovery*	*Limits*	*Notes*
Decachlorobiphenyl DCB (SUR)	*64*	*31-150*	
Tetrachloro-m-xylene TCMX (SUR)	*45*	*30-145*	

QCBatchID: QC1208963 **Analyst:** Abanh **Method:** EPA 608

Matrix: Water **Analyzed:** 11/19/2019 **Instrument:** SVOA-GC (group)

Blank Summary

Analyte	Blank Result	Units		RDL	Notes
QC1208963MB1					
4,4'-DDD	ND	ug/L		0.1	
4,4'-DDE	ND	ug/L		0.1	
4,4'-DDT	ND	ug/L		0.1	
a-BHC	ND	ug/L		0.1	
Aldrin	ND	ug/L		0.1	
b-BHC	ND	ug/L		0.1	
Chlordane (technical)	ND	ug/L		1	
d-BHC	ND	ug/L		0.1	
Dieldrin	ND	ug/L		0.1	
Endosulfan I	ND	ug/L		0.1	
Endosulfan II	ND	ug/L		0.1	
Endosulfan sulfate	ND	ug/L		0.1	
Endrin	ND	ug/L		0.1	
Endrin aldehyde	ND	ug/L		0.1	
Endrin Ketone	ND	ug/L		0.1	
Heptachlor	ND	ug/L		0.1	
Heptachlor epoxide	ND	ug/L		0.1	
Lindane (Gamma-BHC)	ND	ug/L		0.1	
Methoxychlor	ND	ug/L		0.1	
PCB-1016	ND	ug/L		0.5	
PCB-1221	ND	ug/L		0.5	
PCB-1232	ND	ug/L		0.5	
PCB-1242	ND	ug/L		0.5	
PCB-1248	ND	ug/L		0.5	
PCB-1254	ND	ug/L		0.5	
PCB-1260	ND	ug/L		0.5	
Toxaphene	ND	ug/L		2	

Lab Control Spike/ Lab Control Spike Duplicate Summary

Analyte	Spike Amount LCS	Spike Amount LCSD	Spike Result LCS	Spike Result LCSD	Units	Recoveries LCS	Recoveries LCSD	RPD	Limits %Rec	Limits RPD	Notes
QC1208963LCS1, QC1208963LCSD1											
4,4'-DDD	0.5	0.5	0.37	0.36	ug/L	74	72	3	51-119	20	
4,4'-DDE	0.5	0.5	0.35	0.34	ug/L	70	68	3	44-123	20	
4,4'-DDT	0.5	0.5	0.33	0.34	ug/L	66	68	3	58-118	20	
a-BHC	0.5	0.5	0.33	0.34	ug/L	66	68	3	36-127	20	
Aldrin	0.5	0.5	0.28	0.28	ug/L	56	56	0	39-118	20	
b-BHC	0.5	0.5	0.31	0.31	ug/L	62	62	0	54-119	20	
d-BHC	0.5	0.5	0.31	0.31	ug/L	62	62	0	47-121	20	
Dieldrin	0.5	0.5	0.34	0.34	ug/L	68	68	0	53-112	20	
Endosulfan I	0.5	0.5	0.35	0.35	ug/L	70	70	0	48-117	20	
Endosulfan II	0.5	0.5	0.35	0.35	ug/L	70	70	0	53-113	20	
Endosulfan sulfate	0.5	0.5	0.35	0.35	ug/L	70	70	0	58-111	20	
Endrin	0.5	0.5	0.33	0.33	ug/L	66	66	0	54-144	20	
Endrin aldehyde	0.5	0.5	0.32	0.32	ug/L	64	64	0	53-108	20	
Endrin Ketone	0.5	0.5	0.38	0.38	ug/L	76	76	0	50-116	20	
Heptachlor	0.5	0.5	0.30	0.30	ug/L	60	60	0	41-123	20	
Heptachlor epoxide	0.5	0.5	0.33	0.33	ug/L	66	66	0	44-113	20	
Lindane (Gamma-BHC)	0.5	0.5	0.33	0.33	ug/L	66	66	0	41-124	20	
Methoxychlor	0.5	0.5	0.39	0.39	ug/L	78	78	0	52-174	20	
PCB-1016	5	5	3.4	3.2	ug/L	68	64	6	70-130	20	L
PCB-1260	5	5	3.5	3.5	ug/L	70	70	0	70-130	20	

QCBatchID:	**QC1208963**	**Analyst:**	Abanh	**Method:**	EPA 608
Matrix:	Water	**Analyzed:**	11/19/2019	**Instrument:**	SVOA-GC (group)

Data Qualifiers and Definitions

Qualifiers

A	See Report Comments.
B	Analyte was present in an associated method blank.
B1	Analyte was present in a sample and associated method blank greater than MDL but less than RDL.
BQ1	No valid test replicates. Sample Toxicity is possible. Best result was reported.
BQ2	No valid test replicates.
BQ3	No valid test replicates. Final DO is less than 1.0 mg/L. Result may be greater.
BQ4	Minor Dissolved Oxygen loss was observed in the blank water check, however, the LCS was within criteria, validating the batch.
BQ5	Minor Dissolved Oxygen loss was observed in the blank water check.
C	Possible laboratory contamination.
D	RPD was not within control limits. The sample data was reported without further clarification.
D1	Lesser amount of sample was used due to insufficient amount of sample supplied.
D2	Reporting limit is elevated due to sample matrix. Target analyte was not detected above the elevated reporting limit.
D3	Insufficient sample was supplied for TCLP. Client was notified. TCLP was performed per the Client's instructions.
DW	Sample result is calculated on a dry weigh basis.
E	Concentration is estimated because it exceeds the quantification limits of the method.
I	The sample was read outside of the method required incubation period.
IR	Inconclusive Result. Legionella is present, however, there is possible non-specific agglutination preventing specific identification.
J	Reported value is estimated
L	The laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) was out of control limits. Associated sample data was reported with qualifier.
L2	LCS did not meet recovery criteria, however, the MS and/or MSD met LCS recovery criteria, validating the batch.
M	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits due to matrix interference. The associated LCS and/or LCSD was within control limits and the sample data was reported without further clarification.
M1	The matrix spike (MS) or matrix spike duplicate (MSD) is not within control limits due to matrix interference.
M2	The matrix spike (MS) or matrix spike duplicate (MSD) was not within control limits. The associated LCS and/or LCSD was not within control limits. Sample result is estimated.
N1	Sample chromatography does not match the specified TPH standard pattern.
NC	The analyte concentration in the sample exceeded the spike level by a factor of four or greater, spike recovery and limits do not apply.
P	Sample was received without proper preservation according to EPA guidelines.
P1	Temperature of sample storage refrigerator was out of acceptance limits.
P2	The sample was preserved within 24 hours of collection in accordance with EPA 218.6.
P3	Per Client request, sample was composited for volatile analysis. Sample compositing for volatile analysis is not recommended due to potential loss of target analytes. Results may be biased low.
Q1	Analyte Calibration Verification exceeds criteria. The result is estimated.
Q2	Analyte calibration was not verified and the result was estimated.
Q3	Analyte initial calibration was not available or exceeds criteria. The result was estimated.
S	The surrogate recovery was out of control limits due to matrix interference. The associated method blank surrogate recovery was within control limits and the sample data was reported without further clarification.
S1	The associated surrogate recovery was out of control limits; result is estimated.
S2	The surrogate was diluted out due to the presence of high concentrations of target and/or non-target compounds. Surrogate recoveries in the associated batch QC met recovery criteria.
S3	Internal Standard did not meet recovery limits. Analyte concentration is estimated.
T	Sample was extracted/analyzed past the holding time.
T1	Reanalysis was reported past hold time due to failing replicates in the original analysis (BOD only).
T2	Sample was analyzed ASAP but received and analyzed past the 15 minute holding time.
T3	Sample received and analyzed out of hold time per client's request.
T4	Sample was analyzed out of hold time per client's request.
T5	Reanalysis was reported past hold time. The original analysis was within hold time, but not reportable.
T6	Hold time is indeterminable due to unspecified sampling time.
T7	Sample was analyzed past hold time due to insufficient time remaining at time of receipt.

Definitions

DF	Dilution Factor
MDL	Method Detection Limit. Result is reported ND when it is less than or equal to MDL.
ND	Analyte was not detected or was less than the detection limit.
NR	Not Reported. See Report Comments.
RDL	Reporting Detection Limit
TIC	Tentatively Identified Compounds

ENTHALPY ANALYTICAL

Chain of Custody Record

Lab No: 421379

Page: of

Turn Around Time (rush by advanced notice only)

Standard:		5 Day:		3 Day:	
2 Day:		1 Day:		Custom TAT:	

Enthalpy Analytical - Orange

931 W. Barkley Avenue, Orange, CA 92868

Phone 714-771-6900

Matrix: A = Air S = Soil/Solid W = Water DW = Drinking Wate SD = Sediment PP = Pure Product SEA = Sea Water SW = Swab T = Tissue WP = Wipe O = Other

Preservatives: 1 = $Na_2S_2O_3$ 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Sample Receipt Temp: 4.2 / 0.6 (lab use only)

CUSTOMER INFORMATION		PROJECT INFORMATION	
Company:	Chambers Group Inc.	Quote #:	
Report To:	Heather Franklin	Proj. Name:	Big Tujunga
Email:	hfranklin@chambersgroupinc.com	Proj. #:	
Address:		P.O. #:	
		Address:	
Phone:	970-420-0816	Global ID:	
Fax:		Sampled By:	

	Sample ID	Sampling Date	Sampling Time	Matrix	Container No. / Size	Pres.	Analysis Request: organochlorides 8081 - 11/14/19	Test Instructions / Comments
1	Ponds Inlet	11/14/19	0857 am	W			X	
2	Ponds Outlet	11/14/19	0848 am	W			X	
3	Haines Creek Exit	11/14/19	0809 am	W			X	
4								
5								
6								
7								
8								
9								
10								

	Signature	Print Name	Company / Title	Date / Time
1 Relinquished By:		Mauricio Gomez	Chambers Group / Biologist	11/14/19 / 04:53 pm
1 Received By:		Elizabeth Ramirez	EA	11/14/19 4:53 pm
2 Relinquished By:				
2 Received By:				
3 Relinquished By:				
3 Received By:				

ENTHALPY ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: Chambers Group Inc. Project: Big Tujunga

Date Received: 11/14/19 Sampler's Name Present: ☐ Yes ☑ No

Section 2

Sample(s) received in a cooler? ☑ Yes, How many? 1 ☐ No (skip section 2) Sample Temp (°C) (No Cooler) :_____

Sample Temp (°C), One from each cooler: #1: 4.2 #2: _____ #3: _____ #4: _____

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: _____

Section 3

Was the cooler packed with: ☑ Ice ☐ Ice Packs ☐ Bubble Wrap ☐ Styrofoam ☐ Paper ☐ None ☐ Other _____

Cooler Temp (°C): #1: 0.6 #2: _____ #3: _____ #4: _____

Section 4	YES	NO	N/A
Was a COC received?	✓		
Are sample IDs present?	✓		
Are sampling dates & times present?	✓		
Is a relinquished signature present?	✓		
Are the tests required clearly indicated on the COC?	✓		
Are custody seals present?		✓	
If custody seals are present, were they intact?			✓
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)			✓
Did all samples arrive intact? If no, indicate in Section 4 below.	✓		
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were the samples collected in the correct containers for the required tests?	✓		
Are the containers labeled with the correct preservatives?			✓
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			✓
Was a sufficient amount of sample submitted for the requested tests?	✓		

Section 5 Explanations/Comments

Section 6

For discrepancies, how was the Project Manager notified? ☐ Verbal PM Initials:_____ Date/Time_____

☐ Email (email sent to/on):_____ /_____

Project Manager's response:

Completed By: _____ Date: 11/14/2019

Enthalpy Analytical, a subsidiary of Montrose Environmental Group ,Inc.
931 W. Barkley Ave, Orange, CA 92868 • T: (714) 771-6900 • F: (714) 538-1209
www.enthalpy.com/socal

APPENDIX H – TRAILS MAINTENANCE AND MONITORING MEMOS

April 13, 2019

Melanie Morita
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

RE: Memorandum for the March 2019 Trails Monitoring Program Throughout the Riparian and Uplands of the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Morita,

This memorandum summarizes the first trail maintenance effort conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA) in March 2019. This memo shows compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek, which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group qualified biologists and restoration specialists participating in trail maintenance activities within the BTWMA worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the trail maintenance effort including dates, names of participants, locations of maintenance activities performed, sensitive resources encountered, and mitigation actions taken, are found below.

The trail maintenance team focused on historically mapped authorized trails throughout the Big Tujunga Wash, Haines Canyon Creek, the Tujunga Ponds and all unauthorized trails. All mapped locations were inspected, and maintenance was performed if required. The areas requiring maintenance were the result of the considerable amount of rainfall received this past winter; debris obstructions and trail washout prompted visitors to deviate from the authorized trails and form new bypasses. All debris and obstructions were cleared from the established trails allowing for safe passage. The trail monitoring efforts focused on increasing visitor safety and minimizing negative impacts to native habitat by prohibiting equestrian riders and hikers from wandering off trail. The negative impacts that are caused by unauthorized, off-trail use include, the trampling of native seedlings and resprouting vegetation, compaction of the soil, erosion, and the introduction of fertilizer (e.g., horse droppings) and weed seeds into new areas.

METHODS

A pre-activity survey for sensitive plant and wildlife species including nesting birds, was conducted prior to the start of trail maintenance activities by Chambers Group Biologist Alisa Muniz on April 25, 2019. Prior to the start of work, crew members participating in either trail maintenance and/or exotic plant eradication efforts received onsite orientation and instruction regarding safety, permit and mitigation regulations, and sensitive species that may be encountered in the work areas. The meeting was conducted by Habitat Restoration Foreman Tim Wood who conducted all of trail maintenance activities necessary for the month of March. Collector for ArcGIS (Collector), a Geographic Information System (GIS) application, was used to navigate and work along authorized trails, and to avoid disturbing any sensitive plants or wildlife during trail maintenance activities.

Collector was also used to locate the original authorized trails and address areas requiring maintenance. Where bypassed sections of the authorized trail system were observed, felled debris from the surrounding areas was used to block off entry points and discourage further deviations from authorized trails. In addition, felled debris was used to delineate the authorized trails, helping to guide site visitors along the permitted course. Debris obstructions were cut

with chainsaws and dragged clear of the trail. In areas where drainage swales and trail washout occurred, the soil was back-filled and/or graded with hand tools (shovels and picks).

RESULTS

Trail maintenance was performed on March 27, 2019, while efforts to remove smaller debris that could be addressed without equipment was performed intermittently on previous site-walk assessment and survey days. The work required only one crew member and was completed within the same work day.

During trail maintenance efforts, two felled trees were cleared from the eastern portion of the trail system towards the Tujunga Ponds. Trail maintenance activities were also performed along the southeastern trail towards the equestrian center entrance and included, addressing trail washout issues, blocking off an unauthorized trail, and the delineation of the authorized trail. Care was taken to avoid damaging native plants during this process. No active bird nests or homeless encampments were encountered in or near the work areas during the trail maintenance effort.

SUMMARY AND DISCUSSION

Once the pre-activity survey was conducted, all trail maintenance activities were performed by Habitat Restoration Foreman Tim Wood who ensured regulations and requirements were closely followed. Chambers Group biologists were present on site for the duration of trail maintenance activities. No birds showed signs of stress during trail maintenance efforts.

Chambers Group staff will continue to support the ongoing effort to protect and enhance the BTWMA's native habitat through regular trail maintenance efforts. Chambers Group staff will continually assess the efficacy of trail maintenance methods and adjust these methods as needed to best support mitigation goals. Trail monitoring and maintenance efforts will continue as needed, throughout the month of April, with future efforts planned to occur in the summer.

Please feel free to contact me at (949) 261-5414 extension 7242, via cell phone at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like any additional information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood

Habitat Restoration Foreman

SITE PHOTOS

Photo 1: Before trail was cleared of felled trees on March 9, 2019. The area was not yet dry enough to conduct work safely.

Photo 2: After trail was cleared of felled trees on March, 27 2019. Felled debris was used to delineate the authorized trail.

Photo 4: Before backfilling and grading a swale depression.

Photo 4: After backfilling and grading a swale depression. Felled debris was used to delineate the authorized trail.

Photo 5: Felled debris from surrounding areas was used to block of unauthorized trails.

Photo 6: The equestrian entry point affected by washout, after being backfilled and graded. Felled debris in the surrounding area was used to delineate the authorized trail entry and course.

May 11, 2019

Melanie Morita
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

RE: Memorandum for the April 2019 Trails Monitoring Program Throughout the Riparian and Uplands of the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Morita,

This memorandum summarizes trail monitoring and maintenance efforts conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA) in April 2019. This memo shows compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek, which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group qualified biologists and restoration specialists participating in trail maintenance activities within the BTWMA worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the trail maintenance effort including dates, names of participants, locations of maintenance activities performed, sensitive resources encountered, and mitigation actions taken, are found below.

The trail maintenance team focused on historically mapped authorized trails throughout Big Tujunga Wash, Haines Canyon Creek, and the Tujunga Ponds, and all unauthorized trails. All mapped locations were inspected, and maintenance was performed if required. The areas requiring maintenance were the result of the considerable amount of rainfall received this past winter; debris obstructions and trail washout prompted visitors to deviate from the authorized trails and form new bypasses. All debris and obstructions were cleared from the established trails allowing for safe passage. The trail monitoring efforts focused on increasing visitor safety and minimizing negative impacts to native habitat by prohibiting equestrian riders and hikers from wandering off trail. The negative impacts that are caused by unauthorized, off-trail use include, the trampling of native seedlings and resprouting vegetation, compaction of the soil, erosion, and the introduction of fertilizer (e.g., horse droppings) and weed seeds into new areas.

METHODS

Prior to the start of work, crew members received onsite orientation and instruction regarding safety, permit and mitigation regulations, and sensitive species that may be encountered in the work areas. The meetings were conducted by Habitat Restoration Foreman Tim Wood who was present on site and participated in trail maintenance activities. Pre-activity sweeps for sensitive plant and wildlife species including nesting birds, were conducted prior to the start of trail maintenance activities by Biologist Jacob Lloyd Davies. Collector for ArcGIS (Collector), a Geographic Information System (GIS) application, was used to navigate and work along authorized trails, and to avoid disturbing any sensitive plants or wildlife during trail maintenance activities.

Collector was also used to locate the original authorized trails and address areas requiring maintenance. Where bypassed sections of the authorized trail system were observed, felled debris from the surrounding areas was used to block off entry points and discourage further deviations from authorized trails. In addition, felled debris and/or stones were used to delineate the authorized trails, helping to guide site visitors along the permitted course. Debris

obstructions were cut with chainsaws and dragged clear of the trail. In areas where drainage swales and trail washout occurred, the soil was back-filled and/or graded with hand tools (shovels and picks).

RESULTS

Trail maintenance was performed on April 4, addressing the east entry point from the Cottonwood Avenue bluffs down towards the central trail section that parallels Haines Canyon Creek. This section of trail had eroded away during last winter's storms, exposing large rocks, and making equestrian passage difficult and unsafe. The boulders were removed and pushed down and off the trail to a location where they would neither pose a risk to the public nor have any negative effects on native plants. The trail was also backfilled, graded, and cleared of small debris. In addition, a small section on the southeast trail near and below the equestrian center entrance was addressed. At this location the authorized trail follows a swale and crosses through an active seep that occurs when groundwater saturation is at its highest. The erosion caused by water moving through this area last winter exposed numerous roots from surrounding snags, which not only posed dangers themselves, but also acted as catch-alls for garbage that is washed downstream. Here, crew members removed the exposed snag roots and the accumulation of garbage they entrapped, providing the public an area to navigate around the seep and continue on the trail safely. The garbage was bagged and removed from the site.

On April 18, a section of authorized trail was addressed where it crosses an arroyo that is part of the larger Big Tujunga Wash braided stream channel system. This section of trail is located between the eastern riparian area and the trails that lead around the Tujunga Ponds, parallel to the Los Angeles County Parks and Recreation site boundary. Here the trail was eroded by the flow of water during last winter's storms; the channel expanded, cut further into the banks, and eliminated access to the trail crossing. Crew members dug out a new crossing point, removed soil and rocks, graded the area for safe passage, and used the exposed rocks to delineate the restored crossing point and continuity of the trail.

On April 23, two downed snags were removed from the southwest trail, causing some equestrian riders to deviate from the authorized trail. The snags were bucked, the logs were cleared from the trail, and the debris was used to delineate the authorized trail. Biologist Jacob Lloyd Davies was present during the crews' activities to monitor that no sensitive biological resources were disturbed by chainsaw noise or the removal efforts. The trail monitoring and maintenance work performed in April required between two and four crew members per day, and the issues addressed each day were completed within the same work day.

SUMMARY AND DISCUSSION

All trail maintenance activities were supervised by Habitat Restoration Foreman Tim Wood who ensured regulations and requirements were closely followed. During trail maintenance efforts, care was taken to avoid damaging native vegetation. No birds showed signs of stress during trail maintenance efforts, and no sensitive biological resources including nesting birds, were disturbed. No active bird nests or homeless encampments were encountered in or near the work areas during the trail maintenance efforts.

Chambers Group staff will continue to support the ongoing effort to protect and enhance the BTWMA's native habitat through regular trail maintenance efforts. Chambers Group staff will continually assess the efficacy of trail maintenance methods and adjust these methods as needed to best support mitigation goals. Trail monitoring and maintenance efforts will continue throughout the majority of May, on an as-needed basis. Focused trail maintenance efforts to reestablish the north and northwest trail sections will be performed at the end of May.

Please feel free to contact me at (949) 261-5414 extension 7242, via cell phone at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like any additional information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood

Habitat Restoration Foreman

SITE PHOTOS

Photo 1: On April 4, crew members begin digging out the exposed boulders to be moved off the trail.

Photo 2: After the trail was cleared of boulders, backfilled, and graded, on April 4.

Photo 3: On April 4, crew members removed exposed snag roots, cleared the area of garbage, and graded the area to safely pass around a seep.

Photo 4: Continuation of snag root removal, clearing debris and garbage, and grading on April 4.

Photo 5: On April 18, crew members began to dig out a new access point across an arroyo to reestablish trail continuity.

Photo 6: After completing the grade for the new crossing point, crew members used the exposed rocks to delineate the continuation of the trail, on April 18.

Photo 7: On April 23, crew members removed two downed snags that were obstructing the trail.

June 8, 2019

Melanie Morita
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

RE: Memorandum for the May 2019 Trails Monitoring Program Throughout the Riparian and Uplands of the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Morita,

This memorandum summarizes trail monitoring and maintenance efforts conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA) in May 2019. This memo shows compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek, which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group qualified biologists and restoration specialists participating in trail maintenance activities within the BTWMA worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the trail maintenance effort including dates, names of participants, locations of maintenance activities performed, sensitive resources encountered, and mitigation actions taken, are found below.

The trail maintenance team focused on historically mapped authorized trails throughout Big Tujunga Wash, Haines Canyon Creek, and the Tujunga Ponds, and all unauthorized trails. All mapped locations were inspected, and maintenance was performed if required, between May 28 and May 31. The main focus of the May trail maintenance efforts was to maintain high traffic areas of the authorized trails for public use and safety. Any trails that were excluded from these efforts are part of considerations regarding the abandonment of low-traffic or dead-end trails, or will be addressed during our next trail maintenance efforts scheduled at the beginning of June. All debris and obstructions were cleared from the established trails allowing for safe passage. The trail monitoring efforts focused on increasing visitor safety and minimizing negative impacts to native habitat by prohibiting equestrian riders and hikers from wandering off trail. The negative impacts that are caused by unauthorized, off-trail use include, the trampling of native seedlings and resprouting vegetation, compaction of the soil, erosion, and the introduction of fertilizer (e.g., horse droppings) and weed seeds into new areas.

METHODS

Prior to the start of work, crew members received onsite orientation and instruction regarding safety, permit and mitigation regulations, and sensitive species that may be encountered in the work areas. The meetings were conducted by Habitat Restoration Foreman Tim Wood who was present on site and participated in trail maintenance activities. Pre-activity sweeps for sensitive plant and wildlife species including nesting birds, were conducted prior to the start of trail maintenance activities by Biologist Jacob Lloyd Davies. Collector for ArcGIS (Collector), a Geographic Information System (GIS) application, was used to navigate and work along authorized trails, and to avoid disturbing any sensitive plants or wildlife during trail maintenance activities.

Collector was also used to locate the original authorized trails and address areas requiring maintenance. Where bypassed sections of the authorized trail system were observed, felled debris from the surrounding areas was used to

block off entry points and discourage further deviations from authorized trails. In addition, felled debris and/or stones were used to delineate the authorized trails, helping to guide site visitors along the permitted course. Debris obstructions such as felled trees that blocked portions of trails were cut with chainsaws and dragged clear of the trail. In areas where drainage swales and trail washout occurred, the soil was back-filled and/or graded with hand tools (shovels and picks). The trail monitoring and maintenance work performed in May required four crew members per day.

RESULTS

The southern trail leading through the riparian area west of the Cottonwood Avenue bluffs has no maintenance issues that need to be addressed, and has been excluded from detailed maintenance efforts as it will soon be closed once the CDFW approved Trail Realignment work has been completed. The southern trail sections on the east and west sides of the Wheatland Avenue entrance were assessed during exotic plant eradication efforts and were found to have no obstructions or safety hazards. General maintenance requirements will be addressed in conjunction with the Trail Realignment efforts in that area.

No active bird nests or new homeless encampments were encountered in or near the work areas during the trail maintenance efforts. No sensitive species were detected during the pre-activity surveys or monitoring efforts.

Trail maintenance was performed on May 28, addressing the trail that extends northeast from the Cottonwood Avenue bluffs, towards and around the Tujunga Ponds. The crew removed the gravel and cobble along sections of trail that merge with the arroyos that source from the Haines Canyon Wash. The aggregate was pulled to either side of the trail in order to define the trail's boundaries. Native trees and shrubs found encroaching on or crowding the trail, were structurally and directionally pruned so that energy would be redirected to new growth leaders (vertically growing branches), encouraging upward rather than outward growth in the future. Exotic grasses or forbs growing next to the trail were either cut down or removed in order to reduce the potential for seeds to spread further along the trail. Maintenance to the trail loop around the Tujunga Ponds was completed, with the exception of two sections where standing water is still present as the result of winter flooding. These two sections on the north and southwest sides of the ponds will be addressed in future trail maintenance efforts when the ground is dry and passable.

On May 29, maintenance was performed along the trail loop and entry points located on top of the bluff north of Haines Canyon Creek and the Cottonwood Avenue bluff. Crew members widened the trail where necessary, removed loose rocks, pruned impeding vegetation, and graded the entry points to make the approaches safer. On the upper bluff trail portions, crew members cleared the trails of plant debris and/or loose aggregate and used the materials to delineate the trails and make them safer for passage.

On May 30, trail maintenance was performed on the northwestern trails that branch out from the north Wheatland Avenue entrance and the northwestern portion of the Big Tujunga Wash. Where necessary, crew members widened and removed loose rocks from the trails, pruned impeding vegetation, and graded trail sections and their junctions. Loose aggregate was pulled to the sides to define trail boundaries.

On May 31, maintenance was performed along the trail loop and entry points located around the riparian area east of the Cottonwood Avenue bluffs and north of the equestrian center. The crew removed the gravel and cobble along sections of trail that merge with the arroyos that source from the Haines Canyon Wash. The aggregate was pulled to either side of the trail in order to delineate the trail's boundaries. Native trees and shrubs found encroaching on or crowding the trail, were structurally and directionally pruned so that energy would be redirected to new growth leaders, encouraging future growth in sustainable directions. Exotic grasses or forbs growing next to the trail were either cut down or removed in order to reduce the potential for seeds to spread further along the trail. Garbage and inorganic debris were bagged and removed from the trail.

SUMMARY AND DISCUSSION

All trail maintenance activities were supervised by Habitat Restoration Foreman Tim Wood who ensured regulations and requirements were closely followed. During trail maintenance efforts, care was taken to avoid damaging native vegetation. No birds showed signs of stress during trail maintenance efforts, and no sensitive biological resources including nesting birds, were disturbed. No active bird nests or new homeless encampments were encountered in or near the work areas during the trail maintenance efforts. The crew will continue to focus on the high-traffic, authorized trails and these trails will be addressed before the completion of the Trail Realignment efforts

Chambers Group staff will continue to support the ongoing effort to protect and enhance the BTWMA's native habitat through regular trail maintenance efforts. Chambers Group staff will continually assess the efficacy of trail maintenance methods and adjust these methods as needed to best support mitigation goals. Trail monitoring and maintenance efforts will continue into the beginning of June.

Please feel free to contact me at (949) 261-5414 extension 7242, via cell phone at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like any additional information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood

Habitat Restoration Foreman

SITE PHOTOS

Photo 1: On May 28, gravel and cobble were raked aside to delineate the trail and allow for safer passage to the Tujunga Ponds.

Photo 2: On May 29, crew members cleared the northern central bluff trails and entry points of aggregate, impeding plants, and stones that crowd the trails.

Photo 3: On May 30, crew members cleared the northwestern trails that navigate through Big Tujunga Wash and used the cobble to define the trail boundaries.

Photo 4: Before gravel and debris were removed and grading was performed in the sections of trail that merge with the arroyos around the riparian area east of the Cottonwood Avenue bluffs.

Photo 5: After crew members performed trail maintenance on May 31.

Photo 6: Before cutting back annual exotic plants, grading, and pruning the impeding native plant growth from trails around the eastern riparian area.

Photo 7: After crewmembers performed trail maintenance on May 31.

June 27, 2019

Melanie Morita
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

RE: Memorandum for the June 2019 Trails Monitoring Program Throughout the Riparian and Uplands of the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Morita,

This memorandum summarizes trail monitoring and maintenance efforts conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA) in June 2019. This memo shows compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek, which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group qualified biologists and restoration specialists participating in trail maintenance activities within the BTWMA worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the trail maintenance effort including dates, names of participants, locations of maintenance activities performed, sensitive resources encountered, and mitigation actions taken, are found below.

The trail maintenance team focused on historically mapped authorized trails throughout Big Tujunga Wash, Haines Canyon Creek, and the Tujunga Ponds, and all unauthorized trails. All mapped locations were inspected, and maintenance was performed if required, between June 3 and June 12. The main focus of the June trail maintenance efforts was to maintain high traffic areas of the authorized trails for public use and safety. Any trails that were excluded from these efforts were previously addressed in May. All debris and obstructions were cleared from the established trails allowing for safe passage. The trail monitoring efforts focused on increasing visitor safety and minimizing negative impacts to native habitat by prohibiting equestrian riders and hikers from wandering off trail. The negative impacts that are caused by unauthorized, off-trail use include, the trampling of native seedlings and resprouting vegetation, compaction of the soil, erosion, and the introduction of fertilizer (e.g., horse droppings) and weed seeds into new areas.

METHODS

Prior to the start of work, crew members received onsite orientation and instruction regarding safety, permit and mitigation regulations, and sensitive species that may be encountered in the work areas. The meetings were conducted by Chambers Group Habitat Restoration Foreman Tim Wood who was present on site and participated in trail maintenance activities. Pre-activity sweeps for sensitive plant and wildlife species including nesting birds, were conducted prior to the start of trail maintenance activities by Biologist Alisa Muniz. Collector for ArcGIS (Collector), a Geographic Information System (GIS) application, was used to navigate and work along authorized trails, and to avoid disturbing any sensitive plants or wildlife during trail maintenance activities.

Collector was also used to locate the original authorized trails and address areas requiring maintenance. Where bypassed sections of the authorized trail system were observed, felled debris from the surrounding areas was used to block off entry points and discourage further deviations from authorized trails. In addition, felled debris and/or stones were used to delineate the authorized trails, helping to guide site visitors along the permitted course. Debris

obstructions such as downed trees that blocked portions of trails were cut with chainsaws and dragged clear of the trail. In areas where drainage swales and trail washout occurred, the soil was back-filled and/or graded with hand tools (shovels, grading rakes, and picks). The trail monitoring and maintenance work performed in June required an average of four crew members per day.

RESULTS

The southern trail leading through the riparian area west of the Cottonwood Avenue bluffs has no maintenance issues that need to be addressed, and has been excluded from detailed maintenance efforts as it will be closed once Trail Realignment work has been completed.

On June 3, trail maintenance was performed on the northeastern trails that branch out from the north Wheatland Avenue entrance and the northeastern portion of the Big Tujunga Wash, and trails that cross the Big Tujunga Wash. Where necessary, crew members widened and removed loose rocks from the trails, pruned impeding vegetation, and graded trail sections and their junctions. Loose aggregate was pulled to the sides to define trail boundaries.

On June 4 through June 6, maintenance was performed along the central trail leading from the first Haines Canyon Creek crossing to the western trail system and site boundary. Crew members focused their efforts on removing loose cobble and aggregate that had been exposed over time due to heavy visitor traffic along this trail. Loose rocks were pulled to the sides of the trail to delineate trail boundaries and areas where trails merge, and entry points were graded to make the approaches safer.

On June 12, trail maintenance was performed on a portion of the southern trail that extends through the riparian area east of the south Wheatland Avenue entrance, near Haines Canyon Creek. Crew members removed a section of snag roots that were exposed over time due to heavy visitor traffic. This section of roots created trip hazards for equestrians and hikers passing through. The roots were removed below ground level and beyond the trail boundaries to prevent future exposure and safety hazards. Crew members also performed general trail maintenance to the trails that branch out from and around the south Wheatland Avenue entrance and extend west to the property boundary. On these trails and entry points, efforts focused on removing loose cobble and aggregate that had been exposed over time due to heavy visitor traffic, supporting safety and easing navigation through this area. Loose rocks were pulled to the sides of the trail to delineate its course. Where necessary, crew members also pruned impeding vegetation and graded trail sections and their junctions.

SUMMARY AND DISCUSSION

All trail maintenance activities were supervised by Habitat Restoration Foreman Tim Wood who ensured regulations and requirements were closely followed. During trail maintenance efforts, care was taken to avoid damaging native vegetation. No birds showed signs of stress during trail maintenance efforts, and no sensitive biological resources including nesting birds, were disturbed. No new homeless encampments were encountered in or near the work areas during the trail maintenance efforts. The crew will continue to address and maintain high-traffic, authorized trails. General trail maintenance and safety monitoring will continue on all authorized trails to provide public safety and enjoyment.

Chambers Group staff will continue to support the ongoing effort to protect and enhance the BTWMA's native habitat through regular trail maintenance efforts. Chambers Group staff will continually assess the efficacy of trail maintenance methods and adjust these methods as needed to best support mitigation goals. Trail monitoring and maintenance efforts will be performed as needed throughout the summer months.

Please feel free to contact me at (949) 261-5414 extension 7242, via cell phone at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like any additional information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood

Habitat Restoration Foreman

PHOTOS

Photo 1: Before – example of a northern trail, east of the north Wheatland Avenue entrance.

Photo 2: After – crew members performing general trail maintenance, on June 3.

Photo 3: Before – example of a central trail, through the Big Tujunga Wash area.

Photo 4: After – crew members performing general trail maintenance, on June 4.

Photo 5: Crew members continuing general maintenance along the central Big Tujunga Wash trail, on June 5.

Photo 6: Results of maintenance efforts along the central Big Tujunga Wash trail, on June 6.

Photo 7: Before - example of impeding vegetation on trails in the south Wheatland Avenue entrance area.

Photo 8: After – crew member pruned impeding native vegetation to clear the trail and support continued growth, on June 12.

Photo 9: Before – example of a trail through the south Wheatland Avenue entrance area.

Photo 10: After – crew members performed general trail maintenance in the south Wheatland Avenue entrance area, on June 12.

August 2, 2019

Melanie Morita
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

RE: Memorandum for the July 2019 Trails Monitoring Program Throughout the Riparian and Uplands of the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Morita,

This memorandum summarizes trail monitoring and maintenance efforts conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA) in July 2019. This memo shows compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek, which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group qualified biologists and restoration specialists participating in trail maintenance activities within the BTWMA worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the trail maintenance effort including dates, names of participants, locations of maintenance activities performed, sensitive resources encountered, and mitigation actions taken, are found below.

The trail maintenance team focused on historically mapped authorized trails throughout Big Tujunga Wash, Haines Canyon Creek, and the Tujunga Ponds, and all unauthorized trails. All mapped locations were inspected, and maintenance was performed if required, between July 1 and July 12. The main focus of the July trail maintenance efforts was to maintain high traffic areas of the authorized trails for public use and safety. Any trails that were excluded from these efforts were previously addressed or did not require any maintenance efforts at the time of inspection. All debris and obstructions were cleared from the established trails allowing for safe passage. The trail monitoring efforts focused on increasing visitor safety and minimizing negative impacts to native habitat by prohibiting equestrian riders and hikers from wandering off trail. The negative impacts that are caused by unauthorized, off-trail use include the trampling of native seedlings and resprouting vegetation, compaction of the soil, erosion, and the introduction of fertilizer (e.g., horse droppings) and weed seeds into new areas.

METHODS

Prior to the start of work, crew members received onsite orientation and instruction regarding safety, permit and mitigation regulations, and sensitive species that may be encountered in the work areas. The meetings were conducted by Habitat Restoration Foreman Tim Wood who was present on site and participated in trail maintenance activities. Pre-activity sweeps for sensitive plant and wildlife species including nesting birds, were conducted prior to the start of trail maintenance activities by Biologists Alisa Muniz and Omar Moquit. Collector for ArcGIS (Collector), a Geographic Information System (GIS) application, was used to navigate and work along authorized trails, and to avoid disturbing any sensitive plants or wildlife during trail maintenance activities.

Collector was also used to locate the original authorized trails and address areas requiring maintenance. Where bypassed sections of the authorized trail system were observed, felled debris from the surrounding areas was used to block off entry points and discourage further deviations from authorized trails. In addition, felled debris and/or stones

were used to delineate the authorized trails, helping to guide site visitors along the permitted course. Debris obstructions such as downed trees that blocked portions of trails were cut with chainsaws and dragged clear of the trail. In areas where drainage swales and trail washout occurred, the soil was back-filled and/or graded with hand tools (shovels, grading rakes, and picks). The trail monitoring and maintenance work performed in July required an average of three crew members per day.

RESULTS

On July 1, trail maintenance was performed along the southern trail that leads through the western riparian area of the site, between the Cottonwood Avenue bluff and the south Wheatland Avenue entrance. Here, a snag tree (approximately 30 feet in height) fell across the trail, obstructing visitor passage and causing equestrians to deviate from the authorized trail. The snag was bucked into smaller pieces, cleared from the trail and the vegetation upon which it fell, and the material was used to block the passage equestrians were using to detour around the downed snag. Trail maintenance efforts continued with the bucking and removal of a log from Haines Canyon Creek that was damming the flow of water, near the south Wheatland Avenue entrance. This log was the trunk of a large snag (approximately 60 feet in height) that fell naturally during a storm the previous winter. The snag fell across Haines Canyon Creek, but did not obstruct the flow initially. At some point following the snag failure, the trunk was presumably cut by a member of the public. The trunk was cut in such a way that when it fell from the upturned root mass, it dropped perpendicular to creek, obstructing and altering the flow of the creek. Once the log was removed the creek flowed freely along its original, natural course. In this same section of Haines Canyon Creek, three unauthorized stone dams were discovered in the creek bed. The stone dams were constructed by members of the public, and appeared to be built so that the obstructed flow of water would create wading pools. The dams were deconstructed the same day and the stones were either spread across the creek bed or back into the surrounding landscape. Extreme caution was taken during all work within the creek to monitor that no negative impacts were incurred by sensitive species residing within and around the creek. Trash and furniture left on site by members of the public were hauled away from the area to eliminate any future use.

On July 8, trail maintenance was performed along the eastern trail realignment section. This accelerated schedule for follow up efforts was timed to correspond with increased summer traffic, monitoring that the establishment and break-in of the new trail would continue to be as safe and enjoyable for the public as it was upon completion. In this section, general maintenance efforts focused on grading, compacting, and clearing stones upturned by visitor traffic along the trail. Maintenance efforts began along the southern section of trail through the western riparian area and between the two realigned trail sections. Through this section, crew members cut back and pruned vegetation that was impeding the trail. The vegetation included both native and exotic species. Caution was taken to differentiate between the species in order to encourage new growth of native species and reduce the possibility of exotic species being spread along the trail by visitor traffic.

On July 10, trail monitoring and maintenance efforts were focused on the trails beginning at the north Wheatland Avenue entrance, and continuing through the Big Tujunga Wash area and the top of the north-central bluff trails and entry points. These trails were monitored for impeding vegetation and potential safety issues. Where issues were discovered, minor maintenance was performed in support of safe passage.

On July 11, trail maintenance was performed on the trails passing through and surrounding the eastern riparian area and Haines Canyon Wash. Along these trails, crew members cut back and pruned vegetation that was impeding the trail. The vegetation included both native and exotic species. Caution was taken to differentiate between the species in order to encourage new growth of native species and reduce the possibility of exotic species being spread along the trail by visitor traffic. Trail maintenance efforts also began on the trail that surrounds the Tujunga Ponds. Sections of this trail were still flooded from winter storms, but were finally dry enough that maintenance efforts could be performed to support the anticipated use of this trail throughout the summer. Trail maintenance efforts around the ponds focused on clearing impeding vegetation and potentially hazardous debris. A failing snag tree was discovered

leaning into the trail, making passage underneath its branches difficult and unsafe for equestrian traffic. The snag was cut down and the material was used to delineate nearby trail boundaries.

On July 12, trail maintenance was completed around the Tujunga Ponds by addressing a failed snag tree in an area frequented by visitors and where Chambers Group biologists enter the East Tujunga Pond during exotic wildlife removal efforts. The snag was bucked and cleared from the area, and the material was moved to the boundaries of this open space along the trail. Efforts then returned to completing maintenance on the east and west trail realignment sections, supporting safe trail conditions for summer visitors. In these sections, crew members performed grading, compacting, and clearing stones upturned by visitor traffic along the trail. Crew members performed similar general trail maintenance tasks on the section of trail between the western merger of west realignment section and the southern section of trail that meets the Big Tujunga Wash crossing. This is a high-traffic section of trail that receives visitor traffic from the south Wheatland Avenue entrance and the Hansen Dam equestrian trails. The trail was graded, cleared of large cobble and loose aggregate, and the material was used to help define the trail boundaries.

SUMMARY AND DISCUSSION

All trail maintenance activities were supervised by Habitat Restoration Foreman Tim Wood who monitored that regulations and requirements were closely followed. During trail maintenance efforts, care was taken to avoid damaging native vegetation. No birds showed signs of stress during trail maintenance efforts, and no sensitive biological resources including nesting birds and sensitive fish species residing in the creek, were disturbed during maintenance activities. No new homeless encampments were encountered in or near the work areas during the trail maintenance efforts. The crew will continue to address and maintain high-traffic, authorized trails. General trail maintenance and safety monitoring will continue on all authorized trails to provide public safety and enjoyment. Equestrian users have made multiple comments regarding their appreciation for the removal of snags, felled trees, and rocks within the trails that increases the overall safe passage.

Chambers Group staff will continue to support the ongoing effort to protect and enhance the BTWMA's native habitat through regular trail maintenance efforts. Chambers Group staff will continually assess the efficacy of trail maintenance methods and adjust these methods as needed to best support mitigation goals. Trail monitoring and maintenance efforts will be performed as needed throughout the summer months.

Please feel free to contact me at (949) 261-5414 extension 7242, via cell phone at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like any additional information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood

Habitat Restoration Foreman

PHOTOS

Photo 1: Before – snag tree obstructing the southern trail through the west riparian area.

Photo 2: After – snag tree was bucked and removed, on July 1.

Photo 3: Before – the log that was cut to dam Haines Canyon Creek.

Photo 4: After – the log was reduced and moved to allow for natural flow, on July 1.

Photo 5: Before – one example of three dams constructed to create wading pools.

Photo 6: After – dam was deconstructed, stones spread back in the landscape, and furniture was hauled away, on July 1.

Photo 7: Crew member performing maintenance along the eastern realignment section, on July 8.

Photo 8: Before – eastern realignment entrance showing cobble upturned by visitor traffic.

Photo 9: After – trail maintenance performed to support visitor traffic and trail establishment, July 8.

Photo 10: Before – impeding vegetation on a trail through and around the eastern riparian area.

Photo 11: After – crew members cut back and pruned vegetation to encourage native growth and reduce the spread of exotic species, on July 11.

Photo 12: Crew member cutting and removing a failing snag tree obstructing passage around the Tujunga Ponds, on July 11.

Photo 13: Cutting back exotic grasses along the southern trail through the west riparian area to reduce the potential spreading of seed, on July 12.

Photo 14: Before – trail section between the west end of the western trail realignment and the Big Tujunga Wash crossing.

Photo 15: After – crew members performed general trail maintenance to support public safety and enjoyment, on July 12.

November 1, 2019

Julianna Colwell
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

Subject: Memorandum for the September and October 2019 Trails Monitoring Program Throughout the Riparian and Uplands of the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Colwell,

This memorandum summarizes trail monitoring and maintenance efforts conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (Mitigation Area) in September and October 2019. This memo shows compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek, which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group qualified biologists and restoration specialists participating in trail maintenance activities within the Mitigation Area worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the trail maintenance effort including dates, names of participants, locations of maintenance activities performed, sensitive resources encountered, and mitigation actions taken, are found below.

The trail maintenance team focused on historically mapped authorized trails throughout Big Tujunga Wash, Haines Canyon Creek, and the Tujunga Ponds, and all unauthorized trails. All mapped locations were inspected, and maintenance was performed if required, between September 30 and October 11. Trail maintenance efforts were focused on maintaining high traffic areas of the authorized trails for public use and safety, as well as addressing requests made by equestrian riders during public outreach events. Any trails that were excluded from these efforts were previously addressed or did not require any maintenance efforts at the time of inspection. All debris and obstructions were cleared from the established trails allowing for safe passage.

The trail monitoring efforts focused on increasing visitor safety and minimizing negative impacts to native habitat by prohibiting equestrian riders and hikers from wandering off trail. The negative impacts that are caused by unauthorized, off-trail use include the trampling of native seedlings and resprouting vegetation, compaction of the soil, erosion, and the introduction of fertilizer (e.g., horse droppings) and weed seeds into new areas. Chambers Group staff addressed the most frequent request received from equestrian riders, which was to widen the eastern trail realignment and the southern trail that follows Haines Canyon Creek. Trail widening was performed to allow easier passage of riders traveling in opposite directions, reducing the need to ride off-trail to bypass others. This contributes to the overall goals of the Mitigation Area by increasing visitor safety and minimizing negative impacts to native habitat from riding off-trail.

Methods

Prior to the start of work, crew members received onsite orientation and instruction regarding safety, permit and mitigation regulations, and sensitive species that may be encountered in the work areas. The meetings were conducted by biologists Erik Olmos, Corey Jacobs, and/or Alisa Muniz who were present on site and participated in trail maintenance activities. Collector for ArcGIS (Collector), a Geographic Information System (GIS) application, was used

to navigate and work along authorized trails, and to avoid disturbance to any documented sensitive plants and wildlife in areas requiring maintenance. Where bypassed sections of the authorized trail system were observed, felled debris from the surrounding areas was used to block off entry points and discourage further deviations from authorized trails. In addition, felled debris and/or stones were used to delineate the authorized trails, helping to guide site visitors along the permitted course. To address the requests of the equestrian riders, trimming of encroaching vegetation along the trail sides was performed, and felled debris and stones were also adjusted to widen trails where space allowed. Debris obstructions such as downed trees that blocked portions of trails were cut with chainsaws and dragged clear of the trail. The trail monitoring and maintenance work performed in September and October required an average of three crew members per day.

Results

On September 30, trail maintenance was performed on the trails passing through and surrounding the eastern riparian area and Haines Canyon Wash. Along these trails, crew members cut back and pruned vegetation that was impeding the trail and cleared large rocks that had been upturned by equestrian traffic. The vegetation trimmings and rocks were pulled to either side of the trail to define the trail's boundaries (Photo 1).

On October 1, trail maintenance focused on the heavily trafficked trail that extends northeast from the Cottonwood Avenue bluffs, towards and around the Tujunga Ponds. Native trees and shrubs found encroaching on or crowding the trail were structurally and directionally pruned to encourage upward rather than outward growth in the future. Exotic grasses or forbs growing next to the trail were either cut down using weed whackers or removed in order to reduce the potential for seeds to spread further along the trail (Photos 2 and 3). Large rocks and cobble were also cleared and used to line the trail.

On October 2 and 3, trail maintenance was performed along the eastern trail realignment and the southern section of trail through the western riparian area. In this section, general maintenance efforts focused on cutting back and pruning vegetation that was impeding the trail and clearing stones upturned by visitor traffic. Sections of trail were also widened to address requests made by equestrian riders. The rocks and debris that had been used to delineate the trail were pulled back to widen the trail where space allowed (Photo 4 and 5). This provided more room for equestrian riders to pass one another, increasing visitor safety and minimizing negative impacts to native habitat by reducing the need to ride off-trail (Photo 6).

On October 4, maintenance efforts continued along the southern section of trail through the western riparian area and into the western trail realignment. Through this section, crew members cut back and pruned encroaching vegetation that was impeding the trail and cleared rocks and debris that had accumulated. The vegetation included both native and exotic species, and caution was taken to differentiate between the species in order to encourage new growth of native species and reduce the possibility of exotic species being spread along the trail by visitor traffic.

On October 11, it was discovered that a large Fremont cottonwood (*Populus fremontii*; approximately 30 feet in height) had fallen across the trail that follows the eastern portion of Haines Canyon Creek, between the Cottonwood Avenue bluffs and the Tujunga Ponds, obstructing visitor passage (Photo 7). The tree was bucked into smaller pieces and cleared from the trail and the vegetation upon which it fell. The debris was then used to realign the trail that had been obstructed (Photo 8). It did not appear that riders had been travelling off-trail to bypass the downed tree, likely due to the size of the tree and density of vegetation surrounding the trail.

Summary and Discussion

All trail maintenance activities were supervised by Erik Olmos, Corey Jacobs, and/or Alisa Muniz who monitored that regulations and requirements were closely followed. During trail maintenance efforts, care was taken to avoid damaging native vegetation. No new homeless encampments were encountered in or near the work areas, and previously cleared encampments continue to appear unoccupied. The crew will continue to address and maintain high-

traffic, authorized trails. General trail maintenance and safety monitoring will continue on all authorized trails to provide public safety and enjoyment. Incidental feedback received from equestrian riders has included comments regarding their appreciation of the removal of overgrown vegetation, fallen debris, and rocks, as well as the widening of sections of trail. This feedback from equestrian riders, as well as the feedback received during public outreach events, will continue to be incorporated in future trail maintenance efforts.

Chambers Group staff will continue to support the ongoing effort to protect and enhance the Mitigation Area's native habitat through regular trail maintenance efforts. Chambers Group staff will continually assess the efficacy of trail maintenance methods and adjust these methods as needed to best support mitigation goals. Trail monitoring and maintenance efforts will be performed as needed throughout the fall and winter months.

Please feel free to contact me at (949) 261-5414 extension 7242, via cell phone at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like any additional information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood

Habitat Restoration Foreman

PHOTOS

Photo 1: Trail in the eastern riparian area, east of the Cottonwood Avenue bluffs, after trail maintenance was completed.

Photo 2: Crew members using weed whackers to trim overgrown vegetation on the trail between the Cottonwood Avenue bluffs and the Tujunga Ponds.

Photo 3: The trail between the Cottonwood Avenue bluffs and the Tujunga Ponds after trail maintenance was completed.

Photo 4: Section of the eastern trail realignment where debris and rocks made the trail unnecessarily narrow, before trail widening.

Photo 5: Crew members widening a section of the eastern trail realignment.

Photo 6: Section of the eastern trail realignment after widening. The trail now allows easier passage of equestrian riders traveling in opposite directions, reducing the need to ride off trail.

Photo 7: A fallen Fremont cottonwood obstructing the trail between the Cottonwood Avenue bluffs and the Tujunga Ponds.

Photo 8: Trail between the Cottonwood Avenue bluffs and the Tujunga Ponds after the fallen Fremont cottonwood was bucked into smaller sections and used to line the trail.

December 31, 2019

Julianna Colwell
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

Subject: Memorandum for the December 2019 Trails Monitoring Program Throughout the Riparian and Uplands of the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Colwell,

This memorandum summarizes trail monitoring and maintenance efforts conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (Mitigation Area) in December 2019. This memo shows compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek, which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group qualified biologists and restoration specialists participating in trail maintenance activities within the Mitigation Area worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the trail maintenance effort including dates, names of participants, locations of maintenance activities performed, sensitive resources encountered, and mitigation actions taken, are found below.

The trail maintenance team focused on historically mapped authorized trails throughout Big Tujunga Wash, Haines Canyon Creek, and the Tujunga Ponds, and all unauthorized trails. All mapped locations were inspected, and maintenance was performed if required, between December 12 and December 31. The trail monitoring efforts focused on increasing visitor safety and minimizing negative impacts to native habitat by prohibiting equestrian riders and hikers from wandering off trail. The negative impacts that are caused by unauthorized, off-trail use include the trampling of native seedlings and resprouting vegetation, compaction of the soil, erosion, and the introduction of fertilizer (e.g., horse droppings) and weed seeds into new areas. Chambers Group staff addressed the most frequent request received from equestrian riders, which was to widen the eastern trail realignment. Trail widening was performed to allow easier passage of riders traveling in opposite directions, reducing trail congestion and the need to ride off-trail to bypass others. This contributes to the overall goals of the Mitigation Area by increasing visitor safety and minimizing negative impacts to native habitat from riding off-trail.

Methods

Prior to the start of work, crew members received onsite orientation and instruction regarding safety, permit and mitigation regulations, and sensitive species that may be encountered in the work areas. The meetings were conducted by biologist Alisa Muniz who was present on site and participated in trail maintenance activities. Collector for ArcGIS (Collector), a Geographic Information System (GIS) application, was used to navigate and work along authorized trails, and to avoid disturbance to any documented sensitive plants and wildlife in areas requiring maintenance. Trail maintenance efforts were focused on maintaining high traffic areas of the authorized trails for public use and safety, as well as addressing requests made by equestrian riders during public outreach events. Any trails that were excluded from these efforts were previously addressed or did not require any maintenance efforts at the time of inspection. All debris and obstructions were cleared from the established trails allowing for safe passage. Where bypassed sections of the authorized trail system were observed, snag debris from the surrounding areas was used to block off entry points

and discourage further deviations from authorized trails. In addition, downed snag debris and/or stones were used to delineate the authorized trails, helping to guide site visitors along the permitted course. To address the requests of the equestrian riders, a portion of the eastern trail realignment was widened and multiple obstructions that blocked portions of trail were removed/repaired. Obstructions included downed tree/snag debris and a sinkhole that had developed along the southeastern trail. Debris obstructions such as downed trees that blocked portions of trails were cut with chainsaws and dragged clear of the trail. The trail monitoring and maintenance work performed in December required an average of three crew members per day.

Results

On December 12, trail maintenance was performed on the trails passing through and surrounding the eastern riparian area and Haines Canyon Wash, as well as around the Tujunga Ponds. Along these trails, crew members removed downed snag debris that was impeding the trail and cleared large rocks that had been upturned by equestrian traffic. The crew discovered a snag (approximately 40 feet in height) that had fallen across eastern trail near Haines Canyon Wash (Photo 1). It appeared that equestrian riders had been riding off-trail to bypass the fallen snag. The snag was bucked into smaller pieces and the debris was used to block of the unauthorized trail diversion and better delineate the authorized trail (Photo 2). In addition, a large sinkhole (roughly 4 feet deep) was discovered along the southeastern trail near the Equestrian Center. The sinkhole had formed in the middle of an authorized trail and it appeared that equestrian riders had created a small trail diversion to bypass the area (Photo 3). Because of the size and location of the sinkhole, and the relatively small impact that the trail diversion had created, the original trail that included the sinkhole was blocked off and the trail diversion was cleared of debris and widened to ease visitor passage (Photo 4). This small trail diversion did not change the overall length of the trails in the Mitigation Area, did not require a revision to the trail maps, and is in line with overall goal of increasing visitor safety and minimizing negative impacts to native habitat caused by off-trail riding. Snag debris and rocks were pulled to either side of the trail to define the remainder of the trail's boundaries.

On December 30, trail maintenance was performed along the eastern trail realignment and the southern section of trail through the western riparian area. In this section, general maintenance efforts focused on removing downed snag debris and clearing stones upturned by visitor traffic. The crew also widened a small ramp that was incorporated into the trail realignment that had narrowed over time with equestrian usage (Photos 5 and 6). The slope along which the ramp was placed was dug out roughly 2 additional feet and graded to even out the path (Photo 7). This trail widening will provide more room for equestrian riders to pass one another and minimize congestion along the trail, reducing the need to ride off-trail.

On December 31, trail maintenance was performed on the trails within the Big Tujunga Wash and on the northern bluff, west of the Tujunga Ponds. Crew members walked the length of these trails to ensure the nothing was obstructing visitor travel and cleared rocks and debris that had accumulated. Cleared materials were then used to line and clearly delineate authorized trails (Photos 8 and 9).

Summary and Discussion

All trail maintenance activities were supervised by Alisa Muniz who monitored that regulations and requirements were closely followed. During trail maintenance efforts, care was taken to avoid damaging native vegetation. No new homeless encampments were encountered in or near the work areas, and previously cleared encampments continue to appear unoccupied. The crew will continue to address and maintain high-traffic, authorized trails. General trail maintenance and safety monitoring will continue on all authorized trails to provide public safety and enjoyment. Incidental feedback received from equestrian riders has included comments regarding their appreciation of the removal of overgrown vegetation, fallen debris, and rocks, as well as the widening of sections of trail. This feedback from equestrian riders, as well as the feedback received during public outreach events, will continue to be incorporated in future trail maintenance efforts.

Chambers Group staff will continue to support the ongoing effort to protect and enhance the Mitigation Area's native habitat through regular trail maintenance efforts. Chambers Group staff will continually assess the efficacy of trail maintenance methods and adjust these methods as needed to best support mitigation goals.

Please feel free to contact me at (949) 261-5414 extension 7242, via cell phone at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like any additional information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood

Habitat Restoration Foreman

PHOTOS

Photo 1: A snag that had fallen across the trail within the eastern riparian area.

Photo 2: After the snag had been bucked and used to block off the unauthorized trail diversion.

Photo 3: A sinkhole that had formed along the trail within the eastern riparian area. Equestrian riders appeared to have been bypassing the sinkhole to the left.

Photo 4: The trail with the sinkhole was blocked and the bypass was cleared of debris and lined to ease visitor passage.

Photo 5: Crew members digging out the slope to widen a ramp within the eastern trail realignment.

Photo 6: Ramp before trail widening. The trail had narrowed over time with equestrian use.

Photo 7: Ramp after trail widening. The wider trail will provide more room for equestrian riders to pass one another and reduce the need to ride off-trail.

Photo 8: Rocks had accumulated on many trails throughout Big Tujunga Wash.

Photo 9: Rocks were removed and used to clearly delineate authorized trails to minimize off-trail riding, and provide for safe equestrian travel.

APPENDIX I – TRAIL REALIGNMENT MEMO REPORT AND CDFW COMPLETION NOTIFICATION

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
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(858) 467-4201
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

April 16, 2019

Sterling Klippel
Los Angeles County Flood Control District
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Alhambra, CA 91803
SKLIPPEL@dpw.lacounty.gov

Subject: Complete Notification of Lake or Streambed Alteration
Notification No. 1600-2019-0077-R5
Big Tujunga Wash Mitigation Area Trail Realignment Project

Dear Mr. Klippel:

On March 21, 2019, the California Department of Fish and Wildlife (Department) received your Notification of Lake or Streambed Alteration (Notification). On that same day, your Notification was deemed complete.

The Department is required to submit a draft Lake or Streambed Alteration Agreement (Agreement) to you within 60 calendar days from the date the Notification is complete, if the Department determines that an Agreement is required for the project. An Agreement will be required if the Department determines that your project could substantially adversely affect an existing fish or wildlife resource. Therefore, the Department has until May 20, 2019 to issue you a draft Agreement or inform you that an Agreement is not required.

Please be advised that you may not proceed with any work until the Department executes an Agreement, informs you that an Agreement is not needed, or does not provide you with a draft Agreement within 60 days of the date your notification was deemed complete.

If you have any questions regarding this matter, please contact Mr. Steve Gibson, Senior Environmental Scientist (Specialist) at (562)342-2106 or steve.gibson@wildlife.ca.gov.

Sincerely,

Victoria Tang
Senior Environmental Scientist (Supervisory)

cc: Steve Gibson, CDFW, Senior Environmental Scientist (Specialist)

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Melanie Morita, LACFCD, mmorita@dpw.lacounty.gov
Julianna Colwell, LACFCD, jcolwell@dpw.lacounty.gov

July 31, 2019

Melanie Morita
Los Angeles County Public Works
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Alhambra, California 91803-1331

RE: Memorandum for the June and July 2019 Trail Realignment Efforts Throughout the Riparian and Uplands of the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Morita,

This memorandum summarizes trail realignment efforts conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA) in June and July 2019. This memo shows compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek, which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Chambers Group qualified biologists and restoration specialists participating in trail maintenance activities within the BTWMA worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the trail realignment effort including dates, names of participants, locations of maintenance activities performed, sensitive resources encountered, and mitigation actions taken, are found below.

The trail realignment effort focused on abandoning approximately 1,580 feet of authorized trail and eliminating three points where the trail required visitors to cross Haines Canyon Creek. The abandoned trail section was offset by the creation of two new trails with a combined distance greater than the abandoned trail sections. In addition, the new trail realignment has facilitated the closure and bypass of three stream crossings, which will reduce potential disturbance and negative impacts to the sensitive species in and around Haines Canyon Creek. The creation of new trails has also facilitated the closure of multiple sections of unauthorized trails that were lengthened by public use after the Creek Fire and prior to trail reestablishment, when much of the trail network was ambiguous (due to lack of vegetation and the trails being obscured by ash and debris). These sections of unauthorized trails total approximately 500 feet in length, and since their routes were not clearly defined, visitors would wander through the habitat randomly and without a dedicated path; the negative effects of unauthorized trail use on the surrounding habitat were substantial. The trail realignment crew incorporated unauthorized trails into the new trail alignment wherever possible to minimize further disturbance and encourage the habitat recovery in these areas.

METHODS

Prior to the start of work, crew members received onsite orientation and instruction regarding safety, permit and mitigation regulations, and sensitive species that may be encountered in the work areas. The meetings were conducted by Habitat Restoration Foreman Tim Wood who was present on site and participated in trail realignment activities. Pre-activity sweeps for sensitive plant and wildlife species including nesting birds, were conducted prior to the start of trail realignment activities by Biologist Alisa Muniz. Collector for ArcGIS (Collector), a Geographic Information System (GIS) application, was used to avoid disturbing any sensitive plants or wildlife during trail realignment activities.

During trail realignment activities, Collector was used to locate and navigate through the originally proposed trail realignment sections (2018) in order to ensure that the new trail segments would be comparable in length and would avoid impacting the surrounding habitat to the greatest extent possible. Any deviations from the originally proposed trail courses were minor and in response to the discovery of sensitive resources that may not have been present in

2018 (e.g., regenerative or new native plant growth). In areas where unauthorized trails were discovered, felled debris from the surrounding areas was used to block off entry points and discourage future deviations from the trail realignment. In addition, felled debris and/or stones were used to delineate the realigned trails, helping to guide site visitors along the permitted course. In areas where vegetation needed to be cleared to make way for the new trail, the trail course and surrounding area were first assessed, and then plans were revised to avoid native plant species. Trail realignment efforts were directed towards areas with existing exotic plant species already targeted for removal. These non-native annual grasses and forbs were cut down with weed whackers, and cleared from the area to decompose on site. Where native vegetation was found obstructing the trail realignment course and was unavoidable, plants were pruned (using hand-pruners and bypass loppers) rather than removed to accommodate passage. In areas where native species such as poison oak (*Toxicodendron diversilobum*) were determined to threaten public safety, the shrubs were removed with shovels, axes, hand-saws, and picks. Crew members wore Tyvek suites and nitrile gloves in addition to their standard personal protective equipment (PPE), to increase their own safety during poison oak removal. Debris obstructions such as downed trees lay across portions of the intended realignment trails; the obstructions were cut with chainsaws and dragged clear of the trail course. In addition, chainsaws were used to cut down snag trees that were determined to pose a threat to public safety. The felled snag debris was used to delineate the new trail route and block unauthorized trails. Any remaining material was bucked and reduced in bulk, and left to decompose on site. Where the new trail route crossed through drainage swales, sections with extreme pitch, or potholed areas, soil was back-filled, compacted, and graded with hand tools (shovels, grading rakes, and picks) to provide a more even terrain for visitor traffic. Abandoned creek crossings were blocked with T-post and 12-gauge wire fencing, installed using a hand shovel, hand post-driver, and lineman pliers. Yellow flagging tape and signs were also installed to make the posts/wire more visible to visitors, and temporary signs notifying visitors of the trail realignment efforts and new trail courses were posted. The trail realignment work performed in June required an average of four crew members per day. Incidental work to finalize the effort continued into July and required one-to-two crew members per day.

RESULTS

On June 4, the trail realignment efforts commenced with a pre-activity survey performed by Biologist Alisa Muniz through the areas where the new trail would pass. An Anna's hummingbird (*Calypte anna*) nest was discovered in a small boxelder (*Acer negundo*) snag, approximately 20 feet from the ground and on the opposite side of Haines Canyon Creek from where work was to be conducted. The nest was a small cup-shaped nest constructed with downy plant materials and spider webs and was determined to be in the nest building stage as an adult was observed adding spider webs to the outside of the nearly completed nest. Work was planned to be performed within the nest buffer zone; however, the nest was determined to be far enough away that disturbance to the nest would be unlikely. The biologist monitored the nest while work was being performed and was prepared to enact avoidance measures in the event that the birds became stressed or nesting behaviors changed. A phainopepla (*Phainopepla nitens*) nest was discovered near the western edge of the eastern portion of the proposed trail realignment. The nest was located deep within a fork in a large snag that splits into three trunks near its base and is surrounded by poison oak. The nest was located in the northwestern trunk, near the top where the trunk branches into three smaller branches, approximately 35 feet high and approximately 6 feet from the top of the snag. The nest was small and very cryptic and is only visible from the northeast. The nest was determined to be in the nestling stage. The male was observed continually delivering food to the nestlings, though, the nestlings themselves were not observed. A 25-foot avoidance buffer was established and flagged for identification and avoidance purposes. The disturbance threshold for phainopepla is assumed 250 feet, but could be lowered at the direction of the avian biologist based on the type of work being completed and its tolerance for disturbance.

On June 5, crew members felled snags along the eastern realignment section that were determined to pose a safety risk to visitors using the trail. Felled debris from the snags was bucked and later used to delineate the new trail route. On June 6, the crew began to rough-cut the trail through the eastern realignment portion. Exotic species were either

cut down or removed, native species were pruned where necessary, and debris was cleared that would obstruct the trails course.

On June 7, crew members began lining the trail boundaries with the felled snag debris and/or stones from the area, and graded the trail swath to provide safe passage for visitors. At the end of the workday, the eastern trail portion was completed and opened for public use.

On June 10, the crew began work on the west trail realignment section. Work began in the southern portion of this trail section with an initial rough-cut of the course. Crew members removed non-native weeds and poison oak from the area through which the trail would pass. Crew members began cutting in, digging out, grading, and compacting a section of trail that would traverse an embankment over a small bluff to increase aesthetic value of the trail and overlook of the area.

On June 11, the crew continued to remove poison oak from the trail course and along trail edges. Cutting in, digging out, grading, and compaction efforts continued on the north side of the small bluff that the trail would traverse. Small snag trees were felled that posed a potential risk to public safety, and the crews began to delineate the trail with the snag debris produced.

On June 12, final grading and delineation of the new western trail section was performed and completed. The crew focused their efforts on blocking off all unauthorized or abandoned trails that branched out from the authorized trail or new realignment trail sections. The unauthorized trails were blocked with existing snag branches, plant debris, and rocks from the area, to prevent continued use and encourage habitat recovery.

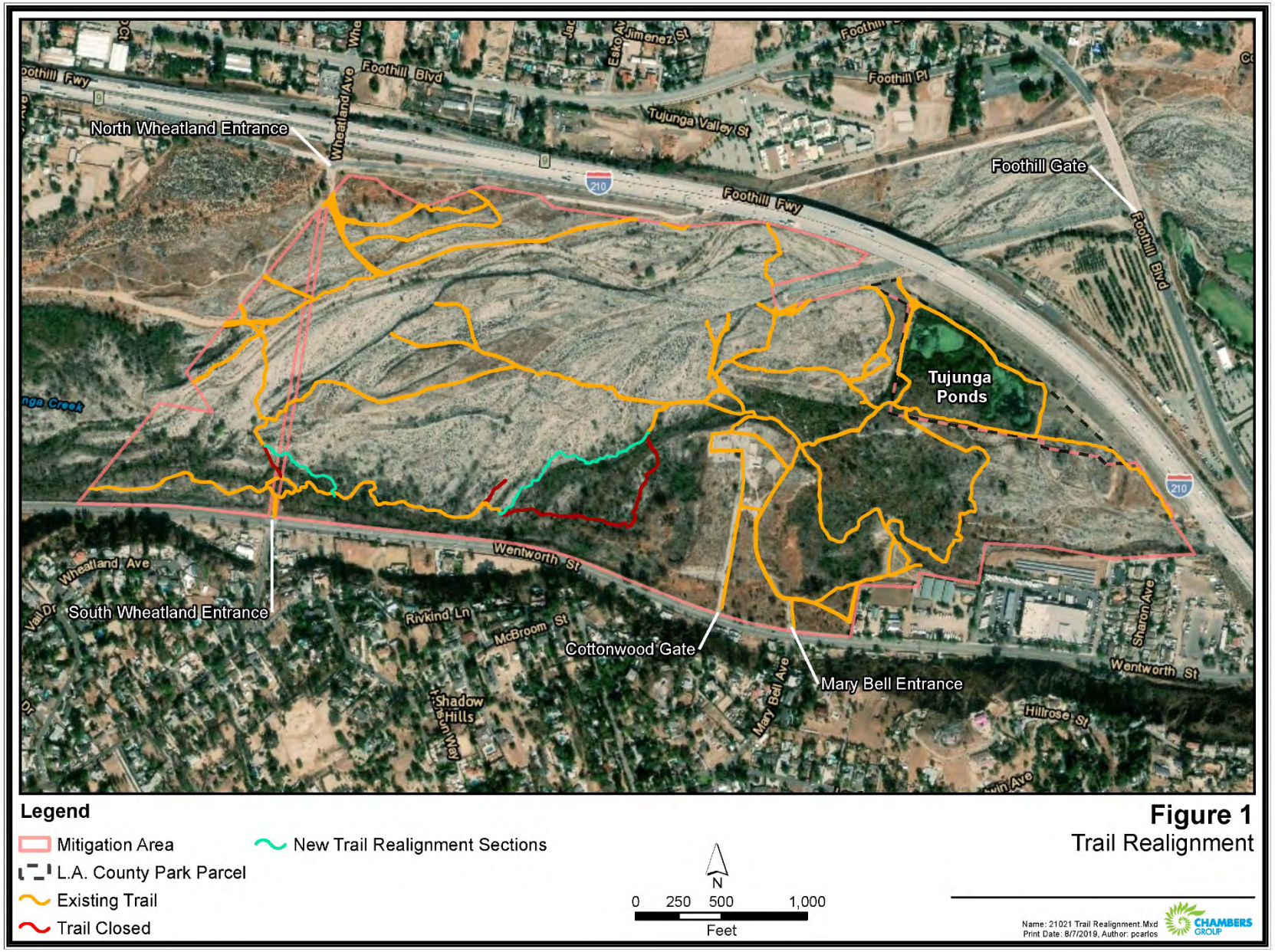
On June 13, crew members installed T-posts and three-wire fencing on both sides of the single western creek crossing closure. Temporary signs (new manufactured signs were to be shipped and were not available at this time) were installed to inform the public of the habitat restoration in progress and direct them towards the new trail. Crew members moved existing snag debris and stones onto the old trail leading to the creek crossing and behind the wire fences, to further discourage public entry. Cuttings from surrounding trees were planted in the entry points on both sides of the creek crossing closures to discourage public use and restore old and unauthorized trails to native habitat conditions. Tree cuttings planted included one boxelder and one willow (*Salix* sp.) on the north side, and one California sycamore (*Platanus racemosa*) and two willows on the south side.

On June 14, crew members installed T-posts and three-wire fencing in front of the two eastern creek crossing closures. Temporary signs were installed to inform the public of the habitat restoration in progress and direct them towards the new trail. In addition, crew members moved existing snag debris and stones onto the old trail leading to the creek crossing and behind the wire fences, to further discourage public entry. Cuttings from nearby native trees were planted at each of the creek crossing points of entry, at a depth where they would receive a source of water (underground creek flow), and begin to reclaim the space. Tree cuttings planted included one boxelder and one willow on the north side of the east crossing, one Fremont cottonwood (*Populus fremontii*) and one willow on the south side of the east crossing, one willow on the east side of the west crossing and one Fremont cottonwood on the west side of the west crossing.

On June 26, Habitat Restoration Foreman Tim Wood conducted a follow-up site walk to monitor the use of the new trail and check for any signs of vandalism, trail deviation, or other negative impacts caused by the public. The trails showed encouraging signs of substantial use such as the beginning of a trough in the trail where equestrian traffic began to compact areas dense with sand and ash. No signs of deviation from the new trail, or re-entry into the unauthorized trail sections were observed. Only one instance of vandalism was observed; one short section of wire fence was damaged which was repaired. In addition, only one branch from the planted cuttings was observed broken in the same area (probably by the same culprit), though the cutting as a whole was fine. All other cuttings installed at the stream crossing closures seemed to have passed the initial shock period associated with transplantation, and show signs of health and potential new growth.

On July 1, Habitat Restoration Foreman Tim Wood, with support from GIS Analyst Phillip Carlos, completed the mapping of both trail realignment sections. Collector was used to document progression along the new trails; record location data points, calculate linear distance, and create a map of the route. The final eastern trail realignment section is 1,210 linear feet. The final western trail section is 560 linear feet. A map of the BTWMA trail system including the new trail sections is included as Figure 1, Trail Realignment.

Figure 1. Trail Realignment



Between July 26 through July 31, permanent signs were installed at the four creek crossing closures including at two eastern closures and at the north and south sides of one western closure. These signs inform the public of the new trail directions and that the areas beyond those closures are part of "Active Habitat Restoration" efforts. A fifth sign was also installed at the three-way merger of the west trail realignment section and the authorized trail to help guide visitors to other trails on the property. In addition to the trail realignment signs, five signs were installed at the high-traffic entry points of the BTWMA including the equestrian entrance from Gibson Ranch, the two trail heads located on the Cottonwood Avenue bluff, the south Wheatland Avenue trail head, and a trail merger point near the north Wheatland Avenue entrance where two authorized trails join the street entrance trail and a trail from the Hansen Dam area. These signs inform the public that the entire property is an "Environmentally Sensitive Area" and list many of the rules they are to follow as site visitors. The rules included on this sign focus on prohibited actions that have been determined to pose the greatest threat to the sensitive resources within the BTWMA, and encourage the public to "Help Support Habitat Recovery" with their cooperation. All signs were set on 8-foot U-channel steel posts, 2 feet into concrete and 6 feet above the ground. Tim Wood assessed the design of the signs and determined that although the signs were made of aluminum, the single attachment point at the U-channel steel posts was not enough to prevent potential bending of the signs by the public. Therefore, Tim reinforced each sign with a steel backing frame, fabricated and included to help prevent vandalism and other potential damage. Each mounting bolt was split and flared to help prevent theft. All signs were faced in a direction that maximizes visibility from the trail approach, and were placed in locations that would not obstruct visitor traffic along the trails.

SUMMARY AND DISCUSSION

All trail realignment activities were supervised by Habitat Restoration Foreman Tim Wood who monitored that regulations and requirements were closely followed. During the trail realignment efforts, care was taken to avoid damaging native vegetation. No birds showed signs of stress during trail realignment efforts, and no sensitive biological resources including nesting birds, were disturbed. The establishment and opening of the new trails and the three creek crossings closures as part of the trail realignment effort, has been completed. The total combined distance for both trail realignment sections is approximately 1,770 linear feet. General maintenance and safety monitoring of the new trail realignment sections will be included with all other trail maintenance and monitoring efforts to provide public safety and enjoyment. Throughout the trail realignment process, several equestrian users mentioned their contentment and satisfaction regarding the new trail alignment, the high visibility of the trail, the grading and removal of trip hazards for safe horse passage, and signs to help direct travel and protect the environment.

Chambers Group staff will continue to support the ongoing effort to protect and enhance the BTWMA's native habitat through regular trail maintenance efforts. Chambers Group staff will continually assess the efficacy of trail maintenance methods and adjust these methods as needed to best support mitigation goals. Trail monitoring and maintenance efforts will be performed as needed throughout the summer months.

Please feel free to contact me at (949) 261-5414 extension 7242, via cell phone at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like any additional information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood

Habitat Restoration Foreman

PHOTOS

Photo 1: Crew member cutting down a snag along the eastern trail realignment section, on June 5.

Photo 2: Example of native vegetation pruned, rather than removed, to clear space for the new trail, on June 6.

Photo 3: Crew members cutting, grading, and using stones to delineate the eastern trail section, on June 7.

Photo 4: Crew members removing poison oak prior to cutting the western trail swath, on June 10.

Photo 5: Crew member cutting into an embankment through which the western trail realignment section traverses, on June 11.

Photo 6: Example of the incorporation of an unauthorized trail into the new trail, and snag debris used to prevent future deviations into recovering habitat, on June 12.

Photo 7: Crew members installing T-posts and three-wire fencing at the western creek crossing trail closure, on July 13.

Photo 8: Crew member planting cuttings on the south bank of the eastern creek crossing closure, on June 14.

Photo 9: New growth buds swelling after the initial cutting/planting shock, observed on June 26.

Photo 10: Eastern trail realignment section - east entry and creek crossing closure, on July 31.

Photo 11: Eastern trail realignment section - west entry and creek crossing closure, on July 31.

Photo 12: Trail merger – where the western trail realignment section joins the existing trail, on July 31.

Photo 13: Western trail realignment section – northern creek crossing closure, on July 31.

Photo 14: Western trail realignment section - southern creek crossing closure, on July 31.

Photo 15: Equestrian entrance from Gibson Ranch, on July 31.

Photo 16: Cottonwood bluff – east entrance trail, on July 31.

Photo 17: Cottonwood bluff – west entrance trail, on July 31.

Photo 18: South Wheatland Avenue entrance trails, on July 31.

Photo 19: North Wheatland Avenue entrance trail merger section, on July 31.

Photo 20: ESA Sign.

Photo 21: Example of the backing frames installed to discourage vandalism.

Photo 22: Example of how sign bolts were split and flared to discourage theft.

APPENDIX J– STAKEHOLDER MAILING LIST

Mr. Aaron Allen
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APPENDIX K – NEWSLETTERS

Big T Wash Line

Spring 2019

A Publication of Los Angeles County Public Works

IN THIS ISSUE

ABOUT THE BIG TUJUNGA WASH MITIGATION AREA

"Big T" is a parcel of land located in the City of Los Angeles's Sunland area (see Page 4).

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Public Works's implementation of the Master Mitigation Plan for Big T has been underway since April 2000. Big T protects one of the most rapidly diminishing habitat types found in Southern California: willow riparian woodland. Big T is home to several protected species of fish, including the Santa Ana sucker, Santa Ana speckled dace, and arroyo chub, and contains habitat for sensitive bird species such as the least Bell's vireo and southwestern willow flycatcher.

The purpose of this newsletter is to provide updates to ongoing programs and to explain upcoming enhancement measures that will be implemented on the site. Newsletters are published on a semi-annual basis in the spring and fall.

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dpw.lacounty.gov/wrd/projects/BTWMA

The Rebuilding of an Ecosystem

Have you ever heard of the term "trophic cascade"?

A trophic cascade is a tiered ecological process that starts at the top of the food chain with carnivores (secondary consumers) and works its way down through the herbivores (primary consumers), and reaches the bottom with the plants, or primary producers. The effects of the trophic cascade can be seen when a species population within one of the trophic levels is either increased or decreased. One of the most famous examples of a trophic cascade involves the gray wolves of Yellowstone National Park, and the key role they play in the habitat in which they live.

In 1926 the last gray wolves were killed in Yellowstone. With the removal of the wolves from the area, the white-tailed deer population spiked as the herbivores no longer had a top carnivore to keep their populations in check. The white-tailed deer devoured an excessive amount of the area's vegetation. This increase in the deer's grazing and consumption strongly impacted Yellowstone's ecosystem. Streams were adversely affected by the increase in the foot traffic and grazing of deer along the stream banks, making the stream banks weak. The weakened stream banks led to erosion and sedimentation which altered fish populations. The loss of vegetation led to the loss of small mammals and in turn caused a decrease in the raptor (birds of prey) population.

In 1995, in order to restore balance to Yellowstone's ecosystem, U.S. and Canadian wildlife officials reintroduced wolves into the park. The wolves not only helped the ecosystem by hunting some of the deer, but they also changed the deer's behavior. The deer learned to avoid certain areas in the park because they knew where the wolves were located. As a result, areas of the park that were now devoid of deer had a rapid ecological explosion and the recovery of plant life in those areas was impressive. The increase in trees and vegetation welcomed several raptor and songbird species back to the park such as hawks, bald eagles, ospreys, Wilson's warblers, willow flycatchers, and many more.

As plants began to reestablish along the stream banks, erosion ceased, creating more pools and more channels to support fish. With the return of trees, beavers returned and the dams they created provided habitat for reptiles, amphibians, otters, muskrats, fish and ducks. The wolves killed coyotes which led to an increase in the number of small mammals such as rabbits and mice. With populations of small mammals on the rise, hawks, foxes, badgers, and eagles began to thrive. The loss and rebirth of wolves back into Yellowstone is a prime example of how changing a single aspect of an ecosystem can cause multiple effects that can either unbalance or rebalance the trophic levels and ultimately the health of an ecosystem.

How does this relate to Big T? The trophic cascade just described was an example of a "top down" trophic cascade. Big T is similarly experiencing the effects of shifting trophic levels but from the bottom up. After the Creek Fire burned through the area in 2017, Big T appeared nothing more than a wasteland. The lack of vegetation took a toll on the animals who had once called Big T home. In this case, the lowest level of the trophic cascade, primary producers, was greatly reduced, shifting the balance of herbivores and carnivores and reducing the amount of wildlife Big T could support. Removing the plants sent a shock wave though the area. Without plants, food for herbivores, cover for wildlife, and suitable habitat for nesting birds were limited. Without herbivores, carnivores had all but vanished from Big T.

By the spring of 2018 a small number of plants had begun to resprout and reestablish, but very few animals had returned to the area. Fast forward to 2019, it is evident that the plant life at Big T is making a healthy comeback. Just within a year, many bird species have returned to the area. If you were walking through Big T a year ago, you might have seen an occasional hawk flying overhead, but birds were otherwise scarce. This spring, twenty-six bird species have already been observed at Big T, and active nests are already being identified by biologists. As native vegetation continues to reestablish, Big T will be able to support the abundance of herbivores that it once hosted, and carnivores will be soon to follow.

Although Yellowstone National Park and Big T are extraordinarily different, they are both good examples of how changes within a trophic level can have substantial effects on the overall health of an ecosystem. Here at Big T the plants are leading the way and bringing balance back to the habitat. As devastating as the Creek fire was, we are fortunate that we get to witness Big T coming back to life.

The Big Dead Trees at Big T

"Why not cut them all down?"

It's a fair question, and one worth discussing. In order to do so it's important to understand what these dead trees are, what they provide, and how they will help sustain the health of Big T for years to come.

The woodland areas along Haines Canyon Creek and surrounding the Tujunga Ponds at Big T are called snag forests. Snag forests, sometimes referred to as complex early seral forests, can be caused by disease, insect infestation, and fire, as we've seen. Snag forests are temporary habitats. They can be thought of as transitional ecosystems, and should not be considered devoid of life. Numerous studies have shown that snag forests can potentially support greater biodiversity than their counterparts with living, closed canopies.

So, what do snags forests do? Let's start from the top, and consider the activity we can already see taking place as these snags fulfill the last stages of a tree's ecological cycle.

The remaining crowns, or the area where the leaf canopies once existed, provide material and space for nesting birds. Tree crowns also provides perches for flocking and predatory birds. Hawks and other birds of prey take advantage of the unobstructed views provided by these snags while hunting and also use them for nesting. The open leafless crowns also provide the opportunity for light to reach the forest floor. This allows for new varieties of plant species to grow in areas where they would otherwise be unable to do so under shaded canopies. Many native, migratory birds and insects require specific plants to feed upon, seeking out flower nectar, seeds, or foliage for larval development. Simply said, an increase in plant biodiversity within an ecosystem stimulates and provides for a greater biodiversity of insects and other animals that can be supported within that ecosystem.

The trunks are pillars for communities of beetles, ant colonies, bee hives, and other insect larvae. These insects aid in the decomposition process, feed insectivorous birds and mammals, and act as the pollinators. Woodpeckers are a great example of a species that benefits from these insect colonies. They not only burrow into the snags for food, but also create shelters that can later be inherited by other species. Often, when larger limbs fall from these snags, hollows in the trunks occur. These hollows offer opportunities for larger mammals such as squirrels, opossums and raccoons, and birds such as owls, to take up residence.

The decaying roots, limbs, and other fallen debris encourage fungal and bacterial growth in the soil. These decomposers unlock and replenish the availability of nitrogen and other minerals essential for plant growth. Mycorrhizae (microscopic fungi) for instance, form symbiotic relationships with plants helping both to thrive. These processes work as the foundation for new life, while helping to support existing bird, mammal, fish, and other aquatic species.

In terms of fresh water ecology, branches and trunks are referred to as course woody debris. Course woody debris creates sanctuaries for aquatic species providing shelter and nurseries to spawn. On land, downed trees and branches provide structural foundations for ground dwelling animals to burrow, find refuge, and store what they have foraged. Course woody debris also helps rejuvenate plants by slowing the flow of water through a habitat. This allows for an increase in water retention, percolation into the soil, and causes deviations in creek and swale channels resulting in a broader distribution of water throughout.

It is important to consider the variety of trees that inhabited Big T, their composition, and how they will vary in their decomposition. Trees with softer wood, such as cottonwoods and alders, will decompose more rapidly, while willows (medium composition), oaks, and black walnut (hard woods) will break down more slowly as they experience these final processes. The rate of decomposition defines the persistence of a snag forest. The persistence of the snag forest at Big T reminds us of the benefits and opportunities associated with any snag forest, and how they only exist as part of a larger and longer ecological process. Time is the most important factor.

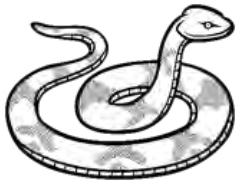
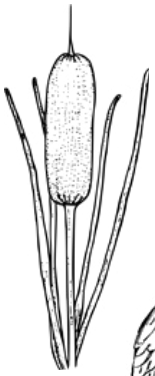
Future efforts at Big T will continue to focus on habitat preservation, but actions will be taken foremost in the interest of public safety; any snags located along authorized trails that are determined to be a risk to public safety, will be removed. Due to the sensitive nature of the site, the absolute removal of all burned trees from the site is not appropriate. Trees that do not pose an immediate safety issue will be left standing, while the cut material from any trees that are cut down will be left on site to aid in the decomposition process and used to delineate authorized trails throughout Big T. Both the trees left standing and the material from the trees that will be cut down have already been severely burned, significantly reducing the potential for them to contribute to additional fire risk. In order to reduce the fuel load at Big T while still protecting wildlife and habitats in the area, a scaled-down version of fuel reduction will be conducted, and will consist of vegetation trimming and the removal of dead vegetation in fuel modification zones, in accordance with the Los Angeles County Department of Agricultural Commissioner/Weights and Measures fuel modification and vegetation management guidelines.

While the Creek Fire may be seen as a devastating, singular occurrence, it is important to understand that the numerous ecological processes that have already begun will provide opportunities and aid in the preservation of the habitat at Big T for years to come. The fire and resulting snag forest have made way for a breath of new life at Big T, and we would not want suffocate any of these natural processes with over-reactive measures. Although many of the snag trees will be removed, we must understand that to remove all the dead trees at Big T, we would actually be removing substantial opportunities for life. With this appreciation in mind, we can see the remaining snag forest not as headstones for the past, but rather as building blocks for the future.

KID'S CORNER






Producers, Consumers and Decomposers

- Producers are organisms that make their own food using energy from the sun. Color the producers GREEN.
- Consumers are animals that eat plants and/or other animals and cannot make their own food. Color the consumers BLUE.
- Decomposers break down dead plants and animals and release nutrients into the soil. Color the decomposers YELLOW.

EMERGENCIES? INCIDENTS? QUESTIONS?

CALL 911 TO REPORT ANY EMERGENCY SUCH AS FIRE OR ACCIDENT

• To report minor incidents or regulation infractions contact the Sheriff's Department at 1-800-834-0064. (Please DO NOT use 911.)

• Do not attempt to enforce regulations yourself; please allow law enforcement to handle the situation or incident.

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

Crystal Franco, Stormwater Engineering Division
Los Angeles County Public Works
900 S. Fremont Avenue
Alhambra, CA 91803
Email: BTWMA@dpw.lacounty.gov
Phone: (626) 458-6158

Where is the Big Tujunga Wash Mitigation Area?

Downstream of Big Tujunga Canyon, right in Lake View Terrace and south of the 210 freeway, you'll find a native riparian (water loving plant) natural area filled with cottonwoods, willows, and pools of water that support many native aquatic species.

Check out the Big T website for more information at:

- *dpw.lacounty.gov/wrd/projects/BTWMA*

Big T Wash Line

Winter 2020

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The New Trails

Many visitors to Big T have come to find that three of the Haines Canyon Creek crossings have been closed, and two new trail sections now bypass these crossings.

Many visitors to Big T have come to find that three of the Haines Canyon Creek crossings have been closed. The creation of the new trail sections prompted the closure of two previously authorized trail sections that totaled approximately 1,580 feet in length. The two new trail sections offset the distance of the closed trails, with a combined length of approximately 1,770 feet. The new eastern trail section bypasses the two creek crossings that bookend what many veteran visitors refer to as the "water trail". The new western trail section bypasses one creek crossing that was located north of the south Wheatland Avenue entrance. Several factors were considered when planning the new trail routes, including coordination with resource agencies such as the California Department of Fish and Wildlife (CDFW), the proximity of the new trails to the creek, the creation of new vantage points of the surrounding landscape for visitors to enjoy as they navigate through the site, the potential for shade in these areas as the trees continue to regenerate and form canopies, and establishing the routes through areas where habitat disturbance would be minimal. Many may be wondering why rerouting the trails was necessary. Let's explore the reasoning behind the trail realignment and how the new trail system helps to support Big T and public enjoyment.

It is important to understand the purpose of the mitigation area. The land was purchased as a mitigation area by Los Angeles County in 1998 to offset ecological loss on other Public Works projects. Due to resource agency agreements and permit conditions, Public Works is required to maintain and enhance Big T in perpetuity. Because of these requirements, the area now serves as a habitat preserve for numerous federal and/or state-listed endangered, threatened, or otherwise sensitive wildlife species including southwestern pond turtle (*Actinemys pallida*), coast horned lizard (*Phrynosoma blainvillii*), black-crowned night heron (*Nycticorax nycticorax*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), Cooper's hawk (*Accipiter cooperii*), California gnatcatcher (*Polioptila californica*), loggerhead shrike (*Lanius ludovicianus*), least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), Santa Ana sucker (*Catostomus santaanae*), Santa Ana speckled dace (*Rhinichthys osculus*), arroyo chub (*Gila orcutti*), and other native wildlife.

The needs of these species contribute to how this land is restored and maintained, and their mere presence provides visitors peace of mind in knowing that they can enjoy the area for years to come. The trail and creek crossing closures are part of continuing efforts to preserve sensitive species whose existence and ecological contributions are essential to the health of Big T.

Did you know that native fish species spawn in the sandy areas of the creeks? That's the exact type of habitat where many of the creek crossings were located. Our native fish and their spawning grounds were being trampled by unknowing trail users. Reducing the number of creek crossings decreased the amount of visitor contact in these areas, thus supporting sensitive native fish species. Fewer creek crossings allow native fish to disperse more evenly throughout the creek channel, where previously, they were corralled between crossings. Free movement through the creek allows for new food sources, genetic diversity, nurseries, and shelters from predatory animals, all of which supports the health of the species. Reducing contact with the creek helps minimize the potential spread of harmful bacteria and other pathogens that people and animals carry on their skin or fur; feet, shoes, paws or hooves; or that can be passed by saliva, feces, and urine.

So, what's so special about these "little fish", and why won't any little

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fish do? Functional redundancy, sometimes referred to as functional equivalence, is an ecological term for circumstances in which one species can be substituted by another and fulfill the same role within an ecosystem. Our "little fish" species, the Santa Ana sucker, the arroyo chub, and the Santa Ana speckled dace are specialists in their ecosystem and cannot easily be replaced. In fact, the Santa Ana sucker is such a specialist in its environment that it can only be found in a few

locations in Southern California. In these areas the Santa Ana sucker receive federal and state protection. Big T's native fish are highly adapted to persisting through seasonal "boom and bust" fluctuations in water levels and seasonal flooding. The exotic fish species introduced into the Tujunga Ponds are not specialists in this environment and are not adapted to the extreme seasonal water fluctuations that Big T experiences. They are opportunists. When waters are calm, small non-native fish migrate upstream from Hansen Dam and downstream from the Tujunga Ponds (when they are still small enough to slip past fish exclusionary nets). Here they prey on smaller native species. Over time, these predatory exotic species devastate native fish populations, such that their reduced contributions to the ecosystem threaten more than just the creek itself. Consider what happens when the numbers of native fish have been decimated and only exotic fish species remain: seasonal floods occur, the exotic fish that are not adapted to this environment are eliminated or displaced, and the creek is now devoid of an essential link in the food chain for native aquatic birds.

By closing the "water trail" (as it was known by my many users), this area can now remain undisturbed while willow and cottonwood trees regenerate. The understory of mulefat thickets, a plant community that is specially adapted to intermittent flooding, can reestablish with less competition from invasive species and weeds that we unintentionally spread off ourselves and our animal companions. Restoration of this habitat will encourage many bird species back to the area such as the least Bell's vireo and southwestern willow flycatcher; these species require contiguous stretches of secluded, high-quality riparian habitat for nesting and foraging. Restoring this section of trail back to native habitat will be key in their return to the area.

The new trail alignment gives some of these sensitive species a bit more space. Their presence is part of what makes Big T unique and special. Along these new trail routes, visitors will see new bird species because there are undisturbed areas for them. All of these efforts may take time before the returns take hold, but we can be confident that what we do today at Big T will reach far beyond today's view. The changes made to the trail system are not a loss, but rather, an adjustment with gains to follow. Preserving this habitat is to preserve what we and future generations of visitors will enjoy.

Help Support Habitat Recovery

Big T is used for recreational purposes, but irresponsible recreation can lead to loss, degradation, and alteration of habitat for sensitive species.

Although naturally occurring events such as wildfires and heavy rain storms can cause changes to terrestrial and aquatic environments, irresponsible recreation can also alter the habitats of many of the wildlife species at Big T. While the vast majority of visitors are good stewards of the property and respect the area, some site users engage in irresponsible activities including, the introduction of non-native animal and plant species to the site, erecting dams (or installation of other barriers) in Haines Canyon Creek, swimming and bathing in the creek, littering and dumping trash, hiking or riding off from authorized trails, creation of new unauthorized trails, making contact with animals, and disturbing and altering the

environment. The site is either home to or has potential habitat for a number of federal and/or state-listed or otherwise sensitive wildlife species. These species are negatively affected by even minor infractions of the rules.

New signage is posted throughout Big T that reads 'Environmentally Sensitive Area' with a reminder to better support habitat recovery. Below we explore the site rules, and learn why each rule is instrumental in supporting habitat recovery and public safety at Big T, and what to do if you see a violation of the site rules.

NO SMOKING OR CAMPFIRES

This rule seems pretty obvious, right? Yet, the remains of small campfires have been found in various locations around Big T. All it takes is one rogue ember from a campfire or a cigarette butt that has not been properly extinguished and Big T could be ablaze once again. If you see illegal campfires or other dangerous

Continued on next page...

activities that could lead to a fire, contact law enforcement immediately. Work together to keep Big T and the homes that surround it safe.

NO CAMPING – DAY USE ONLY

Once the sun starts to set, it's time to pack up. Please be aware the site is only open from the hours of sunrise to sunset. The recovery goals include restoration and preservation, which requires that only the most minimally invasive activities be allowed on site. Damage to vegetation, trash, the illegal collection of firewood, illegal campfires, and swimming or bathing in the creek, are all activities associated with camping that are not permitted at Big T. Please report any unauthorized camping to Public Works.

NO LITTERING OR DUMPING

Many community members have participated in the Annual Trail Cleanup Day events and know firsthand the amount of trash that ends up on the site, and the huge effort it takes clean it all up. Broken glass, fishing lines, furniture, wrappers, plastic bags, clothes, cans, bleach containers, bottles, and sport balls are just a few of the many trash items recovered. Trash items have been observed entangled in shrubs, floating in the creek and ponds, and tossed out along the trails. While many trash items wash into Big T from upstream, it is important not to add to trash on site. One of the best and easiest ways to support habitat recovery is to pick up trash items found on site and dispose of them properly. Please implement the "leave no trace" mindset and take care to secure all trash items and check the area around you for any trash you may have dropped before leaving the site. There are trash cans located at the Cottonwood Avenue entrance and the north Wheatland Avenue entrance that allow for convenient disposal of trash items.

NO OFFROAD VEHICLES

Off-road vehicles including motorized bikes, dirt bikes, motorcycles, quads and other recreation vehicles are not permitted. The trail system at Big T has been designed for walking, hiking, and equestrian use only. Off-road vehicle use can damage native, recovering habitat, create new unauthorized trails, spread invasive seeds, and is a potential fire hazard. Furthermore, off-road vehicles can be dangerous to pedestrians and equestrians, and wildlife using the trails. It is important to only engage in off-road activities at approved off-road areas in the county.

STAY ON AUTHORIZED TRAILS

The current trails have been rerouted and improved to minimize negative impacts to native habitats. The existing trails are maintained to help keep visitors from wandering off the trails. These trails should only be used by equestrians and pedestrians. Temporary housing encampments and other structures have been observed in off-trail areas, including tents, and "huts" built from native plant materials. Some of the plant materials used were removed from live, recovering, native trees, and other native vegetation was trampled in the removal process. Going off trail leads to the unnecessary damage of vegetation, and disturbs potential nesting birds and other wildlife found within the site. Please be aware that disturbing nesting birds and other wildlife is a violation of state and federal regulations. It is important that authorized trails be the only routes used to navigate around Big T. Bridges and pathways constructed of rocks and logs have also been observed within creek at unauthorized crossings. Like rocks dams, these crossings act as barriers that limit the distribution of sensitive aquatic species. Blocking the distribution of sensitive or endangered species is a violation of state and federal laws, and can result in fines exceeding thousands of dollars. Only cross the creek at authorized locations, and report unauthorized crossing to Public Works.

Violations such as building huts, blocking water flow, and stealing wood compromise sensitive habitat and are completely against the rules of Big T.

DOGS MUST BE ON A LEASH

Who's a good dog? Probably your dog! But no matter how good your dog is, or how they may stay right by your side, it is important that you keep them on a leash when visiting Big T. Leashing your dog increases public safety, the safety of native wildlife, and the safety of your pet. It is hard to know what may set our pets off or spook them. Letting your dog off leash also increases the risk of encountering other off-leash dogs that may not be "good dogs", and increases the risk of them encountering some not-so-friendly plants such as poison oak and stinging nettle. In addition, our pets enjoy splashing in the creek to cool off; however, just as human visitors are asked to stay out of the creek it is critical to the

Continued on next page...

health of sensitive aquatic species that pets stay out of the creek as well. Don't risk letting them run free! It's not worth it!

NO FISHING OR CONTACT WITH ANIMALS

The Tujunga Ponds are managed and designated as a wildlife sanctuary by the Los Angeles County Department of Parks and Recreation. As such, fishing is strictly prohibited in the ponds and adjacent waterways including Haines Canyon Creek. Purposeful contact with animals is also prohibited at Big T. Los Angeles County's Ordinances state that "A person shall not molest, hunt, disturb, injure, shoot at, take, net, poison, wound, harm, kill or remove from any park or riding and hiking trail any kind of animal." Give wildlife space whenever possible. Binoculars are an excellent way to view wildlife without getting too close. If you observe illegal fishing or other prohibited activities or interactions that may harm wildlife please contact Public Works immediately.

NO RELEASING OF ANIMALS OR PLANTS

Avoid introducing non-native species to the Tujunga Ponds and Haines Canyon Creek to help recovery of the native aquatic species. As discussed in the article Invasive Aquatic Species, in the Fall 2018 Edition of Big T Washline, introduced wildlife may thrive in the aquatic ecosystems, but they alter the natural habitat and negatively impact native species. When non-native species are introduced into the ponds or creek, native species are often deprived of the resources, food, and habitat needed to survive. Larger non-native species that are introduced into the ponds and creek, prey on the smaller native species. Releasing non-native or domesticated animals into native habitats can also spread disease to native wildlife. Aquatic weed species are often introduced into waterways by the prohibited dumping of aquariums. If these aquatic weed species take hold, they can be expensive to control and detrimental to aquatic habitats. Avoid the transfer of invasive plants to Big T by checking your clothes, animals, and personal items for seeds, soil, and plant materials before entering the site and disposing of these materials properly in a sealed trash receptacle.

NO SWIMMING OR WADING IN PARK WATERS

Swimming or wading in the creek is tempting during hot summer days. Some visitors construct dams in the creek with rocks, logs or other materials, in order to create deeper, ponded areas for swimming and cooling off. Building dams limits the range and distribution of sensitive aquatic species, modifies their habitat, and can ultimately lead to decreased populations. Swimming or bathing in the creek also introduces pollutants into the water. Use of bathing products such as shampoos and soaps can change the chemistry and quality of the water, and harmful bacteria and pathogens can be transmitted from people and animals to native aquatic species. Dams observed within the creek should be reported to Public Works so they can be carefully removed.

Biologists removing an illegally constructed rock dam.

Please follow the below guidelines for dealing with someone blatantly violating the rules of Big T:

- Do not approach or confront rule violators
- Note the time and date of incident
- Note the location within Big T (which trail or area)
- If possible and safe, take pictures of the area
- Report intoxicated individuals to Los Angeles County Sheriff, Parks Bureau Trails Team at (323) 845-0070
- Other violations can be reported to Public Works directly at (626) 458-6158

NO CONSUMPTION OF ALCOHOL OR DRUGS OR PUBLIC INTOXICATION

In an effort to keep Big T a safe and inviting place for everyone, it is important that alcohol and drugs not be brought to or used on the site. In addition, public intoxication is not to be tolerated. Call local authorities if impaired individuals are encountered.

NO DISTURBING THE PEACE

Disturbing the peace includes willfully making, continuing, or encouraging any excessively loud or unnecessary noise or language which unreasonably disturbs the peace or enjoyment of a park. Please be respectful of others and keep your conduct courteous! In the event of a disturbance or if you feel unsafe, remove yourself from the situation, and call local authorities immediately.

NO DISTURBING THE ENVIRONMENT

Public Works wants to remain engaged with the local community and ensure the continued, shared use of the facility. It is important that everyone does their part to follow the rules and minimize impacts and disturbances to the environment. Unauthorized activities, no matter how insignificant they seem, can result in the loss and degradation of habitat for the sensitive and endangered species that make Big T their home. As an example, shrubs provide food, nesting material, and shade for songbirds and other wildlife. The federal-listed threatened coastal California gnatcatcher is a species that relies on healthy stands of shrub habitat (coastal sage scrub) which they require for nesting. These shrubs may sometimes seem insignificant, but the habitat is vital to the reproduction of California gnatcatchers. In simple terms, everything at Big T from the tiniest pebble to the largest majestic oaks, is either "somebody's" food or "somebody's" home. If we all conduct ourselves as if we are guests at someone else's home while visiting, following the site rules will become second nature.

Sincere thanks and appreciation to community members who follow the site rules, and help to protect Big T.

KID'S CORNER

Fill in the blanks to complete the park rules by unscrambling the words on the right. If you get stuck, look for clues throughout the newsletter.

Hint:	Word:
» NO _____ - DAY USE ONLY	GPAMNIC
» NO _____ OR DUMPING	TLNGTIIRE
» NO OFFROAD _____	HIVELCSE
» STAY ON AUTHORIZED_____	STLIAR
» _____ MUST BE ON A LEASH	SGDO
» NO _____ OR CONTACT WITH ANIMALS	HIFGINS
» NO RELEASING OF _____ OR PLANTS	LAMINSA
» NO SWIMMING OR WADING IN _____ WATERS	KRPA
» NO DISTURBING THE PEACE OR _____	MVINORNNEET

Can you unscramble this important message?

PELH	PRTPSUO	TIHABTA	YCEEVROR
_____	_____	_____	_____

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Los Angeles County Public Works
900 S. Fremont Ave
Alhambra, CA 91803
Email: BTWMA@pw.lacounty.gov
Phone: (626) 458-6158

Where is the Big Tujunga Wash Mitigation Area?

Downstream of Big Tujunga Canyon, right in Lake View Terrace and south of the 210 freeway, there is a native riparian (water loving plant) natural area filled with cottonwoods, willows, and pools of water that support many native aquatic species.

Check out the Big T website for more information at:

- *pw.lacounty.gov/wrd/projects/BTWMA*

APPENDIX L – COMMUNITY ADVISORY COMMITTEE MEETING DOCUMENTS

PUBLIC NOTICE

BIG TUJUNGA WASH MITIGATION AREA
COMMUNITY ADVISORY COMMITTEE MEETING

Notice is hereby given that annual meeting of the Big Tujunga Wash Mitigation Area Community Advisory Committee (CAC) will be held on:

Thursday, April 25, 2019
6:30 p.m. to 8:30 p.m.
Hansen Yard
10179 Glenoaks Boulevard
Sun Valley, CA 91352

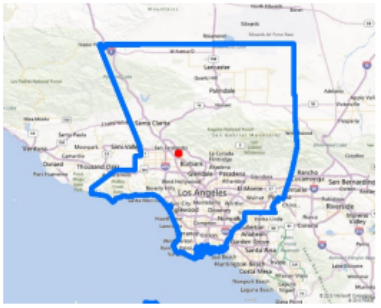
Note: Entrance to Hansen Yard is off Branford Street. There is no access from Glenoaks Boulevard. Please refer to map for entrance to facility.

The purpose of the CAC meeting is to update members on the status of site monitoring efforts in the mitigation area and to discuss upcoming activities. We invite all interested parties to attend (see below agenda). The minutes from the previous meeting are located on the mitigation area website (link is included below). We look forward to seeing you there.

For more information about the mitigation area, please visit www.dpw.lacounty.gov/wrd/projects/BTWMA. If you have changes to your e-mail address or would like to be removed from the CAC distribution list, please contact BTWMA@dpw.lacounty.gov.

Geocortex Essentials for ArcGIS Server

Los Angeles County Department of Public Works



Big Tujunga Wash Mitigation Area

CAC Meeting Location

Hansen Yard
10179 Glenoaks Blvd
Sun Valley, CA 91352

Note: Entrance to Hansen Yard is off Branford St. Please refer to map for entrance to facility.

Notes

0.07 Miles 0 0.07 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere

BIG TUJUNGA WASH MITIGATION AREA
COMMUNITY ADVISORY COMMITTEE MEETING

AGENDA

Thursday, April 25, 2019
6:30 p.m. to 8:30 p.m.
Hansen Yard
10179 Glenoaks Boulevard
Sun Valley, CA 91352

Panel: Los Angeles County PublicWorks (Public Works)
Chambers Group, Inc. (Chambers Group)

I. Welcome/Introduction

II. Review of Meeting Agenda

III. Site Maintenance Issues
Discussion of Action Items from 2018 CAC Meeting

IV. Summary of 2018 Eradication Program

V. Current Status of Programs for 2019

1. Creek Fire Assessment and Site Recovery
2. Fuel Reduction Activities
3. Snag Removal Program (LA City tree crews)
4. Exotic Plant Eradication Program
5. Exotic Wildlife Removal Program
6. Brown-headed cowbird trapping for 2019
7. Water Quality Analysis
8. Trails Restoration/Maintenance
9. Public Outreach Program

VI. Schedule Next CAC Meeting

VII. Comments, Questions, and Answers

May 1, 2019

Melanie Morita, Civil Engineer
Chambers Group
5 Hutton Centre Ave. Suite 750
Santa Ana, Ca 92707

Big Tujunga Wash Mitigation Area Community Advisory Committee Meeting Minutes:

Melanie Morita,

This memo summarizes the Community Advisory Committee (CAC) Meeting held on Thursday, April 25, 2018, from 6:30 p.m. to 8:30 p.m. at the Hansen Yard located at 10179 Glenoaks Boulevard, Sun Valley, CA 91352.

Meeting Minutes for CAC meeting April 25, 2019

I. Welcome/Introduction

Attendees:

Marlene Rador
Marylouise Eclman (FTDNC Equestrian)
Heather Driscoll
John Laue (STNC)
Gerardo Barrientas (SHPOA)
Julia Tarnawski (SHPOA)
Tim Wood (Chambers Group)
Paul Morrissey (Chambers Group)
Melanie Morita (Public Works)

II. Review of Meeting Agenda

III. Site Maintenance Issues from 2018 - Discussion of Action Items from 2018 CAC Meeting:

1. The group discussed sending out an email blast when ATVs will be used for onsite maintenance so that residents know the difference between recreational riders and Chambers Group staff.
    a. We informed the group that ATVs are not proposed for exotic plant removal work.
2. The group discussed the need to replace two trashcans by the ponds near northwest Wheatland entrance, and to replace trashcans by the Cottonwood entrance.
    a. This was resolved, the trashcans have been replaced.
3. The group discussed the need to remove the fire-melted porta-potty at the Cottonwood entrance.
    a. This was resolved, the remnants of the burned porta-potty were removed.
4. Residents expressed interest in coordinating with Public Works and Chambers Group on volunteer opportunities as they arise.
    a. Public Works and Chambers Group will provide email updates for volunteer opportunities.
5. Residents will help identify large bulky debris items to be removed and will contact Chambers Group/Public Works for removal.

a. Ongoing as items are reported. Contact numbers for Tim Wood, Paul Morrissey, and Melanie Morita were shared with the group.

IV. Summary of 2018 Eradication Program

1. Exotic Plant removal: Approximately in May - December 2018.
    a. Approximately 57 different exotic grasses/herbs/shrubs species and 8 different exotic tree species were identified treated with California approved herbicide or other treatment removal methods
    b. In 2018, we used a more aggressive program for targeting and eliminating the large, non-native trees that create the dense overstory. Removal of these exotic tree species will create a more open canopy within the Mitigation Area, which will allow more sunlight to reach the native plant species growing beneath the canopy.
2. Exotic Wildlife Removal: March – July 31, primarily ponds and areas of Haines Creek where red swamp crayfish were located; August – December Haines Creek and ponds.
    a. Approx. 5,000 crawfish, 400 mosquito fish, 700+ green sunfish, 1,200+ bluegill, 1,800 bass, and 1 tilapia were removed from the ponds and Haines Creek.
    b. 3 natives – SAS, arroyo chub, and SA speckled dace – were observed throughout Haines Creek.
3. Water Quality
    a. 3 sites had surface water, Tujunga Ponds (2), Haines Creek (1); no water in Tujunga Wash
    b. No herbicides or pesticides were detected.
    c. DO and pH were low likely due to ash/silts from the fire entering the creek
4. Trails Monitoring Program
    a. Substantially more trail maintenance work was required in 2018 than in previous efforts due to the Creek Fire that burned through the Mitigation Area in December 2017.
    b. New trail system will be established in 2019 based on concurrence from CDFW.
5. Annual Trail Cleanup Day
    a. The Twelfth Annual Trail Cleanup Day was held on Saturday, November 3, 2018.
    b. Less participation than in previous years, may be due to fire or less public engagement due to High Speed Rail alignment not proposed for this area.
6. Public Outreach
    a. Summer months – pamphlets to educate visitors about illegal recreational activities: not staying on authorized trails, fishing, swimming, building dams, and wading. In rare cases, cooking, barbequing, and alcohol consumption were observed.

V. Current Status of Programs for 2019

1. Creek Fire Assessment and Site Recovery
    a. Post-fire Tree assessment (December 2018)
    b. Post-fire continuing invasive plant emergence

c. Native plant recovery – vegetation and seed bank not burned too badly; good recruitment due to ash on ground

2. Fuel Reduction Activities
    a. Vegetation trimming and removal of dead vegetation in an approximate 2.4-acre area to improve public safety and reduce the probability of loss of adjacent structures from potential fire.
    b. Good response from group, concerns for future fires was communicated.
3. Snag Removal Program (LA City tree crews)
    a. Completed this week.
    b. Removal of dead trees that were considered a public safety risk. Many trees remained due to benefit of snags in the BTWMA.
    c. Discussed the importance of woody debris as cover and shelter for many different animal species.
4. Exotic Plant Eradication Program
    a. New methods for exotic plant eradication (no herbicides)
    b. Targeted species and importance for eradication. Seeding times of non-native plants will determine which plants are targeted at any given time.
5. Exotic Wildlife Removal Program
    a. Methods for exotic wildlife eradication
    b. Targeted species and importance for eradication
    c. Red-eared turtle and bullfrogs were observed
6. Brown-headed cowbird trapping for 2019
    a. Methods for brown-head cowbird eradication
    b. Importance for eradication at 4 traps
    c. Least Bell's vireo (likely migrating through) heard at ponds on Wednesday near Tujunga ponds.
7. Water Quality Analysis
    a. Reasons for analysis
    b. Sampling locations
8. Trails Restoration/Maintenance
    a. Methods to reestablish trails and remove/repurpose burned/fallen debris
    b. Damaged trees near trails
    c. Efforts to prevent new, unauthorized trail creation by hikers and equestrians
9. Public Outreach Program
    a. Educational brochure in English/Spanish provided to public on summer weekends (recently updated)
    b. Focusing attention on the prevention (through Public Outreach) and removal of illegal rock dams

1.

VI. Comments, Questions, and Answers

1. Group voiced concern about the stockpiling of woody debris within the BTWMA along portions of the creek and trails. They mentioned that some of the stockpiles were over 6 feet high.
    a. No one from Chambers Group has observed these stacked piles of wood within the BTWMA. Could be from large flood events that pushed debris downstream of the BTWMA. Chambers Group delineates the trails with single branches. Chambers Group installs vertical mulching up to 3 feet to block unauthorized trails only.
    b. We encouraged the group to identify any locations of concern on the map or Google Earth, and we will investigate and correct if necessary.
2. Group voiced concern with the use of herbicides that may affect horses.
    a. Herbicides has recently been banned for Public Works projects; no herbicides will be used until further notice.
3. Group voiced concern about the removal of fish species, especially large-mouth bass (since some folks have been fishing there for decades) and red-swamp crayfish.
    a. We discussed the predatory nature of bass, and how a single bass could effectively wipe out a generation of hatchling fish. We discussed the three native fish species found in Haines Creek, and that there are only 3 locations in the world where Santa Ana sucker reside. Some folks in the group did not know there were protected fish species in the creek.
    b. We discussed the harm that red-swamp crayfish can do to a natural stream system, including the killing of small fish.
4. Group voiced concern about equestrian safety and trail establishment.
    a. We discussed the new trail establishment, the importance to stay on authorized trails, the removal of snags for safety concerns, and the delineation of the trails with woody debris.
    b. We discussed the option of installation of trails signs and information regarding the BTWMA at several locations including the Cottonwood, Wheatland, and Mary Bell entrances.
5. Group voiced concern regarding cowbird trapping.
    a. We discussed the biology and historical migrations of cowbirds, and their effect on songbirds today due to nest parasitism. We discussed the general locations of the traps, and the importance of reducing nest parasitism on sensitive songbirds during the breeding season, including the positive effect trapping has had on the least Bell's vireo population over the past decade.
6. Group voiced concern regarding homeless encampments
    a. We discussed the different law enforcement jurisdictions on and near the property, and the protocol for communication with Public Works and/or Chambers Group to identify and resolve the issue. Once the camp has been notified, there is an approximate 10-day period for the camp to dismantle and leave the premises.
    b. Contact numbers for Public Works and Chambers Group were shared with the group.
7. Group voiced concerns about "dangerous dogs" owned by a few of the homeless camps under the 210 fwy, that the dogs are often not on leash and could harm both equestrian riders and the horses.

a. We discussed the need to contact Public Works immediately to resolve the issue if they see the dogs again. We will follow up regarding all homeless encampments and notify law enforcement.

8. Group invited PW to join them at other community meetings such as the Shadow Hills Riders/community group to educate the members about the BTWMA, land ownership, and why the rules in place are important.
    a. Contact numbers were provided for future events.

If you have any questions regarding this memo, please feel free to reach out to me.

Sincerely,

CHAMBERS GROUP, INC.

Paul Morrissey
Director of Biology
pmorrissey@chambersgroupinc.com
(949) 261-5414 ext7288

BIG TUJUNGA WASH MITIGATION AREA
COMMUNITY ADVISORY COMMITTEE MEETING
April 25, 2019
Hansen Yard 6:30 to 8:30 P.M.

Name	Organization	Phone No	Email	Add to Mailing List
Maelene Rader		818-890-7593	GENERALMAR@AOL.COM	✓
MARYLOUISE ECKMAN	FTDNC EQUESTRIAN	818-795-5754	MARYLOUISE.ECKMAN@	✓
Paul Morrissey	Chambers Group	562 355 4143	pmorrissey@chambersgroupinc.com FTDNC.ORG	
Heather A. Driscoll		818 481 7470	heatherodriscoll@gmail.com	✓
John Hawe	STNC	818-414-4063	Lauejp@gmail.com	✓
TIM WOODS	Chambers Group	(626) 437-9935	twood@chambersgroupinc.com	✓
CEDARD [redacted]ENTAS	SHPOA	(818) 645-2554	gerardosart@earthlink.net	✓
TARNAWSKI, JULIA	SHPOA	818 281 1859	julie_t@earthlink.net	

APPENDIX M – PUBLIC OUTREACH MEMO REPORT

November 4, 2019

Julianna Colwell
County of Los Angeles, Department of Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

Subject: Public Outreach for June through September 2019 for the Big Tujunga Wash Mitigation Area, Los Angeles County, California

Dear Ms. Colwell,

In an ongoing effort to enhance and protect the existing habitat at the Big Tujunga Wash Mitigation Area (Mitigation Area) for native wildlife species, Chambers Group, Inc. (Chambers Group) has continued bilingual public outreach efforts to non-equestrian and equestrian user groups who regularly visit the Mitigation Area for recreational purposes.

Outreach Efforts

Onsite interviews and education about the Mitigation Area were conducted on five occasions in 2019 by Chambers Group bilingual biologists Erik Olmos, Alisa Muniz, and Mauricio Gomez. Outreach efforts took place on June 30, July 28, August 25, September 14, and September 28, 2019. All outreach efforts took place during the peak site use hours of 8:45 a.m. to 1:00 p.m. The June 30 outreach effort took place at the Foothill Trails District Neighborhood Council Equine Fair (Equine Fair) in conjunction with Los Angeles County Public Works (Public Works) between the hours of 9:45 a.m. to 2:45 p.m.

During public outreach visits at the Mitigation Area, Chambers Group biologists walked the authorized trails system and visited popular swimming/wading locations along Haines Canyon Creek (creek) and around the Tujunga Ponds (ponds), speaking with visitors they encountered. Visitors that were interviewed fell into one of two groups: non-equestrian user groups or equestrian user groups.

During the five outreach visits, all non-equestrian and equestrian visitors encountered were offered an educational brochure outlining Public Works' conservation goals for the Mitigation Area. The educational brochure contained the Mitigation Area's rules and regulations, as well as a list of the sensitive species found on the site. During each outreach event, Chambers Group biologists provided information on why specific activities are prohibited in the Mitigation Area and the extent of their negative impacts on the sensitive species. Most outreach events consisted of informal interviews and short question and answer sessions. Questions from the visitors were primarily about the purpose of the Mitigation Area's rules and regulations and the types of sensitive resources found in the Mitigation Area. Most equestrian users expressed appreciation towards the outreach efforts and agreed with the information presented in the educational brochure. In general, equestrian and non-equestrian users were responsive to the public outreach efforts.

Non-Equestrian User Groups

A total of nine non-equestrian site users were encountered during the five public outreach visits in 2019. All nine of the non-equestrian site users interviewed were local residents. Seven of the nine non-equestrian site users were encountered at the Equine Fair and two individuals were encountered along the trails around the creek and the ponds. All site users were offered an educational brochure about the site, informed about activities that are prohibited in the Mitigation Area, and were asked if they had any questions on any of the information presented. Some of the issues observed by the biologists during the outreach included the building of dams and swimming in the creek, and removal of vegetation adjacent to the creek.

Individuals that were encountered during the outreach visits were generally receptive to the information provided on the sensitive resources and rules within the Mitigation Area. Individuals that were unaware of and/or violating rules

were generally respectful and receptive to the information provided by the biologists. Interactions with individuals that were observed violating the rules of the Mitigation Area are described below.

During a public outreach effort conducted by biologists Erik Olmos and Mauricio Gomez on July 28, it was discovered that the same female individual that was encountered in 2018 and in recent interactions, had dammed the creek again. The portion of the creek where she had been frequenting was dammed with tree stumps. A cabana-like structure (structure) had also been built. A male individual who was with her was observed bathing in the creek and was informed that it was not allowed. The biologists gave them an educational brochure and explained that damming the creek and swimming within the Mitigation Area is prohibited. The same female individual was encountered at the same location on September 14, and it was discovered that she had removed native vegetation just south of the structure. When the biologists, once again, explained to the individual why removing vegetation was prohibited in the Mitigation Area, the individual explained that she had observed a snake and could not stand the idea of a snake hiding behind the structure. She expressed her fear of snakes, which led her to remove the native vegetation approximately ten feet southeast of the structure. The biologists reiterated how removal of native vegetation can adversely affect sensitive resources. During the interaction with the individual the biologists reminded her of the importance of not removing vegetation, feeding the fish (which was observed during interactions with the individual in 2018), and damming the creek.

On August 25, an individual was encountered at the outlet of the ponds just upstream of the existing exclusionary fence, gathering his belongings as the biologists approached him. The biologists approached the individual and gave him an educational brochure and explained that bathing and swimming within the Mitigation Area is prohibited. He explained that he frequently uses the creek, but was receptive to the biologists and gathered his belongings and departed from the creek after being informed about the sensitive resources within the Mitigation Area.

Primary usage of the Mitigation Area as described by the non-equestrian users interviewed included, hiking/walking, walking dogs, exercise, and general recreation. Concerns raised by non-equestrian users interviewed included: trash, vandalism, the presence of snags along trails, and the homeless population. The biologist asked the individuals to contact local law enforcement and Public Works if suspicious or illegal activities are observed in the Mitigation Area. Recommendations provided by non-equestrian users interviewed included, placing more trash cans and signage throughout the Mitigation Area, increasing oversight and security within the Mitigation Area, and removing homeless encampments.

In addition to the Public Outreach efforts above, additional encounters with non-equestrian users were noted. A white Tahoe Suburban (license plate number 8BDB426) was observed at the Cottonwood Avenue entrance on October 29. A woman was observed releasing a California ground squirrel she captured at her place of residence. Chambers Group biologist Paul Morrissey approached her immediately and explained that it was illegal to release wildlife at the Mitigation Area. She was receptive to the encounter, and stated she would adhere to the rules, and left the property immediately.

Effects on Sensitive Habitat by Non-Equestrian User Groups

The most substantial impacts on sensitive habitat by non-equestrian user groups are caused by swimming and building rock dams within the creek. Rock dams are constructed by individuals to make swimming areas deeper. There are a few unauthorized swimming areas that have become popular spots for non-equestrian users to congregate, picnic, and swim. The most popular location is the unauthorized swimming area situated approximately 280 feet northwest of the south Wheatland Avenue entrance. The dam at this location had been removed by Chambers Group biologists and was then re-constructed by members of the public with large tree stumps that required multiple people to remove. Photos of the dam composed of large tree stumps are included below (Photos 1 and 2).

Several additional rock dams, both large and small, were encountered in the creek and were removed during 2019 public outreach and exotic wildlife removal efforts. Rock dams are usually constructed with boulders and tree branches and were often found reinforced with tarps and other materials that reduce the natural flow of the creek and create a buildup of water. The changes to the natural flow of the creek can be detrimental to the sensitive species of fish within

the creek. Rock dams reduce the flow of the creek and create large pools of water that are favorable habitat for the exotic, invasive aquatic species such as the red swamp crayfish (*Procambarus clarkii*) and American bullfrog (*Lithobates catesbeianus*), that prey on native species such as the Federally listed threatened Santa Ana sucker (*Catostomus santaanae*). These pools reduce suitable breeding habitat for sensitive fish species as well. In an effort to reduce these effects, non-equestrian user groups were approached and educated during the outreach site visits. All rock dams encountered during site visits were documented and the larger rock dams were reported to Public Works for removal.

Equestrian User Groups

A total of 33 equestrian users were approached and interviewed during the 5 public outreach visits in 2019. Sixteen of the 33 equestrian users were encountered at the Equine Fair and 17 equestrian users were encountered along the authorized trails of the Mitigation Area along the creek and near the ponds. All 33 of the equestrian users interviewed were local residents. Equestrian users were offered an educational brochure and were informed about various aspects of the Mitigation Area. Outreach events with equestrian users were usually brief, as most of the equestrian site visitors were frequent users of the Mitigation Area and were receptive to the outreach efforts. Many equestrian users commended the outreach efforts and contributed information to the biologists. Most of the questions asked by equestrian users were about the trail maintenance and trail realignment efforts taking place at the Mitigation Area.

Secondary usage of the Mitigation Area as described by the equestrian users interviewed included hiking and walking. Concerns raised by the equestrian users interviewed included: trail maintenance (particularly vegetation overgrowth and relocating rocks on the trails), the presence of snags/logs along trails, trash, the lack of shaded areas and fewer creek crossings along the new, realigned trails, the realigned trails being too sandy and dusty, the low visibility of wire fencing blocking old trails, illegal dumping, the presence of poison oak (*Toxicodendron diversilobum*) along trails, off-highway vehicle use on the trails, and the homeless population. Equestrian users reported observations of individuals camping in the Mitigation Area and cooking along the creek. The biologists asked the equestrian users to contact local law enforcement and Public Works if suspicious or illegal activities are observed in the Mitigation Area. Recommendations provided by the equestrian users interviewed included, placing more trash cans throughout the Mitigation Area, more clean-up events, more community meetings regarding the Mitigation Area and the realignment of the trails, increasing oversight and security in the Mitigation Area, widening the trails, removing large rocks and snags from the trails to eliminate safety issues for horses, attaching flagging to the wire fences blocking the old trails for better visibility, and fining individuals that are observed misusing the Mitigation Area.

Additional interactions with equestrian users that occurred outside of Public Outreach efforts usually consisted of equestrian users thanking the work crews for maintaining and beautifying the site and trails, and their acknowledgment that they understood the importance of restoring native habitat. Some interactions consisted of specific requests from equestrian users such as, clearing vegetation from the trails (specifically poison oak and the burs from cocklebur (*Xanthium strumarium*) that get stuck in their horses' coats), widening the trails, and opening the old, abandoned trail sections back up. Chambers Group biologists responded to requests to reopen the abandoned trail sections by educating site users on creek ecology and the importance of restoring habitat in the abandoned trail areas.

One equestrian user was observed off-trail during the 2019 outreach efforts. The biologists did not have an opportunity to speak to the equestrian user as she was on the phone.

Effects on Sensitive Habitat by Equestrian User Groups

Equestrian site users can affect sensitive terrestrial habitat by traveling off from the established trail systems and can disturb sensitive aquatic habitat when traveling through the creek. Riders were reminded to cross the creek single-file to minimize erosion along the banks, and to stay on the authorized trails. The creation of new trails and traveling off from the authorized trails can be minimized with continued trail maintenance and equestrian site user education.

Please do not hesitate to contact me at (949) 261-5414 or at pmorrissey@chambersgroupinc.com, to discuss any questions or concerns.

Sincerely,

CHAMBERS GROUP, INC.

Paul Morrissey
Principal | Director of Biology

SITE PHOTOS

Photo 1: Illegal dam composed of tree stumps observed on July 28, 2019, during a public outreach effort. The dam was located along Haines Canyon Creek north of the south Wheatland Avenue entrance.

Photo 2: Closeup of the tree stumps observed during the July 28, 2019 public outreach effort. The dam was located along Haines Canyon Creek north of the south Wheatland Avenue entrance.

APPENDIX N – sUAS POST-FIRE VEGETATION MAPPING AND ANALYSIS REPORT

March 25, 2020

Julianna Colwell
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

Subject: 2019 sUAS Post Creek Fire Vegetation Mapping Report for the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Colwell,

This memorandum summarizes the post Creek Fire assessment for the Big Tujunga Wash Mitigation Area (Mitigation Area) conducted in 2019. Field surveys were conducted on August 22 and December 30 and 31, 2019 to record the current conditions of the Mitigation Area (photos and aerial imagery) 20 months after the Creek Fire in December 2017, map the recovery of vegetation following the Creek Fire, and to identify ways to enhance the Mitigation Area for the greatest mitigation potential.

2018 Post Fire Assessment Background Summary

This effort followed a survey conducted in 2018 that assessed the burn severity of the Mitigation Area within the first year post-fire. Fire severity was rated on a 0 (deeply burned) to 3 (unburned) scale and was mapped within the Mitigation Area with post-burn basemap imagery from February 2018 (Figure 1). Through the 2018 post-burn mapping effort, it was determined that almost all of the existing vegetation was damaged or destroyed by the fire. It appeared that the areas with the highest density of plants, mostly along Haines Canyon Creek, were deeply burned or showed signs of severe surface burns. Almost 75 percent of the site exhibited signs of severe surface burns, including most of the riparian area along Haines Canyon Creek, and more than half of the area surrounding the Big Tujunga Wash. In some of the riparian areas, the fire burned intensely enough to sterilize the soil (destroy the seed bank in the topsoil), while in other areas the fire was less intense with the seed bank surviving and the resprouting species showing recruitment/regrowth during 2018. Seedlings observed to be recruiting within burned areas covered much of the open areas; however, most of those seedlings were non-native and invasive species. Some of the most commonly observed emergent species were non-native grasses, castor bean (*Ricinus communis*), red-stemmed filaree (*Erodium cicutarium*), and shortpod mustard (*Hirschfeldia incana*). The fire had created an ideal environment for germinating weeds by creating an open canopy, alkaline soil, and nutrient-rich ash that soaks up rainfall and retains soil moisture.

The lightly scorched and unburned areas were mainly concentrated within and directly adjacent to Big Tujunga Wash, likely due to less dense vegetation present to spread the fire. The areas with a lower density of vegetation had a greater number of individual plants that survived the fire. During incidental surveys conducted in the early part of 2017, alluvial scrub areas associated with the Big Tujunga Wash had a low amount of non-native grass coverage, which could also be a factor contributing to burn severity.

2019 Post Fire Assessment Summary and Recovery Efforts

The site assessment utilizing a small Unmanned Aircraft Systems (sUAS) device was performed by Clark Austin in August 2019. The assessment encompassed the entire Mitigation Area and included the fire damaged areas within the Big Tujunga Wash, Haines Canyon Creek, the Tujunga Ponds, as well as areas that had been previously treated during non-native plant eradication efforts. Figure 2 depicts 2019 sUAS imagery with the fire severity data overlay, for comparison with the 2018 imagery presented in Figure 1.

Trail Realignment Effort

The trail realignment effort in 2019 focused on abandoning approximately 1,580 linear feet of previously authorized trails and eliminating points where the trail required visitors to cross Haines Canyon Creek. The abandoned trail section was offset by the creation of two new trails with a combined distance of approximately 1,770 linear feet; the final eastern trail realignment section is approximately 1,210 linear feet and final western trail section is approximately 560 linear feet. In addition, the new trail realignment has facilitated the closure and bypass of three stream crossings, which will reduce disturbance and potential negative impacts to the sensitive species in and around Haines Canyon Creek. The creation of new trails has also facilitated the closure of multiple sections of unauthorized trails that were lengthened by public use after the Creek Fire and prior to trail reestablishment, when much of the trail network was ambiguous (due to lack of vegetation and the trails being obscured by ash and debris). These sections of unauthorized trails total approximately 500 feet in length, and since their routes were not clearly defined, visitors would wander through the Mitigation Area randomly and without a dedicated path; the negative effects of unauthorized trail use on the surrounding habitat were substantial. The trail realignment crew incorporated previously disturbed trails into the new trail alignment wherever possible to minimize further disturbance and encourage the habitat recovery in these areas.

Snag Removal Effort

A post-fire tree assessment for the Mitigation Area was conducted in December 2018, as part of the Trail Maintenance and Monitoring task. The field survey was conducted on December 14, 2018, to assess and map burned native trees (burned during the Creek Fire), located along or in proximity to the existing authorized trail system and the anticipated alternative trail system. Snags that were identified included those that may pose potential public safety concerns due to the compromised integrity of the burned trees and the continuing deterioration of these trees over time. This effort served to supplement and aid in the Snag Removal Project that occurred in April 2019 as part of a larger 2017 Creek Fire cleanup project paid for by a National Dislocated Worker's Grant. Chambers Group collaborated with Public Works staff as well as the San Gabriel Valley Conservation Corps (SGVCC), the LA Conservation Corps (LACC), and the Northern California Construction Training (NCCT) to facilitate the safe removal of the designated pre-approved snag trees.

During the post-fire assessment, tree species observed to have suffered the most fire damage and that were recommended for crown reduction or complete removal included willows (*Salix* spp.), Fremont cottonwood (*Populus fremontii*), and white alder (*Alnus rhombifolia*); all softwood riparian species that are not well adapted to surviving a burn event. Data collected during the post-fire tree assessment combined with data from subsequent tree/snag surveys of the Mitigation Area set the basis for the Snag Removal Project. During the snag removal effort three main areas within the Mitigation Area were targeted, including the area around the Cottonwood Avenue entrance, the riparian area near the south Wheatland Avenue entrance, and the northwestern portion of the site near the north Wheatland Avenue entrance; snags of both native and non-native species were removed from these areas. Native tree species that had suffered the most damage and were removed included western sycamore (*Platanus racemosa*) from around the Cottonwood Avenue entrance area, willows, white alders, and Fremont cottonwoods from the south Wheatland Avenue entrance area, and western sycamores from the north Wheatland Avenue entrance area.

Non-Native Plant Removal Effort

In concert with the sUAS vegetation mapping effort, ongoing monitoring of past non-native plant removal efforts and continued removal of non-native and invasive vegetation occurred within the Mitigation Area. Periodic site visits were conducted to map the locations of non-native plant species removal efforts, to strategize methods of eradication, and to determine if and where additional removal efforts were necessary. The removal of non-native plants was conducted throughout 2019 to ensure that removal techniques would coincide with the non-native plant species' growth cycles. The major focus of this task throughout most of 2019 was to remove non-native plants such as shortpod mustard and other mustard species (*Brassica* spp., *Sisymbrium* spp.), castor bean, non-native thistles (*Cirsium* spp.), white sweetclover (*Melilotus albus*), poison hemlock (*Conium maculatum*) and non-native brome grasses (*Bromus* spp.) using the California Department of Fish and Wildlife (CDFW)-approved herbicides through April 23, 2019, and mechanical

removal methods only, thereafter. During November and December 2019, non-native plant removal efforts shifted to targeting non-native plants along Haines Canyon Creek and around the Tujunga Ponds. Dense, extensive stands of umbrella plant (*Cyperus involucratus*) and eupatory (*Ageratina adenophora*) were removed from these areas using mechanical removal methods. Removal of these species was labor intensive and required a sizable effort as these plants are rhizomatous and/or are able to resprout from portions of the root, stems, or crown, requiring that the entire plant and root be hand-dug from the substrate to minimize the potential for resprouting.

Substantially more non-native plant species were present in the Mitigation Area in 2019 than in 2017 and 2018 due to the considerable amount of rainfall during the 2018/2019 rainy season, and the advantageous spreading of weeds into open spaces made available by the destruction of native vegetation from the Creek Fire. Alternating warm and cool weather patterns and occasional small rain showers continued to encourage the germination and development of new non-native plants throughout the Mitigation Area during the spring and early summer of 2019. Relatively mild summer conditions continued to encourage germination, development, and spreading of non-native plants into open spaces throughout the summer months. However, these conditions also favored the accelerated regeneration of native tree species such as willow species, Fremont cottonwood, coast live oak (*Quercus agrifolia*), and western sycamore. By the end of summer 2019, many of the larger native trees had recovered from the dormancy period induced by the fire damage and had produced leaves and/or were filling out their canopies. Western sycamore tended to have the longest dormancy periods with many individuals showing no initial signs of regrowth until April 2019, while overall, Fremont cottonwood trees were primarily observed resprouting from the base and displayed limited canopy recovery. Trees that experienced a complete loss of canopy but were able to persist by basal growth production, had resprouted growth that by mid-2019 had become tall enough to provide some refuge (i.e., shade and the potential for reduced water loss) for wildlife and additional vegetation recruitment. Trees had developed lower limbs wide enough that they were beginning to create low canopies, and as a result, substantial amounts of non-native plant species were emerging and developing in locations where these opportunities for refuge and resources were now available. These conditions facilitated longer growth and developmental periods which gave rise to plentiful seed production, and ultimately, led to an increase in direct competition with native species that tend to reclaim open spaces more slowly. Qualitative observations in mid to late 2019 of regenerating and developing native understory species such as mulefat (*Baccharis salicifolia* subsp. *salicifolia*) and laurel sumac (*Malosma laurina*) indicated that native understory species had been present and had experienced a high level of competition from non-native species. Only non-native species removal methods that did not inhibit the regeneration of the native tree species and/or further hinder the growth of the native understory species were used in 2019 and will be considered and implemented during future non-native plant species removal efforts.

2019 Vegetation Mapping Results

Vegetation communities mapped within the Mitigation Area and the adjacent Los Angeles County Department of Parks and Recreation (LACDPR) parcel in August 2019 are described below according to *A Manual of California Vegetation, 2nd edition* (Sawyer et al. 2009; MCV2) and are included in the 2019 Post Fire Vegetation Communities Map (Figure 3). The types and descriptions presented here represent fire-recovering vegetation community types and were named based on the dominant species within each respective polygon. Although much of the vegetation burned during the Creek Fire, many areas are returning to their pre-fire vegetation community types either through crown or underground root burl sprouting from plant tissue that survived the fire, or through seeds in the soil that survived the fire. Recovery of vegetation communities is affected by a number of factors and has resulted in a mosaic of vegetation densities and communities through the Mitigation Area. Vegetation surrounding the Tujunga Ponds has appeared to recover quicker than other areas of the Mitigation Area; potentially due to soil moisture levels surrounding the ponds. Acreages of each of these vegetation communities and other non-vegetated areas were mapped in August 2019 and are included in Table 1.

A majority of the severely burned areas are associated with recovering riparian systems that display a high degree of species dominance fragmentation and plasticity and may result in a variety of successional and climax communities based on a number of variables including but not limited to, invasive species dominance and composition, future climatic variables, ground water levels, and/or new or existing pests or diseases. Therefore, utilizing pre-defined MCV2 riparian vegetation communities (e.g., Black Willow – Red Willow Riparian Woodland, Arroyo Willow Thickets, Sandbar Willow Thickets, Fremont Cottonwood Forest, and/or White Alder Groves) to classify the recovering riparian areas would not be prudent at this stage of the burn-recovery process. These highly fragmented forms of riparian woodland were combined into a new, more encompassing vegetation community called Broadleaf Riparian Woodland to act as an umbrella community to address the similar management needs of fire-recovering riparian systems dominated by deciduous tree species. This vegetation community was further broken down into scrub, woodland, and forest cover classes to further optimize the mitigation potential within the larger Mitigation Area. Trees that survived the Creek Fire in the Broadleaf Riparian Woodland communities may not have yet achieved pre-fire heights or cover, but remain important species in the overall tree/shrub canopy and contribute to the vegetative cover of their respective communities.

Table 1: Vegetation Communities and Other Areas within the Mitigation Area

Vegetation Community or Other Area	Size (Acres)
Mitigation Area	
Bare Ground	8.98
California Buckwheat Scrub	10.12
Disturbed	9.64
Freshwater Marsh	0.09
Grassland	2.35
Mixed Broadleaf Riparian Forest	1.16
Mixed Broadleaf Riparian Scrub	12.39
Mixed Broadleaf Riparian Woodland	37.87
Mulefat Thickets	3.33
Pavement	3.58
Scale Broom Scrub	119.10
Western Sycamore Woodland	3.59
Total	**212.20**
Los Angeles County Parks and Recreation Parcel	
Bare Ground	0.75
Disturbed	0.07
Freshwater Marsh	1.55
Mixed Broadleaf Riparian Scrub	2.04
Mixed Broadleaf Riparian Woodland	3.55
Open Water	1.95
Scale Broom Scrub	2.96

Vegetation Community or Other Area	Size (Acres)
Total	**12.87**
Grand Total	**225.07**

Bare Ground

There were 8.98 acres of Bare Ground areas mapped within the Mitigation Area, and 0.75 acre of Bare Ground areas mapped within the LACDPR parcel in 2019. Bare Ground areas are primarily composed of highly compacted soils and are devoid of vegetation. Areas classified as Bare Ground in the Mitigation Area include the trails, cleared pads and dirt access roads, and large expanses of unvegetated scoured areas south of the ponds.

California Buckwheat Scrub

California Buckwheat Scrub, as described by Sawyer et al. (2009), is dominated by California buckwheat (*Eriogonum fasciculatum*) and may be co-dominant in the shrub canopy in cismontane stands with other native shrubs typical of coastal sage scrub habitat types. These shrubs may form a continuous or intermittent shrub canopy less than 6 feet in height. The herbaceous layer is variable and may be grassy; emergent trees may also be present at low cover. This vegetation community typically occurs on upland slopes, and within intermittently flooded arroyos, channels, and washes between sea level and 3,950 feet above mean sea level (amsl) in coarse, well drained, and moderately acidic to slightly saline soils. The floristic composition of this vegetation community is consistent with the Diegan coastal sage scrub vegetation community described by Holland (1986).

This vegetation community can be found near the Cottonwood Avenue gate in the southeastern portion of the Mitigation Area. Species found within the Mitigation Area typical of this vegetation community included California buckwheat and deerweed (*Acmispon glaber*) with lesser amounts of California sagebrush (*Artemisia californica*), coyote brush, California bush sunflower (*Encelia californica*), laurel sumac, coastal prickly pear (*Opuntia littoralis*), white sage (*Salvia apiana*) and black sage (*Salvia mellifera*). There were 10.12 acres of California Buckwheat Scrub mapped within the Mitigation Area in 2019; this habitat type was not observed within the LACDPR parcel in 2019.

Disturbed

Disturbed areas are mostly devoid of vegetation due to recent disturbances. These areas tend to be dominated by pioneering herbaceous species that readily colonize disturbed ground and that are typically found in temporary, often frequently disturbed habitats (Barbour et al. 1999). Species are often non-native ruderal species. The soils of disturbed areas are typically characterized as heavily compacted. The vegetation in these areas is adapted to living in compact soils where water does not readily penetrate the soil.

Areas classified as disturbed within the Mitigation Area occur in the southern portion of the site at the south Wheatland Avenue entrance and in areas by the Cottonwood Avenue gate and south of Haines Canyon Creek. Plant species found in 2019 within the Mitigation Area typical of disturbed areas included: annual brome grasses (*Bromus* spp.), lamb's quarters (*Chenopodium album*), shortpod mustard, perennial pepperweed (*Lepidium latifolium*), cheeseweed (*Malva parviflora*), white sweetclover, horehound (*Marrubium vulgare*), tree tobacco (*Nicotiana glauca*), wild oats (*Avena* spp.), fountain grass (*Pennisetum setaceum*), radish (*Raphanus sativus*), castor bean, tumble mustard (*Sisymbrium altissimum*), and London rocket (*Sisymbrium irio*). Scattered native species were also present within the disturbed areas including deerweed, tarragon (*Artemisia dracunculus*), coyote brush, jimson weed (*Datura wrightii*), and horseweed (*Erigeron canadensis*). There were 9.64 acres of disturbed areas mapped within the Mitigation Area, and 0.07 acre of disturbed areas mapped within the LACDPR parcel in 2019.

Freshwater Marsh

Freshwater Marsh is described by Holland (1986) as being dominated by perennial, emergent monocot species between 13 and 16 feet in height that often form completely closed canopies. This vegetation community is often dominated by bulrushes (*Schoenoplectus* sp.) and cattails (*Typha* spp.). Freshwater Marsh typically lacks a significant current, but is permanently flooded with fresh water, where this prolonged saturation results in deep, peaty soils. This vegetation community can be found along the coast, in coastal valleys near river mouths and around the margins of lakes and springs.

Freshwater Marsh within the Mitigation Area was mapped along the perimeters of the Tujunga Ponds. Plant species found in 2019 within the Mitigation Area typical of this vegetation community included: native mugwort (*Artemisia douglasiana*), tall flatsedge (*Cyperus eragrostis*), water-cress (*Nasturtium officinale*), salt marsh fleabane (*Pluchea odorata* var. *odorata*), slender cattail (*Typha domingensis*), non-native eupatory, umbrella plant and smilo grass (*Stipa miliacea* var. *miliacea*). A major effort was made in 2019 to remove the umbrella plant and eupatory from the Freshwater Marsh areas around the ponds and along Haines Canyon Creek. There were 0.09 acre of Freshwater Marsh mapped within the Mitigation Area, and 1.55 acres of Freshwater Marsh mapped within the LACDPR parcel in 2019.

Grassland

Wild oats and annual brome grasslands, as described by Sawyer et al. (2009), may be dominated by wild oat (*Avena* spp.), false brome (*Brachypodium distachyon*), annual brome grasses and/or barley (*Hordeum murinum*) or these species are co-dominant with other non-native species in the herbaceous layer such as Australian saltbush (*Atriplex semibaccata*) and horehound. This non-native annual grassland type forms an open to continuous herbaceous layer less than 4 feet in height. Emergent trees and shrubs may be present at low cover. This vegetation community occurs in all topographic settings in foothills, waste places, rangelands, and openings in woodlands from 30 feet to 7,215 feet amsl (Sawyer et al. 2009). The floristic composition of this vegetation community is consistent with the valley and foothill grassland and non-native grassland communities described by Holland (1986).

This vegetation community can be found in the southwestern corner of the Mitigation Area west of the south Wheatland Avenue entrance to the site. Other patches of non-native grassland were mapped in the scoured alluvial fans and north of the Big Tujunga Wash area in the northwestern portion of the Mitigation Area. Species found within the Mitigation Area typical of this vegetation community include slender wild oat (*Avena barbata*), wild oat (*Avena fatua*), ripgut grass (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), foxtail chess (*Bromus madritensis* subsp. *madritensis*), Bermuda grass (*Cynodon dactylon*), rattail sixweeks grass (*Festuca myuros*), Italian ryegrass (*Festuca perennis*), barley, Mediterranean schismus (*Schismus barbatus*), and wheat (*Triticum aestivum*). The Mitigation Area included 2.35 acres of grassland areas as mapped in 2019; this habitat was not observed within the LACDRP parcel in 2019.

It should be noted, that smaller areas of grass-dominated habitat were present along existing trails, however these patches were generally discontinuous with other, larger grassland areas and are generally considered part of the habitat fringe for many of the habitats boarding the existing trail network. Larger areas of this habitat type are located outside of the Mitigation Area, primarily along Wentworth Ave. and the equestrian center located to the southeast of the main Mitigation Area. These areas of outside habitat will impact habitat along the border of the Mitigation Area by providing a source of invasive species seed and pollen.

Mixed Broadleaf Riparian Habitat

Three types of Mixed Broadleaf Riparian habitat were mapped in 2019 within the Mitigation Area. The plant species comprising each of these vegetation community types are similar but differ in the stage of succession, both since flooding and in the severity of burn during the Creek Fire. A later successional vegetation community will be dominated by older trees and form a more continuous canopy than a vegetation community that experiences frequent disturbance through flooding or that was severely affected by fire. There may be an intermittent to open shrub layer and variable

herbaceous layer, again, depending on the frequency and level of disturbance. Mixed Broadleaf Riparian habitats occur on floodplains, along low-gradient rivers, along perennial or seasonally intermittent streams, springs, in lower canyons in desert mountains, in alluvial fans, and in valleys with a dependable subsurface water supply that can vary considerably during the year, from sea level to approximately 7,870 feet amsl (Sawyer et al. 2009).

Mixed Broadleaf Riparian Scrub

Mixed Broadleaf Riparian Scrub as mapped within the Mitigation Area represents the earliest seral stage in which the amount of time since flooding is the least of the three riparian habitats on site. This vegetation community is recovering from the fire through resprouting and through seed germination, but the overall climax vegetation community is unknown at this time.

Sparsely vegetated sand bars and terraces within Haines Canyon Creek were mapped as Riparian Scrub habitats. These areas were dominated by low-growing shrubs and herbaceous species and lacked an established tree canopy. Species representative of a Mixed Broadleaf Riparian Scrub vegetation community within the Mitigation Area included mulefat and multi-trunked shrubby willows including arroyo willow (*Salix lasiolepis*) and narrow-leaved willow (*Salix exigua*). Herbaceous species such as stinging nettle (*Urtica dioica*), mugwort and various native and non-native dock species (*Rumex* spp.) and sedges (*Cyperus* spp.). This vegetation community was mapped in small scattered patches throughout the southern portion of the Mitigation Area mainly around Haines Canyon Creek and south of the Tujunga Ponds. There were 12.39 acres of Mixed Broadleaf Riparian Scrub mapped within the Mitigation Area, and 2.04 acres of Mixed Broadleaf Riparian Scrub mapped within the LACDPR parcel in 2019.

Mixed Broadleaf Riparian Woodland

Mixed Broadleaf Riparian Woodland as mapped within the Mitigation Area represents an intermediate seral stage with more vegetative cover than riparian scrub areas, but with less vegetative cover than a mature riparian forest vegetation community. Species representative of this vegetation community within the Mitigation Area included mulefat, arroyo willow, narrow-leaved willow, red willow (*Salix laevigata*), western sycamore, and occasional Fremont cottonwood. The understory was mainly comprised of native California rose (*Rosa californica*) and California blackberry (*Rubus ursinus*) as well as non-native Himalayan blackberry (*Rubus armeniacus*).

This vegetation community was found mainly along Haines Canyon Creek in the southern portion of the Mitigation Area. There were 37.87acres of Mixed Broadleaf Riparian Woodland mapped within the Mitigation Area, and 3.55 acres of Mixed Broadleaf Riparian Woodland mapped within the LACDPR parcel in 2019.

Mixed Broadleaf Riparian Forest

Mixed Broadleaf Riparian Forest as mapped within the Mitigation Area represents the latest seral stage in which the time since flooding is greatest. This vegetation community had greater than 60 percent vegetative cover in the tree canopy and was dominated by tall trees including western sycamore, Fremont cottonwood, velvet ash (*Fraxinus velutina*), and occasional white alder. Willow trees including black willow (*Salix gooddingii*) and red willow as well as scattered California box-elder (*Acer negundo*) were also present. The shrub canopy was minimal and a well-established herbaceous understory was lacking.

This vegetation community was mapped within the southwestern corner of the Mitigation Area by the south Wheatland Avenue entrance. The Mitigation Area includes 1.16 acres of Mixed Broadleaf Riparian Forest; this habitat was not mapped within the LACDPR parcel in 2019.

Mulefat Thickets

Mulefat Thickets, as described by Sawyer et al. (2009), are dominated by mulefat or mulefat is co-dominant in the shrub canopy with California sagebrush, coyote brush, laurel sumac, tree tobacco, willow, blue elderberry (*Sambucus nigra* subsp. *caerulea*) and tamarisk (*Tamarix* spp.) forming a continuous two-tiered canopy at less than 6 feet and between 6 and 16 feet in height. The herbaceous layer is sparse. Emergent trees may be present at low cover. This vegetation community typically occurs in canyon bottoms, floodplains, irrigation ditches, lake margins and stream channels from sea level to 4,100 feet amsl, in mixed alluvium soils. The floristic composition of this vegetation community is consistent with the Mulefat Scrub vegetation community described by Holland (1986).

This vegetation community was mapped as several thin bands along Big Tujunga Wash in the northwestern portion of the Mitigation Area. Species found within the Mitigation Area typical of this vegetation community include mulefat, scale broom (*Lepidospartum squamatum*), California buckwheat, occasional Fremont cottonwood trees and scattered herbaceous annual species such as telegraph weed (*Heterotheca grandiflora*), hairy golden-aster (*Heterotheca sessiliflora*), California chicory (*Rafinesquia californica*), bicolored cudweed (*Pseudognaphalium biolettii*) and felty everlasting (*Pseudognaphalium canescens*). Occasionally, Mediterranean tamarisk (*Tamarix ramosissima*) was identified throughout the year within this vegetation community; however, efforts were made to remove any resprouts as they emerged. The Mitigation Area included 3.33 acres of Mulefat Thickets in 2019; this habitat was not observed within the LACDPR parcel in 2019.

Open Water

Open Water often contains a number of phytoplankton species and filamentous blue-green and green algae. In shallow water vascular species including horned pondweed (*Zannichellia palustris*), duckweed fern (*Azolla filiculoides*), and duckweed (*Lemna* spp.) may be found floating on the water surface (Gray and Bramlet 1992). Although other aquatic plants have been observed in the Tujunga Ponds in prior years, major non-native aquatic vegetation eradication efforts were not necessary in 2019. Approximately 1.95 acres of Open Water were mapped within the LACDPR parcel in 2019.

Pavement

Pavement, as the name implies, consists of developed areas with asphalt or concrete pads that are devoid of vegetation. These areas have been altered by humans and once contained man-made structures. Developed areas (asphalt and concrete) were mapped within the Mitigation Area south of Haines Canyon Creek at the Cottonwood Avenue entrance to the site. The Mitigation Area included 3.58 acres of Pavement in 2019; this habitat was not mapped within the LACDPR parcel in 2019.

Scale Broom Scrub

Scale Broom Scrub as described by Sawyer et al. (2009), is dominated by scale broom or scale broom may be co-dominant in the canopy with other native shrubs. The vegetation community is often characterized by a two-tiered, open to continuous shrub canopy less than 6 feet in height, and a variable (sometimes grassy) herbaceous layer. Emergent trees or tall shrubs may be present at low cover, including southern California black walnut (*Juglans californica*), western sycamore, Fremont cottonwood or blue elderberry. This vegetation community occurs in intermittently or rarely flooded, low-gradient alluvial deposits along streams, washes, and alluvial fans between 160 and 4,950 feet amsl. The floristic composition of this vegetation community is consistent with the Riversidian alluvial fan sage scrub vegetation community described by Holland (1986).

Scale Broom Scrub is the largest vegetation community mapped within the Mitigation Area as part of the alluvial floodplain of the Big Tujunga Wash. Frequent scouring and sheet flows keep this early successional vegetation community only sparsely vegetated. Species found within the Mitigation Area typical of this vegetation community include scale broom, California sagebrush, California buckwheat, sand-wash butterweed (*Senecio flaccidus* var. *douglasii*), mulefat, coastal prickly pear, thick-leaved yerba santa (*Eriodictyon crassifolium*), our Lord's candle

(*Hesperoyucca whipplei*), deerweed, laurel sumac, and lemonadeberry (*Rhus integrifolia*). There were 119.10 acres of Scale Broom Scrub mapped within the Mitigation Area, and 2.96 acres of Scale Broom Scrub mapped within the LACDPR parcel in 2019.

Western Sycamore Woodland

Western sycamore Woodland, as described by Sawyer et al. (2009), is a vegetation community in which the western (or California) sycamore is the sole or co-dominant species in the canopy with white alder (not present on site), southern California black walnut, Fremont cottonwood, willow species, oak (*Quercus* spp.), and other trees also present. Trees are usually less than 115 feet in height with an open canopy. Shrubs can be common or infrequent and the ground layer can be grassy (Sawyer et al. 2009). This vegetation community is often characterized by permanently saturated soils and riparian corridors leading into braided, depositional channels of intermittent streams. Terraces can be adjacent to the floodplains and are subject to high-intensity flooding. Soils are alluvial in nature, often cobbly and rocky. Holland (1986) describes this type of vegetation community as a riparian forest or sycamore alluvial woodland. Elevation for the Western Sycamore Woodland ranges from sea level to 7,900 feet amsl.

Western Sycamore Woodland was mapped in the southeastern portion of the Mitigation Area in a terrace on either side of the Mary Bell Avenue entrance to the site. Scattered western sycamore trees interspersed with blue elderberry and coast live oak trees were present in this vegetation community on site. The understory was comprised of a non-native grassy layer and infrequent native shrubs. There were 3.59 acres of Western Sycamore Woodland mapped within the Mitigation Area in 2019; this habitat was not observed within the LACDPR parcel in 2019.

2019 Vegetation Mapping Analysis

Annual vegetation mapping and analysis provides valuable data that not only aid in the management of the Mitigation Area, but help identify ways to enhance the Mitigation Area for the greatest mitigation potential. As such, it is critical that a regular assessment of the post-fire recovery of the Mitigation Area be conducted and implementation methods are adapted as needed to achieve overall Mitigation Area goals. The 2018 Conceptual Mitigation Plan outlined three key components for post-fire restoration: controlling early successional invasive plants, hydroseeding open areas with native species to slow the establishment of non-native species, and planting riparian and upland vegetation in two phases. Thus far, a majority of the post-fire restoration efforts have been devoted to controlling early successional invasive plants. While these efforts have been critical in helping native vegetation to reestablish and early signs of recovery have been observed, much untapped recovery potential still exists in the hydroseeding and replanting of key areas with native species.

Based on the burn severity of the Mitigation Area, some habitat areas may not recover on their own or will recover so slowly that they should be supplemented with native seed and/or container plants to reestablish native vegetation more quickly. A phased approach to seeding, installation of cuttings, and planting was recommended in the 2018 Conceptual Mitigation Plan to enhance the habitat as rapidly as possible and minimize overall recovery time. This approach was reevaluated in 2019 based on the 2019 vegetation mapping analysis to identify areas and native species within the Mitigation Area that exhibited minimal signs of recovery. Recommendations for enhancement were provided and have also been updated based on the 2019 vegetation mapping analysis (Table 2)

Table 2: 2018 Conceptual Mitigation Plan and 2019 Recommendations

2018 Assumptions/Recommendations		2019 Updates	
Habitat	**Recommendation**	**Update**	**Reasoning**
2018: Mulefat Thickets **2019:** Mulefat Thickets	Mulefat cuttings are recommended for planting on approximately 13 acres in riparian areas along Haines Canyon Creek at a density of 200 cuttings per acre.	Increase mulefat planting density to **250** cuttings per acre along Haines Canyon Creek. Continue aggressive non-native species abatement along riparian areas. Introduce cuttings/plantings of the following species in the basin east of the north Wheatland Avenue entrance. • western sycamore • holly-leaf cherry (*Prunus ilicifolia*) • blue elderberry	Mulefat struggled to recover in 2019, being outcompeted by non-native species such as umbrella plant and eupatory. Mulefat is a critical component of the riparian habitats essential to the recovery of least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*). Increase competition on non-native species by increasing shade provided by native plants and providing habitat connectivity and foraging areas for riparian wildlife species.
2018: Black Willow- Fremont Cottonwood Woodland **2019:** Broadleaf Riparian Woodland	Black Willow-Fremont Cottonwood Woodland species are recommended for planting from cuttings and container stock at a density of 200 plants per acre on 60 acres within the two areas on the site: a large area south of Tujunga Ponds and a small area south of Haines Canyon Creek.	Increase plantings of Black Willow-Fremont Cottonwood Woodland species from containers and cuttings to **300** per acre. Focus on planting tall tree species along new trail alignment to provide shade and encourage use from equestrians and pedestrian hikers. Update species palette to include the following species that are showing limited or no recovery: • California walnut • white alder	Limited canopy recovery from surviving tree species decreases year-round trail use by people due to lack of shade. Planting more tree species will increase eventual canopy cover and Mitigation Area utilization. Additional vegetative cover may also inadvertently increase homeless or vagrant disturbance to habitat or waterways. California walnut and white alder were observed to either not be recovering, or recovering very slowly (i.e., only basal growth and no canopy growth) in 2019.
2018: California sagebrush-California buckwheat scrub **2019:** California Buckwheat Scrub	California Sagebrush-California Buckwheat Scrub species are recommended for planting at a density of 100 plants per acre from container stock on 5.9 acres in an upland area near	Continue non-native species removal with an expanded focus to include non-native grass species. Supplement 2018 recommendations to include additional broadcasting of seed or hydroseeding for the following species to increase native plant density:	To keep the non-native grasses under control and minimize the amount of dry, flashy fuels in the summer months, additional California Sagebrush-California Buckwheat Scrub species should be added to encourage further native plant densities in the upland areas. Maintaining a diversity and high-quality upland scrub habitat may encourage return of the federally

2018 Assumptions/Recommendations		2019 Updates	
Habitat	**Recommendation**	**Update**	**Reasoning**
	the south border with Wentworth Street.	• deerweed • thick-leaved yerba santa • California buckwheat • our Lord's candle Install or reuse the existing irrigation system infrastructure to supply water to all container plants.	threatened coastal California gnatcatcher (*Polioptila californica californica*) as well. By installing a new irrigation system or reusing the existing abandoned temporary irrigation system points of connection, container plants can be used resulting in greater native plant coverage in a shorter amount of time and a potentially lower plant mortality rate.
2018: Scale Broom Scrub **2019:** Scale Broom Scrub	Scale Broom Scrub species are recommended for planting from container stock on 14 acres west of Tujunga Ponds in a slightly upslope area at a density of 100 plants per acre.	Increase plantings to **150** plants per acre. Update species palette to include: • coast prickly pear • blue elderberry at riparian interface • California walnut at riparian interface	Coast prickly pear and our Lord's candle are recommended for planting at the entrances to unauthorized trail closures to help increase recovery in these areas and discourage trail use. These areas have traditionally been hard to close off due to a lack of snag materials in the habitat. Blue elderberry and California walnut are recommended to be planted along trails in transitional habitat areas (between riparian and Scale Broom Scrub habitats) to provide shade along the trail alignment. Both of these tree species have shown slow recovery in 2019.
2018: Grassland **2019:** Wild Oat and Brome Grass Grassland	Hydroseed open areas between plantings with native grasses: California brome (*Bromus carinatus*), meadow barley (*Hordeum brachyantherum*), and blue wildrye (*Elymus triticoides*) at a rate of 60 pounds per acre.	Increase hydroseed areas to include portions of the Cottonwood/Mary Bell Avenue bluffs, the entire upper ribbon along Wentworth Avenue/the equestrian center and southeastern site boundary, and the eastern bluff. Hydroseeding should occur in November or December to take advantage of winter rains.	Seeding grassland areas (or anywhere grasses currently grow) with native perennial grass species will help to crowd out non-native annual grass species. Native perennial grass species are also resilient and will persist after the mechanical removal (e.g., mowing) of non-native annual grasses.

Substantial recovery of existing native vegetation as well as establishment of non-native species was noted in 2019. Areas along Haines Canyon Creek and the eastern portions of the Mitigation Area appear to have the highest amount of recovering native vegetation. The eastern portion of the Mitigation Area was determined to have experienced an average burn severity of 1 (severe surface burn), indicating the seed bank was able to largely survive the fire front and provide a basis for the revegetation of native species. Non-native removal efforts targeted large amounts of castor bean, umbrella plant, and eupatory within this portion of the Mitigation Area, and continued mechanical treatments will be necessary to keep these species controlled during this early stage of recovery. Additional non-native species that were removed in large amounts in the 2019 effort included, poison hemlock, sweetclover (*Melilotus* spp.), mustard species, and tree of heaven (*Ailanthus altissima*).

Upland areas located between the Big Tujunga Wash and Haines Canyon Creek experienced a range of burn severity (1 to 3; severe surface burn to unburned). Recruitment of these upland areas appears to be limited, possibly due to the high water permeability of local soils, but also the generally low density of native plant species in this area. Continued monitoring of the area should occur to ensure no invasive plant populations take hold. It is expected that these upland areas may be colonized by non-native grass species such as Mediterranean schismus which can easily become naturalized into the matrix of the Scale Broom Scrub vegetation community and degrade the overall quality of the habitat if not controlled. Furthermore, allowing invasive grass species to naturalize within the Scale Broom Scrub could provide a future conduit for fire to spread by filling in the normally bare-ground, interstitial shrub spaces with vegetation.

Discussion and Conclusions

The high-resolution imagery provided by the 2019 sUAS survey indicates that a substantial amount of recovery has occurred within the Mitigation Area following the Creek Fire. This recovery may be partially attributed to the higher-than-average 2018/2019 rainfall year; refer to Figures 1 and 2 for a comparison of the 2018 and 2019 sUAS imagery of the site.

Based on the results of the post-fire assessment, status of the non-native plant species removal efforts, trail realignment efforts, and the 2019 sUAS survey, additional recommendations are provided below to maximize the mitigation potential of the Mitigation Area.

- The sUAS technology is able to detect new unauthorized footpaths before they become heavily used trails and should be utilized on a periodic basis to assess vegetation recovery and assess the trail system. The imagery from these updates can also be used to enhance dynamic community engagement efforts and for Mitigation Area progress update purposes.
- Additional refinements to the existing trail network may be derived from future sUAS basemap updates. While additional trail closures or extensions are not expected, continued public use of the Mitigation Area during the post-fire recovery effort may result in new unauthorized trails being created and other preferred trails abandoned. Additional trail realignment efforts may limit fragmentation of core habitat and maximize mitigation potential.
- Native species, such as mulefat, along Haines Canyon Creek are showing minimal signs of recovery due to competition from recruiting invasive species and decreased water availability. Mulefat is an early successional species which is typically able to recolonize disturbed sites quickly. The slow recovery of this species at the Mitigation Area is concerning and must be addressed soon. The burn severity in this area was high, but with continued removal of non-native species and supplemental planting of locally-sourced native seed or cuttings into a first and second mid-story canopy will reduce the potential for further recruitment of non-native species within the Mitigation Area and will increase the overall habitat quality.
- Non-native species removal activities should be focused on areas of Riparian Scrub and Riparian Woodland communities where the sparse native canopy cover results in higher sunlight penetration to the ground level and increases the potential for recruitment/establishment of non-native species. By encouraging early successional

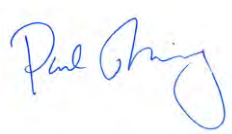
native communities to develop into Riparian Forest habitat through increased plantings, the overall Mitigation Area is much more likely to provide suitable nesting habitat for protected wildlife species such as least Bell's vireo or the southwestern willow flycatcher much sooner than if left to recover on its own. In addition, well-developed Riparian Forest habitat will help moderate the water temperature of Haines Canyon Creek to provide a higher-quality and more resilient stream chemistry for sensitive fish species including the federally threatened Santa Ana sucker (*Catostomus santaanae*), the arroyo chub (*Gila orcutti*), and the Santa Ana speckled dace (*Rhinichthys osculus* ssp. 3), which are all California Species of Special Concern.

- Continued focus on non-native species control within the eastern portion of the Mitigation Area will benefit areas downstream by limiting non-native seed production and dispersal to the west which will minimize the need for future removal efforts.
- The White Alder Forest that was present before the Creek Fire has not shown signs of recovery. It is suggested that a similar broadleaf riparian tree species, such as Fremont cottonwood, be planted in this area to enhance habitat connectivity and increase the potential for hosting listed wildlife species. Leaving a gap in the upper canopy layer by not replanting white alder or another broadleaf riparian tree species leads to homogeneity and low diversity of the habitat which is not suitable nesting habitat for listed wildlife species such as least Bell's vireo and southwestern willow flycatcher.
- Focus on converting isolated patches of non-native grassland associated with upland areas within the Big Tujunga Wash and along existing trails in the western portion of the Mitigation Area to native grasslands. These areas could be inoculated with native perennial grass species that survive periodic mowing to create niche native habitat areas that can be utilized by a diverse range of wildlife species and would contribute to an overall increase in native species richness in the general area.
- Continued monitoring to prevent the establishment of non-native grass species that may naturalize within the Scale Broom Scrub is recommended. If any non-native grasses naturalize within the inter-shrub matrix of this vegetation community it could degrade the overall habitat quality quickly and provide a conduit for fire to spread in the future.
- Supplementing the upland scrub areas with native plantings including cactus will reduce competition from non-native grasses, mustard, and encourage the return of sensitive avian coastal sage scrub species such as the California gnatcatcher and cactus-specialized avian species such as the coastal cactus wren (*Campylorhynchus brunneicapillus*).
- Introducing cuttings of western sycamore and Fremont cottonwood would help in providing competition to non-native species and provide shade to increase public utilization of the space within the small basin to the east of the north Wheatland Avenue entrance. These areas are currently filled with an extensive mulefat population intermixed with a large amount of non-native species. During snag removal efforts, blue elderberry and holly-leaf cherry that were dead or had been fire damaged to the point where regrowth was not expected were removed from the area; reintroduction of these species would increase local species richness and potentially provide foraging habitat and habitat connectivity for least Bell's vireo, and other listed sensitive species.

Please feel free to contact me at (949) 261-5414 extension 7288, or at pmorrissey@chambersgroupinc.com, if you have any questions regarding this memo or are in need of further information.

Sincerely,

CHAMBERS GROUP, INC.



Paul Morrissey

Principal | Director of Biology

Attachment 1 – Figures

Attachment 2 – Site Photographs

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ATTACHMENT 1– FIGURES

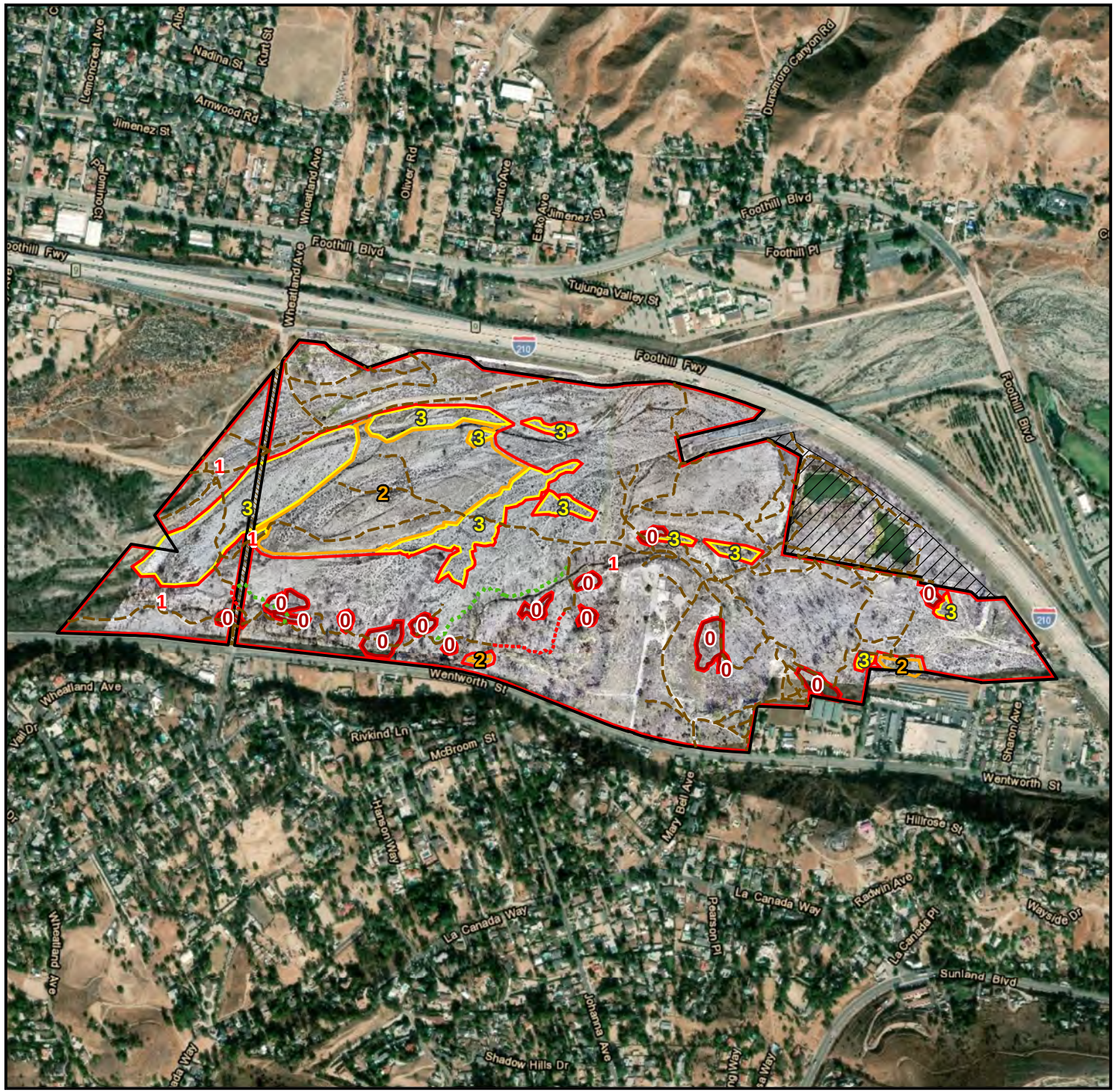


Figure 1

sUAS Aerial Imagery
with Burn Severity
2018

- Mitigation Area
- L.A. County Park Parcel
- Wheatland Ave Easement
- Trail Closed
- Existing Trail
- New Trail Realignment Sections

Fire Severity

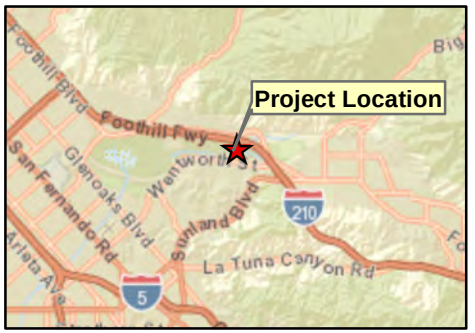
- 0 - Deeply Burned
- 1 - Severe Surface Burn
- 2 - Lightly Scorched
- 3 - Unburned

N

0 300 600 1,200

Feet

2018 Drone Imagery
The surrounding basemap imagery outside the Mitigation Area is stock imagery and depicts the pre-fire conditions in the area



Name: 21021 Fig 1 2018 sUAS Aerial Imagery with Burn Severity 8.5x11.Mxd Print Date: 3/31/2020, Author: pcarlos

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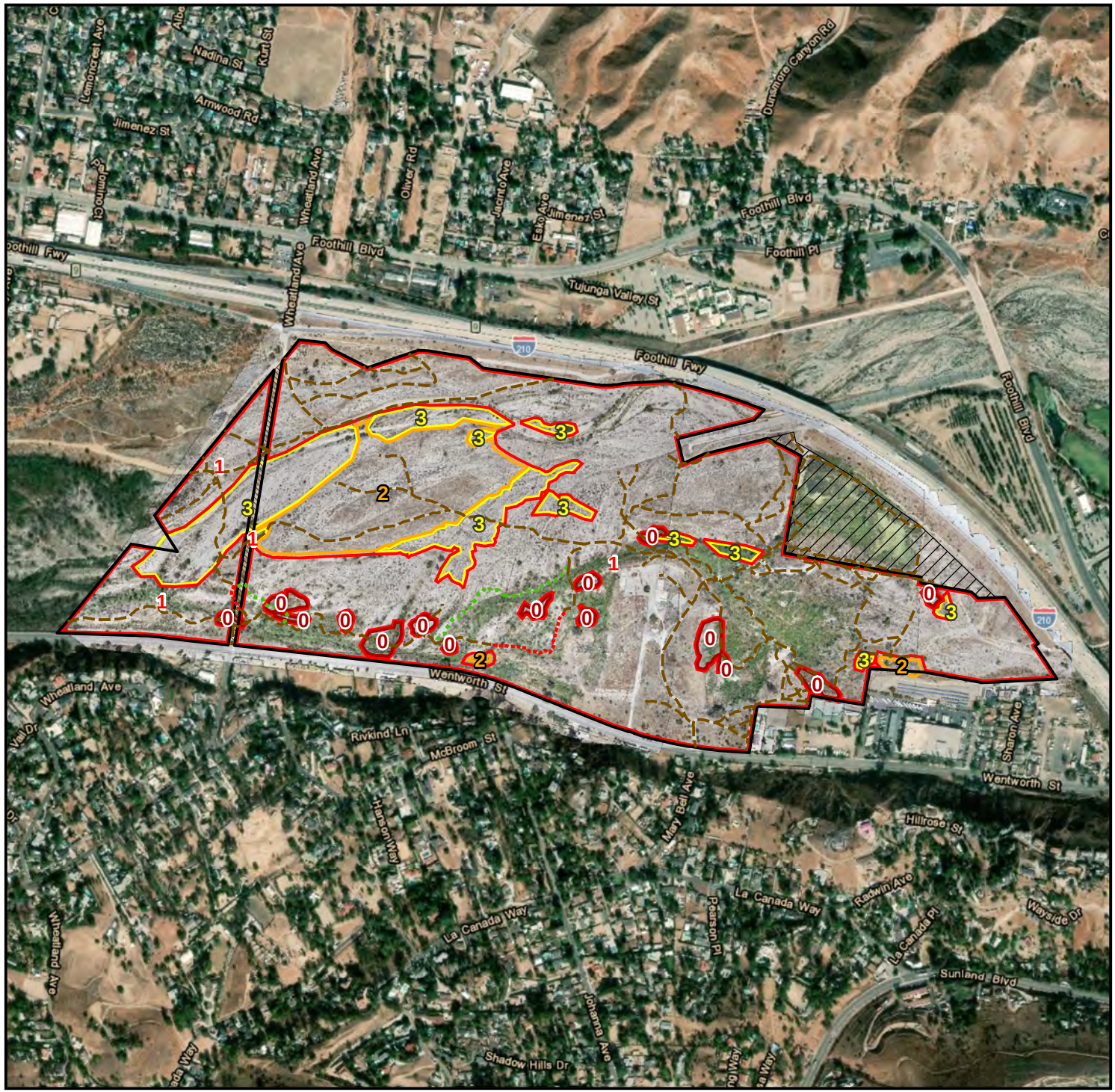


Figure 2

sUAS Aerial Imagery
with Burn Severity
2019

- Mitigation Area
- L.A. County Park Parcel
- Wheatland Ave Easement
- Trail Closed
- Existing Trail
- New Trail Realignment Sections

Fire Severity

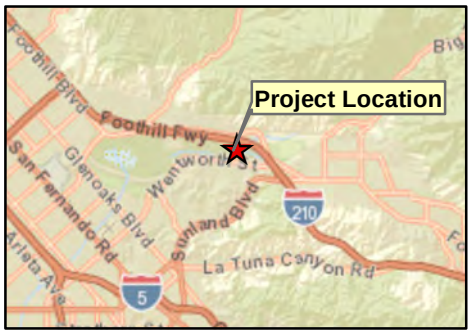
- 0 - Deeply Burned
- 1 - Severe Surface Burn
- 2 - Lightly Scorched
- 3 - Unburned

N

0 300 600 1,200

Feet

2019 Drone Imagery
The surrounding basemap imagery outside the Mitigation Area is stock imagery and depicts the pre-fire conditions in the area



Name: 21021 Fig 2 2019 sUAS Aerial Imagery with Burn Severity 8x11.Mxd Print Date: 3/31/2020, Author: pcarlos

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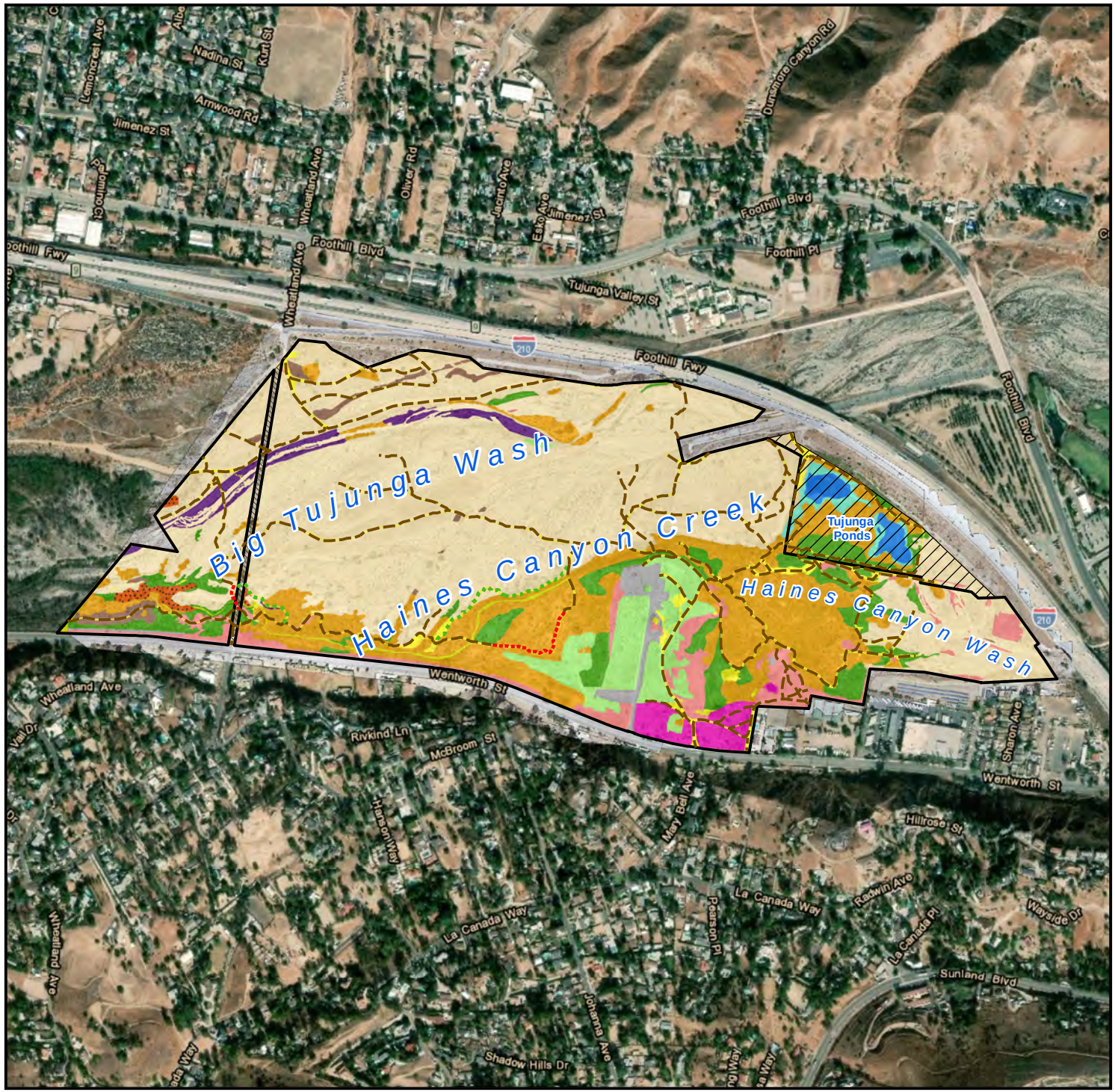


Figure 3
Vegetation Communities 2019

- Mitigation Area
- L.A. County Park Parcel
- Wheatland Ave Easement
- Trail Closed
- Existing Trail
- New Trail Realignment Sections

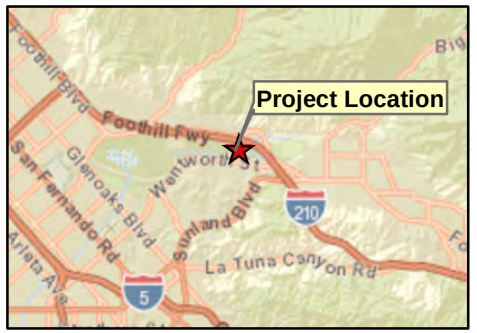
Vegetation Communities

- Bareground
- California Buckwheat Scrub
- Disturbed
- Freshwater Marsh
- Mixed Broadleaf Riparian Forest
- Mixed Broadleaf Riparian Scrub
- Mixed Broadleaf Riparian Woodland
- Mulefat Thickts
- Open Water
- Pavement
- Scale Broom Scrub
- Western Sycamore Woodland
- Wild Oat and Annual Brome

N

0 300 600 1,200 Feet

2019 Drone Imagery
The surrounding basemap imagery outside the Mitigation Area is stock imagery and depicts the pre-fire conditions in the area



Name: 21021 Fig 3 2019 Vegetation Communities 8.5x11.Mxd
Print Date: 3/31/2020, Author: pcarlos

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ATTACHMENT 2– SITE PHOTOGRAPHS

ATTACHMENT 2 – SITE PHOTOGRAPHS

Photo 1.

Overview of eastern portion of the Mitigation Area including the Los Angeles County Parks and Recreation parcel. Habitats visible include Open Water, Freshwater Marsh, Mixed Broadleaf Riparian Woodland, Bare Ground, and Disturbed habitat. View northeast.

Photo 2.

Closeup view of Open Water, Broadleaf Riparian Woodland, and Freshwater Marsh habitat. View east.

Photo 3.

View of the transition from Scalebroom Scrub to Mixed Broadleaf Riparian Woodland. View southwest.

Photo 4.

Overview of Big Tujunga Wash with Mulefat Thickets visible within the wash, and open areas of Scalebroom Scrub. View northeast.

Photo 5.

Closeup view of Wild Oat and Annual Brome Grassland and Scalebroom Scrub. View northwest.

Photo 6.

Closeup of Western Sycamore Woodland and the transition between California Buckwheat Scrub and Disturbed habitats. View north.

Photo 7.

Overview of the Big Tujunga Wash and associated Scalebroom Scrub and Wild Oat and Annual Brome Grassland. View northeast.

Photo 8.

Closeup of California Buckwheat Scrub. View northeast.

Photo 9.

Closeup of Mulefat Thickets along Haines Canyon Creek with rock dams that have since been removed. View northeast.

Photo 10.

Overview of Mixed Broadleaf Riparian Forest habitat with Disturbed habitat and Bare Ground in the foreground. View northeast.

Photo 11.

Closeup view of Mixed Broadleaf Riparian Scrub habitat. View southwest.

APPENDIX O – SNAG REMOVAL MONITORING REPORT

May 10, 2019
(21021.04)

Melanie Morita
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

SUBJECT: MEMORANDUM FOR THE APRIL 2019 DEAD TREE SNAG REMOVAL MONITORING THROUGHOUT THE BIG TUJUNGA WASH MITIGATION AREA, LOS ANGELES COUNTY, CALIFORNIA.

Dear Ms. Morita,

The purpose of this memo is to summarize dead tree snag removal activities monitored by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA) on April 17 through 19, and April 22, 2019, and to inform you of sensitive biological resources observed and compliance and adherence to mitigation and avoidance measures set forth in the Master Mitigation Plan (MMP) and the California Department of Fish and Wildlife (CDFW) Agreement Regarding Proposed Stream or Lake Alteration No. 1600-2008-0253-R5 for the Big Tujunga Wash and Haines Canyon Creek, which are named tributaries to Hansen Dam Flood Control Basin in Los Angeles County, California. Qualified Chambers Group biologists monitoring dead tree snag removal activities within the BTWMA worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the dead tree snag removal effort including dates, names of participants, locations of activities performed, sensitive resources encountered, and mitigation actions taken, are found below.

PRE-ACTIVITY NESTING BIRD SURVEY

On April 16, 2019 a pre-activity nesting bird survey was conducted by Biologist Alisa Muniz at four locations where snag removal was planned to occur. These locations included, the Cottonwood Avenue bluffs and trails to the north, the Mary Bell Avenue entry trail and bluffs, the south Wheatland Avenue entry and surrounding trailheads, and the north Wheatland Avenue entry and the surrounding riparian area along the 210 Freeway embankment. At all four locations, numerous species of birds were present and observed singing, foraging, preening, interacting, and showing territorial behavior; however, only a single nest was located. Ms. Muniz located an active Bewick's wren (*Thryomanes bewickii*) nest along the trail located at the north end of the Cottonwood Avenue bluffs leading down towards Haines Canyon Creek. The location was flagged and considerations were made to exclude the trees within the buffer zone. It was determined that the exclusion of trees T13A-willow (*Salix* sp.), T13B-black walnut (*Juglans californica*), and T36-boxelder (*Acer negundo*) were necessary to adhere to the required buffer area of 250 feet. It was concluded that work plans could continue in these areas with biological monitoring; the biologist would monitor the nest and stop work if the birds showed any signs of stress due to work activities.

ACTIVITIES MONITORED

On April 17, snag removal efforts were performed by Los Angeles Conservation Corp (LACC) and Northern California Construction Training (NCCT), biological monitoring was performed by Alisa Muniz, and restoration

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monitoring was performed by Restoration Foreman Tim Wood. All project efforts focused on snags marked for removal beginning at the Cottonwood Avenue entrance and continuing within the bluffs along the road. Snags T1 through T12 were removed in these efforts and included two black elderberry (*Sambucus nigra*), four western sycamore (*Platanus racemosa*), six deodar cedar (*Cedrus deodara*), one Fremont cottonwood (*Populus fremontii*), and one stone-fruit variety (*Prunus* var.). Felled snags and limbs were pulled away from regenerative basal growth and/or native plant species, large woody debris was reduced in height and volume, felled material was removed from the road, and all debris was spread throughout the area for decomposition on site.

On April 18, snag removal efforts were performed by Los Angeles Conservation Corps (LACC), and Northern California Construction Training (NCCT), biological monitoring was performed by Biologist Mauricio Gomez, and restoration monitoring was performed by Tim Wood. All project efforts focused on snags marked for removal in the vicinity of the south Wheatland Avenue entrance, and along the trailheads that begin at that entry point. Snag locations T14(A-C) through T19, T37 through T39, and T40 and T41 were addressed in these efforts and included the removal of two western sycamore, two Fremont cottonwood, seven willow, two white alder (*Alnus rhombifolia*), and one Chinese elm (*Ulmus parvifolia*). Most of the locations addressed included individual snags. Only locations T14, T16, and T17 represented small stands of snags. Felled snags and limbs were pulled away from regenerative basal growth and/or native plant species, large woody debris was reduced in height and volume, felled material was utilized to delineate the authorized trail routes through this area or block areas where trails deviated from the authorized trail system, and the remaining material/debris was spread throughout the area for decomposition on site.

On April 19, snag removal efforts were performed by LACC and NCCT, biological monitoring was performed by Mauricio Gomez, and restoration monitoring was performed by Tim Wood. The NCCT crew focused their efforts at the Mary Bell Avenue entrance and along the beginning of trail that leads through the Cottonwood Avenue bluff. Snags T20 and T42 through T45 were removed by NCCT and included, three Eucalyptus (*Eucalyptus* sp.) and two western sycamore. The LACC crew continued their efforts around the south Wheatland Avenue entrance and surrounding trailheads, targeting snags in the area where they had left off the previous day. The focus of the LACC effort was to sweep through the area where the previous day's work had been conducted to confirm that entry points and authorized trails were clear of debris, in order to further support public safety. During the sweep several small unmarked snags were also removed. The crew then continued the removal of snags at three locations, T16, T17, and T39; however, the removal of these snags was only partially complete by the end of the day. The crew ceased their efforts once they reached a point where the snags were in a safe and secure state and noted that completion will be addressed in future snag clearing efforts. Both crews were asked to sweep through the areas where work was performed and remove any remaining small debris from native vegetation that may have been missed previously, further supporting restoration goals. Felled snags and limbs were pulled away from regenerative basal growth and/or native plant species, large woody debris was reduced in height and volume, felled material was utilized to delineate the authorized trail routes through the work areas or block areas where trails deviated from the authorized trail system, and all material/debris was spread throughout the area for decomposition on site.

On April 22, snag removal efforts were performed by LACC and NCCT, biological monitoring was performed by Alisa Muniz, and restoration monitoring was performed by Tim Wood. All project efforts focused on snags marked for removal in the vicinity of the north Wheatland Avenue entrance and along the riparian area south of the 210 Freeway. Snag locations T21 through T34(A-G) and T46 through T48 were addressed in these efforts and included the removal of 12 western sycamore, 1 holly leaf cherry (*Prunus ilicifolia*), 2 black elderberry, 1

willow, and 1 Peruvian pepper tree (*Schinus molle*). Most of the locations addressed represented small stands of snags. Only locations T22 and T30 through T32 represented individual snags. Removal of one of the seven snags at location 34(A-G) was not completed by the end of the effort; the snag was left in a safe and secure state and completion will be addressed during future snag clearing efforts. Felled snags and limbs were pulled away from regenerative basal growth and/or native plant species, large woody debris was reduced in height and volume, and all debris was spread throughout the area for decomposition on site.

SENSITIVE BIOLOGICAL RESOURCES OBSERVED

On April 17, both work crews were advised of and adhered to the exclusion of T13A, T13B, and T36 due to established Bewick's wren nest, as explained to them by Alisa Muniz. Ms. Muniz monitored that the project work did not disturb the active nest or cause stress to the birds.

On April 18, both crews were advised of the location of a California scrub-jay (*Aphelocoma californica*) building its nest and adhered to the limitations as explained to them by the Mauricio Gomez. Mr. Gomez monitored that the project work did not disturb the nest building activity.

On April 19, a pre-activity nesting bird survey was conducted by Mauricio Gomez at the Mary Bell Avenue location. The NCCT crew was advised and adhered to the limitations regarding the location of a northern mockingbird (*Mimus polyglottos*) nest identified during the survey. Mr. Gomez monitored during the activities and determined that the project work did not disturb the active nest. The LACC crew was monitored, advised of the location of a California scrub-jay continuing to build its nest, and adhered to the limitations as explained to them by the Mauricio Gomez. Mr. Gomez monitored throughout the activities and documented that the project work did not disturb the nest building activity.

On April 22, a pre-activity nesting bird survey was conducted by Alisa Muniz at the north Wheatland Avenue location. Many bird species were observed singing, foraging, preening, and displaying territorial behavior; however, no nests were observed at this location.

ADHERENCE TO MITIGATION AND AVOIDANCE MEASURES

From project commencement and throughout their performance it was shown that both the LACC and NCCT crews understood the sensitivity of the site and the project goals. Both crews were receptive to guidance from their crew leaders, biological monitors, and the restoration monitor. In very few instances where debris from the removal efforts unavoidably came into contact with unintended targets (e.g., native vegetation, the creek) both crews were receptive to direction and took action to correct the occurrence. Both crews were proactive in avoiding native plants and removing debris when contact occurred. In the single instance where debris fell into Haines Canyon Creek on April 18, crew members were quick to respond and remove the material. With consideration to those few instances, these areas were monitored for potential negative effects, and there was found to be no long-term negative effects incurred by unintended targets. Both the LACC and NCCT conducted work earnestly, cooperatively, and in a manner that supported the project goals.

Please feel free to contact me at (949) 261-5414 extension 7242, via cell phone at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like any additional information.

Sincerely,

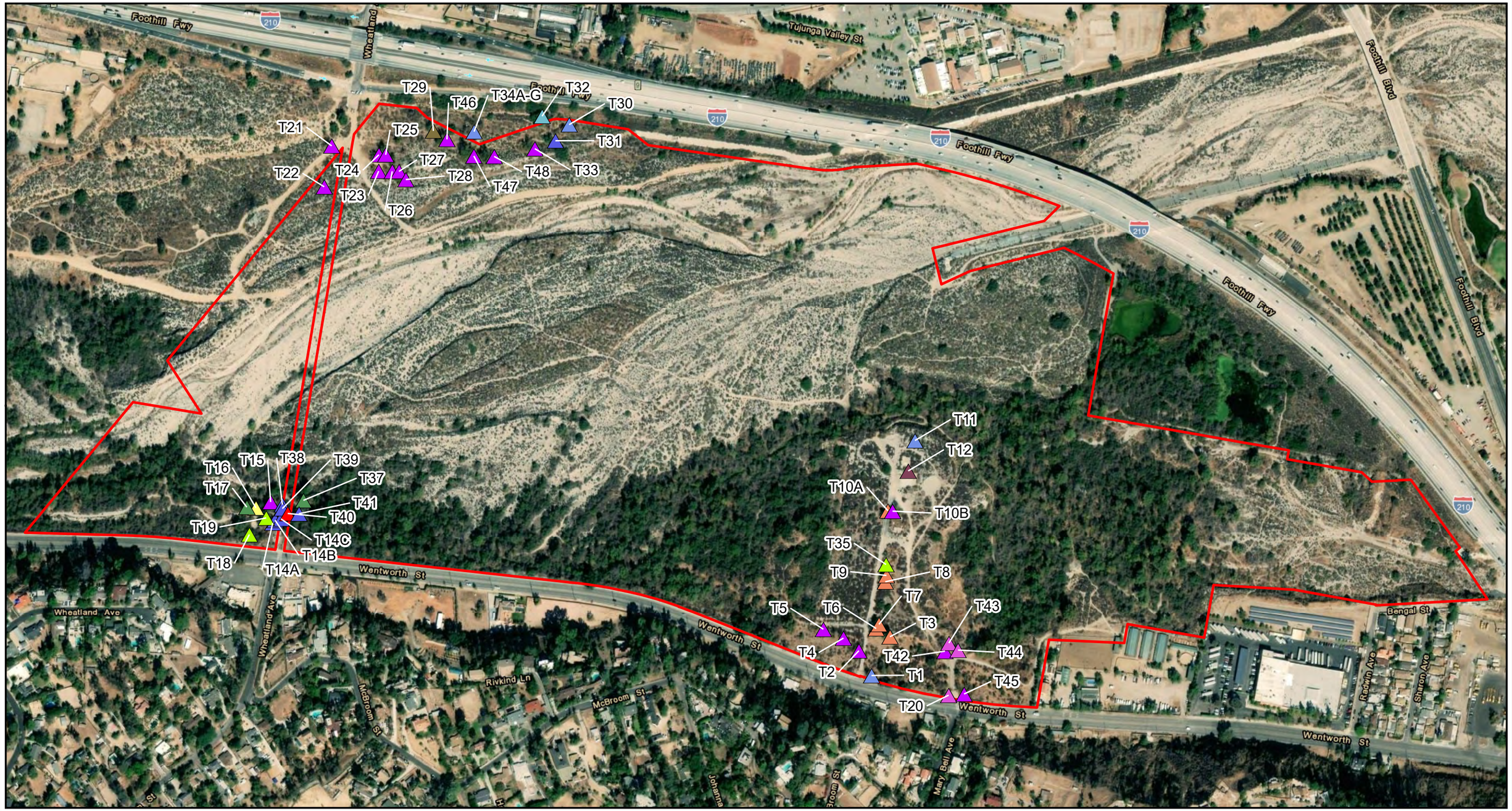
CHAMBERS GROUP, INC.

Tim Wood

Habitat Restoration Foreman

Attachments

Attachment A – Figure 1 Big Tujunga Snag Removal Map
Attachment B – Site Photographs



Legend

- Mitigation Area

Snag Species

- Black elderberry
- Chinese elm
- Cottonwood
- Deodar cedar
- Eucalyptus species
- Holly-leaf cherry
- Mixed Stand
- Peruvian pepper tree
- Stone-fruit species
- Western sycamore
- White alder
- Willow species

N

0 250 500 1,000

Feet

Figure 1
Big Tujunga Snag Removal Map

Name: 21021 Snag Map.Mxd
Print Date: 5/8/2019, Author: esimmons

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ATTACHMENT B – SITE PHOTOGRAPHS

Photo 1.

T1: Black elderberry, facing south.

Site: Cottonwood Avenue

GPS: 34.2646, -118.3454

Photo 2.

T1: After complete snag removal by NCCT on 4/17, facing southeast.

Photo 3.

T2: Western sycamore, facing north.

Site: Cottonwood Avenue

GPS: 34.2649, -118.3456

Photo 4.

T2: After selective removal of one of the two snags and selective limb reduction by LACC on 4/17, facing north.

Photo 5.

T3: Deodar cedar, facing east.

Site: Cottonwood Avenue

GPS:
34.2650, -118.3451

Photo 6.

T3: After selective removal of snag trunk only by NCCT on 4/17, facing southeast. Felled limb remains as habitat for birds and climbing structure for existing Chilicothe (*Marah macrocarpa*).

Photo 7.

T4: Western sycamore, facing southwest.

Site: Cottonwood_Avenue

GPS: 34.2650, -118.3458

Photo 8.

T4: After complete snag removal by LACC on 4/17, facing south.

Photo 9.

T5: Western sycamore, facing north.

Site: Cottonwood Avenue.

GPS: 34.2651, -118.3461

Photo 10.

T5: After selective removal of two of the three snags by LACC on 4/17, facing north.

Photo 11.

T6: Deodar cedar, facing southeast.

Site: Cottonwood Avenue

GPS: 34.2651, -118.3453

Photo 12.

T6: After complete snag removal by NCCT, on 4/17, facing east.

Photo 13.

T7: Deodar cedar, southeast.

Site: Cottonwood Avenue

GPS: 34.2652, -118.3453

Photo 14.

T7: After complete snag removal by NCCT on 4/17, facing northeast.

Photo 15.

T8: Deodar cedar, facing east.

Site: Cottonwood Avenue

GPS: 34.2657, -118.3452

Photo 16.

T8: After complete snag removal by LACC on 4/17, facing southeast.

Photo 17.

T9: Deodar cedar, facing southeast.

Site: Cottonwood Avenue

GPS: 34.2658, -118.3452

Photo 18.

T9: After complete snag removal by LACC on 4/17, facing northeast.

Photo 19.

T35: Fremont cottonwood, facing east.

Site: Cottonwood Avenue

GPS: 34.2659, -118.3452

Photo 20.

T35: After selective removal by NCCT on 4/17, facing northeast. Cavity remains as habitat.

Photo 21.

T10A: Deodar cedar, facing northwest.

Site: Cottonwood Avenue

GPS: 34.2666, -118.3452

Photo 22.

T10A: After complete snag removal by LACC on 4/17, facing northwest.

Photo 23.

T10B: Western sycamore, facing southeast.

Site: Cottonwood Avenue

GPS: 34.2666, -118.3451

Photo 24.

T10B: After selective removal by LACC on 4/17 (snag hanging over the road only), facing northeast.

Photo 25.

T11: Black elderberry, facing southeast.

Site: Cottonwood Avenue

GPS: 34.2674, -118.3448

Photo 26.

T11: After complete snag removal by LACC on 4/17, facing north.

Photo 27.

T12: Stone-fruit variety, facing north.

Site: Cottonwood Avenue

GPS:
34.2671, -118.3449

Photo 28.

T12: After complete snag removal by LACC on 4/17, facing north.

Photo 29.

T14A: Willow species, facing northwest.

Site: South Wheatland Avenue

GPS: 34.2663, -118.3542

Photo 30.

T14A: After complete snag removal by LACC on 4/18, facing west.

Photo 31.

T14B: Willow species, facing northwest.

Site: South Wheatland Avenue

GPS: 34.2664, -118.3542

Photo 32.

T14B: After complete snag removal by LACC on 4/18, facing northwest.

Photo 33.

T14C: Willow species, facing northwest.

Site: South Wheatland Avenue

GPS: 34.2664, -118.3541

Photo 34.

T14C: After complete snag removal by LACC on 4/18, facing northwest.

Photo 35.

T15: Western sycamore, facing north.

Site: South Wheatland Avenue

GPS: 34.2666, -118.3543

Photo 36.

T15: After complete snag removal by NCCT on 4/18, facing northeast.

Photo 37.

T16: Mixed stand of western sycamore and willow species, facing north.

Site: South Wheatland Avenue

GPS: 34.2665, -118.3545

Photo 38.

T16: After six of the ten snags were removed by LACC on 4/19, facing north.

Photo 39.

T17: White alder, facing northwest.

Site: South Wheatland Avenue

GPS: 34.2665, -118.3546

Photo 40.

T17: After one of two snags were removed by LACC on 4/19, facing north.

Photo 41.

T18: Fremont cottonwood, facing south.

Site: South Wheatland Avenue

GPS: 34.2662, -118.3546

Photo 42.

T18: After complete snag removal by NCCT on 4/18, facing southwest.

Photo 43.

T19: Fremont cottonwood, facing east.

Site: South Wheatland Avenue

GPS: 34.2664, -118.3543

Photo 44.

T19: After complete snag removal by NCCT on 4/18, facing south.

Photo 45.

T37: White alder, facing north.

Site: South Wheatland Avenue

GPS: 34.2666, -118.3538

Photo 46.

T37: After complete snag removal by NCCT on 4/18, facing northwest.

Photo 47.

T38: Willow species, facing northwest.

Site: South Wheatland Avenue

GPS: 34.2666, -118.3541

Photo 48.

T38: After complete snag removal by LACC on 4/18, facing northwest.

Photo 49.

T39: Willow species, facing northwest.

Site: South Wheatland Avenue

GPS: 34.2665, -118.3541

Photo 50.

T39: After complete snag removal by NCCT on 4/18, facing north.

Photo 51.

T40: Chinese elm, facing east.

Site: South Wheatland Avenue

GPS: 34.2664, -118.3540

Photo 52.

T40: After complete snag removal by NCCT on 4/18, facing west.

Photo 53.

T41: Willow species, facing northwest.

Site: South Wheatland Avenue

GPS: 34.2664, -118.3539

Photo 54.

T41: After complete removal of one of the four snags by LACC on 4/19, facing north.

Photo 55.

T20: Eucalyptus species, facing south.

Site: Mary Bell Avenue

GPS: 34.2643, -118.3442

Photo 56.

T20: After complete snag removal by NCCT on 4/19, facing south.

Photo 57.

T42: Western sycamore, facing north.

Site: Mary Bell Avenue

GPS: 34.2649, -118.3443

Photo 58.

T42: After complete snag removal by NCCT on 4/19, facing east.

Photo 59.

T43: Eucalyptus species, facing north.

Site: Mary Bell Avenue

GPS: 34.2650, -118.3442

Photo 60.

T43: After complete snag removal by NCCT on 4/19, facing south.

Photo 61.

T44: Eucalyptus species, facing north.

Site: Mary Bell Avenue

GPS: 34.2649, -118.3441

Photo 62.

T44: After complete snag removal by NCCT on 4/19, facing southwest.

Photo 63.

T45: Western sycamore, facing south.

Site: Mary Bell Avenue

GPS: 34.2643, -118.3440

Photo 64.

T45: After selective removal of upper limbs only by NCCT on 4/19, facing east. Trunk with cavity remains as habitat.

Photo 65.

T21: Western sycamore, facing west.

Site: North Wheatland Avenue

GPS: 34.2710, -118.3535

Photo 66.

T21: After selective removal of two of the four snags by NCCT on 4/22, facing west.

Photo 67.

T22: Western sycamore, facing south.

Site: North Wheatland Avenue

GPS: 34.2705, -118.3536

Photo 68.

T22: After complete snag removal by NCCT on 4/22, facing south.

Photo 69.

T23: Western sycamore, facing south.

Site: North Wheatland Avenue

GPS: 34.2707, -118.3528

Photo 70.

T23: After selective removal of one of the two snags by LACC on 4/22, facing south.

Photo 71.

T24: Western sycamore, facing north.

Site: North Wheatland Avenue

GPS: 34.2709, -118.3528

Photo 72.

T24: After selective removal of five of the six snags by LACC on 4/22, facing north.

Photo 73.

T25: Western sycamore, facing northeast.

Site: North Wheatland Avenue

GPS: 34.2709, -118.3527

Photo 74.

T25: After selective limb reduction by LACC on 4/22, facing northeast.

Photo 75.

T26: Western sycamore, south.

Site: North Wheatland Avenue

GPS: 34.2707, -118.3526

Photo 76.

T26: After complete snag removal by LACC on 4/22, facing southwest.

Photo 77.

T27: Western sycamore, facing southwest.

Site: North Wheatland Avenue

GPS: 34.2707, -118.3525

Photo 78.

T27: After complete snag removal by LACC on 4/22, facing southwest.

Photo 79.

T28: Western sycamore, facing southwest.

Site: North Wheatland Avenue

GPS: 34.2706, -118.3524

Photo 80.

T28: After complete snag removal by LACC on 4/22, facing south.

Photo 81.

T29: Holly-leaf cherry, facing north.

Site: North Wheatland Avenue

GPS: 34.2712, -118.3520

Photo 82.

T29: After selective removal of two of the three snags by LACC on 4/22, facing north.

Photo 83.

T30: Black elderberry, facing south.

Site: North Wheatland Avenue

GPS: 34.2713, -118.3500

Photo 84.

T30: After complete snag removal by NCCT on 4/22, facing north.

Photo 85.

T31: Willow species, facing northeast.

Site: North Wheatland Avenue

GPS: 34.2711, -118.3502

Photo 86.

T31: After complete snag removal by NCCT on 4/22, facing south.

Photo 87.

T32: Peruvian pepper, facing north.

Site: North Wheatland Avenue

GPS: 34.2714, -118.3504

Photo 88.

T32: After complete snag removal by NCCT on 4/22, facing north.

Photo 89.

T33: Western sycamore, facing south.

Site: North Wheatland Avenue

GPS: 34.2710, -118.3505

Photo 90.

T33: After selective removal of eight of the nine snags by NCCT on 4/22, facing south.

Photo 91.

T34A-G: Black elderberry, facing northwest.

Site: North Wheatland Avenue

GPS: 34.2712, -118.3514

Photo 92.

T34A-G: After removal of six of the seven snags by LACC on 4/22, facing northwest.

Photo 93.

T46: Western sycamore, facing northwest.

Site: North Wheatland Avenue

GPS: 34.2711, -118.3518

Photo 94.

T46: After selective removal of five of the seven snags by LACC on 4/22, facing northwest.

Photo 95.

T47: Western sycamore, facing southwest.

Site: North Wheatland Avenue

GPS: 34.2709, -118.3514

Photo 96.

T47: After selective limb reduction by LACC on 4/22, facing southwest.

Photo 97.

T48: Western sycamore, facing southwest.

Site: North Wheatland Avenue

GPS: 34.2709, -118.3511

Photo 98.

T48: After selective limb reduction by NCCT on 4/22, facing southwest.

Photo 99.

T13A: Excluded - snag is within Bewick's wren nesting buffer.

Photo 100.

T13B: Excluded - snag is within Bewick's wren nesting buffer.

Photo 101.

T36: Excluded - snag is within Bewick's wren nesting buffer.

Photo 102.

NCCT crew reducing limb volume, bucking logs, and clearing debris from Cottonwood Avenue, after felling T6 on 4/17.

Photo 103.

LACC crew removing T4 and spreading debris for decomposition, on 4/17.

Photo 104.

NCCT crew member removing T19 snags, on 4/18.

Photo 105.

LACC crew removing a section of T16 and clearing felled debris from the banks of Haines Canyon Creek, on 4/18.

Photo 106.

NCCT crew roped-off and making the final cut to T20, on 4/19.

Photo 107.

LACC crew members sweeping through project areas, performing remaining reduction and/or removal necessary to confirm debris has been cleared from trails and vegetation, on 4/19.

Photo 108.

NCCT crew roped-off and ready to direct the fall of T32 away from unintended targets, on 4/22.

Photo 109.

LACC crewmembers removing debris away from the basal growth of T27, on 4/22.

Photo 110.

Felled debris was used to delineate authorized trails.

Photo 111.

Felled debris was used to block and redirect unauthorized trails.

Photo 112.

The log containing the Bewick's wren nest discovered on 4/16. The nest is within a small cavity at the far end of the log that is pointing downhill, circled in pink. Photo was taken facing northwest.

Photo 113.

Location of the California Scrub-jay nest discovered on 4/18, in a coast live oak tree near the south Wheatland Avenue snag removal area. Photo taken facing south.

Photo 114.

Location of the northern mockingbird nest discovered on 4/19, on a coast live oak tree northeast of the Mary Bell Avenue removal area. Photo taken facing east.

APPENDIX P – FUEL REDUCTION MEMO REPORT

July 15, 2019

Melanie Morita
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

RE: Memorandum for the July 2019 Fuel Reduction Activities at the Big Tujunga Wash Mitigation Area as part of the Trails Monitoring Program Described in the 2019 Revised Implementation of the Master Mitigation Plan Programs.

Dear Ms. Morita,

This memorandum summarizes the fuel reduction efforts conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA) in July 2019. This memo shows adherence to the Notice of Non-compliance issued by the City of Los Angeles Fire Department (LAFD) on March 8, 2015 and the brush clearance requirements established by the County of Los Angeles Department of Agricultural Commissioner/Weights and Measures. Chambers Group qualified biologists and restoration specialists participating in the fuel reduction activities within the BTWMA worked to monitor and enforce that all mitigation and avoidance measures were followed by the work crews. Details of the fuel reduction effort including dates, names of participants, locations of maintenance activities performed, sensitive resources encountered, and mitigation actions taken, are found below. The fuel reduction team focused on areas of concern identified during the reconnaissance site visit conducted by ECORP Consulting, Inc. (ECORP) and Natures Image on October 13, 2015, and by the representing inspector from LAFD on October 14, 2015, including areas adjacent to Gibson Ranch and along the Wentworth Avenue property boundary. Most of the existing fuel (old-growth vegetation) that was present on site during the 2015 reconnaissance site visits, burned during the 2017 Creek Fire. Due to the elimination of on-site fuel, many of the recommendations and guidelines made in 2015 are no longer applicable. Due to the sensitive nature of the site and high potential for erosion to occur, the absolute removal of vegetation in the fuel modifications zones is not appropriate. Instead of complete vegetation removal in these areas, a scaled-down version of fuel reduction was performed as proposed and described below, substantially reducing the chance of negatively affecting wildlife and habitats within the BTWMA. All mapped locations were inspected, and maintenance was performed if required.

METHODS

Prior to the start of work, crew members received onsite orientation and instruction regarding safety, weed and brush clearance requirements, permit and mitigation regulations, and sensitive species that may be encountered in the work areas. The meetings were conducted by Chambers Group Habitat Restoration Foreman Tim Wood who was present on site and participated in fuel reduction activities. Pre-activity sweeps for sensitive plant and wildlife species including nesting birds, were conducted prior to the start of fuel reduction activities by Biologist Omar Moquit. Collector for ArcGIS (Collector), a Geographic Information System (GIS) application, was used to locate previous recorded sensitive resources in order to avoid causing disturbances to them during brush clearance. In all of the fuel reduction areas addressed, gasoline powered weed-whackers were used to cut down grasses and small forbs that required clearing and/or maintenance and thinning. Throughout these areas, steel grading rakes were used to clear existing trails and move cut debris into spaces where it is permitted to decompose. For large forbs and exotic species that required removal, either hand-pulling or digging (shovels) methods were used, and the debris was reduced in bulk by using bypass pruning loppers and small hand saws. Snags were felled and bucked with a chainsaw, and all debris was pulled away from the firebreak and scattered flush on the ground for decomposition on site. Trees and large shrubs were

limbed up with bypass hand pruners, bypass pruning loppers and/or handsaws to meet the six-foot ground clearance requirement. The fuel reduction work was performed on July 9 and 10 and required three crew members per day.

RESULTS

On July 9, fuel reduction efforts focused on establishing the 10-foot firebreak that is required along public roads. Crew members removed developing forbs and weeds, and cut down grasses along the entire length of the property boundary adjacent to Wentworth Avenue; all vegetation within the easement between the fence and the curb was cleared. In addition, crew members established the 30-foot firebreak required at the west end of Gibson Ranch and the residential structure neighboring the BTWMA. In these areas all grasses were reduced to less than 2 inches in height; forbs where removed from a gate access area and along a section where emergency access might be necessary; all weeds and brush were removed from the fence-line shared between the properties. The trees in and around these areas were limbed up to six feet from the ground, and all vegetative debris was cleared from the 30-foot firebreak and left to decompose elsewhere on site.

On July 10, fuel reduction and brush clearance efforts were performed on the bluff north of Gibson Ranch and areas adjacent to the stable complex on the east side of the ranch. Crew members cut down and removed weeds and brush within the 30-foot firebreak area, and removed dead vegetation and debris. On the bluff and around the equestrian entrance to the BTWMA, and outside of the 30-foot firebreak perimeter (where vegetation is permitted to remain), crew members cut down or removed non-native grasses and forbs to inhibit the fire-ladder between the ground and the canopies of native vegetation. Trees and large shrubs were limbed up to six feet from the ground or one-third of their height, respectively. Snag trees still present as a result of the 2017 Creek Fire were cut down and cleared from the area. All debris was reduced in bulk and scattered in areas where dead and decomposing materials are allowed to remain on site.

In the area north and east of Gibson Ranch that adjoins the southern bluffs of Haines Canyon Wash it was discovered that the private property owners/occupants had already conducted brush clearance efforts. This section of land was inspected along the southeastern site boundary and no areas were found to require further maintenance.

SUMMARY AND DISCUSSION

The main focus of the July fuel reduction efforts was to perform the required deferred maintenance, recover a defensible firebreak for first-responders, and help support safety measures for the BTWMA and the surrounding structures and public spaces that neighbor the property. Chambers Group crew members reduced the potential vertical and horizontal fire-ladders in high-risk areas, around structures, and along roads in support of first response efforts and public safety in the event of wildfire. Along the Wentworth Avenue, vegetation was removed to provide a 10-foot firebreak from the road (County Code Section 325.10). In areas adjacent to Gibson Ranch, forbs and grasses were removed, reduced, or cleared from within 30 feet of structures (County Code Section 325.2.1 (2)). All vegetative debris was removed from within the 30-foot firebreak into areas where firewood and composting materials are permitted to be stored/dispersed (County Code Section 325.2.1 (1)). The material was reduced in bulk and scattered flush on the ground when possible to provide some protection from erosion but not to the extent to suppress seed germination or to become a potential fire hazard. In some areas outside of the 30-foot firebreak, clearing of dead vegetation, grasses, and/or thinning was performed around stands of native vegetation that were found to be stabilizing the soil and aiding in erosion prevention (County Code Section 325.2.1 Exceptions (3)). Limbs from trees and large shrubs were removed or pruned up to six feet from the ground or one-third of their height to help inhibit the potential transmission of fire into their canopies. All non-native species found within the areas where brush clearance was performed were removed.

All fuel reduction activities were supervised by Habitat Restoration Foreman Tim Wood who ensured regulations and requirements were closely followed, and care was taken to avoid damaging native vegetation. No birds showed signs of stress during work efforts, and no sensitive biological resources including nesting birds, were disturbed.

Chambers Group staff will continue to support the ongoing effort to protect and enhance the BTWMA's native habitat while helping to support public safety through the regular monitoring of these firebreak areas. Fuel reduction efforts will continue with the approval and support of Los Angeles County Public Works on an as-needed basis, or will be conducted again next season when the development of vegetation requires maintenance.

Please feel free to contact me at (949) 261-5414 extension 7242, via cell phone at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like any additional information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood

Habitat Restoration Foreman

PHOTOS

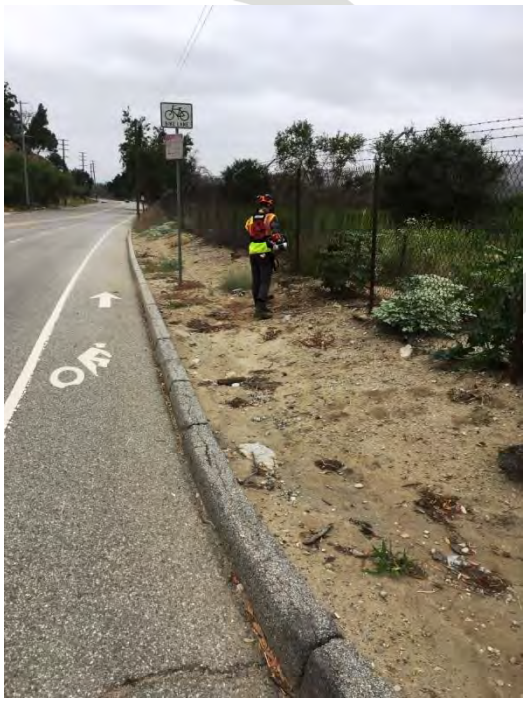

Photo 1: Crew member cutting down all vegetation along Wentworth Avenue, on July 9.

Photo 2: Crew member removing a snag near the west end of Gibson Ranch, on July 9.

Photo 3: Example of the dense vegetation along the west fence line adjacent to the residential structure west of Gibson Ranch, on July 9.

Photo 4: Residential fence line and potential emergency access/entry path after clearing weeds and brush from the firebreak area, on July 9.

Photo 5: Before - basal growth of a western sycamore tree near the west end of Gibson Ranch and the residential structure.

Photo 6: After limbing the canopy to six feet from the ground and the basal growth to one-third its height, on July 9.

Photo 7: Crew member cutting down the forbs and grasses within 30 feet of Gibson Ranch, on July 10.

Photo 8: Crew member cutting down the non-native forbs and grasses outside of the 30-foot firebreak where native species are permitted to remain, on July 10.

Photo 9: Before fuel reduction efforts along the trail through the equestrian center bluff.

Photo 10: After fuel reduction efforts along the trail through the equestrian center bluff, on July 10.

Photo 11: Before fuel reduction efforts north of the Gibson Ranch stables.

Photo 12: After fuel reduction efforts north of the Gibson Ranch stables, on July 10.

Photo 13: Before - willow snag located on the perimeter of the equestrian center bluff.

Photo 14: After removal of the willow snag; care was taken not to harm regenerative basal growth, on July 10.

Photo 15: Overview of the area north of Gibson Ranch after fuel reduction efforts, on July 10.

APPENDIX Q – SPECIAL INCIDENT MEMO REPORT

August 9, 2019

Melanie Morita
Los Angeles County Public Works
900 South Fremont Avenue
Alhambra, California 91803-1331

RE: Memorandum for Incident Reporting at the Big Tujunga Wash Mitigation Area, Los Angeles County, California.

Dear Ms. Morita,

This memorandum summarizes the ongoing efforts conducted by Chambers Group, Inc. (Chambers Group) at the Big Tujunga Wash Mitigation Area (BTWMA) to address prohibited and illegal activities by members of the public. This memo describes the recurring incidents within Haines Canyon Creek where prohibited and illegal activities including the construction of rock and log dams, the destruction of native habitat and vegetation, harm to sensitive and protected fish species including the federally threatened Santa Ana sucker (*Catostomus santaanae*), and continue to take place. The most substantial impacts on sensitive habitat by site visitors are caused by swimming and building rock dams within Haines Canyon Creek. Rock dams are constructed by individuals to make swimming areas deeper. There are a few unauthorized swimming areas that have become popular spots for site visitors to congregate, picnic, and swim. The most popular location is the unauthorized swimming/wading area located approximately 280 feet northwest of the south Wheatland Avenue entrance.

Rock dams are usually constructed with boulders, tree branches and logs, and are often found reinforced with tarps and other materials that reduce the natural flow of the creek and create a buildup of water. The changes to the natural flow of the creek can be detrimental to the sensitive species of fish within the creek. Rock dams reduce the flow of the creek and create large pools of water that are favorable habitat for the exotic, invasive aquatic species such as the red swamp crayfish (*Procambarus clarkii*) and American bullfrog (*Lithobates catesbeianus*), that prey on native species such as Santa Ana sucker. These pools increase the levels of bacteria and parasites, which have a negative effect on native fish species. These pools also reduce suitable breeding habitat for native and sensitive fish species. The repercussions of these dams also include negative impacts on the surrounding landscape by changing or diverting water flow which can alter the presence or abundance of regenerating native plant species (post-Creek Fire), and slow or inhibit native plant recovery. The negative impacts on native habitat are compounded by continuous off-trail foot traffic, trampling of native species, and a more immediate threat, the discovery that native vegetation is being illegally cut and removed for use in the construction of dams and the creation of structures/recreation areas. Details of ongoing incidents involving prohibited activities including dates, names of Chambers Group employees who documented and reported the incidents, interactions with individuals in violation of the rules, sensitive resources impacted, and corrective actions taken, are found below.

INCIDENTS

During a public outreach visit conducted by Biologists Erik Olmos and Cynthia Chavez on August 19, 2018, an individual was encountered sitting near a rock dam in Haines Canyon Creek, northwest of the south Wheatland Avenue entrance. The biologists were approaching the dam to photograph it when the individual explained that she had constructed it so she could swim. The biologists gave her an educational brochure and explained that damming the creek and swimming in the Mitigation Area is prohibited. The individual was receptive to the biologists when discussing how altering the streambed in any way can adversely affect sensitive resources. The individual explained

that she had previously been approached by others over the years who provided her the same information, but that she has been building dams along Haines Canyon creek every year (in order to swim) for more than 30 years and that she doesn't understand what the issue is with swimming and building dams. She added that she doesn't understand how her actions adversely affect the sensitive fish species as she has never directly harmed them. The biologists reiterated how any change to the streambed (e.g., sedimentation) can adversely affect sensitive resources, at which point the individual thanked the biologists and wished them a good day.

During a public outreach visit conducted by Biologists Erik Olmos and Jacob Lloyd Davies on August 25, 2018, the individual was again encountered at the dam. When the biologists, once again, tried to explain to the individual why building dams and swimming are prohibited in the Mitigation Area, the individual explained that she didn't see the harm she was doing to the sensitive resources, and rather, that she was taking care of them as she regularly fed algae-based fish food to the Santa Ana sucker and arroyo chub in the dammed area. The fish in the dammed area were observed displaying flashing behavior in an attempt to remove parasites from their gills.

On September 1, 2018, the same individual was encountered sitting on rocks beside where the dam had been removed days prior by Biologists Paul Morrissey and Corey Jacobs. During the interaction with the individual the biologists reminded her of the importance of not feeding the fish and damming the creek.

On June 12, 2019, the same individual was discovered by Chambers Group crew members at this same location. She and another male individual were seen swimming, washing, and building a rock dam. Habitat Restoration Foreman Tim Wood approached the couple to inform them that swimming and all other activities in the creek are prohibited. It was made explicitly clear that any alteration of the stream bed and surrounding landscape were prohibited and to cease these activities immediately, referring to the rock dam the individuals were building and the development of the creek bank where they congregate. The individuals discussed with a sense of entitlement, that they have been visiting, recreating, and building dams and structures in the area for 30 years, and seemed to feel that since they pick up litter in the area (according to them), that their presence and actions there are actually beneficial rather than destructive. Their litter removal efforts were encouraged and their visits were not discouraged, but it was explained a second time that any alteration to the creek and landscape is prohibited. Both individuals agreed that they understood.

On July 1, 2019, Habitat Restoration Foreman Tim Wood returned to the area to discover that a log was being used to dam the creek, along with three more rock dams in this same area had been constructed. The log was bucked and removed, and the dams were taken down. Furniture found in the areas that were being altered was removed, and hauled away for disposal.

During a public outreach effort conducted by Biologists Erik Olmos and Mauricio Gomez on July 28, 2019, it was discovered that the same female individual that was encountered last year and in recent interactions, had dammed the creek again. The portion of the creek where she had been frequenting was dammed with tree stumps. A cabana-like structure had also been built. A man who was with her was observed bathing in the creek and was informed that it was not allowed. The biologists gave them an educational brochure.

On July 31, 2019, it was discovered that the area of these reoccurring incidents had been developed far more than previously observed. A cabana-like structure was found over the area where these individuals congregate. Logs, branches, stones and other natural materials from the landscape were used to construct the structure. Upon inspection of the area, it was found that native willow branches had been cut from regenerating native willows to build a thatch roof over this structure. The vegetation around the structure was trampled, and in some places, cleared to make way for the prohibited building activities. Existing snag root-balls, branches, trunks and other natural materials were moved within the creek bed and downstream to dam the creek flow, creating a far larger unnatural pool than was previously seen in the area. On this same day, Habitat Restoration Foreman Tim Wood received multiple complaints from equestrians regarding the activities they had observed in this area. One of the complaints

described the same female individual hosting a party for a group of men including music, dancing of sorts, and the consumption of alcohol; to name some of the activities. The day prior to these complaints, Tim Wood also received a call from a participant in the Community Advisory Committee Meeting confirming and also describing the illegal activities going on this area.

SUMMARY AND DISCUSSION

In previous efforts to correct the prohibited activities in this area, Chambers Group staff has been able to respond immediately by informing the individuals of their infractions and removing the structures that were found in violation. The most recent violations have surpassed any of the prohibited activities observed and reported thus far, and will require a substantially larger effort and a more dedicated response to correct the violations and repair the habitat destruction that has occurred. The offending individuals seem to feel very justified in their actions given the number of years they have been recreating in the area and their familiarity with the site, and are unlikely to cease these prohibited activities with continued verbal warnings and site education alone. Given the observations of illegal activities by members of the public, the continuous discovery of prohibited activities by Chambers Group staff, and the sense of entitlement and persistence of the individuals discussed to continue violating the law and the BTWMA rules, it has become necessary to request the support of an appropriate law enforcement agency to help proscribe future offences within the BTWMA. To sustain these efforts, Chambers Group staff will continue to monitor for prohibited activity and report these occurrences as part of the ongoing effort to protect and enhance the BTWMA's native habitat.

Please feel free to contact me at (949) 261-5414 extension 7242, via cell phone at (626) 437-9935, or at twood@chambersgroupinc.com, if you have any questions or would like any additional information.

Sincerely,

CHAMBERS GROUP, INC.

Tim Wood

Habitat Restoration Foreman

INCIDENT PHOTOS

Photo 1: The lady encountered on multiple occasions, taken during the deconstruction of one of the rock dams on August 31, 2018.

Photo 2: Example of one of the rock dams discovered in this area, on August 31, 2018.

Photo 3: The cabana built adjacent to the creek, facing south on July 31.

Photo 4: The cabana built adjacent to the creek, facing west on July 31.

Photo 5: Native willow branches cut to build the thatched cabana roof, on July 31.

Photo 6: Snag roots, logs, and other natural materials used to dam the creek, facing west on July 31.