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**Results of Focused Surveys for
Unarmored Threespine Stickleback
and Other Special-Status Fish Species;
Natural River Management Plan Area
Valencia, California**

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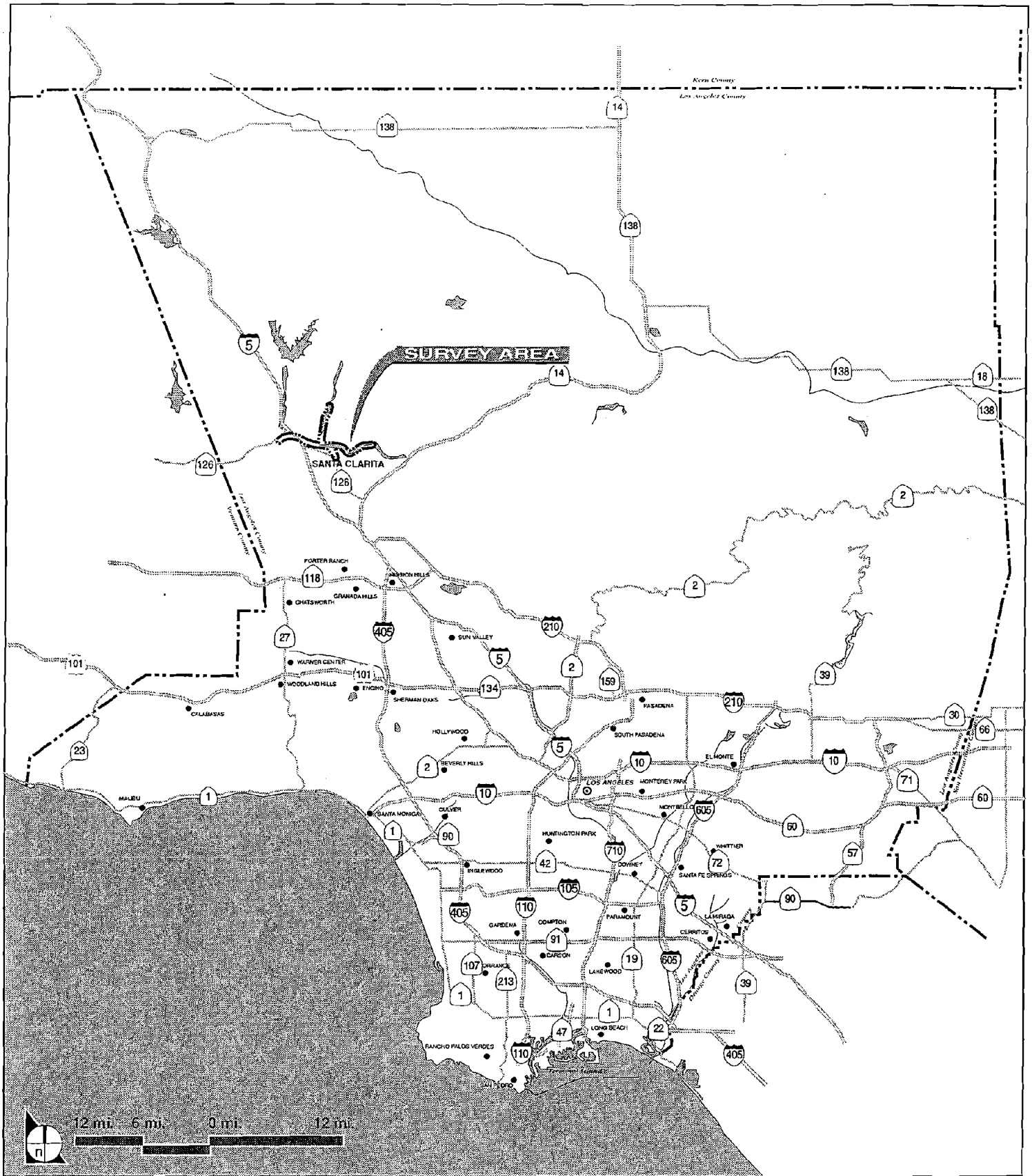
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**Results of Focused Surveys for Unarmored Threespine Stickleback
and Special-Status Fish Species
Newhall Ranch
Valencia, California**

The following presents the findings of focused protocol surveys that were conducted from March through June, 2002 to determine the presence/absence of the federally- and state-listed Endangered unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*) (herein UTS) in portions of the Santa Clara River in Los Angeles County that are incorporated within and upstream of the Natural River Management Plan area. This report is intended to provide project specific biological information to Newhall Ranch Company, US Army Corps of Engineers (ACOE), US Fish and Wildlife Service (USFWS), and California Department of Fish and Game (DFG) regarding results of focused surveys for unarmored threespine stickleback and additional special-status fish species including arroyo chub (*Gila orcutti*) and Santa Ana sucker (*Catostomus santaanae*) identified within the subject survey reaches.

INTRODUCTION

The survey area is located in northwestern Los Angeles County (Figure 1), within the Newhall, California US Geological Survey (USGS) 7.5-Minute Quadrangle Map. All sample sites selected were within potentially suitable habitats in portions of the Santa Clara River from near its confluence with Castaic Creek, east (upstream) approximately 7.2 miles. The survey effort also included approximately 2.5 miles of tributary drainages including San Francisquito Creek from its confluence with the Santa Clara River, north to the Copper Hill Bridge; the South Fork Santa Clara River from its confluence with the Santa Clara River, southeast to the Saugus Ventura Road Bridge crossing; and Bouquet Canyon Creek from its confluence with the Santa Clara River, northeast to the Newhall Road Bridge crossing. The primary purpose of these surveys was to determine current distribution of the UTS and to differentiate specific habitat characteristics being utilized by UTS within the portions of the Santa Clara River watershed included in the Natural River Management Plan area, as well as additional drainage areas on land owned by The Newhall Land and Farming Company. The secondary purpose was to determine the presence and current distribution of other special-status fish species including the Santa Ana sucker and the Arroyo chub.



NEWHALL RANCH™
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Figure 1
REGIONAL LOCATION

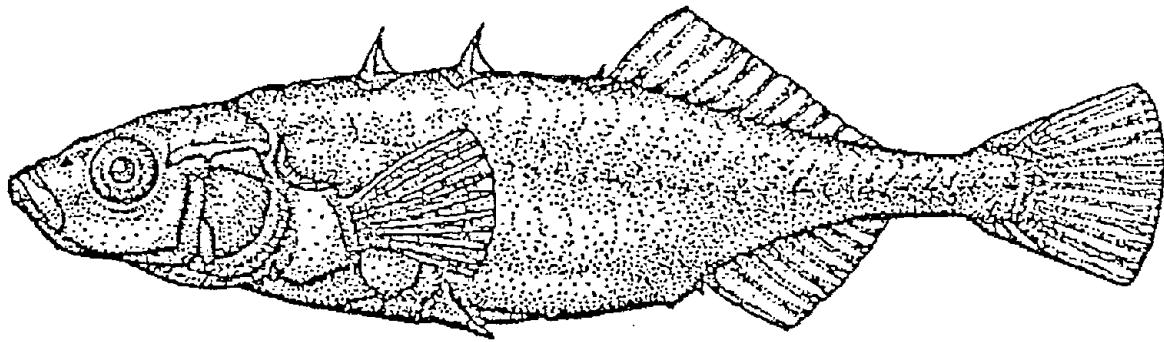
General UTS Background

Sticklebacks are a small (rarely exceeding 2.4 inches) streamline fish with two isolated dorsal spines, with a third, smaller spine at the front edge of the soft-rayed portion of the dorsal fin (USFWS 1985). Additional distinctive features include the unusual pelvic girdle that includes a spine on both sides, and the bright nuptial coloration of the male. The male stickleback builds a nest of fine plant debris and algal strands where it courts females that enter its territory. Several females may deposit eggs in a single nest. The males care for and protect the eggs and young. Sticklebacks are apparently an annual species, surviving for only one year (USFWS 1985), though some local scientists believe some individuals may live more than one year.

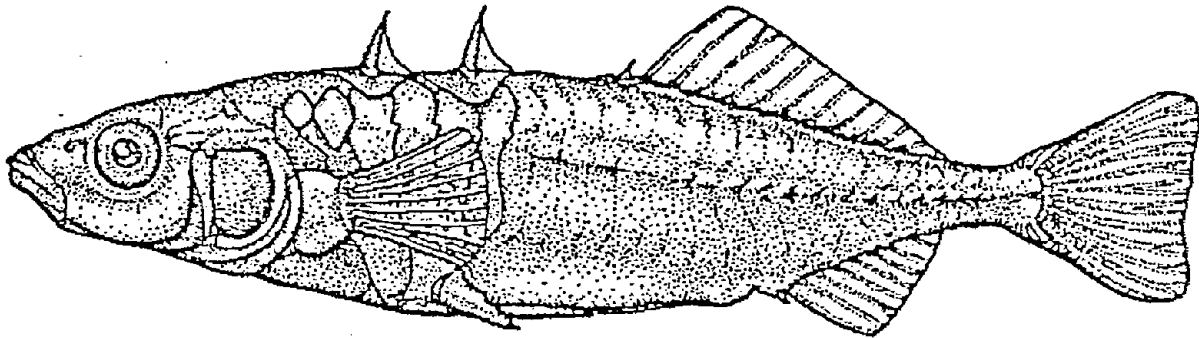
Three morphologically distinct subspecies of threespine stickleback (*Gasterosteus aculeatus*) occur in California. Two of these, the semi-armored (*G. a. microcephalus*) and the subject unarmored subspecies (*G. a. williamsoni*) occur in the Santa Clara River system. The number of, or absence of, bony lateral plates is the primary characteristic in differentiating the subspecies. The fully armored subspecies (*G. a. aculeatus*) typically has a row of bony plates that extends the full length of both sides of its lateral surface from above the gill plate to the base of the caudal fin. Lateral plates on the semi-armored subspecies do not extend the full length and are limited to the anterior portion of the body. Figure 2 provides an illustration of the three subspecific morphological characteristics.

Regional distribution of UTS is thought to have originally included the headwaters of the Santa Clara River, and low gradient portions of the Santa Ana, San Gabriel, and Los Angeles Rivers (USFWS 1985). The latter three populations are now extinct and it is now generally accepted that distribution of the remaining naturally occurring UTS population is limited to the Santa Clara River, east (upstream) and including the juncture with San Martinez Grande Canyon. The USFWS 1985 Revised Recovery Plan also includes a population in the San Antonio Creek drainage in Santa Barbara County and was considering a population in Shay Creek, San Bernardino County. All of these populations are protected by the federal listing. However, more recent genetic data suggest these and another population later discovered in the Baldwin Lake basin are not UTS (Haglund 1988).

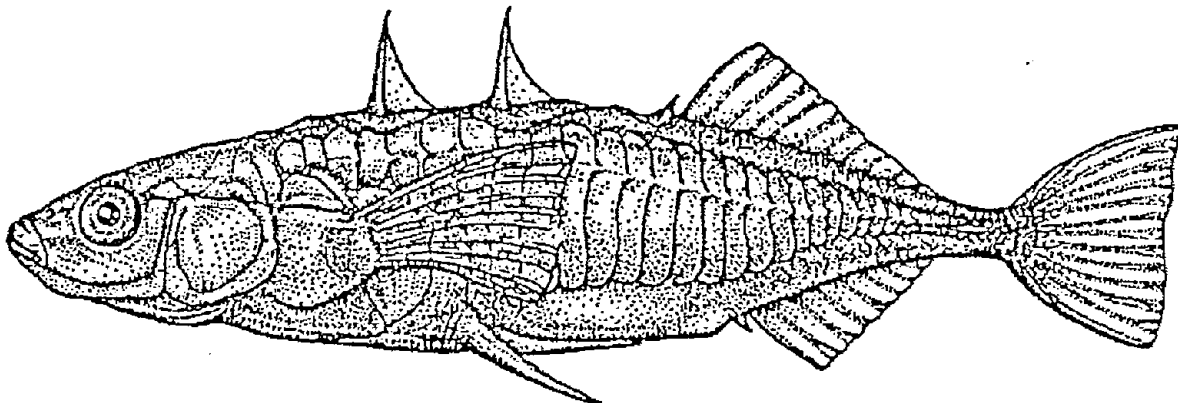
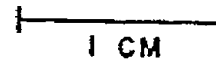
The UTS was listed as an Endangered species by the USFWS in October 1970 (35 Federal Register 16047) and by the State of California in June 1971. A federal Recovery Plan was initially prepared by USFWS in 1977 and a Revised Recovery Plan was prepared in December 1985. Critical habitat was proposed in 1980. However, in September 2002, the USFWS determined that the proposed designation of critical habitat should not be made (67 Federal Register 58580).



G. a. williamsoni



G. a. microcephalus



G. a. aculeatus



Source Haglund, 1989



NEWHALL RANCH
SPECIFIC PLAN

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Figure 2
**SUBSPECIFIC MORPHOLOGICAL
CHARACTERISTICS**

Overview of UTS Habitat Characteristics

Breeding, and newly hatched young occur in clean water, along shallow stream edges or braids in dense vegetation, where they are protected from being washed away in the stream current. In these areas the water temperatures are typically warmer, which is thought to increase the speed of development of the young. Larger juveniles and sub-adults (less than 0.8 inches) are also usually observed in the protection of dense vegetation, in slow moving or standing water (USFWS 1985).

Adults have been found in a variety of habitats throughout the stream, but tend to occur most frequently in areas of slow or standing water. When occurring in the main stream channel, they tend to seek shelter behind obstructions and under vegetation (USFWS 1985).

Essential Habitat Designation

Essential habitat is not specifically defined in the Recovery Plan for the species. However, it is stated that the designated Essential Habitat coincides with the areas proposed by the USFWS as Critical Habitat (45 Federal Register 76012-76015). In this proposal Critical Habitat is defined as: (1) the specific areas within the geographic area occupied by a species, at the time it is listed in accordance with the Endangered Species Act of 1973 as amended, on which are found those physical or biological features (a) essential to the conservation of the species and (b) that may require special management considerations or protection; and (2) specific areas outside the geographic area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. "Conservation" means the use of all methods and procedures that are necessary to bring an endangered or a threatened species to the point at which listing under the Act is no longer necessary (USFWS, 2001).

Critical Habitat was initially proposed for UTS in 1980. However, as a result of a lawsuit by the Center for Biological Diversity in January 2002, USFWS was forced to evaluate whether or not to designate Critical Habitat for the UTS and reached a finding that the designation should not be made (67 Federal Register 58580). In 1985, the USFWS prepared a Revised Recovery Plan identifying three Essential Habitat zones within the Santa Clara River watershed (**Figure 3**). They are described in the Revised Recovery Plan (USFWS 1985) as follows:

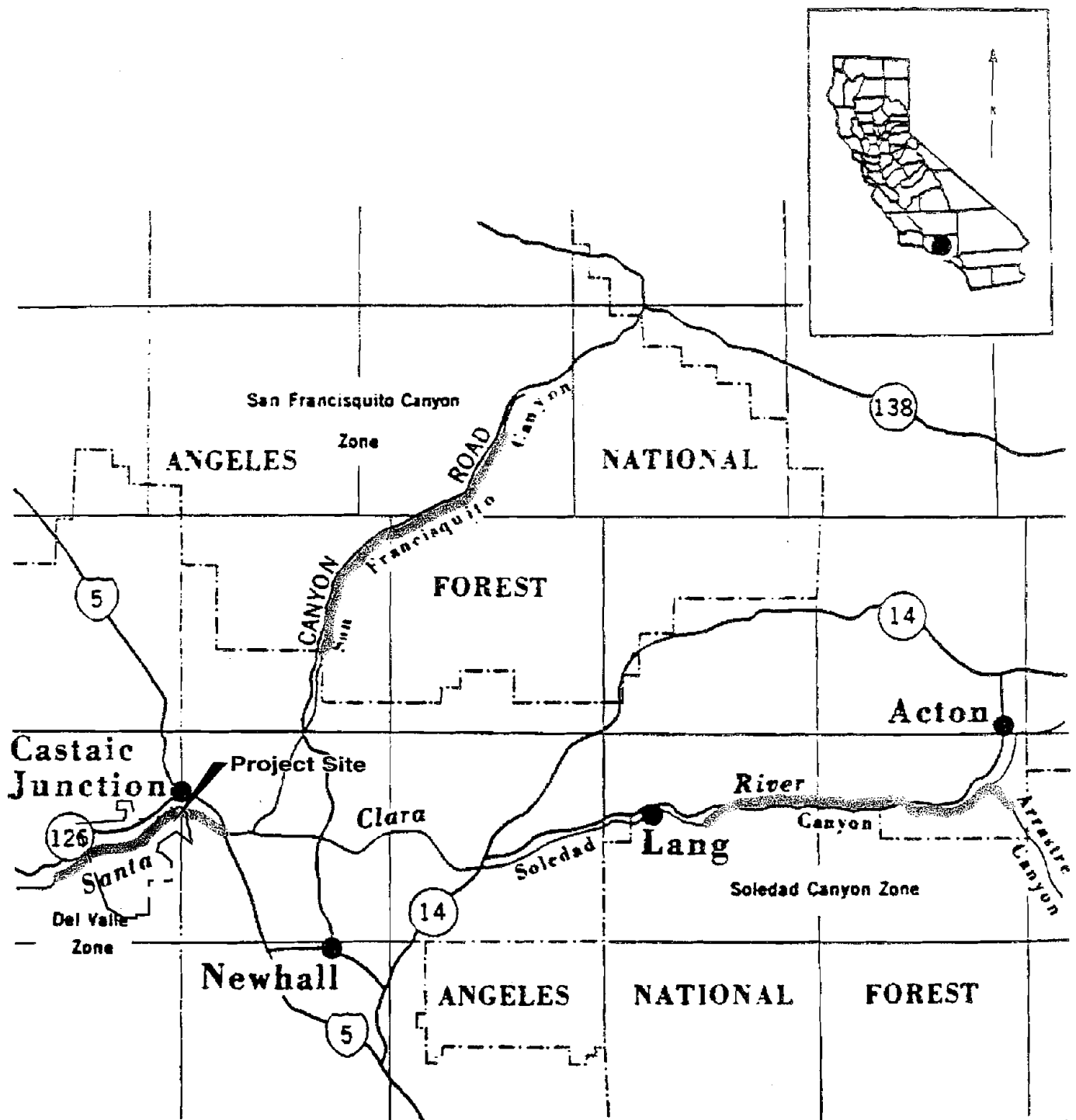
1. **Del Valle Zone.** An area of land and water with the following components (San Bernardino meridian): Santa Clara River within T4N, R16W and R17W, beginning at its confluence with San Martinez Grande Canyon, at a point 0.9 of a mile (1.5

kilometers) southwest of Del Valle settlement, and extending upstream approximately 5.6 miles (8.8 kilometers) to the Interstate Highway 5 Bridge.

2. San Francisquito Creek Zone. An area of land and water with the following components (San Bernardino meridian): San Francisquito Canyon watercourse, within T5N, R16W and T6N, R15W, beginning at a point where the Angeles National Forest boundary intersects the San Francisquito Canyon watercourse approximately 2.5 miles southwest of San Francisquito Powerhouse No. 2, and extending upstream in San Francisquito Canyon approximately 8.4 miles (13.5 kilometers) to San Francisquito Powerhouse No. 1, near its junction with Clearwater Canyon.
3. Soledad Canyon Zone. An area of land and water in Los Angeles County, with the following components (San Bernardino meridian): Santa Clara River within T4N, R13W, and R14W, beginning at a point 1.4 miles (2.3 kilometers) upstream in Soledad Canyon from the community of Lang, at the downstream end of the area called River's End Park, at 34° 26' 7" N, 118° 21' 51" W, thence extending upstream approximately 8.5 miles (13.7 kilometers) to its confluence with Arrastre Canyon, at a point located about 0.6 of a mile (1 kilometer) southwest of Los Angeles County Rehabilitation Camp, thence upstream in Arrastre Canyon approximately 0.8 of a mile (1.4 kilometers) to 34° 26' 7" N, 118° 11' 51" W.

Criteria used by USFWS to select Critical Habitat, and thus Essential Habitat, include evaluation of an area to determine the presence of primary constituent elements. These elements include physical and biological features that are essential to the conservation of the species, and that may require special management and protection (USFWS 1980). Primary constituent elements for UTS include specific quantity and quality of water and isolation from predators. These elements are specifically outlined in the Proposed Rule (USFWS 1980) and include:

- Permanent Stream Flow. Remaining streams utilized by this fish have low discharge rates, so that relatively minor modifications of ground water levels or channel characteristics could result in elimination of all fishes by desiccation.
- Slow Current. Sticklebacks favor shallow water with slow to moderate current, and probably can not reproduce effectively in deep, swift or completely still water.
- Low Turbidity and Pollution. Sticklebacks strongly favor clear water, seldom or never being found in turbid water conditions. Specific pollution susceptibilities have not yet been established, but water quality has been found to be high where populations have persisted, and they have disappeared from streams with reduced water quality.
- Isolation. Survival and genetic integrity evidently depend on the absence of large aquatic predators, certain potential competitors, and all other subspecies of sticklebacks. The latter are not particularly strong swimmers, and apparently do not move upstream during times of high water. They are excluded from the designated areas at other times by natural barriers in certain segments of the watercourse. These barriers should not be modified or bypassed.



ESSENTIAL HABITAT

Source UTS Recovery Plan, 1985



Prepared For: Newhall Ranch Company

Figure 3
ESSENTIAL HABITAT ZONES

It should be noted that, as with most fish species, UTS are not distributed uniformly throughout the Santa Clara River, and that breeding habitats are patchily distributed. The nature of breeding habitats is dynamic and may shift in structure and specific location from year to year depending upon seasonal rainfall and storm cycles. However, most of the breeding habitats identified over the past several years of study have been concentrated in the same general areas and support the same general habitat conditions.

It is expected that the perennial source of tertiary treated effluent discharged from Water Reclamation Plants (WRP) 32 and 26 contribute to provide more persistent breeding and nursery habitats than occurred naturally in areas located downstream from these locations. The discharge is relatively consistent in temperature and average velocity. Larger storm events are still expected to significantly alter breeding and nursery areas in the short term, but the regular release of water from the WRPs likely allows for extended breeding throughout the otherwise dry summer months.

General Santa Ana Sucker Background

Santa Ana suckers are endemic to drainages of the Los Angeles Basin including the Los Angeles, San Gabriel, and Santa Ana Rivers. This is the smallest sucker species in California, rarely reaching lengths greater than six inches (McGinnis 1984). They primarily feed on algae, detritus, and diatoms and have indicated intolerance for polluted or highly modified streams. Spawning generally occurs from April through early July and peaks in late May to early June. From 4,400 to over 16,000 eggs may be laid by a single female over gravel substrate. Santa Ana suckers are relatively short-lived, rarely surviving beyond their second year (Haglund and Baskin 1995). Like the UTS, Santa Ana suckers have evolved in drainages that often dry to small scattered pools in the dry summers; tolerant of warm water and low oxygen levels.

This species occurs in a variety of habitats within small to medium-sized (less than 22 feet wide) perennial stream channels with gravelly to rocky substrates. They are found in depths ranging from a few inches to over three feet and occur in variable flows from slow to swift (Moyle et al. 1995). Santa Ana suckers are typically found in clear water, but can tolerate periods of increased turbidity.

The Santa Ana sucker was listed by the USFWS as a threatened species on May 12, 2000. However, as this species is considered to be introduced in the Santa Clara River watershed, the population here is specifically excluded from the federal threatened status. Santa Ana suckers are considered by CDFG to be Species of Special Concern. CDFG does not differentiate Santa Ana Suckers occurring in the Santa

Clara River from other populations. This species was considered to be abundant as recently as 1970, but has since significantly declined in most of its native drainages (Moyle et al. 1995).

General Arroyo Chub Background

According to Moyle (1995) arroyo chubs are native to the Los Angeles, San Gabriel, San Luis Rey, Santa Ana, and Santa Margarita rivers, as well as, Malibu and San Juan Creeks. They have also been introduced into a number of drainages, extending their current range north to Chorro Creek in San Luis Obispo County. The population in the Santa Clara River, including the study reach, is also considered an introduced population.

The arroyo chub is relatively small, with adults averaging five inches in length. They are known to spawn primarily during March and April, though some may breed into July (Haglund and Baskin 1995). Spawning typically occurs in slow pools with aquatic vegetation. Some arroyo chubs have been determined to be over 4 years old, but breeding begins after the first year. After the second year, females are generally larger than males (Haglund and Baskin 1995). An omnivorous species, the arroyo chub feeds on algae, insects, and small crustaceans. They are believed to obtain much of their nutrition from the organisms associated with the aquatic plants (Haglund and Baskin 1995). Like the other two fish species discussed, the arroyo chub has evolved to tolerate high temperatures and hypoxic conditions that occur in the dry summers.

Habitat requirements are described by Moyle (1995) as slow-moving or backwater sections of warm to cool streams with mud or sand substrates. Within the survey reach, chubs were the most abundant species present and were detected in a variety of microhabitat conditions and flows, including open swift flowing portions of the channel.

The arroyo chub is not listed by either federal or state regulatory agencies, but is considered a Species of Special Concern by CDFG due to its declining status in its native drainages. The special concern status does not distinguish between native and introduced populations.

METHODOLOGY

Previous Studies In and Near the Newhall Ranch Project Area

Documentation pertinent to the biological resources in the vicinity of the site was reviewed and analyzed. Information reviewed included: (1) the Revised Recovery Plan for the unarmored threespine

stickleback; (2) literature pertaining to habitat requirements of sensitive species potentially occurring on the project site; (3) the California Natural Diversity Data Base (CNDDB 2002) information regarding special-status species potentially occurring on the project site for the Newhall and Val Verde USGS 7.5-Minute Quadrangle Maps, and (4) previous surveys for aquatic resources in the Newhall Ranch Specific Plan area and vicinity.

The following are sources that provide information regarding special-status fish distribution within and/or in the near vicinity of the study reach. Each of these sources has identified UTS, Santa Ana sucker and arroyo chub as occurring in and near portions of the respective study areas. The general consensus of distribution for UTS in the Santa Clara River includes all areas supporting surface water east (upstream) of the Ventura/Los Angeles County line near San Martinez Grande Canyon.

- U.S. Fish and Wildlife Service. Recovery Plan (revised); Unarmored Threespine Stickleback. Revision approved December 26, 1985. The first description of the unarmored subspecies was by Girard in 1854 from a specimen collected in Soledad Canyon. Distribution of UTS in the Santa Clara River is described as "...the headwaters of the Santa Clara River and its tributaries, in northern Los Angeles County.
- Aquatic Consulting Services, Inc.; July 2002. Aquatic Surveys Along the Santa Clara River; Part IV: Ventura County Line to Las Brisas Bridge, Ventura County, California – Protocol surveys for special status fish species during 2001. Three of 49 sampling locations identified stickleback as being present. All three were within 1.3 miles of the County boundary. None of the sample data indicated the total number of individuals collected and two of the three sample sites indicated sticklebacks were represented as fry or juveniles.
- Aquatic Consulting Services, Inc.; June 2002. Aquatic Surveys Along the Santa Clara River; Part III: West of Commerce Center Bridge to the Ventura County Line, California – Protocol surveys for special status fish species during 2001. Seven of the 56 locations sampled included UTS. None of the sample data indicated the total number of individuals collected and some of the sample sites indicated sticklebacks were represented as juveniles.
- Thomas Haglund and Jonathan Baskin, 2000. Fish and Wildlife Survey and Habitat Assessment of the Santa Clara River at Interstate 5 – This project was conducted for the California Department of Transportation for replacement of the Interstate 5 Bridge where it crosses the Santa Clara River. This study included focused special-status fish surveys. Several sites were sampled within 500 meters upstream and downstream of the bridge using a 1/8 inch mesh seine. Arroyo chub, UTS and Santa Ana sucker were detected throughout the survey reach. Large numbers of fry of all three species were detected and suggest breeding by all three species was occurring in that vicinity in 2000. Identification of UTS was made by morphological characteristics, primarily plate counts.
- Thomas Haglund and Jonathan Baskin; December 1995. Final Report: Sensitive Aquatic Species Survey, Santa Clara River and San Francisquito Creek, Newhall Land and Farming Company Property, Los Angeles County, California – Survey results indicated UTS were "continuously distributed from Bouquet Canyon Road Bridge downstream to the confluence of Castaic Creek". Positive subspecific identification was made through horizontal starch gel electrophoresis.
- Thomas Haglund, 1989. Current Status of the Unarmored Threespine Stickleback (*Gasterosteus aculeatus williamsoni*) along portions of the Santa Clara River Drainage – The project reach for

this report included the Santa Clara River from near the confluence with Castaic Creek upstream to near Saugus; Castaic Creek from Interstate 5, downstream to SR 126; and the downstream portion of San Francisquito Creek outside the National Forest. Identification methodology included characterization of lateral plate counts and then identification was further verified utilizing electrophoretic methods. The report concluded that stickleback were absent from lower San Francisquito Creek and were rare in Castaic Creek. Distribution of sticklebacks was patchy along the study reach within the Santa Clara River. The report further determined that the sticklebacks sampled throughout the reach were the unarmored *G. a. williamsoni*.

- Impact Sciences, Inc. 2003. Results of Focused Surveys For Unarmored Threespine Stickleback and Other Special-Status Fish Species; Newhall Ranch, Valencia, California – This report covered survey results conducted in the Santa Clara River from the Las Brisas Bridge crossing in Ventura County, east (upstream) to the Castaic Creek Confluence. Identification of UTS was accomplished by lateral plate counts. Results of the survey indicated scattered, but regular distribution of UTS east of San Martinez Grande crossing. A few individuals appearing to be UTS, based solely on lateral plate counts, occurred downstream of San Martinez Grande crossing.

Survey Scope and Methods

Though there are no specific survey protocol for sampling UTS, USFWS developed particular criteria to determine sub-specific identification when surveying for sticklebacks. The criteria state “*G. a. williamsoni* are readily distinguished from the other two subspecies on the basis of lateral plate counts alone, provided that at least 25 morphologically mature specimens (i.e., individuals of at least 32mm in standard length [SL], Bell [1981]) are available. Samples of *G. a. williamsoni* generally average 0.06 to 0.55 lateral plates per individual and *G. a. microcephalus* average more than six lateral plates per individual (Bell 1976b).” Plate counts referred to include total number occurring on both sides of the body.

As previously discussed, it is generally accepted by USFWS and UTS experts that sticklebacks occurring east (upstream) of San Martinez Grande Canyon, near the Los Angeles/Ventura County boundary, are the endangered unarmored subspecies. Impact Sciences performed focused surveys for UTS between March 27 and June 15, 2002. Surveys were conducted by Mr. Dave Crawford under the authority of his individual USFWS Section 10(a)(1)(A) Endangered Species Recovery permits.

The purpose of the survey effort was to determine presence/absence, and if present the current distribution of UTS and other special-status fish species within the Natural River Management Plan area. In order to minimize impacts to the species, whenever UTS were detected, an effort was made to collect no more than 25 individuals for subspecific identification purposes. If 25 individual UTS were collected, no further sampling was to be conducted at that survey location. All fish collected during the survey effort were released immediately following identification. No UTS or other special-status fish species were lost during the survey effort.

Sampling was conducted utilizing a 15x5-foot 1/8-inch mesh seine and a small hand net. Most locations observed within the survey reach that supported typically suitable habitat were sampled. However, additional survey sites were also sampled such that representative locations of all habitat types present in the survey reach were included. A total of 48 survey locations were sampled within the survey reach covered in this study (Figure 4). At each sample site, the location was recorded utilizing a GPS unit (with sub-meter accuracy), the stream was sampled for fish and general habitat characteristics were recorded. All fish were identified, as were any other special-status aquatic wildlife species observed. In addition to fish sampling, the survey effort included an analysis of habitat types being utilized by UTS.

SURVEY RESULTS

During some of the survey efforts, there was a higher than average volume of water flowing at a relatively high velocity compared to typical summer season flows. The focus species of this survey, particularly sticklebacks, tend to avoid areas of high velocity flows. Additionally, areas of high flow rates combined with a high volume of water affects the efficiency of the seining efforts with small mesh nets as the weighted line is often lifted from the bottom of the stream, permitting escape of trapped fish. As such, the higher flow rates may have some affect on the data, and therefore, on the perceived distribution of special-status fish species occurring in the survey area.

Several portions of the survey reach were dry at the time of the surveys. These areas are also illustrated in Figure 4. Each of these areas was walked to determine if there were isolated pools potentially supporting fish. There were no such pools discovered in any of the indicated dry stretches of streambed.

Unarmored threespine stickleback and Arroyo chub were recorded in multiple locations within remaining flowing channels of the survey area. One sample site recorded the presence of Santa Ana sucker.

Out of the total 48 sample locations, 21 locations recorded the presence of one or more UTS. Both adults and subadults were recorded in most of the locations where the species was detected. Numerous individuals, including early stage juveniles, were recorded in two general areas including the marshy area north of the main channel at Castaic Junction and the confluence of San Francisquito Creek. Their presence combined with the occurrence of relatively ideal habitat conditions at those areas suggest these may be important breeding and/or nursery areas.

All sticklebacks captured and recorded had one or less lateral plates. Several of the locations yielded 25 or more individuals, confirming the conclusion that these were the endangered unarmored subspecies *G. williamsoni*. The plate counts from this and previous studies in this area, and electrophoresis data previously recorded from these areas, suggest all of the UTS recorded in this survey reach were also of the endangered subspecies.

Santa Ana suckers were identified at only one location. Two single adults were observed at sample station 24. This species has been identified in the survey reach covered by this study previously. As two individuals were identified, and the survey methodology for this study only included a single sampling at any one given point, it is reasonable to assume that Santa Ana suckers still periodically occur throughout the study reach.

Arroyo chub were abundant throughout the reach. They were observed at nearly half of the sample locations, and they occurred in large numbers at most of those locations. All age classes were recorded suggesting that spawning likely occurs throughout both of the survey reaches.

Additional fish species recorded in this survey include prickly sculpin (*Cottus asper*), mosquitofish (*Gambusia affinis*), sailfin molly (*Poecilia latipinna*), goldfish (*Carassius auratus*), and largemouth bass (*Micropterus salmoides*). The latter three species were all recorded at station 48, in the pool created by runoff outfall. None of these species are considered native to the Santa Clara River watershed. Largemouth bass is a predatory fish that may significantly affect native fish populations where it occurs.

Appendix A provides a summary of data collected for each sample site including the recorded GPS coordinates, a brief description of the habitat(s), the species of fish collected, and any other pertinent and incidental recorded observances.

Habitat Evaluation Summary

Nearly all of the Santa Clara River within the Natural River Management Plan area, east (upstream) of the Castaic Creek confluence is considered by regulatory agencies and fisheries biologists to be of relatively high quality for UTS as this species has been identified throughout this reach and because most or all of the primary constituent elements for UTS habitat are present. Results of the surveys reported herein confirm the presence of UTS in scattered locations throughout the survey reach and generally support previous data.

As discussed the habitat evaluation was conducted concurrently with the presence/absence surveys within the survey reach with the goal of identifying specific important breeding and nursery areas, and any other habitats where UTS appeared to occur in concentrated numbers. The data suggest there were two areas within the Natural River Management Plan survey reach that may be of particular importance as breeding and/or nursery areas. These include the marshy areas north of the primary channel at Castaic Junction and the San Francisquito Creek confluence area.

In both areas, habitat conditions are relatively similar in that each support very dense riparian woodlands providing relatively constant shade over shallow, slow moving, marshy areas. In the majority of locations where juvenile UTS were located, there were submergent filamentous algae, emergent vegetation, or both. Juveniles were rarely found where the combined submergent and emergent vegetation covered more than 50 percent of a channel or pool.

CONCLUSION/DISCUSSION

Special status fish species including UTS, Santa Ana sucker, and arroyo chub were identified within several areas of the survey reach that supported surface water. The data further indicate that there are currently two areas of important breeding and grow-out habitat for UTS. Additionally, the presence of several arroyo chubs suggest that habitats and conditions within the surveyed areas continue to be of suitable quality to support reproducing populations of this special-status species. Although only two Santa Ana suckers were identified during the survey effort, it is expected that they still periodically occur as well.

Although the populations of Santa Ana sucker and arroyo chub in the Santa Clara River watershed are considered to be introduced, their presence and persistence here is important as many of the drainages to which they are native, continue to be impacted by urbanization. As such, the Santa Clara River populations may one day serve as an important genetic base for the continued survival of these species if remaining native populations continue to decline elsewhere.

The presence of Santa Ana sucker and arroyo chub does not appear to negatively affect the persistence of UTS where they occur together. Because all three have similar habitat requirements, the management and protection of UTS will likely benefit Santa Ana sucker and arroyo chub.

Management and protection of UTS should continue and should include measures to preserve and protect all of the primary constituent elements. Permanent stream flow is facilitated in the subject survey area by releases of tertiary treated water from the WRP No. 32 near Castaic Junction and WRP No. 26

further upstream (adjacent to Bouquet Canyon Road Bridge). Past and recent survey data suggest that this perennial effect may facilitate year-round breeding and a greater amount of dispersal habitat for young downstream of these releases. As the releases are intermittent, some areas of slow current are maintained, turbidity is minimized and the treatment process of the water appears to satisfactorily limit pollution. Additional measures to limit the influx of pollutants into the river should continue to be part of the design and environmental review process for future development projects along the river. Further, it will be important to ensure existing natural barriers of genetic transfer are maintained such that the semi-armored subspecies of stickleback is not permitted to breed with the unarmored population.

Of particular importance is the protection of the two identified breeding/nursery areas. It will be important to consider these areas when designing any future bank stabilizations or channel improvements. Specifically, it will be important to maintain shallow, slow-moving marshy areas and the associated riparian woodland vegetation. Buried bank stabilization has already been completed on the northwest side of the San Francisquito Creek confluence. The existence and persistence of the adjacent high-quality breeding and nursery habitat suggest that this form of stream bank stabilization, combined with conservation of existing riparian woodlands, would be the preferred method for future projects in the river and its tributaries.

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APPENDIX A

Natural River Management Plan Area Fish Survey Data

Appendix A
Natural River Management Plan Area Fish Survey Data

Station # 1	GPS location: 34° 26' 07"N 118° 36' 45"W
Habitat Description:	[Main channel] Stream width ±5', Depth ±24" Sandy cobble substrate Outer dense willows; Stream edge dense cattails, mule fat No submergent algae
Species Recorded:	arroyo chub
Station # 2	GPS location: 34° 26' 08"N 118° 36' 44"W
Habitat Description:	[Marshy area at base of south bank] Stream width ±2', Depth ±1", Silty sand substrate Edge of dense cottonwood/willow woodland; mule fat, cocklebur No submergent algae
Species Recorded:	None
Station # 3	GPS location: 34° 26' 08"N 118° 36' 43"W
Habitat Description:	[Narrow braid] Stream width ±4', Depth ±2", sandy substrate Dense willow and cottonwood; No submergent algae
Species Recorded:	None
Station # 4	GPS location: 34° 26' 06"N 118° 36' 42"W
Habitat Description:	[Narrow braid at base of south bank] Stream width ±2', Depth ±4", Silty sand substrate Outer dense willow/cottonwood/arundo; Stream edge grass, water speedwell, cattail, watercress <5% submergent algae
Species Recorded:	14 UTS (all age classes)
Station # 5	GPS location: 34° 26' 08"N 118° 36' 42"W
Habitat Description:	[Narrow braid at base of north bank] Stream width ±3', Depth ±4", Sandy substrate Dense giant reed/willow/cottonwood/grass <10% submergent filamentous algae
Species Recorded:	1 UTS (1 subadult)
Station # 6	GPS location: 34° 26' 09"N 118° 36' 35"W
Habitat Description:	[Narrow braid at base of north bank] Stream width ±4', Depth ±3", Sandy substrate Dense giant reed/willow/cottonwood/grass <10% submergent filamentous algae
Species Recorded:	10 UTS (7 subadults, 3 adults), arroyo chub, mosquitofish

Appendix A (continued)
Natural River Management Plan Area Fish Survey Data

Station # 7	GPS location: 34° 26' 08"N 118° 36' 39"W
Habitat Description:	[Marshy area at base of north bank, south of ag field] Stream width ±6', Depth ±4", silty substrate Dense willows/arundo/mule fat - shaded No submergent filamentous algae
Species Recorded:	Four (4) UTS (1 adult m, 3 subadult)
Station # 8	GPS location: 34° 26' 11"N 118° 36' 37"W
Habitat Description:	[Marshy area at base of north bank, south of ag field] Stream width ±6', Depth ±4", silty substrate Dense willows/giant reed/mule fat - shaded No submergent filamentous algae
Species Recorded:	Four (4) UTS (1 adult m, 3 subadult)
Station # 9	GPS location: 34° 26' 12"N 118° 36' 35"W
Habitat Description:	[Small braided channel at base of north bank, south of ag field] Stream width ±4', Depth ±10", silty sand substrate Dense willows/giant reed - shaded 10% submergent filamentous algae
Species Recorded:	10 UTS (5 adult, 5 juvenile), mosquitofish
Station # 10	GPS location: 34° 26' 12"N 118° 36' 32"W
Habitat Description:	[Small braided channel at base of north bank, south of ag field] Stream width ±4', Depth ±10", silty sand substrate Dense willows/giant reed - shaded 20% submergent filamentous algae
Species Recorded:	12 UTS (5 adult, 2 subadult, 5 juvenile)
Station # 11	GPS location: 34° 26' 07"N 118° 36' 23"W
Habitat Description:	[Primary channel] Stream width ±5', Depth ±14" Gravelly cobble substrate Outer banks relatively dense willows/oak - partially shaded Stream edge grasses/water speedwell/sedge/cattail No submergent algae
Species Recorded:	arroyo chub
Station # 12	GPS location: 34° 26' 06"N 118° 36' 19"W
Habitat Description:	[Primary channel] Stream width ±5', Depth ±18" Gravelly cobble substrate Relatively dense willows/cottonwood - partially shaded Stream edge grasses/water speedwell/sedge/cattail No submergent algae
Species Recorded:	arroyo chub

Appendix A (continued)
Natural River Management Plan Area Fish Survey Data

Station # 13	GPS location: 34° 26' 12"N 118° 36' 18"W
Habitat Description:	[Marshy area/pool on north side of primary channel] Stream width ±4', Depth ±18", silty substrate Dense willow/cottonwood/mule fat - shaded 25% submergent filamentous algae
Species Recorded:	24 UTS (all age classes, one gravid female)
Station # 14	GPS location: 34° 26' 05"N 118° 36' 15"W
Habitat Description:	[Primary channel] Stream width ±5', Depth ±18" Gravelly cobble substrate North bank willows/mule fat - partially shaded Stream edge grasses/water speedwell/sedge/cattail No submergent algae
Species Recorded:	arroyo chub
Station # 15	GPS location: 34° 26' 03"N 118° 36' 09"W
Habitat Description:	[Primary channel] Stream width ±8', Depth ±14" Gravelly cobble substrate Outer clumps of willow/mule fat; Stream edge grass/water speedwell/sedge No submergent algae
Species Recorded:	None
Station # 16	GPS location: 34° 26' 03"N 118° 36' 04"W
Habitat Description:	[Primary channel] Stream width ±8', Depth ±12" Gravelly cobble substrate Outer clumps of willow/mule fat; Stream edge grass/water speedwell/sedge No submergent algae
Species Recorded:	arroyo chub
Station # 17	GPS location: 34° 26' 03"N 118° 36' 04"W
Habitat Description:	[Edge of marshy area north side of primary channel] Stream width ±3', Depth ±4", sandy cobble substrate Relatively dense willow/cottonwood/mule fat - partially shaded No submergent algae
Species Recorded:	Mosquitofish
Station # 18	GPS location: 34° 26' 05"N 118° 36' 04"W
Habitat Description:	[Edge of marshy area north side of primary channel] Stream width ±3', Depth ±4", sandy cobble substrate Dense willow/cottonwood/mule fat - partially shaded No submergent algae
Species Recorded:	12 UTS (10 subadult, 2 adult m)

Appendix A (continued)
Natural River Management Plan Area Fish Survey Data

Station # 19	GPS location: 34° 26' 08"N 118° 35' 52"W
Habitat Description:	[Marshy area north side of primary channel] Stream width ±8', Depth ±6", sandy substrate Dense willow/cottonwood/mule fat - shaded No submergent algae
Species Recorded:	Three (3) adult UTS (1 m, 2 f)
Station # 20	GPS location: 34° 26' 07"N 118° 35' 48"W
Habitat Description:	[Marshy area north side of primary channel] Stream width ±3', Depth ±10", sandy substrate Dense willow/cottonwood/mule fat - shaded No submergent algae
Species Recorded:	mosquitofish
Station # 21	GPS location: 34° 26' 06"N 118° 35' 39"W
Habitat Description:	[Marshy area north side of primary channel] Stream width ±5', Depth ±4", sandy substrate Dense willow/cottonwood/mule fat - shaded No submergent algae
Species Recorded:	Over 25 UTS (all age classes; many juvenile), mosquitofish
Station # 22	GPS location: 34° 26' 06"N 118° 35' 38"W
Habitat Description:	[Marshy area north side of primary channel] Stream width ±5', Depth ±6", sandy substrate Dense willow/cottonwood/mule fat - shaded No submergent algae
Species Recorded:	Five (5) adult UTS (1 m, 4 f [one gravid]), mosquitofish, Arroyo chub
Station # 23	GPS location: 34° 25' 44"N 118° 35' 31"W
Habitat Description:	[Primary channel] Stream width ±15', Depth ±10" Sandy cobble substrate Relatively dense willow/cottonwood; Stream edge grass/mustard/sedge/water speedwell No submergent filamentous algae
Species Recorded:	Arroyo chub/prickly sculpin
Station # 24	GPS location: 34° 25' 41"N 118° 35' 25"W
Habitat Description:	[Primary channel] Stream width ±8', Depth ±18" Cobbly rocky substrate Wooded terraces (willow/cottonwood); Stream edge grass/water speedwell/watercress No submergent filamentous algae
Species Recorded:	Arroyo chub/Santa Ana sucker

Appendix A (continued)
Natural River Management Plan Area Fish Survey Data

Station # 25	GPS location: 34° 25' 39"N 118° 35' 18"W
Habitat Description:	[Primary channel] Stream width ±6', Depth ±18" Sandy cobble substrate Wooded terraces (willow/cottonwood); Stream edge grass/water speedwell/watercress No submergent filamentous algae
Species Recorded:	Arroyo chub
Station # 26	GPS location: 34° 25' 35"N 118° 35' 08"W
Habitat Description:	[At Old Road Bridge] Stream width ±14', Depth ±6", cobble substrate Open scattered willow/mule fat/grass/water speedwell No submergent algae
Species Recorded:	Arroyo chub, mosquitofish
Station # 27	GPS location: 34° 25' 34"N 118° 35' 05"W
Habitat Description:	[Side channel – between I-5 and Old Road bridges] Stream width ±4', Depth ±18", Silty sand substrate Willow/mule fat/cattail/rush/speedwell/watercress No submergent algae
Species Recorded:	One (1) juv UTS, arroyo chub
Station # 28	GPS location: 34° 25' 31"N 118° 34' 57"W
Habitat Description:	[Primary channel, east side of I-5 Bridge] Stream width ±6', Depth ±20", Sandy cobble substrate Scattered willow/mule fat; Stream edge grass No submergent algae
Species Recorded:	arroyo chub
Station # 29	GPS location: 34° 25' 33"N 118° 34' 45"W
Habitat Description:	[Braided channels, downstream of RR crossing] Stream width ±5', Depth ±4", Sandy substrate Scattered mule fat; Stream edge grass/water speedwell/mustard 10% submergent algae
Species Recorded:	arroyo chub, mosquitofish – shallow areas appeared to be nursery for both species
Station # 30	GPS location: 34° 25' 34"N 118° 34' 41"W
Habitat Description:	[Primary channel, at RR crossing] Stream width ±6', Depth ±7", Sandy cobble substrate Willow/cocklebur/sedge/grasses No submergent filamentous algae
Species Recorded:	None

Appendix A (continued)
Natural River Management Plan Area Fish Survey Data

Station # 31	GPS location: 34° 25' 37"N 118° 34' 26"W
Habitat Description:	[River and Creek channel at San Francisquito Creek confluence] Width ±4', Depth ±6", Sandy cobble substrate Willow/cocklebur/nasturtium/sedge/grasses No submergent filamentous algae
Species Recorded:	Two (2) UTS (1 juv, 1 adult m), arroyo chub
Station # 32	GPS location: 34° 25' 43"N 118° 34' 24"W
Habitat Description:	[Marshy area at San Francisquito Creek confluence] Width ±15', Depth ±4" Silty cobble substrate Open willows/cottonwood/rush - partially shaded <10% submergent algae
Species Recorded:	Arroyo chub, mosquitofish
Station # 33	GPS location: 34° 25' 41"N 118° 34' 21"W
Habitat Description:	[Marshy area at San Francisquito Creek confluence] Width ±20', Depth ±10" Silty sand substrate Dense willows/cottonwood/rush - shaded No submergent algae
Sample Results:	Over 25 UTS (all age classes), mosquitofish, arroyo chub
Station # 34	GPS location: 34° 25' 43"N 118° 34' 19"W
Habitat Description:	[Marshy area at San Francisquito Creek confluence] Width ±25', Depth ±8" Silty cobble substrate Dense willows/rush - shaded No submergent algae
Species Recorded:	25+ UTS (all age classes),
Station # 35	GPS location: 34° 25' 44"N 118° 34' 15"W
Habitat Description:	[Edge of marshy area at San Francisquito Creek confluence] Width ±8', Depth ±4" Silty cobble substrate Willows/cottonwood/smartweed/grasses - partially shaded No submergent algae
Species Recorded:	Six (6) juvenile UTS, mosquitofish

Appendix A (continued)
Natural River Management Plan Area Fish Survey Data

Station # 36	GPS location: 34° 25' 35"N 118° 34' 11"W
Habitat Description:	[One of three channel braids] Stream width ±6', Depth ±6"; Sandy cobble substrate Cattail/smartweed <5% submergent filamentous algae
Species Recorded:	Four (4) adult UTS (3f, 1m), mosquitofish (western toad tadpoles)
Station # 37	GPS location: 34° 25' 30"N 118° 33' 55"W
Habitat Description:	[Small side channel] Stream width ±2', Depth ±2", Sandy substrate Scattered grasses/smartweed No submergent filamentous algae
Species Recorded:	One (1) adult UTS (f), arroyo chub
Station # 38	GPS location: 34° 25' 30"N 118° 33' 47"W
Habitat Description:	[Open channel] Stream width ±10'; Depth ±6"; Sandy cobble substrate Grasses/smartweed on both banks <5% submergent filamentous algae
Species Recorded:	None
Station # 39	GPS location: 34° 25' 30"N 118° 33' 42"W
Habitat Description:	[Smaller side channel, west side of McBean Bridge] Stream width ±2', Depth ±4"; Cobble substrate Smartweed, grasses, cattail, young willows on both banks No submergent algae
Species Recorded:	Mosquitofish
Station # 40	GPS location: 34° 25' 28"N 118° 33' 40"W
Habitat Description:	[Slow side channel near McBean Bridge] Stream width ±4'; Depth ±2"; Sandy silt substrate Relatively dense smartweed/mule fat/young willow on both banks No submergent filamentous algae
Species Recorded:	Four (4) subadult UTS, arroyo chub
Station # 41	GPS location: 34° 25' 25"N 118° 33' 28"W
Habitat Description:	[Primary channel] Stream width ±8'; Depth ±4" Sandy cobble substrate Both banks relatively dense willow/mule fat/smartweed/grasses 10% submergent filamentous algae
Species Recorded:	None

Appendix A (continued)
Natural River Management Plan Area Fish Survey Data

Station # 42	GPS location: 34° 25' 20"N 118° 33' 22"W
Habitat Description:	[Secondary braid in South Fork near confluence] Stream width ±3'; Depth ±2"; Sandy substrate Relatively open with willow, mule fat, smartweed, grass <5% submergent algae
Species Recorded:	Four (4) subadult UTS
Station # 43	GPS location: 34° 25' 24"N 118° 33' 08"W
Habitat Description:	[Secondary braid of channel] Stream width ±2'; Depth ±2" cobble substrate smartweed, grass, cattail, small willows <5% submergent filamentous algae
Species Recorded:	Mosquitofish
Station # 44	GPS location: 34° 25' 29"N 118° 32' 47"W
Habitat Description:	[Confluence of primary and secondary stream braids] Stream width ±10'; Depth ±14"; Sandy cobble substrate Willows, few cottonwood, giant reed, No submergent algae
Species Recorded:	None
Station # 45	GPS location: 34° 25' 30"N 118° 32' 43"W
Habitat Description:	[Primary channel] Stream width ±8'; Depth ±12"; Sandy substrate; dense cattails No submergent algae
Species Recorded:	None
Station # 46	GPS location: 34° 25' 31"N 118° 32' 36"W
Habitat Description:	[Secondary braid of channel] Stream width ±15'; Depth ±4"; Sandy cobble substrate Both banks relatively open with patches of willow, mule fat, smartweed, cattail, grass <10% submergent filamentous algae
Species Recorded:	Mosquitofish
Station # 47	GPS location: 34° 25' 30"N 118° 32' 31"W
Habitat Description:	[Near confluence w/ Bouquet Creek] Stream width ±6'; Depth ±6"; Sandy substrate; open cattail, willows Approximately 20% submergent filamentous algae
Species Recorded:	Mosquitofish

Appendix A (continued)
Natural River Management Plan Area Fish Survey Data

Station # 48	GPS location: 34° 25' 26"N 118° 32' 23"W
Habitat Description:	[Large outflow pipe from development to north] Stream width ±6'; Depth ±3'; Silty sand substrate Pool at base of pipe outflow, apparently planted with mule fat and willow. Cattails present. Dense filamentous algae
Species Recorded:	Sailfin molly, goldfish, largemouth bass

