
Impact Sciences, Inc., "Results of Focused Surveys for Arroyo Toad and Special-Status Aquatic Reptiles and Amphibians within the Natural River Management Plan Area, Valencia, California" (September 19, 2001)

**Results of Focused Surveys for
Arroyo Toad and
Special-Status Aquatic Reptiles and Amphibians
within the
Natural River Management Plan Area
Valencia, California**

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Results of Focused Surveys for Arroyo Toad and Special-Status Aquatic Reptiles and Amphibians within the Natural River Management Plan Area Valencia, California

The following presents the findings of focused protocol surveys that were conducted to determine the presence/absence of the federally-listed Endangered arroyo toad (*Bufo californicus*) within portions of the Santa Clara River, South Fork Santa Clara River, San Francisquito Creek, and Bouquet Canyon Creek in Los Angeles County that, together, comprise the Natural River Management Plan (NRMP) area. This report is intended to provide project specific biological information to Valencia Company, U.S. Army Corps of Engineers (ACOE) and U.S. Fish and Wildlife Service (FWS) regarding results of focused surveys for arroyo toad and additional special-status amphibians and aquatic reptiles including southwestern pond turtle (*Clemmys marmorata pallida* – herein SPT) and two-striped garter snake (*Thamnophis hammondi* – herein TGS) conducted on the subject site.

INTRODUCTION

The NRMP area totals approximately 1200 acres and is located in north Los Angeles County (Figure 1). Surveys were conducted in potentially suitable habitat in portions of the Santa Clara River from the confluence with Castaic Creek, east approximately eight (8) miles to a Southern California Edison easement located east of the Los Angeles Aqueduct pipe river crossing. The survey area also included portions of San Francisquito Creek (approximately 2.8 miles), South Fork Santa Clara River (Approximately 1.1 miles), and Bouquet Canyon Creek (0.3 mile). The survey area is situated within the Newhall, California U.S. Geological Survey (USGS) 7.5-minute quadrangle map, (Figure 2).

General Arroyo Toad Background

The arroyo toad is a small (generally 2 to 3 inches in snout to vent length), light greenish gray or tan toad with warty skin and dark spots. Its underside is white or buff colored without spots. A light-colored stripe crosses the head and eyelids, and a light area usually occurs on each sacral hump and in the middle of the back (FWS, 1994). The arroyo toad does not have the prominent white dorsal stripe characteristic of the western toad (*Bufo boreas*).

The arroyo toad was listed as a federally Endangered species by the Service on December 16, 1994 (50 CFR Part 17). The arroyo toad is also considered a Species of Special Concern by the California Department of Fish and Game and a Protected Amphibian under the state Fish and Game Code. A

NRMP Arroyo Toad Report

L E G E N D

 Arroyo Toad Protocol Survey Reach

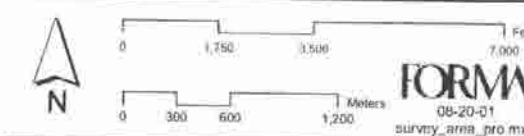


Figure 2

SURVEY AREA

federal Recovery Plan was prepared in 1999 and critical habitat was defined in February 2001. Much of the information in the federal listing documents (FWS 1994, 1999, 2001a) regarding the biology of the arroyo toad was derived from extensive research conducted by Dr. Samuel Sweet of the University of California, Santa Barbara (Sweet 1992, 1993). Additional detail is included in the Recovery Plan (FWS 1999) and a radio telemetry study conducted by Ruben Ramirez (2000).

Although considered a subspecies by some taxonomists, the nearest population of the arroyo toad's closest relatives is the Colorado River basin. Based on the separation from the other subspecies and results from recent genetic tests, it has been recommended that the arroyo toad be considered a separate species (FWS 2001a). For this reason, many biologists refer to arroyo toad as *Bufo californicus* and is, therefore, considered as such in this report.

Arroyo toad historically ranged from the upper Salinas River, south through the Santa Ynez, Santa Clara, and Los Angeles River basins and the coastal drainages of Orange, Riverside, and San Diego Counties to the Arroyo San Simeon system into Baja California, Mexico (FWS 1999). As of 1994 arroyo toad was known from only 22 populations (Ramirez 2000). Many areas that may have historically contained suitable breeding habitat for arroyo toad have been degraded by dam and flood control construction, off-road recreation, urbanization, mining, and introduced predators (FWS, 1999). This species is currently found in relatively small, isolated populations. Most remaining populations of arroyo toad occur on privately owned lands. Less than 50 percent of the known extant populations of arroyo toad occur on the Los Padres, San Bernardino, and Cleveland National Forests (FWS, 1994).

Overview of Arroyo Toad Habitat Characteristics

In general, arroyo toad requires habitat features that occur in drainages of a narrow, intermediate range of size that have a sufficient number of tributaries to produce an amount of alluvium necessary to decrease the gradient and form suitable breeding pools (Sweet 1992). Dr. Sweet's research in the Los Padres National Forest also suggests that "The late breeding season and long periods of dependence on surface water of arroyo toad larvae and juveniles restrict them from occurring in areas where the riverbed dries out by early summer (1992)."

Habitats utilized by arroyo toad include both breeding sites and over-wintering sites. Suitable breeding habitat features include shallow pools with a minimum of vegetation along one or both margins during the breeding season (Sweet 1992). Preferred pools occur adjacent to sand bars and sandy, stream terraces with vegetation that is mature enough to stabilize the terrace soils during all but the largest storm events. Eggs are deposited and larvae develop in shallow pools with minimal current,

little or no emergent vegetation, and a sand or pea gravel substrate overlain with silt (FWS, 1994). As described by Sweet (1992), the following characteristics are relatively consistent with documented breeding pools: proximity to sandy terrace habitat; minimal current; the majority of the pool is less than 30 cm deep; substrate is sand, gravel, or pebbles; a gently sloping shoreline, or central sand bar; and bordering vegetation is low or set back such that most of the pool is open to the sky.

After metamorphosis (usually in June and July), juvenile toads commonly remain on the bordering gravel bars until the pool dries up (often between 3 and 8 weeks) (Sweet 1992). Juvenile and adult frogs feed on insects on sandy stream terraces with a sparse understory at ground level and a light to moderate overstory of riparian trees, including cottonwoods (*Populus* sp.), oaks (*Quercus* sp.), or willows (*Salix* sp.). Adult toads excavate shallow burrows on the terraces for shelter during the day when the surface is still damp or for longer intervals during the dry season (FWS, 1994).

Adult arroyo toad extensively utilize terraces and marginal zones (areas of mixed sediments that occur between the stream channel and mature riparian vegetation zone) outside the breeding season "and seem to have a critical dependence on terrace habitat in the late fall and winter months, when they are generally inactive" (Sweet 1992). Terraces utilized occur in the vicinity of breeding sites and are commonly characterized by sparse to moderate vegetation including mule fat (*Baccharis salicifolia*), California sycamore (*Platanus racemosa*), cottonwoods (*Populus* spp.), willow (*Salix* spp.), and coast live oak (*Quercus agrifolia*). The understory in these habitats may be bare or consist of scattered grasses herbs, and leaf litter (FWS 2001a). In order for any of these habitats to be suitable for arroyo toad use, several areas of open friable sand must be present where they can burrow (FWS 2001a).

Adult arroyo toads have also been documented in upland habitats outside of a stream channel, primarily outside of the breeding season. These 'uplands' are generally associated with accessible upper flood terraces that occur in the vicinity of breeding habitat. Upland habitats utilized by over-wintering arroyo toad include alluvial scrub, coastal sage scrub, chaparral, grassland and oak woodland (FWS 2001a). Soils are also important in these over-wintering habitats. Though individual arroyo toad have been documented from small mammal burrows, the majority of data suggests that they prefer sandy soils in which to burrow (Bloom, personal communication). Data collected by Ramirez (2000) suggest that arroyo toad may move burrow sites to follow soil moisture levels. Some arroyo toad have been documented to move back into the stream channel itself during the driest part of the season.

There is some variation in the timing of arroyo toad breeding based upon location and environmental conditions, but it generally takes place between February and late June. In the region that includes the subject survey area, breeding generally occurs between April and June. Adult males will select a

breeding site generally based on the criteria described above, but may call from a variety of positions within the pools including the margins, edges of central bars, submerged bars, or occasionally from the surface of dense submerged vegetation (Sweet 1992). During courtship, males vocalize a high trill usually lasting 8 to 10 seconds (FWS 1999).

Critical Habitat Designation

Critical habitat is defined by the USFWS 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).

Criteria used by FWS to select critical habitat includes evaluation of an area to determine the presence of "primary constituent elements," as defined at 50 CFG 424.12(b) (FWS 2001a). These elements include physical and biological features that are essential to the conservation of the species, and that may require special management and protection (FWS 2001a). Primary constituent elements for the arroyo toad include aquatic breeding habitats and non-breeding upland habitats. These elements are discussed by Sweet (1992, 1993) and are specifically outlined in the Final Rule and include:

- A hydrologic regime that supplies sufficient flowing water of suitable quality and sufficient quantity to sustain eggs, tadpoles, metamorphosing juveniles, and adult breeding toads;
- Low-gradient stream segments (typically less than 4 percent) with sandy or fine gravel substrates which support the formation of shallow pools and sparsely vegetated sand and gravel bars for breeding and rearing of tadpoles and juveniles;
- A natural flooding regime or one sufficiently corresponding to a natural regime that will periodically scour riparian vegetation, rework stream channels and terraces, and redistribute sands and sediments, such that adequate numbers and sizes of breeding pools and sufficient terrace habitats with appropriate vegetation are maintained;
- Upland habitats (particularly alluvial streamside terraces and adjacent valley bottomlands that include areas of loose soil and dependable subsurface moisture where toads can burrow underground

and avoid desiccation) of sufficient width and quality to provide foraging and living areas for subadult and adult arroyo toads;

- Few or no nonnative species that prey upon or compete with arroyo toads, or degrade their habitat;
- No manmade barriers that completely or substantially impede migration to over-wintering sites, dispersal between populations, or recolonization of areas that contain suitable habitat;
- Limited human-related disturbance.

It should be noted, and is discussed in the Final Rule that arroyo toad are not distributed uniformly throughout the designated critical habitat areas and that breeding and upland habitats are patchily distributed (FWS 2001a). The nature of breeding habitats is dynamic and may shift in structure and location from year to year depending upon seasonal rainfall and storm cycles. Similarly upland habitats, though more stable, can be affected by fire, storms, and other natural events.

Determination of whether an area was critical to the conservation of arroyo toad was accomplished by determining if an area 1) supports a substantial core population; 2) supports at least a small arroyo toad population and possesses favorable habitat conditions for population expansion and persistence; 3) suitable habitat situated in a location that appears to be crucial for maintaining the viability of a larger metapopulation; 4) occupied habitat on the periphery of the arroyo toad's geographic range; and 5) occupied habitat in atypical or underrepresented ecological environments (e.g., high elevation or desert-edge populations (FWS 2001a).

In order to preserve as much of the ecological and geographic diversity of arroyo toad distribution, three recovery units were selected. These are referred to as the Northern, Southern, and Desert recovery units. These units are based on ecological and geographic separation and the known and historic range of the species. The Service's goal is to stabilize and expand the populations in these units in order to preserve the species' genetic diversity as well as the environments in which the species is found (FWS 1999). The recovery units are based on the U.S. Geological Survey hydrologic subregion and accounting unit boundaries as delineated on the Hydrologic Unit Map. The objective of the recovery plan is to initially recover the arroyo toad sufficiently to warrant reclassification to Threatened status and finally to recover the species sufficiently to warrant delisting altogether (FWS 2001a).

USFWS has identified 22 critical habitat units for the recovery of the arroyo toad. The unit nearest to the NRMP is Unit 6, the Upper Santa Clara River Basin, which consists of portions of Castaic and San Francisquito Creeks, the Santa Clara River, and adjacent uplands, encompassing approximately 8,305

acres (Figure 3). USFWS (2001a) states that the NRMP (and its associated conservation easement) is essential as it serves as a dispersal corridor for arroyo toads between Castaic Creek and San Francisquito Creek. Arroyo toads have been recorded at the following locations within critical habitat Unit 6:

- Castaic Creek – both above and below the reservoir – occurrences documented on Department of Water Resources land and the Angeles National Forest both above and below the Castaic Lake reservoir (FWS 1999, FWS 2001a)
- Upper San Francisquito Creek – recent surveys (presumably on Forest Service land) “found evidence of the species” in this drainage within the designated critical habitat area (FWS 2001a).
- Santa Clara River – 2000 CNDDDB report of 6 arroyo toad tadpoles observed by Dr. Lou Courtois in the river adjacent to Castaic Junction site.

The FWS (2001a) considers the Santa Clara River to be essential as a dispersal corridor for arroyo toads between Castaic Creek and upper San Francisquito Creek. FWS (2001a) believes the stability of the Upper Santa Clara River basin arroyo toad population will increase substantially with appropriate management of non-native plants and animals and habitat rehabilitation. These activities are already underway in the lower San Francisquito Creek area and include removal of giant cane and tamarisk from the streambed and supplemental plantings of willows and cottonwoods.

METHODOLOGY



Previous Studies In and Near the NRMP Project Area

Documentation pertinent to the biological resources in the vicinity of the site was reviewed and analyzed. Information reviewed included: (1) the Federal Register listing package for the federally listed Endangered arroyo toad potentially occurring on the project site; (2) literature pertaining to habitat requirements of sensitive species potentially occurring on the project site; (3) the California Natural Diversity Data Base (CNDDDB 2001) information regarding special-status species potentially occurring on the project site for the Newhall, Val Verde, and Mint Canyon USGS 7.5-minute quadrangle maps, and (4) previous surveys for aquatic resources in the NRMP project area. A summary of the results are provided below.



NRMP Arroyo Toad Report

L E G E N D

-  NRMP Survey Area
-  Arroyo Toad Critical Habitat

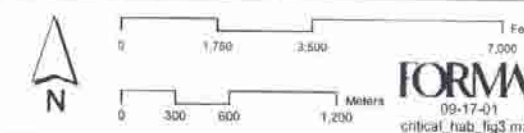


Figure 3

CRITICAL HABITAT (UNIT 6)

- Federal Register – The December 16, 1994 Determination of Endangered Status for the Arroyo Southwestern Toad (50 CFG Part 17, RIN 1018-AB97) cited arroyo toad locations from Sespe and Piru Creeks and the Los Padres National Forest (FWS 1994). There were no records of any arroyo toad in the NRMP area mentioned in this report.
- The February 7, 2001 Final Designation of Critical Habitat for the Arroyo Toad; Final Rule (50 CFR Part 17, Vol. 66, No. 26), stated that arroyo toad have been reported from Castaic Creek above and below the reservoir and from San Francisquito Creek between the southern end of Section 34 and Bee Canyon. There were no records of any arroyo toad in the NRMP area mentioned in this report (FWS 2001a).
- Rare Plant and Animal Survey, Santa Clarita Water District Service Area (San Marino Environmental Associates, 1995) – Non-protocol reconnaissance surveys were conducted in the NRMP project area, but the species was not observed. However, the author states that it could be present in low numbers.
- Sensitive Aquatic Species Survey for Newhall Land & Farming Company (San Marino Environmental Associates, 1995) – Non-protocol reconnaissance surveys were conducted of the Santa Clara River from Bouquet Canyon to Castaic Creek, and along San Francisquito. None were found.
- Newhall Ranch Biota Report (RECON, 1995) – Non-protocol surveys were conducted on the Santa Clara River for the Newhall Ranch Specific Plan EIR prepared by Los Angeles County. None were seen during the surveys, but there is a moderate potential for their occurrence on the main stem in Newhall Ranch. Downstream of the NRMP.
- Survey for Arroyo Toad for Newhall Ranch (RECON, 1999) – Protocol surveys were conducted, but no toads were observed. However, appropriate habitat is present downstream of the NRMP.
- Biota Report for SEATAC for West and East Creek Projects on San Francisquito Creek (Impact Sciences, 1998) – Report states that the species may travel periodically to project area from upstream population; cited Frank Hovore's report of anuran (frog or toad) eggs observed in the project area, but washed away by stream flows before an accurate identification could be made.
- Surveys on Tesoro del Valle (White and Leatherman Bioservices, 2001) – Arroyo toad habitat assessment for the Tesoro del Valle project located on San Francisquito Creek, immediately north of the NRMP project area. The assessment focused on the Tesoro project area, as well as

approximately 9 linear miles of San Francisquito Creek habitat, north from its confluence with the Santa Clara River. The evaluation was based on the presence or absence of primary constituent habitat elements. The report concluded that the most critical primary constituent element is a hydrologic regime that supports habitat for breeding adults, eggs, tadpoles, and metamorphosing juveniles (Leatherman, 2000). As such, it was determined that the best potential habitat for the arroyo toad in San Francisquito Creek occurs north of the Tesoro del Valle project site on the National Forest. The report further stated that though the project area and other portions of San Francisquito Creek south of U.S. Forest Service lands supported many of the primary constituent elements, the hydrologic regime was not present. Therefore, it was concluded that this portion of San Francisquito Creek would only be useful for dispersing individuals if they were to occur in the immediate area.

- Sandburg Reconnaissance Surveys, NRMP project area – In April 2001, Ms. Nancy Sandburg conducted surveys in the Santa Clara River on Newhall Land and Farming property. In notes sent to the USFWS, Ms. Sandburg reported observations of a total of four adult toads from several survey efforts. Each was detected in the Santa Clara River in the near vicinity of the San Francisquito Creek confluence. A single adult was observed at night on April 18 and three adults were reported as observed in the same general vicinity on the following week although their exact location is unknown. Ms. Sandburg's notes did not include detection of any vocalizations or any other breeding behavior.
- Sandburg Reconnaissance Surveys, Soledad Canyon area – In May 2001, Ms. Sandburg conducted arroyo toad surveys in the Santa Clara River in the Soledad Canyon area. Arroyo toad tadpoles (three separate cohorts) were reported from three separate drying pools within the project reach which includes the portion of the Santa Clara River occurring between the River's End vacation park and the proposed Transit Mix Concrete company mine. This site is situated approximately 9 miles east of the NRMP. Ms. Sandburg noted that there was a potential for some of the tadpoles to be lost before metamorphosis due to the rapid evaporation of the remaining water in the pools (Sandburg 2001).

Survey Scope and Methods

USFWS developed a survey protocol to determine the presence or absence of arroyo toad (FWS 2001b; see Appendix A). The protocol requires six focused surveys be conducted in suitable habitat between March 15 and July 1 with at least seven days between surveys. The surveys were timed such that at least one survey is conducted during the months of April, May, and June. Surveys should include both

daytime and nighttime components conducted within the same 24-hour period. The surveys should not be conducted during adverse weather conditions because environmental conditions such as low temperatures, high winds, and rain may affect the behavior of arroyo toad. Full moon phases should also be avoided.

Impact Sciences conducted protocol surveys for arroyo toad beginning April 17, 2001 on approximately 11.5 total miles of the Santa Clara River and associated tributaries. Surveyors included Impact Sciences Senior Biologist David Crawford, Mr. Scott Cameron of Ecological Sciences, Inc., Mr. Pete Bloom and Ms. Chris Neimela. Both Mr. Cameron and Mr. Bloom hold current FWS Section 10(a)(1)(A) Endangered Species Recovery permits to survey and handle this species. Ms. Neimela is named as an authorized assistant on Mr. Bloom's permit. Mr. Crawford has also had considerable experience surveying, trapping, and relocating arroyo toads with both Mr. Cameron and Mr. Bloom.

The primary purpose of the survey effort was to determine presence/absence of arroyo toad within the NRMP area. As such, pursuant to protocol, if and when any arroyo toads were observed or detected, surveys would cease in those specific areas. Surveys were continued in areas adjacent to observed toads in order to accurately map the specific locations of all occupied areas within the entire survey reach.

In order to cover the entire survey reach following FWS survey guidelines, the NRMP area was divided into five separate survey zones such that each zone could be fully evaluated by two biologists during a single survey effort. The limits of each survey zone are described as follows:

- **Castaic Junction** – The portion of the Santa Clara River that occurs between the confluence of Castaic Creek and the Interstate 5 overpass (**Figure 4a**). Six (6) focused surveys were conducted in this zone on April 17, May 15, May 27, June 11, June 18, and June 26, 2001.
- **NRMP 1** – The portion of the Santa Clara River extending east from the Interstate 5 overpass to the McBean Parkway Bridge. NRMP 1 also includes the lower portion of San Francisquito Creek from its confluence at the Santa Clara River, north to approximately 150 meters north of the Newhall Road Bridge (**Figure 4b**). Six (6) focused surveys were conducted in this zone on April 26, May 4, May 24, May 31, June 8, and June 15, 2001.
- **NRMP 2** – The portion of the Santa Clara River situated between the McBean Parkway Bridge and a point approximately 450 meters east of the Bouquet Canyon Road Bridge. NRMP 2 also includes the portion of Bouquet Canyon Creek from its confluence with the Santa Clara River, northeast to Newhall Ranch Road and the portion of the South Fork Santa Clara River from its confluence with

the Santa Clara, southeast to the Magic Mountain Parkway Bridge (Figure 4c). Six (6) focused surveys were conducted in this zone on April 28, May 8, May 25, June 9, June 16, and June 23, 2001.

- **NRMP 3** – The portion of the Santa Clara River situated between the eastern terminus of NRMP 2 and the eastern edge of the Newhall Land and Farming property boundary, approximately 750 meters east of where the Los Angeles Aqueduct pipeline crosses the river (Figure 4d). During the initial walkthrough of this survey zone on April 18, 2001, there was no water detected within the survey reach with the exception of a very small amount of runoff entering the riverbed from a concrete drainage on the south side of the river immediately adjacent to the Los Angeles Aqueduct pipe crossing. The small amount of water that was present was not of a quantity or quality to support breeding arroyo toads. As there was no suitable breeding habitat within this survey zone, the full complement of six protocol surveys was not conducted. However, in addition to the April 18 walk over, two additional surveys were conducted at night on May 8 and June 16.
- **NRMP 4** – The portion of San Francisquito Creek located between the northern terminus of NRMP 1 and the Copper Hill Drive Bridge (Figure 4e). During the initial walkthrough of this survey zone on April 17, 2001, there was no water detected within the survey reach with the exception of three man-made detention basins. Two of which were outside the banks of the stream. As no suitable breeding habitat was present in this survey reach, the full complement of protocol surveys was not conducted. However, the entire survey reach, including each of the small basins, was surveyed for arroyo toad on that initial visit and three subsequent visits that occurred on May 3, May 18, and June 25. Other than the three basins mentioned (which rapidly evaporated over the survey period and were dry by June 25) no water was present in this survey zone.

Pursuant to protocol methodologies (see Appendix A), a series of six day and night surveys (conducted within the same 24-hour period) were conducted at least seven days apart. Additionally, at least one survey was conducted in each of the months of April, May, and June. Each survey zone was systematically surveyed by at least two biologists at a time. Daytime surveys consisted of identifying suitable breeding pools to determine if egg masses, tadpoles, or metamorphosing juveniles were present, and for the purpose of identifying the most likely calling sites for any adult males that were potentially in the area. All nighttime surveys were conducted when air temperatures were at least 55 degrees Fahrenheit when they were initiated. Periods of full moon phases were generally avoided. Surveys were conducted each night from about 2030 to 0000 hours.



Arroyo Toad General Survey Area

LEGEND

 Arroyo Protocol Toad Survey Boundary

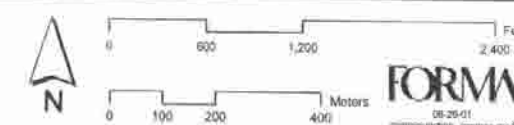
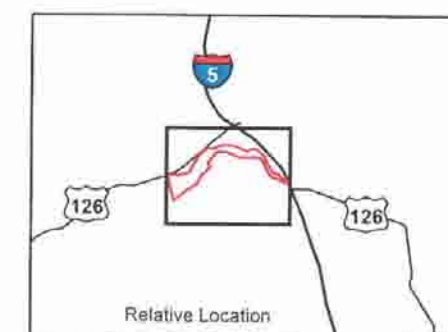


Figure 4a

**CASTAIC JUNCTION
SURVEY REACH**



NRMP Arroyo Toad Report

L E G E N D

 Arroyo Protocol Toad Survey Boundary

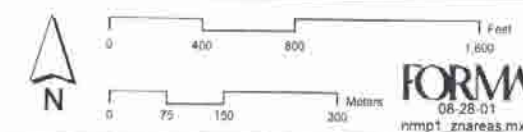

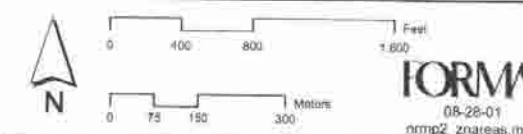


Figure 4b
NRMP
SURVEY REACH 1

NRMP Arroyo Toad Report

L E G E N D

 Arroyo Protocol Toad Survey Boundary



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Figure 4c
NRMP
SURVEY REACH 2

NRMP Arroyo Toad Report

L E G E N D

 Arroyo Protocol Toad Survey Boundary

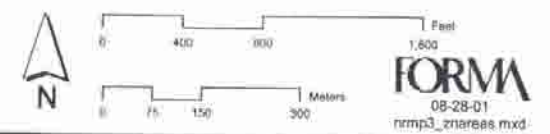
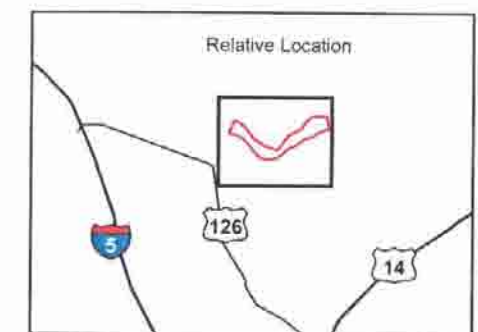
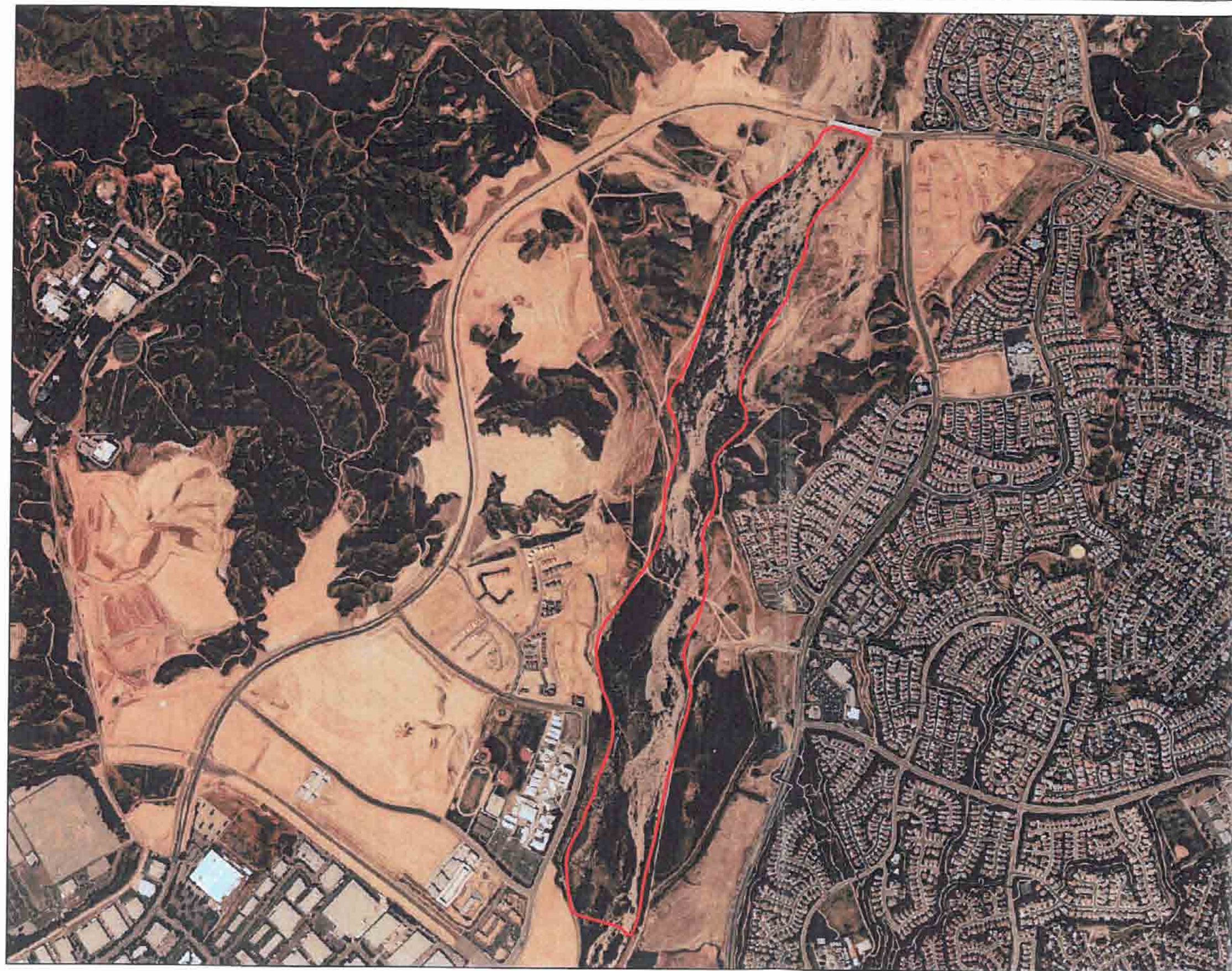


Figure 4d

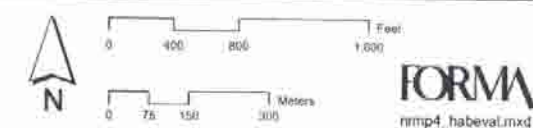
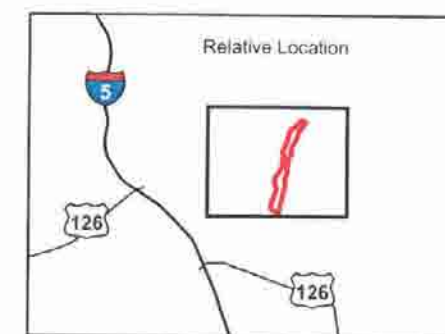
NRMP
SURVEY REACH 3



NRMP Arroyo Toad Report

L E G E N D

 Area of Arroyo Toad Protocol Survey



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Figure 4e

NRMP
SURVEY REACH 4

Weather conditions were generally calm and clear throughout the survey effort with a few nights of relatively overcast conditions. Each zone was surveyed by walking slowly and carefully along stream banks or within the stream itself when necessary. As with the daytime surveys, every precaution was taken not to disturb or create silt deposits within potential breeding pools, and care was taken not to disturb or injure potentially occurring arroyo toad adults, juveniles, tadpoles, or egg masses. Periodic stops were taken to listen for calling males at 15-minute intervals or as appropriate depending upon individual zone conditions. Surveys were conducted as quietly as possible to maximize the potential to hear calling arroyo toads. Handheld flashlights and headlamps were utilized to visually locate toads within potential breeding areas and along stream banks. In addition to documenting arroyo toad data, all aquatic herpetofauna observed during both day and night surveys were recorded.

Additionally, Mr. Crawford and Mr. Cameron conducted two visits to an area known to be occupied by arroyo toad to determine if and when adult males were calling and what stages of development larval tadpoles would be in. The area surveyed was a portion of Castaic Creek that is situated approximately one mile north of the Castaic reservoir on U.S. Forest Service land.

During both visits, arroyo toad tadpoles were observed in relatively large numbers, but no adults were observed. This is likely based on the timing of the visits which occurred in early and mid-June when adults are likely to have returned to burrow sites. Mr. Pete Bloom, who also participated in some of the NRMP survey, was concurrently monitoring arroyo toad population activity on Camp Pendleton in San Diego County. Though it is understood that there is some variation in the timing of life history events between San Diego and Los Angeles County, the information was useful in calculating whether adults would be calling and when tadpoles began metamorphosing.

Following the completion of the protocol surveys, upland habitats adjacent to the river and creek channels were examined to determine their suitability for use as dispersal and over-wintering habitat. Key elements indicating suitability include soils, connectivity, vegetation, slope, barriers, and land use.

PROTOCOL SURVEY RESULTS

A single adult arroyo toad was observed on May 8, 2001 in NRMP zone 2 (Figure 5). The toad was detected by eye shine at approximately 2031 hours and was assumed to be a male based on its size (approximately 58 mm). When it was detected, the arroyo toad was soaking in approximately 2 cm of water in a narrow braided channel with very little flow, adjacent to a sand bar and a small clump of giant cane (*Arundo donax*). The animal did not vocalize while we were in its vicinity either before or

NRMP Arroyo Toad Report

L E G E N D

- Impact Sciences Arroyo Toad Sighting May 2001
- Southwestern Pond Turtle Observation
- Two-striped Garter Snake Observation
- NRMP Survey Area

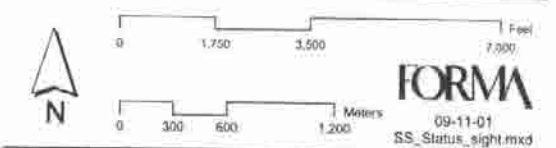


Figure 5

**SPECIAL-STATUS
SPECIES LOCATIONS**

after detection. No other arroyo toads, at any life stage, were observed or detected during the entire survey effort in any portion of the NRMP area. Based on the description provided to FWS, this sighting was within approximately 200 yards of where Ms. Sandburg identified four adult arroyo toads during her surveys.

Habitat in the area where the arroyo toads were observed included sparsely vegetated sandbars with gravelly to sandy substrates. As described, small clumps of giant cane were present as were scattered sweet clover (*Melelotis* sp.), willow saplings, and non-native tamarisk (*Tamarix* sp.). The outer terraces that exist along the base of the north bank, supported patches of larger cottonwoods and willows, and other areas more dominated by mule fat. At the confluence with San Francisquito Creek, the vegetation was very dense and included willows, cottonwoods, and dense patches of cattails. Existing development characterizes much of the adjacent uplands though some undeveloped areas are still present. The undeveloped areas are heavily disturbed from off road vehicle, bicycle, and pedestrian traffic. Proximity to roads, industrial facilities, and other existing development, combined with rip-rap and other forms of bank stabilization, further reduce the suitability and availability of this habitat to over-wintering arroyo toads.

In addition to the single arroyo toad that was recorded, several additional amphibian and aquatic reptile species were detected. All life stages of western toad (*Bufo boreas*), Pacific chorus frog (*Pseudacris regilla*), California chorus frog (*Pseudacris cadaverina*), were observed and tadpoles and adults of the non-native African clawed frog (*Xenopus laevis*) were also detected in great number. An interesting note is that no bullfrogs (*Rana catesbeiana*) were detected during the entire survey effort. Several two-stripe garter snake (*Thamnophis hammondi*) and southwestern pond turtle (*Clemmys marmorata pallida*), both California protected species, state species of special concern and federal 'species of concern' were also detected throughout the survey effort. Locations of these special-status species are also illustrated on Figure 5.

HABITAT EVALUATION

Habitat conditions were variable between survey zones and within each survey zone. Most of the habitat covered by protocol surveys was considered to be of relatively high quality as most or all of the primary constituent elements of arroyo toad habitat were present.

An additional habitat evaluation was conducted following completion of the protocol surveys with the goal of more fully understanding the extent of arroyo toad habitat suitability within the NRMP area. As protocol surveys were primarily conducted in aquatic habitat, these additional evaluations were

focused on upland habitat adjacent to the selected protocol survey zones. Methods used in the upland habitat evaluations included a combination of analyzing recent aerial photographs, USGS topographic maps, and USDA Soil Service maps, and then verifying preliminary conclusions in the field. As part of this evaluation, we attempted to delineate areas of high, medium, and low habitat quality based on the presence or absence of the primary constituent elements.

The primary constituent elements, by definition, are all required in order to support a sustainable population of arroyo toad. As such, only those areas that supported all of these habitat characteristics were considered to be of high quality. Habitat areas that supported most of the elements (lacking one or possibly two depending upon all environmental factors) were considered to be of moderate quality, and those areas missing two or more elements (especially where hydrologic regime was absent) were considered to be of low value as arroyo toad habitat.

Most data reported to date suggests that non-breeding and over-wintering adult arroyo toads will move to sandy terraces that support marginal zones and a variety of vegetation including cottonwood or oak woodlands, sage or saltbush scrub, and chaparral. The Final Rule for Critical Habitat cites results from a 1998 study by Paul Griffin and Ted Case that indicate average maximum movements perpendicularly from a streambed were approximately 240 feet for male arroyo toads and 443 feet for females. A maximum movement record of 984 feet was also cited in this study (FWS 2001a). The Recovery Plan cites data from one study suggesting perpendicular movement from 1580 to nearly 6350 feet. Another study in San Diego County involving upland pitfall trapping cited in the Final Rule for Critical Habitat indicated perpendicular movements ranging from 46 feet to nearly 3,600 feet. These latter two studies were conducted in San Diego County in drainages that are considerably broader and flatter than those found in the NRMP area, and are also subject to very different climatic conditions. The radio telemetry study by Ruben Ramirez (2000) reported upland terrace dispersal up to 121 feet at Little Rock Creek and up to 656 feet at Horsethief Canyon, which are both situated on the north side of the Transverse Ranges; an area more geographically and climatically similar to the NRMP area. Ramirez (2000) concluded that dispersal distance from breeding habitats to upland habitats are expected to be less in drier habitats than in moister areas. Factors which may be contributing to the decreased upland movement include limited rainfall, limited availability of late season surface water, reduction of soil moisture as distance to creek increases, and reduced shrub cover, which likely increases evaporation from upland soils (Ramirez 2000). Ramirez (2000) also notes that in the Transverse Ranges, tall cliff faces (>60 degrees) and steep canyon slopes represent barriers to the movement of this species.

In the process of evaluating Critical Habitat for arroyo toad, the FWS determined that areas up to 80 feet in elevation above the stream channel were most likely to contain the primary constituent upland

habitat elements (FWS 2001a). They utilized a 250 meter grid (conforming to a Universal Transverse Mercator [UTM] grid) to map the habitat areas. This method successfully included most documented occurrences and approximately 88 percent of the upland pit fall trapping study captures. This method minimized inclusion of existing development into designated Critical Habitat boundaries. However, some developed areas are still illustrated as occurring within Critical Habitat boundaries and the Final Rule specifically states: "Federal actions limited to these areas would not trigger a Section 7 consultation, unless they affect the species and/or the primary constituent elements in adjacent critical habitat" (FWS 2001a).

For the purposes of this evaluation, each habitat zone corresponds to the protocol survey zones previously described and also includes all upland habitat occurring within approximately 1,640 feet of either side of the outward boundaries of the protocol survey areas as illustrated. This limit was selected based on the literature regarding adult arroyo toad upland dispersal perpendicular to breeding habitats. Habitat quality can vary considerable throughout a survey zone and obviously boundaries do not occur in straight lines. However, for the purpose of illustration, areas evaluated are depicted in zones of existing development and low, moderate, and high quality habitats. Zones illustrated were conservatively delineated in favor of the higher grade of habitat. The following provides a description of the results of the habitat evaluation by survey zone.

Castaic Junction (Figure 6a)

Within the Riverbanks

The Castaic Junction reach supports a diverse mosaic of riparian and wetland habitats within the river channel, including open water, barren sandbars, and various densities of riparian woodland. This reach supports multiple small channels that range from shallow open and braided to relatively deep and under dense cover. Several sand bars and sandy/gravelly terraces are present between the stream banks. The channel ranges in width from 400 feet to over 1,200 feet. Perennial flow is present from the Los Angeles County Sanitation Districts' Water Reclamation Plant in the reach (No. 32), as well as from the upstream plant (No. 26).

All of the primary constituent elements for arroyo toad habitat are present along most of this reach within the riverbanks. For example, there is a sufficient water to sustain the life cycle of arroyo toad within the river channel as evidenced by the large numbers of western toad and chorus frog eggs, larvae, juveniles, and adults which were observed. Additionally, this portion of the river is of sufficiently low gradient and support patches of sandy and fine gravel substrates. A few shallow pools

NRMP Arroyo Toad Report

L E G E N D

- Area of Arroyo Toad Upland Habitat Survey
- High Quality Habitat
- Moderate Quality Habitat
- Low Quality Habitat

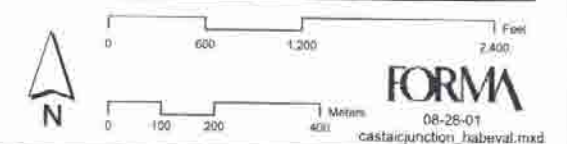
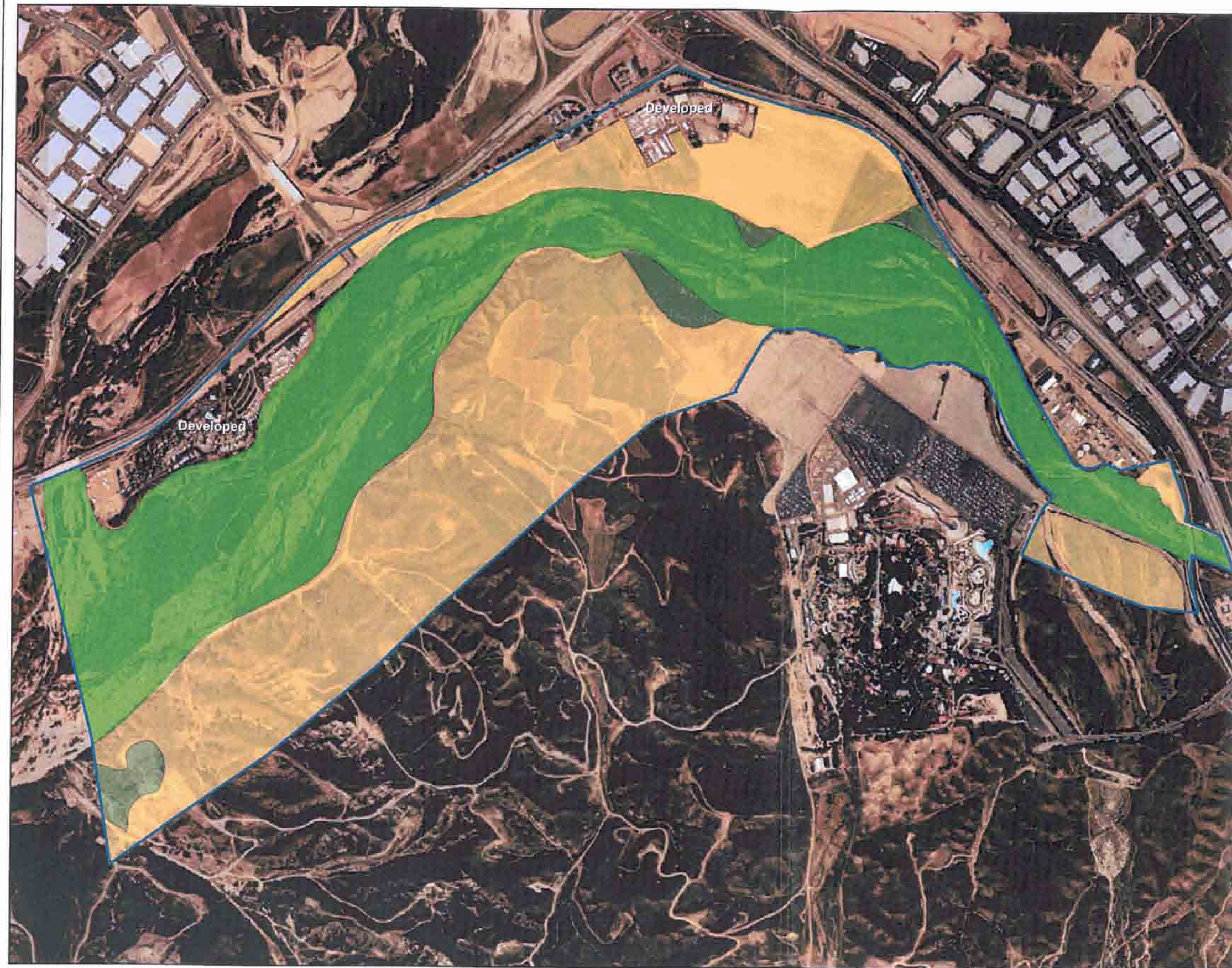


Figure 6a
CASTAIC JUNCTION
HABITAT EVALUATION REACH

are present and though some sand/gravel bars are present, most were relatively densely vegetated at the time of the survey. The reach is also subject to a natural flooding regime that will periodically scour riparian vegetation, rework stream channels and terraces, and redistribute sands and sediments, such that adequate numbers and sizes of breeding pools and sufficient terrace habitats with appropriate vegetation are maintained. Finally, there are sufficient upland terrace habitats between the banks of the river to support arroyo toad. The terraces within the channel are subject to major storm events that have the potential to scour the entire area between the banks, which could ultimately result in the loss or displacement of any arroyo toad present in the zone at the time. However, the presence of some mature willows and cottonwoods suggest that the substrate may be stable enough to withstand such storm events. Also, at the confluence with Castaic Creek there are upland 'island' terraces within the river channel that could support over-wintering adult arroyo toad.

No non-native predators were observed within this reach, although non-native fish and African clawed frogs are known from nearby portions of the Santa Clara River and Castaic Creek.

Outside of the Riverbanks

There are no manmade barriers present in this reach that could completely or substantially impede upland movement of arroyo toads. However, it should be noted that considerable stretches of stream bank in this zone are near vertical and of a height that would significantly impede migration out of the stream channel.

Most of the upper terraces and foothill slopes (beyond the stream banks) are highly disturbed from existing development and human activity. The north side of the river supports areas of active agriculture, industrial development, and a campground/trailer park. Most of these areas are inaccessible due to the height and near vertical angle of portions of the north bank. Those areas that would otherwise be accessible, such as the campground, are likely too disturbed to provide suitable upland refuge for toads as pedestrian, bicycle and off road vehicle traffic is prevalent in the terrace areas. There are a few small pockets of habitat along the northern boundaries that have been designated as moderate quality. These areas support habitat features conducive to arroyo toad occupation, but also have access difficulties due to height and steepness of adjacent banks.

The majority of the southern river bank is high and steep, presenting access difficulties for arroyo toads. Most of the eastern half of the survey zone outside of the channel banks has existing development and paved areas associated with the Magic Mountain amusement park. The western half of the southern bank is not developed, and supports primarily scrub and patches of grassland habitats.

However, these areas would be very difficult for toads to access and generally do not support sandy soils suitable for burrowing. There are two small areas accessible near the western end of the southern bank, but these areas are highly disturbed and do not support suitable conditions for over-wintering toads.

Conclusion

Based on the above observations, the river channel areas within this reach contain high quality habitat for the arroyo toad. The adjacent uplands on the north side, consisting of agricultural fields, development, and recreational facilities are considered to be of low quality as most of these areas are difficult to access and they do not support habitat characteristics suitable for survival of over-wintering arroyo toads. As previously discussed, arroyo toads are periodically found in agricultural fields. However, due to the nature of land practices (i.e., tilling, disking, and pesticide use) it is expected that mortality rates in these areas exceed reproduction rates (FWS 2001a). No arroyo toads were found in agricultural fields during the subject survey. As such it is appropriate to consider these areas of low value as habitat for arroyo toads. The small areas that do support suitable habitat are characterized as moderate quality habitat, because they would still be difficult for arroyo toads to access. The southern uplands are considered to be low quality because, though they are not developed and support primarily native vegetation, access to these areas would be difficult for arroyo toads and soils in these areas are dense and compacted and not favorable for burrowing. As such, the best opportunities for over-wintering toad would be inside the stream banks where soil types are suitable and soil moisture is higher.

NRMP Survey Reach 1 (Figure 6b)

Within the Riverbanks

This reach contains high quality habitat in the river channel, between riverbanks. The river exhibits a considerable diversity of sandbars, terraces, and riparian woodlands combined with shallow low-flow pools that have suitable substrate for the various life stages of the arroyo toad. The stream channel width ranges from approximately 200 feet to 1,000 feet between banks.

Each of the primary constituent elements was determined to be present throughout the Santa Clara River portion of the survey reach. There is a sufficient quantity and quality of water present in this area to sustain the life cycle of arroyo toad within the river channel. The primary source of flows in this portion of the river are from Water Reclamation Plant No. 26. Flows are somewhat variable, but

NRMP Arroyo Toad Report

L E G E N D

- Arroyo Protocol Toad Survey Boundary
- High Quality Habitat
- Moderate Quality Habitat
- Low Quality Habitat

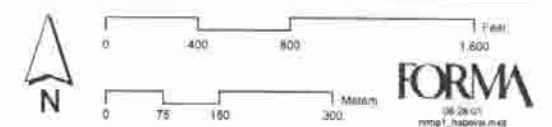


Figure 6b
NRMP
HABITAT EVALUATION
REACH 1

daily fluctuations are less dramatic than the Castaic Junction zone. Braided, open low-flow channels are characteristic of the eastern half of this zone and indicative of a sufficiently low gradient to support breeding pools. These channels varied from nearly 20 feet across to less than 3 feet in width in this zone. Nearly all of the channels were less than 12 inches deep. The river in the western half of the zone occurs more often as a single narrower channel with flow rates that often exceed those conducive to breeding amphibians. The stream bottom throughout the reach is characterized as sandy to gravelly with little accumulated silt. As described, shallow pools, sandbars, and sparsely vegetated terraces are also present in the eastern half of the zone. This reach is subject to a natural flooding regime that will periodically scour riparian vegetation, rework stream channels and terraces, and redistribute sands and sediments, such that adequate numbers and sizes of breeding pools and sufficient terrace habitats with appropriate vegetation are maintained.

There are sufficient upland terrace habitats within the riverbanks to support arroyo toads in this portion of NRMP Reach 1. These terraces consist of sandy to gravelly soils with densities of vegetation varying from bare to dense, increasing with distance from the channel. Dominant vegetation includes willows, mule fat, cotton woods, and patches of non-native giant cane and tamarisk. Terraces within the river channel are subject to major storm events that have the potential to scour the entire area between the banks, which could ultimately result in the loss or displacement of any arroyo toad present in the reach at the time. However, the presence of some mature willows and cottonwoods suggest that the ground may be stable enough to withstand such storm events.

San Francisquito Creek

Water is only present in the creek at the confluence with the Santa Clara River. However, the other primary constituent elements are present within much of this portion of the survey reach. As the majority of data suggest arroyo toad movement in these areas is likely to be within 1640 feet, this distance within the creek is considered to be high quality habitat. Further upstream (north) into San Francisquito Creek most of the primary constituent elements are still present, but the area is considerably farther from any suitable breeding habitat. Therefore, another 1640 feet north of the high quality habitat in San Francisquito Creek is considered to be of moderate quality. The northernmost portion of San Francisquito Creek that is included in the survey reach is too far from any suitable breeding area to be considered more than low quality habitat.

Gunitite bank stabilization is in place along the western edge of San Francisquito Creek south of Newhall Ranch Road. These structures are of a design that would prohibit upland migration. Along the east side of San Francisquito Creek and both sides of the Santa Clara River, buried bank

stabilization has recently been installed in the easterly portion of the survey area. This design mimics the existing banks and does not prohibit upland migration in areas that were previously accessible. No manmade barriers are present in the western portion of the survey zone that completely or substantially impede upland movement, though several areas exist where the banks are too high and steep to facilitate upland access.

A few non-native African clawed frog tadpoles were observed in some of the sheltered pools present in the confluence area. Additionally, several clawed frogs were observed in manmade channels adjacent to San Francisquito Creek, north of the reach boundaries and in a manmade detention basin on the south side of the river channel, opposite the confluence.

Off road vehicle tracks were visible in the marginal and terrace habitats of this reach. This activity is highly detrimental to any arroyo toads potentially occurring in these areas as they would be expected to be buried in the terrace sands if present.

The confluence of the river with San Francisquito Creek supports dense riparian and wetland vegetation that may provide habitat for adult arroyo toad along its outer edges, but is for the most part too dense to be suitable for arroyo toad occupation. Additionally, the area at the confluence supported swamp-like ponded areas for several hundred feet upstream into San Francisquito Creek that lacks suitable arroyo toad breeding or over-wintering habitats.

Outside of the Riverbanks

The upper terrace habitats (beyond the riverbanks) on the north side of the river are not suitable for arroyo toad over-wintering for several reasons. The eastern half of the river upland terrace is fully developed and does not support any suitable habitat. The western half of the northern river upland is not developed, but is exposed to a considerable amount of human disturbance. This is evidenced by a network of dirt roads and pathways, several patches of cleared vegetation, and vehicle and pedestrian tracks. Some of these areas would be accessible by arroyo toads, but because of the disturbance, lack of suitable soils in some areas, angle of slope in the outer areas, and the distance from suitable breeding habitat, most of the outer-most upland habitat surveyed in this area would not be expected to support over-wintering toads. However, on the north bank in the western-most portion, adjacent to the Interstate 5 bridge, there are areas of upland habitat that support suitable soils and vegetation and are somewhat less disturbed than the other areas described. These upland terrace habitats are considered to be of high quality.

Upper terraces along part of the south side of the river vary from developed to high quality. Most of the eastern half of the south side supports existing residential development. There is a buffer area that has been set aside between the river bank and the edge of development, but this area is relatively steeply sloped and does not support sandy or other loose friable soils suitable for burrowing. Other areas on this side support suitable soils and vegetation, but may not be easily accessible to arroyo toads because of the presence of rip-rap and/or the degree of slope of the river bank in that area. As such, these areas are considered to be of moderate value.

San Francisquito Creek

No suitable upland terrace habitat exists adjacent to this portion of San Francisquito Creek. Both sides of the river support existing development (south of Newhall Ranch Road Bridge) or have been graded for projects in progress (north of Newhall Ranch Road Bridge). Additionally, concrete bank stabilization structures are in place along the west bank that would effectively prohibit any upland movement by arroyo toads.

Conclusion

NRMP Survey Reach 1 supports a mosaic of habitat types and qualities. Though most of the high quality habitat occurs between the banks, there are some areas of high and moderate quality upland terrace habitat associated with this portion of the Santa Clara River. No suitable upland terrace habitat associated with this portion of San Francisquito Creek is present and the outer reaches of upland habitat in the remaining areas surveyed only support low quality habitat based on disturbance, soils, and accessibility by toads.

NRMP Survey Reach 2 (Figure 6c)

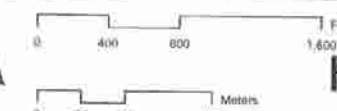
Within the Riverbanks

The river channel along this reach supports suitable breeding, foraging, and over-wintering habitats. The western half of this reach contains areas of open braided streams with a few small pools, several sandbars, open terraces, and a patch of riparian woodlands. The eastern half of the reach contains a deeper, relatively narrow channel that flows through dense cattails (*Typha* spp.) and riparian vegetation. In some of this eastern portion, the vegetation is nearly impenetrable and completely shaded. As such, the western half of this reach provides a greater amount of suitable breeding habitat than does the eastern half. The stream channel width throughout the zone ranges from approximately

NRMP Arroyo Toad Report

LEGEND

- Area of Arroyo Toad Upland Habitat Survey
- High Quality Habitat
- Moderate Quality Habitat
- Low Quality Habitat



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Figure 6c
NRMP
HABITAT EVALUATION
REACH 2

500 feet to 1,200 feet between banks. At the time of the survey the flows on site were relatively low with some daily fluctuations of volume and velocity. Two sources were evident; the primary source being from the Los Angeles County Sanitation Districts' Water Reclamation Plan No. 26 and a secondary, lesser amount from runoff flowing from Bouquet Canyon Creek. No flows existed east (upstream) of Bouquet Canyon Road.

Each of the primary constituent elements was determined to be present in portions of the reach. There is a sufficient quantity and quality of water present to sustain the life cycle of arroyo toad within the river channel. However, the streamflow is variable due to daily fluctuations in tertiary treated effluent discharges from the water reclamation plant that discharges at the eastern end of this reach.

Braided, open low-flow channels are present in the western half of reach and indicative of a sufficiently low gradient. The stream bottom is characterized as sandy to gravelly with little accumulated silt. A few shallow pools and sandbars, and several sparsely vegetated terraces are also present. This reach is subject to a natural flooding regime that will periodically scour riparian vegetation, rework stream channels and terraces, and redistribute sands and sediments, such that adequate numbers and sizes of breeding pools and sufficient terrace habitats with appropriate vegetation are maintained.

There are several upland terrace habitats present in the river channel that represent suitable overwintering habitat. There are a few patches that support mature willow and cottonwood trees and sandbars that support sparse vegetation. Terraces within the channel are subject to major storm events that have the potential to scour the entire area between the banks, which could ultimately result in the loss or displacement of any arroyo toad present in the zone at the time. Conversely, the presence of some mature willows and cottonwoods suggest that portions of this zone may be stable enough to withstand such storm events.

No non-native African clawed frog tadpoles were not observed in this reach. However, the densely vegetated portions of the reach associated with the deeper channel were not accessible during the surveys and may support this non-native predator.

Evidence of human use in the river channel was present. Several sets of tracks were visible throughout the channel and on one occasion during the protocol surveys a group of three people were observed harvesting cattails while their pick-up truck was parked on a sandbar. Though the loss of cattails may not directly affect arroyo toads potentially occurring in the area, the alteration of stream flows

and presence of vehicle traffic have the potential to significantly alter stream flow patterns and crush any arroyo toads potentially burrowed in the vicinity.

South Fork Santa Clara River

The South Fork Santa Clara River between its confluence with the Santa Clara River and the Magic Mountain Parkway Bridge was dry during the protocol survey effort and subsequent upland habitat surveys. Its southern banks contain concrete channel lining just upstream of the confluence, while the natural north banks are more accessible. Within the channel, most of the primary constituent elements are present (with the exception of water). Soils, sandbars, and terrace habitats suitable for over-wintering are present, though no suitable breeding habitat is present in this portion of the survey zone. As such, based on proximity of suitable breeding habitat in the main stem of the river, the portion of the South Fork that extends from the confluence south (upstream) approximately 1,640 feet is considered to be of high habitat value as suitable sandy terraces are present for over-wintering toads potentially present in the area. Further upstream into the South Fork, most of the primary constituent elements are still present, but the area is considerably further from any suitable breeding habitat. Therefore, the next 1640 feet north of the high quality habitat in the South Fork Santa Clara River is considered to be of moderate quality. A concrete rip-rap drop structure downstream of the Valencia Boulevard Bridge is a significant barrier to upstream toad movement on the South Fork.

Bouquet Canyon Creek

The portion of Bouquet Canyon Creek included in the survey area extends from the confluence with the river approximately 1,200 feet upstream to the Newhall Ranch Road Bridge. It supports relatively dense wetland vegetation and low flows of water that occur in swamp-like ponded areas. Both banks contain gunite bank stabilization. Pools and shallow channels are present, but contain a considerable amount of silt. Water quality in this area is also questionable at times as its source is all runoff from streets and developed areas. For these reasons, the portion of Bouquet Canyon Creek occurring within the survey area is considered only to be of moderate habitat quality. North of Newhall Ranch Road Bridge, Bouquet Canyon Creek is a fully-lined concrete channel and supports no suitable arroyo toad habitat.

Outside of the Riverbanks

Considerable stretches of stream bank in this zone are near vertical and of a height that would significantly impede migration out of the stream channel. Most of the outer banks within NRMP

Survey Reach 2 have been developed with exposed gunite and rip rap channel lining that is not conducive to arroyo toad movement outside the river channel because of the steep angle. Additionally, nearly all upper terrace habitats (beyond the stream banks) are too disturbed through development and human activity (commercial and residential development on both sides of the river) to support any arroyo toad attempting to disperse to adjacent uplands. Those few areas not developed, that still may be accessible to toads, including a buffer area set aside between the river bank and the edge of the Bridgeport residential development, are more steeply sloped than areas generally preferred by arroyo toads and do not support sandy or other loose friable soils suitable for burrowing.

South Fork Santa Clara River

There is very little upland terrace habitat remaining adjacent to the South Fork. The vast majority of area immediately adjacent to the banks supports commercial development. The few areas not developed are most accurately described as vacant lots. Most of these areas do not support suitable soils or any vegetation and the few small patches that do are heavily disturbed through weed abatement, pedestrian, and vehicle traffic. As such, upland terrace habitat adjacent to the South Fork are considered to be of low quality as arroyo toad habitat.

Bouquet Canyon Creek

Upland habitat is not accessible from the Bouquet Canyon Creek channel in the survey area due to the gunite bank stabilization structure and there is no available undeveloped land adjacent to this portion of the creek.

Conclusion

Based on the presence of primary constituent elements, the Santa Clara River and a portion of the South Fork Santa Clara River in NRMP Survey Reach 2 support high quality habitat between the riverbanks for the arroyo toad. These areas provide breeding, foraging, and/or over-wintering habitat. Approximately 1,200 feet of Bouquet Canyon Creek, 1,640 feet of the South Fork Santa Clara River, and approximately 1,000 feet east (upstream) of Bouquet Canyon Road Bridge is considered moderate habitat because of the presence of most primary constituent elements except water. The remaining undeveloped areas within this survey area, including upland terraces, were inaccessible, too highly disturbed, or lacked enough of the primary constituent elements to support a sustainable population of arroyo toads. Therefore these areas are all considered to be of low quality.

NRMP Survey Reach 3 (Figure 6d)

Within the Riverbanks

Surface water was not present in this reach except for a small amount of urban runoff (a single pool less than 36 inches in diameter) entering the river near the Los Angeles Aqueduct crossing which only extends about 35 feet before going subsurface. The runoff flows are very shallow and slow and do not form pools suitable for breeding. The single pool present had a silty substrate, was full of rubbish, and no aquatic fauna, including invertebrates, were observed in the pool. The width of the stream channel ranges from approximately 600 feet to over 1,600 feet. Most of this reach does support suitable sandbars, terraces, and mature riparian edge habitat between its banks. However, it does not contain sufficient quantity or quality of water present to sustain the life cycle of arroyo toad. As such, based on the distance from suitable breeding habitat, approximately 800 feet of the western-most portion of the channel within NRMP 3 is considered to be of moderate habitat quality. Though many of the primary constituent elements are present in the remaining portion of the survey area, it is not expected that there would be any arroyo toads within range to utilize this habitat.

Outside of the Riverbanks





Much of the adjacent uplands are undeveloped, and consist of farmland, grasslands, and scrub communities. However, much of it is characterized as steep foothill slopes. Though there are some accessible upper terraces adjacent to the river, some are exposed to regular farming, and vehicle disturbance. Additionally, even though portions of the upper terraces provide suitable over-wintering habitat, they are located well over 3,280 feet from the nearest suitable breeding habitat. As such, it is not expected that arroyo toads occurring in the Santa Clara River would travel the distance necessary over dry soils to access these upland areas. Therefore, because of the distance from breeding habitat, most of this survey reach is considered to be of low quality.

Conclusion

As discussed, though portions of the Santa Clara River and adjacent upland terraces in this survey reach support some of the primary constituent elements of arroyo toad habitat, their distance from water and suitable breeding habitat substantially limit their value to the species and are therefore considered to be of low quality.

NRMP Arroyo Toad Report

L E G E N D

-  Area of Arroyo Toad Upland Survey
-  High Quality Habitat
-  Moderate Quality Habitat
-  Low Quality Habitat

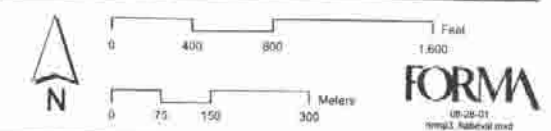


Figure 6d
NRMP
HABITAT EVALUATION
REACH 3

NRMP Survey Reach 4 [San Francisquito Creek] (Figure 6e)

Within the Riverbanks





There was no water within this survey reach during the surveys (April through August) with the exception of three man-made basins, two of which were located outside of the streambanks. The habitat within this reach of San Francisquito Creek supports most of the primary constituent elements of suitable arroyo toad habitat except for the hydrologic regime. The man-made basin that was situated within the stream banks was located adjacent to the Decoro Bridge site. This basin did not represent suitable breeding habitat as it never supported flowing currents and supported a silty mud substrate, unsuitable for arroyo toad larvae development. Additionally, the basin was surveyed extensively and completely evaporated by June.

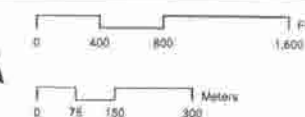
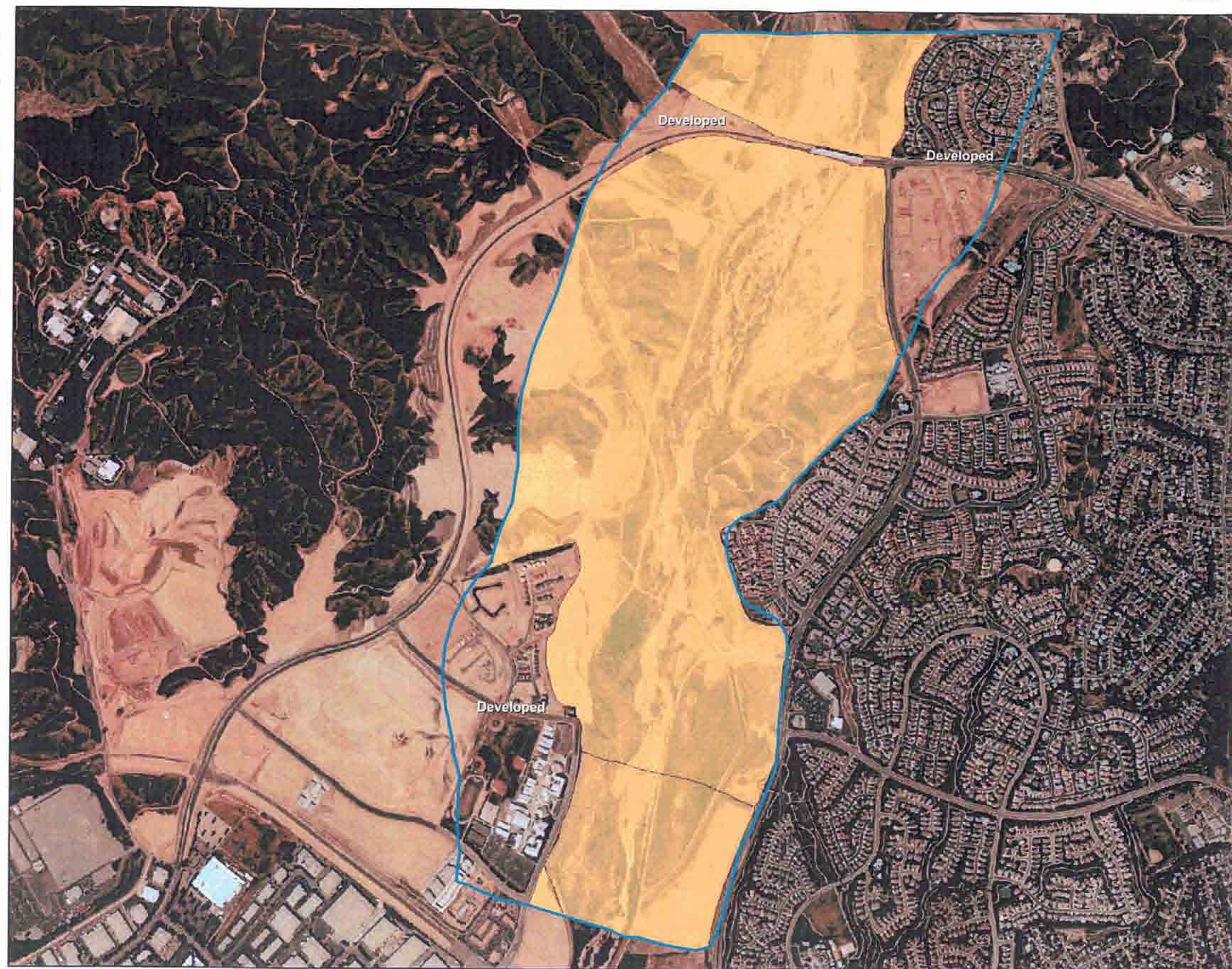
The stream channel width throughout the zone ranges from approximately 600 feet to nearly 1,000 feet. The channel appears to be of sufficient low gradient to support shallow low-flow channels with suitable substrate, and it periodically does so following major storm events. The reach is subject to a natural flooding regime that will periodically scour riparian vegetation, rework stream channels and terraces, and redistribute sands and sediments. Surveys revealed the signs of a series of small braided channels in the dry sand. As such, adequate terrace habitats can be formed, but it is apparent that water is only present in this zone during the rainy season and only infrequently extends into the breeding season.

Data from ACOE flow regime studies in San Francisquito Creek indicate that even in a year of above average rainfall, there were no surface flows in this portion of San Francisquito Creek in early May. The 2000/2001 storm season resulted in an average of over 20 inches of rainfall on site, which is 25 percent above the average of 16 inches for the area. Surveys conducted on May 2, 2001 revealed that from about 1,000 feet south of the National Forest boundary, south to beyond Newhall Ranch Road Bridge, there were no surface flows and the area was dry. This condition is expected to be a result of evapotranspiration and percolation into the streambed and banks. Data provided in Dr. Sweet's studies (1992, 1993) suggest that arroyo toad life spans have not been documented beyond five years. Considered together, these data suggest that it would be extremely unlikely for a breeding population of arroyo toads to survive in this portion of San Francisquito Creek. In order to breed successfully, arroyo toads would have to consistently find a place to burrow with sufficient moisture and food base present throughout the year, for a period of at least four to five years, successfully find a mate, successfully breed, and produce enough offspring to be able to repeat the entire process over again. Even if all of these actions were to occur (which would be extremely unlikely), a single drought of more than

NRMP Arroyo Toad Report

L E G E N D

-  Area of Arroyo Toad Upland Survey
-  High Quality Habitat
-  Moderate Quality Habitat
-  Low Quality Habitat



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Figure 6e
NRMP
HABITAT EVALUATION
REACH 4

six or seven years would eliminate the species from the area. It is reasonable to expect that this has happened more than once even in recent history.

Additionally, the nearest documented occurrences of arroyo toad are over 1.3 miles away in the Santa Clara River near the confluence of San Francisquito Creek. This distance is more than twice as far as any data collected to date suggests for upland movement of arroyo toad.

Despite the absence of reliable breeding habitat, there are several terrace habitats in the creek channel that are suitable for over-wintering arroyo toads were they to occur. However, as discussed, any arroyo toad occurring in this reach would have to emigrate from suitable breeding habitat that occurs well beyond the documented distances this species is known to migrate.

Non-native predators were not observed within the creek channel as there was no water present. However, there are a few manmade drainages present on the eastern side of the creek where African clawed frog tadpoles and juveniles were observed. Should this species persist in the immediate area, they have the potential to substantially impact any native aquatic fauna potentially occurring in this portion of San Francisquito Creek when there are sufficient flows.

There are no manmade barriers in this reach that would impede movement to upland habitat beyond the stream banks. However, most of the banks in this survey reach are deeply incised and nearly vertical, which is likely to impede outward migration.

Outside of the Riverbanks

There is very little suitable upland habitat present outside the banks along this reach. Upland terraces in this area either are or have been in agricultural production for several decades. As discussed in the Final Rule for Critical Habitat for arroyo toads, this species has been identified in agricultural fields. However, due to regular disking and pesticide application, mortality is expected to exceed reproduction in these areas over the long term (FWS 2001a). No arroyo toads were observed in Newhall agricultural fields. Most of the remaining uplands have been grubbed and/or graded in preparation of development. Some small areas do still occur that provide habitat conditions that could support over-wintering arroyo toads. However, as discussed, they are not expected to occur in this area.

Conclusion

Based on existing conditions and the data that has been collected to date from this and other studies, arroyo toads are not expected to occur in this portion of San Francisquito Creek. Further, though many

of the primary constituent elements are present, the lack of water in the creek and the distance from suitable breeding habitat result in the conclusion that NRMP Survey Reach 4 supports low quality habitat for arroyo toad.

DISCUSSION/CONCLUSION

Based on the results of the studies conducted by Impact Sciences and from other surveys conducted in the area over the past several years, it is apparent that very few arroyo toads are present in this portion of the Santa Clara River watershed (Figure 7). Though speculative, there are a number of possible explanations for the apparent low numbers. As most of the major arroyo toad studies have described in detail, there are a number of factors that contribute to the reduction of arroyo toad populations, and nearly all of these factors are present within the subject survey area.

Nearly all of the studies conducted to date suggest that water is the most important primary constituent element required for the existence and survival of arroyo toad. The complete lack of water in the breeding season in NRMP Survey Reaches 3 and 4, and their distance from suitable breeding habitat, effectively eliminate them from further consideration as habitat required for the survival of the species.

Habitat destruction and alteration has been described by most experts as being the primary cause for the decline in arroyo toad numbers. Sweet (1992) identifies dams as being responsible for greatest amount of suitable arroyo toad habitat and cites a number of examples. The NRMP area is affected both directly and indirectly by dams and other sources of flow regulation. Castaic Dam occurs between two contemporary documented populations of arroyo toad (FWS 2001a) which suggests it may have eliminated a considerable amount of suitable habitat for this species.

Water flows along the Santa Clara River in the NRMP area during the survey period are largely attributable to the tertiary treated effluent releases from the WRP No. 32 and further upstream (adjacent to Bouquet Canyon Road Bridge) from WRP No. 26. Fluctuating flow rates and water levels from WRP releases may also be a factor in affecting suitable breeding habitat in the river.

Another factor that was frequently detected, and sometimes observed was the illegal use of off road vehicles (ORV) within the drainage. Vehicle tracks were observed on many sandbars, terraces and even through the low flow channels. These activities can crush buried toads and destroy both upland and breeding habitats.

NRMP Arroyo Toad Report

L E G E N D

- Impact Sciences Arroyo Toad Sighting May 2001 (n=1)
- Sandburg Adult Arroyo Toad Sighting 2001 (n=4)
- 1994 CNDDB Arroyo Toad Occurrence (n=1)
- 2000 CNDDB Arroyo Toad Tadpole Occurrence (n=6)
- NRMP Project Area

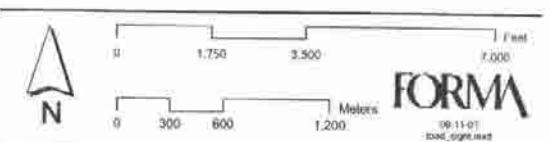


Figure 7

**DOCUMENTED ARROYO TOAD
LOCATIONS WITHIN
THE NRMP AREA**

Non-native predators can also be a contributing factor to the reduction of arroyo toad in the region. Though it was noted that bullfrogs now appear to be absent from the NRMP area, the voracious African clawed frog was detected within and adjacent to most of the survey area, sometime in great numbers. These frogs have been observed preying on various life stages of arroyo toad including eggs, larvae, and adults (Ramirez 2000). Non-native fishes feeding on larval and juvenile arroyo toad have also been recorded (Sweet 1992). Several predatory species of non-native fish are known from the Santa Clara River system. Though none was directly observed during the survey effort, it is likely they still occur and pose a threat to breeding toads.

Native predators also contribute to reduce numbers of arroyo toad in a given area. Two-striped garter snake and southwestern pond turtle were observed in most of the survey zones. Though declining in numbers themselves, when either of these two species encounters a breeding pool of arroyo toad tadpoles, they can significantly impact that population.

Other land uses such as urbanization, agriculture, and mining can also contribute to the reduction of suitable habitat. Development reduces the amount of area available to locally occurring arroyo toads and factors such as increased human presence and non-native plants and animals, and alteration of water quality inevitably follow. Agriculture commonly includes regular tilling of soil and introduction of pesticides and herbicides, all contributing to the reduction of the amount of suitable habitat available to this species. Sand and gravel mining operations also directly impact river and streambeds and result in increased silt loads that can smother egg masses downstream.

The habitat evaluation portion of this study revealed that essentially all of the suitable arroyo toad habitat within the NRMP area occurs between the banks of the Santa Clara River and its associated tributaries. Beyond the outer banks, both natural topography and human activities provide an inaccessible and/or inhospitable environment for any dispersing toads. However, it would appear that much of the upland habitat beyond the banks of the stream may not have provided suitable overwintering habitat for adult arroyo toad due to the arid conditions and lack of constituent elements that characterize much of the area. As such, it is possible that arroyo toad numbers were never high in this portion of the Santa Clara River.

Tributary streams included in the study such as Bouquet Canyon Creek and the South Fork Santa Clara River have been modified to a degree that no longer support suitable arroyo toad habitat (if they once did). They are not likely to do so in the future as it would require the removal of bank stabilization and existing upland development. Though San Francisquito Creek supports several of the primary constituent elements, it lacks the hydrologic regime to support a sustainable population of arroyo toad.

In summary, very few arroyo toads are present within the portion of the Santa Clara River watershed included in the NRMP area. Whether one surmises that they are a remnant of a once much larger population, or individuals from surviving upstream populations that may have been displaced during storm events from previous years, it is apparent that they are not breeding in this area and, as such, are not likely to persist.

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APPENDIX A

USFWS Survey Protocol for Arroyo Toad

SURVEY PROTOCOL FOR THE ARROYO TOAD

The following guidelines are provided to facilitate accurate assessments of the presence or absence of the federally listed endangered arroyo toad (*Bufo microscaphus californicus*). Accurate survey data are needed to provide the U.S. Fish and Wildlife Service (Service) with sufficient information to respond to requests for Federal permits and licenses. Currently, surveys performed in accordance with these guidelines will not require a permit under section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended. However, permits to conduct arroyo toad surveys may be required in the future. In all cases, extreme care must be taken when conducting surveys to avoid inadvertently injuring or killing toads, or damaging their habitat. These guidelines are not meant to be used for long-term monitoring of projects or the overall status of populations; guidelines for such monitoring efforts should be developed with the assistance of the Service for specific cases.

The Service recommends that the following survey guidelines be used to determine if arroyo toads are present in the vicinity of proposed activities, but cautions that negative surveys during a year of severe weather (e.g., drought, extended rainy season, cold weather) may be inconclusive. Contact the appropriate field office (addresses and phone numbers below) before conducting surveys for additional information.

- 1) Areas within one kilometer (1 km) of arroyo toad sites (documented by the presence of eggs, larvae, juveniles, or adults) that have suitable habitat shall be presumed to have arroyo toads.
- 2) If the sole purpose of surveys is to determine the presence or absence of the arroyo toad, surveys shall cease immediately upon determination that arroyo toad eggs, larvae, juveniles, or adults are present in the survey area. The arroyo toad locations shall be recorded on a USGS 1:24,000 (7.5 minute) map
- 3) To be reasonably confident that arroyo toads are not present at a site, at least six (6) surveys must be conducted during the breeding season, which generally occurs from March 15 through July 1, with at least seven (7) days between surveys. Extreme weather conditions can cause variations in the breeding season; these conditions should be fully considered when developing a schedule of surveys. If uncertainty exists as to whether environmental conditions are suitable (see guideline #9 below), contact the appropriate field office for further information.
- 4) At least one survey shall be conducted per month during April, May, and June.
- 5) Surveys shall include both daytime and nighttime components conducted within the same 24-hour period (except when arroyo toads have been detected in the survey area).
- 6) Daytime surveys shall include an assessment and mapping of: a) arroyo toad habitat suitability, and b) the presence of arroyo toad eggs, larvae, or juveniles. Extreme caution must be used to avoid crushing arroyo toads that are burrowed into sand bars and banks, or lodged in depressions in the substrate (sand, gravel, soil). Arroyo toads will use trails and roads up to several hundred meters from breeding sites while foraging; therefore, caution must be taken to not disturb, injure, or kill arroyo toads when using these roads and trails.
- 7) Daytime surveys shall be conducted by walking slowly along stream margins and in adjacent riparian habitat, visually searching for (but not disturbing) eggs, larvae, and juveniles. If necessary, surveyors may walk within the stream, taking care not to disturb or create silt deposits within breeding pools. If stream crossings are necessary, these should be on the downstream ends of

potential breeding pools or in fast-flowing channels to minimize the likelihood of stirring up silt deposits. Arroyo toad eggs are usually laid in shallow water (less than four inches deep), and are susceptible to being smothered by silt that may be raised by walking in or across breeding pools.

8) Nighttime surveys (assuming eggs, larvae, and/or juveniles have not been detected) shall be conducted by walking slowly and carefully on stream banks. Surveyors should stop periodically and remain still and silent for approximately 15 minutes at appropriate sites to wait for arroyo toads to begin calling. The same cautions used for daytime surveys to avoid disturbing, injuring, or killing arroyo toads shall be incorporated.

9) Nighttime surveys must be conducted between one hour after dusk and midnight, when air temperature at dusk is 55 degrees Fahrenheit or greater. Surveys should not be conducted during nights when a full or near-full moon is illuminating the survey area or during adverse weather conditions such as rain, high winds, or flood flows.

10) Nighttime surveys must be conducted as silently as possible, because talking or other human-generated noises may cause arroyo toads to stop calling or leave the creek. Strong headlights or flashlights may be used to visually locate and identify adult arroyo toads, and flash photography may be used to document sightings of solitary individuals; otherwise lighting should be kept to a minimum.

11) Pairs of arroyo toads are very sensitive to disturbances, particularly waves or ripples (calling males are less easily disturbed). Therefore, surveyors must not enter the water near amplexing or courting pairs, and must immediately leave the vicinity upon their discovery.

12) A final report, to be submitted within 30 days of each field season or positive survey shall be prepared that includes survey dates and times, names of surveyor(s), air temperature, estimated wind speed, lighting conditions, a description of the survey methods used, and survey locations plotted on a USGS 1:24,000 (7.5 minute) map.

13) The results of a field survey may not be valid for any of the following reasons: a) surveys were conducted in a manner inconsistent with this protocol, b) surveys were incomplete, c) surveys were conducted during adverse conditions or during a season of severe weather conditions, or d) reporting requirements were not fulfilled. In such cases, the Service may request that additional surveys be conducted.

The final report should be provided to the appropriate Service field office:

For surveys in Monterey, San Luis Obispo, Santa Barbara, and Ventura Counties, Los Angeles County west of Highway 405, and the desert portions of Los Angeles and San Bernardino Counties, reports should be sent to the Ventura Fish and Wildlife Office, 2493 Portola Road, Suite B, Ventura, California 93003 (phone: (805) 644-1766).

For surveys in Los Angeles County east of Highway 405 and south of the desert, Orange, Riverside, Imperial, San Diego, and montane and cismontane San Bernardino Counties, reports should be sent to the Carlsbad Fish and Wildlife Office, 2730 Loker Avenue West, Carlsbad, California 92008 (phone: (760) 431-9440).

If a surveyor thinks that a specific project warrants alterations in this protocol, the Service should be contacted

prior to the onset of surveys to discuss and possibly grant permission for proposed modifications. We would appreciate receiving any comments or ideas on these guidelines or recommendations for their improvement. For additional information, please contact the Ventura Fish and Wildlife Office at (805) 644-1766 or the Carlsbad Fish and Wildlife Office at (760) 431-9440.

Diane K. Noda
Field Supervisor

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