

**Results of Focused Surveys for
Arroyo Toad and
Special-Status Aquatic Reptiles and Amphibians
Newhall Ranch,
Valencia, California**

Prepared for:

Newhall Ranch Company
23823 Valencia Boulevard
Valencia, California 91355

Prepared by:

Impact Sciences, Inc.
30343 Canwood Street, Suite 210
Agoura Hills, California 91301

May 21, 2002

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
INTRODUCTION.....	1
General Arroyo Toad Background.....	1
Overview of Arroyo Toad Habitat Characteristics	4
Critical Habitat Designation.....	6
METHODOLOGY	9
Previous Studies In and Near the Newhall Ranch Project Area.....	9
Survey Scope and Methods	11
PROTOCOL SURVEY RESULTS.....	15
HABITAT EVALUATION	15
Newhall Ranch Survey Reach (Zone 1)	18
Newhall Ranch Survey Reach (Zone 2)	21
DISCUSSION/CONCLUSION.....	24
REFERENCES.....	27

Appendix A – USFWS Survey Protocol for Arroyo Toad

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1 Regional Location	2
2 Survey Reach.....	3
3 Critical Habitat (Unit 6)	8
4a Newhall Ranch Survey Reach Zone 1.....	12
4b Newhall Ranch Survey Reach Zone 2.....	13
5 Special-Status Species Locations.....	16
6b Newhall Ranch Habitat Evaluation Zone 1.....	19
6c Newhall Ranch Habitat Evaluation Zone 2.....	22

**Results of Focused Surveys for Arroyo Toad and
Special-Status Aquatic Reptiles and Amphibians
Newhall Ranch
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 in Los Angeles County that comprise the Newhall Ranch Specific Plan area. This report is intended to provide project specific biological information to Newhall Ranch 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 Newhall Ranch Specific Plan survey reach is located in north Los Angeles County (Figure 1). Surveys were conducted in potentially suitable habitat in portions of the Santa Clara River from near the confluence with Castaic Creek, west (downstream) approximately four (4) miles to the Los Angeles County border (Figure 2). The survey area is situated within the Val Verde, California U.S. Geological Survey (USGS) 7.5-minute quadrangle map.

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 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 Report

L E G E N D

-  Arroyo Toad Survey Reach
-  Newhall Ranch Specific Plan Boundary



FORMA
03-22-02
surv-rch_nh1_2_fig2.mxd

Figure 2
SURVEY REACH

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.

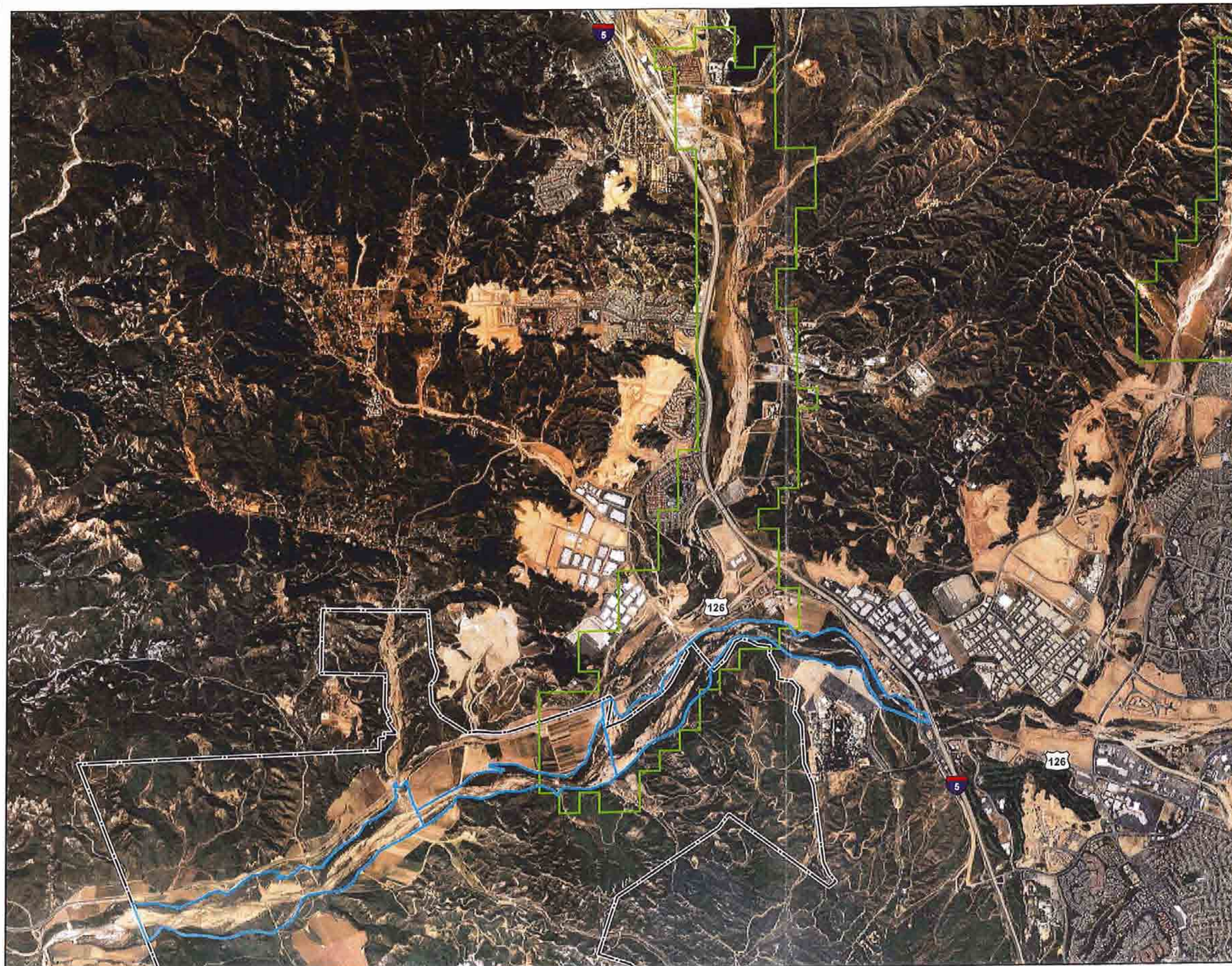
It should be noted, and is discussed in the Final Rule that arroyo toad are not distributed uniformly throughout the designated critical habitat areas and that breeding and upland habitats are patchily distributed (FWS 2001a). The nature of breeding habitats is dynamic and may shift in structure and 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 Newhall Ranch 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**). Arroyo toads have been recorded at the following locations within critical habitat Unit 6, upstream of the subject Newhall Ranch survey area.

- 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.



Arroyo Toad Report

L E G E N D

-  Arroyo Toad Critical Habitat
-  Arroyo Toad Survey Reach
-  Newhall Ranch Specific Plan Boundary

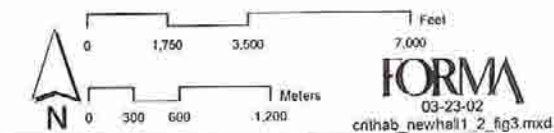


Figure 3

CRITICAL HABITAT (UNIT 6)

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 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 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 Newhall Ranch project area. A summary of the results are provided below.

- 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 Newhall Ranch 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 Newhall Ranch 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 NMRP 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.

- Survey for Arroyo Toad for Newhall Ranch (RECON, 1999) – Protocol surveys were conducted, but no toads were observed. However, appropriate habitat is present.
- 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).
- Impact Sciences, Inc. protocol surveys in NRMP area, portions of Castaic Creek, San Francisquito Creek from the Santa Clara River to the Copper Hill Bridge, and the Santa Clara River east from the NRMP area to approximately 500 meters past the Los Angeles Aqueduct crossing, including portions of South Fork Santa Clara River and Bouquet Creek – In spring 2001 intensive surveys following FWS recommended survey protocol were conducted in the described area. A single arroyo toad was observed in the Santa Clara River adjacent to the San Francisquito Creek confluence.

Survey Scope and Methods

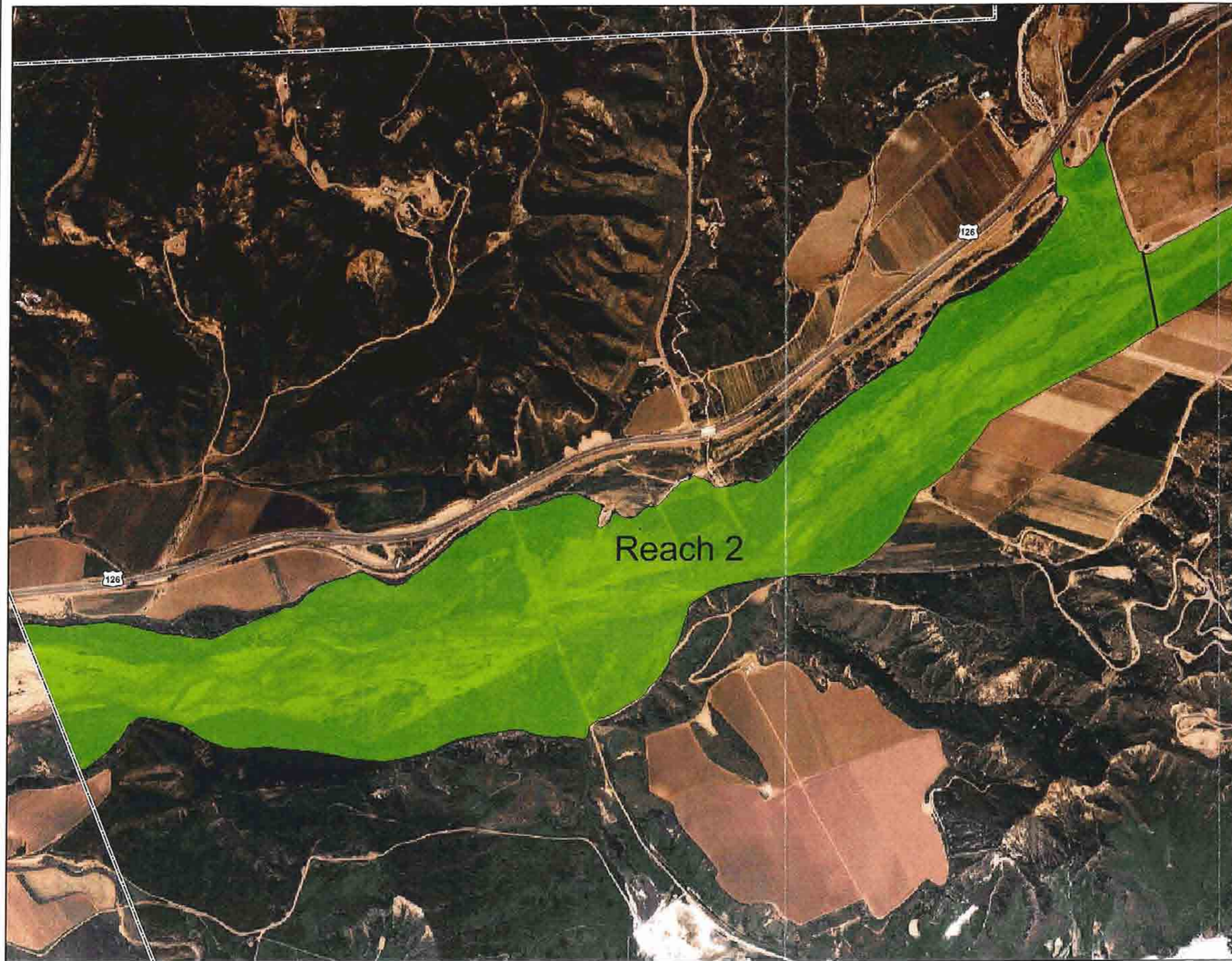
USFWS developed a survey protocol to determine the presence or absence of arroyo toad (FWS 2001b; see **Appendix A**). The protocol requires six focused surveys be conducted in suitable habitat between March 15 and July 1 with at least seven days between surveys. The surveys were timed such that at least 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 19, 2001 on approximately 4.0 total miles of the Santa Clara River. 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 Newhall Ranch 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 Newhall Ranch area was divided into two 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:

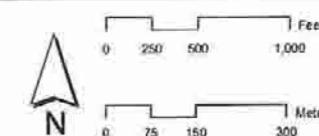
- **Newhall Ranch 1 (Survey Zone 1)** – The portion of the Santa Clara River that occurs between the confluence of Castaic Creek and the Chiquito Canyon crossing (**Figure 4a**). Six (6) focused surveys were conducted in this zone on April 19, May 1, May 21, June 7, June 14, and June 21, 2001.
- **Newhall Ranch 2 (Survey Zone 2)** – The portion of the Santa Clara River extending west from the Chiquito Canyon crossing to the Ventura County border (**Figure 4b**). Six (6) focused surveys were conducted in this zone on April 19, May 2, May 14, May 29, June 13, and June 20, 2001.



Arroyo Toad Report

L E G E N D

-  Arroyo Toad Survey Reach
-  Newhall Ranch Specific Plan Boundary



FORMA
03-22-02
surv-rch_nh2_fig4b.mxd



Figure 4b

**NEWHALL RANCH
SURVEY REACH ZONE 2**



Arroyo Toad Report

L E G E N D

-  Arroyo Toad Survey Reach
-  Newhall Ranch Specific Plan Boundary



FORMA
03-22-02
surv-rch_nh1_fig4a.mxd

Figure 4a

**NEWHALL RANCH
SURVEY REACH ZONE 1**

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.

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 the survey effort, 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

No arroyo toads were observed or detected in the Newhall Ranch survey area and daytime surveys did not reveal the presence of any egg masses or larvae and no juvenile or adult toads were observed or otherwise detected. In addition, no available survey data indicates that the arroyo toad has been recently recorded within the Newhall Ranch survey areas.

Though no arroyo toads were recorded, other 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 recorded. 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 and state species of special concern, were also detected throughout the survey effort. Locations of these special-status species are also illustrated on Figure 5.

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. Habitat in the area included sparsely vegetated sandbars with gravelly to sandy substrates. As described, small clumps of giant cane were present as were scattered willow saplings, and non-native tamarisk (*Tamarix* sp.). The outer terraces that exist along the base of the north and south banks, supported patches of larger cottonwoods and willows, and other areas more dominated by mule fat. The vegetation in these areas was often very dense and included willows, cottonwoods, and dense patches of cattails. Existing agricultural uses characterize much of the adjacent uplands though some undeveloped areas are still present. Habitat characteristics for each survey zone were relatively similar throughout each reach of the two reaches that comprise the Newhall Ranch survey area.

HABITAT EVALUATION

Most of the habitat (within the river channel) covered by protocol surveys within the Newhall Ranch area was considered to be of relatively high quality as most or all of the primary constituent elements of arroyo toad habitat were present.



Arroyo Toad Report

LEGEND

-  Arroyo Toad Survey Reach
-  Newhall Ranch Specific Plan Boundary
-  Southwestern Pond Turtle.
-  Two-Striped Garter Snake

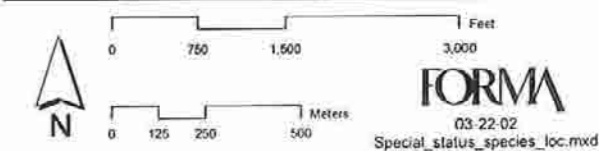


Figure 5

Special - Status Species Locations

An additional habitat evaluation was conducted following completion of the protocol presence/absence surveys with the goal of more fully understanding the extent of arroyo toad habitat suitability within the Newhall Ranch 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 Newhall Ranch 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.

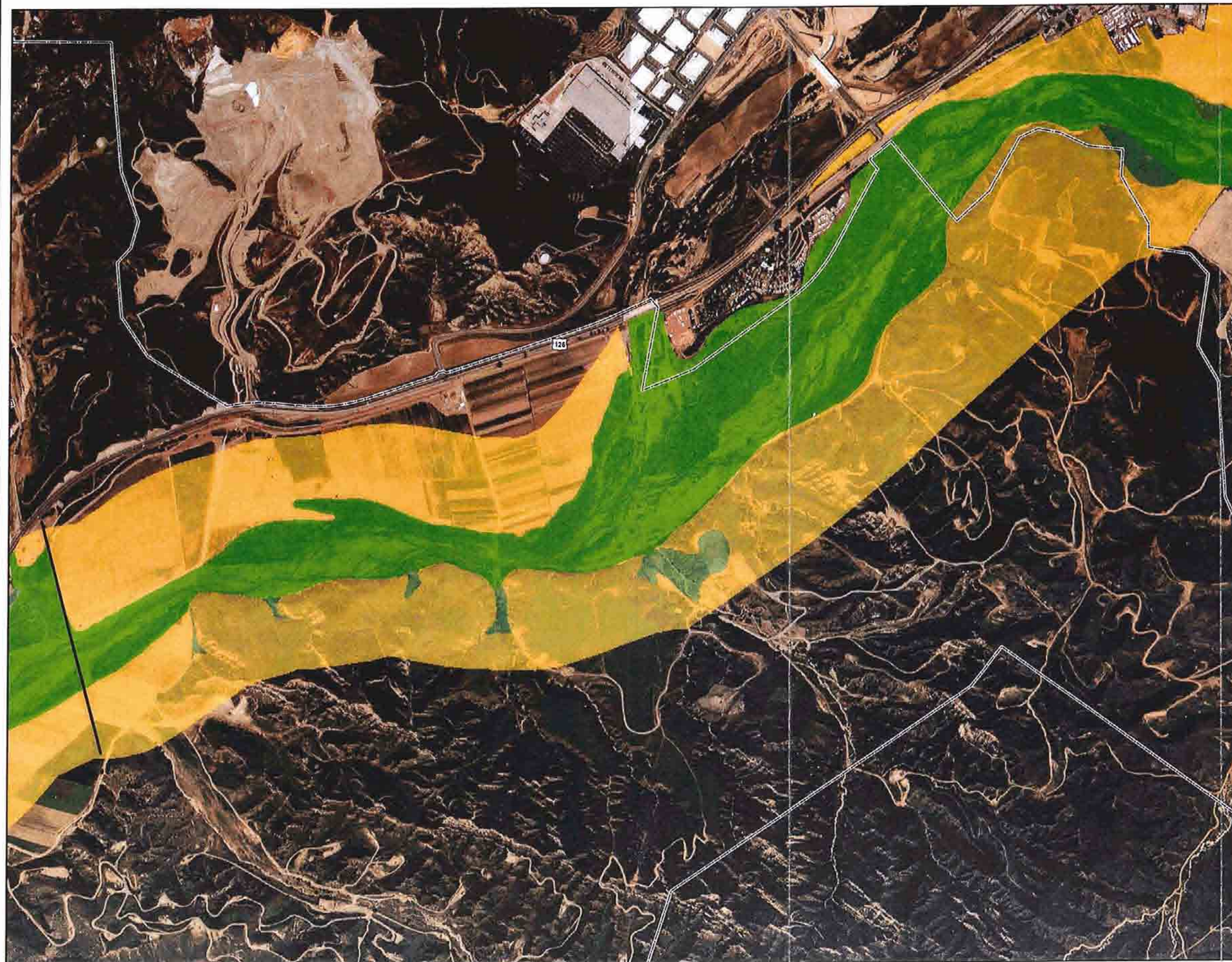
In the process of evaluating Critical Habitat for arroyo toad, the FWS determined that areas up to 80 feet in elevation above the stream channel were most likely to contain the primary constituent upland habitat elements (FWS 2001a). They utilized a 250-meter grid (conforming to a Universal Transverse 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.

Newhall Ranch Reach 1 (Figure 6a)

Within the Riverbanks

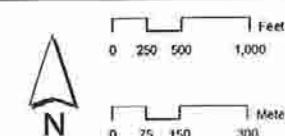
This reach supports a diverse mosaic of riparian and wetland habitats within the river channel, including open water, barren sandbars, and various densities of riparian scrub and woodland. Reach 1 supports multiple small channels that range from shallow open and braided to relatively deep (>1 meter) and under dense vegetative cover. Several sand bars and sandy/gravelly terraces are present between the stream banks. The channel ranges in width between its banks from approximately 400 feet to 1,600 feet. Perennial flow results from tertiary treated water released from the Los Angeles County Sanitation Districts' Water Reclamation Plant (No. 32) upstream of the reach, as well as from the upstream plant (No. 26).



Arroyo Toad Report

L E G E N D

- High Quality Habtiat
- Moderate Quality Habtiat
- Low Quality Habtiat
- Newhall Ranch Specific Plan Boundary



FORMA
03-11-02
newhall1_habeval.mxd

Figure 6a

**NEWHALL RANCH HABITAT
EVALUATION ZONE 1**

All of the primary constituent elements for arroyo toad habitat are present along most of this reach within the riverbanks. For example, there is 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 supports patches of sandy and fine gravel substrates. The primary source of water in this portion of the river are from upstream water reclamation plants, and at times, temporary releases from Castaic dam. During these temporary water releases, water flow immediately downstream of the Castaic Creek confluence (along the northern river channel) resulted in very high flow rates and was not conducive to the establishment of potential breeding pools. Overall, the stream bottom throughout the reach is characterized as sandy to gravelly with little accumulated silt. Braided, open low-flow channels, sandbars, and sparsely vegetated terraces are present in this zone. This zone supports areas characteristic of a sufficiently low gradient to support potential breeding pools. 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.

There are upland terraces within the river channel that could support over-wintering adult arroyo toad in this portion of the Newhall Ranch survey area. 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, cottonwood, arrow weed 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.

No non-native predators were observed within this reach, although non-native fish, African clawed frogs, and bullfrogs 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 many 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 long-standing agricultural uses. Both the north and south sides of the river support areas of active agriculture. In fact, nearly all of the upland habitat present along the northern channel bank is currently under agricultural production. However, there are areas of upland habitat along the southern channel boundaries that have been designated as moderate quality due to the presence of sage scrub vegetation and absence of agriculture, although many upland areas present along the south bank are inaccessible due to the height and near vertical angle of the bank. Some of these upland areas support habitat features conducive to arroyo toad occupation, but there are only a few small areas where access would not be constrained due to the presence of dense vegetation and/or height and steepness of adjacent banks.

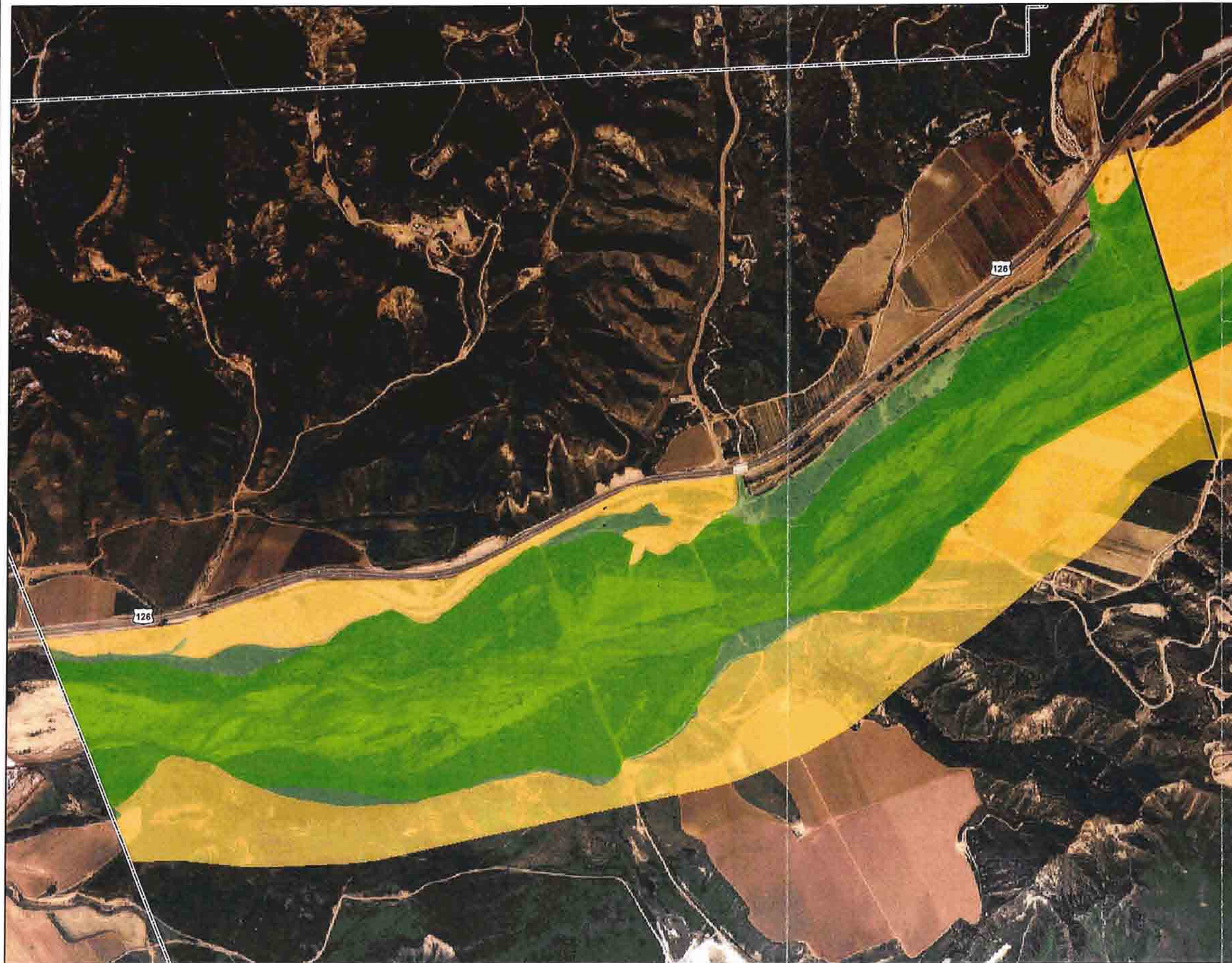
Conclusion

Newhall Ranch 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 moderate quality upland terrace habitat associated with this portion of the Santa Clara River, primarily located above the southern riverbank where native sage scrub vegetation is present. However, most of the adjacent uplands consist primarily of agricultural fields, which 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 upland habitat are characterized as moderate quality habitat, because overall, they would still be difficult for arroyo toads to access. 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.

Newhall Ranch Reach 2 (Figure 6b)

Within the Riverbanks

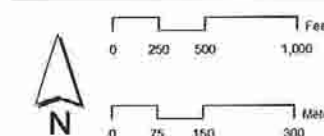
This reach contains high quality habitat in the river channel, between riverbanks. The river exhibits a considerable diversity of sandbars, terraces, and riparian woodlands combined with shallow low-flow pools that have suitable substrate for the various life stages of the arroyo toad. The stream channel width ranges from approximately 400 feet to nearly 2,000 feet.



Arroyo Toad Report

L E G E N D

- High Quality Habtiat
- Moderate Quality Habtiat
- Low Quality Habtiat
- Newhall Ranch
Specific Plan Boundary



FORMA
03-11-02
newhall2_habeval.mxd

Figure 6b

**NEWHALL RANCH HABITAT
EVALUATION ZONE 2**

All of the primary constituent elements for arroyo toad habitat are present along most of this reach within the riverbanks. For example, there is 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. The primary source of flows in this portion of the river is from upstream water reclamation plants and temporary water releases from Castaic dam. Overall, the stream bottom throughout the reach is characterized as sandy to gravelly with little accumulated silt. Braided, open low-flow channels, sandbars, and sparsely vegetated terraces are present in this zone. This zone supports areas characteristic of a sufficiently low gradient to support potential breeding pools. 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.

There are upland terraces within the river channel that could support over-wintering adult arroyo toad in this portion of the Newhall Ranch survey area. 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, cottonwood, 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.

No non-native predators were observed within this reach, although non-native fish, African clawed frogs, and bullfrogs 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 (along the southern channel bank) 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 long-standing agricultural uses. Both the north and south sides of the river support areas of active agriculture. In fact, nearly all of the upland habitat present along the northern channel bank is

currently under agricultural production. However, there are areas up upland habitat along the southern channel boundaries that have been designated as moderate quality due to the presence of sage scrub vegetation and absence of agriculture, although many upland areas present along the south bank are inaccessible due to the height and near vertical angle of the bank. Some of these areas support habitat features conducive to arroyo toad occupation, but there are only a few small areas where access would not be constrained by the presence of dense vegetation and/or height and steepness of adjacent banks.

Conclusion

Newhall Ranch Reach 2 supports a mosaic of habitat types and qualities. Though most of the high quality habitat occurs between the banks, there are some areas of moderate quality upland terrace habitat associated with this portion of the Santa Clara River, primarily located along the southern river bank where native sage scrub vegetation is present. However, most of the adjacent uplands consist primarily of agricultural fields, which 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 upland habitat are characterized as moderate quality habitat, because overall, they would still be difficult for arroyo toads to access. 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.

DISCUSSION/CONCLUSION

Based on the results of the studies conducted by Impact Sciences and from other surveys conducted in the vicinity over the past several years, it appears that arroyo toads are absent in this portion of the Santa Clara River watershed. Though speculative, there are a number of possible explanations for their apparent absence. 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.

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 Newhall Ranch 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, in particular those areas located downstream of the dam.

Water flows along the Santa Clara River in the Newhall Ranch 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.

Non-native predators can also be a contributing factor to the reduction of arroyo toad in the region. Though it was noted that bullfrogs and African clawed frogs were not recorded within the Newhall Ranch survey area. Ongoing eradication efforts may have temporarily reduced numbers of predatory amphibian species within the area. However, these predatory species are currently known from the immediate vicinity, and sometimes they can occur in great numbers, which results in adverse impacts to the arroyo toad (if historically present in the area). 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 both of the Newhall Ranch 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. Wading birds such as herons and egrets also have a potential to significantly impact tadpole populations.

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 the majority of suitable arroyo toad habitat present within the Newhall Ranch area occurs between the banks of the Santa Clara River. 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 historically provided suitable over-wintering habitat for adult arroyo toad due to the arid conditions and lack of constituent elements that characterize high quality arroyo toad habitat. As such, it is possible that arroyo toad numbers were never high (if historically present) in this portion of the Santa Clara River.

In summary, no arroyo toads were recorded within the portion of the Santa Clara River watershed included in the Newhall Ranch area, however this taxon does occur in very low numbers upstream. Whether one surmises that the upstream population(s) 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 the subject area and currently do not utilize habitats present within the Newhall Ranch survey areas.

APPENDIX A

USFWS Survey Protocol for Arroyo Toad

REFERENCES

- Bloom, Peter. 2001. Personal communication. August 7, 2001. Santa Ana, California.
- Ramirez, Ruben S. 2000. Interim Report: *Arroyo Toad (Bufo californicus); Radio Telemetry Study, Little Rock Creek*. March. Contract report to USDA Forest Service. Arcadia, CA.
- Sandburg, Nancy H. 2001. *Field Summary of Santa Clara River Surveys for Bufo californicus and Rana aurora draytonii*. May 8 through May 29, 2001. Unpublished summary report to U.S. Fish and Wildlife Service Ventura Field Office.
- Sweet, Samuel S. 1992 (revised). *Initial Report on the Ecology and Status of the Arroyo Toad (Bufo microscaphus californicus) on the Los Padres National Forest of Southern California, with Management Recommendations*. 15 December, 1991. Contract report to USDA Forest Service, Los Padres National Forest. Goleta, CA.
- Sweet, Samuel S. 1993. *Second Report on the Biology and Status of the Arroyo Toad (Bufo microscaphus californicus) on the Los Padres National Forest of Southern California*. September 2. Contract report to USDA Forest Service, Los Padres National Forest. Goleta, CA.
- U.S. Fish and Wildlife Service, 2001a. *Survey Protocol for the Arroyo Toad*, Ventura Fish and Wildlife Office. World Wide Website, [http://ventura.fws.gov/Survey Prot/arroyotoad.htm](http://ventura.fws.gov/SurveyProt/arroyotoad.htm).
- U.S. Fish and Wildlife Service. 2001a. 50 CFR Part 17, *Final Designation of Critical Habitat for the Arroyo Toad; Final Rule*.
- U.S. Fish and Wildlife Service. 1999. *Arroyo Southwestern Toad (Bufo microscaphus californicus) Recovery Plan*. U.S. Fish and Wildlife Service, Portland, Oregon. vi + 119 pp.
- U.S. Fish and Wildlife Service, 1994. *Determination of Endangered Status for the Arroyo Southwestern Toad; Final Rule*. 50 CFR Part 17, RIN 1018-AB97.

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