Aquatic Consulting Services, Inc., "Aquatic Surveys along the Santa Clara River; Part I: Castaic Junction Project Area, Los Angeles County, California" (April 2002; 2002D)

2000

AQUATIC SURVEYS ALONG THE SANTA CLARA RIVER

PART I: CASTAIC JUNCTION PROJECT AREA,

LOS ANGELES COUNTY, CALIFORNIA

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I. INTRODUCTION

The Santa Clara River is one of the largest rivers in Southern California, and one of the last major rivers in the region that exists in a relatively natural state. The river originates in the northern slopes of the San Gabriel Mountains in Los Angeles County. The headwaters of the Santa Clara River, and some of its major tributaries, originate on National Forest lands. It traverses Ventura County and flows into the Pacific Ocean halfway between the Cities of San Buenaventura and Oxnard. It's approximately 100 miles long, and its watershed covers about 1,600 square miles. The majority of the main river corridor is privately owned.

Runoff generated from winter storms collects in the Santa Clara River, which extends from above the community of Acton to the Pacific Ocean. These flood flows are highly variable. Tertiary-treated effluent from two water reclamation plants also provides perennial flows.

The river provides habitat for a variety of aquatic species, including the federally listed endangered unarmored threespine stickleback. The purpose of this study was to conduct surveys of aquatic habitats existing along the Santa Clara River. All fish, amphibian, and reptile species encountered were identified, their location noted, and habitat features described.

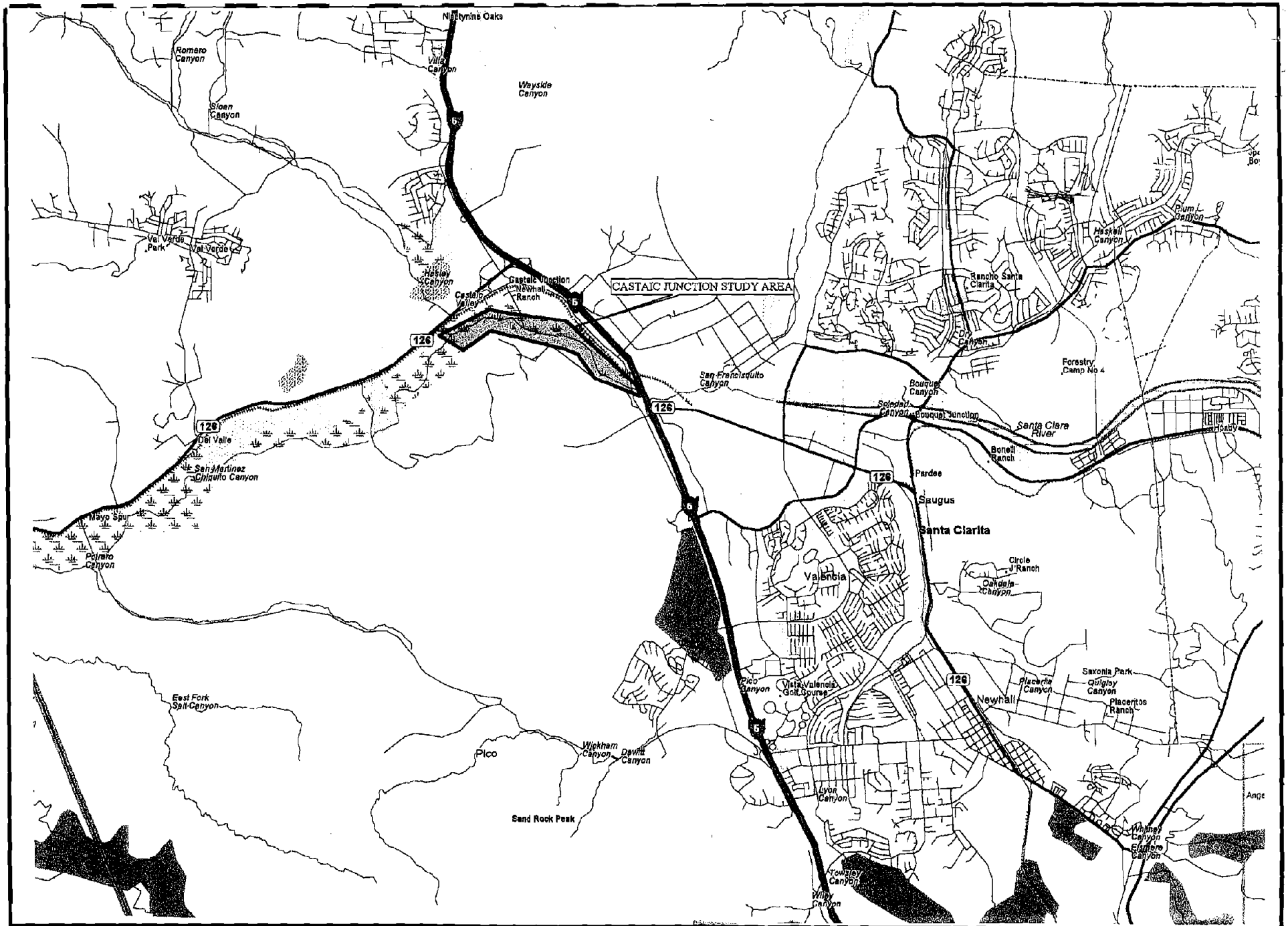
II. PROJECT LOCATION AND FEATURES

The study area is located along the Santa Clara River, starting at the Interstate 5 bridge over the Santa Clara River to a point approximately 9,900 feet downstream. Figure 1 is a geographic map showing the general location of the Castaic Junction study area (outlined in red) in relation to other existing landmarks. General features existing within the study area are described below.

A. EXISTING REACHES

The section of Santa Clara River downstream of the Interstate 5 bridge can be divided into three reaches based on gross changes in topography that directly influence functional channel width and indirectly influence vegetation types growing along the stream channel. Large riparian corridors may create a canopy over sections of the river, providing extensive shading. Typical mature riparian vegetation includes Arundo (*Arundo donax*), willow (*Salix sp.*), cottonwood (*Populus fremontii*), mulefat (*Baccharis salicifolia*), Tamarisk (*Tamarix sp.*), and nettle (*Urtica sp.*). The channel width depends upon the time of year and location along the river. During storm flows, the width may be several hundred feet, but during late summer it may be only a few feet. The following is a general description of features found within each reach.

Reach #1 - This reach extends from the Interstate 5 bridge downstream to a wastewater treatment plant located along the north bank, a distance of approximately 2,700 feet. In addition to sand, the river channel contains sections of gravel and rock, along with concrete debris. The river corridor is narrow, the low-flow channel is incised, and steep banks exist along both sides. Oaks



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Geographic Location Map Showing the General Study Area

FIGURE 1

grow along both sides of the river, but disappear near the north bank at the treatment plant retaining wall.

Reach #2 - This reach extends from the wastewater treatment plant downstream to Castaic Junction, a distance of approximately 6,000 feet. The river corridor is relatively narrow with either a steep bank or incised (scoured) upland terrace along various portions. There, channel bottom composition is similar to that found in Reach #1 (sand, gravel, and rock). There is an existing oak woodland zone limited to the south bank. The riparian zone along the stream is limited to the north bank.

Reach #3 - This reach extends from Castaic Junction downstream towards the Castaic Creek confluence. Approximate length of this section is 1,200 feet. This is one of the widest portions of the river. The river bottom is primarily sand with a few sections of gravel and rock. Although the low-flow channel is focused, there is little incision present. The extensive riparian zones are located along both sides of the river.

B. SEASONAL FLOW PATTERNS

The changing seasonal flow patterns within the Santa Clara River drainage constantly modify the type and available aquatic habitat along the river. Increased winter runoff scours and redeposits stream sediments along the downstream river corridor. At the same time, vegetative debris (trees and other plant materials) that are also washed downstream by elevated flows, become lodged along the banks and in the center of the river. These debris piles create temporary structures that physically assist in removing suspended sediments from the river water. As the velocity of flow reduces, silt and debris are trapped at these locations causing the formation of large sandbars along the river.

During non-storm periods in the spring months (March through May), base flow within the Santa Clara River is primarily defined by the continuous discharge from the wastewater treatment plants. During the non-storm periods in the summer (June through August) and fall (September through November), the flow patterns that helped to create various aquatic habitats along the river decline considerably, and the river begins to clearly focus a zone of potential aquatic habitat within the central portion of the streambed. During these months, aquatic vegetation clearly defines the low-flow channel within the streambed. There are also notable changes in the lateral location of the low-flow channel over the course of a day resulting from changing water surface elevation throughout the day. These periods coincide with elevated water releases from the two upstream wastewater treatment plants. As water elevation changes, some sandbars are eroded and new ones created. These continuous processes create new pools or ponds along the river course, and at the same time can realign the low-flow channel.

C. EXISTING AQUATIC HABITAT TYPES

There are four basic aquatic habitat types along the Santa Clara River within the study area: low-flow channel, riffle, on-channel pool, and isolated pool. The following describes the basic features common to each type and also discusses how each is formed.

Low-flow Channel - The low-flow channel is the portion of the riverbed where water flows continuously. The exact location of this channel along the river may change seasonally as well as throughout the day. Erosion and accretion of existing alluvium constantly remove and redeposit sediments along the length of the river. Depth of water within the low-flow channel varies with season and surface water flow. During the winter, water depth can be several feet, but during the drier summer months, only a few inches. Aquatic plants growing along the edge of the river during the spring months may trap and hold sediments, causing creation of a new sandbar that redirects surface flows, creating a new low-flow channel. Established plants tend to clearly define the low-flow channel through the summer and fall months. Typically, the wider section of the low-flow channel is lined with a variety of vegetation including water speedwell (*Veronica anagallis*), water cress (*Nasturtium sp.)*, grasses (*Disticulus*), umbrella sedge (*Cyperus difformis*), mugwoft (*Artemisia douglasiana*), stinging nettle *(Urtica sp.*), smartweed (*Polygonum lapathifolium*), and sometimes filamentous algae.

Riffle - The riffle consists of coarse gravel, rock outcroppings, and debris piles occurring along some portions of the river. These naturally-armored areas are less prone to erosion throughout the day, and provide almost permanent sections of channel habitat or pool areas. During storm events, these areas may be altered by elevated surface flows, floating debris, or other flow-related factors. Like the low-flow channel, water depth within these areas is dictated by the seasonal surface flow patterns. During the summer and fall, depths are generally a few inches. Vegetation typically growing along riffles consists of willow (*Salix sp.*), cottonwood (*Populus fremontii*), Arundo (*Arundo donax*), and mulefat (*Baccharis salicifolia*).

On-channel Pool - There are several areas along sandbars located within the center of the river or along the lateral banks which contain either debris or large established vegetation at the upstream end, which create small backwater areas. Surface flows within these on-channel pools are obvious. These on-channel pools are generally small in size, typically a few feet wide and up to twenty feet long, although some pools are narrower and longer. Water depth is similar to that of the low-flow channel. These pools generally contain some vegetation along the edge and upstream areas. Vegetation growing within or surrounding these pools consists of a variety of plants including water speedwell, smartweed, sedges, cattails (*Typha sp.)*, grasses, nettle, and watercress. Most on-channel pools contain filamentous algae along the bottom and edges. Some on-channel pools may also have a riparian canopy (willows, cottonwoods, mulefat, *Arundo*) providing shade to the pool during a portion of the day, while others lack riparian cover altogether.

Isolated Pool - The isolated pool is similar to the on-channel pool except it does not have a direct surface connection to the low-flow channel. In most cases there is no observable surface water

flow. Water depth within these pools can range from a few inches to three or four feet. These pool areas may be devoid of typical vegetation, but all seem to have filamentous algae growing along the bottom and edges. Other typical plant species periodically observed within isolated pools include watercress, sedges, reeds, water speedwell, smartweed, and nettle. Some isolated pools may also have a riparian canopy providing shade to the pool during a portion of the day, while others lack riparian cover altogether.

III. AQUATIC SPECIES

Aquatic species that have the potential to occur along the Santa Clara River drainage consist of several species of fish, amphibians, and reptiles. Commonly found fishes include the unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*), the arroyo chub (*Gila orcutti*), the Santa Ana sucker (*Catostomus santannae*), and the mosquitofish (*Gambusia affinis*). Other species rarely encountered include large-mouth bass (*Micropterus salmoides*), rainbow trout (*Oncorhynchus mykiss*), prickly sculpin (*Cottus asper*), and goldfish (*Carassius auratus*). The steelhead trout (*O. mykiss irideus*) has been reported within the lower reaches of the Santa Clara River but has not been reported upstream of Piru Creek. Commonly found amphibians along the Santa Clara River include the California treefrog (*Hyla cadaverina*), Pacific treefrog (*Hyla regilla*), African clawed frog (*Xenopis laevis*), and western toad (*Bufo boreas*). Less common amphibians include the Western spadefoot toad (*Scaphiopus hammondi*), California red-legged frog (*Rana aurora draytonii*), and the arroyo southwestern toad (*Bufo microscaphus californicus*). Reptiles occurring along the Santa Clara River aquatic zone include the Western pond turtle (*Clemmys marmorata pallida*) and two-striped gartersnake (*Thamnophis couchi hammondi*).

A. FISH SPECIES

There are several fish species that may occur within the Santa Clara River drainage.

Unarmored Threespine Stickleback (*Gasterosteus aculeatus williamsoni*) - The stickleback population is limited to on-channel and isolated habitats, secondary inflow channels, plunge pools, and ponds. Water velocity appears to be the limiting factor that keeps the stickleback out of low-flow channels except during late summer when surface water levels are reduced. Stickleback will tend to move along protected areas of the streambank where water velocities are limited. Sticklebacks use the on-channel and isolated pools, secondary inflow channels, and ponds for reproduction and nursery areas. The stickleback is fully protected as a State and Federally listed endangered species. This is not an abundant species within the Santa Clara River drainage.

According to Moyle (1976), stickleback are quiet-water fish, which live in weedy ponds and shallow backwaters, or among emergent plants at stream edges, over bottoms of sand and mud. They feed primarily on bottom organisms or organisms living on aquatic plants. They require cool water (23 - 24° C) for survival. Clear water is a primary requirement for continued survival since they are visual feeders. Stickleback typically complete their life cycle in one year, although

headwaters of the Santa Clara River and San Francisquito Creek. Since stickleback are not strong swimmers and cannot leap over the lowest barriers, their continued survival depends on their ability to reach slower velocity areas within downstream reaches. As water velocities diminish, stickleback can seek favorable habitat where they can reproduce. Even during drier winters, stickleback populations survive within small isolated pools along the Santa Clara River that can persist throughout the hot summer months. During wetter-than-normal winters, sticklebacks that survive the elevated flows can reproduce within downstream reaches. Adults remaining within the headwater areas also reproduce, providing continuation of the species.

Arroyo Chub (*Gila orcutti*) - The chub is the dominant species, occurring within the majority of available aquatic habitats (low-flow channels and on-channel pools). The chub may also use secondary channels. The arroyo chub is currently listed as "Species of concern" by the federal government.

According to Moyle (1976), the chub is adapted for surviving in the warm fluctuating streams of the Los Angeles Plain. Originally these streams were muddy torrents in the winter and clear intermittent brooks in the summer. Generally, chubs stay in the slowest moving sections of the stream with sandy bottoms, although they prefer mud bottoms. This species is an omnivorous grazer, feeding heavily on algae and other plants, as well as small crustaceans and aquatic insects. Breeding usually takes place in pools during March and April. The existing conditions along the Santa Clara River seem ideally suited for the chub population.

Santa Ana Sucker (*Catostomus santannae*) - Like the chub, the sucker population is found in many different habitats along the Santa Clara River (low-flow channels and on-channel pools). Suckers within the Santa Clara River are not considered to be abundant. The Santa Ana sucker is currently listed as a federally protected "Threatened" species.

According to Moyle (1976), Santa Ana suckers generally live in small (narrow) streams, with a wide range in velocity. Typically these streams are subject to severe flooding. Like the stickleback, they prefer cooler water temperatures (less than 22° C). They can survive in fairly turbid water. Boulders, rubble, and sand are the main bottom materials associated with typical sucker habitat. Algae are the primary food, especially diatoms and detritus that they scrape from rocks and other surfaces. In the Santa Clara River, 98 percent of their diet consists of algae and detritus, although small numbers of aquatic insect larvae are also taken. Suckers generally spawn from early April to early July.

Steelhead - Southern California (*Oncorhynchus mykiss irideus*) - Steelhead may be found in most of the streams flowing to the ocean. This species can be either anadromous or a freshwater resident. There is a considerable overlap in migration and spawn timing between the various populations of the same run type (winter and summer runs). California steelhead generally spawn earlier than those occurring in areas to the north. Spawning generally begins in December. Water depth does not seem to be critical to migrating steelhead because they migrate when high flows are present. The adult fish typically spend two years in the ocean before entering fresh water to spawn. Juvenile steelhead remain in fresh water for one to two years before migrating to the sea. Complete life history data for Southern California steelhead are lacking, but existing data suggests the juvenile can smolt in one year. Steelhead may spawn more than once, but existing data suggest that more than two spawnings

is uncommon. This species is currently listed as "Threatened" by the federal government.

Other Fish Species – Large-mouth bass (*Micropterus dolomieui*), prickly sculpin (*C. asper*), rainbow trout (*Salmo gairdneri*), and goldfish (*Carassius auratus*) are only encountered within the river following winter storm runoff or during releases from Castaic Dam. Since the depth of water within the river is too shallow, and suitable spawning and nursery habitat for these species are non-existent, they are not considered to be indigenous to the area. Mosquitofish (*Gambusia affinis*) occur within the river as a result of mosquito abatement activities within the watershed.

B. AMPHIBIANS

There are several different amphibians previously found within the Santa Clara River Drainage.

Pacific Treefrog (*Hyla regilla*) – This commonly heard frog of the Pacific coastal area is active both day and night (Behler and King 1979). According to Stebbins (1966), Pacific treefrogs frequent a variety of habitats from sea level to high mountains. The frog breeds in marshes, lakes, ponds, roadside ditches, reservoirs, and slow-moving streams in woods, meadows, and grassland. This frog is considered to be chiefly a ground dweller, found among low plant growth near water. This treefrog breeds from January through July.

California Treefrog (*Hyla cadaverina*) – This species is primarily nocturnal. It seeks shade during the day among rock crevices near water. Protective coloration helps it avoid daytime predators. When disturbed, it leaps into the water but returns almost immediately to shore (Behler and King 1979). According to Stebbins (1966), the California treefrog frequents canyon streams and washes where there are rocks, quiet pools, and shade. It ranges from the desert to the pine belt in the mountains, and breeds from March through May.

Western Toad (*Bufo boreas*) – This species is active at twilight. At higher elevations, where nighttime temperatures are low, it is often active during the day. It lives in burrows of its own construction or those of small rodents (Behler and King 1979). According to Stebbins (1966), the Western toad frequents a great variety of habitats, desert streams and springs, grassland, woodland, and mountain meadows. It is also found in and near ponds, lakes, reservoirs, rivers, and streams. In warm, low-lying areas they are active at night, but at higher elevations or in northern areas they may be diurnal. This toad buries itself in loose soil or seeks shelter in the burrows of gophers or other animals. It breeds during the months of January to September, depending on weather. Egg strings are attached to vegetation in shallow, usually still water.

Western Spadefoot Toad (*Scaphiopus hammondi*) – This species is nocturnal. It is often numerous where soil conditions are favorable for burrowing. Deep burrows provide a microhabitat with moderate temperatures and humidity. It tolerates a wide range of conditions from semiarid to arid, and prefers shortgrass plains and sandy, gravelly areas such as alkali flats, washes, and river floodplains (Behler and King 1979). According to Stebbins (1966), the Western spadefoot toad is primarily a species of the lowlands, frequenting washes, floodplains of rivers, alluvial fans, playas, and alkali flats, but ranges into the foothills and mountain valleys. It breeds in quiet streams and temporary

Western Spadefoot Toad (*Scaphiopus hammondi*) – This species is nocturnal. It is often numerous where soil conditions are favorable for burrowing. Deep burrows provide a microhabitat with moderate temperatures and humidity. It tolerates a wide range of conditions from semiarid to arid, and prefers shortgrass plains and sandy, gravelly areas such as alkali flats, washes, and river floodplains (Behler and King 1979). According to Stebbins (1966), the Western spadefoot toad is primarily a species of the lowlands, frequenting washes, floodplains of rivers, alluvial fans, playas, and alkali flats, but ranges into the foothills and mountain valleys. It breeds in quiet streams and temporary pools from January through May. Both state and federal governments list this toad as "Species of Concern".

Arroyo Southwestern Toad (*Bufo microscaphus californicus*) – This species is primarily nocturnal, but can also be found foraging during the day (Behler and King 1979). According to Stebbins (1966), the Arroyo southwestern toad can be found along washes, streams, and arroyos of semi-arid parts of the southwest. It breeds in brooks or streams and frequents sandy banks containing willows, cottonwoods, or sycamores. Adults are nocturnal except during the breeding season from March through July. This species is currently listed as "Endangered" by the federal government and designated as "Special Concern" by the State of California.

African Clawed Frog (*Xenopus laevis*) - This exotic species was introduced into California from Africa and has become established within the Santa Clara River watershed. Although mainly aquatic, this nocturnal frog sometimes occurs along more upland areas and is known to migrate overland. When not actively foraging or mating, the frog rests quietly on the bottom of pools or hides under rocks. This species is highly carnivorous and eats anything it can catch (Behler and King 1979).

California Red-Legged Frog (*Rana aurora draytonii*) – This is a highly aquatic species with little movement away from streamside habitats. Individuals are occasionally found on roads at night during winter and spring rains. Typically these frogs occur in the vicinity of quiet, permanent pools of streams, marshes, and occasionally ponds, but they can also be found in damp woods. This frog prefers shorelines with extensive vegetation and will usually escape to water areas that are typically at least three feet deep. This is a diurnal species that is active all year along the coast, but inactive during late summer to early winter in other areas. This frog breeds from November through March, laying egg masses in permanent bodies of water with dense stands of overhanging willows and an intermixed fringe of cattails. The eggs are deposited in permanent pools attached to emergent vegetation. Requires permanent or nearly permanent pools for larval development, which takes 11 to 20 weeks. May require rains for dispersal. Breeding takes place over a few days. This frog appears to be extinct in most of Southern California, south of the Santa Clara River. This species is currently listed as "Threatened" by the federal government and a "Species of Concern" by the State of California.

C. REPTILES

There are very few reptiles that occur within aquatic habitats located within the Santa Clara River drainage.

Southwestern Pond Turtle (*Clemmys marmorata pallida*) – This species is often observed basking alone. When disturbed, it will quickly dive into water. One turtle may challenge another for a favored basking site by extending its neck, opening its mouth, and exposing its yellow-edged jaws and reddish interior. According to Stebbins (1966), this is a thoroughly aquatic turtle of ponds, marshes, rivers, streams, and irrigation ditches that typically have rocky or muddy bottoms with cattails, water lilies, or other aquatic vegetation. This turtle may be seen basking on logs, cattail mats, and mudbanks. It nests from May to August, mostly June and mid-July, time varying with locality. Food consists of aquatic plants, insects, and carrion. This turtle is currently designated "Species of Concern" by both the state and federal governments.

Two-stripe Garter Snake (*Thamnophis couchi hammondi*) – This species can be found in a variety of habitats from marshes to clear, swift streams and rivers (Behler and King 1979). According to Stebbins (1966), this snake occurs primarily in rivers and streams but may also occur in a great variety of aquatic environments. It usually retreats to water when frightened, and is primarily diurnal but active at dusk during warmer weather. It feeds on fish, fish eggs, frogs, toads, tadpoles, salamanders, earthworms, and leeches. This live-bearer breeds in the spring and produces young in late summer. This snake is currently designated a "Species of concern" by both state and federal governments.

IV. SURVEY PROTOCOLS

Field surveys were conducted on May 9 and May 23, 2000. All surveys were conducted during normal daylight hours and consisted of walking the river and randomly selecting sampling locations. If the location potentially offered suitable habitat characteristics for aquatic species, it was sampled. During this site selection, no attempt was made to pre-determine whether or not an area contained any aquatic resources. Since stickleback are quiet-water fish, sampling areas were selected based upon general habitat features where stickleback are typically found (weedy ponds and shallow backwaters, or among emergent plants at stream edges, over bottoms of sand and mud). Since this species is a visual feeder, any selected sampling area needed to also have clear water. Key habitat characteristics included: reduced flows (such as that found within off-channel backwater areas, pools, and other isolated waters), available cover (vegetation or algae), and water clarity. Many of the areas which seemed suitable for stickleback would also provide habitat to other aquatic species (fishes, amphibians, and reptiles). Since the survey also included other aquatic species (fishes, amphibians, and reptiles), other randomly-selected areas without the typical stickleback characteristics were also included as sampling stations. These locations generally had overhanging cover/shade along the stream edge and usually higher water velocities.

At each sampling point, two photographs were taken—one looking downstream and one facing upstream. The survey location was established using a Ground Position Satellite (GPS) receiver. The physical features of the site (general location relative to the main river channel, bottom composition, presence of vegetation, etc.) were observed and noted. If the area was an isolated pool, the site was observed for a few minutes to determine if any aquatic species were present. A large dip net, aquarium net, and small minnow seine (mesh size 1/8- and 3/16-inch, respectively) were used to sample each location. An area approximately ten feet upstream to ten

feet downstream of the sampling station was sampled. All species captured were identified and released back into the same location. If captured tadpoles were determined to be arroyo southwestern toad, further sampling at that location was discontinued to avoid take per U.S. Fish and Wildlife Service guidelines (Noda 1999). During all daytime surveys, care was taken to minimize noise so any nearby pond turtles or garter snakes located along the riverbanks and sandbars could be observed and noted. The approximate location of each sampling location is shown on Figure 2.

V. RESULTS

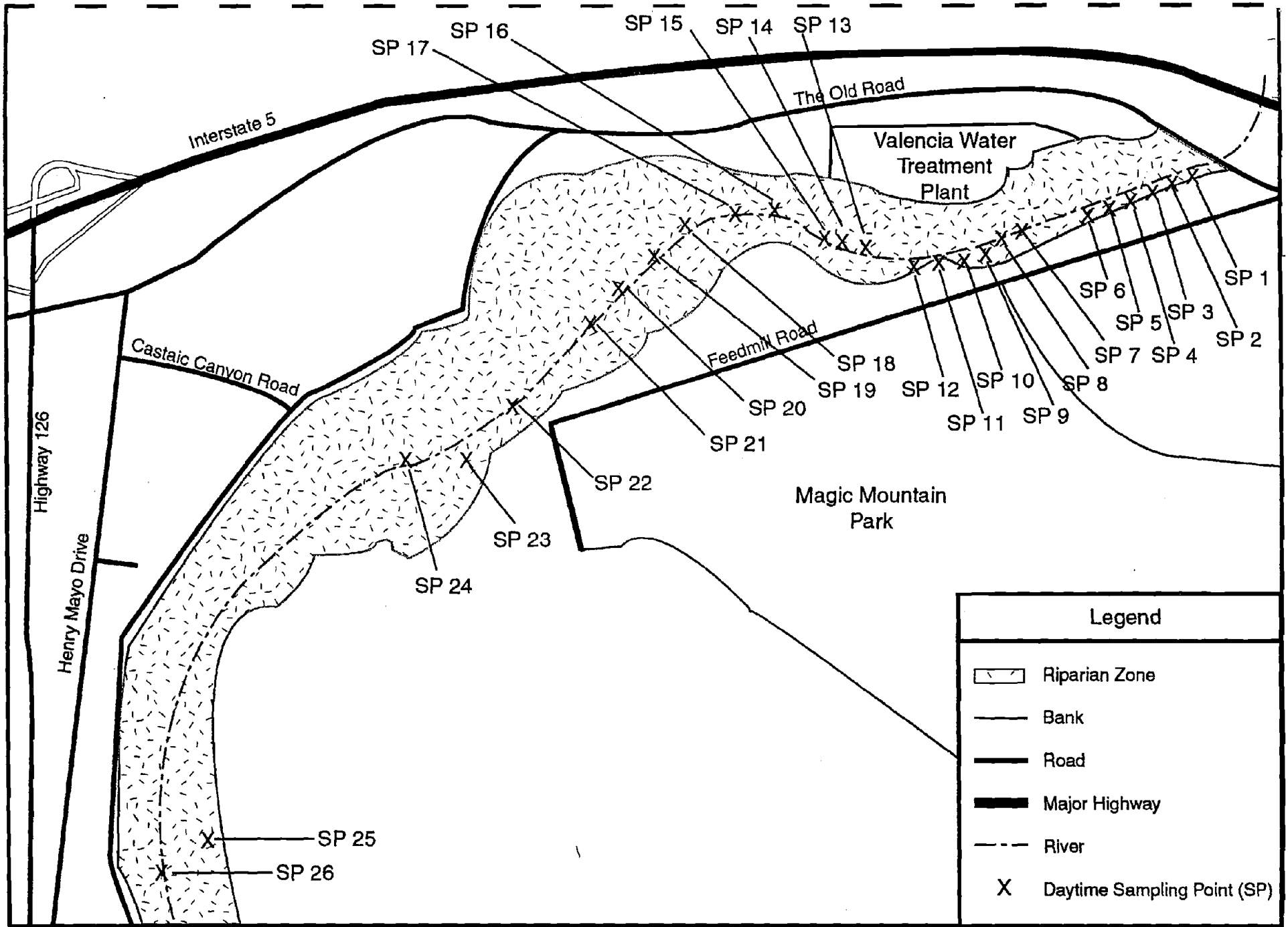
A. FIELD SURVEYS

The exact location of the 26 sample points within the study area was determined using a GPS receiver. The location of each station was subsequently plotted on a project map using DeLorme software. Figure 2 shows the location of each sampling point as determined by the GPS receiver. Based upon visual observations of the existing river conditions between sampling points 24 and 25, suitable fish habitat characteristics (see IV. Survey Protocols) did not exist. This area contained a sandy bottom, lacked any overhead riparian cover, and lacked shoreline vegetation. There were no side channels, isolated pools, or on-channel pools present within this area. Therefore no sampling was conducted within this area. In addition, five of the 26 sampling locations did not contain any aquatic species (points 9, 17, 19, 20, and 25).

Results of the field survey revealed that a variety of aquatic species occur along the Santa Clara River within the study area. The dominant fish species was the arroyo chub. Arroyo chubs (*G. orcutti*) were found at 20 of the 26 sampling locations. Unarmored threespine sticklebacks (*G. aculeatus williamsoni*) were found within only three of the 26 sampling locations (points 3, 11, and 26). No Santa Ana sucker, mosquitofish, or other fish species was collected within the study area.

Amphibians located within the study area during daytime surveys included the Pacific treefrog (*H. regilla*) California treefrog (*H. cadaverina*), western toad (*B. boreas*), western spadefoot toad (*S. hammondi*), and arroyo southwestern toad (*B. microscaphus californicus*). Hyla were located at three locations (sample points 1, 3, and 26). Western toads were collected at only one location (sample point 26). Arroyo southwestern toads (tadpoles) were found at only three of the 26 sampling locations (points 3, 4, and 26) during the surveys. Two locations were contiguous, and the third location was at the most western (downstream) point (sample point 26) within the study area. The California red-legged frog (*R. aurora draytonii*) was not observed within the study area. A Western pond turtle (*Clemmys marmorata*) was observed at the west end (downstream) of the study area (sample point 26). Two-striped gartersnake (*T. couchi hammondi*) were not observed within the study area.

Specific information concerning the physical and vegetative features of each sampling point and species observed are summarized in Appendix A. Photographs of each sampling point are included in Appendix B.



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Map Showing Approximate Locations of Daytime Sampling Points Along the Santa Clara River

FIGURE 2

VI. CONCLUSIONS

Although daytime surveys revealed a variety of aquatic habitat types, approximately 19 percent of the areas surveyed did not contain any vertebrate organisms. The dominant fish species was arroyo chub and the least abundant was the unarmored threespine stickleback. No other species of fish was encountered within the study area. The three amphibians found during field surveys within the study area included both species of treefrog, western toad, and arroyo southwestern toad (tadpoles). No other amphibians were noted. A western pond turtle was observed, but no two-striped gartersnake were noted within the study area.

VII. REFERENCES

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APPENDIX A – SAMPLE POINT DATA

SAMPLE POINT: 1 **DATE**: 5/9/00 **GPS LOCATION**: 34° 25' 605" by 118° 35' 270"

HABITAT DESCRIPTION: Low-flow channel off main Santa Clara River South Bank. Sandy bottom. Plants along bank included umbrella sedge and filamentous algae.

SPECIES PRESENT: Arroyo chub, treefrog.

SAMPLE POINT: 2 **DATE**: 5/9/00 **GPS LOCATION:** 34° 25' 620" by 118° 35' 285"

HABITAT DESCRIPTION: Low-flow secondary channel along the north side of river. Gravel and sand bottom. Overhanging grasses with Arundo and smartweed providing shade. Limited alga growth along bottom.

SPECIES PRESENT: Arroyo chub.

SAMPLE POINT: 3 **DATE**: 5/9/00 **GPS LOCATION:** 34° 25' 633" by 118° 35' 288"

HABITAT DESCRIPTION: On-channel pool connecting to secondary flow channel.

SPECIES PRESENT: Arroyo southwestern toad (tadpole), treefrog, and stickleback.

SAMPLE POINT: 4 **DATE**: 5/9/00 **GPS LOCATION:** 34° 25' 668" by 118° 35' 346"

HABITAT DESCRIPTION: Low-flow secondary channel along south bank with obvious surface flow. Smartweed, tules, umbrella sedge, mule fat, and water speedwell present.

SPECIES PRESENT: Arroyo chub (fry and adult), arroyo southwestern toad (tadpole).

SAMPLE POINT: 5 **DATE**: 5/9/00 **GPS LOCATION:** 34° 25' 652" by 118° 35' 344"

HABITAT DESCRIPTION: Low-flow secondary channel along the south bank with obvious surface flow originating from the main channel. Bottom consists of sand and gravel (50%/50%). No obvious plant species associated with pool.

SPECIES PRESENT: Arroyo chub (fry and juveniles).

SAMPLE POINT: 6 **DATE**: 5/9/00 **GPS LOCATION**: 34° 25' 724" by 118° 35' 464"

HABITAT DESCRIPTION: Low-flow primary channel located along the north bank, immediately downstream of Wastewater Treatment Plant retaining wall. Sand and gravel bottom. Willows overhang area. Algae and some umbrella sedge.

SPECIES PRESENT: Arroyo chub.

SAMPLE POINT: 7 **DATE**: 5/9/00 **GPS LOCATION:** 34° 25' 734" by 118° 35' 494"

HABITAT DESCRIPTION: Low-flow primary channel along the north side of river. Bench area adjacent. Grasses, willow, tule, umbrella sedge, smartweed, and juncas.

SPECIES PRESENT: Arroyo chub.

SAMPLE POINT: 8 **DATE**: 5/9/00 **GPS LOCATION**: 34° 25' 729" by 118° 35' 552"

HABITAT DESCRIPTION: Pool area along primary channel along the south bank of river. Obvious rapid surface flow through pool. Bottom consists of gravel, rock, and sand. Limited vegetation present consisting of algae along edge of rock, grasses, Tamarisk, and cottonwood.

SPECIES PRESENT: Arroyo chub.

SAMPLE POINT: 9 **DATE**: 5/9/00 **GPS LOCATION**: 34° 25' 727" by 118° 35' 562"

HABITAT DESCRIPTION: Low-flow primary channel along south bank. Noted a small tributary inflow, originating from the Magic Mountain parking lot (located to the south) immediately upstream. Area overgrown with tree tobacco, Arundo, Spanish clover, and some tules. Some algae present. Bottom consists of gravel, sand, and some rocks.

SPECIES PRESENT: No species collected within pool area.

SAMPLE POINT: 10 **DATE**: 5/9/00 **GPS LOCATION**: 34° 25' 749" by 118° 35' 589"

HABITAT DESCRIPTION: Low-flow primary channel along north bank. Cottonwood, mule fat, and willow over-hanging bank. Sand and gravel bottom.

SPECIES PRESENT: Arroyo chub.

SAMPLE POINT: 11 **DATE**: 5/9/00 **GPS LOCATION**: 34° 25' 770" by 118° 35' 611"

HABITAT DESCRIPTION: Isolated pool area containing watercress and algae. Bottom consisted of coarse gravel and sand.

SPECIES PRESENT: Arroyo chub (adult) and unarmored threespine stickleback (adult).

SAMPLE POINT: 12 **DATE**: 5/9/00 **GPS LOCATION**: 34° 25' 856" by 118° 35' 639"

HABITIAT DESCRIPTION: Low-flow primary channel along the south bank. Bottom sand and gravel with some rock. Vegetation - Arundo, umbrella sedge, willow, cottonwood, and mule fat. Area shaded by vegetation. Much root mass visible.

SPECIES PRESENT: Arroyo chub (adult and fry).

SAMPLE POINT: 13 **DATE**: 5/9/00 **GPS LOCATION**: 34°25' 893" by 118° 35' 642"

HABITAT DESCRIPTION: Low-flow primary channel located immediately upstream of Wastewater Treatment Plant outfall and downstream of sand bar. Sand and gravel bottom. Willow, grasses, smartweed, water speedwell, umbrella sedge and mulefat growing along edge and covering water surface.

SPECIES PRESENT: Arroyo chub.

SAMPLE POINT: 14 **DATE**: 5/9/00 **GPS LOCATION**: 34° 25' 911" by 118° 35' 639"

HABITAT DESCRIPTION: Low-flow primary channel at confluence with Wastewater Treatment Plant. Bottom consisted of rocks and gravel. Plants included smartweed, water speedwell, tule, mulefat, cocklebur, and willow. Much algae on rocks and large algae strands.

SPECIES PRESENT: Arroyo chub (adult).

SAMPLE POINT: 15 **DATE**: 5/9/00 **GPS LOCATION**: 34° 25' 928" by 118° 35' 655"

HABITAT DESCRIPTION: Off channel pool, south side of river. Some algae along bottom No obvious surface flow, but subsurface percolation observed. Willow, mulefat, tules growing along the edge.

SPECIES PRESENT: Arroyo chub (fry).

SAMPLE POINT: 16 **DATE**: 5/9/00 **GPS LOCATION**: 34° 25' 973" by 118° 35' 685"

HABITAT DESCRIPTION: Low-flow primary channel along north bank. Some surface flow through area but not originating from main flow. Sand and gravel bottom. Willow, mulefat, Arundo, grasses, cocklebur, water speedwell, and algae.

SPECIES PRESENT: Arroyo chub (fry).

SAMPLE POINT: 17 **DATE**: 5/9/00 **GPS LOCATIOIN**: 34° 25' 993" by 118° 35' 708"

HABITAT DESCRIPTION: Low-flow secondary channel along the south bank. Low velocity. Primarily sand bottom but some gravel present. Plants included tules, smartweed, water speedwell, cocklebur, willow, and mustard. Shaded bank area.

SPECIES PRESENT: No species collected at this location.

SAMPLE POINT: 18 **DATE**: 5/9/00 **GPS LOCATION**: 34° 26' 42" by 118° 35' 792"

HABITAT DESCRIPTION: Large pool off primary channel along the north side of river. Sand and gravel bottom. Vegetation consists of mulefat, willow, and cottonwood along top. Woody debris pile along bank also provides cover.

SPECIES PRESENT: Arroyo chub (abundant).

SAMPLE POINT: 19 **DATE**: 5/9/00 **GPS LOCATION**: 34° 26' 24" by 118° 35' 840"

HABITAT DESCRIPTION: Small isolated pool located along the north bank. Bottom gravel and sand. Algae dominate vegetation, but umbrella sedge, smartweed, and willow also present.

SPECIES PRESENT: No species collected at this location.

SAMPLE POINT: 20 **DATE**: 5/9/00 **GPS LOCATION**: 34° 26' 25" by 118° 35' 896"

HABITAT DESCRIPTION: Low-flow secondary channel located along the north bank. Sand and gravel bottom. Little overhanging cover. Vegetation consisted of mulefat, willow, water speedwell, grasses, watercress, smartweed, and algae.

SPECIES PRESENT: No species collected at this location.

SAMPLE POINT: 21 **DATE**: 5/9/00 **GPS LOCATION**: 34° 26' 21" by 118° 35' 954"

HABITAT DESCRIPTION: Low-flow secondary channel along the north side of the river adjacent to a large sand bar. Bottom gravel and sand. Willow provides overhead cover. Smartweed, cockle bur, tules, and some algae along outside edge.

SPECIES PRESENT: Arroyo chub (adult).

SAMPLE POINT: 22 **DATE**: 5/9/00 **GPS LOCATION**: 34° 26' 33" by 118° 36' 103"

HABITAT DESCRIPTION: Off channel pool along south bank with visible slow velocity, surface flow. Soft bottom (organic material) covered by algae. Tule, willow, smartweed, water speedwell, mule fat, grasses, umbrella sedge, cocklebur, and cottonwood along edge.

SPECIES PRESENT: Arroyo chub (fry only).

SAMPLE POINT: 23 **DATE**: 5/9/00 **GPS LOCATION**: 34° 26' 21" by 118° 36' 219"

HABITAT DESCRIPTION: Low-flow primary channel along south bank of river. Gravel and sand bottom. Much vegetative debris present. Salt cedar, willow, Arundo, and mugwort.

SPECIES PRESENT: Arroyo chub (adult).

SAMPLE POINT: 24 **DATE**: 5/9/00 **GPS LOCATION**: 34° 26' 76" by 118° 36' 272"

HABITAT DESCRIPTION: Very large isolated pool along north bank. Water source originates from upland source other than primary channel. Inflow small but very visible. Sand bottom with organic material. Vegetation includes mulefat and willow. Much vegetative debris providing cover.

SPECIES PRESENT: Arroyo chub.

SAMPLE POINT: 25 **DATE**: 5/23/00 **GPS LOCATION**: 34° 25' 997" by 118° 36' 817"

HABITAT DESCRIPTION: Low-flow secondary channel along north side of river. Soft bottom consisting of sand with some gravel. Pool isolated by sandbar. Good cover. Willow and Arundo along edge with algae on bottom.

SPECIES PRESENT: No species collected at this location.

SAMPLE POINT: 26 **DATE**: 5/23/00 **GPS LOCATION**: 34° 26' 21" by 118° 36' 896"

HABITAT DESCRIPTION: Isolated pool along the north side of the river. No obvious surface flow. Some algae growing in pond along bottom and surface. Approximately 25% of pond covered by algae. Other plants included water speedwell, willow, tules, smartweed, and umbrella sedge.

SPECIES PRESENT: Arroyo chub (juvenile), stickleback, western toad, arroyo southwestern toad (tadpole), and treefrog (tadpole). Observed one pond turtle observed swimming in area.

APPENDIX B - SITE PHOTOGRAPHS

APPENDIX B - SITE PHOTOGRAPHS

Photo 1. View looking downstream towards station # 1 . Date of photograph 5-9-00.

Photo 2. View looking upstream of station # 1. Date of photograph 5-9-00.

Photo 3. View looking downstream towards station # 2. Date of photograph 5-9-00.

Photo 4. View looking upstream of station # 2. Date of photograph 5-9-00.

Photo 5. View looking downstream towards station # 3. Date of photograph 5-9-00.

Photo 6. View looking upstream of station # 3. Date of photograph 5-9-00.

Photo 7. View looking downstream towards station # 4. Date of photograph 5-9-00.

Photo 8. View looking upstream of station # 4. Date of photograph 5-9-00.

Photo 9. View looking downstream towards station # 5. Date of photograph 5-9-00.

Photo 10. View looking upstream of station # 5. Date of photograph 5-9-00.

Photo 11. View looking downstream towards station # 6. Date of photograph 5-9-00.

Photo 12. View looking upstream of station # 6. Date of photograph 5-9-00.

Photo 13. View looking downstream towards station # 7. Date of photograph 5-9-00.

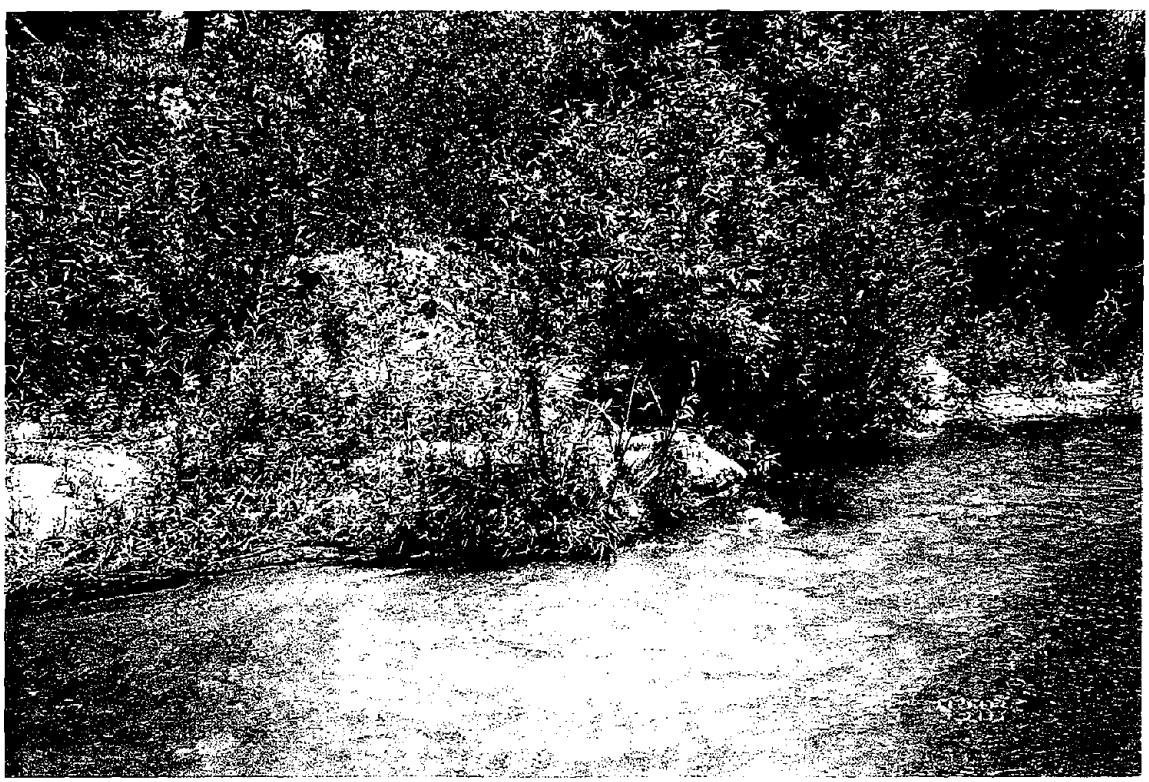

Photo 14. View looking upstream of station # 7. Date of photograph 5-9-00.

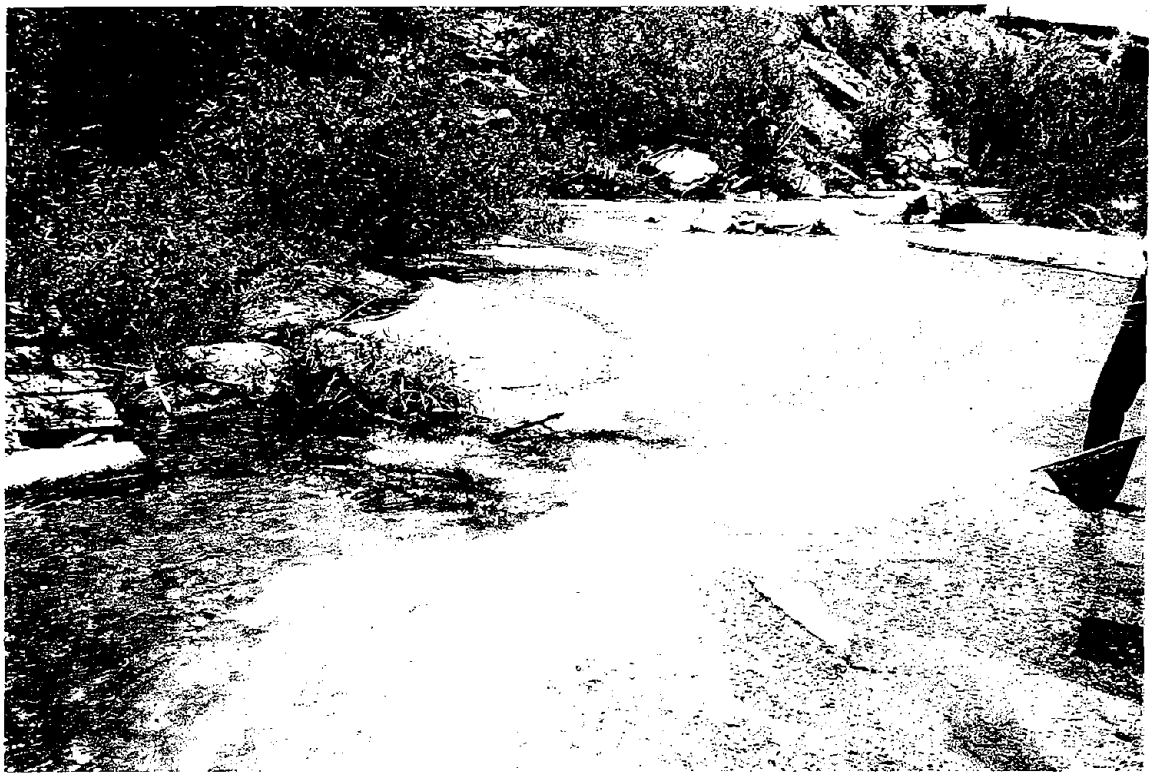

Photo 15. View looking downstream towards station # 8. Date of photograph 5-9-00.

Photo 16. View looking upstream of station # 8. Date of photograph 5-9-00.

Photo 17. View looking downstream towards station # 9. Date of photograph 5-9-00.

Photo 18. View looking upstream of station # 9. Date of photograph 5-9-00.

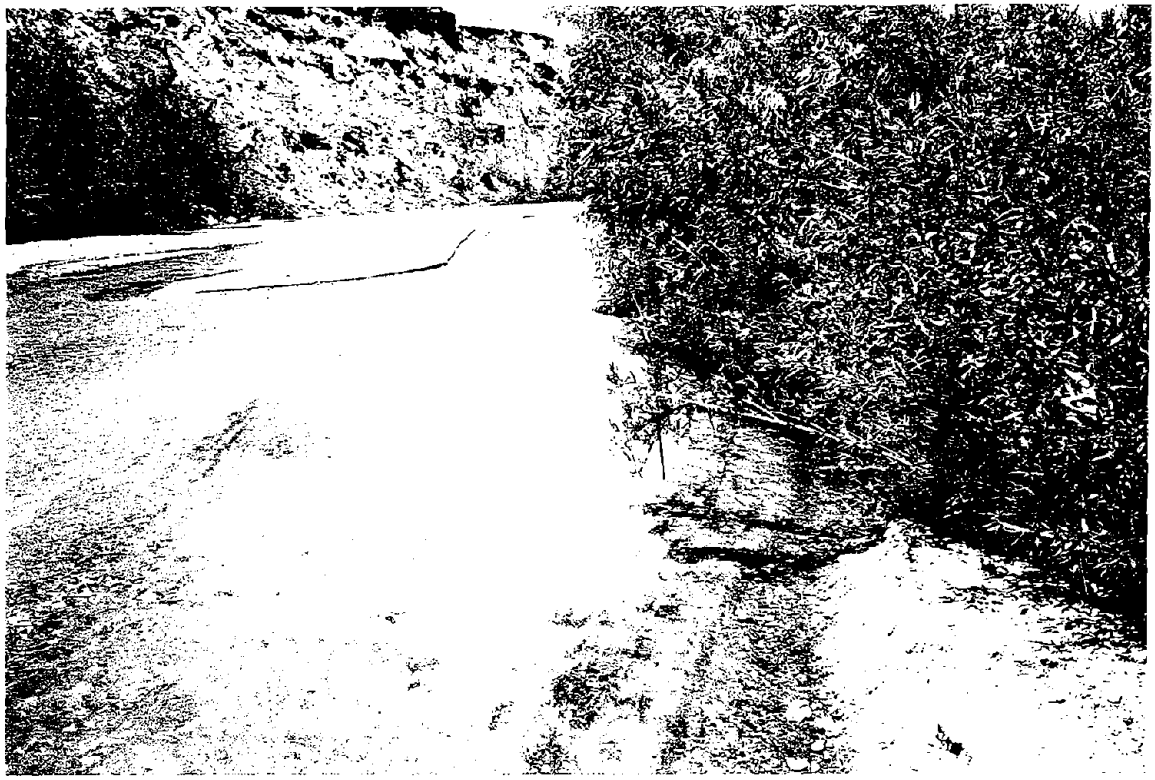

Photo 19. View looking downstream towards station # 10. Date of photograph 5-9-00.

Photo 20. View looking upstream of station # 10. Date of photograph 5-9-00.

Photo 21. View looking downstream towards station # 11. Date of photograph 5-9-00.

Photo 22. View looking upstream of station # 11. Date of photograph 5-9-00.

Photo 23. View looking downstream towards station # 12. Date of photograph 5-9-00.

Photo 24. View looking upstream of station # 12. Date of photograph 5-9-00.

Photo 25. View looking downstream towards station # 13. Date of photograph 5-9-00.

Photo 26. View looking upstream of station # 13. Date of photograph 5-9-00.

Photo 27. View looking downstream towards station # 14. Date of photograph 5-9-00.

Photo 28. View looking upstream of station # 14. Date of photograph 5-9-00.

Photo 29. View looking downstream towards station # 15. Date of photograph 5-9-00.

Photo 30. View looking upstream of station # 15. Date of photograph 5-9-00.

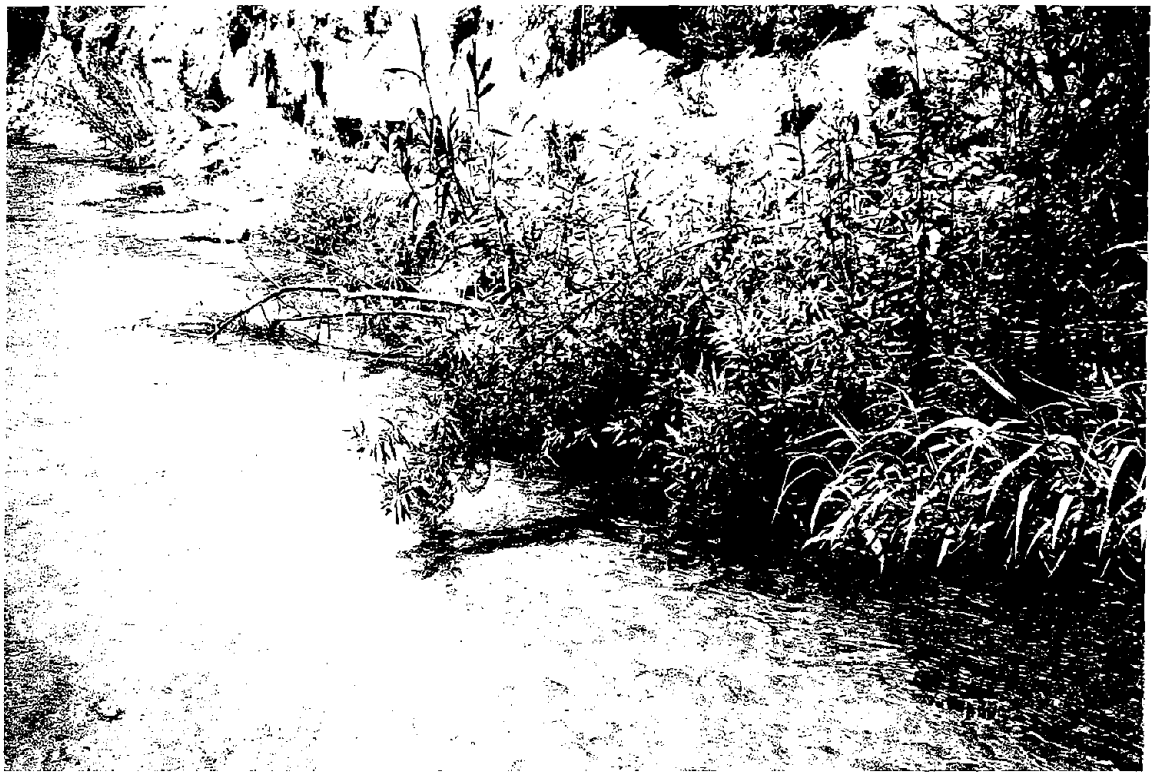

Photo 31. View looking downstream towards station # 16. Date of photograph 5-9-00.

Photo 32. View looking upstream of station # 16. Date of photograph 5-9-00.

Photo 33. View looking downstream towards station # 17. Date of photograph 5-9-00.

Photo 34. View looking upstream of station # 17. Date of photograph 5-9-00.

Photo 35. View looking downstream towards station # 18. Date of photograph 5-9-00.

Photo 36. View looking upstream of station # 18. Date of photograph 5-9-00.

Photo 37. View looking downstream towards station # 19. Date of photograph 5-9-00.

Photo 38. View looking upstream of station # 19. Date of photograph 5-9-00.

Photo 39. View looking downstream towards station # 20. Date of photograph 5-9-00.

Photo 40. View looking upstream of station # 20. Date of photograph 5-9-00.

Photo 41. View looking downstream towards station # 21. Date of photograph 5-9-00.

Photo 42. View looking upstream of station # 21. Date of photograph 5-9-00.

Photo 43. View looking upstream of station # 22. Date of photograph 5-9-00.

Photo 44. View looking downstream towards station # 22. Date of photograph 5-9-00.

Photo 45. View looking upstream of station # 23. Date of photograph 5-9-00.

Photo 46. View looking downstream towards station # 23. Date of photograph 5-9-00.

Photo 47. View looking upstream of station # 24. Date of photograph 5-9-00.

Photo 48. View looking downstream towards station # 24. Date of photograph 5-9-00.

Photo 49. View looking upstream of station # 25. Date of photograph 5-9-00.

Photo 50. View looking downstream towards station # 25. Date of photograph 5-9-00.

Photo 51. View looking upstream of station # 26. Date of photograph 5-9-00.

Photo 52. View looking downstream towards station # 26. Date of photograph 5-9-00.