

VENTURA RIVER STEELHEAD SURVEY

Ventura County, CA



Lower Ventura River

Prepared by

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for

California Department of Fish and Game, Region 5

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Ventura River Steelhead Survey

Spring, 1995

Abstract

A sampling survey was undertaken of selected reaches of the Ventura River to obtain information on current steelhead/rainbow trout populations in the Ventura River system, Ventura County.

Those reaches which remain accessible to adult steelhead migrating upstream from the ocean, and which currently provide potentially suitable spawning and rearing habitat, include the Ventura River from the Robles Diversion downstream to the Ventura River Estuary. No sampling was done on Coyote Creek, or in the Ventura River Estuary. Sampling on San Antonio Creek was limited to a single pool located 0.25 mile above the confluence with the Ventura River.

The survey initially extended from April 18 through April 30, and was subsequently extended through May 27, 1995. A total of 52 rainbow trout were captured, and 48 released during this effort. All fish were captured from six disjunct reaches of the main stem of the Ventura River totaling 4.25 miles.

Information was obtained on the presence and condition of fish. Scales samples were obtained from 17 specimens, and fin tissue samples from 9 specimens for genetic analysis. The number of fish captured generally decreased from upstream to downstream river sections. The fish captured during the survey may be derived from anadromous fish, resident native or non-native fish, or hatchery fish stocked within the Ventura River system, either in tributaries, or two major reservoirs.

Introduction

Steelhead/rainbow trout populations in the Ventura River system (See Figure 1.) have not been well studied. (Chubb, 1997; Moore, 1980a, 1980b)

Prior to the sharp decline in steelhead population size following the construction of Matilija Dam in 1948, investigations in the Ventura River were limited to occasional stream checks to determine general habitat conditions (e.g., stream flow, water temperature, presence or absence of vegetative cover, sedimentation, etc.) and creel censuses by the California Department of Fish and Game (Moore, 1980a; Swift, 1993; Titus, et al., 1995). Moore (1980b) investigated the rearing habitat characteristics and growth/mortality rates of an experimental population of juvenile steelhead stocked from the Mad River Hatchery into the main stem of the Ventura River, but made no

Ventura River Watershed

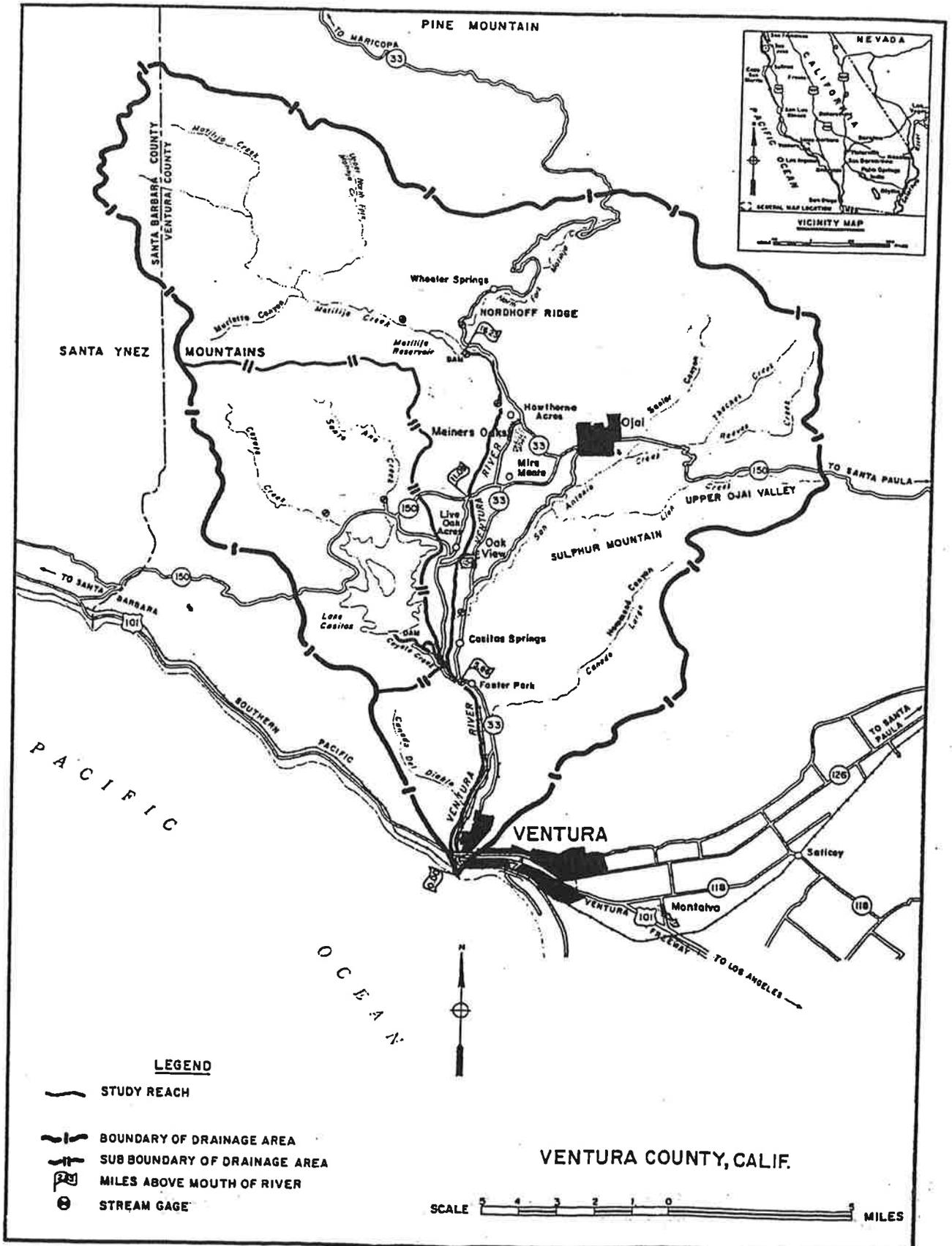


Figure 1

assessment of natural recruitment or run size. A five year river survey by the Casitas Municipal Water District and the City of San Buenaventura relied on visual observations to survey fish populations, and did not employ any standard sampling techniques such as weir traps, fyke nets, seines, or electrofishing. (Casitas Municipal Water District, et al., 1984; City of San Buenaventura, et al., 1990, 1991)

The purpose of the current survey was to ascertain the presence or absence of steelhead/rainbow trout (*Oncorhynchus mykiss*) in the Ventura River and its tributaries which remain accessible to anadromous fish, and to collect scale and tissue samples to generate information on the life history and genetic characteristics of *O. mykiss* in the Ventura River.

No attempt was made to determine population density, distribution, or movement of fish within the river system, though information provided on the catch per unit effort may permit an estimate of the relative density of fishes between river sections sampled. (Bagenal, 1978; Gunderson, 1993)

Methods

Collection permits were obtained from the California Department of Fish and Game to collect steelhead/rainbow trout (*Oncorhynchus mykiss*) from selected reaches of the Ventura River system, Ventura County. (See Figure 2.)

Approximately 5.75 miles (37%) of the 16 mile length of the main stem of the Ventura River was surveyed for *O. mykiss*. Fish populations were sampled by angling with light tackle and artificial lures. Lures consisted of small spinners (with No. 1 or 2 blades) with an artificial fly tied on a No. 12 or 10 barbless hook. Small lead shot was used to weight the spinners to allow angling near the bottom of pools and deep riffles. Most sampling efforts were conducted during the evenings, although several sampling efforts were made during the morning hours.

Several river sections which have historically have contained *O. mykiss* when water conditions are favorable were surveyed from 1 to 4 times. A total of 17 sampling efforts were made during the study period, totaling 31 hours. Sampling periods ranged from 0.5 to 7 hours, with a majority of efforts being 1.5 hours in duration.

Because of the shortness of the survey period and the amount of water to be covered, sampling efforts were concentrated on selected reaches of the main stem of the Ventura River where the likelihood of encountering *O. mykiss* was believed to be greatest, i.e., deep pools, glides, and larger riffle areas. These stream habitat types constituted less than 20% of the river length from which sampling efforts were made. (See Appendix A: Ventura River Steelhead/Trout Habitats.)

No sampling efforts were made in Coyote Creek, and sampling on San Antonio Creek was limited to one effort in a single pool located 0.25 mile above the confluence with the Ventura River. No sampling efforts were made in the Ventura River Estuary which extends 0.5 miles upstream from the Ventura River mouth.

Ventura River Steelhead Sampling Sections

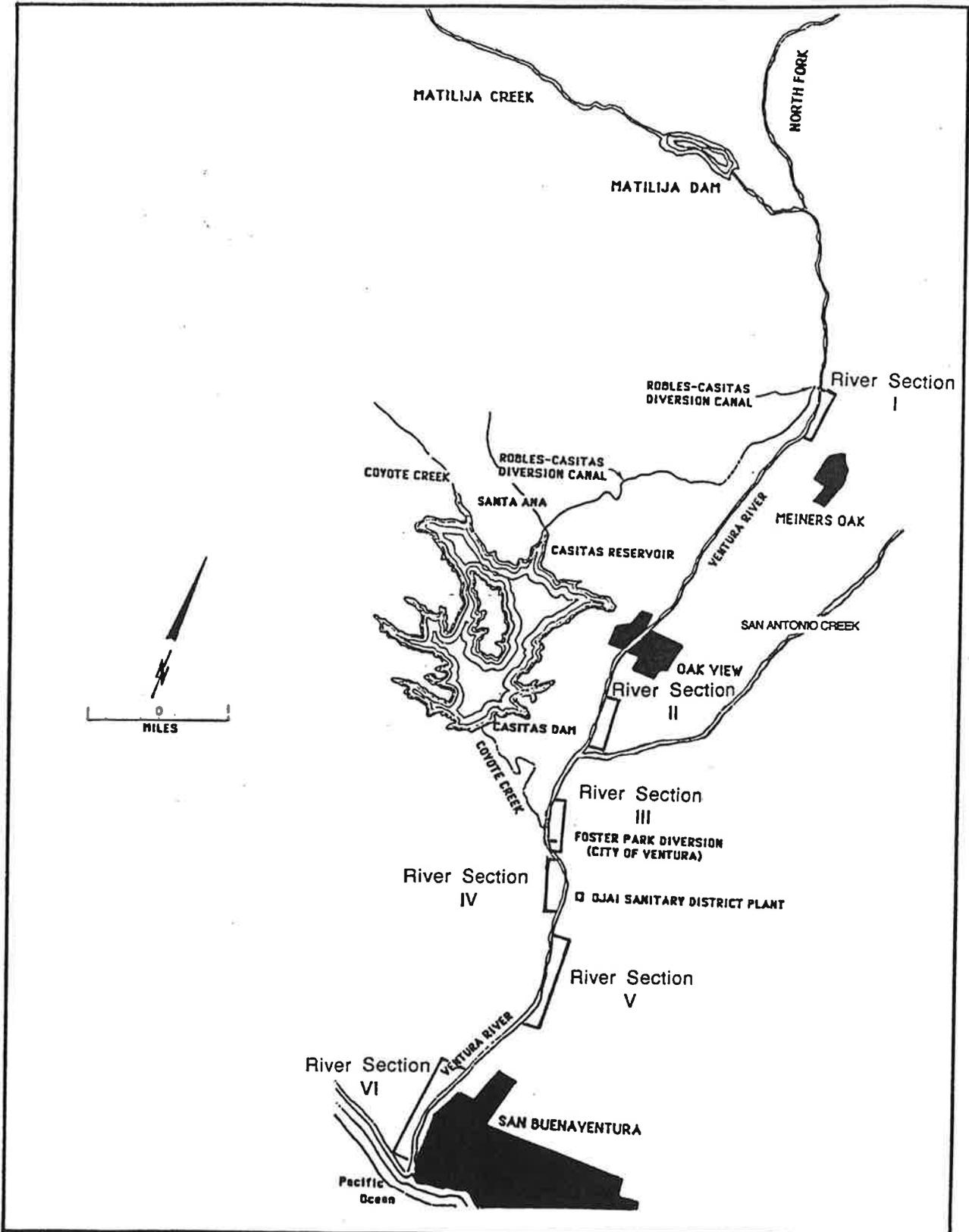


Figure 2

Table 1 provides a breakdown of the sampling effort per river section:

Table 1: Ventura River Steelhead Sampling Sections/Effort

River Section	Length	No. Surveys	Total Hours
I	0.75 mile section extending downstream from the Robles Diversion.	2	3.5
II	0.75 mile section extending from Live Oak Creek downstream to San Antonio Creek	5	7.0
III	0.75 mile section extending upstream from Foster Park Bridge	2	3.75
IV	0.75 mile section extending from Foster Park Bridge downstream to Ojai Valley Sanitary District Wastewater Treatment Facility	3	4.0
V	1.25 mile section extending from Cañada Larga Creek downstream to Shell Road Bridge	4	5.75
VI	1.5 mile section extending upstream from the U.S. Highway 101 Bridge	1	7.0
Total		17	31

The reach of Coyote Creek between the base of Casitas Dam and its confluence with the Ventura River is c. 2 miles in length. This reach of Coyote Creek has been highly modified as a result of the construction and operation of Casitas Dam, which has reduced base flows and eliminated annual flushing flows. This altered flow regime has led to encroachment of the stream channel by riparian vegetation, and heavy accumulation of siltation in the channel bed. The likelihood was low that this stream section (except for the stilling basin at the base of the Casitas Dam spillway) held steelhead or resident rainbow trout.

San Antonio Creek has a year round surface flow, and is the only steelhead spawning tributary which remains accessible to adult steelhead migrating upstream from the ocean. The small summer base flow and relatively few deep holes of this stream, combined with elevated algal levels (due in part to urban and agricultural nutrient sources) and elevated summer base flow water temperatures (due in part to modified riparian vegetative cover) limits, but does not preclude utilization by steelhead or resident rainbow trout.

Sampling efforts were conducted from April 25 through May 20, with one additional effort on May 27, the opening day of the regular trout season. (Additionally, an electrofishing effort was conducted on two sections of the lower Ventura River by the California Department of Fish and Game Wild Trout Crew on June 27, 1995.)

After capture, fish were examined for indications of origin or life history (hatchery, stream, or ocean residence). If a fish appeared to be of non-hatchery origin (by silver coloration, absence of fin erosion, and response to hooking), scale samples were taken above the lateral line, and a 1 cm² sample of tissue was taken from the lower tip of the caudal fin. Scales from two specimens that appeared to be of hatchery origin were also collected for comparison with non-hatchery fish sampled during the survey. Scale and fin tissue samples were not taken from all fish sampled, either because the fish escaped before scale or fin tissue samples could be collected, or because of the likely mortality from further handling. (See Appendix F: Steelhead/Trout Data Survey Reports.)

Scales were placed in individual, labeled manila envelopes. Scale samples from 17 specimens were dry-mounted on glass slides and transmitted to the Inland Fisheries Division, California Department of Fish and Game, for future analysis. (See Appendix G: Steelhead/Trout Scale Vouchers.)

Tissue samples were temporarily preserved in individual labeled zip-lock plastic bags or metal foil. All tissue samples were subsequently transferred to individual, labeled plastic vials and refrigerated at 0° F. Tissue samples were transferred to the Hopkins Marine Station where mitochondrial DNA (mtDNA) was extracted from fin clips using Chelex-100 resin following methods given by Nielsen, et al. (1994b). For mtDNA amplification specific primers were used which were known to amplify a highly variable segment of the mtDNA control region in salmonids. Double and single-stranded amplifications were performed using Polymerase Chain Reaction (PCR). The single-stranded product was sequenced and the DNA was visualized according to methods given by Nielsen, et al. (1994b). Additionally, amplification of alleles at ten microsatellite loci (One μ 14, Ssa85, Ots1, One μ 11, Sfo8, Omy77, One μ 2, Ssa14, Omy325, and One μ 8) were performed on the nine samples; however, several microsatellite loci did not amplify for all of the fish, most likely due to the degraded condition of some of the materials.

Photographs were taken of representative fish from which either scale and/or fin tissue samples were taken. All fish were released (or inadvertently escaped) back into the stream, with the exception of two hatchery fish which were killed during capture. (See Appendix C: Steelhead/Trout Samples.)

Results

Oncorhynchus mykiss were captured from six disjunct sections of the Ventura River totaling 4.25 miles in length, or approximately 27% of the total length of the main stem of the river. (See Figure 2.)

A total of 48 specimens of *O. mykiss* were captured during the survey period, from April 25 through May 20. An additional 4 fish were collected on May 27, the opening day of the regular trout season. Fish were captured as far up-stream as the Robles Diversion (14 miles upstream of the mouth) and as far downstream as the Shell Road Bridge (2.5 miles above the mouth). (See Appendix D: Steelhead/Trout Sample Location Maps.)

The fish ranged in total length from 19 cm (7.5 in), to 39.5 cm (16 in), and averaged 25 cm (9.75 in). A majority of the fish captured appeared to be female, although sex was not formally determined. (See Figure 3.)

Of the 52 fish captured, five appeared to be of hatchery origin. The remaining 47 fish appeared to be of native or non-hatchery origin (i.e., progeny of either resident or anadromous fish). Non-hatchery fish were characterized by a complete complement of non-eroded fins, silver coloration (in several instances loose scales), and a vigorous and acrobatic response to being hooked. Several of the non-hatchery fish exhibited smolt characteristics (i.e., bright silver coloration and loose scales). Hatchery fish had severely eroded dorsal and/or caudal fins (in one case missing pectoral fins), and a sluggish response to being hooked.

Scale samples were taken from 17 individuals. Of these, fin tissue samples were taken from 9 individuals. Tissue samples were taken only from fish not having visible hatchery characteristics (i.e., what appeared to be native resident or anadromous fish) as stipulated in the California Department of Fish and Game scientific sampling permit protocol. (California Department of Fish and Game, 1995) In addition, scale samples were taken from two hatchery fish which were killed during capture for comparison with non-hatchery fish. (See Appendix G: Steelhead/Trout Scale Vouchers.)

Table 2 provides a breakdown of fish captured by river section and catch per unit effort of time.

Table 2: Ventura River Steelhead Sampling Sections/Results

River Section	Length	Total Hours	No. Fish	Fish/Hour
I	0.75 mile section extending downstream from the Robles Diversion.	3.5	19	5.4
II	0.75 mile section extending from Live Oak Creek downstream to San Antonio Creek	7.0	13	1.8
III	0.75 mile section extending upstream from the Foster Park Bridge	3.75	11	2.9
IV	0.75 mile section extending from Foster Park Bridge downstream to Ojai Valley Sanitary District Wastewater Treatment Facility*	4.0	3	0.75
V	1.25 mile section extending from Cañada Larga Creek downstream to Shell Road Bridge	5.75	6	1.04
VI	1.5 mile section extending upstream from the U.S. Highway 101 Bridge	7.0	0	0.0

*The relatively small number of fish collected from this 0.75 mile section may be due to the small number of favorable habitats sampled (2 pools and one run).

Ventura River Steelhead Survey: Length/Number Distribution

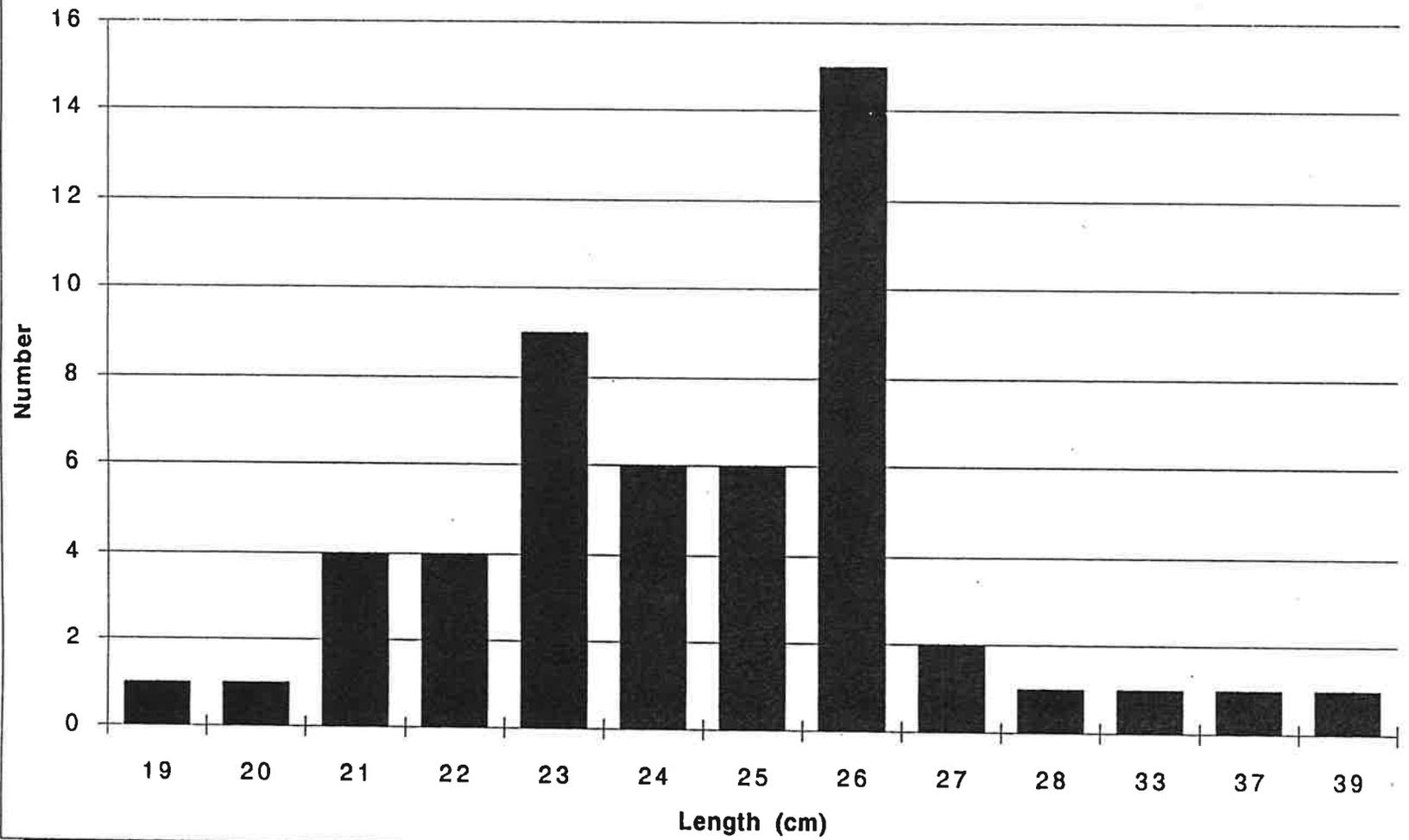


Figure 3

The number of fish captured generally decreased from upstream to downstream sections, with the highest density of fish encountered in the reach of river immediately downstream from the Robles Diversion, and in the vicinity of the Foster Park Diversion. (See Figure 2.). No fish were encountered or captured in the 1.5 mile section of the river extending upstream from the U.S. Highway 101 Bridge (located 0.5 miles above the mouth of the river at the Pacific Ocean). However, in a subsequent electrofishing survey conducted by the California Department of Fish and Game Wild Trout Crew on June 27, 1995, one individual *O. mykiss* was collected c. 1.5 miles above the U.S. 101 Highway Bridge. (See Appendix C: Steelhead/Trout Samples, Figures 23 and 24.)

All scale samples have been deposited with and curated by Dennis McEwan, Inland Fisheries Division of the California Department of Fish and Game. Samples will be analyzed for life history (river, ocean, and estuary) and growth patterns by Department personnel or persons under contract to the Department, and the results presented in a separate report. (See Appendix G: Steelhead/Trout Scale Vouchers.)

All fin tissue samples have been deposited with and curated by Jennifer Nielsen at the Hopkins Marine Station, Stanford University. The results of the mtDNA sequencing revealed that a majority of the fish sampled were of the mtDNA type 3. Haplotype 3 is more common in central and northern California steelhead populations, though this type also occurs in southern populations with less frequency. The small sample size (nine) was, however, not sufficient to draw any conclusions about the relative frequency of mtDNA types in the Ventura River system. (See Figure 4.) The results of the microsatellite analysis was consistent with previous studies of salmonid genotypes, with significant genetic frequency differences among three biogeographic zones in California: northern, from Humboldt Bay to Gualala Point; central, from the Russian River to Point Sur; southern, from San Simeon Point to Santa Monica Bay. (Nielsen, 1996; Nielsen, 1994; Nielsen, et al., 1996; 1995, 1994a, 1994b; 1993a, 1993b) (See Appendix H: Ventura River mtDNA Haplotypes and Nuclear Microsatellite Loci.)

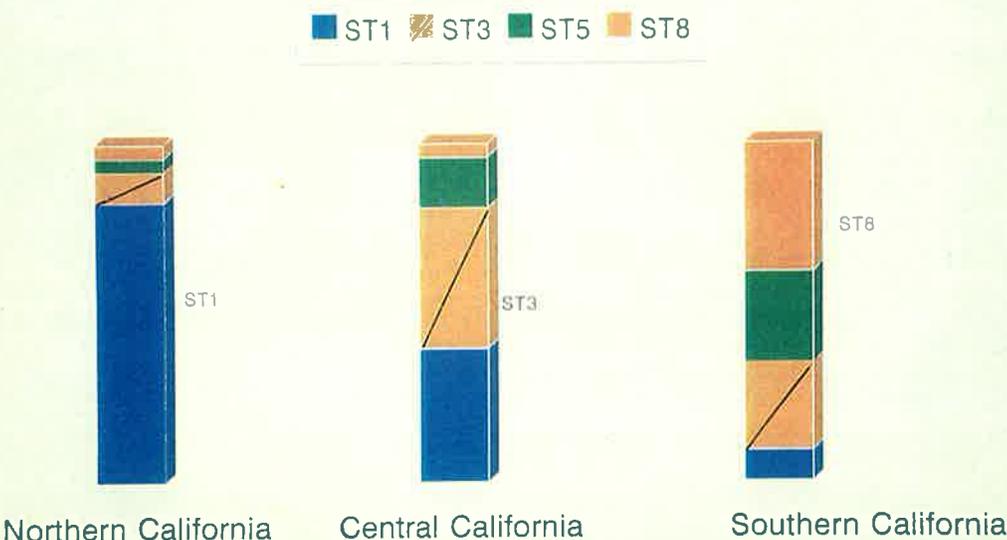
Table 3 presents the results of the mitochondrial sequencing for the mtDNA control region of nine fish sampled during the survey.

Table 3: Ventura River Salmonid Haplotypes

River Section	Specimen No.	Fish Length/cm	mtDNA Haplotype
I	3	19	3
I	38	23	3
I	13	23.5	3
I	48	26	3
II	28	26	5
II	18	23	3
III	26	26	3
IV	22	28	3
V	17	33	1

Distribution of mtDNA Types

Dominate Types



Source: Nielsen, J.L. 1994. Molecular Genetics and Stock Identification in Pacific Salmon.

Figure 4

Discussion

Current Habitat Conditions

Above average rainfall during the 1994-95 rainfall season generated favorable water conditions in the Ventura River and tributaries for resident or anadromous fish. The gauging station at Matilija Dam on Matilija Creek, the principal tributary to the Ventura River, reported 55.56 inches of rain between October 1, 1994 and May 30, 1995, representing a 100% increase over the long term annual average of 26.92 inches reported from this gauge site. Similarly, the gauge located at the Oak View County Fire Station near the middle reaches of the Ventura River, reported 42.27 inches of rain between October 1, 1994 and May 30, 1995, also representing a 100% increase over the long term annual average of 22.28 inches reported from this gauge site. (Casitas Municipal Water District, 1995a, 1995b, and 1995c; Ventura County Flood Control District, 1995a; U.S. Army Corps of Engineers, 1971, 1973) (See Appendix E: Ventura River Hydrologic Conditions.)

Above average rainfall totals resulted in relatively high sustained flows through the survey period. Peak flows measured at the gauging station below the Foster Park Bridge (which records flow to the ocean) reached 51,000 cubic feet per second (cfs) on January 10, 1995, and 34,000 cfs on March 10 1995. Flows to the ocean during the study period did not drop below 85 cfs. As a result, there was continuous flow from the headwaters of the Ventura River (confluence of Matilija Creek and the North Fork of the Ventura River) to the ocean from the first week in January 1995 through the end of the survey period. (The mouth of the river was open prior to the January storms and there was a continuous flow in the lower 8 miles of the river since mid-November.) (Casitas Municipal Water District, 1995d, 1995e, 1995f, and 1995g; Ventura County Flood Control District, 1995a, 1995b, and 1995c; U.S. Geological Service, 1995)

These conditions provided surface flows adequate to allow both upstream migration of adult steelhead from the ocean, as well as downstream emigration of juvenile fish (both offspring of anadromous fish as well as native and non-native resident fish) to the ocean as smolts.

Habitat conditions varied between the six river sections; these are briefly described below.

River Section I: Robles Diversion to Highway 150

This river section consisted principally of a series of pools and glides through a boulder field, with little or no riparian cover. Habitat structure was provided by rock or boulder cover, and relatively deep pools and glides. The section produced the largest number of fish sampled per unit of time effort. (See Appendix A: Ventura River Steelhead/Trout Habitats, Figures 1 and 2.)

River Section II: Live Oak Creek to San Antonio Creek

This river section included some of the most diverse habitats, with portions of the river running through deep pools, shallow riffle series, undercut banks, and along well developed multi-storied riparian vegetation. Fish were encountered primarily in deep pools and riffles. (See Appendix A: Ventura River Steelhead/Trout Habitats, Figures 3 and 4.)

River Section III: Foster Park Bridge Upstream

This river section contained a series of pools deep riffles, and shallow glides. The habitats were bordered by riparian cover, principally a variety of willow (*Salix* sp.) but with some Sycamore (*Platanus racemosa*) and Cottonwood (*Populus trichocarpa*) on one bank, and a gravel or cobble bar on the opposite bank. Pools bordered by over-hanging riparian vegetation provided the largest number of fish, with deeper riffles also holding fish. (See Appendix A: Ventura River Steelhead/Trout Habitats, Figures 5 and 6.)

River Section IV: Foster Park Bridge to Ojai Valley Sanitary District

The river section contained relatively few pools, and only shallow glides or riffles. The majority of the fish were sampled from one large pool cut up against a elevated river terrace, with only moderate riparian cover on one bank. (See Appendix A: Ventura River Steelhead/Trout Habitats, Figures 7 and 8.)

River Section V: Cañada Larga Creek to Shell Road Bridge

The river section contained a number of large and deep pools and glides against undercut banks, and the largest pool in the river sections surveyed (Shell Hole). Riparian vegetation was present along most of the river section, but absent on one bank or with the other bank bordered by a large gravel or cobble bar. Fish were generally confined to pools with over-hanging riparian vegetation and with a small fall or riffle at their upper end. (See Appendix A: Ventura River Steelhead/Trout Habitats, Figures 9 and 10; cover photograph)

River Section VI: U.S. Highway 101 Bridge Upstream

The river section contained a large number of large glides and pools, and riffles, and has the most extensively developed riparian canopy, consisting principally of a variety of willow (*Salix* sp.) and some Cottonwood (*Populus trichocarpa*), and Sycamore (*Platanus racemosa*) intermixed. As noted below, the river section had the most heavily sedimented channel bottom, and produced the fewest fish. Appendix A: Ventura River Steelhead/Trout Habitats, Figures 11 and 12.)

Origin of Populations

Rainbow trout were seen or captured in all river sections surveyed, except the lower 1.5 miles of the Ventura River between the Shell Road Bridge and the U.S. 101 bridge. (However, one individual *O. mykiss* was collected c. 1.5 miles above the U.S. 101 Highway Bridge in a subsequent electrofishing survey by the California Department of Fish and Game Wild Trout Crew on June 27, 1995.) Most of the fish captured during

this study (47 of 52 or 90%) appeared to be non-hatchery fish (i.e., had been spawned and reared in the Ventura River, either as progeny of anadromous or resident fish), based upon external morphologic characteristics (coloration, condition of fins, loose scales) and behavior (vigor in attacking the lure, acrobatic response to being hooked).

The following provides a discussion of the possible origins of the rainbow trout collected during the survey by river section surveyed:

River Section I: Robles Diversion to Highway 150

Approximately 36% of fish taken during this survey were captured in a 0.75 mile section of the main stem of the Ventura River extending downstream from the Robles Diversion. This section of the river is frequently dewatered as a result of diversions by the Robles Diversion to the Casitas Reservoir, and the naturally high percolation rate of surface flows to the shallow groundwater table. It is unlikely that the fish captured in this section were spawned and reared in this section of the Ventura River because of the annual dewatering. These fish were most likely derived from fish populations in the main stem of the Ventura River above the Robles Diversion, or in the headwaters of the Ventura River, either Matilija Creek (and its tributaries) or the North Fork of the Ventura River.

There are approximately 2.75 miles of year-round steelhead/trout habitat in the main stem of the Ventura River above the Robles Diversion, and an additional 1.25 miles of year-round steelhead/trout habitat in Matilija Creek below Matilija Dam. The actual amount of habitat fluctuates annually with stream flow conditions. These stream sections support a heterogeneous rainbow trout population consisting of resident fish, hatchery fish stocked in the headwaters of the Ventura River, and possibly, remnant land-locked steelhead. (Carpanzano, 1966, Cardenas, personal communication) 

Above Matilija Dam there are approximately 15 miles of steelhead/trout habitat in the main stem of Matilija Creek, as well as 7 miles in the Upper North Fork of Matilija Creek, and 5 miles in Murietta Creek. The actual amount of habitat fluctuates annually with stream flow conditions. Matilija Creek and tributaries above Matilija Dam have a heterogeneous salmonid population consisting of naturally spawned resident rainbow trout, stocked hatchery fish, and possibly land-locked steelhead. These fish would have an opportunity to pass from upstream sections downstream when water is spilling over Matilija dam. (Carpanzano, 1996; Chubb, 1997; Moore, 1980a) 

Matilija Dam was constructed in 1948 with an original storage capacity of c. 7,000 acre feet. The reservoir has experienced a 90% reduction in storage capacity as a result of siltation and lowering of the dam. As a result, Matilija Dam spills annually. During the 1995 rainfall season, Matilija Dam spilled continuously from January 9 through May 30, 1995, with average daily spills ranging from 100 cfs to 5,580 cfs. (California Department of Water Resources, 1988; Casitas Municipal Water District, 1995h; Ventura County Flood Control District, 1975)

Fish emigrating or involuntarily moved downstream by high flows in Matilija Creek above the Matilija Dam would drop 140 foot over the spillway of the dam. The vertical drop over Matilija Dam can adversely affect the survival of fish in two ways: (1) direct

physical impact by falling into a static pool of water, and (2) exposure to super-saturation of gases which can result in gas bubble disease and mortality. The physical impact on fish passing over the dam is determined by the terminal velocity of the fish which is a function of the size of the fish and the extent to which the fish is entrained in the falling water stream. Exposure to super-saturation of gases (primarily nitrogen) depends upon the volume of flow and the depth to which the falling water stream penetrates the plunge pool at the base of the dam. (Heise, personal communication)

No studies have been conducted on mortality rates of fish passing over Matilija Dam, and, consequently, it is not known what percentage of fish moving over the dam would survive in the fall, though some injury or mortality can be expected. (Heise, personal communication; Clay, 1995)

The North Fork of the Ventura River (also known as the North Fork of Matilija Creek) has approximately 10 miles of perennial rainbow trout habitat. The North Fork has a heterogeneous rainbow trout population consisting of stocked hatchery fish, naturally spawned resident rainbow trout, and possibly remnant land-locked steelhead. (Moore, 1980a) These fish would have an opportunity to pass downstream when water is flowing through the by-pass gates of the Robles Diversion. The by-pass gates are abutted by a concrete spillway approximately 10 feet in height, with a slope of c. 15°. (Cramer, et al. 1995; Moore, 1980a, 1980b; Wickstrum, personal communication)

River Section II: Live Oak Creek to San Antonio Creek

Twenty-five percent of the fish taken during this survey were captured in a 0.75 mile section of the main stem of the Ventura River extending from Live Oak Creek to San Antonio Creek. Only the lower portions of this reach maintains surface flow in average water years, although the amount of flow can vary considerably depending on seasonal rainfall. The area, however, has historically been used by adult steelhead migrating up from the ocean to spawn, and contains suitable year-round habitat during wet years.

Rainbow trout collected from this section could have been derived from anadromous or resident rainbow trout populations in the Ventura River below the Robles Diversion, resident rainbow trout (native or introduced) populations in the Ventura River system above the Robles Diversion, or stocked hatchery fish that washed down from stocking sites in the Ventura River system above the Robles Diversion.

River Section III: Foster Park Bridge Upstream

Approximately 21% of the fish taken during this survey were captured in a 0.75 mile section of the main stem of the Ventura River extending upstream from the Foster Park Bridge. This area historically has contained year-round trout habitat because of the surface flows from San Antonio Creek and a shallow rising groundwater table. Portions, however, are periodically dewatered as a result of both ground and surface water extractions by the City of San Buenaventura.

Rainbow trout collected from this section could have been derived from anadromous or resident rainbow trout populations in the Ventura River below the Robles Diversion,

resident rainbow trout (native or introduced) populations in the Ventura River system above the Robles Diversion, or stocked hatchery fish that washed down from stocking sites in the Ventura River system above the Robles Diversion.

Additionally, the lower section of this reach of the Ventura River is periodically fed by Coyote Creek and Santa Ana Creek, both of which are blocked by Casitas Dam. Coyote Creek above Casitas Dam has a heterogeneous rainbow trout population consisting of naturally spawned resident fish, and possibly remnant land-locked steelhead. Additionally some hatchery fish stocked in Casitas Reservoir may ascend Coyote and Santa Ana Creek to spawn. All of these fish would have an opportunity to pass from upstream sections downstream when water is spilling over the crest of the Casitas dam spillway (Moore, 1980a).

Casitas Reservoir was completed in 1958 and has a storage capacity of c. 250,000 acre feet. The storage capacity has remained relatively unchanged since its construction because of the diversion of water with low silt levels via the Robles Diversion on the main stem of the Ventura River. As a result, Casitas Dam spills only irregularly. Since its construction Casitas Dam has spilled seven times: 1978, 1980, 1983, 1986, 1991, 1993, and 1995. During the 1994-1995 rainy season, Casitas spilled continuously from January 25 through the end of May, with flows ranging from c. 3 cfs to c. 747 cfs. (California Department of Water Resources, 1988; Casitas Municipal Water District, 1995e)

Casitas spills only during high water years

Fish emigrating or involuntarily moved downstream with high flows in Coyote and Santa Ana Creeks above Casitas Dam could pass over the spillway of the dam which is 285 feet high. The spillway has a slope of only c. 15°. It is possible that a significant percentage of fish moving over the spillway would survive because of the relatively shallow gradient of the spillway shoot. However, it is not likely that large numbers of juvenile trout in the tributary streams would pass through the lake and over the spillway since there is no current to provide stimulus or guidance through the reservoir. Native resident and planted resident trout in the lake near the spillway, however, would have a greater chance than fish in the tributaries to pass over the spillway and contribute to the steelhead/trout population downstream. (Cardenas, personal communication; Clay, 1995)

Two of the five stocked fish believed to be of hatchery origin collected during this survey were taken within 0.5 mile downstream of the confluence of Coyote Creek and the Ventura River, and may have been derived from the hatchery population in Casitas Reservoir, or from hatchery fish stocked in the North Fork of the Ventura River. (See Appendix C: Steelhead/Trout Collections, Figures 18 and 20.)

River Section IV: Foster Park Bridge to Ojai Valley Sanitary District

Approximately 6% of the fish taken during this survey were captured in a 0.75 mile section of the main stem of the Ventura River extending from the Foster Park Bridge downstream to the Ojai Valley Sanitary District.

This reach historically has maintained year-round trout habitat as a result of the contribution of surface flows from the Casitas Springs reach, a shallow rising

groundwater table, and more recently, treated wastewater discharge (1.4 million gallons per day) from the Ojai Valley Sanitary District.

In addition to instream recruitment, fish collected in this reach during the survey could have originated from anadromous fish, or from resident or stocked fish in the main stem of the Ventura River in the Casitas Spring reach, as well as above the Robles Diversion, in the main stem or headwaters of the Ventura River (either from Matilija Creek or the North Fork of the Ventura River).

This reach of the Ventura River is also fed by Coyote Creek and Santa Ana Creek, both of which are blocked by the Casitas Dam, but may periodically receive fish during the spillage water from Casitas Dam.

River Section V: Cañada Larga Creek to Shell Road Bridge

Approximately 12% of the fish taken during this survey were captured in a 1.25 mile section of the main stem of the Ventura River extending from the confluence of Cañada Larga Creek to the Shell Road Bridge.

This reach historically has maintained year-round trout habitat as a result of the contribution of surface flows from the Casitas Springs reach, a shallow groundwater table, Cañada Larga Creek inflows, and more recently, treated wastewater discharge (1.4 million gallons per day) from the Ojai Valley Sanitary District.

In addition to instream recruitment, fish collected in this reach during the survey could have originated from anadromous fish, or been derived from resident or stocked fish in the main stem of the Ventura River in the Casitas Spring reach, as well as above the Robles Diversion, or in the headwaters of the Ventura River, either from Matilija Creek or the North Fork of the Ventura River.

This reach of the Ventura River is also fed by Coyote Creek and Santa Ana Creek, both of which are blocked by the Casitas Dam, but may periodically receive fish as a result of water spillage over Casitas Dam.

River Section VI: U.S. Highway 101 Bridge Upstream

No *O. mykiss* were collected or encountered in the 1.5 mile section of the Ventura River extending from the Shell Road Bridge downstream to the U.S. 101 Bridge. (However, one individual *O. mykiss* was collected c. 1.5 miles above the U.S. 101 Highway Bridge in a subsequent electrofishing survey by the California Department of Fish and Game Wild Trout Crew on June 27, 1995.) This section of the river sustains year-round surface flows supplied by the sources noted above, and during the survey period exhibited habitat conditions comparable, and in some respects superior (because of better developed riparian cover), to the habitat in the section upstream between the Shell Road Bridge and the confluence of San Antonio Creek with the Ventura River. (See Appendix A: Steelhead/Trout Habitats, Figures. 11 and 12.)

Two factors, however, may adversely affect the current suitability of this reach of river for steelhead/ trout, even during periods of high flows: (1) high levels of nutrients and

other pollutants, both from point and non-point sources; and (2) the high degree of sedimentation of the channel bottom. Nutrients and other contaminants in wastewater discharged from the Ojai Valley Sanitary District Treatment Plant have contributed to reduced water quality (including lowered dissolved oxygen levels and turbidity). Additionally, there is a series of storm drains along the lower 2.6 miles of the Ventura River which contribute to pollution loading on the Ventura River. Increased nutrient levels increase algae production and result in diurnal fluctuations of dissolved oxygen. Thick mats of algae growth covered river cobble and sediment deposits in the large pools and runs throughout the lower 1.5 miles of the survey area. (Ojai Valley Sanitary District, 1991) (See Appendix E: Ventura River Hydrologic Conditions.)

Finally, the low gradient of this portion of the Ventura River allows the deposition of fine sediments (silts and muds) from adjacent agricultural, oil, and residential developments. Fine sediments can reduce benthic food production, as well as facilitate the encroachment of aquatic vegetation which can reduce living space for resident or anadromous fish.

Summary and Conclusion

Above average rainfall during the 1994-1995 rainfall season produced flow conditions conducive to anadromous and resident trout utilization throughout the Ventura River system, from its headwaters to the mouth at the Pacific Ocean. A total of 52 rainbow trout were captured by hook and line sampling in six disjunct section of the Ventura River from April 25 through May 27, 1995. The fish ranged in size from 19 cm to 39.5 cm and averaged 25 cm. The density and number of fish captured generally decreased from upstream to downstream river sections.

A majority of the fish sampled during this survey appeared to be of non-hatchery origin (based on smolting characteristics) rather than of hatchery origin (based on fish erosion and other characteristics), but could have been derived from either anadromous or native resident fish. While the origin and life histories of the specimens collected during this survey could not be definitely determined, there are four possibilities for the origins of these fish:

- (1) progeny of anadromous fish;
- (2) progeny of resident native or non-native rainbow trout populations in tributaries of the Ventura River system including tributaries to Casitas Reservoir (i.e., Coyote and Santa Ana Creeks);
- (3) stocked hatchery fish in the main stem or the headwaters of the Ventura River (i.e., Matilija Creek and the North Fork);
- (4) stocked hatchery fish from the two major reservoirs in the Ventura River drainage (i.e., Casitas Reservoir, and Matilija Reservoir).

A comparison with the genetics of fish collected from upstream areas, including Coyote and Santa Ana Creeks, and Matilija Creek and the North Fork of the Ventura

River may be useful in elucidating the nature of the steelhead/trout populations in the Ventura River system. The analysis of the scale and fin tissue samples collected as part of this survey may provide additional insight into origins, population structure, and life histories of the steelhead/trout populations in the Ventura River.

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Appendix A
Ventura River Steelhead/Trout Habitats



Fig. 1.
Ventura River
immediately
below Robles
Diversion, 14
miles above the
mouth. May 20,
1995. Note fair-
weather road
crossing and
plunge pool c. 8
feet deep in
foreground.
Average daily flow
c. 73 cfs.



Fig. 2.
Ventura River c.
0.25 mile below
Robles Diversion.
Note large boulder
field indicative of
relatively steep
gradient. June 5,
1995. Average
daily flow c. 60
cfs.



Fig. 3.
Ventura River c.
0.75 mile above
confluence with
San Antonio
Creek, looking
downstream. May
16, 1995. Note
mature riparian
canopy on west
bank. Average
daily flow c. 64
cfs.

Fig. 4.
Confluence of
Ventura River (L)
with San Antonio
Creek (R). May
16, 1995. Note
turbid water
from San Antonio
Creek following
1.2 in. rainstorm
on the previous
day. Average daily
flow c. 107 cfs.





Fig. 5.
Ventura River c.
0.75 mile above
Foster Park
Bridge, looking
northwest
upstream. May
18, 1995. Depth
of riffle ranged
from 2 to 3 feet.
Average daily flow
c. 103 cfs.

Fig. 6.
Ventura River
near City of San
Buena Ventura
Foster Park
Surface
Diversion, looking
west toward
Foster Park. May
18, 1995. Note
western end of
underground dam
partially exposed
at riffle. Average
daily flow c. 103
cfs.





Fig. 7.
Ventura River c.
0.5 mile below
Foster Park
Bridge, looking
north upstream.
May 10, 1995.
Note temporarily
non-vegetated
floodplain due to
flood scour. Pool
c. 7 feet deep.
Average daily flow
c. 84 cfs.

Fig. 8
Ventura River
opposite Ojai
Valley Sanitary
District
Treatment Plant c.
0.75 mile below
Foster Park
Bridge, looking
southwest
downstream. May
10, 1995. Note
remnant mature
riparian canopy
on west bank.
Average daily flow
c. 84 cfs.





Fig. 9.
Ventura River c.
immediately above
confluence of
Cañada Larga
Creek, looking
southwest
downstream. June
5, 1995. Note
Cañada Larga
Creek entering
from left
foreground.
Average daily flow
c. 84 cfs.

Fig. 10.
Ventura River c.
0.25 mile above
Shell Road Bridge,
looking southeast
downstream. May
20, 1995. Note
Shell Road Bridge
in left
background. Pool
ranged from 2 to
5 feet deep.
Average daily flow
c. 100 cfs.





Fig. 11.
Ventura River c.
1.5 miles
upstream from
the mouth, looking
northwest
upstream. May
30, 1995. Note
mature riparian
canopy on west
bank. Average
daily flow c. 87
cfs.

Fig. 12.
Ventura River c.
0.5 mile above the
the U.S. Highway
101 Bridge,
looking southwest
downstream. May
8, 1995. Note
mature riparian
canopy on east (L)
and west (R)
banks. Average
daily flow c. 130
cfs.



Appendix B
Ventura River Major Water Supply Facilities



Fig. 1.
Matilija Dam
spilling into
Matilija Creek c.
1.25 miles above
its confluence
with the Ventura
River. March 24,
1995. Note dam
height of 140
feet, with
spillway slope of
90°. Average
daily flow c. 425
cfs.



Fig. 2.
Casitas Dam
spilling into
Coyote Creek, c.
1.5 miles above
its confluence
with the Ventura
River. March 11,
1995. Note dam
height c. 285 feet,
with spillway
slope of 15°. Average
daily flow
c. 748 cfs.



Fig. 3.
Robles Diversion Dam. Storm flows passing through four by-pass gates, looking north upstream. March 11, 1995. Note height of diversion dam c. 12 feet, with spillway slope c. 15° . Average daily flow c. 3,347 cfs.

Fig. 4.
Robles Diversion Dam, looking north upstream. April 12, 1992. Note by-pass gates have been lowered to divert water from the Ventura River through the Robles Canal to Casitas Reservoir. Average daily flow (diverted) c. 129 cfs.





Fig. 5.
City of San
Buenaventura
Foster Park
Surface Diversion
intake structure
diverting flow
from east river
channel, looking
northwest
upstream. May
18, 1995. Note
arrow indicates
fish screen over
intake. Average
daily flow c. 103
cfs.

Fig. 6.
City of San
Buenaventura
Foster Park
Surface
Diversion, looking
west across from
the intake.
October 28,
1992. Note
gravel diversion
reconstructed
annually in
varying locations
to divert flow to
surface intake on
east side of
floodplain.
Average daily flow
c. 10 cfs.



Appendix C
Ventura River Steelhead/Trout Samples

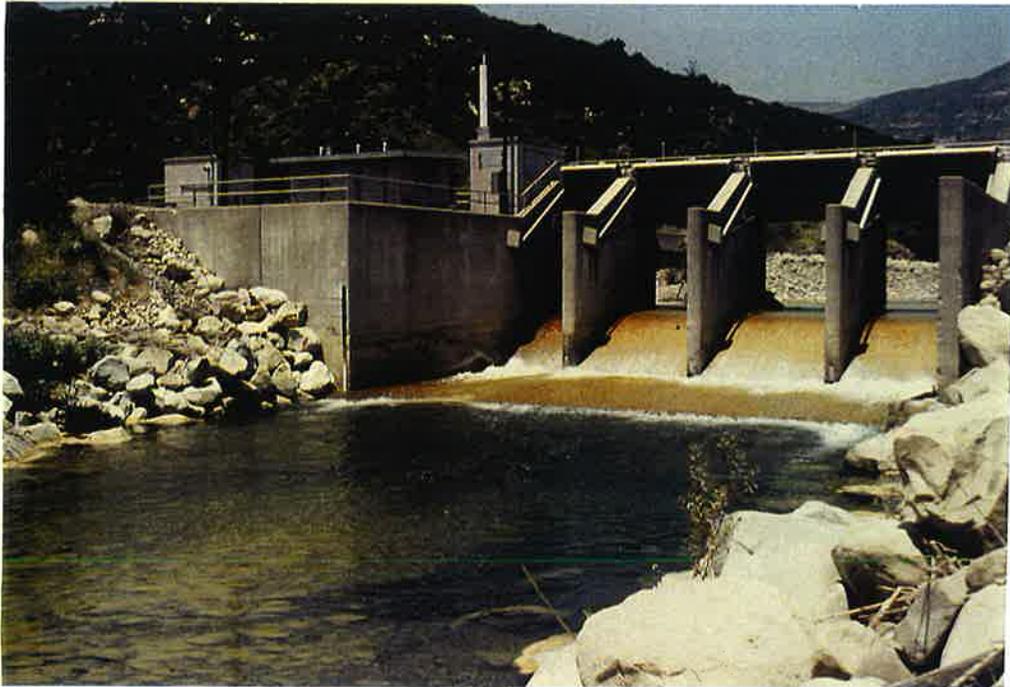


Fig. 1.
Robles Diversion
on the Ventura
River c. 14 miles
above the mouth,
looking northwest
upstream. June
5, 1995. Note
that the four by-
pass gates have
been raised. The
pool below the
concrete apron is
c. 4 feet deep.
Average daily flow
c. 60 cfs.

Fig. 2.
Oncorhynchus
mykiss collected
from the Ventura
River
immediately
below Robles
Diversion. May
20, 1995.
Length: 23.3 cm
(9.25 in.). Note
bright silver
coloration, no fin
erosion. Specimen
No. 43.



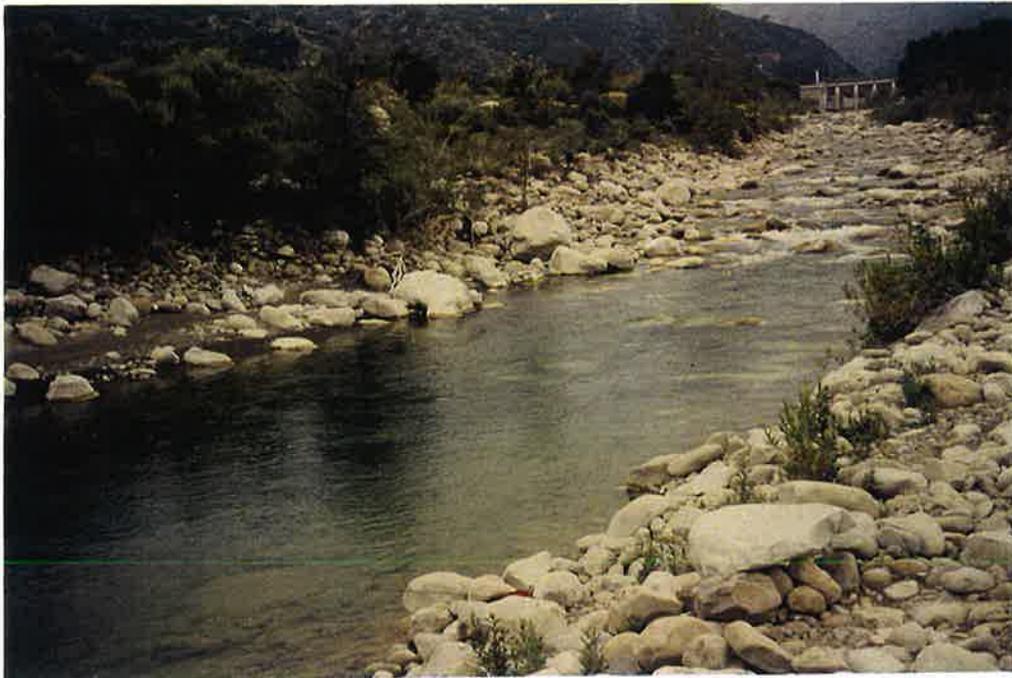
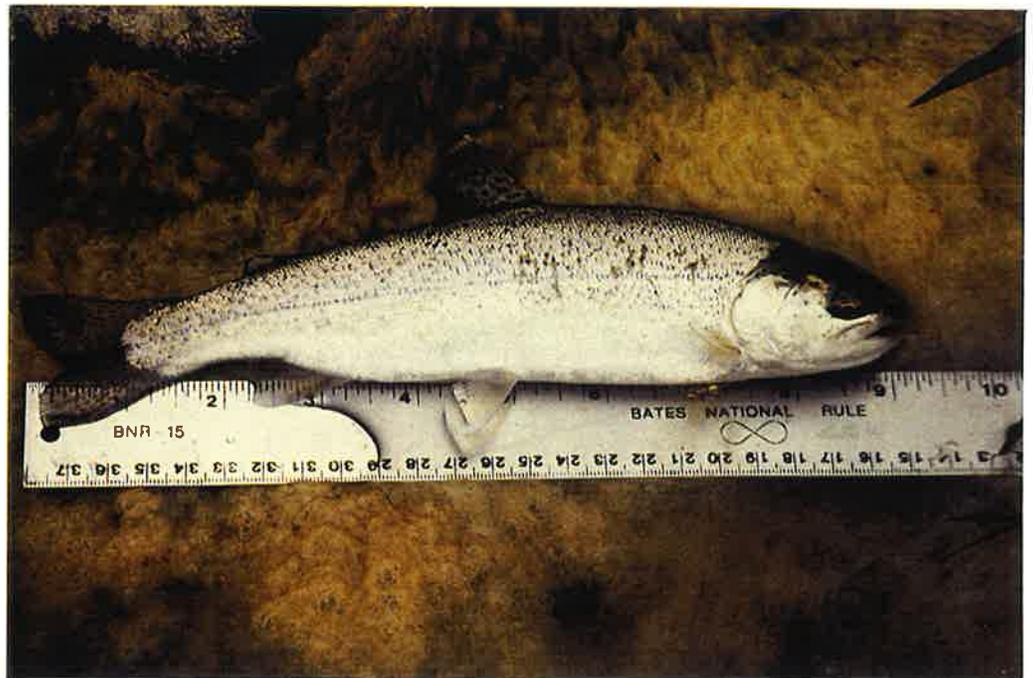


Fig. 3. Ventura River c. 0.25 mile below the Robles Diversion, looking northwest upstream. May 20, 1995. Note boulder field and lack of overhanging riparian vegetation. Average daily flow c. 73 cfs.

Fig. 4.
Oncorhynchus mykiss collected from the Ventura River c. 0.25 mile below the Robles Diversion. May 20, 1995. Length: 23 cm (9 in.). Note bright silver coloration, lose scales above lateral line, no fin erosion. Specimen No. 38.



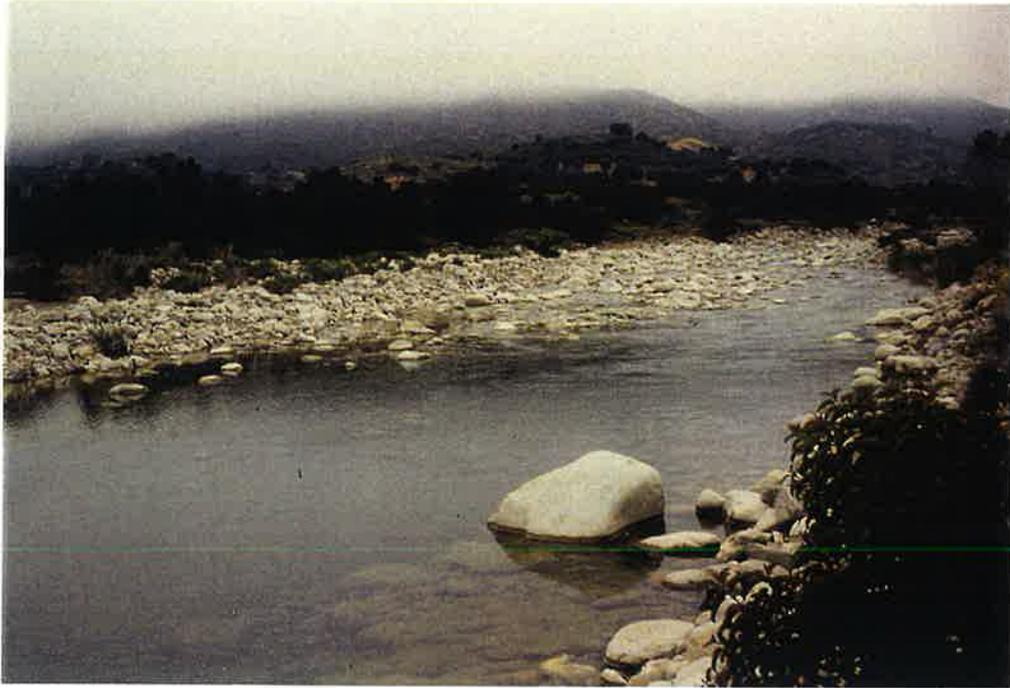


Fig. 5.
Ventura River c.
0.75 mile below
the Robles
Diversion, looking
northwest
upstream. May
20, 1995. Long
pool between 3
and 5 feet deep.
Note boulder field
and lack of over-
hanging riparian
vegetation.
Average daily flow
c. 73 cfs.

Fig. 6.
Oncorhynchus
mykiss collected
from the Ventura
River c. 0.75
mile below the
Robles Diversion.
May 20, 1995.
Length: 19 cm
(7.5 in.). Note
bright silver
coloration, loose
scales near caudal
fin, no fin
erosion.
Specimen No. 33.





Fig. 7.
Ventura River c.
0.75 mile above
the confluence of
San Antonio
Creek, looking
northwest
upstream at east
branch. May 16,
1995. Note pool
in lower left c. 4
feet deep. Average
daily flow c. 64
cfs.

Fig. 8.
Oncorhynchus
mykiss collected
from the Ventura
River c. 0.75
mile above the
confluence of San
Antonio Creek.
May 19, 1995.
Length: 28 cm
(10.75 in.). Note
bright silver
coloration, no fln
erosion.
Specimen No. 28.





Fig. 9. Ventura River c. 0.25 mile above its confluence with San Antonio Creek, looking west upstream at east channel. May 19, 1995. Note pool ranged from 2 to 4 feet deep. Average daily flow c. 73 cfs.

Fig. 10.
Oncorhynchus mykiss collected from the Ventura River c. 0.25 mile above confluence of San Antonio Creek. May 16, 1995. Length: 23 cm (9 in.). Note predominantly silver coloration with rose hue on dorsal side, no fin erosion. Specimen No. 19.





Fig. 11.
Ventura River c.
0.75 miles above
the Foster Park
Bridge, looking
north upstream.
May 18, 1995.
Riffle ranged from
2 to 3 feet deep.
Average daily flow
c. 88 cfs.

Fig. 12.
Oncorhynchus
mykiss collected
from the Ventura
River c. 0.75
mile above the
Foster Park
Bridge. May 18,
1995. Length: 26
cm (10 in.). Note
silver coloration,
lose scales above
lateral line, no fin
erosion.
Specimen No. 26.





Fig. 13.
Ventura River
0.75 mile above
the Foster Park
Bridge, looking
northeast
upstream. May
18, 1995. Pool
ranged between 1
to 4 feet deep.
Average daily flow
c. 103 cfs.

Fig. 14.
*Oncorhynchus
mykiss* collected
from the Ventura
River 0.75 mile
above the Foster
Park Bridge.
April 26, 1995.
Length: 26.5 cm
(10.5 in.).
Note silver tinged
with blue hue
above and below
lateral line, no fin
erosion.
Specimen No. 11.





Fig. 15.
Ventura River
200 yards below
the City of San
Buenaventura
Foster Park
Surface
Diversion, looking
northeast
upstream at east
channel. May 18,
1995. Long glide
ranged from 2 to
4 feet deep.
Average daily flow
c. 103. cfs.

Fig. 16.
*Oncorhynchus
mykiss* collected
from the Ventura
River 200 yards
below the City of
San Buenaventura
Foster Park
Surface
Diversion. May
18, 1995.
Length: 28 cm
(12 in.). Note
silver coloration,
no fin erosion.
Specimen No. 22.



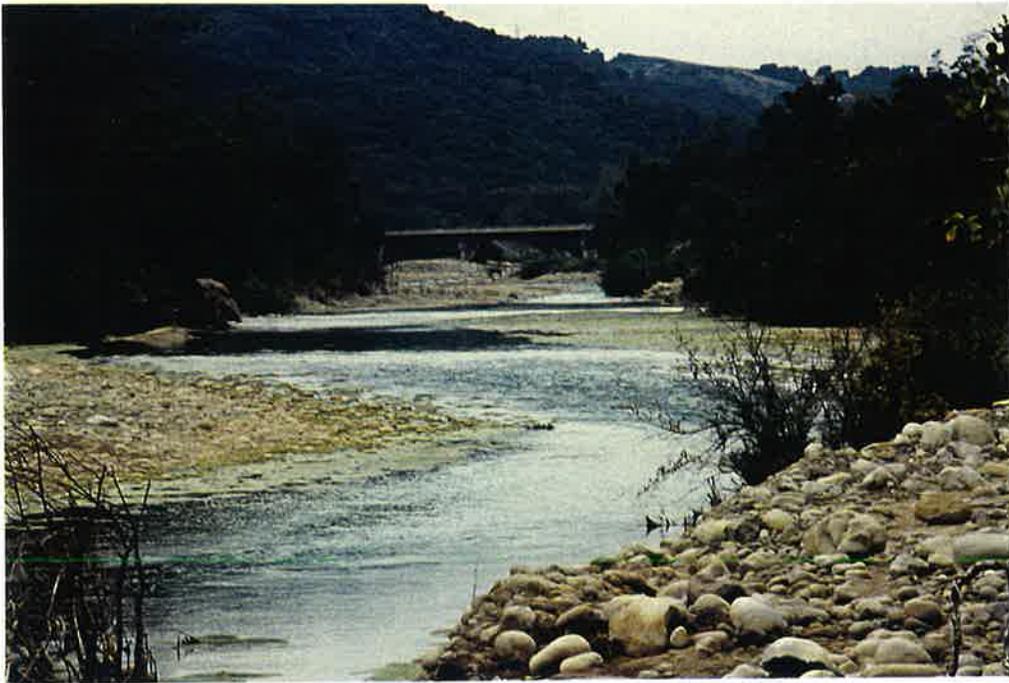


Fig. 17.
Ventura River c.
0.25 mile below
the Foster Park
Bridge, looking
northwest
upstream. June
5, 1995. Note
Foster Park
Bridge in center
background.
Average daily flow
c. 84 cfs.

Fig. 18.
*Oncorhynchus
mykiss* collected
from the Ventura
River c. 0.25
mile below the
Foster Park
Bridge. April 30,
1995. Length: 36
cm (14 in.). Note
silver coloration
above and below
lateral line,
erosion of dorsal
and caudal fin.
Specimen No. 14.

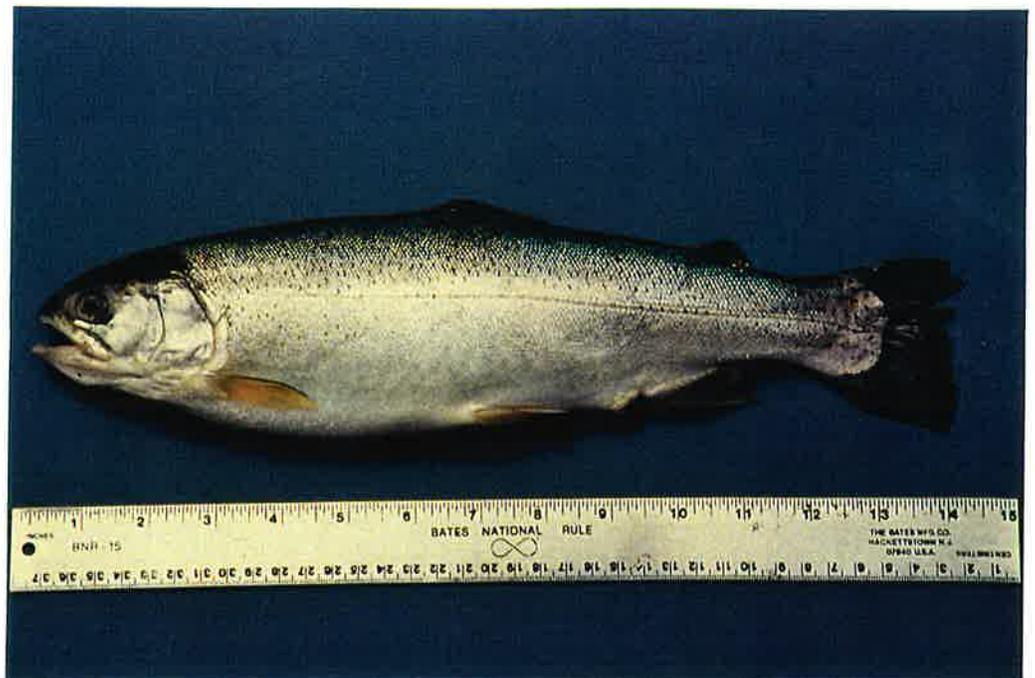




Fig. 19.
Ventura River c.
0.25 mile below
the Foster Park
Bridge, looking
northwest
upstream. June
5, 1995. Note
series of riffles
and glides, Foster
Park Bridge in
center
background.
Average daily flow
c. 84 cfs.

Fig. 20.
Oncorhynchus
mykiss collected
from the Ventura
River c. 0.25
miles below the
Foster Park
Bridge. April 26,
1995. Length: 26
cm (10 in.). Note
silver coloration,
eroded dorsal fin
and upper caudal
fin.
Specimen No. 12

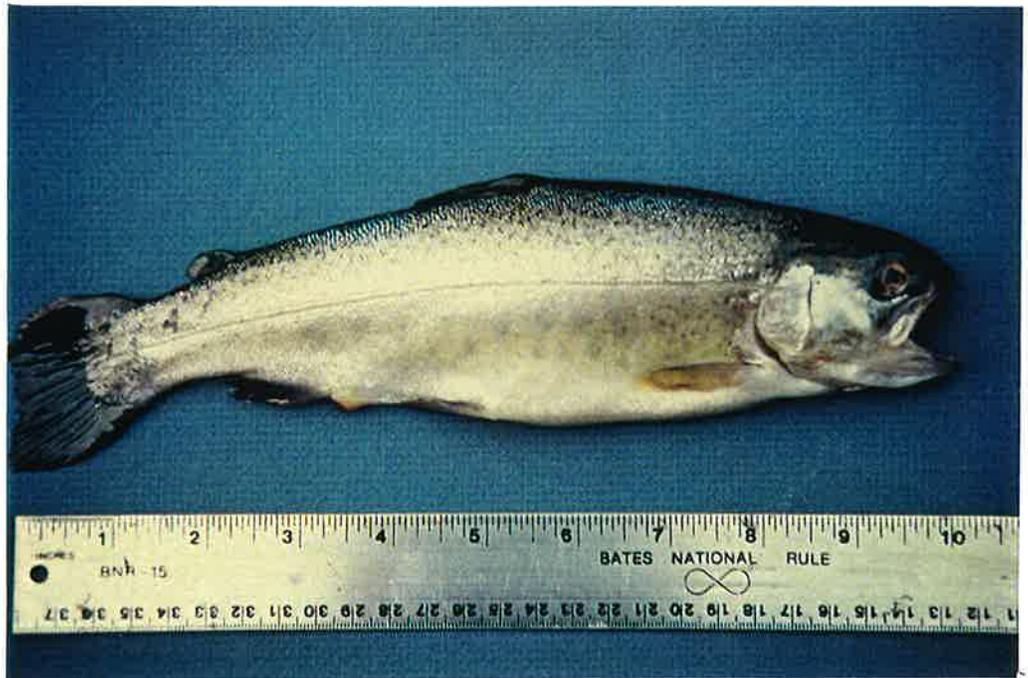




Fig. 21.
Ventura River
0.25 mile above
the Shell Road
Bridge, looking
northwest
upstream. May
18, 1995. Long
glide ranged from
3 to 4.5 feet deep.
Average daily flow
c. 103 cfs.

Fig. 22.
*Oncorhynchus
mykiss* collected
from the Ventura
River 0.25 mile
above the Shell
Road Bridge. May
18, 1995.
Length: 33 cm
(13 in.). Note
bright silver
coloration, lose
scales near caudal
fin, slight erosion
of lower caudal
fin.
Specimen No. 17.





Fig. 23.
Calif. Dept. of Fish
and Game Wild
Trout Crew
electrofishing
Ventura River c.
1.5 miles above
the mouth, looking
northwest
upstream. June
27, 1995.
Average daily flow
c. 60 cfs.

Fig. 24.
Oncorhynchus
mykiss collected
from the Ventura
River c. 1.5 miles
above the mouth.
by Calif. Dept. of
Fish and Game
Wild Trout Crew.
June 27, 1995.
Length: 27 cm
(11.5 in.). Note
silver coloration
below lateral line,
eroded dorsal and
lower caudal fin.



Appendix D
Ventura River Steelhead/Trout Sample Location Maps



Figure 3

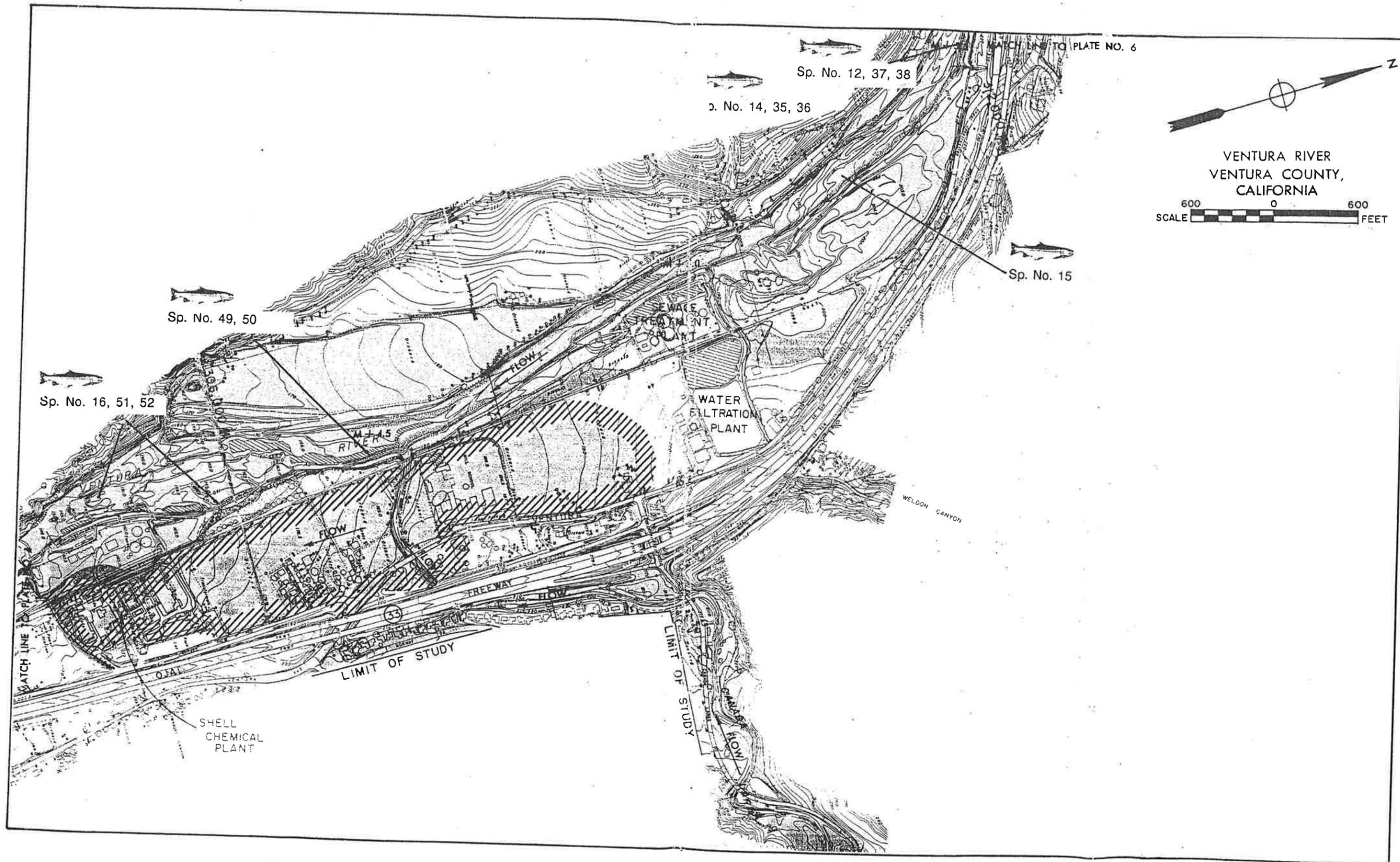


Figure 4

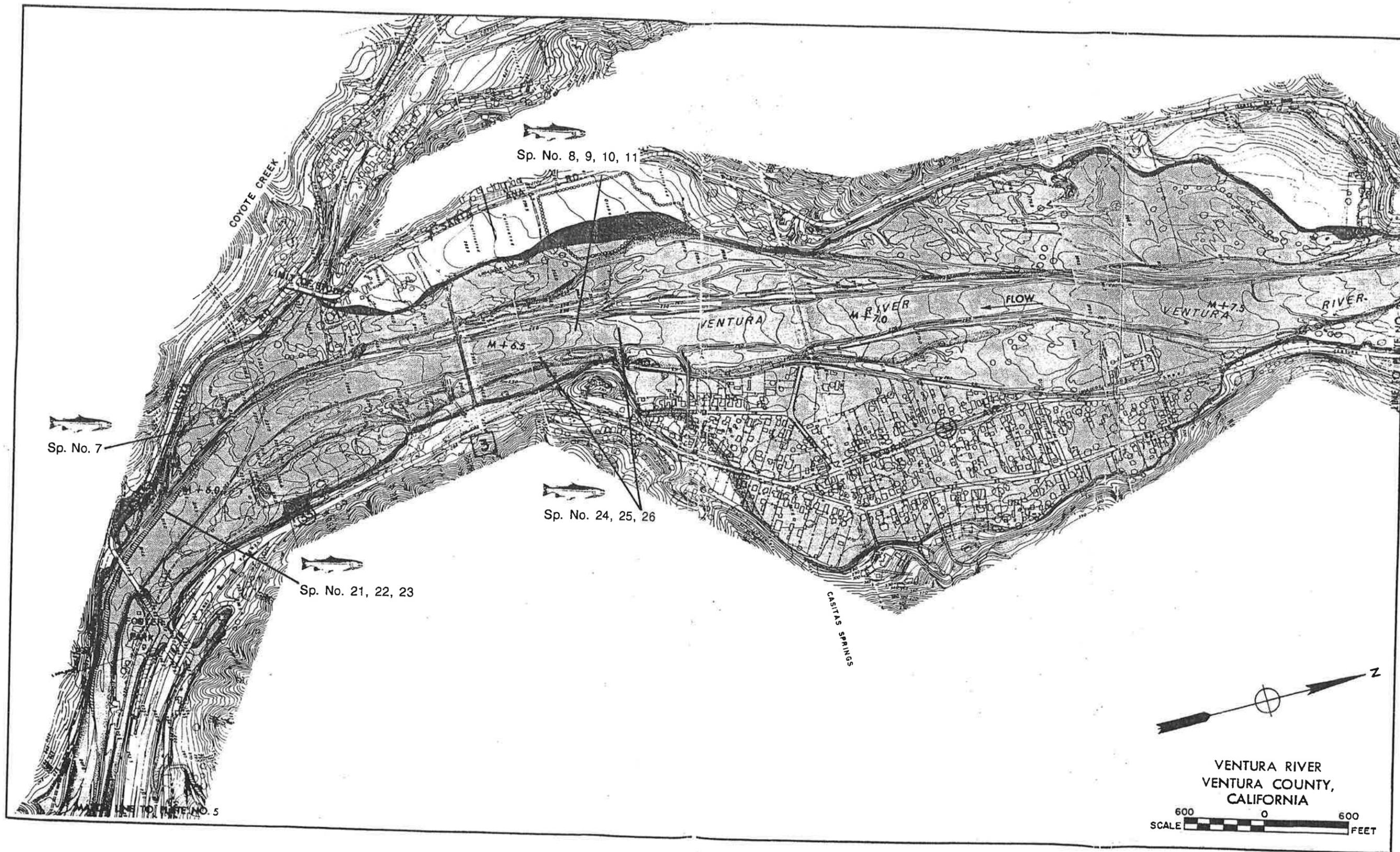


Figure 5



Figure 7

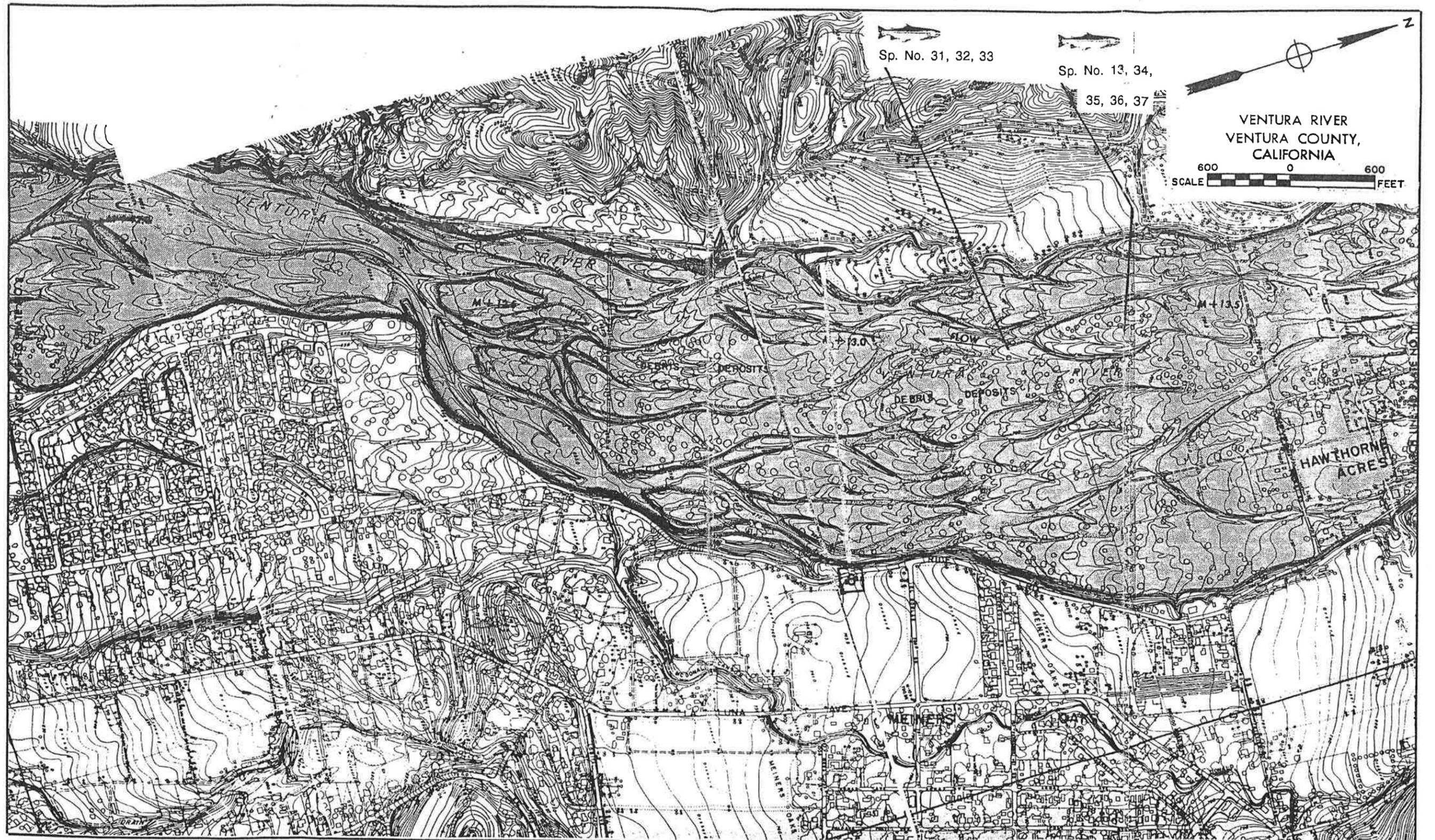


Figure 8

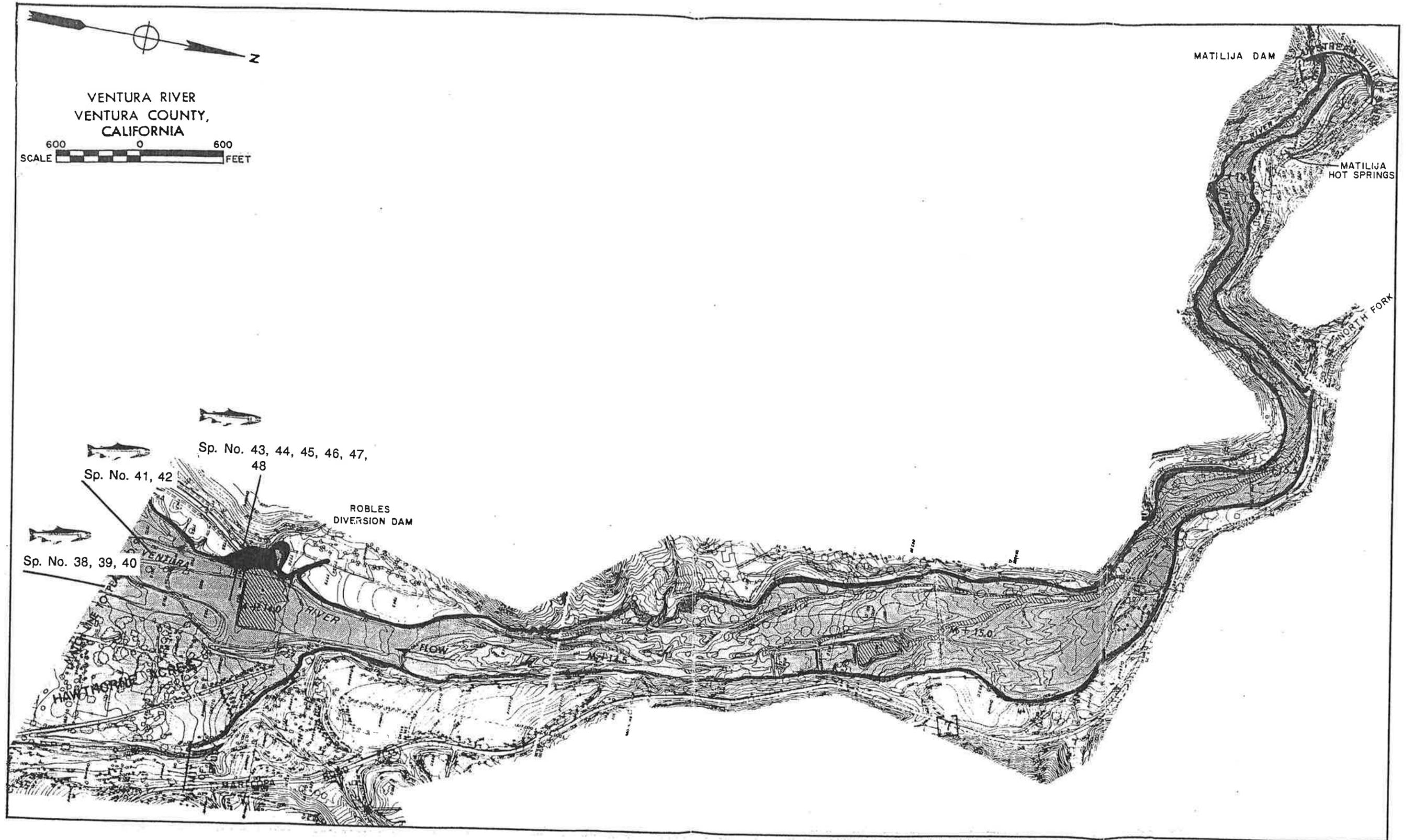


Figure 9

Appendix E
Ventura River Hydrologic Conditions

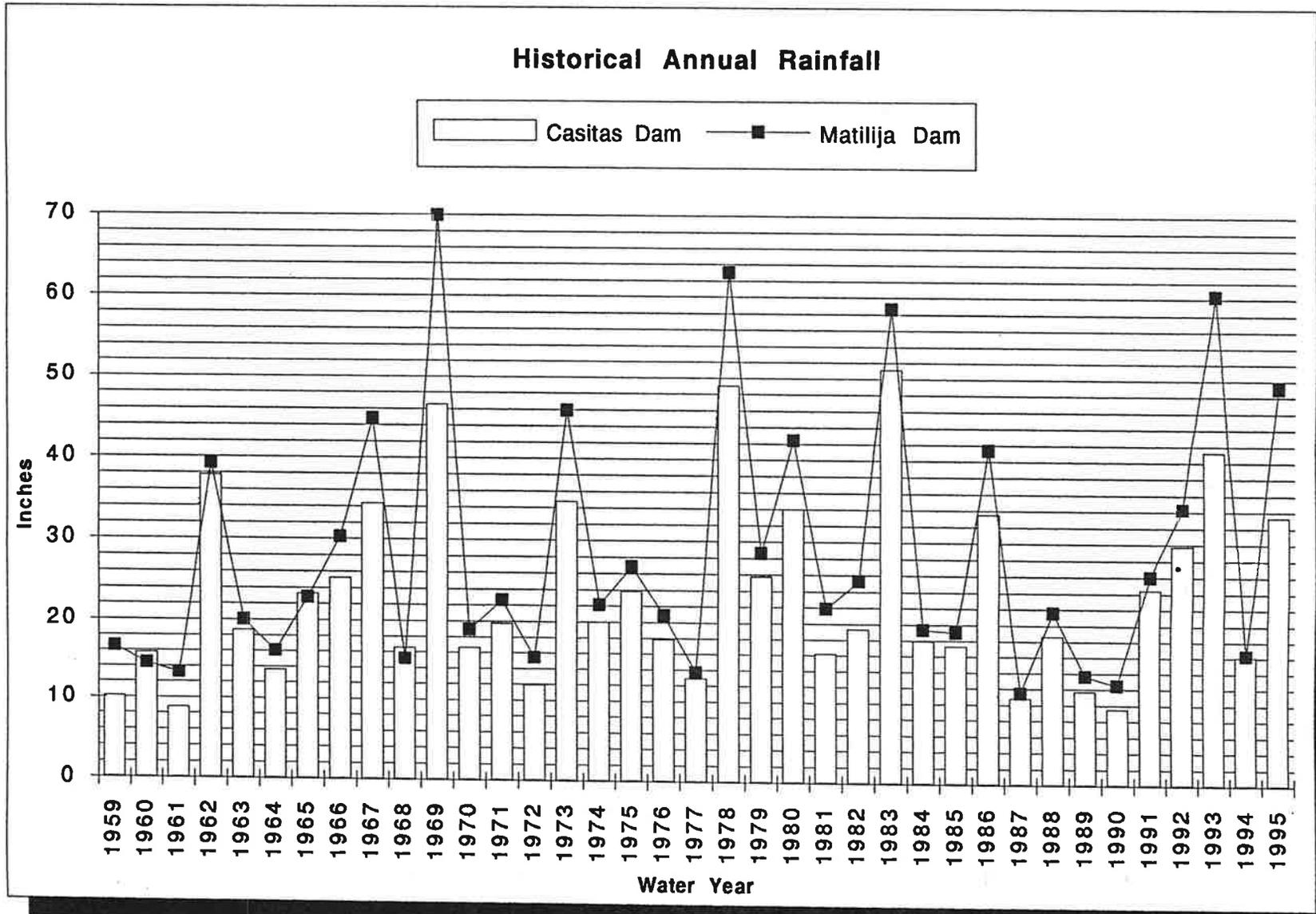


Figure 1

Ventura River Average Daily Flow: 1995

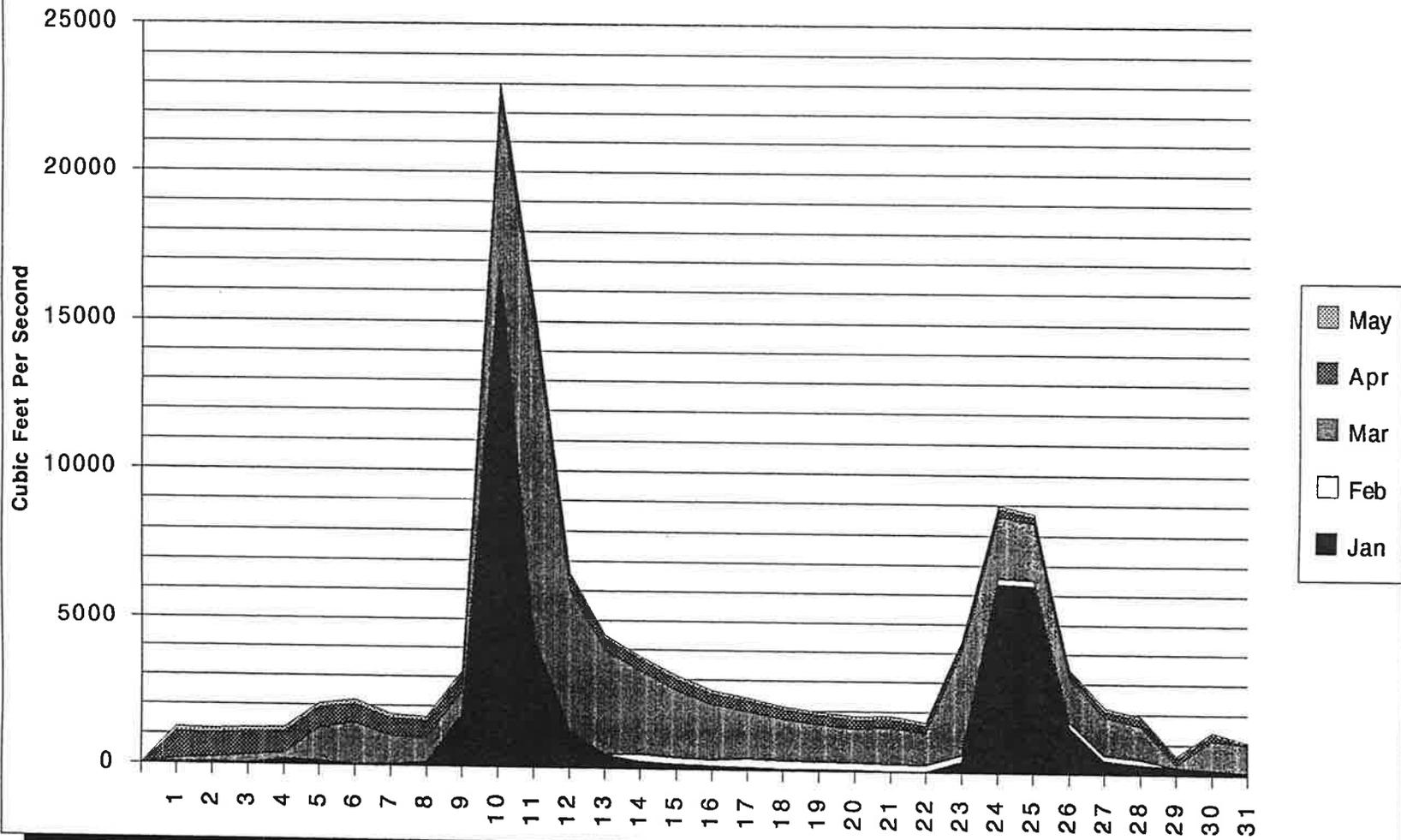


Figure 2

Matilija Dam Spill Rates: 1995

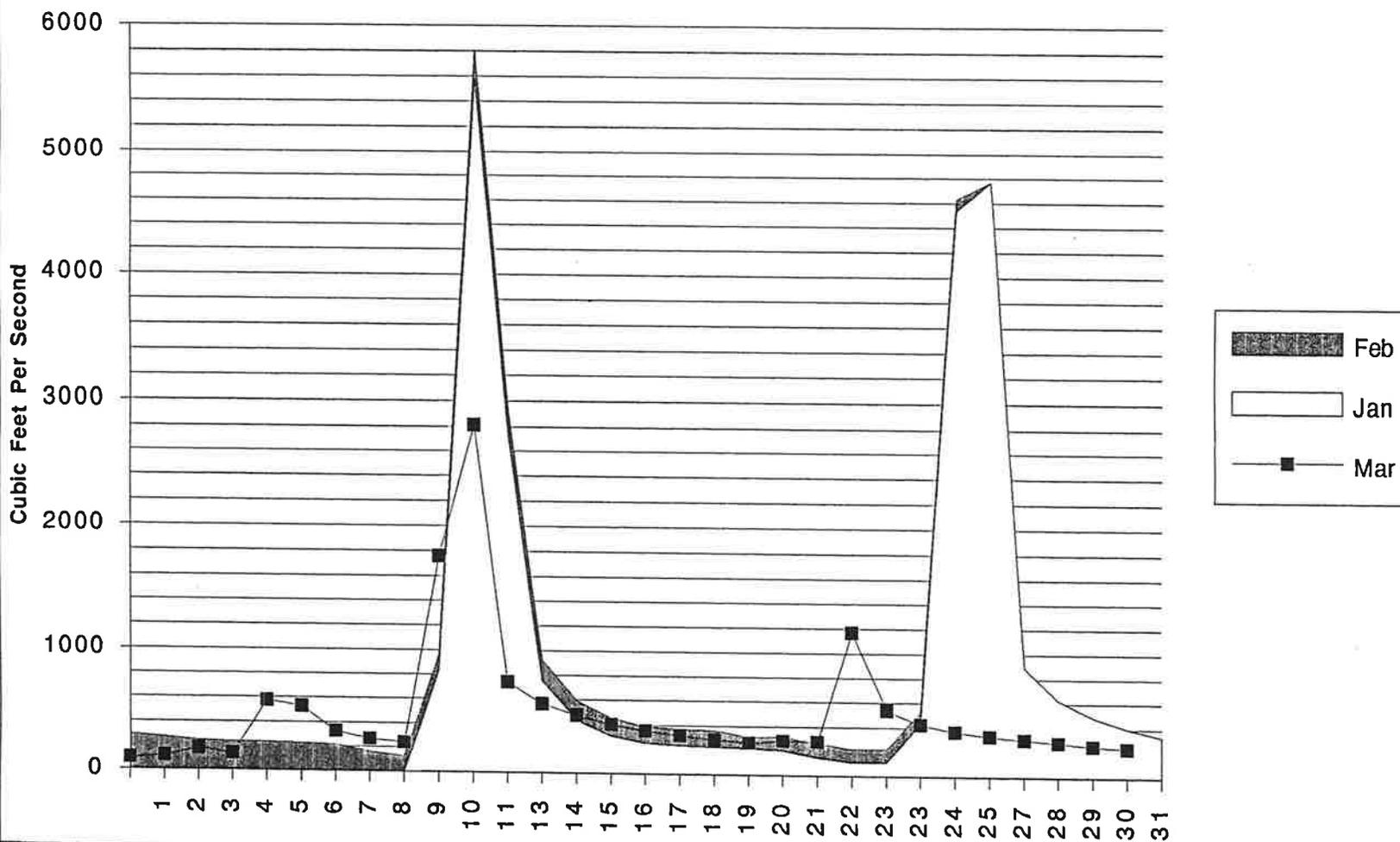


Figure 3

Casitas Dam Spill Rates: 1995

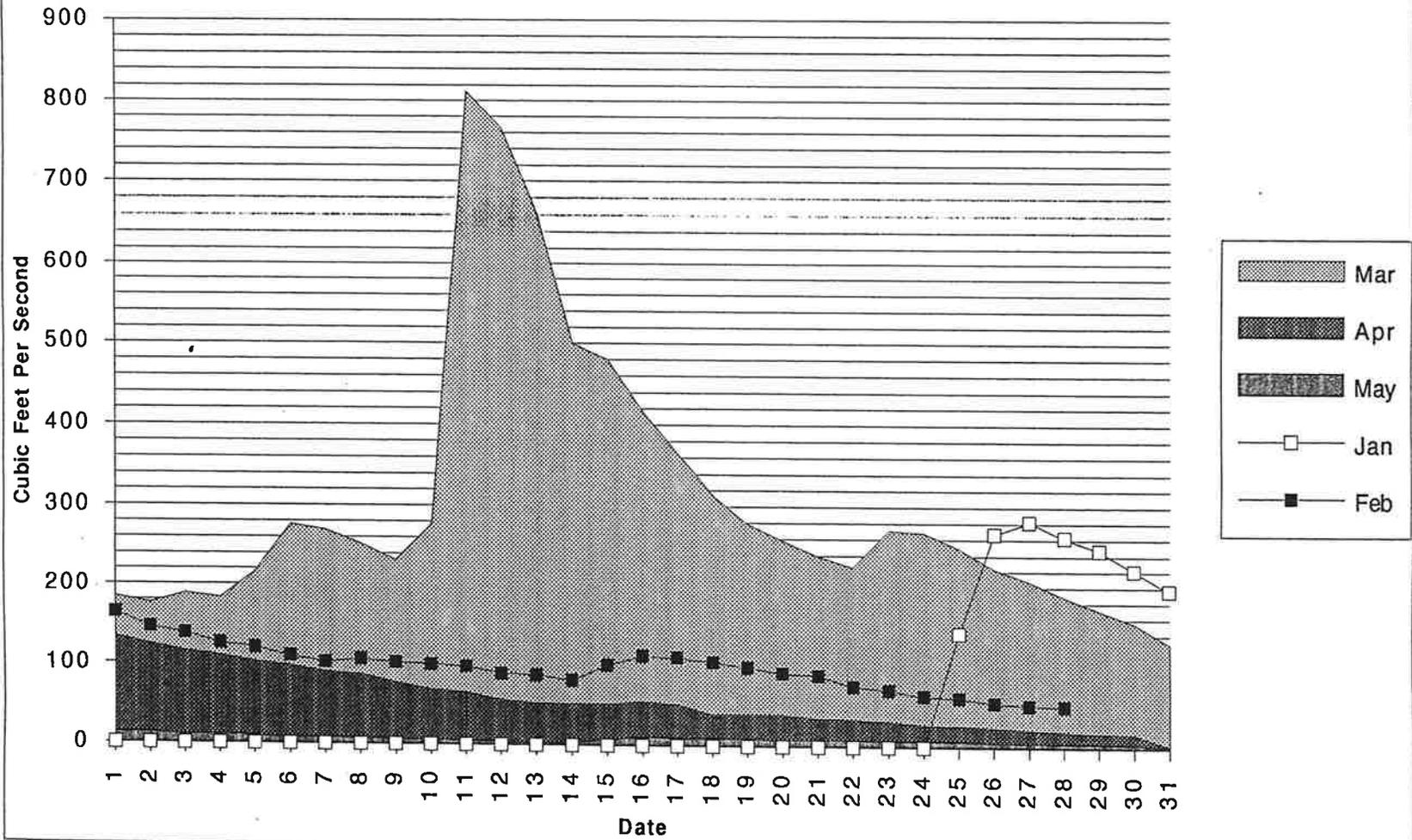


Figure 4

City of San Buenaventura Foster Park Diversion: 1995

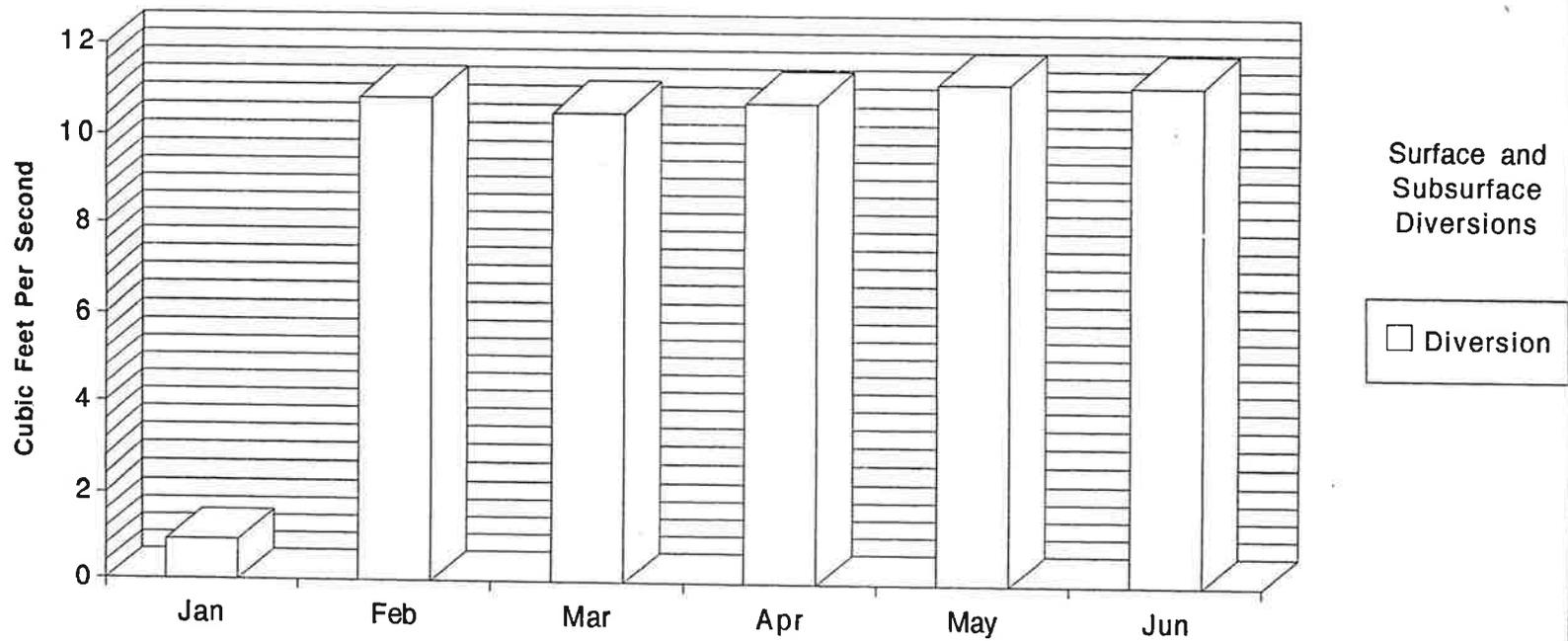
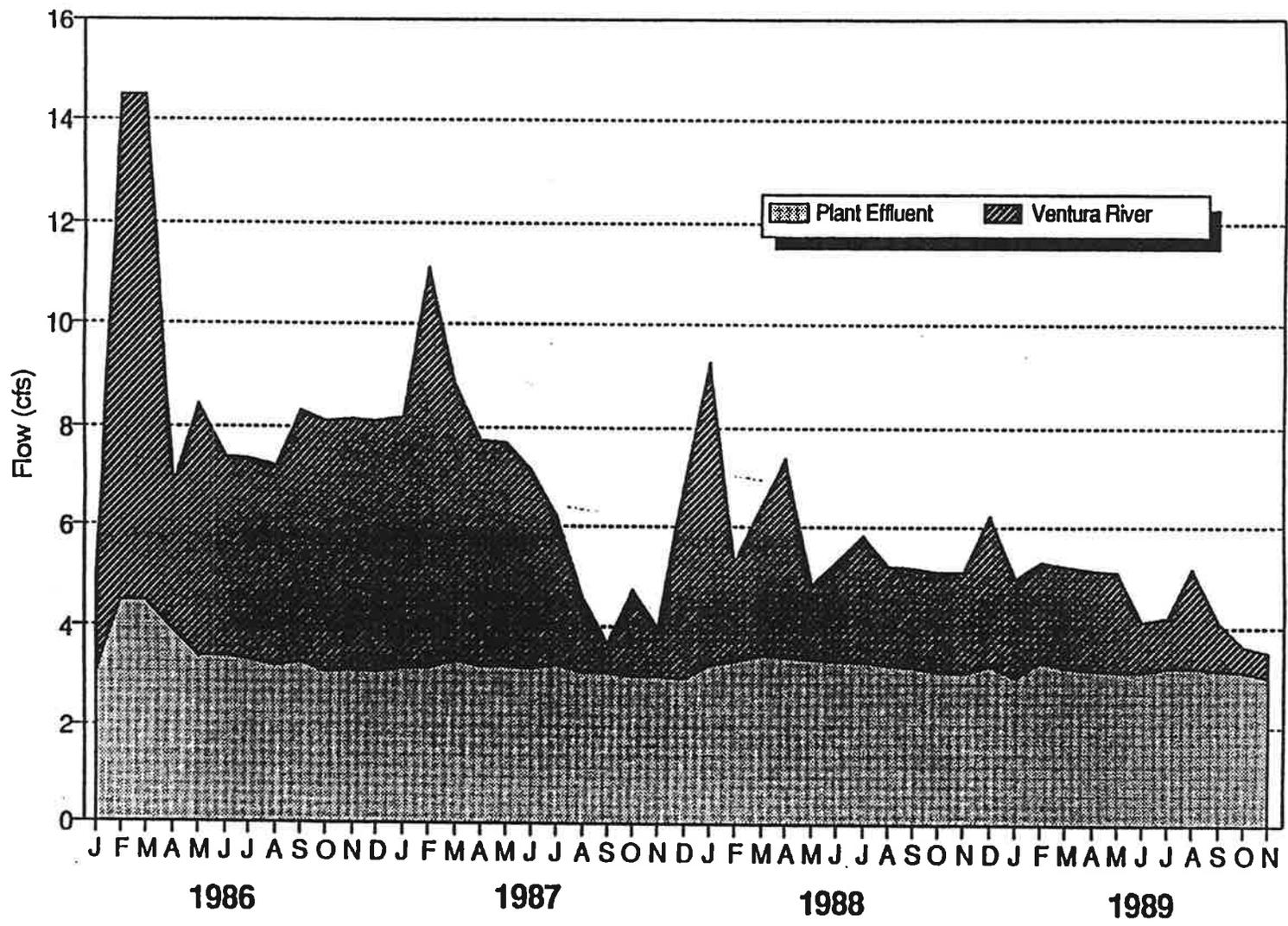


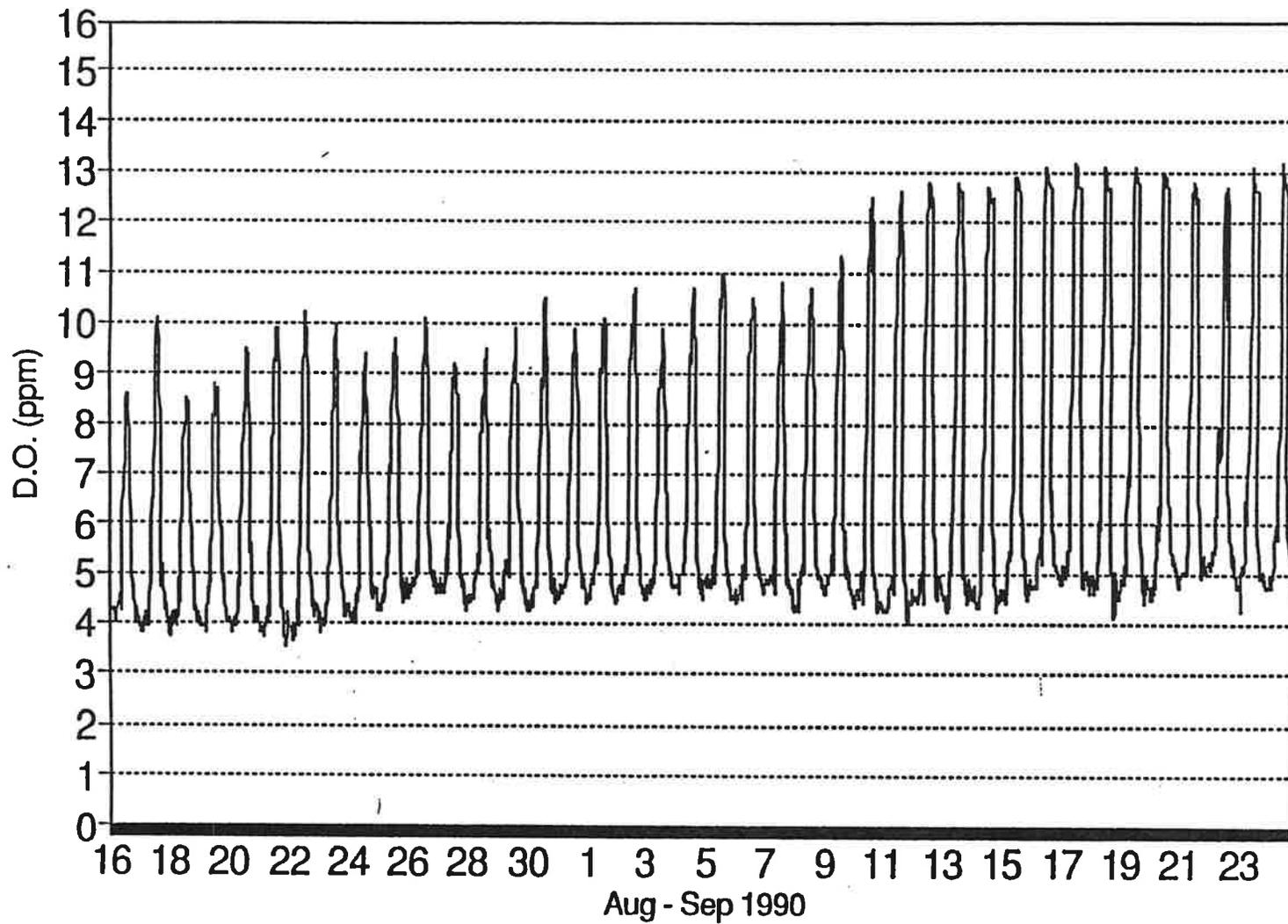
Figure 5



Ventura River Flow and Ojai Valley Sanitary District Discharge
Monthly Average

Source: Ojai Valley Sanitary District, 1991

Figure 6



Diurnal Variations in Dissolved Oxygen Concentrations in Section VI

Source: Ojai Valley Sanitary District, 1991

Appendix F
Ventura River Steelhead/Trout Data Survey Reports

SOUTHERN CALIFORNIA STEELHEAD DATA REPORT

 REPORTING INDIVIDUAL Stanley J. Capelli

 STREAM FISHED Ventura River

 ADDRESS 127 Palomares Avenue, Ventura, CA 93003

 DATE April 25, 1995

 PHONE NO. (805) 654-0851

ONLY ONE DATE AND ONE ANGLER PER DATA SHEET

STATION DATA				STREAM DATA			FISH DATA		COMMENTS
SPM NO.	LOCATION ¹	TIME START STOP		HABITAT TYPE ²	WATER TEMP. ³	TURBIDITY ²	TOTAL LENGHT ⁴	SAMPLE TAKEN ⁵	
1	Conflu. of San Antonio Creek	6:00 pm	8:00 pm	Glide	-	Clear	22 cm	N	Bright silver, no fin erosion; released
2	½ m above conflu. of San Ar.	6:00 pm	8:00 pm	Glide	-	Clear	20 cm	N	Bright silver, no fin erosion; released
3	½ m above conflu. of San Ar.	6:00 pm	8:00 pm	Glide	-	Clear	22 cm	N	Bright silver, no fin erosion; released
4	½ m above conflu. of San Ar.	6:00 pm	8:00 pm	Glide	-	Clear	22 cm	N	Bright silver, no fin erosion; released
5	½ m above conflu. of San Ar.	6:00 pm	8:00 pm	Glide	-	Clear	23 cm	N	Bright silver, no fin erosion; released
6	½ m above conflu. of San Ar.	6:00 pm	8:00 pm	Glide	-	Clear	39½ cm	N	Dorsel fin eroded; released

 Disposition of Sample(s) Taken: No. samples taken

¹Use USGS 7.5' Quad Map if possible; otherwise, identify reach as best you can

²See backside of this page for definitions

³Indicate whether Fahrenheit (F) or Centigrade (C)

⁴Metric system in millimeters (mm) preferable; if no fish caught, enter NF

⁵Indicate if Scales (S), Tissue (T), or None (N); remove scales above lateral line; no more than 1 cm² of caudal (tail) fin tissue removed at outer margin; see backside for further instructions

SOUTHERN CALIFORNIA STEELHEAD DATA REPORT

REPORTING INDIVIDUAL Stanley J. Capelli

STREAM FISHED Ventura River

ADDRESS 127 Palomares Avenue, Ventura, CA 93003

DATE April 26, 1995

PHONE NO. (805) 654-0851

ONLY ONE DATE AND ONE ANGLER PER DATA SHEET

STATION DATA				STREAM DATA			FISH DATA		COMMENTS
SPM NO.	LOCATION ¹	TIME START STOP		HABITAT TYPE ²	WATER TEMP. ³	TURBIDITY ²	TOTAL LENGTH ⁴	SAMPLE TAKEN ⁵	
7	Immed. below Fost Pk. Div.	6:00 pm	8:00 pm	Glide	-	Clear	21½ cm	S	Bright silver, no fin erosion; released
8	¾ m above Fost Pk Brd.	6:00 pm	8:00 pm	Glide	-	Clear	21½ cm	S	Bright silver, no fin erosion; released
9	¾ m above Fost Pk Brd.	6:00 pm	8:00 pm	Glide	-	Clear	24 cm	S	Bright silver, no fin erosion; released
10	¾ m above Fost Pk Brd.	6:00 pm	8:00 pm	Glide	-	Clear	23 cm	S	Bright silver, no fin erosion; released
11	¾ m above Fost Pk Brd.	6:00 pm	8:00 pm	Glide	-	Clear	26½ cm	S	Bright silver, no fin erosion; released

Disposition of Sample(s) Taken: Curated with District Fisheries Biologist (M. Cardenas)

¹Use USGS 7.5' Quad Map if possible; otherwise, identify reach as best you can

²See backside of this page for definitions

³Indicate whether Fahrenheit (F) or Centigrade (C)

⁴Metric system in millimeters (mm) preferable; if no fish caught, enter NF

⁵Indicate if Scales (S), Tissue (T), or None (N); remove scales above lateral line; no more than 1 cm² of caudal (tail) fin tissue removed at outer margin; see backside for further instructions

SOUTHERN CALIFORNIA STEELHEAD DATA REPORT

REPORTING INDIVIDUAL Mark H. Capelli STREAM FISHED Ventura River

ADDRESS Environmental Studies Program, UCSB, S.B. 93106 DATE MAY 1, 1995

PHONE NO. (805) 893-2968 ONLY ONE DATE AND ONE ANGLER PER DATA SHEET

STATION DATA				STREAM DATA			FISH DATA		COMMENTS
SPM NO.	LOCATION ¹	TIME START STOP		HABITAT TYPE ²	WATER TEMP. ³	TURBIDITY ²	TOTAL LENGHT ⁴	SAMPLE TAKEN ⁵	
16	Shell Hole; 1 mile above Shell Rd. Brd	6:00 pm	6:30 pm	Pool	68 F°	Slightly turbid	21 cm	N	Fish escaped

Disposition of Sample(s) Taken: No samples taken

¹Use USGS 7.5' Quad Map if possible; otherwise, identify reach as best you can
²See backside of this page for definitions
³Indicate whether Fahrenheit (F) or Centigrade(C)
⁴Metric system in millimeters(mm) preferable; if no fish caught, enter NF
⁵Indicate if Scales(S), Tissue(T), or None(N); remove scales above lateral line; no more than 1 cm² of caudal(tail) fin tissue removed at outer margin; see backside for further instructions

SOUTHERN CALIFORNIA STEELHEAD DATA REPORT

REPORTING INDIVIDUAL Mark H. Capelli STREAM FISHED Ventura River
 ADDRESS Environmental Studies Program, UCSB, S.B. 93106 DATE May 7, 1995
 PHONE NO. (805) 893-2968 ONLY ONE DATE AND ONE ANGLER PER DATA SHEET

STATION DATA				STREAM DATA			FISH DATA		COMMENTS
SPM NO.	LOCATION ¹	TIME START STOP		HABITAT TYPE ²	WATER TEMP. ³	TURBIDITY ²	TOTAL LENGHT ⁴	SAMPLE TAKEN ⁵	
0	U.S. 101 to So. Cal Gas Line	10:00 am	5:00 pm	Pool, glide run, riffle	68 F°	Slightly turbid	NF	N	Bottom heavily silted with mud

Disposition of Sample(s) Taken: No samples taken

¹Use USGS 7.5' Quad Map if possible; otherwise, identify reach as best you can

²See backside of this page for definitions

³Indicate whether Fahrenheit (F) or Centigrade (C)

⁴Metric system in millimeters (mm) preferable; if no fish caught, enter NF

⁵Indicate if Scales (S), Tissue (T), or None (N); remove scales above lateral line; no more than 1 cm² of caudal (tail) fin tissue removed at outer margin; see backside for further instructions

SOUTHERN CALIFORNIA STEELHEAD DATA REPORT

REPORTING INDIVIDUAL Mark H. Capelli STREAM FISHED Ventura River
 ADDRESS Environmental Studies Program, UCSB, S.B. 93106 DATE May 10, 1995
 PHONE NO. (805) 893-2968 ONLY ONE DATE AND ONE ANGLER PER DATA SHEET

STATION DATA				STREAM DATA			FISH DATA		COMMENTS
SPM NO.	LOCATION ¹	TIME START STOP		HABITAT TYPE ²	WATER TEMP. ³	TURBIDITY ²	TOTAL LENGHT ⁴	SAMPLE TAKEN ⁵	
0	Shell Rd. Brd to Shell Hole	6:00 pm	7:00 pm	Pool, glide runn. riffle	68F°	Slightly turbid	NF	N	

Disposition of Sample(s) Taken: No samples taken

¹Use USGS 7.5' Quad Map if possible; otherwise, identify reach as best you can
²See backside of this page for definitions
³Indicate whether Fahrenheit (F) or Centigrade (C)
⁴Metric system in millimeters (mm) preferable; if no fish caught, enter NF
⁵Indicate if Scales (S), Tissue (T), or None (N); remove scales above lateral line; no more than 1 cm² of caudal (tail) fin tissue removed at outer margin; see backside for further instructions

SOUTHERN CALIFORNIA STEELHEAD DATA REPORT

REPORTING INDIVIDUAL Mark H. Capelli STREAM FISHED Ventura River
 ADDRESS Environmental Studies Program, UCSB, S.B. 93106 DATE May 12, 1995
 PHONE NO. (805) 893-2968 ONLY ONE DATE AND ONE ANGLER PER DATA SHEET

STATION DATA				STREAM DATA			FISH DATA		COMMENTS
SPM NO.	LOCATION ¹	TIME START STOP		HABITAT TYPE ²	WATER TEMP. ³	TURBIDITY ²	TOTAL LENGHT ⁴	SAMPLE TAKEN ⁵	
17	1/4 m above Shell Rd. Brd	6:00 pm	7:00 pm	Glide	68F°	Slightly turbid	33 cm	S, T	Fish bright silver, slight eroded caudal; released

Disposition of sample(s) Taken: Curated with District Fisheries Biologist (M. Cardenas)

¹Use USGS 7.5' Quad Map if possible; otherwise, identify reach as best you can
²See backside of this page for definitions
³Indicate whether Fahrenheit (F) or Centigrade (C)
⁴Metric system in millimeters (mm) preferable; if no fish caught, enter NF
⁵Indicate if Scales (S), Tissue (T), or None (N); remove scales above lateral line; no more than 1 cm² of caudal (tail) fin tissue removed at outer margin; see backside for further instructions

SOUTHERN CALIFORNIA STEELHEAD DATA REPORT

REPORTING INDIVIDUAL Mark H. Capelli

STREAM FISHED Ventura River

ADDRESS Environmental Studies Program, UCSB, S.B. 93106

DATE May 15, 1995

PHONE NO. (805) 893-2968

ONLY ONE DATE AND ONE ANGLER PER DATA SHEET

STATION DATA				STREAM DATA			FISH DATA		COMMENTS
SPM NO.	LOCATION ¹	TIME START STOP		HABITAT TYPE ²	WATER TEMP. ³	TURBIDITY ²	TOTAL LENGHT ⁴	SAMPLE TAKEN ⁵	
0	Conflu of San Antonio Creek to Live Oak Acres Creek	6:00 pm	7:30 pm	Pool, glide run, riffle	69 F°	Clear	NF	N	Water column filled with floating algae due to recent heavy rain

Disposition of Sample(s) Taken: No samples taken

¹Use USGS 7.5' Quad Map if possible; otherwise, identify reach as best you can
²See backside of this page for definitions
³Indicate whether Fahrenheit (F) or Centigrade(C)
⁴Metric system in millimeters(mm) preferable; if no fish caught, enter NF
⁵Indicate if Scales(S), Tissue(T), or None(N); remove scales above lateral line; no more than 1 cm² of caudal(tail) fin tissue removed at outer margin; see backside for further instructions

SOUTHERN CALIFORNIA STEELHEAD DATA REPORT

REPORTING INDIVIDUAL Stanley J. Capelli

STREAM FISHED Ventura River

ADDRESS 127 Palomares Avenue, Ventura, CA 93003

DATE May 16, 1995

PHONE NO. (805) 654-0851

ONLY ONE DATE AND ONE ANGLER PER DATA SHEET

STATION DATA			STREAM DATA			FISH DATA		COMMENTS
SPM NO.	LOCATION ¹	TIME START STOP	HABITAT TYPE ²	WATER TEMP. ³	TURBIDITY ²	TOTAL LENGHT ⁴	SAMPLE TAKEN ⁵	
18	3/4 m above con- flu. of San An	6:30 pm 8:00 pm	Glide	-	Clear	23½ cm	S,T	Bright silver, no fin erosion; released
19	4 m above con- flu of San An	6:30 pm 8:00 pm	Glide	-	Clear	23 cm	S	Bright silver, no fin no fin erosion; no fin released

Disposition of Sample(s) Taken: Curated with District Fisheries Biologist (M. Cardenas)

¹Use USGS 7.5' Quad Map if possible; otherwise, identify reach as best you can
²See backside of this page for definitions
³Indicate whether Fahrenheit (F) or Centigrade (C)
⁴Metric system in millimeters (mm) preferable; if no fish caught, enter NF
⁵Indicate if Scales (S), Tissue (T), or None (N); remove scales above lateral line; no more than 1 cm² of caudal (tail) fin tissue removed at outer margin; see backside for further instructions

SOUTHERN CALIFORNIA STEELHEAD DATA REPORT

REPORTING INDIVIDUAL Mark H. Capelli STREAM FISHED Ventura River
 ADDRESS Environmental Studies Program, UCSB, S.B. 93106 DATE May 16, 1995
 PHONE NO. (805) 893-2968 ONLY ONE DATE AND ONE ANGLER PER DATA SHEET

STATION DATA				STREAM DATA			FISH DATA		COMMENTS
SPM NO.	LOCATION ¹	TIME START STOP		HABITAT TYPE ²	WATER TEMP. ³	TURBIDITY ²	TOTAL LENGHT ⁴	SAMPLE TAKEN ⁵	
20	Confluence of Ventura River & San Antonio Creek	6:30 pm	7:00 pm	Glide	69 F°	Clear	21 cm	N	Fish escaped

Disposition of Sample(s) Taken: No samples taken

¹Use USGS 7.5' Quad Map if possible; otherwise, identify reach as best you can
²See backside of this page for definitions
³Indicate whether Fahrenheit (F) or Centigrade(C)
⁴Metric system in millimeters(mm) preferable; if no fish caught, enter NF
⁵Indicate if Scales(S), Tissue(T), or None(N); remove scales above lateral line; no more than 1 cm² of caudal(tail) fin tissue removed at outer margin; see backside for further instructions

SOUTHERN CALIFORNIA STEELHEAD DATA REPORT

REPORTING INDIVIDUAL Mark H. Capelli

STREAM FISHED Ventura River

ADDRESS Environmental Studies Program, UCSB, S.B. 93016

DATE May 17, 1995

PHONE NO. (805) 893-2968

ONLY ONE DATE AND ONE ANGLER PER DATA SHEET

STATION DATA				STREAM DATA			FISH DATA		COMMENTS
NO.	LOCATION ¹	TIME START STOP		HABITAT TYPE ²	WATER TEMP. ³	TURBIDITY ²	FORK LENGHT ⁴	SAMPLE TAKEN ⁵	
0	Shell Road Brd to Shell Hole	6:00 pm	7:30 pm	Pool, run, glide, riffle	69F°	Slightly turbi	NF	N	

Disposition of Sample(s) Taken: No samples taken

¹Use USGS 7.5' Quad Map if possible; otherwise, identify reach as best you can

²See backside of this page for definitions

³Indicate whether Fahrenheit (F) or Centigrade(C)

⁴Metric system in millimeters(mm) preferable; if no fish caught, enter NF

⁵Indicate if Scales(S), Tissue(T), or None(N); remove scales above lateral line; no more than 1 cm² of caudal(tail) fin tissue removed at outer margin; see backside for further instructions

SOUTHERN CALIFORNIA STEELHEAD DATA REPORT

 REPORTING INDIVIDUAL Mark H. Capelli

 STREAM FISHED Ventura River

 ADDRESS Environmental Studies Program, UCSB, S.B. 93106

 DATE May 18, 1995

 PHONE NO. (805) 893-2968
ONLY ONE DATE AND ONE ANGLER PER DATA SHEET

STATION DATA				STREAM DATA			FISH DATA		COMMENTS
SPM NO.	LOCATION ¹	TIME START STOP		HABITAT TYPE ²	WATER TEMP. ³	TURBIDITY ²	TOTAL LENGHT ⁴	SAMPLE TAKEN ⁵	
21	300 yds below Fost. Pk Div.	8:00 am	8:30 am	Pool	67 F°	Clear	26 cm	N	Fish escaped
22	300 yds below Fost. Pk Div.	8:00 am	8:30 am	Pool	67 F°	Clear	28 cm	S,T	Fish bright silver, eroded caudal fin; released
23	300 yds below Fost. Pk. Div.	8:00 am	8:30 am	Pool	67 F°	Clear	26 cm	N	Fish escaped
24	1/4 m above Fost. Pk. Brd.	9:00 am	9:30 am	Pool	67 F°	Clear	26 cm	N	Fish escaped
25	1/4 m above Fost. Pk. Brd.	9:00 am	9:30 am	Run	67 F°	Clear	25 cm	N	Fish escaped
26	3/4 m above Fost Pk Brd.	9:30 am	9:45 am	Riffle	67 F°	Clear	26 cm	S,T	Fish bright silver, loose scales, no fin erosion; released

 Disposition of Sample(s) Taken: Curated with District Fisheries Biologist (M. Cardenas)

¹Use USGS 7.5' Quad Map if possible; otherwise, identify reach as best you can

²See backside of this page for definitions

³Indicate whether Fahrenheit (F) or Centigrade (C)

⁴Metric system in millimeters (mm) preferable; if no fish caught, enter NF

⁵Indicate if Scales (S), Tissue (T), or None (N); remove scales above lateral line; no more than 1 cm² of caudal (tail) fin tissue removed at outer margin; see backside for further instructions

SOUTHERN CALIFORNIA STEELHEAD DATA REPORT

REPORTING INDIVIDUAL Mark H. Capelli

STREAM FISHED Ventura River

ADDRESS Environmental Studies Program, UCSB, S.B. 93106

DATE May 19, 1995

PHONE NO. (805) 893-2968

ONLY ONE DATE AND ONE ANGLER PER DATA SHEET

STATION DATA				STREAM DATA			FISH DATA		COMMENTS
SPM NO.	LOCATION ¹	TIME START STOP		HABITAT TYPE ²	WATER TEMP. ³	TURBIDITY ²	TOTAL LENGHT ⁴	SAMPLE TAKEN ⁵	
27	1/4 m above conflu of San An	6:00 am	6:30 am	Pool	68 F°	Clear	24 cm	N	Fish escaped
28	1/4 m above conflu of San An	6:00 am	6:30 am	Pool	68 F°	Clear	26 cm	S,T	Fish bright silver, loose scales no fin erosion; released
29	1/2 m above conflu of San An	7:00 am	7:30 am	Pool	68 F°	Clear	26 cm	N	Fish escaped
30	1/2 m above conflu of San An	7:00 am	7:30 am	Pool	68 F°	Clear	26 cm	N	Fish escaped

Disposition of Sample(s) Taken: Curated with District Fisheries Biologist (M. Cardenas)

¹Use USGS 7.5' Quad Map if possible; otherwise, identify reach as best you can

²See backside of this page for definitions

³Indicate whether Fahrenheit (F) or Centigrade(C)

⁴Metric system in millimeters(mm) preferable; if no fish caught, enter NF

⁵Indicate if Scales(S), Tissue(T), or None(N); remove scales above lateral line; no more than 1 cm² of caudal(tail) fin tissue removed at outer margin; see backside for further instructions

SOUTHERN CALIFORNIA STEELHEAD DATA REPORT

REPORTING INDIVIDUAL Mark H. Capelli STREAM FISHED Ventura River
 ADDRESS Environmental Studies Program, UCSB, S.B. 93106 DATE May 20, 1995
 PHONE NO. (805) 893-2968 ONLY ONE DATE AND ONE ANGLER PER DATA SHEET

STATION DATA				STREAM DATA			FISH DATA		COMMENTS
SPM NO.	LOCATION ¹	TIME START	TIME STOP	HABITAT TYPE ²	WATER TEMP. ³	TURBIDITY ²	TOTAL LENGHT ⁴	SAMPLE TAKEN ⁵	
31	3/4 m below Robles Div.	9:00 am	9:15 am	Pool	67 F°	Clear	22 cm	N	Fish escaped
32	3/4 m below Robles Div.	9:00 am	9:15 am	Pool	67 F°	Clear	24 cm	N	Fish escaped
33	3/4 m below Robles Div.	9:00 am	9:14 am	Pool	67 F°	Clear	19 cm	S,T	Fish bright silver; no
34	1/2 m below Robles Div.	9:15 am	9:30 am	Pool	67 F°	Clear	26 cm	N	fin erosion; released fish escaped
35	1/2 m below Robles Div.	9:15 am	9:30 am	Pool	67 F°	Clear	24 cm	N	Fish escaped
36	1/2 m below Robles Div.	9:30 am	9:45 am	Pool	67 F°	Clear	25 cm	N	Fish escaped
37	1/2 m below Robles Div.	9:30 am	9:45 am	Pool	67 F°	Clear	26 cm	N	Fish escaped
38	1/2 m below Robles Div.	9:45 am	10:00 am	Pool	67 F°	Clear	23 cm	S,T	Fish bright silver; no fin erosion
39	1/2 m below Robles Div.	9:45 am	10:00 am	Pool	68 F°	Clear	25 cm	N	Fish escaped
40	1/2 m below Robles Div.	9:45 am	10:00 am	Pool	68 F°	Clear	26 cm	N	Fish escaped

Disposition of Sample(s) Taken: Curated with District Fisheries Biologist(M. Cardenas)

¹Use USGS 7.5' Quad Map if possible; otherwise, identify reach as best you can

²See backside of this page for definitions

³Indicate whether Fahrenheit (F) or Centigrade (C)

⁴Metric system in millimeters (mm) preferable; if no fish caught, enter NF

⁵Indicate if Scales (S), Tissue (T), or None (N); remove scales above lateral line; no more than 1 cm² of caudal (tail) fin tissue removed at outer margin; see backside for further instructions

SOUTHERN CALIFORNIA STEELHEAD DATA REPORT

REPORTING INDIVIDUAL Mark H. Capelli STREAM FISHED Ventura River
 ADDRESS Environmental Studies Program, UCSB, S.B. 93106 DATE May 20, 1995
 PHONE NO. (805) 893-2968 ONLY ONE DATE AND ONE ANGLER PER DATA SHEET

STATION DATA				STREAM DATA			FISH DATA		COMMENTS
SPM NO.	LOCATION ¹	TIME START STOP		HABITAT TYPE ²	WATER TEMP. ³	TURBIDITY ²	TOTAL LENGHT ⁴	SAMPLE TAKEN ⁵	
41	1/8 m below Robles Div.	10:00 am	10:30 am	Pool	68 F°	Clear	23 cm	N	Fish escaped
42	1/8 m below Robles Div.	10:00 am	10:30 am	Pool	68 F°	Clear	23 cm	N	Fish escaped
43	Immed below Robles Div.	10:00 am	10:30 am	Pool	68 F°	Clear	23½ cm	S,T	Fish bright silver;no
44	Immed below Robles Div.	10:00 am	10:30 am	Pool	68 F°	Clear	26 cm	N	fin erosion; released Fished escaped
45	Immed below Robles Div.	10:00 am	10:30 am	Pool	68 F°	Clear	24 cm	N	Fish escaped
46	Immed below Robles Div.	10:30 am	14:45 am	Pool	68 F°	Clear	25 cm	N	Fish escaped
47	Immed below Robles Div.	10:30 am	10:45 am	Pool	68 F°	Clear	25 cm	N	Fish escaped
48	Immed below Robles Div.	10:45 am	11:00 am	Pool	68 F°	Clear	26 cm	S,T	Fish bright silver;no fin erosion; released

Disposition of Sample(s) Taken: Curated with District Fisheries Biologist (M. Cardenas)

¹Use USGS 7.5' Quad Map if possible; otherwise, identify reach as best you can

²See backside of this page for definitions

³Indicate whether Fahrenheit (F) or Centigrade (C)

⁴Metric system in millimeters (mm) preferable; if no fish caught, enter NF

⁵Indicate if Scales (S), Tissue (T), or None (N); remove scales above lateral line; no more than 1 cm² of caudal (tail) fin tissue removed at outer margin; see backside for further instructions

SOUTHERN CALIFORNIA STEELHEAD DATA REPORT

 REPORTING INDIVIDUAL Mark H. Capelli

 STREAM FISHED Ventura River

 ADDRESS Environmental Studies Program, UCSB, S.B. 93106

 DATE May 20, 1995

 PHONE NO. (805) 893-2968

ONLY ONE DATE AND ONE ANGLER PER DATA SHEET

STATION DATA				STREAM DATA			FISH DATA		COMMENTS
SPM NO.	LOCATION ¹	TIME START STOP		HABITAT TYPE ²	WATER TEMP. ³	TURBIDITY ²	TOTAL LENGTH ⁴	SAMPLE TAKEN ⁵	
41	1/8 m below Robles Div.	10:00 am	10:30 am	Pool	68 F°	Clear	23 cm	N	Fish escaped
42	1/8 m below Robles Div.	10:00 am	10:30 am	Pool	68 F°	Clear	23 cm	N	Fish escaped
43	Immed below Robles Div.	10:00 am	10:30 am	Pool	68 F°	Clear	23½ cm	S,T	Fish bright silver;no
44	Immed below Robles Div.	10:00 am	10:30 am	Pool	68 F°	Clear	26 cm	N	fin erosion; released Fished escaped
45	Immed below Robles Div.	10:00 am	10:30 am	Pool	68 F°	Clear	24 cm	N	Fish escaped
46	Immed below Robles Div.	10:30 am	14:45 am	Pool	68 F°	Clear	25 cm	N	Fish escaped
47	Immed below Robles Div.	10:30 am	10:45 am	Pool	68 F°	Clear	25 cm	N	Fish escaped
48	Immed below Robles Div.	10:45 am	11:00 am	Pool	68 F°	Clear	26 cm	S,T	Fish bright silver;no fin erosion;released

 Disposition of Sample(s) Taken: Curated with District Fisheries Biologist (M. Cardenas)

¹Use USGS 7.5' Quad Map if possible; otherwise, identify reach as best you can

²See backside of this page for definitions

³Indicate whether Fahrenheit (F) or Centigrade (C)

⁴Metric system in millimeters (mm) preferable; if no fish caught, enter NF

⁵Indicate if Scales (S), Tissue (T), or None (N); remove scales above lateral line; no more than 1 cm² of caudal (tail) fin tissue removed at outer margin; see backside for further instructions

SOUTHERN CALIFORNIA STEELHEAD DATA REPORT

REPORTING INDIVIDUAL Mark H. Capelli

STREAM FISHED Ventura River

ADDRESS Environmental Studies Program, UCSB, S.B. 93106

DATE May 27, 1995

PHONE NO. (805) 893-2968

ONLY ONE DATE AND ONE ANGLER PER DATA SHEET

STATION DATA				STREAM DATA			FISH DATA		COMMENTS
SPM NO.	LOCATION ¹	TIME START STOP		HABITAT TYPE ²	WATER TEMP. ³	TURBIDITY ²	TOTAL LENGHT ⁴	SAMPLE TAKEN ⁵	
49	4 m below con- flu Canada Larg	10:00am	10:15 am	Pool	68 F°	Clear	26 cm	N	Fish escaped
50	4 m below con- flu Canada Larg	10:15am	10:30 am	Run	68 F°	Clear	24 cm	N	Fish escaped
51	Shell Hole	11:00 am	11:30 am	Pool	68 F°	Clear	26 cm	N	Fish escaped
52	Shell Hole	11:30 am	11:45 am	Pool	68 F°	Clear	23 cm	N	Fish escaped

Disposition of Sample(s) Taken: No samples taken

¹Use USGS 7.5' Quad Map if possible; otherwise, identify reach as best you can

²See backside of this page for definitions

³Indicate whether Fahrenheit (F) or Centigrade (C)

⁴Metric system in millimeters (mm) preferable; if no fish caught, enter NF

⁵Indicate if Scales (S), Tissue (T), or None (N); remove scales above lateral line; no more than 1 cm² of caudal (tail) fin tissue removed at outer margin; see backside for further instructions

DEFINITIONS

HABITAT TYPE:

- POOL:** A usually quiet place in a stream, which varies in size and location within the stream. Current velocity is usually low with little to no turbulence. Substrate is variable.
- GLIDE:** A wide, uniform channel bottom. Flow with low to moderate velocities, lacking pronounced turbulence. Substrate usually consists of cobble, gravel, and sand.
- RUN:** Swiftly flowing reaches with little surface agitation and no major flow obstruction. Often appears as flooded riffles. Typical substrate consists of gravel, cobble, and boulders.
- RIFFLE:** Shallow to steep reaches with swiftly flowing, turbulent water, dominated with cobble or boulders.

SUBSTRATE SIZE

- Sand:** Less than 2 mm (0.08 inch) in diameter.
- Gravel:** 2 to 64 mm (0.08 to 2.5 inches) in diameter.
- Cobble/Rubble:** 64 to 256 mm (2.5 to 10 inches) in diameter.
- Boulder:** Greater than 256 mm (10 inches) in diameter.

TURBIDITY

- Clear:** If bottom is distinctly seen through 4 or more feet of water.
- Slightly turbid:** If bottom is indistinct at from 1 to 4 feet.
- Turbid:** If bottom is visible only at less than 1 foot.

ADDITIONAL TISSUE SAMPLE INSTRUCTIONS

Remove tissue sample from live fish only and on fish with low fin erosion

Use only one labeled (date, station no., and Individual's last name) bag/vial per fish tissue sample; ice sample immediately; freeze as soon as possible

Clean tool after each sample to prevent cross-contamination

Appendix G
Ventura River Steelhead/Trout Scale Vouchers

COLLECTION DATE: April 26, 1995
LOCATION: Ventura River, $\frac{1}{2}$ mile below
Foster Park Bridge
SPECIES: *O. mykiss*
TOTAL LENGTH: 26 cm (10 in)
SAMPLE: Lateral scales
COLLECTOR: Mark H. Capelli
SPECIMEN NO: 12

COLLECTION DATE: May 12, 1995
LOCATION: Ventura River, $\frac{1}{4}$ mile above
Shell Road Bridge
SPECIES: *O. mykiss*
TOTAL LENGTH: 33 cm (13 in)
SAMPLE: Lateral scales
COLLECTOR: Mark H. Capelli
SPECIMEN NO: 17

COLLECTION DATE: May 18, 1995
LOCATION: Ventura River, $\frac{3}{4}$ mile above
Foster Park Bridge
SPECIES: *O. mykiss*
TOTAL LENGTH: 26 cm (10 in)
SAMPLE: Lateral scales
COLLECTOR: Mark H. Capelli
SPECIMEN NO: 26

COLLECTION DATE: May 20, 1995
LOCATION: Ventura River, $\frac{3}{4}$ mile below
Robles Diversion Dam
SPECIES: *O. mykiss*
TOTAL LENGTH: 19 cm ($7\frac{1}{2}$ in)
SAMPLE: Lateral scales
COLLECTOR: Mark H. Capelli
SPECIMEN NO: 33

COLLECTION DATE: April 30, 1995
LOCATION: Ventura River, $\frac{1}{2}$ mile below
Foster Park Bridge
SPECIES: *O. mykiss*
TOTAL LENGTH: 36 cm ($14\frac{1}{2}$ in)
SAMPLE: Lateral scales
COLLECTOR: Mark H. Capelli
SPECIMEN NO: 14

COLLECTION DATE: May 18, 1995
LOCATION: Ventura River, 300 yards below
City of Ventura Foster Park
Surface Diversion
SPECIES: *O. mykiss*
TOTAL LENGTH: 28 cm (12 in)
SAMPLE: Lateral scales
COLLECTOR: Mark H. Capelli
SPECIMEN NO: 22

COLLECTION DATE: May 19, 1995
LOCATION: Ventura River, $\frac{1}{4}$ mile above
confluence of San Antonio Creek
SPECIES: *O. mykiss*
TOTAL LENGTH: 26 cm (10 in)
SAMPLE: Lateral scales
COLLECTOR: Mark H. Capelli
SPECIMEN NO: 28

COLLECTION DATE: May 20, 1995
LOCATION: Ventura River, $\frac{1}{2}$ mile below
Robles Diversion Dam
SPECIES: *O. mykiss*
TOTAL LENGTH: 23 cm (9 in)
SAMPLE: Lateral scales
COLLECTOR: Mark H. Capelli
SPECIMEN NO: 38

COLLECTION DATE: May 20, 1995
LOCATION: Ventura River, immediately
below apron of Robles Diversion
Dam
SPECIES: *O. mykiss*
TOTAL LENGTH: 23½ cm (9¼ in)
SAMPLE: Lateral scales
COLLECTOR: Mark H. Capelli
SPECIMEN NO: 42

COLLECTION DATE: April 26, 1996
LOCATION: Ventura River, immediately
below City of Ventura Foster
Park Surface Diversion
SPECIES: *O. mykiss*
TOTAL LENGTH: 21½ cm (8½ in)
SAMPLE: Lateral scales
COLLECTOR: Stanley J. Capelli
SPECIMEN NO: 7

COLLECTION DATE: April 26, 1995
LOCATION: Ventura River, 3/4 mile above
Foster Park Bridge
SPECIES: *O. mykiss*
TOTAL LENGTH: 24 cm (9½ in)
SAMPLE: Lateral scales
COLLECTOR: Stanley J. Capelli
SPECIMEN NO: 9

COLLECTION DATE: April 26, 1995
LOCATION: Ventura River, 3/4 mile above
Foster Park Bridge
SPECIES: *O. mykiss*
TOTAL LENGTH: 26½ cm (10½ in)
SAMPLE: Lateral scales
COLLECTOR: Stanley J. Capelli
SPECIMEN NO: 11

COLLECTION DATE: May 20, 1995
LOCATION: Ventura River, immediately
below apron of Robles Diversion
Dam
SPECIES: *O. mykiss*
TOTAL LENGTH: 26 cm (10 in)
SAMPLE: Lateral scales
COLLECTOR: Mark H. Capelli
SPECIMEN NO: 48

COLLECTION DATE: April 26, 1995
LOCATION: Ventura River, 3/4 mile above
Foster Park Bridge
SPECIES: *O. mykiss*
TOTAL LENGTH: 21½ cm (8½ in)
SAMPLE: Lateral scales
COLLECTOR: Stanley J. Capelli
SPECIMEN NO: 8

COLLECTION DATE: April 26, 1995
LOCATION: Ventura River, 3/4 mile above
Foster Park Bridge
SPECIES: *O. mykiss*
TOTAL LENGTH: 23 cm (9 in)
SAMPLE: Lateral scales
COLLECTOR: Stanley J. Capelli
SPECIMEN NO: 10

COLLECTION DATE: May 16, 1995
LOCATION: Ventura River, 3/4 mile above
confluence of San Antonio Creek
SPECIES: *O. mykiss*
TOTAL LENGTH: 23½ cm (9¼ in)
SAMPLE: Lateral scales
COLLECTOR: Stanley J. Capelli
SPECIMEN NO: 18

COLLECTION DATE: May 16, 1995

LOCATION: Ventura River, $\frac{1}{4}$ mile above
confluence of San Antonio Creek

SPECIES: *O. mykiss*

TOTAL LENGTH: 23 cm (9 in)

SAMPLE: Lateral scales

COLLECTOR: Stanley J. Capelli

SPECIMEN NO: 19

Appendix H

Ventura River mtDNA Haplotypes and Nuclear Microsatellite Loci

Ventura River Rainbow Trout: mtDNA Haplotypes

Population	Location	Date col.	Length	Field code	Code	Fish	mtDNA haplotype
Ventura River	.25mi above Shell Rd	5/95	33 cm	#17	MPM	48	1
Ventura River	at Robles Diversion	5/95	26 cm	# 48	MPM	49	3
Ventura River	at Robles Diversion	5/95	23.5 cm	# 43	MPM	50	3
Ventura River	25mi below Robles Diversion	5/95	23 cm	# 38	MPM	51	3
Ventura River	.5 mi above Foster Park Br	5/95	26 cm	# 26	MPM	52	3
Ventura River	.25 mi above confluence w/San Antonio cr	5/95	26 cm	# 28	MPM	53	5
Ventura River	300 yd below Foster Park Diversion	5/95	28 cm	# 22	MPM	54	3
Ventura River	.75 mi below Robles Diversion	5/95	19 cm	# 33	MPM	55	3
Ventura River	.75 mi above confluence w/San Antonio cr	5/95	23 cm	# 8	MPM	56	3

Figure 1

Ventura River Rainbow Trout: Nuclear Microsatellite Loci

Code	Fish	Oneμ14		Ssa85		Ots1	
MPM	48	155	155	100	100	153	165
MPM	49	155	155	100	100	165	165
MPM	50	na	na	106	100	163	165
MPM	51	na	na	102	106	na	na
MPM	52	155	155	102	106	163	165
MPM	53	157	157	106	106	161	165
MPM	54	153	153	106	106	165	165
MPM	55	149	153	98	102	165	167
MPM	56	151	151	100	100	163	163

Figure 2

Ventura River Rainbow Trout: Nuclear Microsatellite Loci

Fish	Ssa14		Omy325		Oneμ8	
48	150	150	112	120	158	158
49	128	152	120	122	158	160
50	134	134	106	114	158	158
51	134	134	106	120	158	158
52	152	152	114	116	158	158
53	152	152	120	136	156	158
54	150	152	116	128	158	158
55	134	152	124	134	158	158
56	na	na	112	120	na	na

Figure 4

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