

State of California

The Resources Agency

# Memorandum

Richard Angelos, Chief  
Planning Branch  
Southern District  
Department of Water Resources  
P. O. Box 6598  
Los Angeles CA 90055

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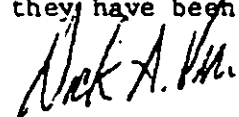
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CALIFORNIA  
COASTAL COMMISSION  
SOUTH CENTRAL COAST DISTRICT

From : Department of Fish and Game

Subject: Lower Santa Clara River Steelhead Study

Enclosed is the final copy of the status report entitled, Lower Santa Clara River Steelhead Study. This report summarizes the first year of a two year field study to determine the status of steelhead resources in the lower Santa Clara River system. Several of the figures are still being reproduced but should be complete within the following week. When they have been completed they will be sent to you under separate cover.



Larry K. Puckett, Supervisor  
Contract Services Section  
Bay-Delta Fishery Project  
(916) 527-6530

State of California  
The Resources Agency  
DEPARTMENT OF FISH AND GAME

LOWER SANTA CLARA RIVER STEELHEAD STUDY

Final Report

March 1985

This report was prepared under Interagency Agreement No. B54179 funded by the Department of Water Resources.

State of California  
The Resources Agency  
DEPARTMENT OF FISH AND GAME

Jack C. Parnell, Director

This report was prepared under the supervision

of

Harold K. Chadwick, Program Manager  
Bay-Delta Fishery Project

by

Larry K. Puckett . . . . . Environmental Services Supervisor

and

Nick A. Villa . . . . . Fishery Biologist

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## INTRODUCTION

On October 24, 1978, the Department of Water Resources (DWR) and the United Water Conservation District (United) filed applications with the State Water Resources Control Board (SWRCB) for water rights permits for the Santa Clara River system, Ventura and Los Angeles counties. The reasons for DWR applications were to appropriate water from Piru Creek (up to 61.175 cubic hectometres [ $\text{hm}^3$ ]-55,000 acre-feet per annum [afa]) and water from Castaic Creek (up to 103.998  $\text{hm}^3$ -85,000 afa) for storage in existing Castaic Reservoir. Under United's application, a permanent Vern Freeman Diversion Dam would be constructed, increasing the quantity of diversion. The permanent diversion will be located a short distance upstream from the existing Saticoy diversion dam which washes out during periods of high runoff in the Santa Clara River.

As a result of these applications, the Department of Fish and Game (DFG) filed protests with the SWRCB on the basis of potential adverse effects on fishery resources. DFG's greatest concerns were over the quantity and timing of releases of water from Pyramid and Castaic reservoirs, which would impact aquatic habitat, and over United's proposed Vern Freeman Diversion Dam, which would prevent upstream migration of adult steelhead, Salmo gairdneri, and adversely affect the downstream migration of steelhead smolts.

As part of the permitting process, the SWRCB required a fishery study designed to "evaluate the steelhead resource potential and determine stream-flow requirements to develop that potential and to support the resource".

The interest in steelhead was based on earlier records of steelhead from the Santa Clara River (Jordan and Everman 1923; Hubbs 1946; Kreider 1948; Moore 1980). More recent evidence of steelhead runs in the Santa Clara River

have been in the form of newspaper articles, photographs, miscellaneous warden reports, and word of mouth. This study was considered necessary because of the uncertainty regarding the existence of a viable Santa Clara River steelhead run.

The objectives of this study were to determine: (1) the existence of a steelhead resource; (2) life history characteristics and distribution of steelhead in the system; (3) the status of steelhead habitat in the lower Santa Clara River drainage; and (4) streamflow requirements for steelhead in the lower Santa Clara River including recommendations for a streamflow regime based on these requirements.

This report presents results of a 2-year field study to verify and describe steelhead resources within the Santa Clara River system, and it presents specific actions that should be taken to protect these resources. These actions could be used as terms for dismissal of the DFG's protest to United Water Conservation District's Application No. 26434.

#### DESCRIPTION OF STUDY AREA

The Santa Clara River is the largest river system in Southern California. It drains an area of 4 175 square kilometres (km<sup>2</sup>) (1,612 square miles [mi<sup>2</sup>]) and enters the Pacific Ocean near Oxnard. Major tributaries are Sespe, Piru, Castaic, Hopper, and Santa Paula creeks. There are three major impoundments which partly regulate the flow in the Santa Clara River: Pyramid and Piru reservoirs on Piru Creek and Castaic Reservoir on Castaic Creek (Figure 1).

The Santa Clara River system is vastly diverse in character. At the mouth is an estuary that fluctuates in size according to outflow and tidal changes. The main Santa Clara River is characterized by a wide, sandy floodway with

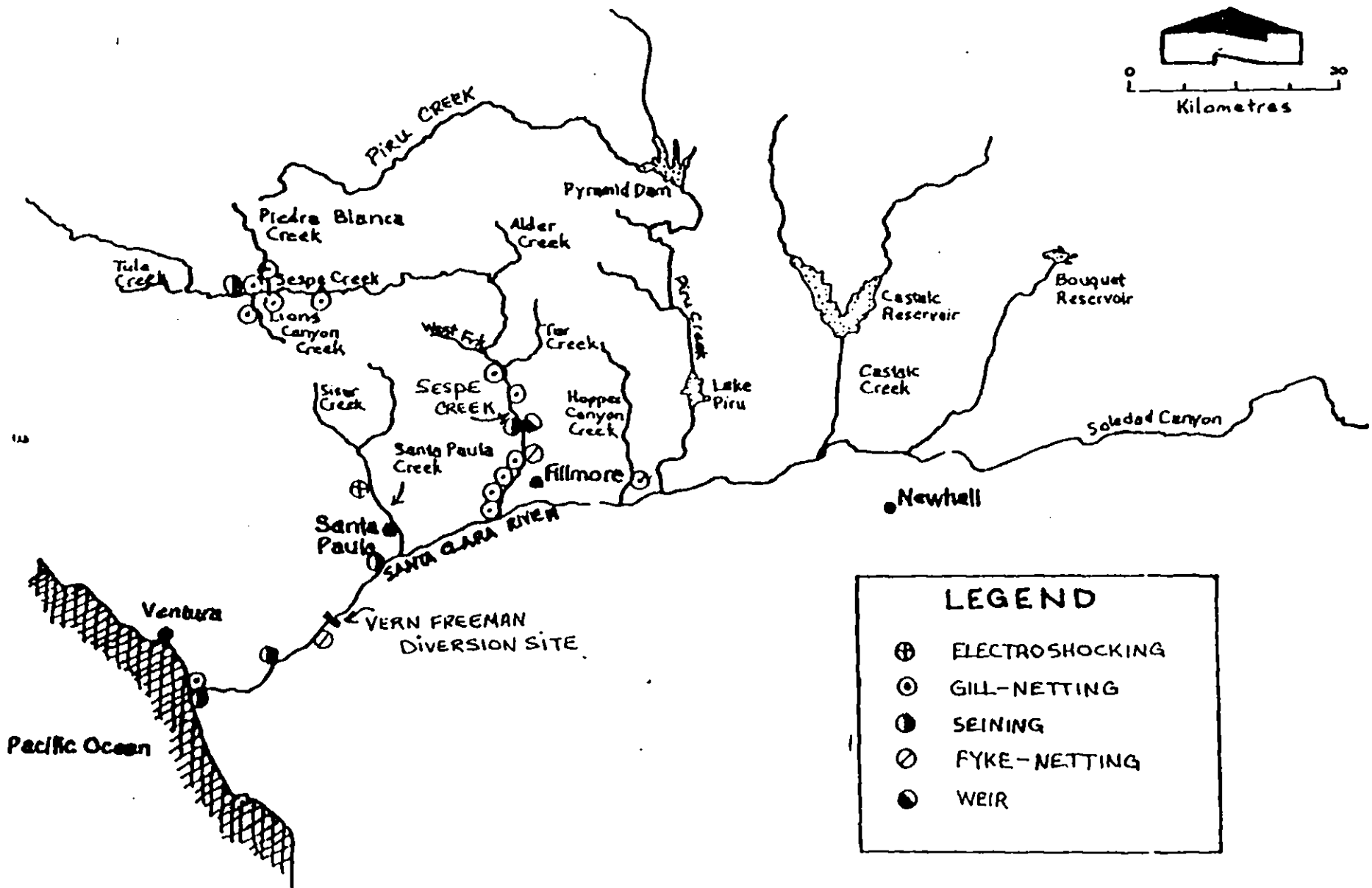


FIGURE I Study Area

extensively braided low-flow channels. Portions of the floodway are vegetated with extensive stands of willow and other riparian species. In this area flooding occurs frequently and changes the stream morphology and riparian cover. Sespe Creek, the largest tributary, is undammed and flows through much of the Los Padres National Forest and the Sespe Condor Sanctuary. Sespe Creek is characterized in its upper reaches by several small creeks bordered by moderately dense riparian vegetation. The middle reach flows through steep, narrow, boulder-lined canyons with little or no riparian but with abundant deep pools and waterfalls. Below this reach the creek flows through a much wider flood plain with fewer pools and broad stretches of shallow water. During drier years, Sespe Creek does not maintain a surface flow to the Santa Clara River; most flow is confined to areas in the canyon and upstream.



## METHODS

1982-83 Study Year

### Adult Steelhead

To verify the presence of steelhead in the Santa Clara River system, the capture and direct observation of adult steelhead by DTC personnel was considered desirable. Because of extremely variable streamflow conditions and the physical character of the streams, various capture methods were employed depending on the conditions encountered. In addition, only those areas likely to be utilized by steelhead were sampled. Those areas included: (1) the Santa Clara River estuary; (2) Sespe Creek from the mouth to the Tar Creek confluence; (3) Sespe Creek from the confluence of Piedra Blanca Creek upstream, including Piedra Blanca, Tule, and Lion Canyon creeks; (4) below the Santa Paula Creek Diversion on Santa Paula Creek; and (5) lower Hopper Canyon Creek (Figure 1).

### Electroshocking

The pool below the Santa Paula Diversion on Santa Paula Creek was electroshocked daily, from February 6 through March 18, 1983, except when flows or turbidity were too high. The Santa Paula Diversion constitutes an impassable barrier to anadromous fishes and the pool immediately below lends itself well to electroshocking.

### Gill-Netting

Throughout various areas in the upper and lower reaches of Sespe Creek (Figure 1), gill-net panels that were 9.5 centimetres (cm) (3.75 inches) stretch monofilament mesh were set perpendicular to the flow to capture adult steelhead. In the Santa Clara River estuary, a 38.11-metre (m) (125-ft) variable mesh gill net was used.

Gill nets were stretched across pools and in riffles and attached to metal fence posts driven into the streambed. In some areas a series of two to four nets were set to sample more area.. Throughout most of the study period, however, flows were too high to sample efficiently. Therefore, gill nets were usually set in slow, shallow margins of the stream, which were safer to wade. Generally, gill nets were set in the late afternoon and fished throughout the night. The gill net was set in the estuary during high tides. Sample locations and times varied and depended mainly upon access availability, flow conditions, and debris load. Fifteen locations--11 in Sespe Creek and 1 each in Hopper, Piedra Blanca, and Lion Canyon creeks and in the Santa Clara River estuary--were sampled from January to May 1983. A total of 3,653 hours of gill-netting effort was expended in these locations.

#### Weir

A weir designed to capture spent steelhead or steelhead carcasses moving downstream was placed in Sespe Creek near Goodenough Road (Figure 1). The weir consisted of two wings composed of T-posts and 19.35-centimetre square (3-inch square) mesh welded wire positioned in the streambed to make a funnel-like "Vee". In the center a live trap was attached to capture fish diverted by the wings (Figure 2). The weir was fished continuously from April 27 through May 25, 1983.

#### Creel Census

Angler success was solicited by posting flyers in various public areas. Most flyers were posted in bait and tackle stores, although some were posted along streams, in campgrounds, gas stations, and shopping centers in the local area. The flyers requested: (1) information on length of fish, (2) date and location of catch, (3) a photograph, preferably with an identifiable landmark in the picture, and (4) a sample of fish scales.

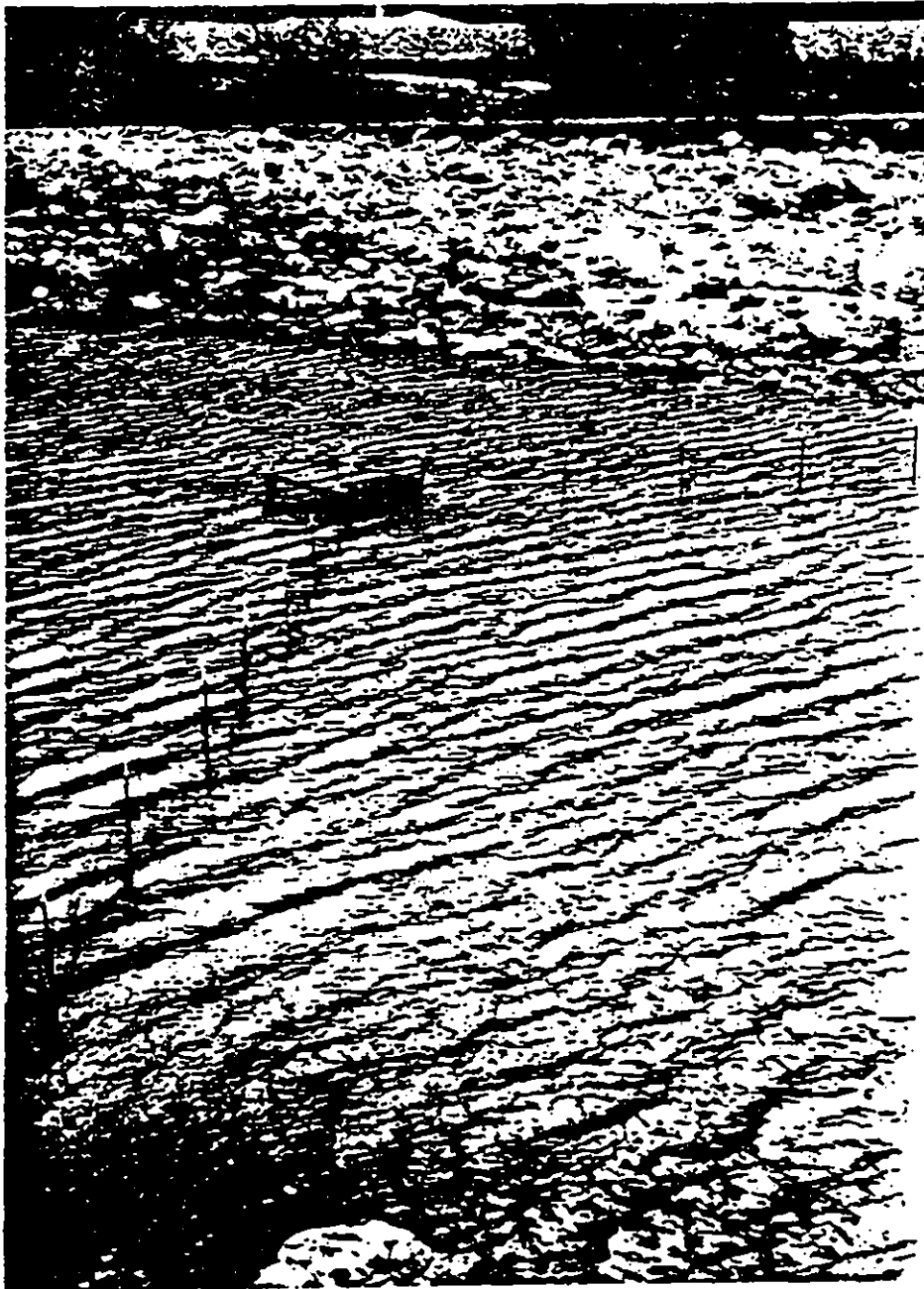


FIGURE 2. Weir set in Sespe Creek near Goodenough Road to capture spent steelhead.

Juvenile Steelhead

Juvenile steelhead remain in fresh water to rear for 1 to 3 years after they hatch, and then migrate to the ocean. During this migratory period the young steelhead (smolts) are vulnerable to various methods of capture. Two methods were used to try to capture steelhead smolts emigrating to the ocean.

Fyke Nets

Fyke nets filter a portion of the stream width in areas of high enough velocity so that emigrating fish do not exit a trap attached to the downstream end of the net (Figure 3).

Fyke netting was begun in January 1983 and continued through June. The fyke net in lower Sespe Creek was fished and checked daily except during very high flows. The fyke net in the Vern Freeman diversion canal near Saticoy was fished continuously except when United was not diverting water. The nets were fished 24 hours a day except for the time it took to identify the catch and clean the net and trap.

Seining

As a supplement to fyke netting, several locations in Sespe Creek and the Santa Clara River and its estuary were seined for emigrating steelhead (Table 1 and Figure 1).

Table 1. Seining Locations for Emigrating Juvenile Steelhead Rainbow Trout in the Santa Clara River System, 1983

<u>Km</u>	<u>River mile</u>	<u>Stream</u>	<u>Description</u>
0.0	0.0	Santa Clara River	Estuary
12.07	7.5	Santa Clara River	Gravel bar
26.39	16.4	Santa Clara River	Gravel bar
12.07	7.5	Sespe Creek	Gravel bar
56.32	35.0	Sespe Creek	Gravel bar

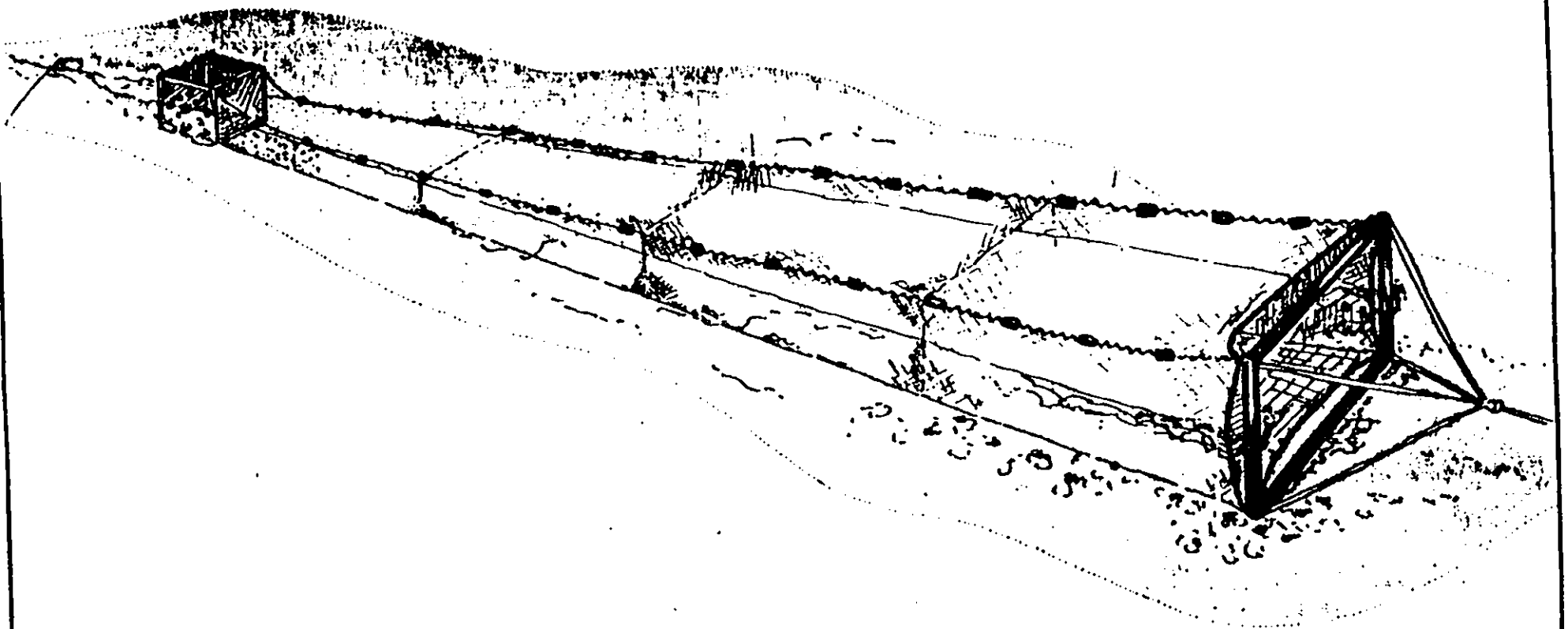


FIGURE 3 Fyke Net

1983-84 Study Year

Adult Steelhead

We learned during the first year of sampling that our best prospect for capturing adult steelhead was to use the weir and trap. Hence, the weir described previously was installed again near Goodenough Road on Sespe Creek. It was fished daily from November 17, 1983, through April 19, 1984 <sup>1/</sup>.

In addition to the weir, flyers requesting information on angler-caught steelhead were again posted locally and in nearby communities.

Juvenile Steelhead

Two fyke nets were used to sample for outmigrating juvenile steelhead (smolts). One net was set in the canal of the Saticoy diversion intake operated by United and the other was installed about .402 km (.25 mile) upstream from the site of the weir in Sespe Creek. The net at Saticoy was fished for ten 24-hour periods from February 7 to March 13, 1984. The net in Sespe Creek was fished for twenty 24-hour periods from March 13 to April 19, 1984.

Other methods included electrofishing for 1 day at Lions Camp on upper Sespe Creek, seining for 1 day at the Santa Clara River estuary, and diving for 1 day with mask and snorkel in pools on Sespe Creek 2.41 km (1.5 miles) upstream from the weir site.

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1/ The weir was positioned with the "vee" pointing upstream with the hope of capturing upstream-migrating steelhead until March 23. On March 23 the weir was repositioned to point downstream to pick up spent fish.

## RESULTS

### 1982-83 Study Year

#### Adult Steelhead

During the 1982-83 study year two adult steelhead were captured and positively identified. One was caught by hook-and-line by an angler who responded to a flyer. The fish was caught in Sespe Creek near Telegraph Road by Bill Cardona on April 2, 1983. It was a male which measured 61.5 cm (24.2 inches) fork length and weighed 2.0 kg (4.5 lb) (Figure 4). Analysis of scales taken from this fish showed that it spent 1 year in fresh water and returned to spawn at the end of its second year in salt water.

The second steelhead was captured in our weir on the night of April 26, 1983. It was a spent female that measured 70.4 cm (27.7 inches) and weighed 2.95 kg (6.5 lb) (Figure 5). This fish also spent 1 year in fresh water and 2 years in salt water.

#### Juvenile Steelhead

One juvenile rainbow trout that was potentially a young steelhead was captured by fyke netting in Sespe Creek. It was captured on April 4, 1983, and measured 15 cm (5.9 inches) fork length. No juvenile steelhead/rainbow trout was captured in the diversion works canal. The fish from Sespe Creek did not display typical steelhead smolt characteristics such as a silvery appearance and loose scales. Although this fish was caught during the probable emigration period for steelhead smolts, we do not know if it was a resident or an anadromous salmonid.

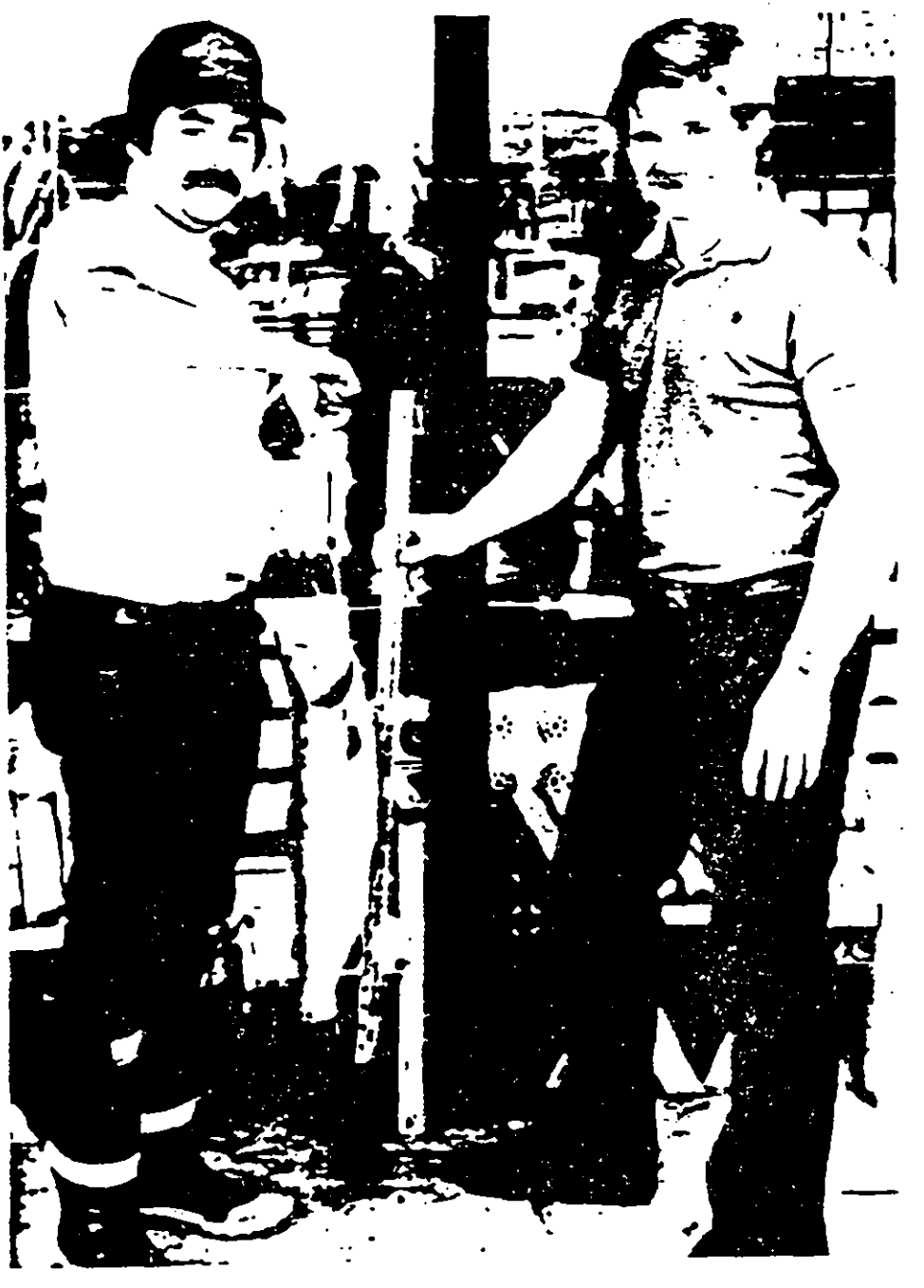


FIGURE 4. Bill Cardona (left) with steelhead trout caught by hook-and-line in Sespe Creek on April 2, 1983, near Telegraph Road. This male fish measured 61.5 cm (24.2 inches) fork length and weighed 2.0 kg (4.5 lb).



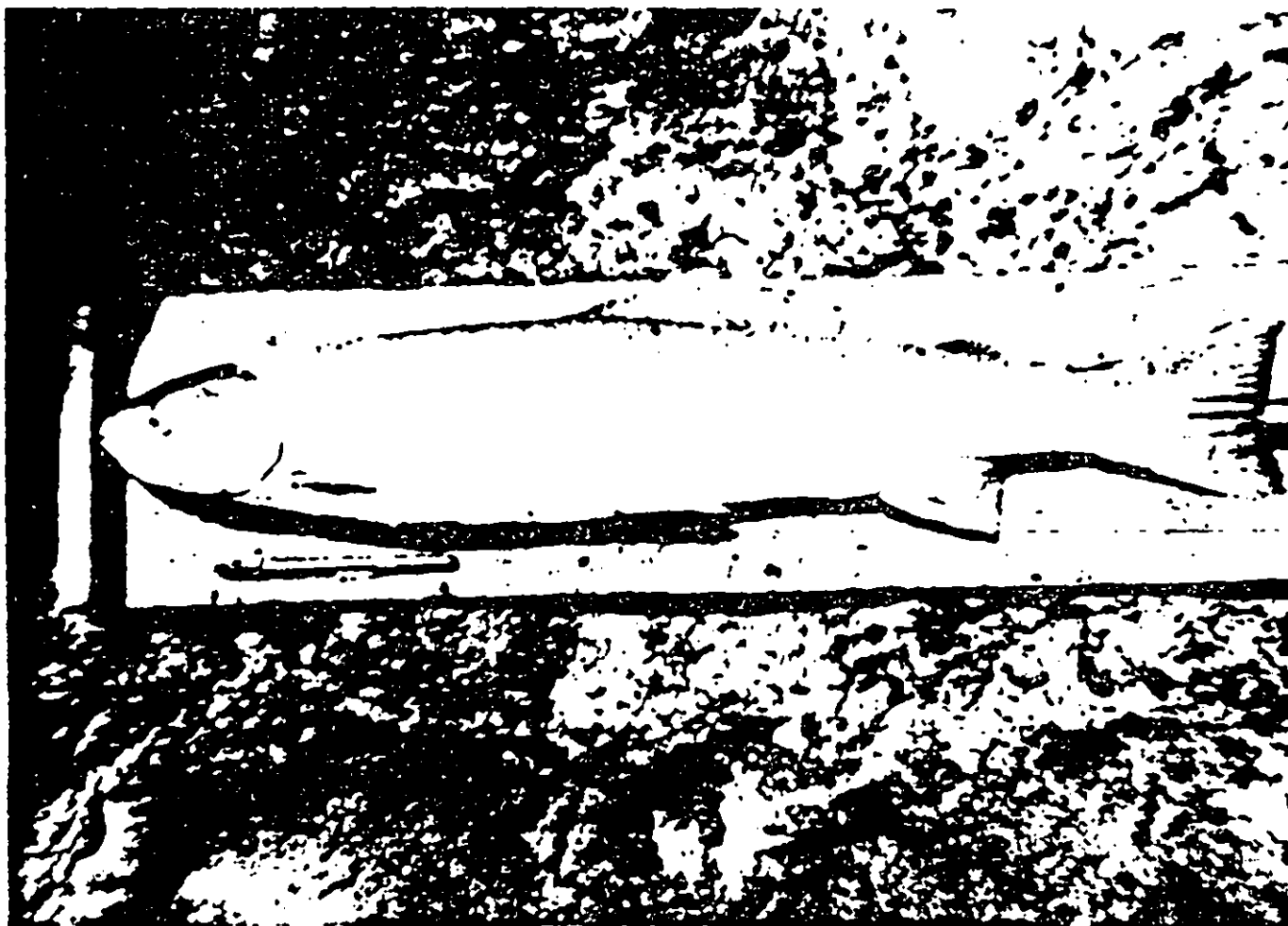


FIGURE 5. Steelhead trout caught in weir set in Sespe Creek near Goodenough Road April 26, 1983. This fish was a spent female that measured 70.4 cm (27.7 inches) and weighed 2.95 kg (6.5 lb).

Other Fishes

Over 600 emigrating juvenile Pacific lamprey were caught by fyke netting in Sespe Creek and United's diversion canal. These fish may have spent as much as 5 years in fresh water before returning to ocean life.

Sixty adult lamprey were captured. Four were caught in the diversion canal; the rest were caught in Sespe Creek. Virtually all of these fish were spawned out and were headed back to the ocean.

Eight other species of fishes were captured during sampling efforts (Table 2). The threespine stickleback and prickly sculpin are native species; the others are introduced from other areas (exotic).

Table 2. Fishes Collected in the Santa Clara River System

<u>Common Name</u>	<u>Scientific Name</u>	<u>Native</u>	<u>Exotic</u>
Pacific lamprey	<u>Lampetra tridentata</u>	X	
Threadfin shad	<u>Dorosoma petenense</u>		X
Steelhead/Rainbow trout	<u>Salmo gairdneri</u>	X	
Arroyo chub	<u>Gila orcutti</u>		X
Santa Ana sucker	<u>Catostomus santaanae</u>		X
Owens sucker	<u>Catostomus fumeiventris</u>		X
Threespine stickleback	<u>Gasterosteus aculeatus</u>	X	
Green sunfish	<u>Lepomis cyanellus</u>		X
Prickly sculpin	<u>Cottus asper</u>		X
Fathead minnow	<u>Pimephales promelas</u>		X

1983-84 Study Year

Adult Steelhead

The weir was positioned in Sespe Creek in fall 1983 before flows were high enough to pass migrating adults upstream. The first substantial rain occurred on December 25 and high flows washed out the weir. Flows did not recede sufficiently to allow wading the stream safely for several days. Replacement weir panels were fabricated and the trap and weir were reinstalled on January 12, 1984. The trap was fished continuously from January 12 until April 19, when it was removed from the stream because of very low flows, hence little likelihood that spent fish could wend their way out of the system.

On March 17 one adult steelhead was captured at the weir. The fish was 45.0 cm (17.7) inches in length and scale analysis showed it spent 2 years in fresh water and 1 year in salt water. The fish was dead and had washed against the upstream side of the weir. It still contained some eggs, hence it probably did not spawn or was in the process of spawning when it died. There was no sign of physical injury.

DFG personnel conducting the field work contacted an angler who said he had caught and released a 61 cm (24-inch) steelhead in mid-March on Sespe Creek near Devil's Gate, about 2.4 km (1.5 miles) upstream from the weir site. The angler also said he had caught other steelhead in Sespe Creek in the past.

During the course of the 2-year study, scale samples from 28 adult salmonids were examined to determine which, if any, matched growth characteristics of steelhead <sup>1/</sup>. The fish ranged in size from 20.3 cm

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<sup>1/</sup> Growth rings are narrowly spaced during freshwater phase, widely spaced during ocean phase. This translates to relatively slow growth in the stream, accelerated growth in the ocean.

(8.0 inches) to 70.4 cm (27.7 inches), and were captured by a variety of methods including hook and line, electrofishing, weir and trap, and gill net.

Twenty-five of the fish were identified as resident trout, as their growth patterns differed from those of known steelhead. It is doubtful that any of these fish were from a hatchery because of their small size at the end of the first year, as determined by scale examination. Hatchery fish would be larger after a year of growth because trout grow much faster there than in the wild. Nevertheless it can not be established that these fish were resident trout and not steelhead, since trout in coastal rivers often migrate to the ocean after a period in fresh water, thus becoming steelhead when conditions permit.

#### Juvenile Steelhead

A 15.7 cm (6.2 inch) juvenile trout was captured March 21 in the fyke net on Sespe Creek and a 17.8 cm (7.0 inch) trout was captured in the same net on March 23. Both fish were silvery and had loose scales, conditions characteristic of steelhead smolts.

No juvenile steelhead/rainbow trout was caught in the diversion works canal at Saticoy.

#### Other Fishes

In addition to the 10 species of fish captured during 1982-83 sampling (Table 2), two additional species (brown bullhead, Ictalurus nebulosus, and black bullhead, Ictalurus melas) were captured in the 1983-84 sampling season. Both these species are exotic.

Several hundred juvenile lamprey were captured in the fyke net on Sespe Creek. Numerous spawned-out adults were caught there and a few were captured at the fyke net in the diversion canal.

Table 3. Growth Characteristics of Rainbow Trout/Steelhead Captured in Sespe Creek (1982-83, 1983-84)

Capture Length		Calculated Length at Age (cm)			Capture Date
cm	(inches)	1	2	3	
Steelhead					
70.4	(27.7)	16.5	46.1	70.4	4/26/83
61.5	(24.2)	19.1	44.4	61.5	4/02/83
45.0	(17.7)	16.7	27.8	45.0	3/17/84
Resident Trout					
45.7	(18.0)	16.7	28.6	40.1	4/29/83
38.1	(15.0)	11.6	21.1	30.4	6/18/83
36.2	(14.2)	17.3	28.9		2/17/83
33.0	(13.0)	16.2	25.5		4/13/84
33.0	(13.0)	14.1	27.9		6/19/83
30.5	(12.0)	14.6	23.1		6/19/83
29.0	(11.4)	14.7	25.1		10/22/83
28.8	(11.3)	11.0	25.2		2/17/83
28.0	(11.0)	16.8	24.3		10/22/83
28.0	(11.0)	12.5	25.5		6/19/83
27.6	(10.9)	16.3	26.4		5/05/83
26.3	(10.4)	10.7	18.1		7/25/83
25.7	(10.1)	9.8	22.1		4/10/83
25.0	(9.8)	9.4	21.7		10/22/83
25.3	(10.0)	10.6	22.6		7/25/83
25.0	(9.8)	9.2	21.9		4/10/83
24.3	(9.6)	11.3	20.3		4/08/83
23.7	(9.3)	14.3	23.0		2/07/83
23.5	(9.2)	9.2	21.7		10/22/83
23.3	(9.2)	9.5	19.2		4/10/83
23.1	(9.1)	11.6	21.3		10/22/83
22.3	(8.8)	8.5	18.2		4/10/83
22.2	(8.8)	8.9	19.0		10/22/83
20.5	(8.1)	10.5			7/25/83
20.3	(8.0)	10.6			4/09/83

## DISCUSSION

The objectives of the 2-year study were: (1) to determine the existence of a steelhead resource; (2) if a resource exists, describe life history characteristics; (3) identify and evaluate steelhead habitat in the lower Santa Clara River drainage; and (4) identify streamflow requirements for steelhead in the lower Santa Clara River and recommend a streamflow regime based on these requirements (Appendix).

The capture of two adult steelhead during the first year of sampling and one during the second year indicates that the species utilizes the Santa Clara River system. Obviously, the small amount of data collected does not provide much information on life history, distribution, or streamflow requirements.

Our observations indicate that Sespe Creek is probably the most attractive, if not the only spawning and nursery area in the system. Judging from an almost complete lack of nursery area (except possibly the estuary) and no spawning area, the importance of the lower Santa Clara River for anadromous fish appears to be as a conveyance to and from the ocean.

Streamflows were too high for sampling returning adult steelhead during the 1982-83 study year. In the 1983-84 study year, no steelhead could have entered the system before the December 25 storm. Flows were high enough for them to reach Sespe Creek for several days. Another minor storm occurred in mid-March which would have permitted access to upstream areas. Therefore upstream migration in this river is probably keyed to anadromous fish taking advantage of only a few days in the winter following major storm events when adequate flows reach the estuary and breach the sand spit. Santa Clara River flows normally drop precipitously following storms. There are no apparent existing hazards or impediments to either upstream- or downstream-migrating fish (other than United's diversion intake) in the lower river.

In the absence of substantial data on juveniles, determining their migration timing is speculation. Our guess is that it would occur during March and April. Survival to adulthood would probably be tied to their moving downstream during a fairly large storm event when ample water bypasses United's diversion intake. During periods of low flow, United often diverts the entire river into the spreading grounds, which would prevent smolts from reaching the ocean.

The age and growth characteristics of the three steelhead captured in Sespe Creek are quite standard for California streams: fish spend 1, 2, or occasionally more years in fresh water and 1 or more years in the ocean. Generally, the longer the fish spends in the ocean, the larger it grows. Of the three fish examined, the smallest fish had spent only 1 year in the ocean, and the larger fish had spent 2 years.

Not enough data were collected to identify specific streamflow requirements for adult and smolt migration in the lower Santa Clara River.

## CONCLUSIONS

1. Adult steelhead enter the Santa Clara River and migrate to Sespe Creek, which has adequate habitat to support salmonids.
2. Steelhead entering Sespe Creek, although probably few in number, stimulate a small sport fishery that is well known to local anglers.
3. Construction of a permanent diversion structure across the lower Santa Clara River without providing fish passage facilities would prevent steelhead from entering the Santa Clara River system.
4. It is our understanding that the project would reduce the number of days some adult steelhead could migrate upstream by reducing flows in the 7.1-10.6 m<sup>3</sup>/s (250-375 cfs) range and in the 10.6-45.3 m<sup>3</sup>/s (375 to 1,600 cfs) range. In spite of this reduction in migration potential, adult fish would still be able to reach Sespe Creek if fish passage facilities are provided.
5. The fate of downstream-migrating fish is much less certain even with screening because of reduced flows and lack of a reliable low-flow channel from the proposed diversion works to the ocean. In spite of this uncertainty, young fish would likely survive because of the protection of high flows during major storm events.
6. An evaluation of flow patterns in the Santa Clara River system shows that the duration of mid-range flows will be reduced; however, there will still be ample flows from other sources in the system for fish to migrate



upstream and downstream without the need for water releases from Pyramid and Castaic reservoirs.

7. To protect the steelhead resource from the impact of the project:
  - a. UWCD should construct a fish screen and a denil fishway with a hydraulic capacity of 40 cfs. The fishway and screen design would be subject to DFG approval.
  - b. The fish screen should be in place and operate continuously whenever the diversion is in operation.
  - c. The fish screen should be designed to preclude the passage of steelhead smolts. Screen openings should be 5/32 inch.
  - d. When the diversion capacity of 375 cfs is reached, 40 cfs should be diverted through the fishway. The 40 cfs flow should be maintained for 48 hours after the Santa Clara River flow recedes to less than 375 cfs. Releases should be scheduled to coincide with storm events (to ensure access to Sespe Creek).
  - e. UWCD should construct a low-flow channel approximately 500 feet long from the exit of the fishway to the natural river channel.
  - f. UWCD should maintain the fish screen and fishway in good operating condition. Trash racks may be required.
  - g. UWCD should provide funds to perform a five-year post-project study to evaluate the effectiveness of the operations. The funds would be to hire a DFG Seasonal Aid for 6 months each year (cost would be approximately \$6,000 per year).

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### ACKNOWLEDGEMENTS

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We extend special thanks to Robert L. Palmer, Graduate Student Assistant, for helping set up and run the field sampling practically single-handed the first year. We also thank Jacki Hyatt and Toni O'Keefe for their work on field sampling the second year.

Charles J. Brown, Jr., Associate Fishery Biologist with DFG in Red Bluff, conducted scale analyses.

APPENDIX I

SCOPE OF STUDY  
LOWER SANTA CLARA RIVER STEELHEAD STUDY  
VENTURA AND LOS ANGELES COUNTIES

Study Plan

The following work plan was prepared as partial fulfillment of Interagency Agreement B54179 between the California Department of Fish and Game and the California Department of Water Resources. The purpose of the plan is to identify the objectives, justification, procedures, and fiscal and personnel requirements needed to gather data and to make recommendations on the feasibility of developing a steelhead trout resource in Sespe Creek and the lower Santa Clara River drainage downstream from Sespe Creek. These alternatives would hinge on the use of water available under permits issued pursuant to Water Application Nos. 25988 and 26058 from Pyramid and Castaic reservoirs. Study funds are available through DWR W.A. 1346-0116.

Determination of flow requirements for steelhead habitat in the Santa Clara River below Sespe Creek assumes the cooperation of DWR and the United Water Conservation District, for release of stored local water up to 14.8 hm<sup>3</sup> (12,000 acre-feet) of water between October and May 1982-83-84 (timing at DFG's request—subject to availability) during the initial 2 years of study. Up to 8.6 hm<sup>3</sup> (7,000 acre-feet) of water would be available from 1984 through the end of the study in 1987. Stored local water will not be released for this study after May 1 of any water year.

I. Determine the status of Santa Clara River system steelhead

- A. Purpose: To provide basic information on the steelhead resources from which recommendations on project alternatives can be developed.

B. Objectives:

1. Document the presence or absence of a steelhead resource in lower Santa Clara River.
2. Determine the distribution of steelhead in the Santa Clara River drainage.
3. Identify the primary life history characteristics of Santa Clara River steelhead.

C. Justification: The presence of a steelhead run in the lower Santa Clara River has grown to be a highly speculative issue. Recent evidence in support of an existing run is from newspaper articles, photographs, and word of mouth. In order to deal with existing doubt, to say nothing of developing alternatives for improving or restoring a run, a great deal of information on steelhead resources, including life history characteristics, is needed.

D. Procedures (Methods):

1. Review recent accounts of steelhead in the system by literature search and by interviewing knowledgeable persons.
2. Adult steelhead
  - a. Procure adult fish by trapping and netting, and by interviewing anglers in lower Santa Clara River and in Sespe and Santa Paula creeks.
  - b. If successful in 2a, determine timing of upstream migration.
  - c. Determine age and growth characteristics by fish scale analysis. These characteristics would include age of fish when caught, incidence of multiple spawning, length of ocean and freshwater residency, and comparison of these characteristics with those of steelhead in other parts of the State.

3. Juveniles

- a. Procure juveniles by trapping, netting, and electroshocking in the lower Santa Clara River, at Vern Freeman Diversion, and in major tributaries, and netting (using mark and recapture techniques) in the estuary.
- b. Determine timing of emigration from the system and season of use and length of residency of smolt in the estuary by 3a above.
- c. Verify smoltification (preparation to adapt to ocean environment) by biochemical and endocrinal analysis, which has been arranged to be accomplished by U. C. Berkeley biologists.

E.	<u>Personnel:</u>	<u>Months</u>	
	Contract Services Section Supervisor	0.75	
	Fishery Biologist	3.0	
	Graduate Student Assistant	6.0	
	Seasonal Aid	6.0	
F.	<u>Equipment</u>	<u>Cost</u>	
	Nets	\$ 2,000	
	Electroshocker	2,000	
	Preserving equipment	200	
	Microscope slides	50	
	Miscellaneous additional equipment on hand with Contract Services Section		
	Automobile leasing	10,000	

II. Estimate of life history characteristics

- A. Purpose: Fill in gaps in information on life history characteristics in the event there are still some gaps in knowledge following field studies and for purposes of developing a restoration perspective.

B. Objectives: Develop a "most probable" life history characteristics scenario on Santa Clara River steelhead.

C. Justification: It may be necessary to draw upon literature sources to round out a description of life history characteristics, and it is necessary to develop a perspective to use as a guide for developing restoration alternatives.

D. Procedures:

1. Conduct a literature search on life history information from other Southern California streams.
2. Review historical and present hydrology of Santa Clara River drainage.
3. Develop a life history chart based on information from current studies and on inference from literature search.

E. <u>Personnel:</u>	<u>Months</u>
Fishery Biologist	0.5
Graduate Student Assistant	2.0

III. Identify and evaluate steelhead habitats within the lower Santa Clara River drainage

A. Purpose: Describe existing habitat and identify the potential for improving this habitat.

B. Objectives:

1. Delineate and evaluate existing spawning and rearing habitat in the lower drainage.
2. Identify any physical hazards or impediments to upstream migration of adults or downstream migration of juveniles.
3. Identify present and proposed channel modification activities and projects.



4. Evaluate existing streamflow regime and water management operations on lower river.

C. Justification: Baseline habitat data are lacking in the lower Santa Clara River drainage. This information is required before feasible alternatives can be developed to improve and perpetuate steelhead trout resources.

D. Procedures:

1. Conduct an intensive evaluation of Sespe Creek steelhead spawning and rearing habitat.
2. Conduct reconnaissance-level surveys on secondary tributaries.
3. Conduct surveys of physical habitat of the estuary/lagoon, and conduct reconnaissance-level water quality monitoring of the estuary/lagoon.
4. Survey and map the lower Santa Clara River channel to identify physical hazards or impediments to immigration and emigration of steelhead. Map existing and proposed channel changes and projects. Utilize existing maps where possible.
5. Describe and evaluate the existing streamflow regime and water management operations on the lower river. Most of this information should already be available from the water applicants.

E. Personnel:

Months

Contract Services Section Supervisor	0.25
Fishery Biologist	1.0
Graduate Student Assistant	6.0
Seasonal Aid	6.0

F. Equipment:

On hand with Contract Services Section or minor general expense items.

IV. Identify flow requirements for adult and smolt steelhead migration in the lower Santa Clara River and develop recommendations for a streamflow regime based on these requirements.

A. Purpose: Determine streamflow requirements for maintaining and/or restoring steelhead resources in the lower Santa Clara River.

Develop recommendations for future project operations based on these requirements and on the ability of DWR and United to provide required water releases.

B. Objectives:

1. Determine criteria for defining steelhead migration flow requirements.
2. Define flow conditions needed to maintain, improve, and/or restore steelhead runs in the lower river (mouth to Piru Creek).
3. Assist applicants in evaluation of recommended modes of operation.

C. Justification: This segment is required to prepare terms to enable DFG and the applicants to resolve the DFG protest of the water applications.

D. Procedures:

1. Review flow criteria most applicable to Santa Clara River steelhead.
2. Select criteria most applicable.
3. Relate criteria to lower Santa Clara River channel.
4. Apply criteria to various scenarios of river channel modification.
5. Define alternative flow regime options (modes of operations) that provide for steelhead migration flow requirements under various scenarios of streamflow manipulation and/or channel modification.

6. Evaluate biological ramifications of modes of operations; for example:

<u>Mode of Operation</u>	<u>Degree of Effectiveness in Maintaining/Improving/Restoring Steelhead Runs</u>
1.	1.
2.	2.
3.	3.

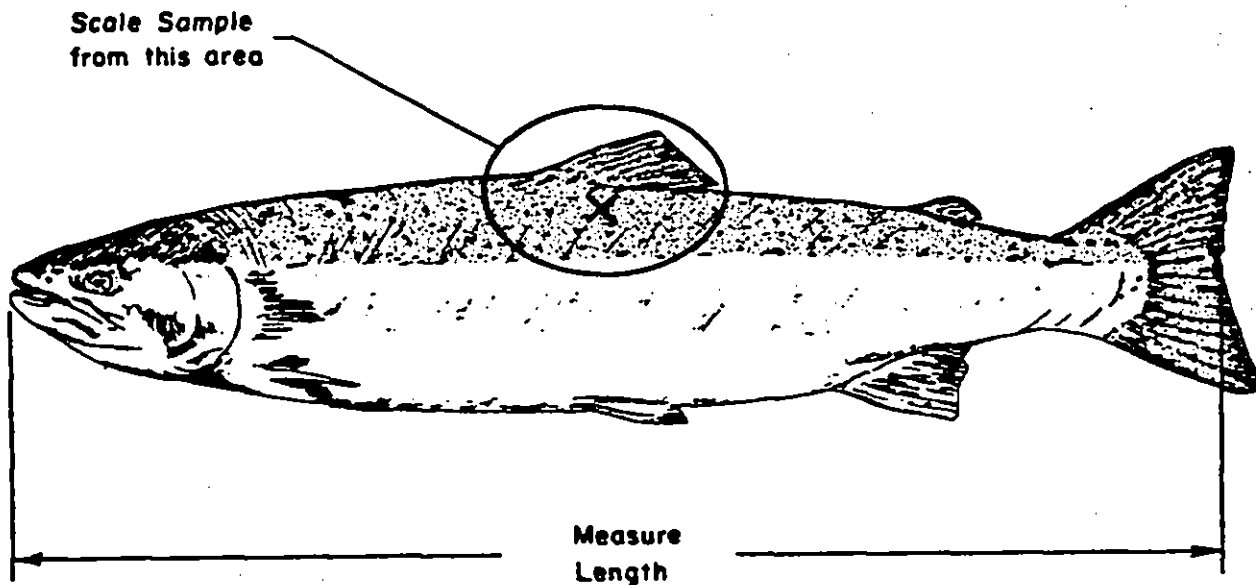
7. Develop priorities for recommended modes of operation.
8. Consult with DWR, UWCD, AND VCFCO in evaluating modes of operation from a water management standpoint.
- a. Operations studies
  - b. Benefit/cost analysis

<u>E. Personnel:</u>	<u>Months</u>
Contract Services Section Supervisor	1.0
Fishery Biologist	2.0
Graduate Student Assistant	4.0
Seasonal Aid	4.0

F. Equipment:  
None

<u>Budget</u>			
<u>Year 1</u>			
<u>Position</u>	<u>Salary (Perm.)</u>	<u>Months</u>	<u>Cost</u>
Env. Serv. Sup. (ESS)	\$2,814	1	\$ 2,814
Fishery Biologist (FB)	1,935	2.5	4,840
Grad. Student Assistant (GSA)	1,006	9	9,050
Seasonal Aid (SA)	725	9	6,530
Operating (includes equipment, other operating, personal services, and overhead)			26,770
Total			<u>\$50,000</u>
<u>Year 2</u>			
ESS		1	\$ 2,814
FB		4	7,740
GSA		9	9,050
SA		9	6,530
Operating			23,900
Total			<u>\$50,000</u>

# Attention Fishermen



The California Department of Fish and Game needs your cooperation in a study to determine the status of steelhead in the Santa Clara River system. If you have caught or know other fishermen who have caught steelhead in the Santa Clara River or Sespe Creek, please contact the Department of Fish and Game at one of the following addresses:

Robert L. Palmer  
427 Mountain View  
Fillmore Ca. 93105

Nick A. Villa  
2440 Main Street  
Red Bluff Ca. 96080  
(916) 527-6530

In addition we need the following information on any and all steelhead caught in the Santa Clara River system:

- 1) Length of fish, measured from snout to fork in tail.
- 2) A scale sample from below the dorsal fin. It can be placed between a fold of paper or in a small envelope.
- 3) A photograph of the fish with an identifiable landmark in the picture.
- 4) Date and location of catch.

JAN 03 1986

A-43

Jack C. Parnell, Director  
Department of Fish and Game  
1415 Ninth Street, 12th Floor  
Sacramento, CA 95814

Report on Lower Santa Clara River Steelhead Study

The Department of Water Resources has reviewed the subject report, which you transmitted to us on October 22, 1985, and we had a thorough discussion of it with Fred Worthley and his staff on December 6, 1985. The United Water Conservation District participated in the review and discussion.

We are pleased that as a result of the discussion it appears now that the possible error in streamflow information referred to in your letter of transmittal has been cleared up and is no longer of concern. There remain, however, several problems with respect to interpretation of data collected during the steelhead study and to the conclusions drawn from it.

Department of Water Resources' comments on the report have been prepared and are attached.

We believe that the opportunity remains to resolve the matter of Santa Clara River steelhead to the satisfaction of all of the concerned parties. Looking toward that objective we remain open to further discussion. The final section of the attachment is our proposal for a settlement.

(sg) David N. Kennedy

David N. Kennedy  
Director  
ATSS 435-6532

Attachment

cc: G. E. Wilde  
United Conservation District  
P. O. Box 432  
Santa Paula, CA 93060

Fred Worthley  
Department of Fish and Game  
245 W. Broadway, Suite 150  
Long Beach, CA 90802

Robert Beveston  
Department of Fish and Game  
1415 Ninth Street, 12th Floor  
Sacramento, CA 95814

cc: Larry Williams, Em. 1609-12  
Eco Partner, Southern District

Harold Knight, Em. 235  
Tak Eyano, Southern District

DFG/WR: (j) (cc: 01.30) 107 1 549

Department of Water Resources Comments on  
Lower Santa Clara River Steelhead Study  
Department of Fish and Game  
Final Report--March 1985

Our comments are directed to the following three issues, which we believe need further consideration:

- A. Does there, in fact, exist a viable population of steelhead, and, if so,
- B. Can there be maintained a steelhead fishery and catchable trout fishery in the same stream?
- C. Would the flow requirements across the Vern Freeman Diversion Dam decrease the project yield to United Water Conservation District (UWCD)?

1. Steelhead Population Department of Water Resources (DWR) does not believe that the study demonstrated that there is a viable population of steelhead in the Santa Clara River system. In spite of major efforts over two years to collect steelhead only three adults and no juveniles were seen. The sampling was done over a two-year period: 1982-83 a wet year, and 1983-84, an "average" year. In fact, the sampling was done at the end of a seven-year period of generally favorable water conditions for anadromous fish.

The three fish seen might easily be explained as strays that originated in another stream but entered the river from the ocean because they happened along when conditions were favorable for entry. Straying into other than their natal streams is well known among steelhead and other salmonids. For example, significant steelhead straying was reported by Shapovalov and Taft (1954)<sup>1</sup> in their definitive life history of steelhead on California's coast. In nine years of mark and recapture studies of steelhead in Waddell and Scott Creeks on the Central California Coast, they found that 1.9 percent of the upstream migrant steelhead that should have returned to Waddell Creek strayed instead to Scott Creek, which enters the ocean 4-3/4 miles south of Waddell Creek. They reported comparable straying of Scott Creek steelhead to Waddell Creek, and that there was much variability in straying patterns in different years.

DWR also believes it significant that during the years of fish sampling on the Santa Clara River, and in other recent years, Department of Fish and Game (DFG) biologists and others noted significant numbers of adult steelhead in the Ventura River to the north and Malibu Creek to the south. (And these were observed without the benefit of an intensive search such as that done on the

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<sup>1</sup>Shapovalov, Leo, and Alan C. Taft. 1954. The life histories of steelhead rainbow trout (*Salmo gairdnerii gairdnerii*) and silver salmon (*Oncorhynchus kisutch*) with special reference to Waddell Creek, California, and recommendations regarding their management. California, Department of Fish and Game, Fish Bulletin (33): 1-375.

Santa Clara River.) This observation adds to the doubt of existence of a steelhead population in the Santa Clara River, and indicates a possible nearby source of steelhead to stray into the Santa Clara River. Further, because the existing diversion dam on the Santa Clara River is designed to wash out when flows exceed diversion capacity, there has been no man-made barrier to upstream migrants that would have stopped them if they had been available.

DWR believes that the study did not show the presence of more than a marginal or remnant population of steelhead. There was no demonstration of the need to install mitigation facilities or operations such as a fishway, fish screen, or water releases related to fishway function.

2. Steelhead Fishery vs. Catchable Trout Fishery Another matter that bears on the steelhead study and on a possible steelhead fishery in the Santa Clara River is the fact that DFG maintains a catchable trout fishery on lower Sespe Creek. As indicated in DFG's final draft of the study report as Conclusion No. 7, "Continued planting of catchable trout in Sespe Creek would possibly cause competition with steelhead juveniles." (This conclusion was not included in the final report.) Since the catchable trout planting and fishing area overlaps, at least in part, with the potential steelhead nursery area and area used by steelhead smolts moving toward the ocean, there is no doubt there would be competition between the catchable trout and steelhead if steelhead were present in the stream. The competition would be for food and space, and also anglers seeking catchable trout would doubtless catch young steelhead as well if any were present. By conducting this catchable trout program, DFG would seem to indicate that they do not assign a high priority to a possible steelhead fishery in the Santa Clara River. Further, if steelhead are present or believed to be present and DFG continues to conduct a catchable trout fishery, would this not be in conflict with Fish and Game Commission policy?

3. Flow Requirements Discussion in the meeting on December 5, 1985, indicated some misunderstanding by DFG regarding the extent of United's water right under approved Application 26434. While the decision provides that diversion may be made to an amount not to exceed 37 cubic feet per second (cfs), there is no assurance that such flows will always be present. In fact, United contends that such flow will be available only briefly after each major storm. Conclusion 7(a) in the DFG report provides that 40 cfs should be maintained for 48 hours after the Santa Clara River flow recedes to less than 375 cfs. This would in a large part nullify one of the two benefits for which United is constructing the Vern Freeman Diversion and, further, would require some flow to be made available under United's prior licensed water right.

Because of these factors, it appears that the recommendation in the report for a flow release of 40 cfs for 48 hours following a flood event may be excessive and should be re-evaluated.

4. Recommendation DWR proposes that the report be revised along the following lines. (This has been developed in consultation with WDC.):

- a. No fish facilities would be installed initially at the Vern Freeman Diversion Dam;
- b. The diversion dam would be designed and constructed to accommodate the later installation of a fishway and fish screen if

one or the other or both are determined to be needed. (Would include planned openings, dimensions, anchor bolts, etc.);

- o No water releases or flows would be made or planned for fish facilities;
- o The State Water Resources Control Board (SWRCB) would retain continuing jurisdiction as to the need for a fishway and/or fish screen at the dam as follows:
  - o If evidence becomes available to indicate the presence of a viable population of steelhead and the need for a fishway and/or fish screen at the dam, the required facilities would be installed by UWCD upon order of the SWRCB; and,
  - o Before any facilities or operations are undertaken to accommodate steelhead at the diversion dam DFG will initiate a program to manage the appropriate portions of the Santa Clara River for steelhead. This would include elimination of any competition from the catchable trout program.
- o Any continuing search for steelhead, or other biological studies related to such a search, will not be performed or funded by DWR or UWCD.



State of California

The Resources Agency

# Memorandum

Date : APR 30 1986

To : G-3  
 Darlene C. Ruiz, Vice-Chairwoman  
 State Water Resources Control Board  
 901 P Street  
 Sacramento, CA 95814

From : Department of Water Resources

Subject: Lower Santa Clara River Fish Study

We are transmitting to you the "Lower Santa Clara River Steelhead Study-Final Report" dated March 1986, by the Department of Fish and Game (DFG). This report was prepared in response to State Water Resources Control Board (Board) Water Right Decision 1536 that,

"Permittee (Department of Water Resources (DWR)) shall fund a two-year study to be performed by DFG of the steelhead resource potential and flow requirements necessary for the transport of adult and juvenile steelhead to and from the spawning and rearing areas of Sespe Creek, and the lower Santa Clara River...."

This study requirement is also part of the water right permit conditions for DWR's Applications 25988 and 26053 for water from Piru and Castaic Creeks and United Water Conservation District's (United) Application 25434 for water from Santa Clara River.

Decision 1536 also provided that upon completion of the study DWR and DFG,

"... will attempt to agree mutually on permanent steelhead improvement and perpetuation conditions to be added to this permit by the Board pursuant to its reserved jurisdiction. Such agreement or, if agreement cannot be reached, terms proposed separately by Permittee and the Department of Fish and Game shall be presented to the Board along with a report of the findings and recommendations of the study and any other relevant information. The Board reserves jurisdiction to consider the appropriate permanent conditions, if any, to be added to this permit."

A substantially identical requirement was provided in the decision regarding United and DFG.

Since the distribution of the draft report by DFG in July 1984, six meetings have been held with DFG staff. Throughout, DWR's primary concern has remained that the study does not support the report conclusions that a steelhead fishery exists in the Santa Clara River. The bases for our position are as follows:

1. The study was conducted during a wet year, a normal year, and at the end of a seven-year period of generally favorable water conditions for anadromous fish.

Darlene C. Ruiz

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2. In the case of both upstream and downstream migrants the sampling attempts were both intensive and extensive covering a good variety of gear, dates, and locations.
3. Only three upstream migrant adult steelhead were noted in intensive sampling over two years. We believe that this number of upstream migrants is best explained as stray fish and not part of an established run of steelhead.

Straying into other than their natal streams is well known among steelhead and other salmonids. For example, significant steelhead straying was reported by Shapovalov and Taft (1954) in their definitive life history of steelhead in Waddell and Scott Creeks on the Central California Coast. They found that 1.9 percent of the upstream migrant steelhead that should have returned to Waddell Creek strayed instead to Scott Creek, which enters the ocean 4-5/4 miles south of Waddell Creek. They reported comparable straying of Scott Creek steelhead to Waddell Creek, and that there was much variability in straying patterns in different years.

4. No downstream migrant steelhead were seen in intensive sampling over two years. The absence of young steelhead is even stronger evidence than the absence of adults that an established population is not present, since young steelhead move to the ocean at ages 1, 2 or 3. This means that the two years of sampling could have captured steelhead hatched over a four-year period.
5. Established runs of steelhead are known to exist (by DFG and anglers) in Malibu Creek, which enters the Pacific Ocean to the south of the Santa Clara River, and in the Ventura River which enters the ocean just to the north. These runs are known without any particular effort being made to search for the fish — while the two-year search on the Santa Clara River was almost completely fruitless. Further, our hypothesis that the three adult steelhead seen in the Santa Clara River were strays is supported by the presence of established runs in the Malibu Creek and in the Ventura River. Fish from these streams would be a ready source of strays which might enter the Santa Clara.

The explanation for the presence of steelhead runs in Malibu Creek and the Ventura River, but not in the Santa Clara River, could be the very high sediment loads in the Santa Clara River. Data assembled by Brownlie and Taylor (1981) shows that the average suspended sediment concentration in the Santa Clara River near its mouth is three times that in the Ventura

Darlene C. Ruiz

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River. Taylor (1977) estimates that the Santa Clara River contributes 51 percent of the sand delivered to the coastline from all of the drainages from Point Conception to the Mexican border. Sediment loads in the high range are quite damaging to fisheries. Typical damage due to these factors would include deposited materials creating barriers to fish migration, reduced production of fish food organisms, and mechanical damage to fish gills.

6. DFG's long-time management of a catchable trout fishery in lower Sespe Creek, a major tributary of the Santa Clara River, indicates that even DFG had no thought that a viable steelhead fishery exists in the Santa Clara River system. If it does, the planting of catchable trout is inimical to Fish and Game Commission policy which requires, "That resident fish will not be planted or developed in coastal steelhead and salmon streams, except after prior Commission approval (a) where the stream is no longer adaptable to anadromous runs...."

We regret that our several meetings did not result in a consensus for recommended Board action. Obviously, there is a difference of opinion as to whether a steelhead fishery should be supported in the Santa Clara River and how the valuable, but limited, water supply should best be used. As stated above, DWR believes that the study demonstrates rather dramatically that a viable population of steelhead does not exist in the river and that it would be extremely imprudent to commit any of this limited water supply, as sought by DFG, to a nonexistent fishery. It would also be counter to State policy, as enunciated in Article X, Section 2 of the California Constitution and Water Code Section 100, that the water resources of the State must be put to beneficial use to the fullest extent of which they are capable. In this regard, the Board should note that condition 7, page 21, of the attached DFG report recommends:

"To protect the steelhead resource from the impact of the project: ... (d) When the diversion capacity of 375 cfs (from the Vern Freeman Diversion Dam to the Saticoy Spreading Basin) is reached, 40 cfs shall be diverted through the fishway (into the Santa Clara River). The 40 cfs flow should be maintained for 48 hours after the Santa Clara River flow recedes to less than 375 cfs . . . ." This 48-hour by-pass requirement represents approximately 160 acre-feet of water during each storm event that could otherwise be diverted to the spreading basin.

United holds License 10173 (application 12092) for appropriation of water from Piru Creek and Santa Clara River. The license allows an instantaneous rate of

Darlene C. Ruiz

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diversion at the Saticoy Headworks of up to 375 cfs. As the by-pass of water sought by DFG would have to be provided by United, DFG is seeking water that would have to come, not from the water right permit under which the Board retained jurisdiction, but from the vested water right under License 10175.

On November 19, 1981 the Board adopted Resolution 81-100 relating to the Upper Aquifer System of the Oxnard Plain. This resolution was adopted following two days of hearings in 1979 and 1981. In that Resolution the Board concluded that "decisive action" was necessary against the intrusion of sea water into the Oxnard Plain Basin. Otherwise, destruction or irreparable injury would result to the quality of the water supplying a substantial part of the municipal and industrial needs and an important agricultural economy. The Board found that the use of the ground water in the Upper Aquifer System must be adjudicated in order to require the restriction of pumping, or a physical solution was necessary. The Board directed its Division of Water Rights to request the Attorney General to take appropriate action under Water Code Section 2100-2102 unless, within a period of 90 days, a local agency had commenced action to initiate such an adjudication.

Neither a local agency nor the Division of Water Rights has proceeded, apparently because the Board favored an alternative physical solution by means of an overland pumping trough pipeline, partially financed through an \$8 million State grant. However, no overland water has been delivered to the Oxnard Plain through the pipeline and the Board's concern, which we share and which prompted the adoption of Resolution 81-100, has not yet been overcome.

On June 17, 1982 the Board adopted Order WR 82-5, "Order Denying Petition for Extension of Time and Revoking Permit 14110." That Order revoked a water right permit of United for a water storage project on Saspe Creek because of (1) a lack of diligence by United in proceeding with the project and, (2) the possible adverse effect of the project on sensitive environmental concerns in the project area. Decision 1385 made special note (page 15) of the action of the Board under WR 82-5 in stating, ". . . the Board should not favor applications to export water from the Santa Clara River basin because the basin is water inefficient" (emphasis added).

Fishery mitigation programs are required by various laws, regulations, or policies when preexisting fishery resources are negatively affected by project construction or operations. If no fishery resource exists prior to project construction, as appears to be the case with steelhead in the Santa Clara River, there is no basis for requiring local water areas to pay for a fishery mitigation program. If DFG (because of a policy or hope to restore

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steelhead to a river where the species once existed) wishes to have a ladder, screen, and flow schedule installed in the Santa Clara River, DFG funds or funds earmarked for fishing restoration (such as funds from the Fishery Restoration Act of 1985, Chapter 1235, Statutes of 1985) should be used or given priority in their schedule of plans.

We are pleased to note that Condition 6, pages 20 and 21, of the subject DFG report recognizes that there is no need for water releases from Pyramid and Castaic Reservoirs. Therefore, the only issue among the parties that remains appears to be the matter of downstream fish flows past the Vern Freeman Diversion Dam and pertinent physical facilities. However, because of the inability to resolve this issue to the satisfaction of all, we are submitting the report along with this statement of DWR's position and other letters and comments as required by Decision 1525.

(sgd) David N. Kennedy

David N. Kennedy  
Director  
ATSS 485-6382

cc: With Attachments

G-3  
Jack C. Parnell, Director  
Department of Fish and Game  
1416 Ninth Street, 12th Floor  
Sacramento, CA 95814

A-43  
Robert Rawstron  
Department of Fish and Game  
1416 Ninth Street, 12th Floor  
Sacramento, CA 95814

A-35  
Orville L. Abbott (with 3 Attachments)  
Executive Officer and Chief Engineer  
California Water Commission  
1416 Ninth Street, Room 1104-4  
Sacramento, CA 95814

G. I. Wilde  
Chief Engineer and General Manager  
United Water Conservation District  
P. O. Box 452  
Santa Paula, CA 93060

KWoodward/DPelgen/HKnight:rp

bcc: (With Attachments)

Mr. Rick Farnsworth  
Ventura County Flood Control District  
800 South Victoria Avenue  
Ventura, CA 93009

Mr. William Lockard  
Ventura County Flood Control District  
800 South Victoria Avenue  
Ventura, CA 93009

Ms. Lee Orquhart  
U. S. Forest Service  
27757 Bouquet Canyon Road  
Saugus, CA 91350

Mr. Tom Dieckman  
Newhall Land and Farming Company  
23323 West Valencia Boulevard  
Valencia, CA 91355

Mr. Cecil Elliot  
S. P. Milling Company  
3555 Vineyard Avenue  
Oxnard, CA 93050

Mr. George Marshall  
Marine Resources Region  
Department of Fish and Game  
245 W. Broadway, Suite 160  
Long Beach, CA 90802

Mr. Larry Puckett  
Department of Fish and Game  
P. O. Box 607  
Red Bluff, CA 96080

Dr. Herbert L. Joseph, MD  
Chairperson, Steelhead Committee  
1516 Napa Street  
Vallejo, CA 94590

Mr. Phillip J. Maes, Chief Planner  
Southern Central Coast District  
California Coastal Commission  
735 State Street  
Balboa Building, Suite 612  
Santa Barbara, CA 93101

Ms. Nancy Sue Pearlman, Executive Director  
Ecology Center of Southern California  
Project of Educational Communications, Inc.  
P. O. Box 55473  
Los Angeles, CA 90035

Mr. John Beuttler, Jr., Executive Director  
United Anglers of California  
1360 Neilson Street  
Berkeley, CA 94702

Mr. Michael McHenry  
2753 Cawalti Road  
Camarillo, CA 93010

Mr. Mark Henri Capelli  
2755 Las Encinas  
Santa Barbara, CA 93105

Mr. William F. Anderson, Chairperson  
Fish and Game Commission  
County of Ventura  
300 South Victoria Avenue  
Ventura, CA 93009

Mr. Rick Breitenback  
Mid-Pacific Regional Office  
Bureau of Reclamation  
U. S. Department of the Interior  
2800 Cottage Way  
Sacramento, CA 95825

(Without Attachments)

William Burke, SFD, Castaic  
Harold Knight, 235  
Dave Pelgen, 215-22  
Ken Woodward, 215-34  
Larry Mullnix, 1509-12  
Harold Steinberg, 1113-14  
Gene Serr, ND  
Bob Potter, SD  
Takashi Ryono, SD