

PRELIMINARY REPORT

THREE MONTH STEELHEAD
SURVEY ON THE LOWER SANTA CLARA
RIVER AND TRIBUTARIES

VENTURA COUNTY, CALIFORNIA

Department of Fish and Game
Region 5
350 Golden Shore
Long Beach, CA 90802

June 1981

INTRODUCTION

The quantity and quality of aquatic resources in the Santa Clara River drainage has been called into question by the Department of Water Resources (DWR) and United Water Conservation District (UWCD) as the resources relate to pending Water Applications. Specifically, the resource in question is the existence of a steelhead population. Historically, steelhead have migrated up the Santa Clara River from the sea and spawned in the tributaries. Recent evidence in support of existing steelhead runs have taken the form of newspaper articles, photographs, and word of mouth. All parties concerned with the Water Applications feel that the existence or non-existence of a steelhead population must be established if the Water Applications are to be conditioned appropriately. Toward this end, the Department of Fish and Game (DFG) is developing a scope of study for a two-year investigation into the steelhead question. In an effort to gain some preliminary data DWR commissioned DFG to undertake a three-month study in the Spring of 1981. This progress report outlines the activities to date and contains all data collected.

Data were gathered from the Santa Clara River, Sespe Creek, and UWCD spreading grounds. Since a steelhead population was the central issue, only the occurrence of rainbow trout, and specifically "wild" trout (not hatchery reared) enter into the following discussion. Species other than rainbow trout were collected, but only as resource information.

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SAMPLE LOCATIONS

Three sampling sites (Figure 1) were established within the Santa Clara River drainage:

1. Santa Clara River at the end of Mission Rock Road;
2. Sespe Creek at the State Highway 126 bridge; and
3. The desilting basin (Pond B) within UWCD's spreading grounds at Saticoy.

The choice of stream sampling locations had several constraints placed upon it: 1) the sites had to be above or within UWCD diversion channel; 2) the nets had to be placed in areas of limited public access; 3) the depth of the stream had to be three feet or less; and 4) the current velocity had to be sufficient to carry fish into the nets, but not so great as to wash out the nets and wings. Areas of limited public access were difficult to find on either watercourse. Access to the Santa Clara River was gained through the Livingston-Graham property. This location could also be reached by off-road vehicles or from South Mountain.

Both stream locations were exposed even though direct access to the Santa Clara River site was controlled by Livingston-Graham. For this reason, the nets were set in the afternoon, retrieved the next morning,

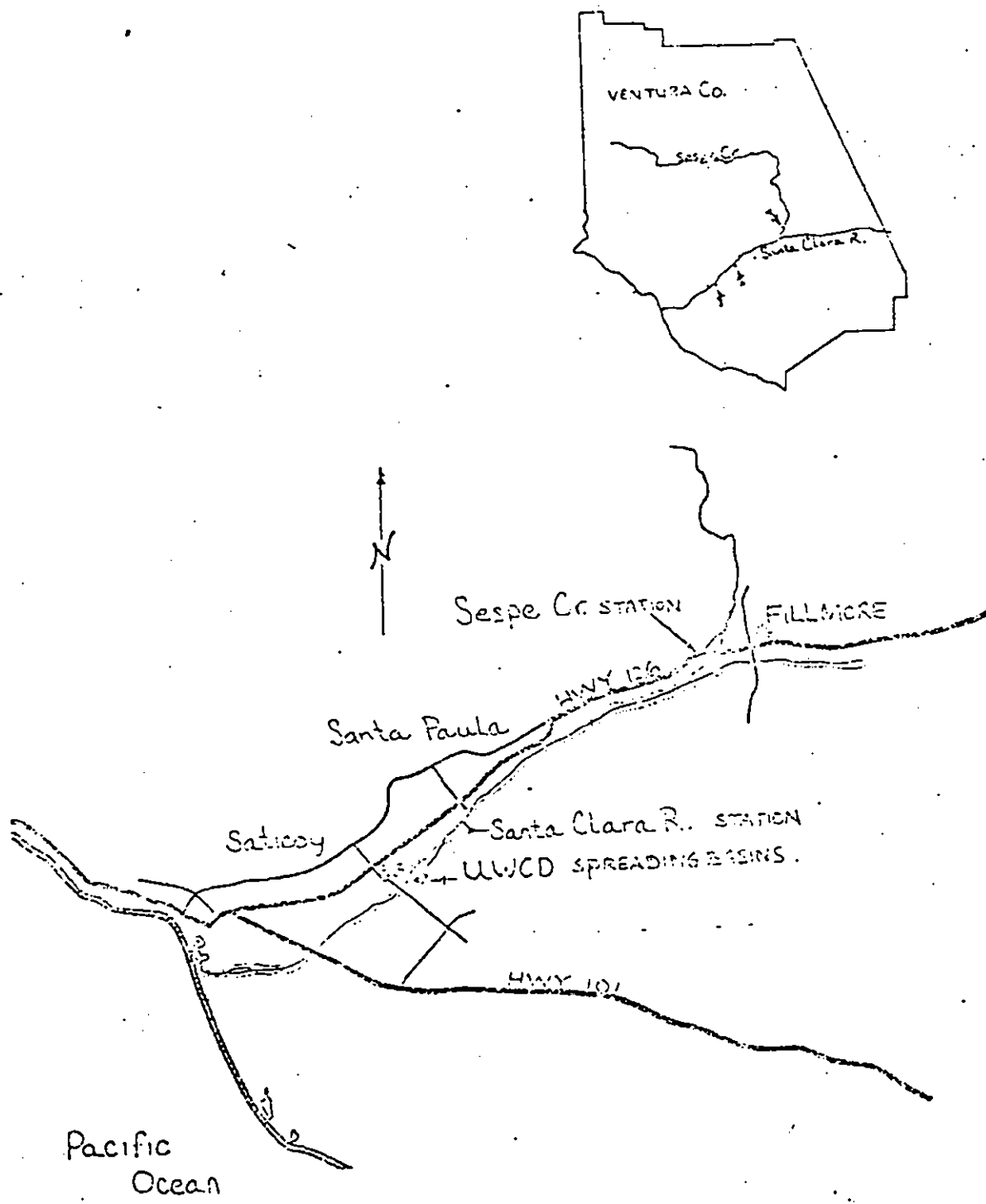


Figure 1. Sampling Stations on Sespe Creek, on the Santa Clara River, and within UICD's Spreading Grounds.

and never sat over a weekend or holiday. This practice limited the sample time but kept the gear in operable condition. Access to ULCD's spreading grounds was more closely controlled by resident employees.

METHODS

Nets

Fyke nets measuring twelve feet long with 3' x 5' mouths were used on both the Santa Clara River and on Sespe Creek (Figure 2). Each net was made up of three mesh sizes ranging from, 1 inch at the mouth, 1/2 inch in the middle, and 1/4 inch at the cod end. Livecars were attached to the cod ends and anchored to the streambed. Two nets set side by side were used on the Santa Clara River while one proved adequate on Sespe Creek.

Fish moving downstream were diverted into the fyke nets through the construction of screened wings extending from the nets to the shore (Figure 3). For the Santa Clara River, 4' x 5' frames were built from 2" x 2" pine and 1/2 inch hardware cloth was stretched over the frames. Both the nets and the frames were secured to the streambed by "T" iron fence posts. On Sespe Creek, rolls of one-inch chicken wire were stretched from the net to the shore along fence posts.

The April 8 and 9 sets on the Santa Clara River were made without benefit of livecars or wings. For these sets, the cod end was tied off.

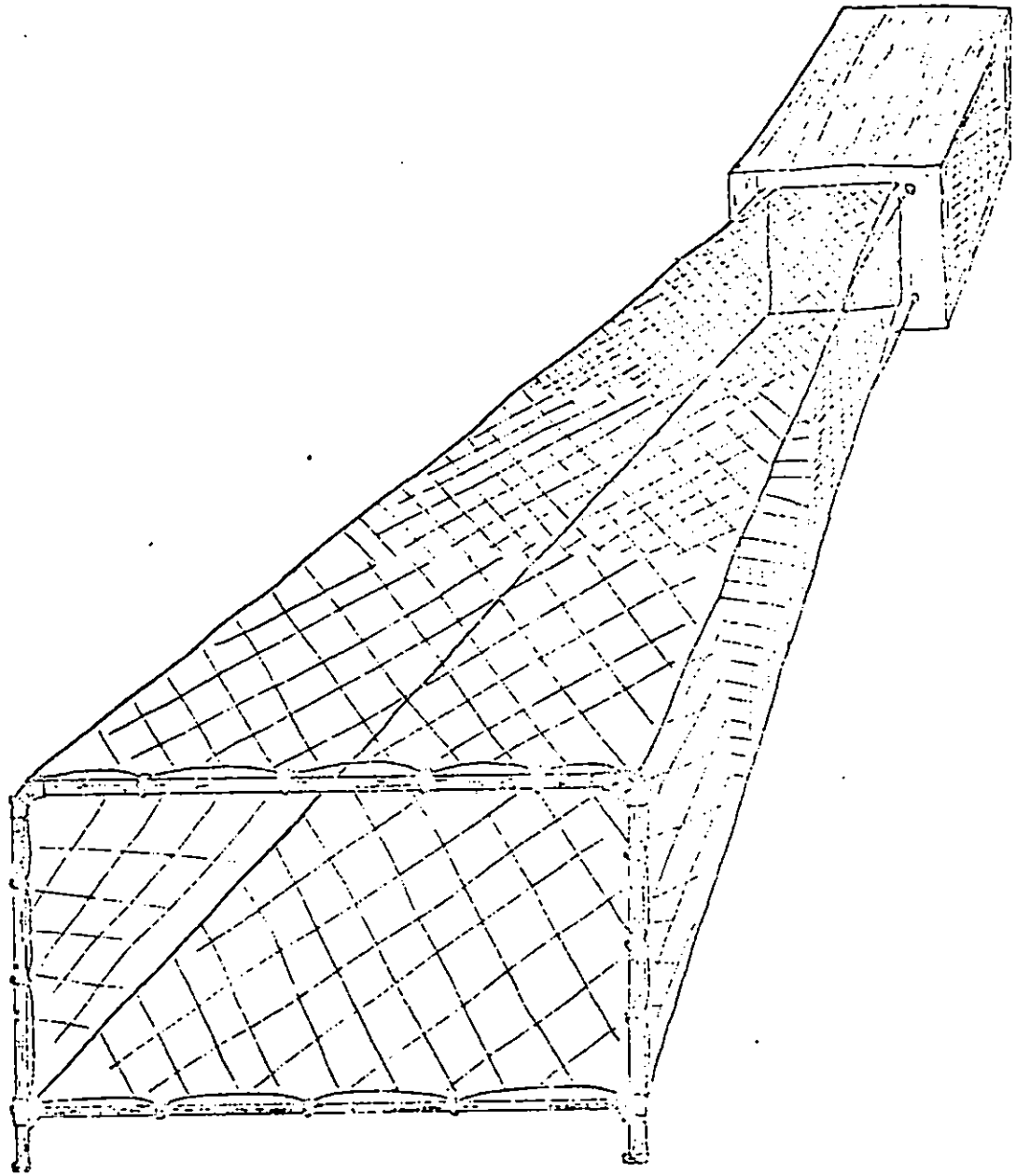


Figure 2. Fyke Net and Livecar

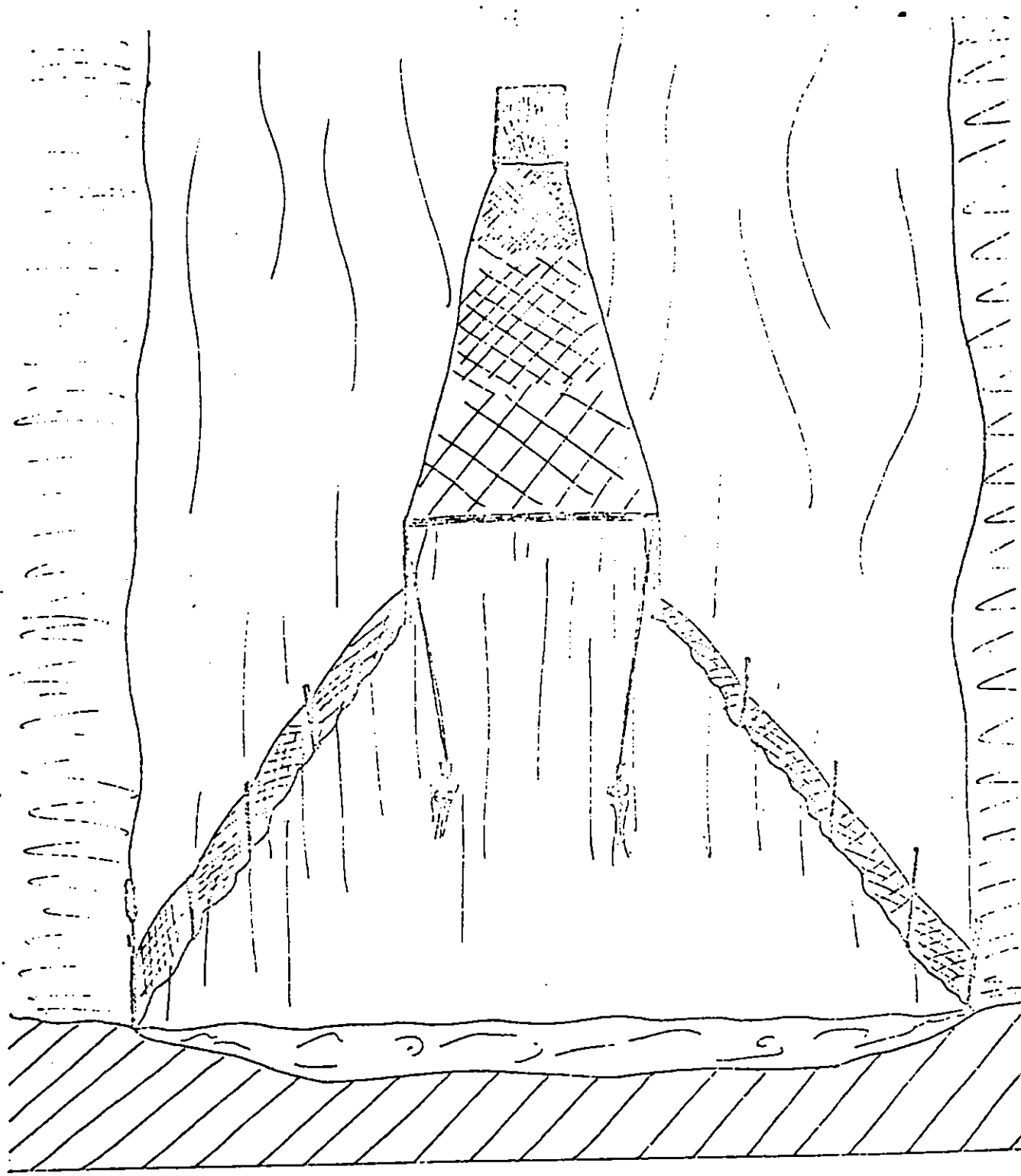


Figure 3. Fyke Net with Livecar and Wings

Two standard set gill nets were used in UWCD's settling pond. One net was placed in the lower one-third of the pond and one in the upper one-third. Both nets were set perpendicularly to the low velocity current.

RESULTS

A summary of all fish species taken from the Santa Clara River, Sespe Creek, and UWCD's spreading grounds is given in Table 1. These data are reported by species, date captured, and location. The dates given are the dates on which the nets were retrieved. Each date represents twelve to fourteen hours of fishing effort.

Tables 2 and 3 summarize the lengths of all "wild" trout caught in Sespe Creek and the desilting basin. One "catchable" (i.e. planted) trout was caught on April 23, but is not included in this tabulation.

Santa Clara River

No meaningful fishery results were obtained from sets in the Santa Clara River proper. The first two days were used to evaluate the performance of the nets in relation to debris load, current velocity, the ability of the riverbed to support the fence posts to which the nets were tethered, and the ability of the nets to escape detection by off-road vehicle users. Both nets survived all four hazards.

Species	Santa Clara River Station										Sespe Creek Station				UWCD Station	
	April										May					
	8	9	15	17	20	23	24	28	30	1	5	12	6	15		
Lamprey, ammocetes larvae																
<u>Lamptera pacifica</u>					6	21	37	52	47	19	30	106				
Lamprey, adult																
						1		2			1	1				
Rainbow trout																
<u>Salmo gairdneri</u>					3	6	6		1		3	2	18	12		
Arroyo chub																
<u>Gila oreutti</u>					65	141	74	73	10	49	29	23				
Fathead minnow																
<u>Pimephales promelas</u>				3	27	21	14	19	4	16	34	15				
Owens sucker																
<u>Catostomus funciventris</u>													36	24		
Santa Ana sucker																
<u>Catostomus santanae</u>					76	99	120	90	3	19	38	13				
Black bullhead																
<u>Ictalurus melas</u>					2	5	1				1	2				
Mosquito fish																
<u>Gambusia affinis</u>						1										
Three-spine stickleback																
<u>Casterosteus aculeatus</u> <u>microcephalus</u>				1	75	39	139	65	20	18						
Green sunfish																
<u>Lepomis cyanellus</u>				2												
Prickly sculpin																
<u>Cottus asper</u>							1		1							

Table 1. Summary of Fyke Net and Gill Net Catches.

DATE	FORK LENGTH	TOTAL LENGTH
	(in cm)	(in cm)
April 20	17	18
	13.7	14.8
	10.9	11.7
23	15.8	16.6
	14.6	15.3
	15.0	15.9
	5.3	5.6
	4.0	4.3
	4.7	5.0
	19.0	20.3
24	9.5	10.2
	3.9	4.2
	5.1	5.4
	4.3	4.7
	16.4	17.7
	4.8	5.0
May 5	3.0	3.2
	3.0	3.2
	3.4	3.6
	3.5	3.6
12	3.5	3.6
Mean	8.8	9.4

Table 2. Fork and Total Length of Rainbow Trout Captured in Sespe Creek.

DATE	FORK LENGTH (in cm)	TOTAL LENGTH (in cm)
May 6	21.0	22.2
	18.8	19.5
	15.0	16.0
	14.8	15.7
	14.0	14.8
	14.2	15.1
	17.0	18.2
	21.3	22.5
	19.1	20.4
	20.0	21.2
	14.8	15.6
	16.0	17.0
	17.2	18.2
	18.2	19.2
	15.5	16.5
May 15	19.0	20.4
	20.8	22.0
	18.0	19.1
	18.2	19.1
	18.0	19.1

Continued

Table 3. Fork and Total Length of Rainbow Trout Captured in USGD's Desilting Basin (Pond B).

DATE	FORK LENGTH	TOTAL LENGTH
	(in cm)	(in cm)
May 15	19.2	20.5
	19.4	20.6
	18.5	19.6
	17.0	18.0
	18.6	19.7
	20.8	22.1
	21.2	22.4
	17.8	19.0
	15.3	16.4
	16.8	17.9
Mean	17.9	18.9

Table 3. Continued

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Livecars and wings were employed during the April 15 and 17 sets. The April 15 set did not capture any fish and the results from the April 17 set was minimal (see Table 1). The fundamental problem accounting for these results was the debris load carried by the river. Mats of algae clogged the wings, nets, and livecars within minutes of being set, which prevented the nets from fishing properly. The wings had clogged so effectively during the April 15 set that the current was deflected downward and had scoured sizeable holes in front of and under the wings. Instead of passing through the wings, nets, and livecars, the main body of water was flowing under the wings, presumably carrying any fish with it. During the April 17 set, debris was cleaned from all components every two hours. Even this did not improve the effectiveness of the trapping arrangement.

Sespe Creek

Trapping on Sespe Creek was successful as evidenced by the data in Table 1. Plate counts made on the three spine sticklebacks showed them to be the partially armored sub-species Gasterosteus aculeatus microcephalus. Rising water temperatures and lowering water levels forced the cessation of trapping. On May 1, flows had dropped to 19 cfs and water temperatures fluctuated between 82° and 65°. By May 27, flows had dropped to 7 cfs with temperatures again in the 80° range.

DISCUSSION

The stated goal of this short-term investigation was to identify steelhead resources within the Santa Clara River drainage. Several methods

have been used in the past to distinguish between rainbow trout and steelhead, but the only definitive identification method is to capture an adult and identify marine residency through scale analysis. No adults were captured which leaves us unable to state unquestionably that the "wild" rainbow trout captured are in fact steelhead. There are, however, several speculative comments that can be offered.

Sespe Creek is the primary spawning ground for natural rainbow trout or steelhead populations. Most likely, the favored sites are the reaches that pass through the condor sanctuary and upstream of the sanctuary. Wild trout were captured in Sespe Creek downstream of these areas and well down the Santa Clara River. Flows in Sespe Creek were in the 20 to 30 cfs range during much of the trapping period, which rules out trout being washed down by excessive flows. The trout captured were all one or two year classes and were either dispersing because of population pressures upstream or they were on their way to the sea. There is no valid means to determine which of these hypotheses is correct. The former would make the trout native rainbows, and the latter would decide in favor of steelhead.

Trout captured in Sespe Creek typically were silver with a blush of pink on the sides and dark speckled backs. The smaller individuals can best be described as being silver with dark speckled backs and nine to eleven par marks. Those trout from the desilting basin were silver with dark speckled backs and nine to eleven par marks.

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UWCD diverted virtually all of the Santa Clara River flow during the time of the study. Most fish moving downstream would also have been diverted into the spreading grounds along with the river's flow. All of the trout taken from the desilting basin had the superficial appearance of steelhead. Their coloring, marking, and size were well within the ranges expected of steelhead smolts.

In the preceding sections, it was noted that steelhead was the species of primary interest, but the occurrence of another anadromous species in the catch is cause for comment. Lamprey ammocetes larvae were captured in every set on Saspe Creek and five adults were taken over the more than three week sampling period. Since lampreys are anadromous and are very much a part of the Santa Clara River biota, a viable link between Saspe Creek spawning grounds and the sea is clearly demonstrated by the presence of this species.

Even though the existence of steelhead cannot be proved with these data, the data presented in this preliminary report certainly support the concept of an extended study to approach the question with a more concentrated effort.

DWR 77a12

PROPOSED WATER RIGHTS PERMIT TERM
TO BE INCLUDED IN PERMITS ISSUED PURSUANT TO
APPLICATIONS NOS. 25988 AND 26058 OF
THE DEPARTMENT OF WATER RESOURCES

FEDERAL COMMISSION
SOUTH-CENTRAL COAST DISTRICT

The Department of Water Resources (DWR) will fund a study by the Department of Fish and Game (DFG) of the steelhead resource potential and flow requirements necessary for the transport of adult and juvenile steelhead to and from spawning and rearing areas of Sespe Creek and the lower Santa Clara River and the flow characteristics of the Santa Clara River and Piru Creek below permittee's facilities. The purpose of this study will be to gather data and make recommendations as to feasible alternatives for the reestablishment of a steelhead resource in Sespe Creek and the lower Santa Clara River which may reasonably be undertaken using water appropriated pursuant to this permit and Permit No. _____ for Pyramid/Castaic Reservoir.

The DWR will obligate an amount not to exceed \$120,000 in total for this study. The study shall be completed by December 31, 1983.

However, if sufficient water to conduct the study is unavailable the study may be extended as late as December 31, 1985, without Board action. The period of the study may be extended further upon a finding by the Board that such extension is

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necessary to accomplish the purposes of the study. To aid in the conduct of the study, DWR will release at the request of DFG the first 12,000 acre feet annually in water years 1981-82 and 1982-83 and the first 7,000 acre feet annually thereafter until completion of the study of stored natural inflow appropriated pursuant to this permit and Permit No. _____ for Pyramid/Castaic Reservoir after providing for prior water rights. The DWR shall notify United Water Conservation District prior to releasing water for purposes of the study. This notification shall be made at least 24 hours prior to the actual release of water. Such release of stored natural inflow shall be made from Castaic and/or Pyramid Reservoirs for research purposes. Water will not be available for such release during water years in which no water in excess of prior rights is appropriated pursuant to this permit or after May 1 of any water year. A water year extends from October 1 of a calendar year through September 30 of the next calendar year. The DWR shall notify DFG by March 1 of any water year in which no water in excess of prior rights is appropriated pursuant to this permit.

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At the conclusion of the study, DWR and DFG will attempt to mutually agree upon permanent steelhead resource terms to be added to this permit by the Board pursuant to its reserved.

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jurisdiction. Such agreement or, if agreement cannot be reached, terms proposed separately by each agency 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 will then consider at a hearing appropriate permanent terms, if any, to be added to this permit.

Respectfully submitted,

David A. Rhodes
Attorney
Department of Water Resources

PUBLIC HEARING NOTICE

LOWER SANTA CLARA RIVER STEELHEAD STUDY

VENTURA AND LOS ANGELES COUNTIES

A meeting will be held to discuss the scope of study for the "Lower Santa Clara River Steelhead Study" being conducted by the California Department of Fish and Game under the auspices of the California Department of Water Resources.

Date: November 22, 1982

Time: 1:00 p.m.

Place: DWR Southern Field Division Office
3149 North Lake Hughes Road
Castiac, California 91310
(213) 620-4107

For further information contact:

Nicholas Villa
California Department of Fish and Game
c/o Department of Water Resources
P.O. Box 607
2440 Main Street
Red Bluff, California 96080-607
(916) 527-6530

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

Certain segments of the study are concurrent and involve multiple-purpose survey and sampling programs.

1. Document the presence or absence of a steelhead resource in the Santa Clara River drainage.
 - A. Procure adult steelhead during periods of upstream migration.
 1. Trapping, netting and angler-caught sources on lower Santa Clara River.
 2. Fish sampling efforts in spawning tributaries.
 3. Fish scale reading for steelhead identification.
 - B. Procure out-migrant juvenile (smolt) steelhead during periods of downstream migration.
 1. Trapping program at Vern Freeman Diversion.
 2. Trapping and netting efforts in tributary streams.
 3. Biochemical and endocrinal analysis of fish to verify smoltification.

2. Identify the primary life-history characteristics of Santa Clara River steelhead.
 - A. Seasonal timing of adult upstream migration.
 1. Trapping, netting and survey efforts
 2. Measure existing flow conditions.

- B. Seasonal timing of smolt downstream migration.
 - 1. Trapping and netting program.
 - 2. Measure existing flow conditions.
 - C. Season of use and length of residency of smolt in Santa Clara River estuary/lagoon.
 - 1. Netting program.
 - 2. Mark-recapture effort.
 - D. Age characteristics of Santa Clara River steelhead.
 - 1. Age at maturity and incidence of multiple spawning - Examination of scales from adult fish.
 - 2. Length of ocean residency - Examination of scales from adult fish.
 - 3. Length of freshwater residency - Examination of scales from adult and smolt fish.
3. Estimation of most-probable life-history characteristics of Santa Clara River steelhead in absence of actual documentation of existence (restoration perspective).
- A. Literature search
 - 1. Steelhead life-history information from Southern California streams.
 - 2. Review of historical and present hydrology of Santa Clara River drainage.
 - B. Delineation of life-history chart based on inference from literature search.

4. Determine steelhead distribution in the lower Santa Clara River drainage

- A. Fish sampling (trapping and netting) program.
- B. Stream surveys, including electroshocking
- C. Delineate streams and stream reaches used by steelhead for spawning, rearing and migration routes.

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

- A. Delineation and evaluation of existing habitats for spawning, rearing and migration.
 - 1. Sespe Creek - intensive evaluative survey.
 - 2. Secondary tributaries from mouth to Piru Creek - Reconnaissance-level surveys.
 - 3. Estuary/Lagoon
 - a. Survey of Physical habitat.
 - b. Water quality monitoring (reconnaissance-level).
 - 4. Mainstem river from mouth to Piru Creek.
 - a. Survey of river channel to identify any physical hazards or impediments to adult upstream migration and smolt downstream migration.
 - b. Identify all present and proposed channel modification activities and projects.
 - c. Evaluate existing streamflow regime and water management operations on lower river.
- B. Evaluate the potential for improving steelhead spawning, rearing and migration habitats, habitat improvement options/alternatives.

1. Sespe Creek.
 2. Secondary tributary streams.
 3. Estuary/Lagoon.
 4. Mainstem Santa Clara River (migration route).
 - a. Physical improvements in channel.
 - b. Streamflow management (basis for detailed examination in Study Segment No. 6).
6. Define and evaluate the flow requirements for adult and smolt steelhead migration in the lower Santa Clara River
- A. Select acceptable criteria for defining steelhead migration flow requirements.
 1. Review of criteria most applicable to Santa Clara River steelhead.
 2. Selection of criteria most applicable to Santa Clara River steelhead.
 - B. Define flow conditions needed to maintain, improve and/or restore steelhead runs in the lower river (mouth to Piru Creek).
 1. Specific application of criteria to lower Santa Clara River channel.
 2. Application of criteria to various scenarios of river channel modification.
 3. Define alternative flow regime options or "modes of operations" that provide for steelhead migration flow requirements under various scenarios of streamflow manipulation and/or channel modification.
 4. Biological evaluation of alternative modes of operation.

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

5. Prioritization of recommended modes of operations.

7. Assist DWR, UWCD, and VCFCO in water management operational evaluation of recommended modes of operation.

- A. Operations studies - consultation by DFG.
- B. Benefit/cost analysis - consultation by DFG.

State of California

The Resources Agency

M e m o r a n d u m

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

Date : February 21, 1984

From : Department of Fish and Game

Subject: Lower Santa Clara River Steelhead Study

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CALIFORNIA
COASTAL COMMISSION
SOUTH CENTRAL COAST DISTRICT

Enclosed are Figures 2, 5, and 6 to be included in your copy of our October 1983 status report entitled, Lower Santa Clara River Steelhead Study.

for
Nek

Larry K. Puckett, Supervisor
Contract Services Section
Bay Delta Fishery Project

cc: Mr. William P. Price, Jr.
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FIGURE 5. Bill Cardona with steelhead trout caught by hook-and-line in Sespe Creek on April 2, 1983 near Telegraph Road. This male fish measured 61 cm (24 in) (fork length) and weighed 2.0 kg (4.5 lbs).