MEMBER UNITS EXHIBIT NUMBER 20

SYRTAC FILE

Date: March 10, 1995

To: Santa Ynez River Technical Advisory Committee

From: Scott Engblom, TAC Project Biologist

Re: Santa Ynez 1994-1995 Compilation Report, Project Documents, and 1995-1996 Study Plan

Enclosed you will find results of observations and studies concerning fish species within the Santa Ynez River and tributaries in what is the first year in a three to five year study. In addition, you will find the proposed study plan for 1995-1996. Finally, you will find the results of efforts to compile all documentation relative to the Santa Ynez River Technical Advisory Committee.

An expanded study plan for the next three to five years is currently being drafted and will be available to TAC members when completed.

Every effort has been made to compile a complete file of information. If you discover that a document in the project document section has been excluded, please contact me so I can rectify the situation.

I would like to thank everyone involved who assisted in gathering this information and who helped in writing this report. Without your help this complicated and difficult task would have been nearly impossible.

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1994 Technical Advisory Committee
Compilation Report and Project Documents

Table of Contents

Part 1 Fisheries and Water Quality

Part 3 Technical Advisory Committee (TAC) Meeting Minutes and Project Documents (Organized by Date).

8/16/94	To:	Paul Forsberg, Environmental Specialist, Dept. Fish & Game Scott Engblom, Project Biologist Santa Ynez River TAC
	From:	Bob Wignot, Executive Director Cachuma Project Authority Kate Rees, Water Resource Specialist, Cachuma Project Authority
	Re:	August 8, 1994 TAC Meeting-Action Items
8/23/94	To:	Mr. R. Craig Wingert, Chief California Protected Species Division
	From:	Boyd Gibbons
	Re:	Department of Fish and Game Coordination with the California Biological Technical Committee for California Steelhead Trout
8/24/94	To:	Jim McNamara
	From:	Paul Forsberg
	Re:	Santa Ynez River Riparian Monitoring Study
9/16/94	To:	John Turner, Chief Environmental Services Division
	From:	Paul Forsberg
	Re:	Status of Department of Fish and Game Draft Steelhead Management Plan for California
9/28/94	To:	Carl Dealy, Natural Resource Specialist
	From:	Department of Fish and Game
	Re:	Update on Department of Fish and Game Efforts on Steelhead Listing
9/29/94	To:	Santa Ynez River Files
	From:	Department of Fish and Game
	Re:	Steelhead Imprinting and Mitigation Issues, Central Coast Water Authority
10/3/94	To:	Santa Ynez River Technical Advisory Committee
	From:	Scott Engblom, Project Biologist Santa Ynez River
	Re:	October 3, 1994 TAC Meeting Agenda and Minutes
10/3/94	To:	Paul Brinkman
	From:	Kate Rees, Cachuma Project Authority
	Re:	Fish Trap on Salsipuedes Ck.
10/5/94	To:	Distribution List (attached)
	From:	Russel R. Ruiz/Goleta Water District
	Re:	Central Coast Water Authority Environmental Assessment/Steelhead Imprinting Mitigation Issue

10/13/94	To:	Santa Ynez River Technical Advisory Committee
	From:	Tom Keegan
	Re:	Acceptance of TAC Project Documents as fulfilling provision 2.c. of the May 1, 1994 Memorandum of Understanding.
11/3/94	To:	See Distribution List
	From:	Ali Shahroody, Stetson Engineers INC.
	Re:	Cachuma Releases to Santa Ynez River
11/7/94	To:	Palmer Jackson
	From:	Kate Rees, Cachuma Project Authority
	Re:	Fish Trap on Alisal Creek
11/8/94	To:	Santa Ynez River Technical Advisory Committee
	From:	Scott B. Engblom, Project Biologist
	Re:	Minutes from the November 8, 1994 Meeting of the Technical Advisory Committee
11/15/94	To:	Trihey & Associates
	From:	Thomas M. Peterson
	Re:	Lompoc Narrows monthly surface flow data for use in Santa Ynez River Steelhead Study
	cc:	Scott Engblom Chip Wullbrandt (Price, Postel & Parma)
12/1/94	To:	Roger Peterson, U.S. Bureau of Reclamation
	From:	Edward Anton, State Water Resources Control Board
	Re:	Water Rights Order WR 94-5 Amending Permits 11308 and 11310 for the Cachuma Project in Santa Barbara County
12/12/95	To:	Santa Ynez River TAC
	From:	Scott Engblom, TAC biologist
	Re:	Minutes from the December 12, 1994 TAC meeting
12/12/94	To:	Don Hanson, Juan Lolita Ranch
	From:	Kate Rees, Water Resource Specialist
	Re:	Access to Private Property to Conduct Field Work for Technical Studies Along the Santa Ynez River
12/12/94	To:	Tom Carey, President Land Trust for Santa Barbara County
	From:	Paul Forsberg, DFG
	Re:	Santa Ynez River Enhancement and Management Plan

1/5/95	To:	Scott Engblom (TAC), Bill Snider (DFG), Tom Keegan (EIP), Chuck Hanson (HE), Ed Ballard (USFWS), Maurice Cardenas (DFG)
	From:	Paul Forsberg, CDF&G
	Re:	Update on Bradbury Dam Safety Issue and Request for Recommendations
1/6/95	To:	Carl Dealy, USBR
	From:	Craig Fusaro
	Re:	Spawning Gravel Restoration Below Bradbury Dam
1/25/95	To:	Carl Dealy, USBR
	From:	Russel Ruiz, General Counsel, Goleta Water District
	Re:	Draft Environmental Assessment Bradbury Dam Modifications Safety Of Dams Program
1/30/95	To:	Paul Forsberg, ESD, DFG
	From:	Craig Fusaro
	Re:	Early 1993 & 1994 Documents Re: Santa Ynez River Flows and Steelhead Spawning Gravel Restoration
2/16/95	To:	Paul Forsberg, ESD, Sacramento
	From:	Maurice Cardenas, DFG
	Re:	Conditions on Sampling Methods of the Lower SYR
2/16/95	To:	See Distribution List
	From:	Russel Ruiz, General Counsel, Goleta Water District
	Re:	State Water Resources Control Board Order 94-5 Status Report Pursuant to Paragraph 3
2/21/95	To:	Fish TAC and Consensus Committee
	From:	Robert Almy, Santa Barbara County Water Agency
	Re:	Cachuma Spills - Acre Feet
2/23/95	To:	Robert Pike, Attorney City of Santa Barbara
	From:	DFG
	Re:	1995 Memorandum of Understanding for Cooperation in Research and Fish Maintenance, Santa Ynez River
2/27/95	To:	Martha Marsango, property owner along Nojoqui Creek
	From:	Kate Rees, Water Resource Specialist
	Re:	Permission to place fish traps on Nojoqui Creek

Following the last TAC Project Document is an accumulation of the TAC Project Biologists weekly summaries to the Biological Subcommittee. These summaries are a brief day to day account of the biologists activities along the Santa Ynez River and its

tributaries. The summaries begin on April 28, 1994 and continue until the present.

EXECUTIVE SUMMARY

Introduction

In 1994, a Memorandum of Understanding (MOU) for Cooperation in Research and Fish Maintenance was drafted for the Santa Ynez River (SYR) below Bradbury Dam. Parties which entered into the agreement include: California Department of Fish and Game (DFG), Santa Ynez River Conservation District, Irrigation District #1 (SYRCDID #1), the City of Lompoc, Cachuma Conservation Release Board (CCRB), United States Bureau of Reclamation (USBR), Santa Ynez River Water Conservation District (SYRWCD), United States Fish and Wildlife Service (USFWS), Santa Barbara County Water Agency (SBCWA). The purpose of assembling this diverse group of persons is to share work and information necessary for a mutually satisfactory resolution of the collective concerns related to the protection of fish and the protection of domestic and agricultural uses below Bradbury Dam.

The MOU created a *Technical Advisory Committee* (TAC), and *Biological Subcommittee* composed of persons with training or experience in fishery biology, engineering, hydrology, and water supply and distribution fields to enhance cooperation among the parties; to collect, analyze and share information related to the SYR watershed fisheries; and to make recommendations for releases of water related to fisheries. Specific goals of the TAC include: evaluating the possibility of restoring the upper tributaries to support anadramous species and reestablishing mainstem spawning and rearing of anadramous steelhead/trout, defining the fisheries potential of the lower river, and optimizing productive capacity of the mainstem and tributaries of the SYR. The ultimate goal of the TAC is to provide the State Water Resources Control Board with the flow requirements and resource management recommendations necessary to balance the needs of consumptive water users with fishery needs downstream of Bradbury Dam

The TAC *Biological Subcommittee* hired a project biologist (Late April 1994) to supervise the field investigation program and to coordinate data collection for the 1994 study plan. Specific objectives of the 1994 study plan included: (1) documenting and quantifying the timing, numbers, and geographic location of adult steelhead/trout and other fish species migrating into the SYR and its tributaries, (2) documenting the abundance, geographic distribution, and habitat conditions of juvenile steelhead trout and other fish species within the river and its tributaries, and (3) providing information on growth, survival, and habitat conditions of juvenile steelhead/rainbow trout and other fish species inhabiting various areas within the SYR Watershed. The purpose of the above objectives is to document and better understand the life history and habitat conditions required by steelhead/rainbow trout and other fish species in order to

develop a long term management plan for the fish inhabiting the SYR and its tributaries below Bradbury Dam. Specific duties of the project biologist in implementing the study plan include: 1) adult trout and fisheries surveys within the mainstem and tributaries of the SYR, 2) investigation of juvenile trout/fishery production within the mainstem and tributaries of the SYR, 3) summer and fall fish population surveys, 4) water quality monitoring at various locations within Lake Cachuma, and the mainstem and tributaries of the SYR, 5) habitat mapping of areas where trout have been observed, and 6) an end of the year compilation report documenting the above activities, minutes from the TAC meetings, and any relevant correspondence between the project biologist and members of the TAC.

WATER QUALITY

Santa Ynez River

Water quality monitoring, mainly temperature, has been ongoing in the Santa Ynez River Watershed since 1993. Currently there are six temperature units (three from Hansen Environmental and three from DFG) dispersed throughout the lower Santa Ynez River from the spill basin at Bradbury Dam to the lagoon at Vandenburg Airforce Base. Objectives of water temperature monitoring include the evaluation of:

* Seasonal patterns of water temperature downstream of Bradbury Dam.
* Diel variations in water temperature.
* Longitudinal gradient in water temperature conditions downstream of Bradbury Dam.
* Habitat quality and suitability for various fish species including steelhead trout.
* Collect sufficient information to calibrate a stream temperature model for the Santa Ynez River under different flow releases.

Lake Cachuma Dissolved Oxygen and Temperature Monitoring

Lake Cachuma, a USBR water supply reservoir in Southern California, has routinely experienced severe hypolimnetic oxygen depletion during summer stratification. The *Project Biologist* was to measure dissolved oxygen and temperature profiles at three locations used by USBR personal in an aeration study during 1980-1984. The USBR originally chose these sites to document oxygen depletion at the head, middle, and lower portions of the lake. The purpose of current monitoring is to document water quality at each location within the lake, determine if anoxic conditions develop within the region where water is released for downstream uses, and to gather a historical data base to document how reservoir stratification has changed over the years.

Flow Releases, Ramping, and Fish Account Usage

In 1994, there were three separate water releases from Bradbury Dam; two for downstream users (WR 89-18) and one for fish maintenance (MOU Fish Account) in the Long Pool. Fish Account releases occurred June 16 to July 23, totaled 43.6 acre feet (af), and accounted for all of the water used from the account in calendar year 1994. The first WR 89-18 releases was for the recharge of the San Lucus Ranch wells. Releases occurred between June 29 to July 7. Total water releases was 108 af. The second WR 89-18 releases occurred between July 25 and October 31. The total amount of water releases was 10,591 acre feet which created a live stream from Bradbury Dam to V Street in Lompoc.

Habitat Mapping

Eighteen habitat units (pool, riffle, run) have been mapped around the confluence area of Salsipuedes and El Jaro creeks where trout have been observed.

Fisheries

Mainstem

Due to the scarce amount of water in the mainstem SYR, 1994 sampling has been limited to: 1) downstream migrant trapping during the late spring and early summer, 2) snorkel surveys of the long pool where adult steelhead/trout have been observed, 3) snorkel surveys of the SYR near the towns of Santa Ynez and Solvang during the WR 89-18 releases, and 4) trapping downstream fish movement during the WR 89-18 releases.

Tributaries

Only a few tributaries (El Jaro, Salsipuedes, and Nojoqui) of the Santa Ynez River have water year round providing much needed rearing and over-summering habitat for steelhead/trout. Trout have been observed using direct observation techniques and captured using electroshockers in both El Jaro and Salsipuedes during May and August of 1994. Although Nojoqui Ck. has good instream and riparian habitat, no steelhead/trout have been observed or captured in 1994.

1994 studies of the above listed tributaries included: 1) Walking surveys to visually document trout and the habitat they occupy, 2) Snorkel surveys of deeper pool areas where over-summering trout may be found, 3) Electroshocking surveys to determine numbers and year classes where trout are present, and 4) Downstream migrant trapping during the spring and early summer to determine timing and water quality conditions for migrating steelhead/trout.

INTRODUCTION

The following is a 1994 annual report describing the cooperative effort among the consortium of resource agencies, water purveyors, and other parties interested in the Santa Ynez River (SYR) fishery issues; the inception of the *Project Biologist* position to oversee the field investigation and data collection in the SYR and tributaries below Bradbury Dam; the specific tasks the project biologist has undertaken to identify water quality conditions and fish species in the SYR and tributaries; State Water Resources Control Board (SWRCB) Water Rights Order 89-18; and the EIR/EIS process for Cachuma Project Contract Renewal and how it relates to this TAC Compilation Report.

Memorandum of Understanding

In 1994, a Memorandum of Understanding (MOU) for Cooperation in Research and Fish Maintenance was drafted for the SYR below Bradbury Dam. Parties which entered into the agreement include: California Department of Fish and Game (DFG), Santa Ynez River Conservation District, Irrigation District #1 (SYRCDID #1), Cachuma Conservation Release Board (CCRB), United States Bureau of Reclamation (USBR), Santa Ynez River Water Conservation District (SYRWCD), United States Fish and Wildlife Service (USFWS), Santa Barbara County Water Agency (SBCWA), the City of Lompoc. The purpose of assembling this diverse group of persons is to share work and information necessary for a mutually satisfactory resolution of the collective concerns related to the protection of fish and the protection of domestic and agricultural uses below Bradbury Dam.

The MOU created a *Technical Advisory Committee* (TAC) and *Biological Subcommittee* composed of persons with training or experience in fishery biology, engineering, hydrology, and water supply and distribution fields to enhance cooperation among the parties; to collect, analyze and share information related to the SYR watershed fisheries; and to make recommendations for releases of water related to fisheries.

MOU Technical Advisory Committee

Specific goals of the TAC are to make long term recommendations on management of the fisheries resources including: evaluating the possibility of restoring the upper tributaries to support anadramous species and reestablishing mainstem spawning and rearing of anadramous steelhead/rainbow trout, defining the fisheries potential of the lower river (below Bradbury Dam), and optimizing productive capacity of fisheries in the mainstem and tributaries of the SYR. The ultimate goal of the TAC is to provide the State Water Resources Control Board with the flow requirements and resource management recommendations necessary to balance the needs of consumptive water users with fishery needs

downstream of Bradbury Dam.

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State Water Resources Control Board

The SWRCB issued permits to USBR in 1958 under Decision 886 to divert, store, and use flood flow waters from the Santa Ynez River. Decision 886 reserved jurisdiction by the Board to determine the amounts, timing, and rates of releases of water past Bradbury Dam required for downstream rights. Subsequent Orders which extended reserved jurisdiction were adopted in 1973, 1978, 1988, and 1989. Order 89-18 also defined a new accounting, monitoring, and operating procedure for Lake Cachuma and Bradbury Dam, requiring the USBR to release water downstream to replenish the riparian groundwater basins and to protect vested downstream rights (89-18 Releases). Water from WR 89-18 releases is held by temporary dam at V Street in Lompoc in order to promote groundwater recharge. The latest Board Order, WR 94-5, adopted in December 1994 1) continues Board jurisdiction until long-term permit conditions are set to protect downstream water right holders, 2) requires a Board hearing by December 1, 2000, 3) requires the submittal of various reports by the Permittee by February 1, 2000, which will assist the SWRCB in selecting a flow

regime for the Contract 4) requires Board determination of any additional environmental documentation by March 1, 2000, and 5) requires "Fish Account" releases in accordance with the 1994 MOU, and any extensions or modifications thereof. The TAC is currently conducting studies and collecting information on fish and fish habitat below Bradbury Dam in order to jointly resolve some of the outstanding issues before the SWRCB.

EIR/EIS

The November 1994 Draft Environmental Impact Statement/ Environmental Impact Report for Cachuma Project Contract Renewal analyzes the environmental impacts of various contract renewal alternatives, including the No Action Alternative (renewal of the contract in its present form with only changes in water prices), and a wide range of additional alternatives that involve modifications to the operation and yield of the Cachuma Project. Environmental impacts of concern include impacts to water supply, agricultural production, socioeconomic conditions, groundwater resources, fish and other aquatic species, endangered and threatened species, recreation, land use, cultural resources, and Indian Trust Assets. The EIS/EIR also addresses potential cumulative impacts and the historic effects of the project on resources in the Santa Ynez River watershed.

The TAC Project Biologist and the TAC seasonal aide assisted in much of the fishery data collection from the tributaries and long pool. They also assisted in gathering data for the EIS/EIR Instream Flow Incremental Measurement augmentation study.

Part 1

Fisheries and Water Quality

The following pages present a compilation summary of the above listed duties, a proposed study plan for 1995, and correspondence between the Project Biologist and members of the TAC.

METHODS

Santa Ynez River Water Temperature Monitoring

Water quality monitoring, mainly temperature, in the Santa Ynez River Watershed has been ongoing since 1993. Currently there are six temperature units (three from Hanson Environmental and three from DFG) dispersed throughout the lower Santa Ynez River from the spill basin at Bradbury Dam to the lagoon at Vandenburg Airforce Base (Figure 1 and 3). The principle objectives of water temperature monitoring include evaluation of:

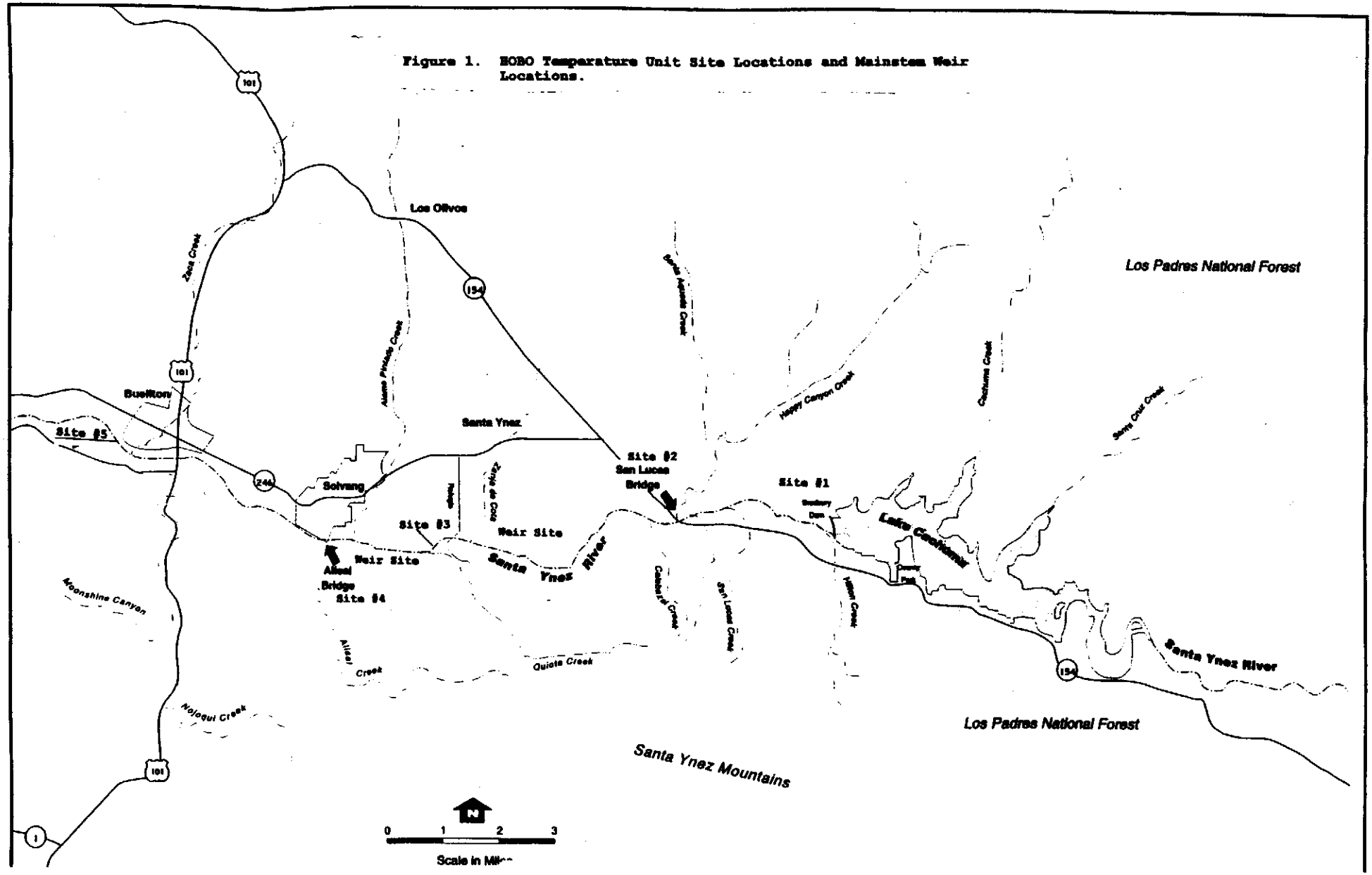
* Seasonal patterns of water temperature downstream of Bradbury Dam.
* Diel variations in water temperature.
* Longitudinal gradient in water temperature conditions downstream of Bradbury Dam.
* Habitat quality and suitability for various fish species including steelhead trout.
* Collect sufficient information to calibrate a stream temperature model for the Santa Ynez River under different flow releases.

The following is a list of locations of the temperature monitors throughout the Santa Ynez River, along with the rational for choosing these locations:

Spill Basin - Site #1 - This location is in the spill basin downgradient from where the flow releases from Bradbury Dam enter. The purpose of monitoring this location is to determine the temperature of flow being released from Bradbury Dam when releases are made. Both Hanson Environmental and DFG have units deployed here. The DFG unit is currently scheduled for removal and possible relocation downstream at the Cargaschi Ranch. The unit is deployed at the tailout of the spill basin in approximately one meter of water.

Highway 154 Bridge - Site #2 - Previous data suggests that water temperature in this area may reach the upper tolerance for trout/steelhead under existing summer conditions. Monitoring is needed to determine this and to calibrate the temperature model. Hanson Environmental has a Ryan Temperature Monitor deployed here. The monitor is located in a large pool roughly 2-3 feet deep (depth depending on the amount of silt present) 50 feet north of the old Highway 154 bridge. The unit is attached to a cable which in turn is attached to a concrete slab.

Figure 1. SOBO Temperature Unit Site Locations and Mainstem Weir Locations.



Refugio Road - Site #3 - This site provides an intermediate location for temperature model calibration. The DFG has had a unit deployed here since May 11, 1994. The unit was retrieved, downloaded and redeployed on July 24, 1994. The time interval of temperature recordings were changed at this time from 1.6 hour intervals to 1.2 hour intervals. This unit has since been retrieved and redeployed on September 14, 1994, and again on December 27, 1994. The thermograph is located roughly 548 feet downstream from the second bridge piling (from south bank) attached to a rootwad on the north bank. The unit is submerged in a large deep pool approximately three feet below the surface.

Alisal Road - Site #4 - This site provides another intermediate location for temperature model calibration. Hanson Environmental currently has a unit deployed at this location. The unit is located just north and below Alisal Bridge in a deep pool. The unit is at around the three foot depth.

Avenue of the Flags at Buellton - Site #5 - This location is needed as a lower calibration point for the water temperature model. The DFG has had a unit deployed here since May 11, 1994. The unit was retrieved, downloaded and redeployed on July 24, 1994. The time interval temperatures were taken was changed at this time from 1.6 hour intervals to 1.2 hour intervals. This unit has since been retrieved and redeployed on September 14, 1994, and again on December 27, 1994. The unit is located between the fifth and sixth bridge abutment (from north bank) attached to a T-post twenty feet form the sixth bridge abutment. The unit is submerged two feet in a run directly below the bridge.

Santa Ynez River Lagoon - Site #6- This site provides information as to water temperature conditions within the lagoon. This data will be used to help determine if water quality conditions favor rearing of juvenile steelhead within the lagoon. The DFG has had a unit deployed here since May 11, 1994. The unit was retrieved, downloaded and redeployed on July 24, 1994. The time interval temperatures were taken was changed at this time from 1.6 hour interval to 1.2 hour interval. This unit has since been retrieved and redeployed on September 14, 1994. The next scheduled retrieval and redeployment is scheduled for December 14, 1994. On December 27, 1994 an attempt was made to retrieve the HOBO unit. The attempt was unsuccessful due to the large increase in lagoon water levels (2-3 feet). Another attempt will be made when conditions permit. The unit is located in the middle portion of the lagoon approximately twenty feet and attached to a T-post roughly three feet below the surface.HOBO temperature monitors (DFG) and Ryan temperature monitors (Hanson Environmental) are being utilized in the mainstem SYR (see Water Quality Section). The Ryan monitors are set to record temperatures every hour, 24 hours a day, for a period of one year; at which time the unit is retrieved and a new unit

deployed. The old unit is sent to Hanson Environmental for downloading. The HOBO temperature monitors are set to record temperatures every 1.2 hours, 24 hours a day, for a period of three months. After three months the units are retrieved and downloaded in the field using a laptop computer with Boxcar software. The downloaded HOBO unit is then redeployed. Batteries for the HOBO units last for a period of one year. There has been monthly temperature (starting in November) checks at each temperature unit location using NBS calibrated thermometers. The purpose of these checks is to make sure the temperature units are staying in calibration.

Mainstem and Tributary Water Quality Monitoring

Water Quality was measured during electrofishing surveys and periodically while checking downstream traps. Water temperature and time of day were recorded nearly every time crews were at the river to document how water temperatures change during various times of day.

Extensive water quality measurements were taken at three sites (listed below in habitat mapping section) during the rampdown study of WR 89-18. The purpose of these measurements was to document if water quality changes in response to decreased flows, and to note any changes in water quality between the three sites.

Conductivity and water temperatures are measured using a Yellow Springs Instrument (YSI) Model 33 Salinity, Conductivity, and Temperature Meter. Dissolved Oxygen is measured using a YSI Model 57 Oxygen Meter. Total hardness (Model 5-EP MG-L) and alkalinity (Model AL-AP MG-L) measurements were performed using HACH Field Test Kits.

Lake Cachuma Dissolved Oxygen and Temperature Monitoring

Lake Cachuma, a Bureau of Reclamation water supply reservoir in Southern California, has routinely experienced severe hypolimnetic oxygen depletion during summer stratification. Dissolved oxygen and temperature profiles were measured at three locations stretching from the dam to the upper end of the lake by USBR personnel in an aeration study during 1980-1984. The USBR originally chose these sites to document oxygen depletion at the head, middle, and lower portions of the lake. The purpose of current studies is to determine water quality at the three locations within the lake, determine if anoxic conditions develop within the region where water is released for downstream uses, and to gather a historical data base to document how reservoir stratification has changed over the years.

Station #1 is located in front of Bradbury Dam at the deepest portion of the lake (40 meters) roughly 50 meters from where water is released for downstream uses. Station #2 is located

within the deep river channel near the middle of the lake off Tequepis Point. Station #3 is located within the deep river channel near the middle of the lake across from the Tecolote Tunnel. See Figure 2 for the map of stations in Lake Cachuma.

Verticle profiles of dissolved oxygen and temperature were performed during four surveys conducted at the three study sites beginning in August: August 26, September 26, November 2, and December 8, 1994. Measurements were taken in the river channel (deepest area) at each site in the lake. The profiles are performed using a Yellow Springs Instrument (YSI) Model 57 Oxygen Meter. Measurements are taken by boat (provided by Cachuma Park Service) every one meter from the surface of the lake to the bottom. Due to equipment malfunction, only temperature profiles were measured during August. Temperature and dissolved oxygen were measured at all three sites during the remaining months.

WR 89-18 and Fish Reserve Account Releases

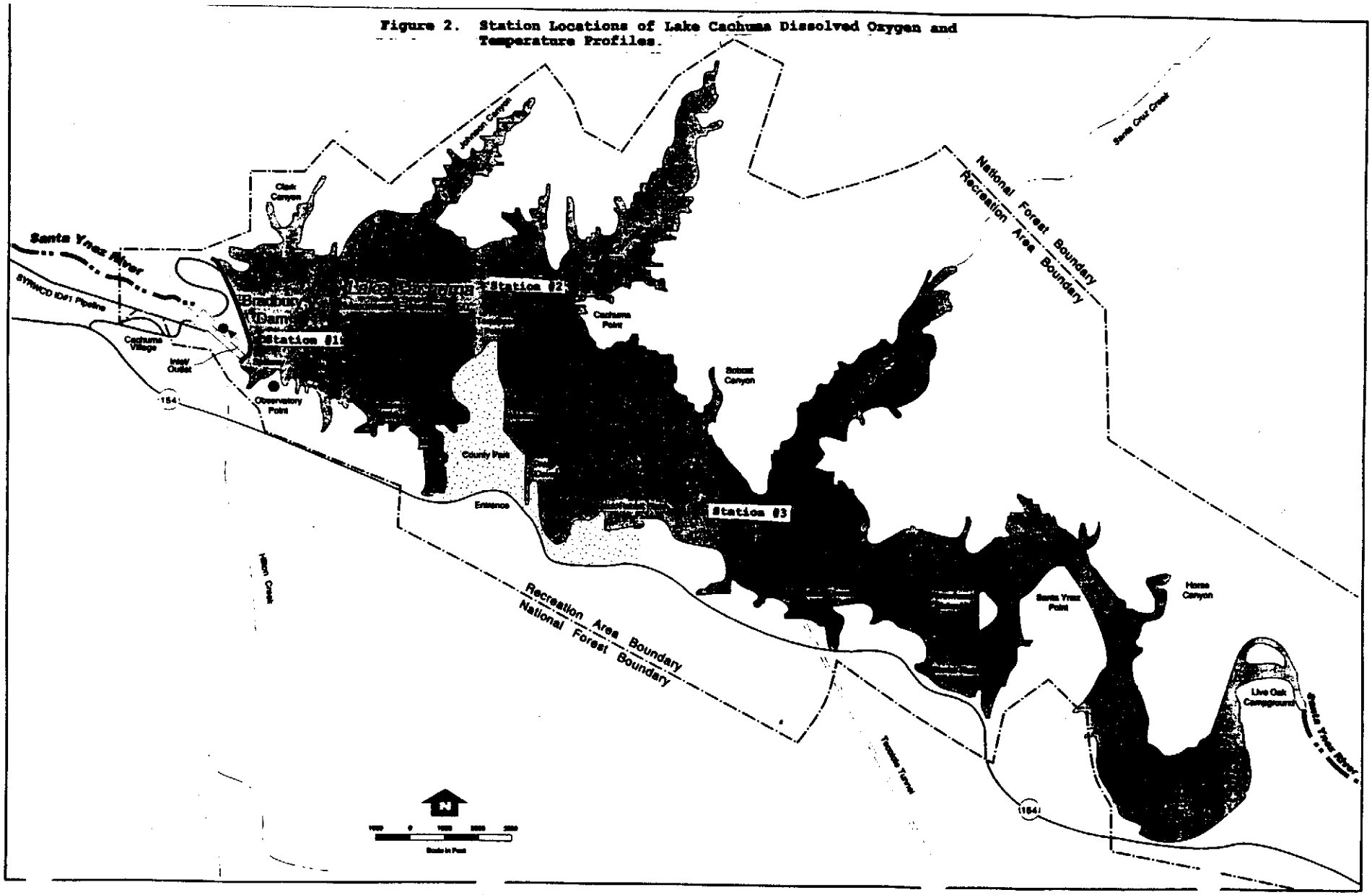
WR 89-18 releases during 1994 began July 25 and extended through October 31. It took approximately two weeks for the water to travel 32 miles downstream to Lompoc. There is a two to one ratio of surface water released from Bradbury that makes it to Lompoc (i.e., for every ten cfs released from Bradbury, about five cfs makes it to Lompoc). This two to one ratio is a result of percolation into the river bed, transporation by plants along the river, and evaporation. Initial releases started at 150 cubic feet per second (cfs), continued for 12 days, and were ramped down to roughly 70 cfs on August 7. After August 7, releases were gradually ramped down to 30 cfs for the remainder of WR 89-18. The total amount of WR 89-18 water releases for 1994 was 10,591 acre feet (af) which created a live stream from Bradbury Dam to V Street in Lompoc. Because the watershed was "charged up", water flow to V Street continued until the rainy season began.

Habitat Mapping and Flows

Aquatic habitat measurements play an integral role in fisheries management. Their use is critical in predicting such things as the impacts of habitat alteration, potential fish production, and probable limiting factors. Habitat measurements can be used in conjunction with knowledge of a species' habitat preference to determine if habitat parameters are limiting and which type of habitat improvements may be beneficial. Habitat measurements also make it possible to classify aquatics habitats into similar groups so that research and management results may be generalized (Nielsen and Johnson 1983).

On the mainstem SYR there have been three sites which have been habitat typed in 1994. These sites were chosen as part of a ramping study focusing on the amount of aquatic habitat lost in

Figure 2. Station Locations of Lake Cachuma Dissolved Oxygen and Temperature Profiles.



length, width, and depth as the regimented ramping down rate was applied to the end of the WR 89-18 releases in October. The study began on October 22, 1994 and continued until November 5, 1994. The ramping schedule was 15 cfs for two days, 10 cfs for four days, 5 cfs for two days, and 1 cfs for two days. Study sites were habitat typed every few days to allow the decreases flows to effect aquatic habitat.

Site #1 was located directly below the tailout section of the spill basin. The site runs approximately 40 meters downstream to the confluence pool formed by Hilton Creek and the SYR. This site was comprised of riffle, run, and small pools. **Site #2** was located near Solvang, roughly 12 miles down river, across from the Alisal Golf Course. This site is composed of riffle and run habitat and extends approximately 52 meters before entering a refuge pool. **Site #3** is located, approximately 25 miles down river directly upstream from the Highway 246 bridge in Lompoc. Site three is classified as riffle and run and extends approximately 50 meters upstream from the bridge. The rational for choosing these sites was to observe how aquatic habitat changes from the dam to further down river. Habitat typing occurred on two occasions; once at the beginning of the study, and again when flows were ramped to one cfs. In addition, there have been 18 habitat units mapped around the confluence area of Salsipuedes and El Jaro Creeks where trout have been observed. This is the same area where the spring and summer trout sampling took place (see results in Fishery Section).

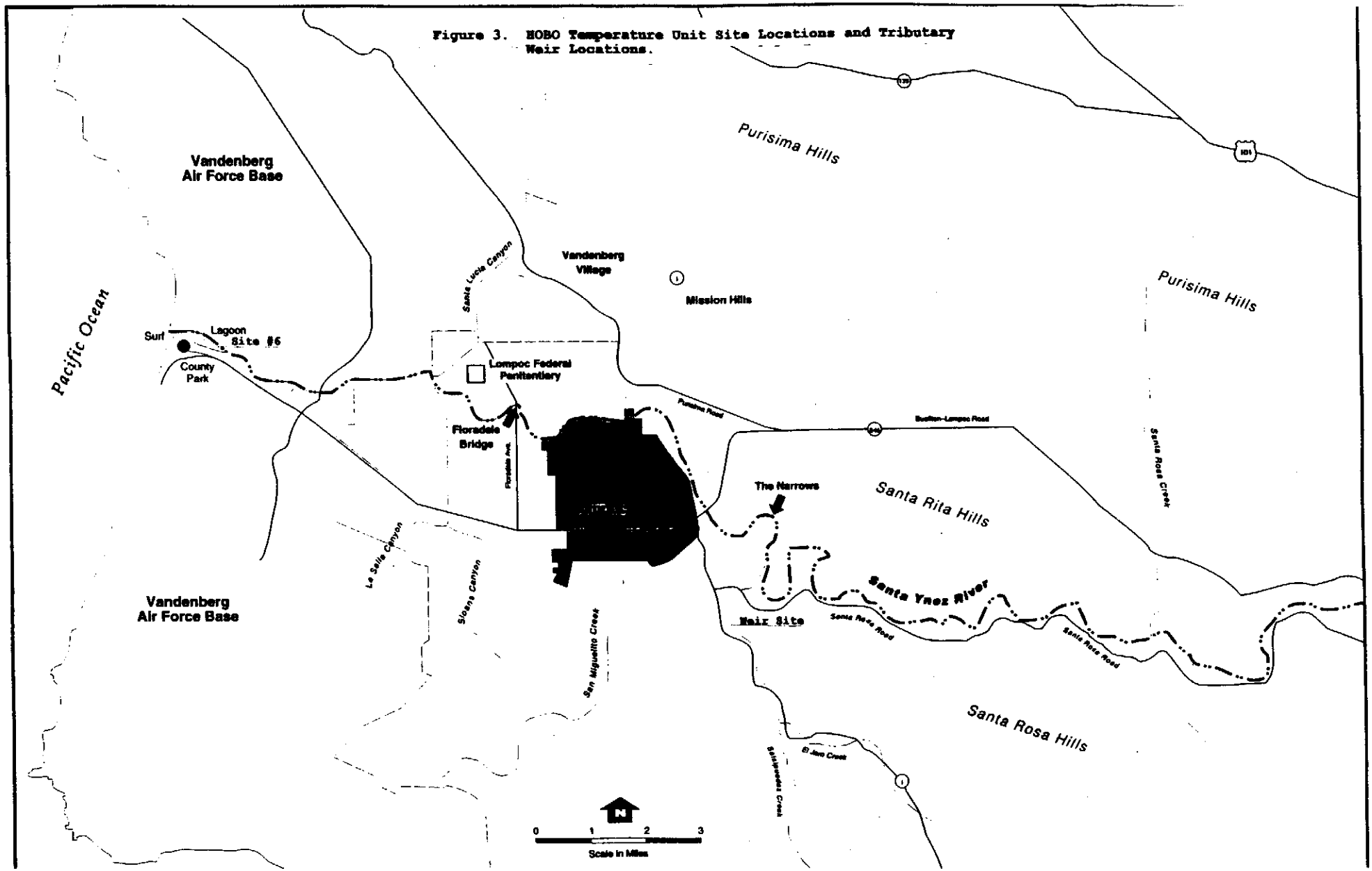
Habitat mapping was performed in areas where trout have been observed (Long Pool and in areas related to flow studies). Channel segment lengths and eight to twelve widths were measured at each study reach. All measurements were recorded in tenths of feet. Stream habitat was classified and inventoried using the Fish Habitat Relationships (FHR) Program of the United States Forest Service (USFS). Observations were made at each study reach regarding the relative amount and percentages of substrate composition and available cover for fish species.

Flows were measured at various cross-sectional sites in the mainstem and tributaries using a Marsh-McBurney Flow Meter. Measurements were made in feet per second.

MAINSTEM FISHERY SURVEYS

Due to the scarce amount of water in the mainstem SYR, 1994 sampling of the mainstem was limited to: 1) downstream migrant trapping during the late spring and early summer, 2) trapping downstream fish movement during the WR 89-18 releases, 3) snorkel surveys of the Long Pool where adult trout have been observed, and 4) snorkel surveys near the cities of Santa Ynez and Solvang during the WR 89-18 releases. Figures 1 and 3 show both mainstem and tributary weir locations.

Figure 3. HOBO Temperature Unit Site Locations and Tributary Weir Locations.



Late spring/early summer downstream trapping

A downstream migrant trap was deployed in the SYR on May 22, 1994 and removed on June 10, 1994. The reason for the late deployment was because the TAC Project Biologist was not hired until the first of May and equipment needs had not been met. Typically, the deployment of downstream migrant traps occurs in February since smolt emigration is known to occur from February-June.

The location of deployment was approximately 175 feet below the confluence of Alamo Pintado Creek and the SYR adjacent to the Alisal Golf Course in Solvang. The purpose of the trapping was to determine if any steelhead/rainbow trout or Pacific lampreys were outmigrating to the ocean. The trap entrance way measured approximately six feet in diameter and of sufficient width to effectively span the SYR channel during this time of year. The holding pen was placed in a small pool roughly two feet deep that had shading in the form of a small arroyo willow (*Salix lasiolepis*).

Downstream migration trapping during WR 89-18 releases

An opportunistic study was undertaken during the start of WR 89-18 releases. The downstream migrant trap was deployed on July 28, 1994 in the SYR at the boundary of the Gainey Winery and Juan Lolita Ranch (Figure 1), (approximately 8 miles downstream from the spill basin). The trap was not deployed earlier due to uncertainty as to how wide the river channel would be when 150 cfs. of water began to flow through the river channel. The trapping was implemented to document downstream migration of fish species from the spill basin and long pool during the WR 89-18 releases. Water and air temperatures were taken each time the trap was checked and cleaned (Table 5). Water flows were measured periodically in a reach roughly 150 meters upstream as part of a flushing flow study performed by Entrix to be included in the EIR/EIS. The effect of how air temperature effected water temperature at different flow releases during different times of day was evaluated.

Downstream migrant traps were placed in the mainstem and tributaries of the SYR. Weirs and panels were constructed of wood, pvc, and electrical conduit. A 4 x 4 x 3.5 foot weir was placed in the thalweg and panels were placed next to the fish trap perpendicular to the flow. Panels were four feet high and six feet long with pvc or conduit spaced 1.25 inches apart. When attempting to catch smaller fish, a plastic mesh (dimensions 3/4 inch) was placed against the panels and inside the weir. Weirs and panels were kept in position by pounding t-posts two to three feet into the river bottom and using bailing wire to attach and secure them. Weirs were checked and cleaned every one to three days depending on debris load.

Downstream migrant trapping during rampdown of WR 89-18

An opportunistic study was also undertaken during the rampdown of WR 89-18 releases. The purpose of the study was to document fish migration from riffles and runs into pools at two sites and to document decrease in available aquatic habitat as a regimented ramping down rate was applied. Results of this study are presented in the Fisheries Section of this document.

Snorkel Surveys - Mainstem (Long Pool)

Three snorkel surveys using direct observation techniques have been performed in the long pool during 1994. Two have been successful and one was unsuccessful due to poor visibility. Two other surveys were planned but postponed due to poor visibility. Each successful survey had two passes completed; the first pass moving in a downstream direction and the second pass moving in a upstream direction. There was a ten minute wait between each pass to allow fish to regroup.

The **first snorkel survey** was performed on May 26, 1994. A 570 foot reach of long pool was snorkeled (average width = 122.5 feet) by a three man crew.

The **second snorkel survey** was performed on July 11, 1994 at 1230 hours. The purpose of the survey was to determine if the fish species composition had changed since the May survey. Two weeks prior to the survey on June 28, 1994 the USBR began releasing water as per Water Rights Order 89-18 to recharge the San Lucus Ranch wells. The snorkel survey began after water was no longer flowing into long pool so as to allow fish to migrate to pool areas. Length snorkeled was approximately 570 feet with an average width of 122.5 feet.

Snorkel Surveys - Mainstem

Two snorkel surveys were performed within the mainstem SYR 10-15 miles below Bradbury Dam during the course of WR 89-18 releases. Releases for WR 89-18 began on July 25, 1994 at 0800. Three days passed before water Prior to releases, the majority of the SYR was almost completely dewatered, from the dam to the trap location five miles down river. A two week time period was allowed to pass before surveys were conducted to insure fish dispersal downstream. The purpose of the snorkel surveys was to document fish species composition, abundance, and migration of fish two weeks after the WR 89-18 releases began. A secondary objective was to see if any steelhead/rainbow trout from the spill basin and/or the Long Pool would also migrate downstream.

The **first snorkel survey** took place on August 9, 1994. Participants included the project biologist and the seasonal aide. The first survey location began directly downstream from

the fish trap (see Fishery Section #4) and was picked (in addition to the above objectives) with the assumption of using the snorkel counts to compare with the downstream trapping effectiveness. An approximate 1.7 mile section (average width 25 feet) of the SYR was snorkeled.

The **second survey** took place on August 24, 1994. Participants included the project biologist and seasonal aide. An approximate 3 mile section on the SYR was snorkeled from Alisal Road Bridge in Solvang upstream to Refugio Road Bridge in Santa Ynez. Visibility during the survey was roughly 8 feet. At the beginning of the survey we concentrated on snorkeling any areas that were deep enough for us to swim in (2 feet and greater). As the survey progressed, concentration switched to deeper pool and run habitat.

TRIBUTARY FISHERY SURVEYS

A few tributaries of the Santa Ynez River have water year round which provide rearing and over-summering habitat for steelhead/rainbow trout. To date, surveys of Salsipuedes, El Jaro, Nojoqui, and Quiota Creeks have included: 1) Walking surveys to visually document steelhead/rainbow trout and the habitat they are found in, 2) Snorkel surveys of deeper pool areas where over-summering steelhead/rainbow trout may be found, 3) Electroshocking surveys to determine numbers and year classes where steelhead/rainbow trout are present, and 4) Downstream migrant trapping during the spring and early summer to determine if steelhead/rainbow trout are migrating downstream.

Electrofishing Surveys

Population estimates in Salsipuedes and El Jaro Creeks were calculated using a mark-recapture method. A model 15A gas powered electrofishing unit and a Smith-Root Type 12 electrofishing were used to collect data in riffle and run habitats. The upstream and downstream ends of the habitat units surveyed were blocked with nets to prevent the movement of fish into or out of the units during sampling. A first pass was made through a section, and fish were collected and held in a five gallon bucket. Fish collected were identified to species, enumerated, measured to the nearest mm (FL), weighed, and then marked with a small clip on the upper lobe of the caudal fin. The fish were then released throughout the section. The sections were rested for two hours. A second pass was made through the section in a manner similar to the first pass. Captured fish were again identified, enumerated, measured, and weighed. The numbers of marked and unmarked fish were then compared to estimate the numbers of fish in each site.

Eighteen habitat units (6 riffle, 6 run, and 6 pools) were sampled May 24-26 1994 and again on August 16-17, 1994 at the

confluence area of Salsipuedes and El Jaro Creeks. This was a spring survey required as part of the EIR/EIS to document presence or absence of steelhead/rainbow trout. Nine of these habitat units were sampled upstream of the confluence in El Jaro Creek. Another six units were sampled in Salsipeudes Creek, above the confluence with El Jaro Creek. An additional three units were sampled below the confluence with El Jaro Creek in Salsipeudes Creek.

Water temperatures were measured in Salsipuedes and El Jaro Creeks to document the temperature difference in each drainage, and to determine the extent of cool water contribution to Salsipuedes below the confluence with El Jaro.

Walking Surveys

The purpose of these surveys was partly reconnesis for the purpose of assessing steelhead/rainbow trout habitat, for determining the presence or absence of steelhead/rainbow trout, and determining numbers and habitat preferences of other fish species inhabiting the SYR tributaries. Surveys were made moving in a upstream direction. Surveyors stayed out of the stream and in riparian cover as much as possible when getting closer to areas of interest. By moving in this fashion the surveyors were able to get very close (up to six feet away) before spooking the steelhead/rainbow trout. Most if not all steelhead/rainbow trout were observed in this manner.

Salsipuedes Creek was surveyed on May 4, 1994 from Highway 1 bridge #51-95 to approximately four miles upstream. Survey area including portions of El Jaro Creek (2 miles) and Salsipuedes Creek (2 miles), both above and below the confluence with El Jaro Creek.

The upstream survey of Nojoqui Creek began May 5, 1994 at 1012 hours below bridge #51-74B, just off Highway 101 approximately four miles south of the City of Buellton. The survey continued in a downstream direction until the confluence with the SYR was reached.

The surveyed of Quiota Creek began on May 5, 1994 at 1400 hours. Quiota Creek is located along Refugio Rd. west of the town of Santa Ynez. The road crosses Quiota Creek several times before finally turning away from the creek. We entered the creek at its first crossing with Refugio Road and proceeded to walk upstream.

Snorkel Surveys

Fish populations in pools were surveyed using direct observation techniques. Two surveyors entered the downstream end of the habitat unit, then progressed upstream in a slow, deliberate manner. The two surveyors maintained spacing across the pool

which allowed the entire habitat unit to be visually surveyed. The distance of the spacing depended on the width of the pool. Fish were only counted when they moved past (downstream of) the surveyor. The surveyors communicated with each other constantly to reduce the chance for fish to be counted twice. A second pass through each station was conducted, and the higher count of the two surveys was used as the estimate. No dissolved oxygen or temperatures were measured during the snorkel surveys.

Downstream Migrant Trapping

A downstream migrant trap was deployed on Salsipuedes Creek, just upstream from Santa Rosa Road bridge, from April 6, 1994 to July 1, 1994. The project biologist took over monitoring and maintenance of the trap from Maurice Cardenas (DFG), and Jeff Jaegar on April 28, 1994.

Other Snorkel and Electrofishing Surveys

Nojoqui Creek was electrofished and snorkeled on May 27, 1994 to determine if steelhead/rainbow trout were present.

Quiota Creek enters the SYR on the west side of Refugio Road Bridge. Refugio Road parallels Quiota Creek for approximately 2.5 miles and crosses the road in several spots. All of Quiota Creek and its tributaries are located on private land. Permission was granted to sample a tributary to Quiota Creek on August 2, 1994. This unnamed tributary enters Quiota Ck. roughly four miles above where Quiota enters the SYR. The tributary is spring fed and has little to no flowing water. Most of the aquatic habitats are produced by upwelling. A 150 meter reach was spot electrofished. The purpose was to identify overall numbers and sizes of trout population, and to evaluate their overall condition. Water chemistry was measured at the lower most upwelling pool.

SCALE ANALYSIS FROM 1993-94 SCALE SAMPLES

Mr. Bill Snider and Mr. Robert Titus of DFG Stream Flow & Habitat Evaluation Program cursorily reviewed the 13 scale samples taken from rainbow trout in the lower SYR during 1993-94. The results from the analysis were provided on March 6, 1995.

RESULTS AND DISCUSSION

WATER QUALITY

Santa Ynez River Water Temperature Monitoring

The following is a series of temperature graphs including location, time interval, and duration in water at each site listed above. Figures 4-9 show results of temperature monitoring at four sites; Highway 154 bridge, Refugio Road, Buellton, and the lagoon. The October-November data for the lagoon temperatures has not been downloaded. Large increases in water depth and poor water clarity have made retrieval impossible. Another attempt will be made during the first week in March.

Average daily water temperatures varied from 18.3 C to 21.3 C for all three sites between May - September (July, August, and September the hottest). Maximum water temperatures varied from 22.1 C to 27.5 C for all three sites between May - September (July and August the hottest). Maximum water temperatures at all three sites were at or near the upper incipient lethal level for rainbow trout (25 C). Literature suggests that average daily temperatures should be less than 20 C and that daily maximum temperatures should be less than 24 C to allow adequate trout growth (Fish Resources Technical Report 1994). After September, daily and maximum temperatures began cooling off to more acceptable levels. Maximum temperatures were generally cooler further down river. Mean temperatures for all three sites stayed within one degree of each other for all months except June and July. During those months the lagoon was the warmest while the other sites were a few degrees cooler. Minimum temperatures were generally warmer further down river.

Mainstem and Tributary Water Quality Monitoring

Most water quality measurements during the rampdown of WR 89-18 showed very little variation between the 15 cfs level and the 1 cfs level (Table 2). Conductivity, alkalinity, and hardness all increased in concentration further downstream. Minor changes were noted at all three sites, but no patterns were observed.

For purposes of discussion on water quality as it relates to fish, results of other water quality monitoring are included in the tributary and mainstem fisheries section.

Figure 4. HOBO Temperature Data

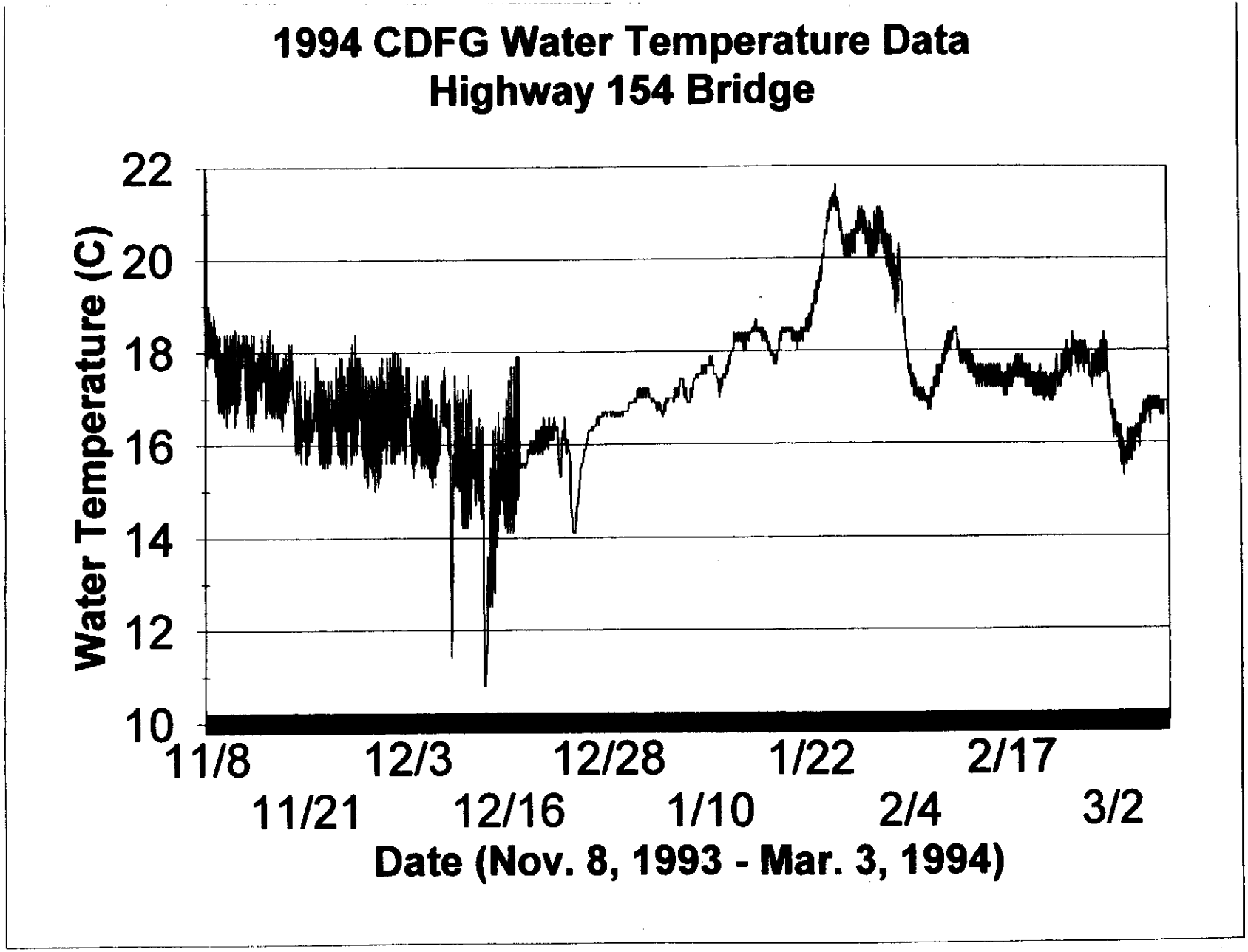


Figure 5. HOBO Temperature Data.

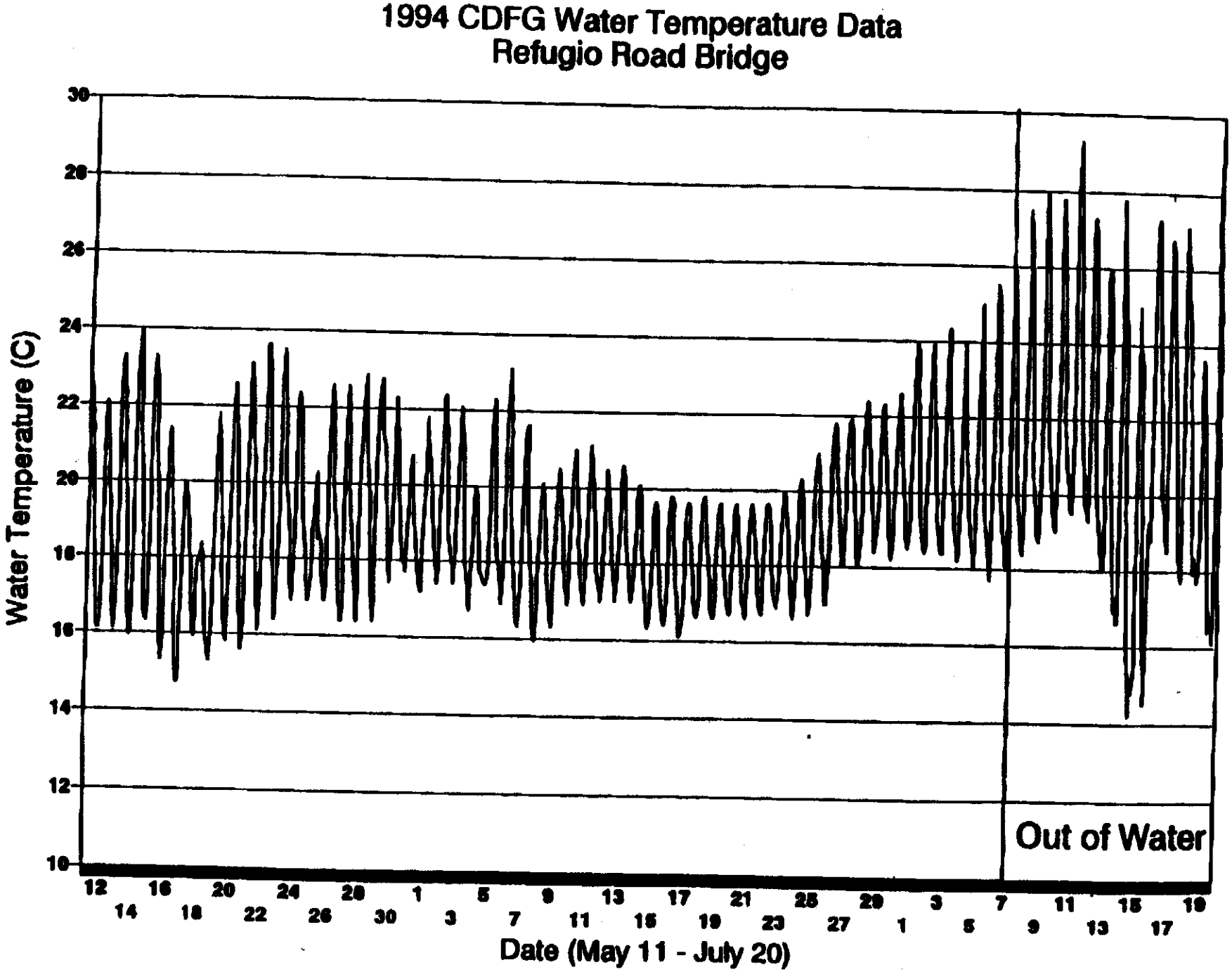


Figure 6. HOBO Temperature Data

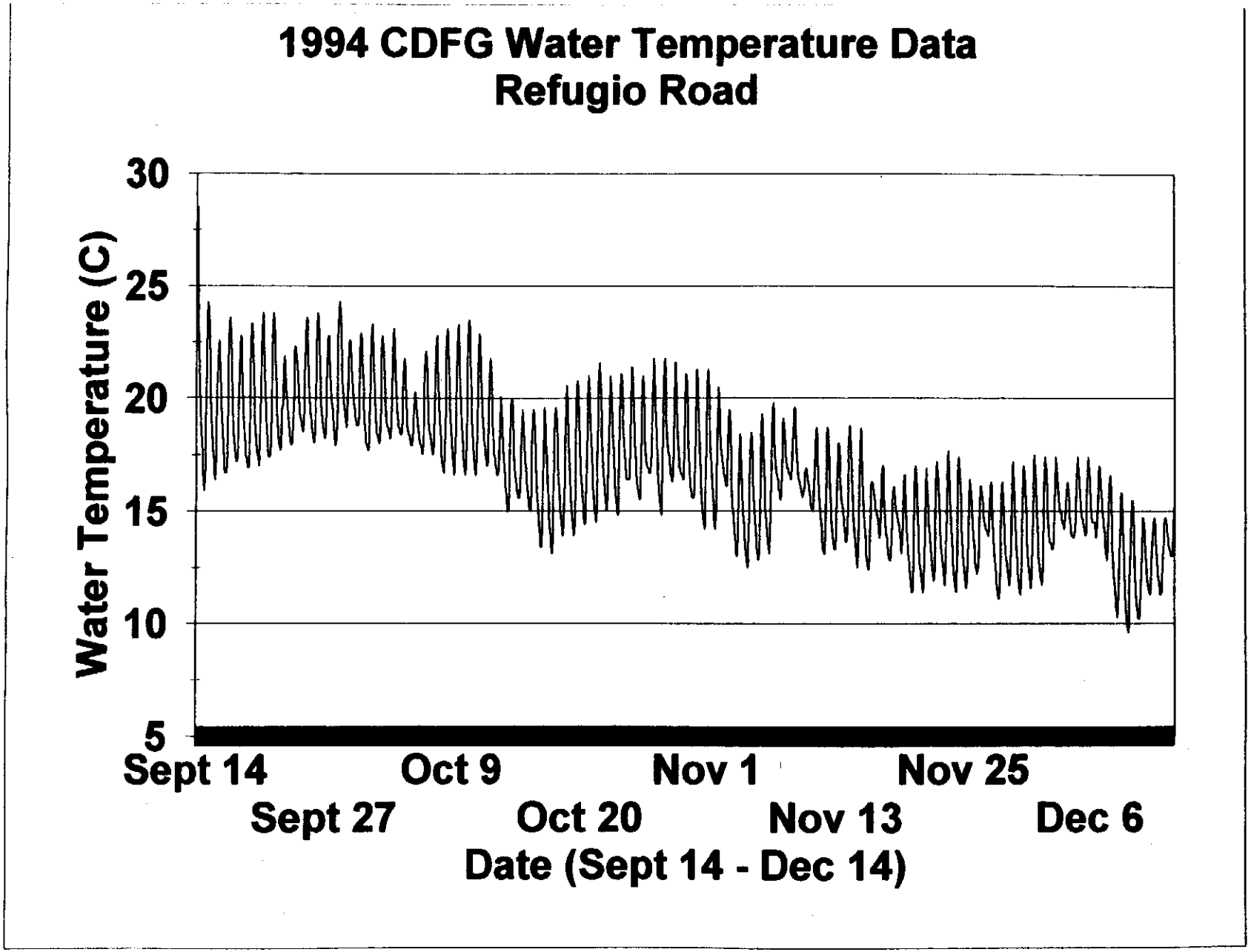


Figure 7. HOBO Temperature Data.

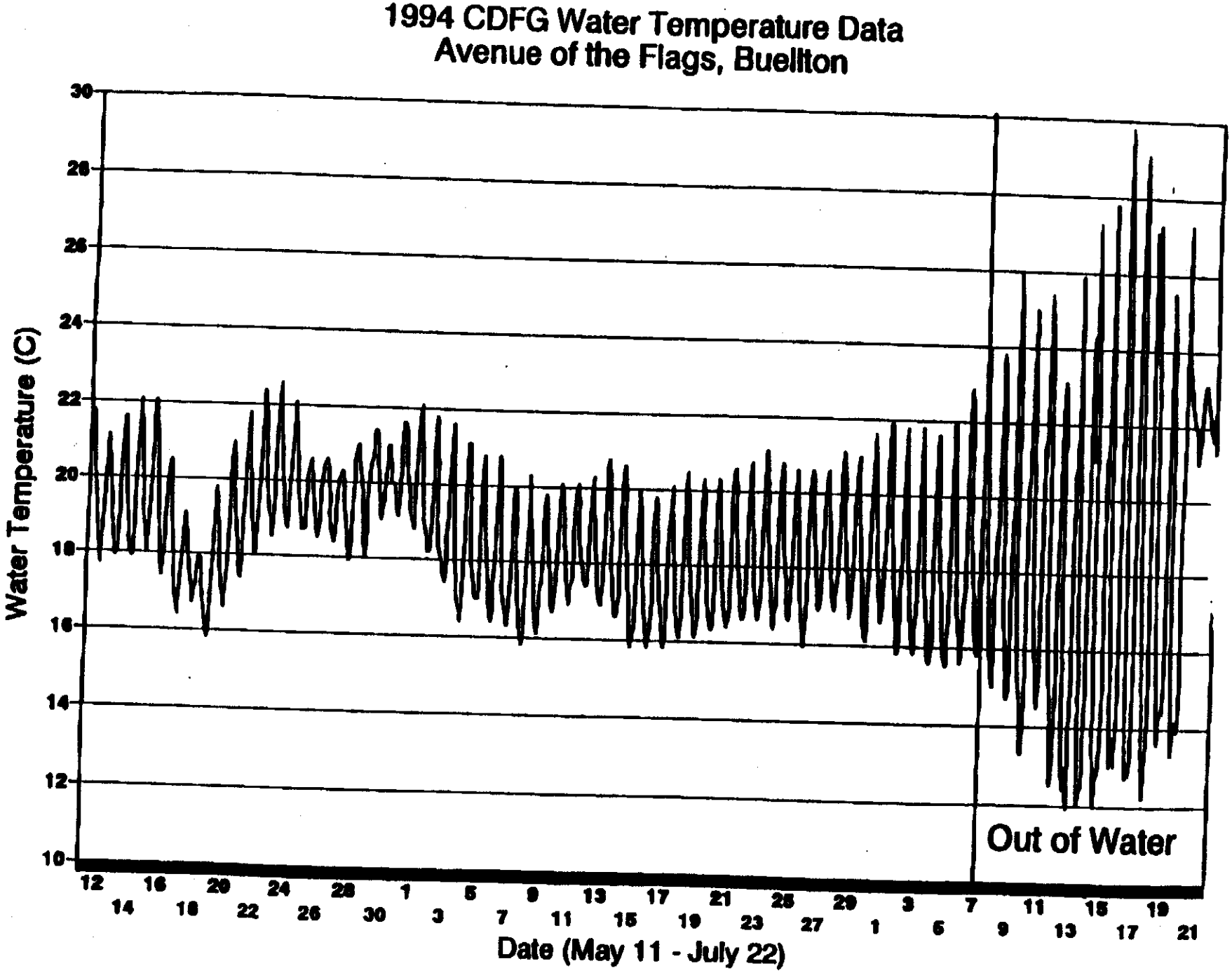


Figure 8. HOBO Temperature Data

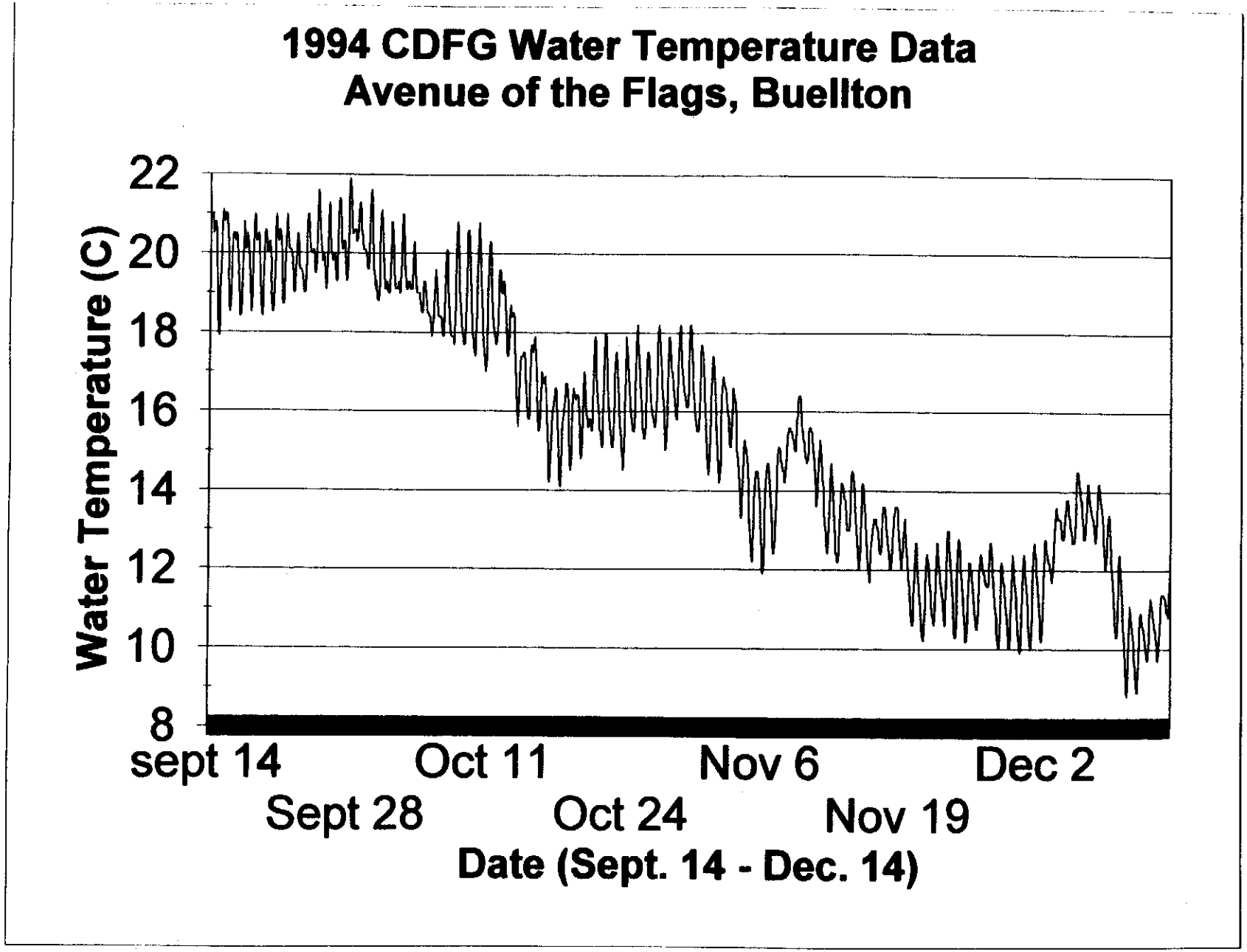


Figure 9. HOBO Temperature Data

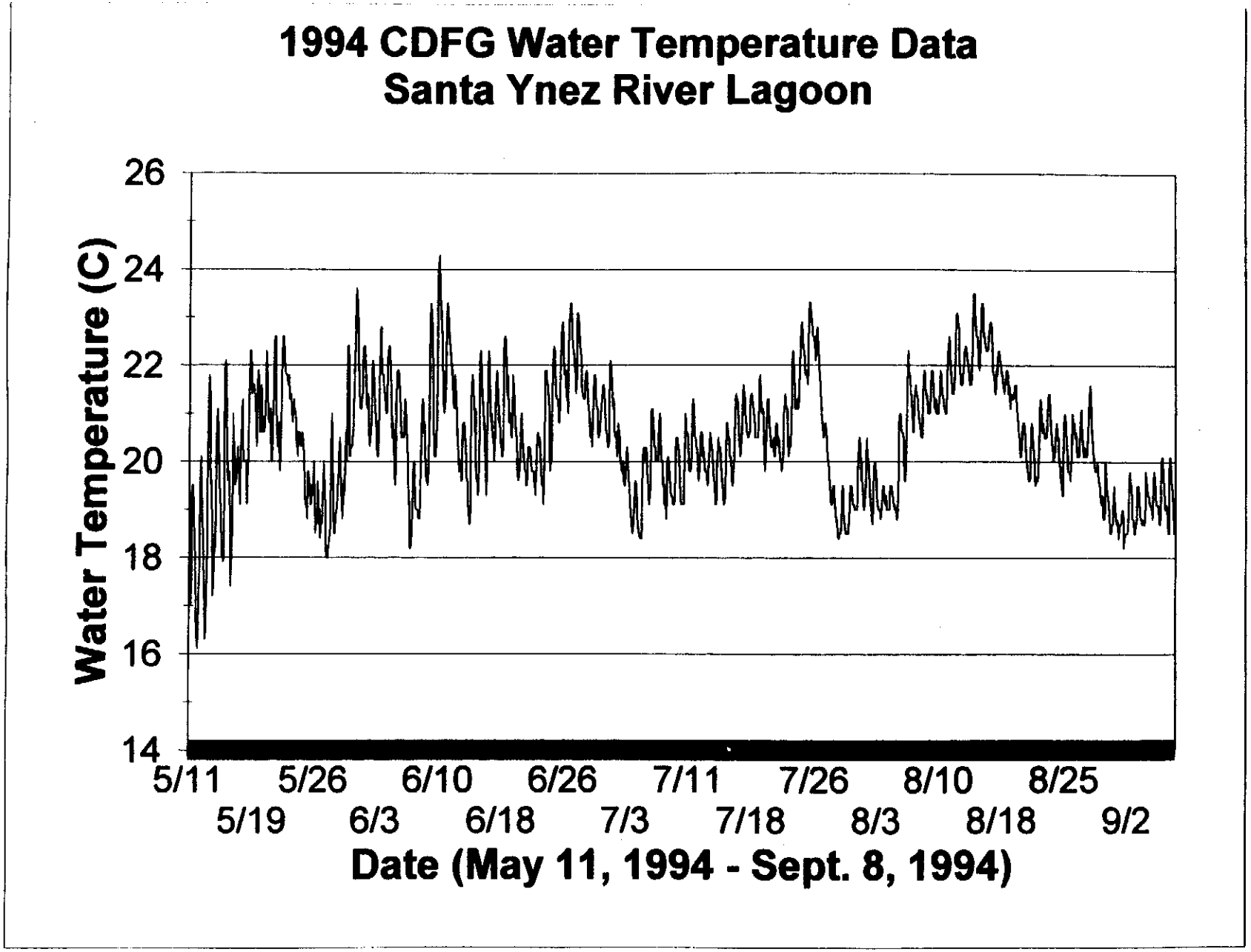


Table 1. Monthly Water Temperatures by Recorder Location Downstream of Bradbury Dam 1994

	May			June			July			August			September		
DFG 1994 Water Temperatures (C)	**Mean**	**Max**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Max**	**Min**
Refugio Road Bridge	19.1	24	14.7	18.8	23.1	15.9	20.4	27.5	15.5	20.3	27.3	15	19.8	25	15.3
Buellton - Avenue of the Flags	19.4	22.6	15.8	18.3	22.1	15.8	18.5	24	14.1	21.3	25.5	17.7	20	21.8	17.9
Lagoon	20	23.6	16.1	21	24.3	18.2	20.3	23.3	18.4	20.7	23.5	18.5	19.1	20.1	18.2

Table 2. Water quality by site during rampdown study of WR 89-18 releases.

Site #	Date	Cachuma Release (cfs)	Site Flow (cfs)	DO (ppm)	pH	Conductivity (umhos)	Alkalinity (ppm)	Hardness (ppm)	Air Temp. (C)	Water Temp. (C)	Time
1	10/26	10	---	10.8	7.9	710	220	520	18.5	14.9	1205
	10/28	5	---	11.6	8.35	720	240	520	19.5	16	1207
	10/31	1	---	11.2	7.9	630	240	560	18.5	14.9	926
	11/1	0	1.3	11.5	8.36	720	220	540	18.8	16.7	1400
	11/5	0	---	10.6	7.94	680	220	460	10.1	11.6	840
2	10/24	10	5.9	12.8	8.57	950	300	620	---	20.5	1413
	10/29	5	3.6	12	8.5	920	320	600	22	19	1130
	10/31	1	2.9	14.3	8.5	890	280	560	22.1	18	---
	11/5	0	3.1	11.8	8.4	590	320	---	18	14.1	1101
3	10/24	10	9.4	10.7	8	1270	320	800	---	19.9	1130
	10/31	1	5.9	10.1	8	1100	340	840	23	21	1415

Lake Cachuma Dissolved Oxygen and Temperature Monitoring

The following figures (10-21) are lake profiles by site. Figures 10-12 are the August 26 temperature profiles. Figures 13-15 are the September 26 temperature and dissolved oxygen profiles. Figures 16-18 are the November 2 temperature and dissolved oxygen profiles. Figures 19-21 are the December 8 temperature and dissolved oxygen profiles.

These figures illustrate lake stratification and fall turnover. The August and September figures at all three sites are very similar in depicting lake stratification and the continued severe hypolimnetic oxygen depletion. During August, lake stratification depths vary somewhat between the study sites. Data from September's survey indicates uniform stratification with the thermocline beginning at approximately 14 meters for all three sites. Note in the November graphs the increased depth in the epilimnion (now at 16 meters) from the September survey. In the fall, with less solar radiation reaching the water and greater heat loss at night, convection and wind mixing begin to erode the thermalcline (Goldman and Horne 1983). As shown in the November graphs, the epilimnion had increased approximately two meters in depth, and decreased about five degrees in temperature since the September survey. This is the beginning of fall turnover. As seen in the December 8 figure, the dissolved oxygen and temperature measurements are essentially the same from the surface to the bottom of the lake. This indicates that the lake waters have mixed and fall turnover has occurred.

WR 89-18 FLOW RELEASES AND FISH RESERVE ACCOUNT USAGE

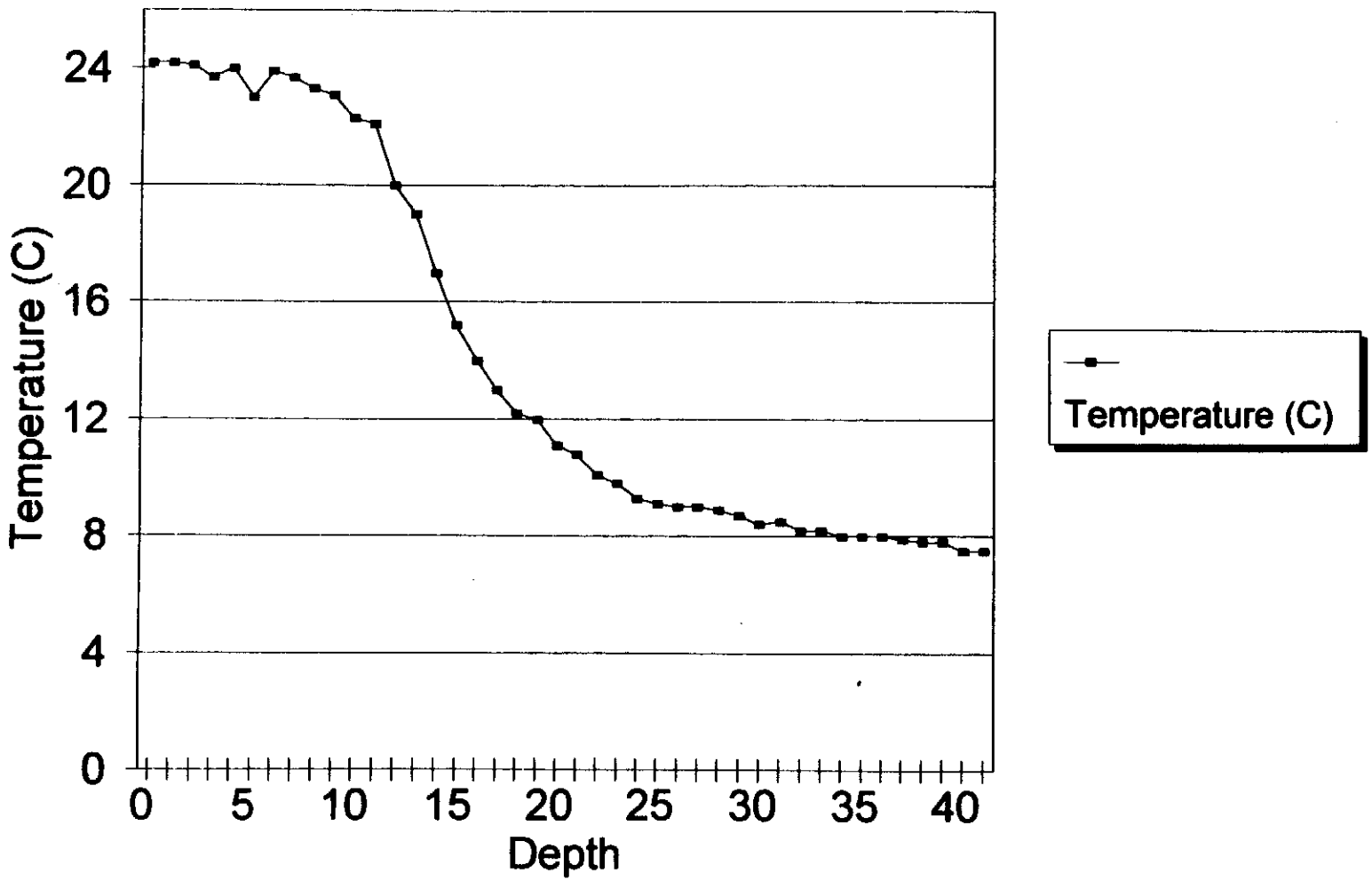
WR 89-18 Flow Releases and Ramping

Since June of 1994, there have been three separate releases from Bradbury Dam; two for downstream users (WR 89-18) and one for fish maintenance (MOU Fish Reserve Account) in the Long Pool (figure 22).

The first release was from the MOU Fish Reserve Account which occurred June 16 to June 27, 1994, and was for the sole purpose of maintaining suitable habitat for trout in the Long Pool. Releases began at the 0.5 cfs rate and were gradually increased to 1.6 cfs. Starting June 28, 1994 as per Water Rights Order 89-18, San Lucus Ranch requested releases for the recharge of the Ranch wells. Releases began at 20 cfs and continued until July 6, 1994. San Lucus releases were ramped down to 10 cfs on July 3 with a two cfs decrease daily until releases were ceased on July 7, 1994. A total of 108 af of water was released. As a result of the San Lucus releases, the Long Pool was filled to a water level more suitable to maintain fish habitat. Releases from the 1994 MOU Fish Account to maintain the long pool did not have to begin again until July 11. Releases from the Fish Account from

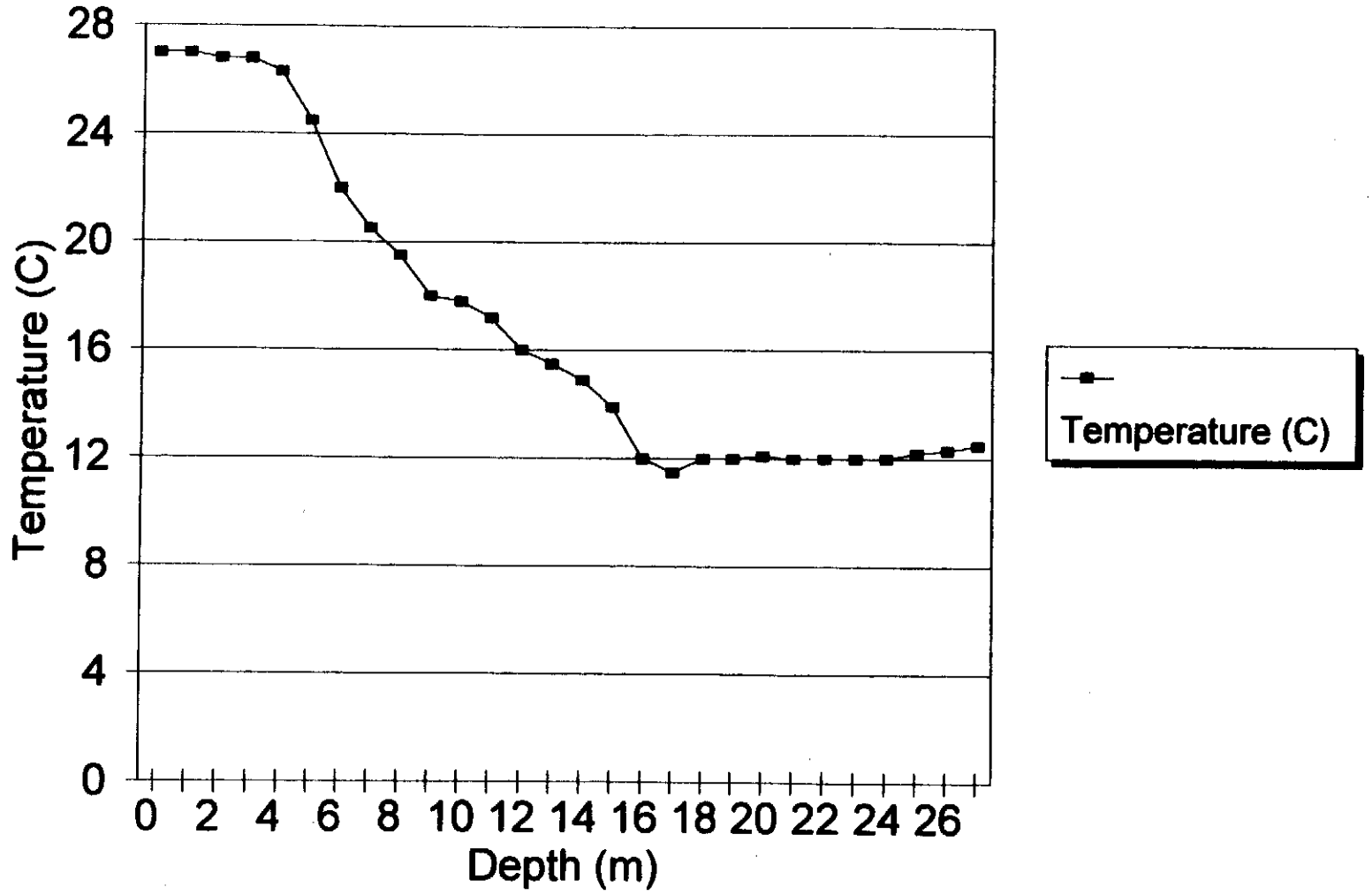
Station 1

Figure 10. Lake Cachuma temperature profile, Bradbury Dam, 8/26/94



Station 2

Figure 11 Lake Cachuma temperature profile,Tequepis Point, 8/26/94



Station 3

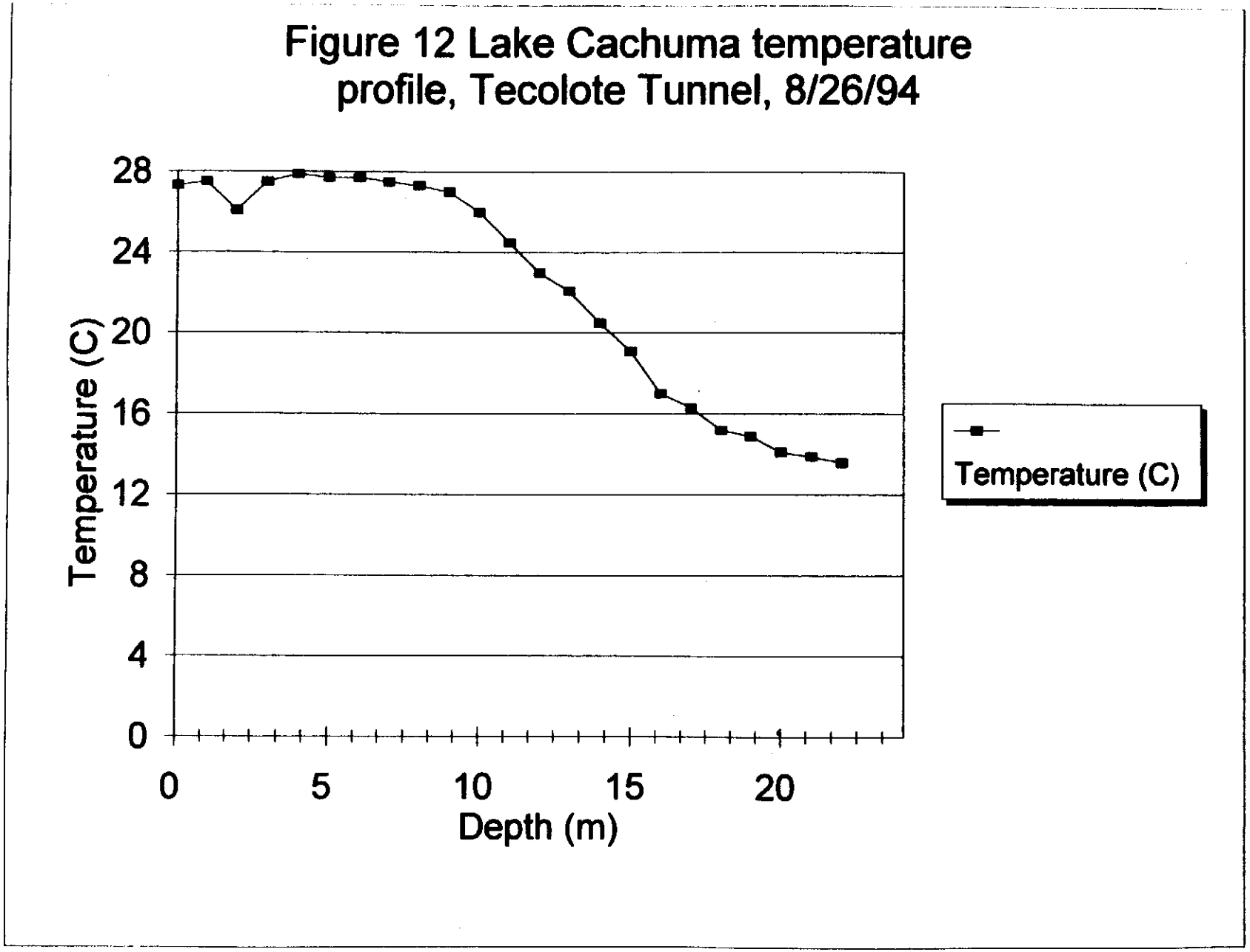
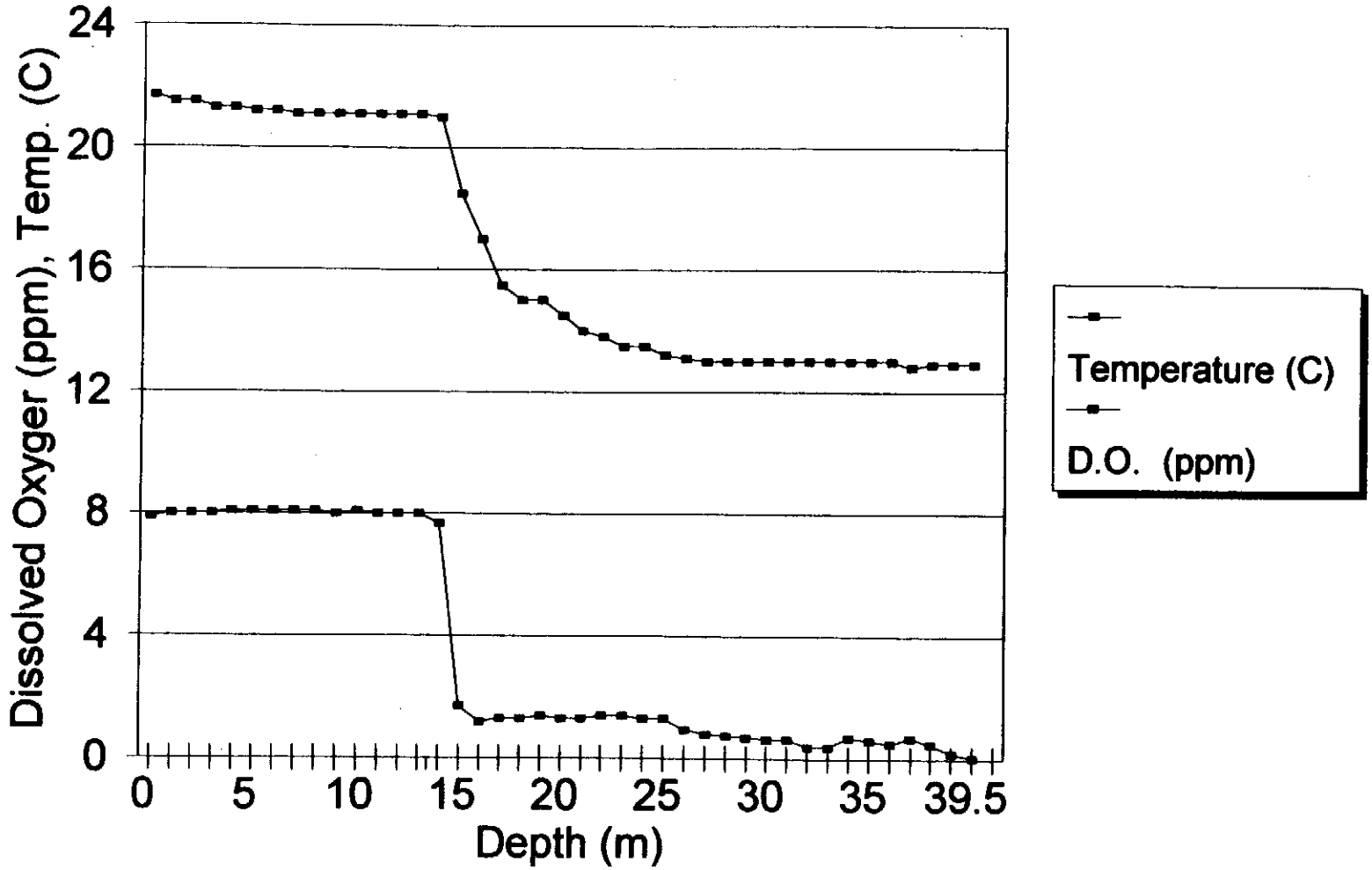


Figure 12 Lake Cachuma temperature profile, Tecolote Tunnel, 8/26/94
Temperature (C)
28
24
20
16
12
8
4
0
0
5
10
15
20
Depth (m)
Temperature (C)

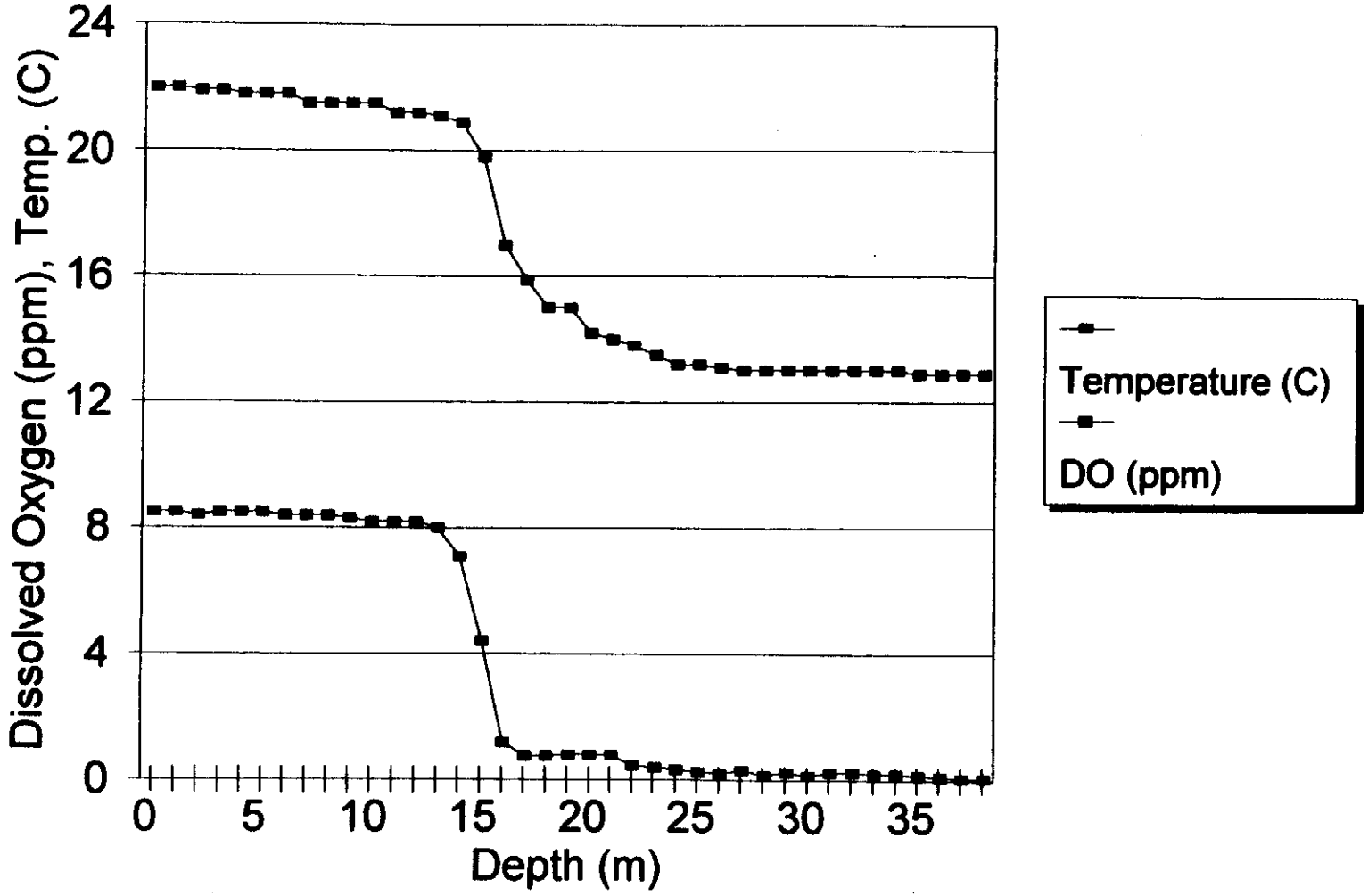
Station 1

Figure 13. Lake Cachuma DO and Temp. profile, Bradbury Dam, 9/26/94



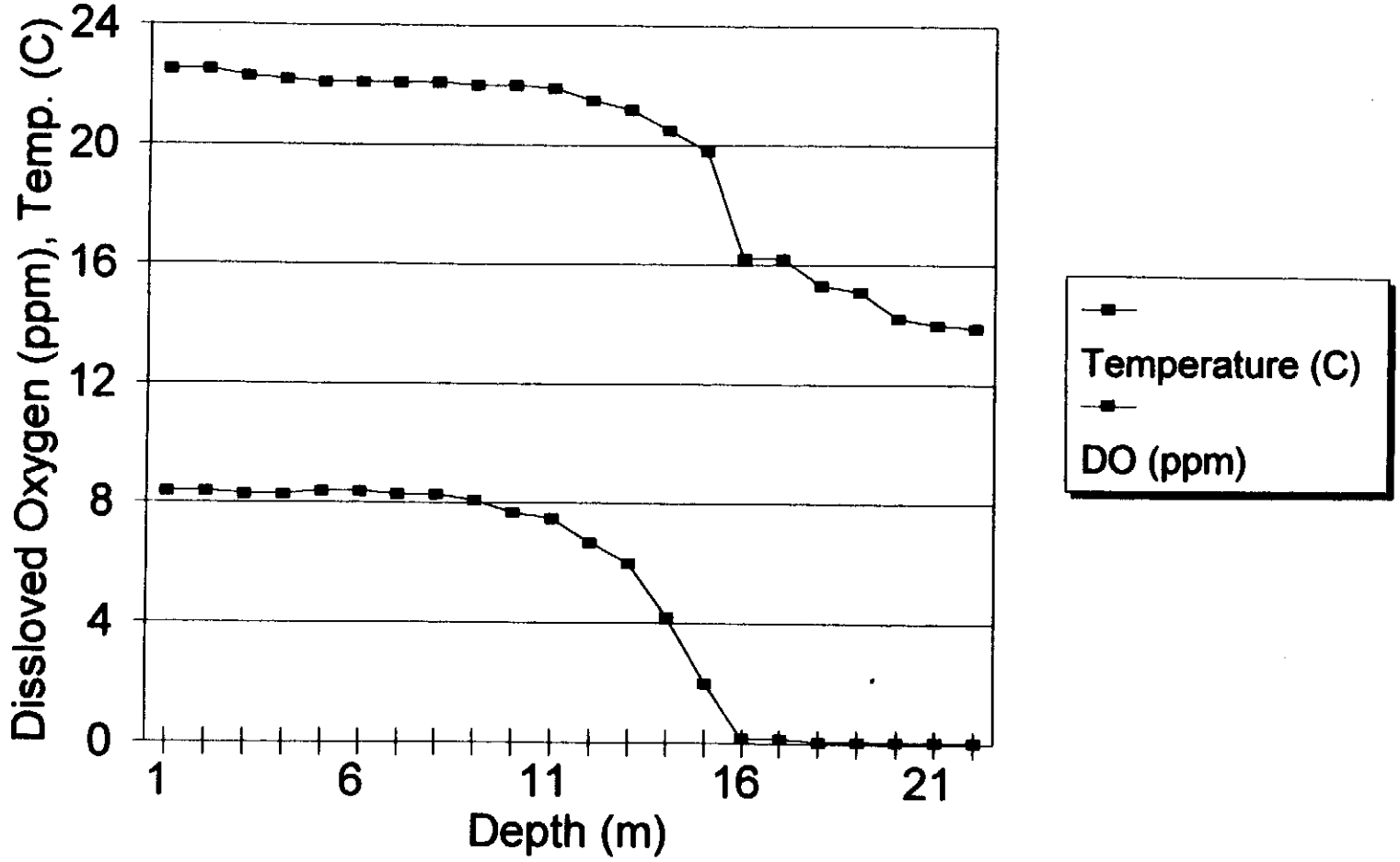
Station 2

Figure 14. Lake Cachuma DO and Temp. profile,Tequepis Point, 9/26/94



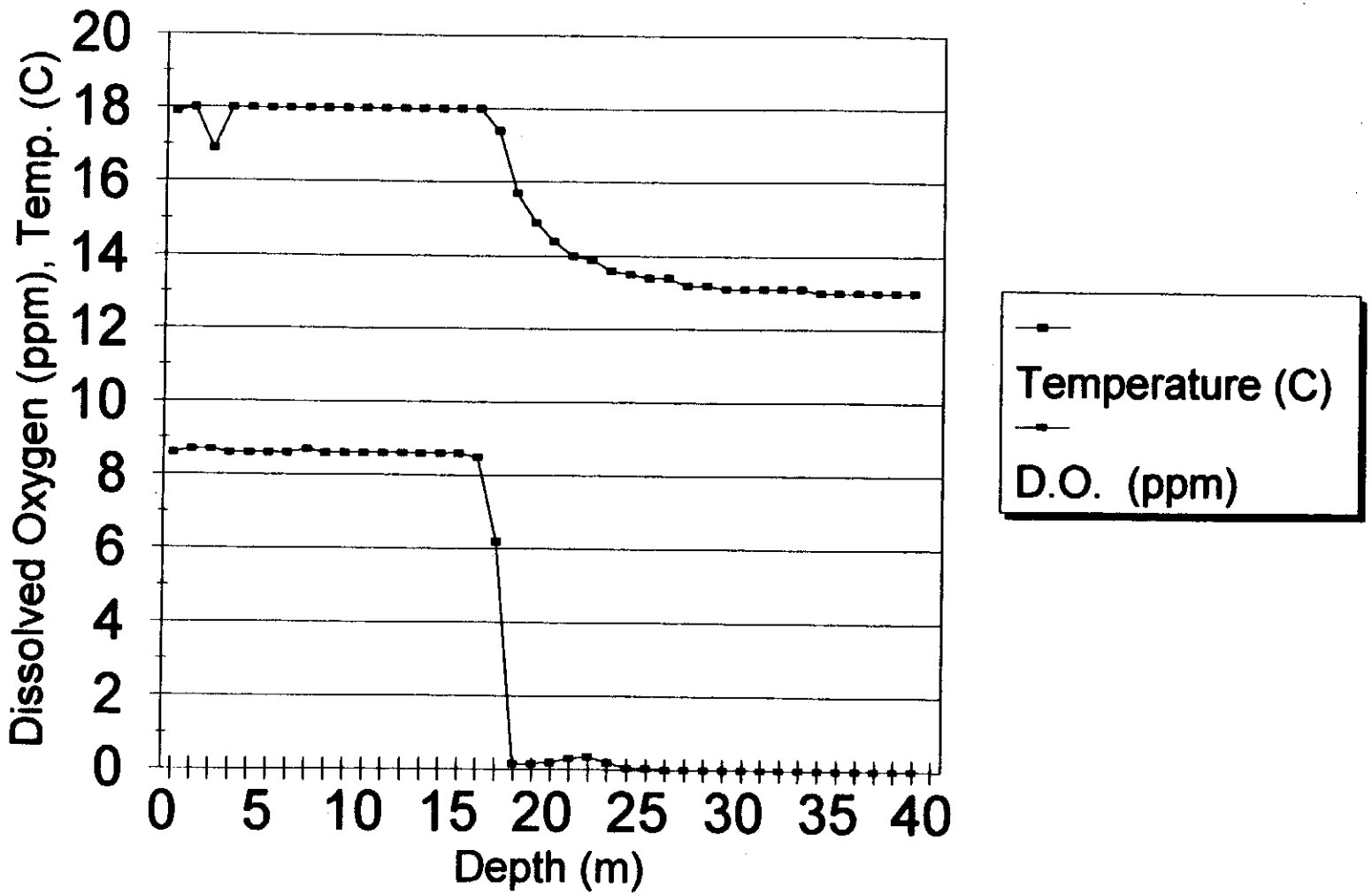
Station 3

Figure 15. Lake Cachuma DO and Temp. profile, Tecolote Tunnel, 9/26/94



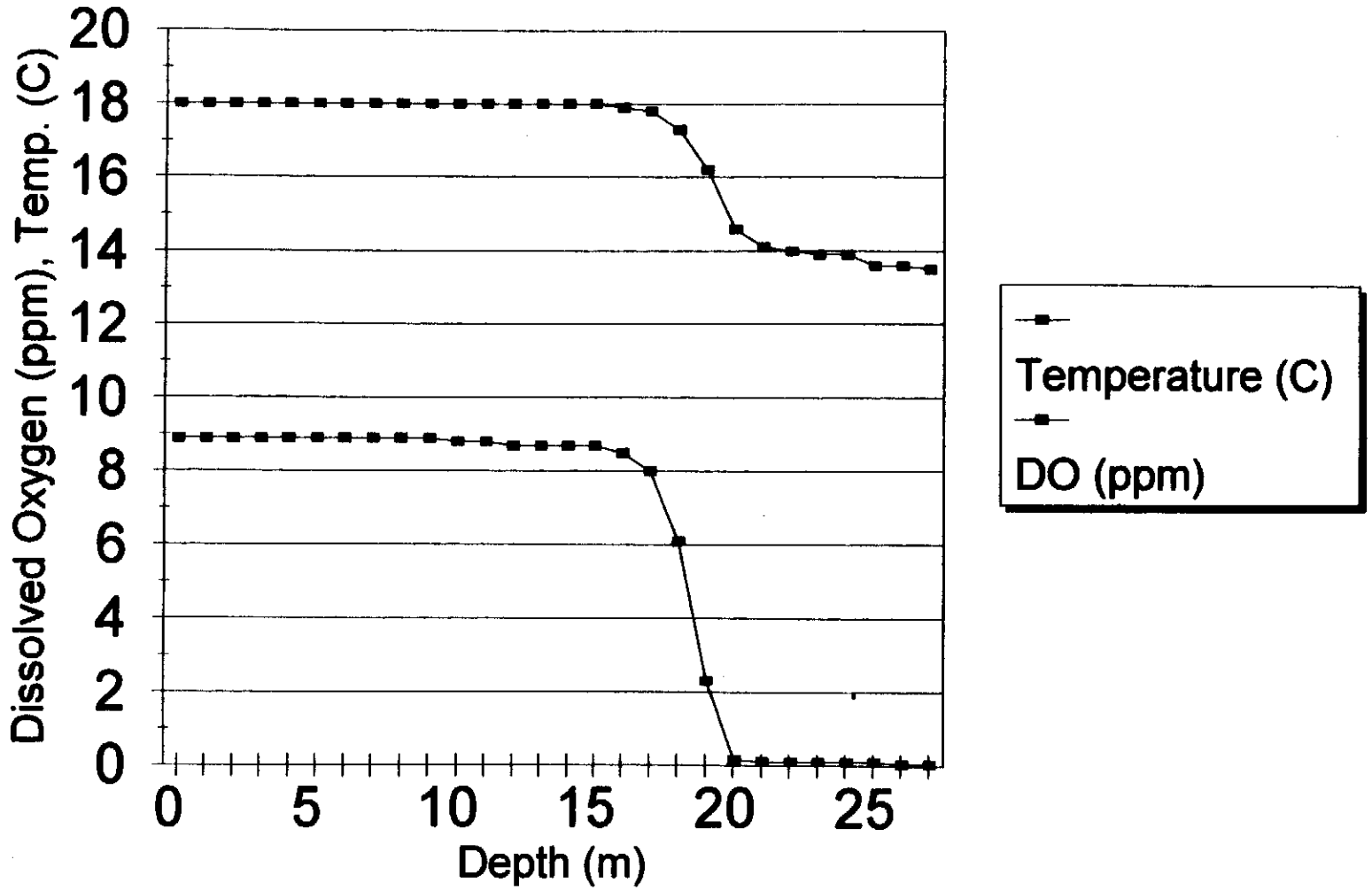
Station 1

Figure 16. Lake Cachuma DO and Temp. profile, Bradbury Dam, 11/2/94



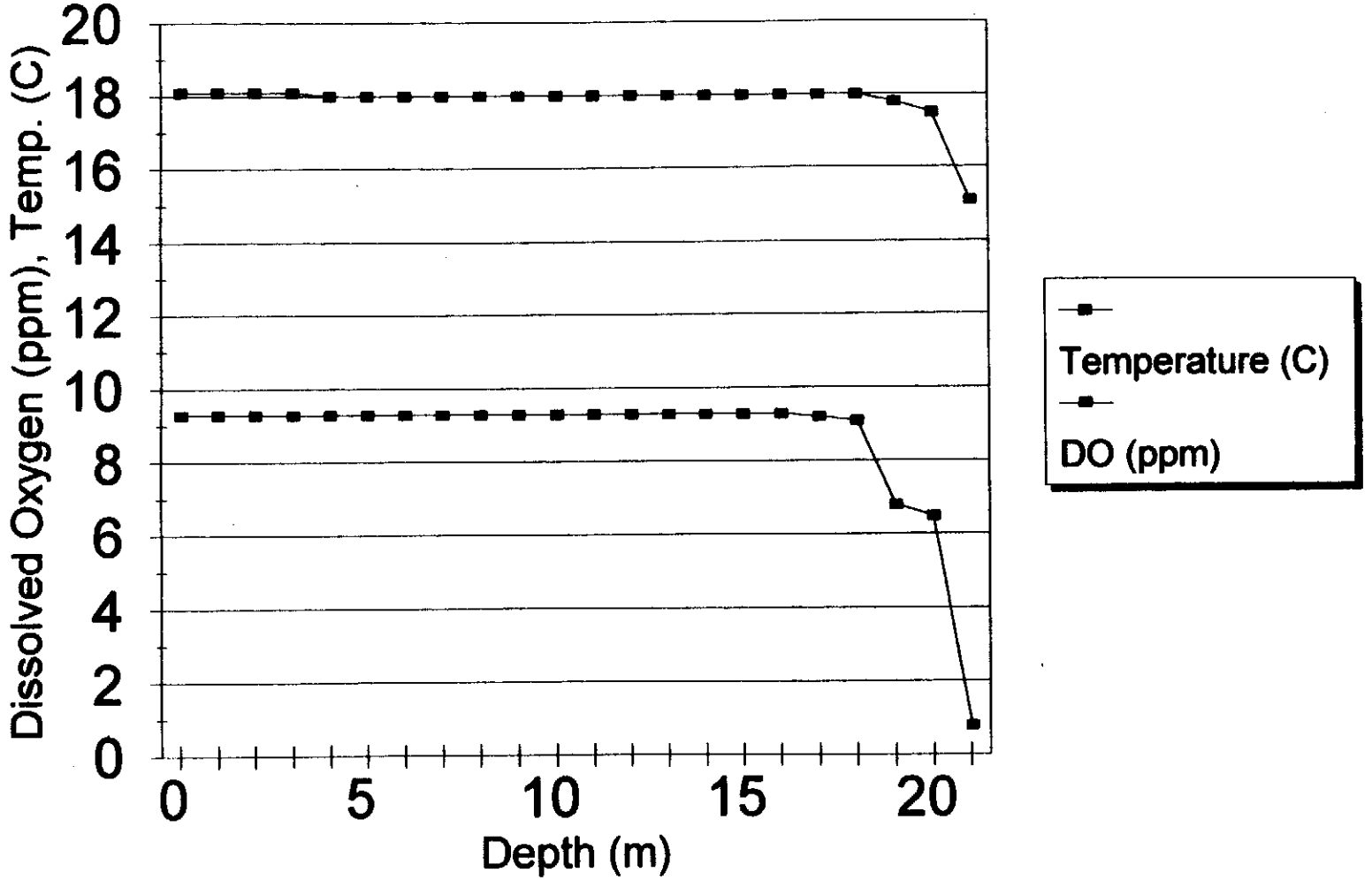
Station 2

Figure 17. Lake Cachuma DO and Temp. profile, Tequepis Point, 11/2/94



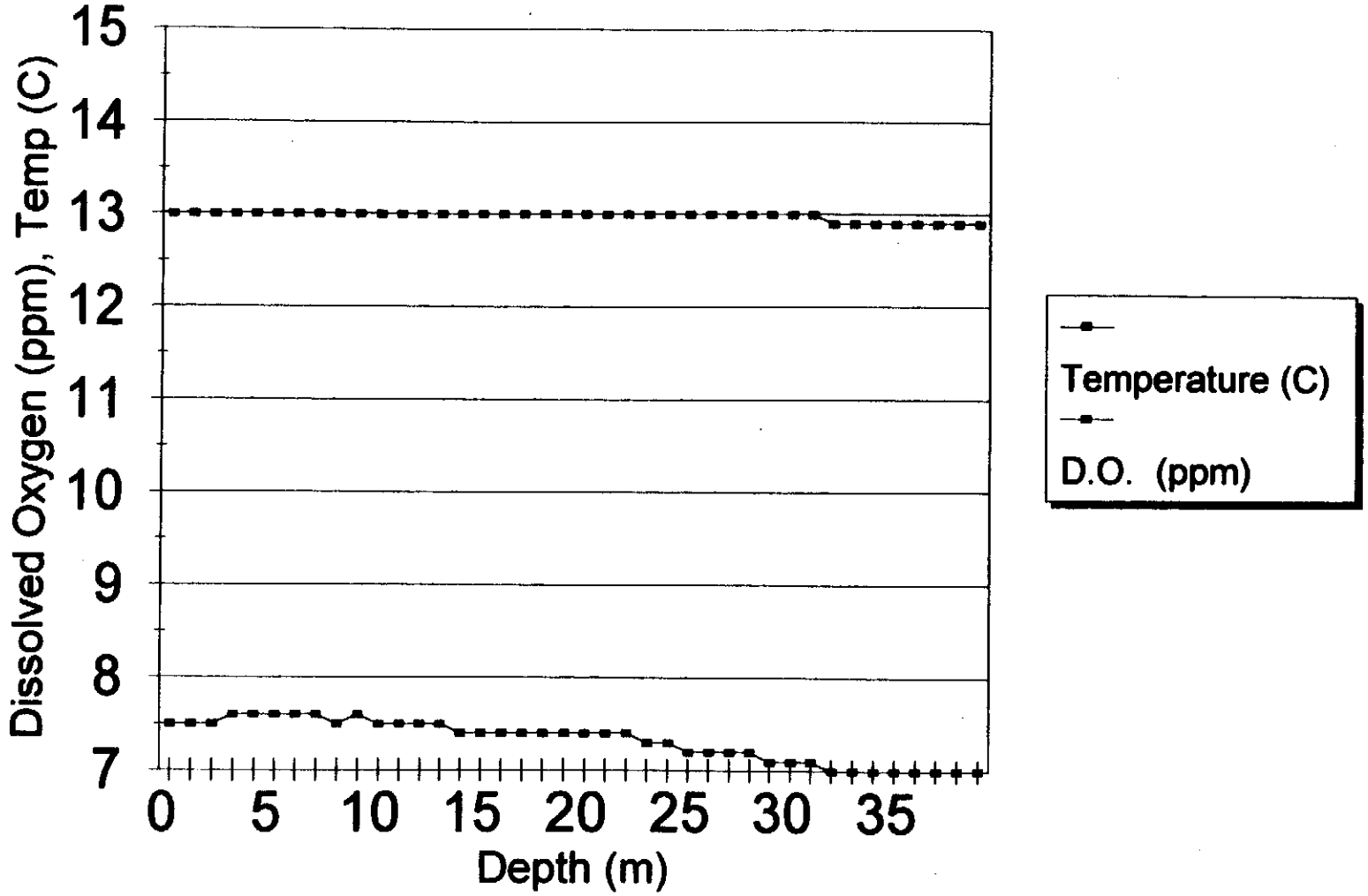
Station 3

Figure 18. Lake Cachuma DO and Temp. profile, Tecolote Tunnel, 11/2/94



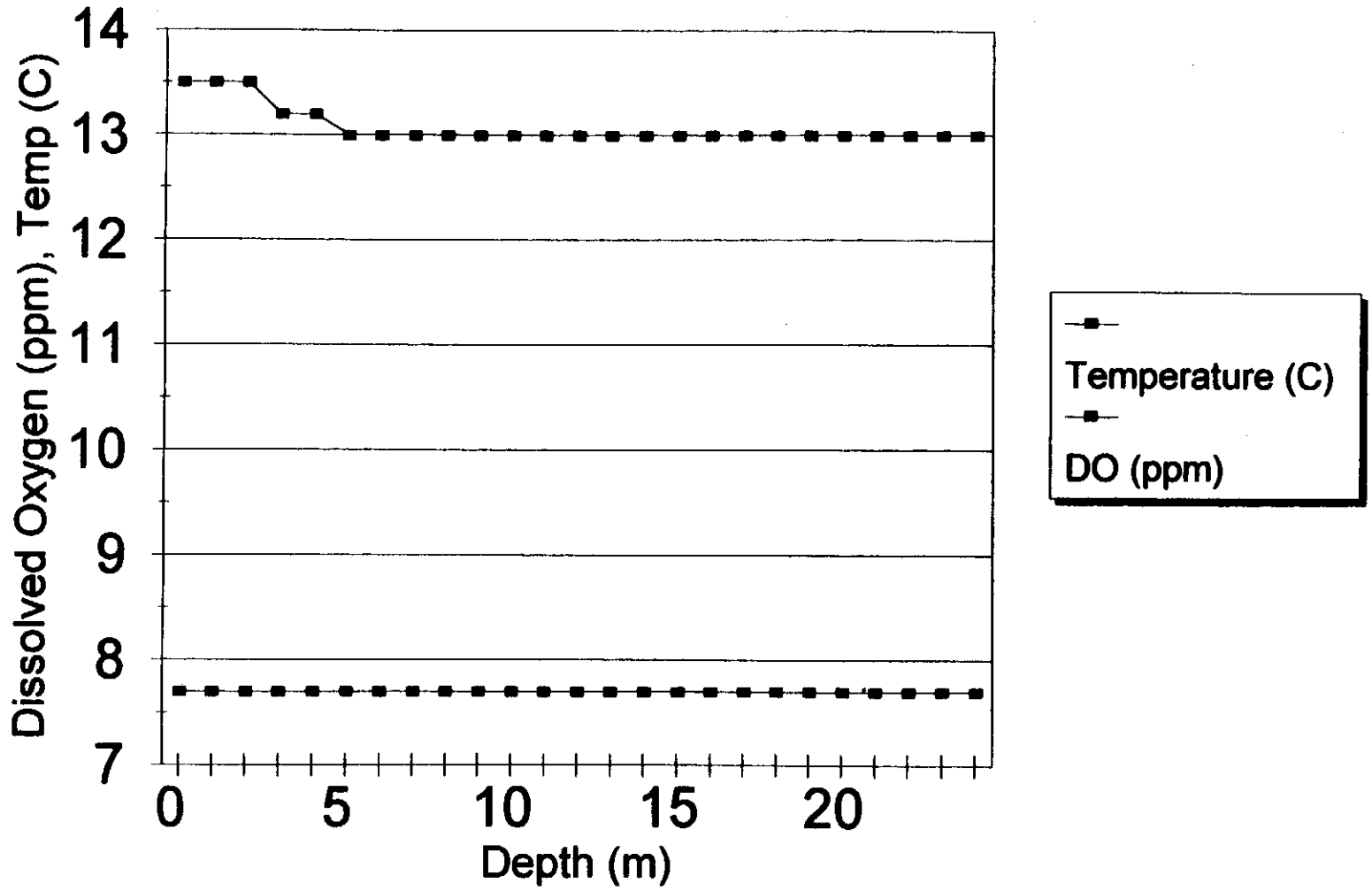
Station 1

Figure 19. Lake Cachuma DO and Temp. profile, Bradbury Dam, 12/8/94



Station 2

Figure 20. Lake Cachuma DO and Temp. profile, Tequepis Point, 12/8/94



Station 3

Figure 21. Lake Cachuma DO and Temp. profile, Tecolote Tunnel, 12/8/94

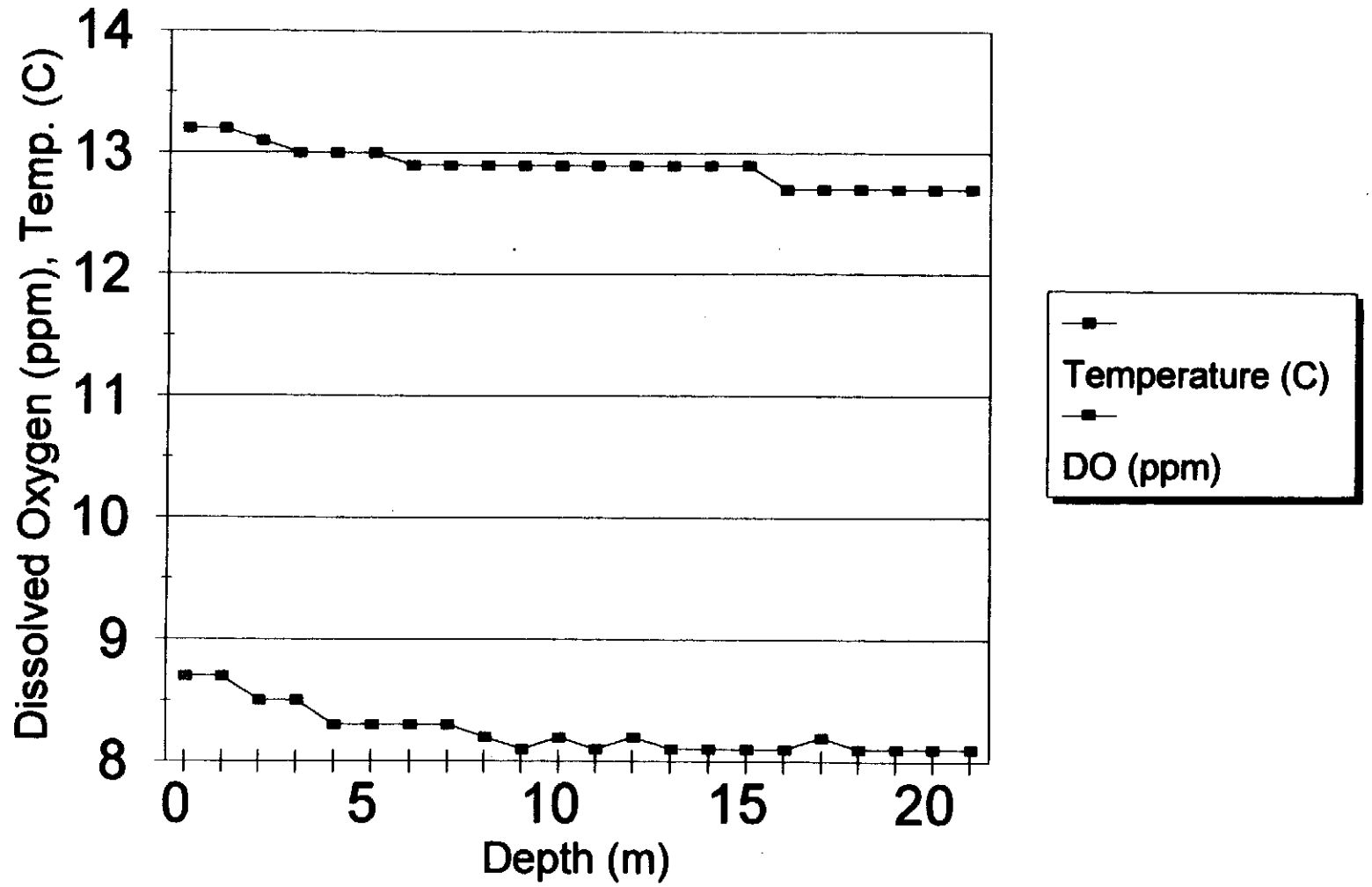
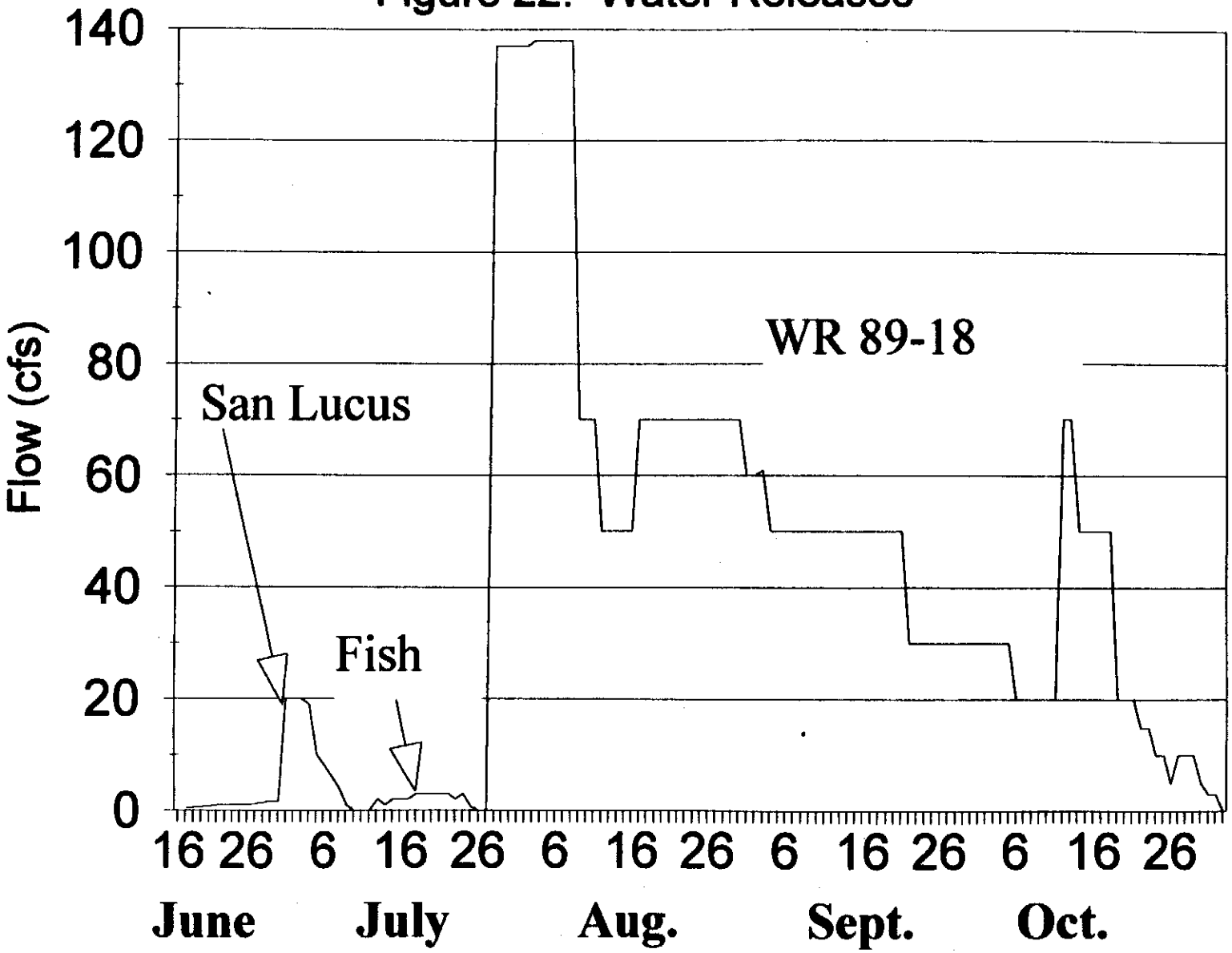


Figure 22. Water Releases



June 16 to July 23 totaled 43.6 acre feet and account for all of the water used from the account in calendar year 1994.

Beginning July 25, 1994 releases for WR 89-18 began and continued until October 31, 1994. The total amount of water released during this time frame was 10,591 acre feet which created a live stream from Bradbury Dam to V Street in Lompoc throughout the entire three months.

It should be noted that seepage rate from June to October varied from 0.3 cfs to 1.4 cfs. Typically seepage is around 1.2-1.4 cfs; but during the large scale releases seepage was reduced by opening the Hollow-Jet valves and eliminating them as a source of seepage.

Fish Reserve Account and Usage

To facilitate cooperative study and to maintain fish in the SYR below Bradbury Dam, and to carry out any necessary studies provided for in the study plan; the 1994 MOU (copy provided in Part 3) has established a Fish Reserve Account to store any spill water available within the Cachuma Project above elevation 750. In the event the Fish Reserve Account is insufficient for purpose of the MOU, and on advice of the TAC, the USBR may make releases from the minimum pool of the Cachuma Project, up to an amount that shall not exceed 2000 acre feet during the term of the MOU (March 1994-March 1995).

As part of the MOU, the TAC was allocated 2,000 af of water from Lake Cachuma. The Biological Subcommittee developed a hierarchy for the use of the fish account. Uses of the MOU fish account are: 1) to maintain aquatic resources, especially steelhead/rainbow trout, threatened or endangered species, and/or their habitat, in the portion of the SYR immediately downstream of Bradbury Dam; 2) to utilize water for the conducting of flow related studies deemed by the TAC to be important for addressing questions relative to the State Water Resources Control Board hearing process; and 3) to utilize the water at the end of peak storm flows to improve or lengthen the migration period or corridor for upstream passage of adult steelhead/rainbow trout.

The Biological Subcommittee of the TAC has used the water during the past two years: 1) to alleviate adverse environmental conditions for steelhead/rainbow trout observed to be holding in pools downstream of Bradbury Dam particularly in the Long Pool immediately downstream of the spill basin; 2) to conduct fish abundance and distribution/movement studies among habitats in the mainstem during low flow conditions; and 3) to collect water temperature information during low flow periods. These uses of water have added greatly to the knowledge of existing aquatic resources and habitats in the SYR and were used in the development of the Cachuma Project EIR/EIS. The TAC will

continue to gather this type of "baseline" data, where necessary. Moreover, the TAC intends to collect habitat, temperature, and flow base data to better understand the SYR system under different flow regimes. The TAC also intends to build upon the information collected and analyzed for the Cachuma Project EIR/EIS. Fish account water will be utilized to collect these type of data as will.

It will also be the intent of the TAC to, whenever possible, take advantage of planned or non-planned releases from Cachuma Reservoir. For example, in 1994-95 the TAC had intended to gather information regarding passage flows using fish account water "piggybacked" on to peak storm events. However, two situations precluded this study; the 1995 storms and the need to release water from storage because of dam safety issues. Therefore, the TAC studies focused on upstream passage into tributaries since mainstem flows would be continuous throughout the upstream migration period. More upstream migrant traps were utilized this year, resulting in more information being gathered to describe tributary utilization by adult steelhead/rainbow trout than in past years. Further, more scale samples and tissue samples have also been collected from adult fish this year than in past years. In addition, tributary flow data during upstream migration is being collected. Moreover, depth and velocity data from redds were collected for the first time.

As of February 28 1995, the releases from the Fish Reserve Account total 43.4 acre feet (2% of the total) and were used to maintain habitat in the long pool during the hot summer months. Currently there is 1956.6 (98%) acre feet left in the account.

An increase in the Fish Reserve Account (spill water) has been proposed and is currently being reviewed. The USBR is investigating the feasibility of modifying flashboards on Bradbury Dam to increase the amount of water stored in Lake Cachuma. Any extra water captured by virtue of the modified flashboards will be added to the Fish Reserve Account.

HABITAT MAPPING

Due to miscommunication among different agencies, the ramping study began at the 15 cfs release instead of 30 cfs.
Site #1: Site #1 showed the greatest change in width and depth as flows decreased (Table 3). From 15 cfs to 1 cfs, average width decreased from 10.8 m to 5.5 m (49% decrease) and average depth decreased from 22 cm to 13.2 cm (40% decrease). Four days after releases ceased, water was still flowing into the study reach at .42 cfs. Average width had decreased to 3.5 m (67% decrease) and average depth decreased to 8.2 cm (62.7% decrease). Riffles and runs were the habitats most affected. Two small pools remained in the study reach after the riffles and runs became dewatered.

Table 3. Habitat data of three sample sites in the Santa Ynez River during rampdown of WR 89-18

Site #	Date	Cachuma Release (cfs)	Site Flow (cfs)	Site Length (m)	Average Width (m)	% Decrease	Average Depth (cm)	% Decrease
1	10/22/94	15	---	40.7	10.8	---	22	---
	10/26	10	---	40.7	8.1	25	21	4.5
	10/28	5	---	40.7	6.8	37	13.8	37.1
	10/31	1	---	40.7	5.5	49	13.2	40
	11/1	0	1.3	---	---	---	---	---
	11/4	0	0.42	40.7	3.5	67.5	8.2	62.7
2	10/22	15	---	52.1	11.6	---	16.6	---
	10/24	10	5.9	52.1	11.6	---	13.3	19.8
	10/29	5	3.6	52.1	9.5	18.1	14.7	11.4
	10/31	1	2.9	52.1	8.6	25.9	13.4	19.2
	11/5	0	3.1	---	---	---	---	---
	11/9	0	3.6	---	---	---	---	---
3	10/24	10	9.4	50.9	11.1	---	10.8	---
	10/31	1	5.9	50.9	9.2	17.1	8.8	18.5

Table 4. Santa Ynez River Downstream Migrant Trap Results
May 22 - June 10, 1994

Date	Species	Species Total	Air Temp. (C)	Water Temp. (C)	Time
May 22-94	Sculpin	1	32.8	24.3	1330
	Fathead	1			
May 26	Arroyo C.	1	29	21.5	1500
	Stickleback	3			
	Fathead	3			
	Amacyte	1			
May 28	No Fish	0	30	25.5	1300
June 1	Stickleback	3	27	24.5	1620
	Belostomatid	2			
June 3	Stickleback	2	29	27.5	1530
	Belostomatid	5			
June 6	Belostomatid	6	28	27	1300
June 10	< 1 cfs	0	25	21.5	1600

Species Totals:	
Arroyo C.	4
Stickleback	12
Fathead	1
Amacyte (juvenile lamprey)	1

Site #2: Aquatic habitat was affected to a lesser degree than Site #1 (Table 3). From 15 cfs to 1 cfs, average width decreased from 11.6 m to 8.6 m (25.9% decrease) and average depth decreased from 16.6 cm to 13.4 cm (19.2% decrease). For several months after flows were ceased, water continued to flow through the site at approximately the same velocity when last measured (3.6 cfs on 11/9/94). Water continued through the site after flows were ceased because the basin was charged up. Any flow was probably a result of ground water upwelling to the surface further upstream. Slight variations in depth were observed depending on what time of day it was. Morning depths tended to be one to two centimeters greater than afternoon depths. Possible reasons for this could be upstream agricultural pumping, transporation by plants, evaporation, or a combination of all three.

Site #3: Measurements were made one week apart. Average width decreased from 11.1 m to 9.2 m (17.1% decrease) and average depth decreased from 10.8 cm to 8.8 cm (18.5% decrease). Water continued to flow through the SYR, at approximately the same rate as when last measured (5.9 cfs on 10/31/94), for several months after the study was completed (Table 3). The actual affect of no flow from the dam may be greater than is apparent. At least one tributary (Salsipuedes Creek) flows into the SYR above site #3. Flows were not taken at Salsipuedes Creek to determine its contribution to the SYR.

FISHERIES-MAINSTEM AND TRIBUTARIES

MAINSTEM FISHERY SURVEYS

Late spring/early summer downstream trapping

The results of the trap data are presented in Table 4. Sculpin, fathead minnows, arroyo chub, and stickleback were the fish species that were captured. Stickleback and fathead minnows were the fish species captured in the greatest numbers. On May 26, 1994, a 73mm ammocoete (juvenile lamprey) was captured and released downnstream. At the trap site, daily water temperatures approached or exceeded the upper tolerance of steelhead/rainbow trout on most days.

Downstream migration trapping during WR 89-18 releases

Water releases for WR 89-18 began on July 25, 1994. For several weeks prior to the releases, the entire 8.0 mile reach from the weir location to the long pool was almost completely dry. Only a few shallow pockets of water were present. It took three days for the water (releases at 150 cfs.) to reach the trap site.

The majority of fish migration was observed within the first week of releases. Hundreds of fish (all warm water species, mainly juvenile largemouth and smallmouth bass) were visually observed

Table 5. Air and water temperature, and water flow during a portion of WR 89-18 relea At the Downstream Migrant Trap (Gainey Winery - Juan Lolita Ranch)

Date	Air (C)	Water (C)	Flow (cfs)	Time of Day
July 28	29	17	65	845
July 29	15	16	*	754
July 30	15	17	*	840
July 31	*	15.7	101	930
Aug. 1	29.4	21	*	1600
Aug. 3	*	16	148	1015
Aug. 5	22	16	*	1000
Aug. 6	*	15	161	800
Aug. 9	25.5	17.7	69	947
Aug. 10	20	17	*	900
Aug. 11	25.5	17	*	745
Aug. 12	23.2	18.5	40	900
Aug. 13	29.4	22.7	*	1145
Aug. 14	22.7	18.8	*	830
Aug. 15	29	23.1	45	1030
Aug. 16	26.6	24.4	*	1738
Aug. 17	29.4	24.9	*	1600
Aug. 18	29	21.3	65	1030
Aug. 20	19.9	17.7	*	930
Aug. 22	15.8	16.2	67	915
Aug. 24	23.8	19.4	*	1117
Aug. 25	*	*	68	*
Aug. 27	21.1	18.3	*	1000
Aug. 29	21.1	20.5	*	1200
Sept. 1	14.9	16.1	*	830
Sept. 6	30.5	24.9	*	1400
Sept. 9	27.2	23.3	*	1430
Sept. 10	22.2	24.4	*	1430
Sept. 19	28.8	23.5	*	1440
Sept. 23	19	17.7	30	930
Sept. 26	34	24	*	1400
Sept. 30	25.5	24	*	1605

following the leading edge of water as it progressed downstream. We did not deploy the weir until one day after flows had passed the proposed weir site due to the uncertainty as to how the water would follow the river channel. As a result, the capture results do not reflect the numbers of fish visually observed at the leading edge of the flows.

A total of ten largemouth bass were captured ranging in size between 60-89 millimeters(2 1/4-3 1/4 inches). About 70% of the bass captures occurred within the first week of trapping. A total of five crappie juveniles and two green sunfish juveniles were captured at various times throughout the trapping. Since crappie were not observed during snorkel surveys, it can be assumed they originated from the spill basin.
No steelhead/rainbow trout were captured during the trapping.

Air temperature had less effect on water temperature when the releases were higher (Table 5). As flows decreased, water warmed considerably, especially later in the day. With late afternoon air temperature at 29 C, water temperature was 25 C at 50 cfs August 17). Compare that with 21 C at 150 cfs when air and time of day were identicle (August 1). Regardless of the release, water temperatures were cooler in the morning than in the afternoon.

Challenges which occurred during trapping included: 1) Having to make openings in the panels during the first few days of trapping to allow large amounts of debris to flow through (or risk weir blowout) which also allowed many migrating fish to escape capture, 2) beginning August 11, 1994 (two weeks after trapping had began), and continuing until September 30, 1994, clogging of the weir and panels by enormous daily amounts of moss and algae made effective trapping difficult.

Approaches for next year's trapping include: 1) Deploying the trap in a wider, shallower portion of the river (preferably 150 meters upstream of current location), 2) Deploying the trap before water reaches the trap location (to document the initial migrating fish), and 3) Placing debris screen upstream to collect debris and prevent blowouts.

Downstream Migrant Trapping During Rampdown of WR 89-18

Site #1: No fish were trapped during the 15 cfs release. The majority of fish migration took place during the 10 cfs release (Table 6). A total of three largemouth bass fry, 22 crappie fry, 4 sculpin, 2 fathead minnows, 1 catfish fry, and 7 crawdads were captured during the 10 cfs release. During the 5 cfs release (10/29 - 10/30), 1 crappie fry, 1 fathead minnow, and 8 crawdads were captured. As flows were ramped down to zero, trapping continued until water no longer flowed into the trap (11/5/94). Between the 1 cfs and zero release (10/31 - 11/5), 5 largemouth

Table 6. Weir captures by site and date during rampdown of WR 89-18.

Site #	Flow	Date	Fish Species Captured						
			LM Bass	Crappie	Sculpin	Stickleback	Fathead	Crawdad	Catfish
1		10/26	2	9	3	0	2	4	0
		10/27	1	12	1	0	0	3	0
		10/28	0	1	0	0	0	0	1
	5	10/29	0	1	0	0	1	2	0
		10/30	0	0	0	0	0	6	0
	1	10/31	1	0	0	0	0	4	0
		11/1	2	0	2	0	0	8	0
		11/3	2	0	1	0	0	12	0
		11/5	0	0	0	0	0	0	0
2		10/27	0	0	0	1	0	4	0
		10/28	0	0	0	0	0	6	0
		10/29	1	0	0	0	0	4	0
		10/30	0	0	0	0	0	3	0
		10/31	0	0	0	0	0	5	0
		11/1	0	1	0	1	0	5	0
		11/3	0	0	0	0	0	3	0
		11/5	0	0	0	0	0	0	0

Table 7. Results from the May and July 1994 Snorkel Survey of Long Pool

		May		July	
	Species	Numbers	Size	Numbers	Size
Pass #1	Steelhead/trout	2=>	20 inches	0	20 inches
		5=<	16 inches	1=<	16 inches
	Largemouth Bass	2=>	18 inches	0	0
		3=>	14 inches	0	0
	Smallmouth Bass	5=>	12 inches	6<=	14 inches
	Green Sunfish	1=	12 inches	1=	12 inches
	Channel Catfish	1=	36 inches	0	0
	Pond Turtles	2	N/A	0	0
	Largemouth Fry	>200	< 4 inches	>500	<4 inches
	Carp	0	0	1>	12 inches
Pass #2	Steelhead/trout	1=>	20 inches	0	20 inches
		5=<	16 inches	4=<	16 inches
	Largemouth Bass	1=>	18 inches	0	0
		2=>	14 inches	0	0
	Smallmouth Bass	6=>	12 inches	5<=	14 inches
	Green Sunfish	1=	12 inches	0	0
	Channel Catfish	1=	36 inches	0	0
	Pond Turtles	2	N/A	0	0
	Largemouth Fry	>200	< 4 inches	>500	<4 inches
	Sculpin	0	0	2=	2 inches

bass, 3 sculpin, and 24 crawdads were captured.

Fish migration, especially crappie fry, probably originated from the spill basin as flows decreased. As flows decreased to the 5 cfs level, the majority of fish had apparently already migrated downstream.

Site #2: A total of 1 largemouth bass fry, 1 crappie fry, 2 stickleback, and 30 crawdads were captured from 10/27 - 11/5/94 (Table 6). A preliminary snorkel survey of refuge pools above and below the trap site during the rampdown resulted in only 1 adult largemouth bass observed. Whether fish migrated further down river, were predated upon by birds or other animals, or died as a result of poor water quality remains unknown.

Snorkel Survey-Mainstem (Long Pool)

First Survey: General observations of the were as follows: Water visibility ranged between 7-15 feet. No surface algae was present. Abundant amounts of aquatic algae observed growing up from the bottom. Oxygen production was observed in the form of visible bubbles floating from the plants to the water surface. Daphnia populations were very dense. Upwelling of cool water was felt in several areas of the long pool. Results from two passes along with the July survey results are presented in Table 7.

Three of the steelhead/rainbow trout observed appeared to have eroded and clubbed fins, indicative of hatchery origin or spawning activity. However, the largest steelhead/rainbow trout observed appeared to be of wild origin. The fish was in excellent condition, had a red band along the lateral line, and had no eroded or clubbed fins. Steelhead/rainbow trout were observed swimming at mid-water level or near bottom.

Temperature conditions in Long Pool appear to be adequate for the survival of adult steelhead/rainbow trout. Upwelling of cooler water may contribute to this although it has yet to be quantified. Survival conditions for juvenile steelhead/rainbow trout are doubtful due to abundant presence of predators, inadequate temperature conditions, or both. The presence large numbers of largemouth bass fry indicates that the bass population is self-propagating.

Second Survey: General observations for the on July 11, 1994 were as follows: Water visibility was cloudy and ranged between 4-8 feet due to the presence of filamentous clouds of algae. The head of long pool (approximately 100 feet) was not snorkeled due to the buildup of thick algae mats. Tall (6-7 feet) aquatic vegetation was abundant in all areas except where large rocks were present. Much of this vegetation blocked our view to many of the deeper areas in long pool. Near the bottom in some of the thicker vegetative areas, it appeared as if tunnels or lanes had

been made by the movements of fish. These areas provided shade and cover for any fish that may have ventured inside. Filamentous clouds of algae were moderate to heavy in all areas snorkeled. High water temperatures appeared to affect steelhead/rainbow trout to a greater extent than the last survey. Steelhead/rainbow trout were observed hanging close to the bottom in ares of cool water upwelling. When spooked, the fish did not seek cover but instead stayed within the confines of the upwelling area (roughly 4-6 feet diameter). All steelhead/rainbow trout except one were observed in the middle portion of long pool just downstream from the staff gauge. The one exception was observed near the reeds on the opposite side of the pool. Results from the two passes are presented with the May survey results in Table 7. Fish counts changed somewhat when compared to the May survey. This may be due to the large increase in cover since the May survey. Largemouth bass observed decreased between the two surveys (5 to 0). Smallmouth bass numbers remained fairly constant (6 to 5). Numbers of largemouth bass fry increased from greater than 200 in May to over 500 in July. Steelhead/rainbow trout numbers decreased from seven in May to four in July.

Third Survey: Water releases of roughly 150 cfs for the recharge of Lompoc (WR 89-18) had been ongoing since July 25, 1994. Upon entering the water we noticed that the visibility was between 2-3 feet, possibly due to the stirring up of substrate within the spill basin as a result of the releases, or to the mixing of nutrients which might cause algae blooms. The entire length of the long pool was snorkeled and no fish observations were made. Water clarity in long pool has remained relatively poor since WR 89-18 releases began.

Snorkel Surveys-Mainstem

Prior to the surveys (as early as June 6, 1994) the stretch of river encompassed by the two snorkel surveys had been almost completely dewatered. Foot surveys upstream from the Refugio Road Bridge during the month of July revealed one isolated area where water was upwelling to the surface. Most of these areas were shallow (1-2 feet) and continued for around 100 feet. Some pockets of water still remained in areas where there were pools below Refugio Road. These pools varied in depth one to five feet. Observations into these pools was limited due to algae mats. Fish that were observed were arroyo chub, stickleback, and mosquito fish.

First Survey: Water clarity was approximately 15 feet depending on the amount of disturbance to habitat. Pools and runs were the areas most effectively snorkeled. Most riffles were too shallow to be effectively snorkeled. Extensive beaver activity has created approximately five "long pool" areas. Many bass were seen holding in these areas. Associated with the beaver dam

areas were abundant reeds along both river banks. Arroyo chub were observed in run areas and small side channel pools that had moderate amount of cover. Most areas snorkeled were lacking instream cover (i.e., woody debris, boulders, fallen willows). The few areas that did have cover had fish associated with them. While most of the 1.7 mile stretch of river had some sort of riparian habitat associated with it, there were very few areas that had any canopy (branches or leaves above the water). Canopy is important for several reasons. The most important is because it shades the water and decrease the amount of heating caused from solar radiation. Those areas where canopy was observed usually had some sort of fish species present.

Results: Counts were broken down by fish species to size groups less than six inches and greater than six inches.

Largemouth Bass		Smallmouth Bass		Arroyo Chub
< 6 inches	>	< 6 inches	>	# Observed
0	18	19	4	> 150

Second Survey: We observed no fish in water areas less than six feet deep. In some riffles we turned over rocks looking for riffle sculpin and found none. Most of the entire three mile reach lacked canopy. Instream cover was localized mainly to stream margin areas. All fish observed were concentrated in pools six feet deep or greater. In these pools, large bass were seen congregating near the bottom with a linear type dispersement (largest to smallest). Small bass (< 4 inches) were observed closer to margin areas where cover was readily available. It was surprising to snorkel runs and pools four feet deep that had some canopy and moderate amounts of riparian and instream cover, and observe no fish. Three small fish were observed whose species we could not identify.

Largemouth Bass		Smallmouth Bass		Channel Catfish
< 6 inches	>	< 6 inches	>	# Observed
33	21	0	3	2

TRIBUTARY FISHERY SURVEYS

Four tributaries El Jaro, Salsipuedes, Nojoqui, and Quiota Creeks (one nameless tributary to Quiota Creek) have available rearing and over-summering habitat and water year around. Steelhead/rainbow trout have been observed using direct observation techniques and captured using electroshockers in both El Jaro and Salsipuedes during May and August of 1994. Although Nojoqui Ck. has suitable instream and riparian habitat, no steelhead/rainbow trout have been observed or captured in 1994 using the above methods. Species of bass and bluegill have been observed in Nojoqui Creek. All tributaries surveyed with the exception of Quiota, have healthy populations of arroyo chub and

stickleback. Other tributaries surveyed in 1994 (Quiota and Alisal Creeks) have water in varying amounts during the year but no fish have been observed/captured. However, several different age classes of trout were captured in a nameless tributary to Quiota Creek. Results of this survey are presented in the Other Snorkel and Electrofishing Survey section. No fish (steelhead/rainbow trout or others) were observed or electrofished in Quiota Creek proper in 1994.

The TAC received an unsubstantiated report that trout were present above the dam on Alisal Creek. Mat Anderson of the Alisal Guest Ranch informed the TAC that trout survived the drought and, to the best of his knowledge, no planting of hatchery fish has ever occurred on that portion of the creek. The DFG stocking records have not been looked at yet to determine this. Sampling of Alisal Creek is tentatively scheduled for 1995.

Walking surveys

May 4, 1994 Survey of Salsipuedes and El Jaro Creeks.

Directly below bridge #51-95 is a large plunge pool approximately two meters deep, with dimensions 11 meters by 8 meters. Surface feeding was observed but the species of fish could not be determined. Cover in this pool consisted of undercut banks and a bubble curtain where the water entered. Flow was visually estimated to be about 3 cfs. Water temperature at 1146 was 17.0C.

The first approximate 1/4 mile of river upstream from bridge #51-95 is characterized as having abundant riparian vegetation. An intact canopy exists in most of this area. Some small pools (< 1 meter deep) were present which offered cover in the form of bubble curtains and undercut banks. The flood plain widens after 1/4 mile with minimal riparian vegetation and canopy to influence the creek. A large corner scour pool was present in this area. Several pond turtles were observed in this pool. Just above the corner scour pool was a lateral scour pool with an undercut bank. One possible trout was observed here (apx. 10 cm). Arroyo chub, fathead minnows, and stickleback were abundant in all habitats, especially pools.

Another trout (apx. 13 cm) was observed above a recently constructed beaver dam about 100 meters below the Jalama Road bridge. Directly below Jalama Rd. bridge was a large deep pool that is scheduled for snorkeling in 1995. Several fish were observed here (species unknown). Roughly 200m above Jalama Rd. bridge a possible redd was observed and flagged for future reference.

Confluence of El Jaro and Salsipuedes Creeks 1330 hours:
Temperature in confluence: 19.0 C
Temperature in El Jaro: 19.8 C
Temperature in Salsipuedes:16.0 C

Salsipuedes above the confluence with El Jaro:

The survey proceeded up Salsipuedes Creek where a small trout was observed in a pool about 50m above the confluence. Roughly 150-200m above the confluence is log formed pool (log circumference apx. 8 feet), where two juvenile trout (7-10 cm) were observed. There is excellent cover and shading in Salsipuedes Ck. from the confluence with El Jaro Creek to the end of the survey area (approximately 300 meters). In addition, suitable spawning gravels were observed in all riffle and pool tailout areas.

We ended Salsipuedes Ck. survey where a large fallen arroyo willow crosses the creek.

El Jaro above the confluence with Salsipuedes Creek:

Nearly 150 meters above the confluence was a large pool where 2 trout (13-15 cm) were observed. This pool had good shading as a result of overhanging willows. There was excellent trout habitat for nearly 50 meters above the pool. Habitat was characterized as having good canopy, overhanging vegetation, and good instream cover in the form of vegetation and boulders.

Observed 4 trout (7-13 cm) in a long deep pool with good canopy approximately 35 meters below a ford (25 meters above previous pool). Water temperature was 19.8 C. There is a large metal plate roughly one meter wide by 2.5 meters long at the head of the pool.

From the ford to a private bridge (roughly 150 meters), habitat is marginal consisting of fine sediment, slow flow and medium canopy. From the private bridge upstream to a sandy cliff on the left bank, the habitat is characterized as high gradient riffles, very rocky, and appears to provide quality trout habitat. Roughly 50 meters upstream of the sandy cliff is a pool where a cottonwood has fallen across the river. We observed 1 trout approximately 6 inches in length.

Roughly 3/4 of a mile above the ford we observed another old ford where the downstream concrete portion had broken away to form a plunge pool. This pool was fairly deep and fish were seen feeding on the surface. This pool will be scheduled for snorkeling in 1995. Directly above the cement drop is a long shallow pool roughly 100 meters long and 4 meters wide. The canopy is relatively intact but the substrate is almost entirely silt.

Nearly 1.5 miles above the ford we observed two possible redds and flagged the spot. There is a good pool along this site with a deep undercut along the cement bank on the left bank of the stream.

No trout were observed after the broken cement ford. We did however observe some reaches that had excellent spawning and rearing habitat. The survey continued nearly two miles above the broken cement ford without observing any trout. Other fish species (i.e., arroyo chub, stickleback) were greatly reduced when compared to below the cement barrier. A greater influence from cattle grazing was observed further up El Jaro Ck. The stream banks were destabilized and there was an increase in the amount of long silty pools. The survey concluded roughly 1 mile from bridge # on Highway 1.

May 5, 1994 Survey of Nojoqui Creek

The water temperature was 16.5 C at 1012. Flow was visually estimated between 3 and 4 cfs. The area upstream of this bridge is characterized as having dense riparian vegetation and canopy along both banks which hang into and over the creek in many places. Walking along and through the stream proved difficult due to abundant vegetation. Spawning and rearing habitat appeared to be in good condition along the upper survey reach. Several medium to large pools appeared to have sufficient cover and depth to hide fish from our observation. These pools were snorkeled during 1994 with no trout/steelhead observed. After walking approximately 1/4 mile upstream from the bridge, passage proved increasingly difficult. The survey crew returned to the bridge and continue the survey downstream.

The downstream section is characterized as having good spawning and rearing habitat. Dense riparian and overhanging vegetation provide canopy cover for much of the stream. Many pools are available which offer excellent cover in the form of depth, roots, undercut banks, and boulders. Abundant populations of arroyo chub and stickleback were observed throughout much of the stream habitat. Just past the second to last northern most Highway 101 bridge that spans the creek was a concrete dam that holds the water flow approximately one meter feet above a plunge pool (pool dimensions 12 m x 12 m). There is a huge root mass that is sticking up at the left bank. No fish were observed but the pool may provide excellent over-summering habitat.

Roughly 250 meters downstream from the dam, cattle impacts became much more evident. Stream banks were noticeably eroded. Cattle tracks were present in the stream and green algae was becoming abundant to the point of covering 75% of pool surfaces. We

observed some sunfish and largemouth bass in one deep pool. The stream bed and stream bank continued to become more degraded as we moved closer to the confluence with the Santa Ynez. Riparian vegetation and canopy no longer influences the stream in this section.

The last 1/2-3/4 of a mile before the confluence had no canopy, very little riparian vegetation, and as a result, the flow began to disappear. Cattle activity was abundant. The stream disappears underground approximately 1/4 mile before it reached the Santa Ynez River. No trout were observed during our survey.

Nojoqui Ck. displayed some of the best spawning and rearing habitat encountered during the 1994 stream surveys. With the exception of strong rain events, the creek falls short of meeting up with the Santa Ynez by approximately 1/4 mile or more depending on the time of year. From where the creek runs dry, upstream roughly 1/2-3/4 mile the stream habitat is moderately to extremely degraded. For roughly 1/4 mile from where the creek drys out, the area has been channelized with a bulldozer and all the riparian vegetation removed. As a result, no canopy exists in this region either.

May 5, 1994 Survey of Quiota Creek

The time was 1400 hours, the water temperature 17.0 C. Water clarity was poor in all pools observed due to a cloudy precipitate in the water. No fish were observed in any portion of the stream. Rocks were turned over at random locations to assess insect life. Several insect populations appeared to be abundant and comparable to other tributaries. The survey crew observed several species of Tricoptera (caddisfly) and Ephemeroptera (mayfly). In addition, Belostomatids (toe biters) were also observed.

Aquatic habitat in Quiota Creek is severely degraded due to cattle who have free range over the entire stream. Fecal matter is visible in the stream and on rocks. Canopy consists of oaks and willows that are fairly abundant throughout the tributary. Riparian vegetation is lacking in many places. Silt is the dominant or subdominant substrate in all areas that have water, especially pools. The survey crew spoke briefly with an older gentleman who stated that many years ago trout were present in the creek year around. He said that since the drought the creek has been dry over summer and he no longer sees fish there.

Snorkel and Electrofishing Surveys

Several electrofishing and snorkel surveys have been performed at the confluence area of El Jaro and Salsipuedes Creeks in 1994. These surveys were performed in conjunction with Entrix personal as part of the EIS/EIR review for the Cachuma Project Contract

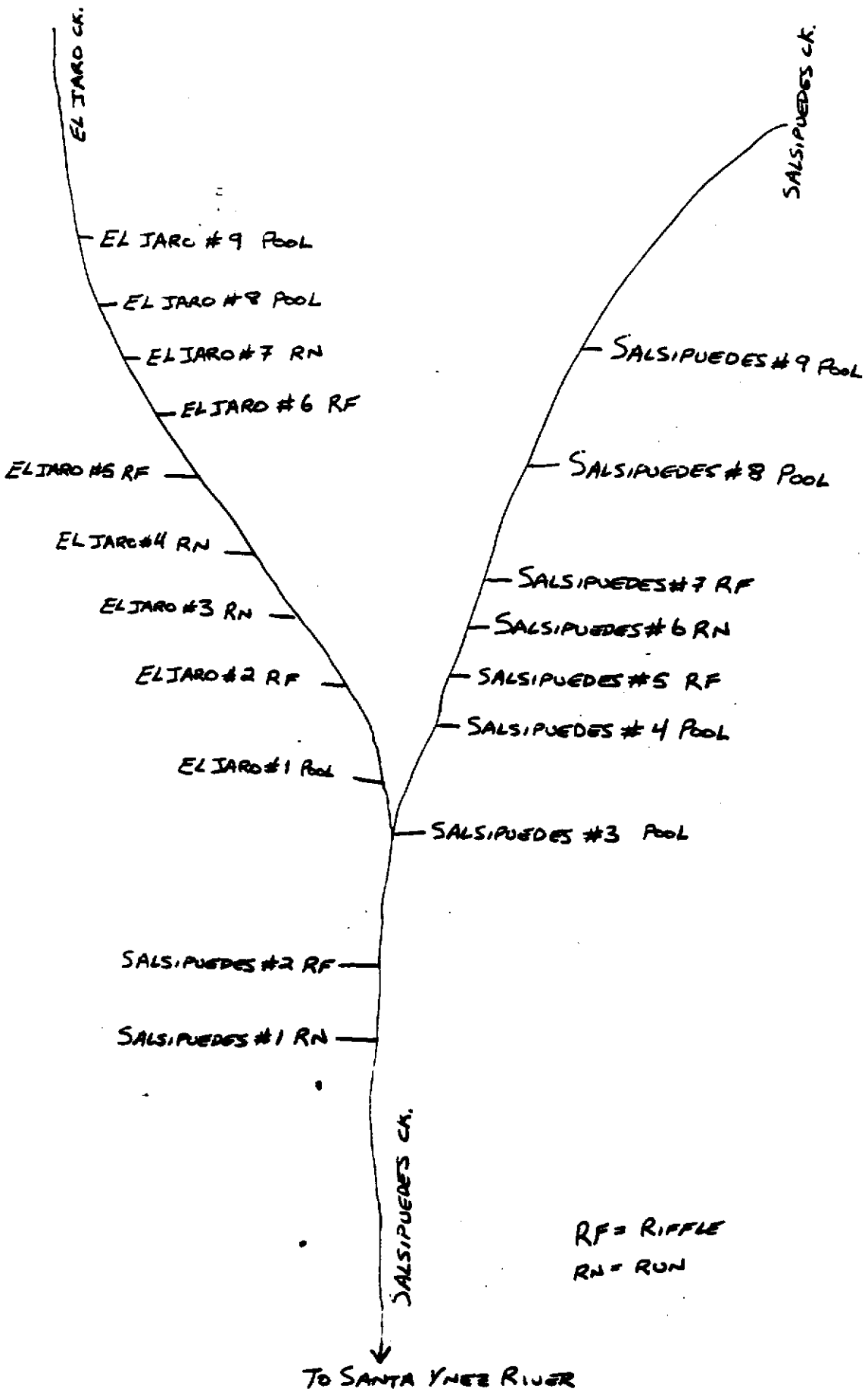


Figure 2? Hand Drawn .ap of Sample Sites at Coonfluence of Salsipuedes Creek and El Jaro Creek.

Renewal. This confluence area (Figure 23), especially upper Salsipuedes Creek, is one of the few places where a self sustaining population of rainbow trout/steelhead have been observed as evident from the different age classes encountered. Other agencies such as the USFS and the USFWS have been interested in this area and have participated in a number of surveys. Their cooperation and assistance has been extremely helpful.

May 24-26, 1994 Confluence Survey Results:

Captured young of the year trout during May ranged in size between 35-55 mm. During August, captured fish had grown to between 60-80 mm. Juvenile steelhead/rainbow trout or adult rainbow trout ranged between 100-300 mm during both sampling dates. Habitat typing of each site was performed on May 27, 1994 after surveys were concluded .

Water temperature in Salsipuedes Creek (May 24, 1994) ten meters above the confluence was 14.4 C at 0920. Water temperature in El Jaro Creek ten meters above the confluence was 16.9 C at 0925. Water temperature in Salsipuedes Creek ten meters below the confluence was 16.0 C at 0930.

Morning water temperature in Salsipuedes Creek above the confluence were approximately two degrees lower than El Jaro or Salsipuedes below the confluence. This is probably because Salsipuedes Creek above the confluence is a smaller watershed and has a more intact canopy which reduces the amount of warming from solar radiation.

August 16-17, 1994 Confluence Survey Results:

This second summer survey was required as part of the EIR/EIS to document growth and movement of fish since the spring.

The same eighteen habitat units were sampled in August that were sampled in late May. Pool habitats were snorkeled and riffle/run habitats were electrofished (Table 8). Year classes were again determined by size. Young of the year trout typically ranged in size between 60-80 mm. Fish between 100-300mm were determined to be juvenile steelhead/rainbow trout or resident rainbow trout. Only one fish was observed over the 250 mm length. This observation occurred in the Salsipuedes Site #4.

Table 8. Spring and Summer results of electroshocking and snorkel surveys.

Salsipuedes Ck. Below Confluence With El Jaro Ck.

Site #	Habitat Type	May YOY	August YOY	May Juvenile	August Juvenile
1	Run	5	10	3	0
2	Riffle	8	5	0	0
3	Pool	0	36	4	2

Salsipuedes Ck. Above Confluence With El Jaro Ck.

Site #	Habitat Type	May YOY	August YOY	May Juvenile	August Juvenile
4	Pool	4	18	0	2
9	Pool	9	0	0	2
5	Riffle	3	2	0	0
7	Riffle	1	1	0	0
6	Run	8	3	0	0
8	Run	8	6	0	0

El Jaro Ck. Above Confluence With Salsipuedes Ck.

Site #	Habitat Type	May YOY	August YOY	May Juvenile	August Juvenile
1	Pool	0	5	2	0
8	Pool	0	1	0	3
9	Pool	0	1	8	3
2	Riffle	2	0	1	0
5	Riffle	3	5	3	0
6	Riffle	0	1	1	0
3	Run	0	2	0	0
4	Run	1	7	1	0
7	Run	0	1	0	0

August 16, 1994 water quality in Salsipuedes Creek 10 meters above the confluence:

	Time 0940	Time 1400
Water Temp.:	16.1 (C)	19.8
Conductivity:	1350 (umhos)	1450
Dissolved Oxygen:	8.2 (ppm)	9.3

Water quality in El Jaro Creek 30 meters above confluence:

	Time 0946	Time 1405
Water Temp.:	18.0 (C)	20.0
Conductivity:	1380 (umhos)	1490
Dissolved Oxygen:	4.5 (ppm)	7.6

Water quality in Salsipuedes Creek 20 meters below confluence:

	Time 1000	Time 1410
Water Temp.:	17.1 (C)	20.0
Conductivity:	1300 (umhos)	1450
Dissolved Oxygen:	9.8 (ppm)	9.4

Morning water temperature in Salsipuedes Creek above the confluence were one to two degrees lower than El Jaro or Salsipuedes below the confluence. Afternoon water temperatures were essentially the same at all three measuring sites. In Salsipuedes Creek, both above and below the confluence, morning and afternoon dissolved oxygen measurements were significantly higher when compared to El Jaro Creek. Conductivity at all three measuring sites rose an average of 120 umhos between the morning and afternoon readings.

Results of the August survey are presented for comparison with the May survey in Table 8.

YOY steelhead/rainbow trout growth were easier to determine because their small size and larger numbers made comparison easier. YOY steelhead/rainbow trout on the average grew approximately 25 mm in length between the May and August survey. Juvenile trout growth was difficult to determine. Their larger size range and fewer numbers captured made growth evaluations inconclusive. However, all size classes of steelhead/rainbow trout were in robust condition and were observed to have good coloring. Water temperatures were slightly warmer during the August survey. Figure 24 (YOY) and Figure 25 (juvenile) show the comparison of survey results between the May and August surveys and the population shifts that have occurred.
Young of the year (YOY) steelhead/rainbow trout were observed in eight of the nine sample sites in Salsipuedes Creek in the May

May 24, 1994 and August 16, 1994

Figure 24. May & August Survey Results
Young Of The Year Trout By Site

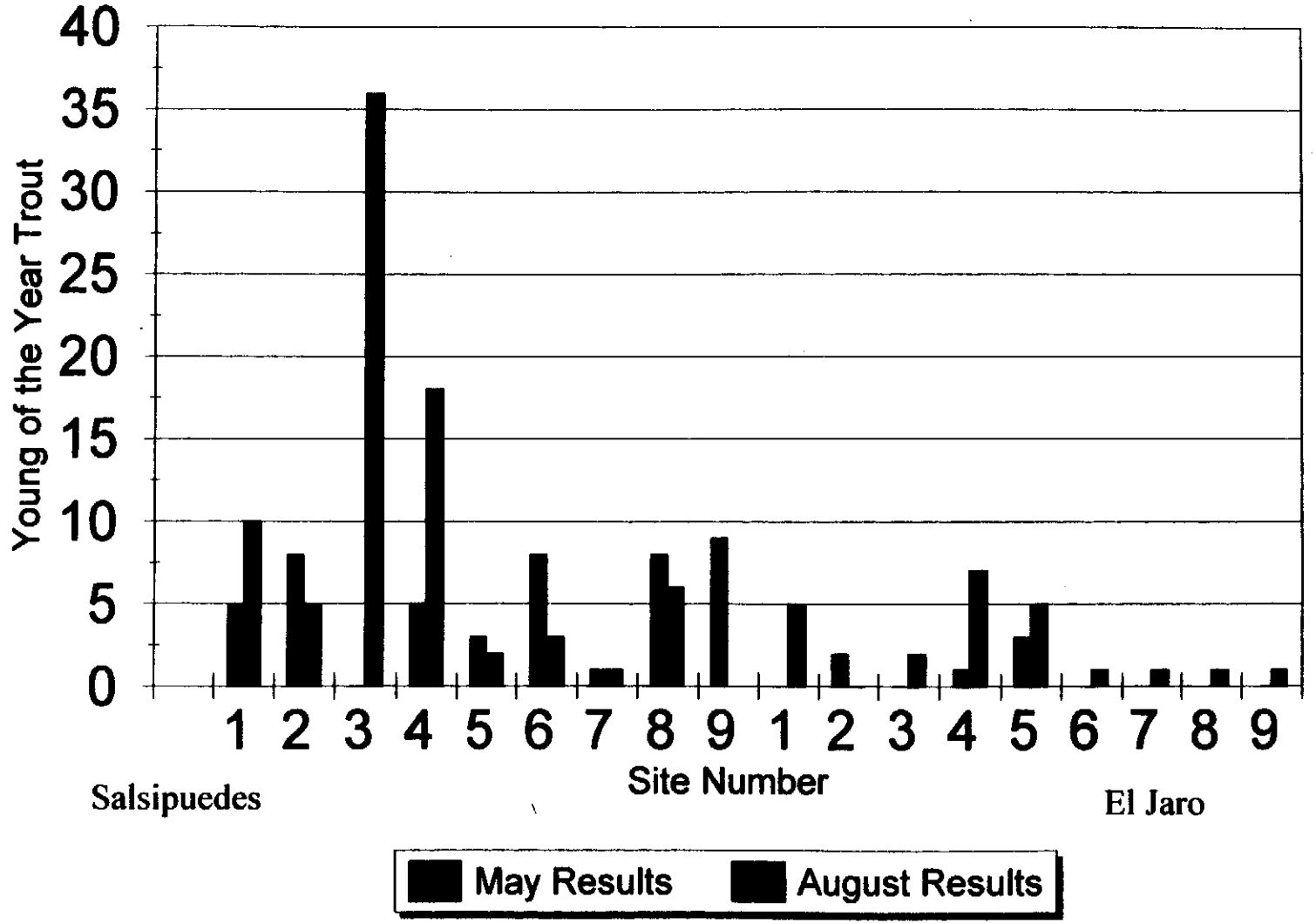
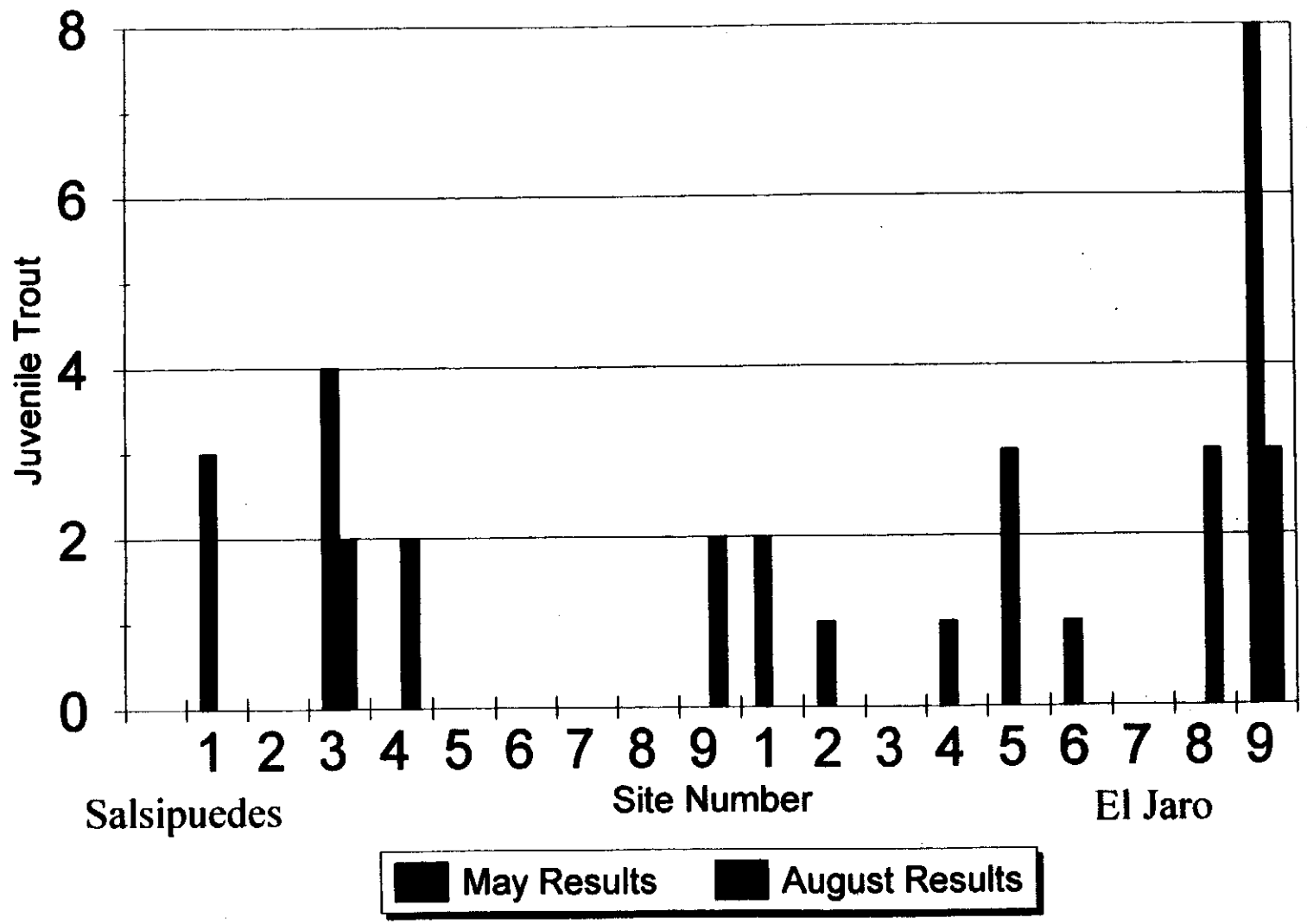


Figure 25. May & August Survey Results
Juvenile Trout by Site



and August 1994 surveys. There were greater numbers of YOY in Salsipuedes Creek compared with El Jaro during both May and August surveys. The greatest change in the YOY populations between the two surveys occurred in two of the three pool sample sites in Salsipuedes Creek. Numbers of YOY trout increased from 0 to 36 in the confluence pool of Salsipuedes and El Jaro Creeks (Site #3) and from 2 to 18 in the first pool upstream of the confluence pool (Salsipuedes Site #4). In the six sample sites in Salsipuedes Creek above the confluence, numbers of YOY remained fairly constant between the May and August surveys (30 vs. 33). The greatest increase in YOY numbers between May and August occurred in Salsipuedes habitat units 1-3 below the confluence (13 vs. 51).

Streamflow in Salsipuedes Creek above the confluence remained fairly constant between the May and August surveys (approximately 0.2 cfs visual estimate during May and August).

It was apparent in Salsipuedes Creek that juveniles were not utilizing the riffle areas in May or August above or below the confluence. Runs are also not favored, probably because of decrease in available habitat over summer months. This was apparent more so in August than in May (3 vs. 0).

Pools appear to be the favored habitat of the juveniles in Salsipuedes Creek and El Jaro Creek, particularly during August. During August, pools were the only habitat in which juveniles were found.

YOY steelhead/rainbow trout in El Jaro Creek increased in eight of the nine sample sites. The number of YOY in all nine sites increased from 6 in the May survey to 24 in the August survey.

There were over twice as many juveniles (16 vs. 7) in El Jaro Creek than Salsipuedes Creek in May. Furthermore, all seven of the juveniles found in Salsipuedes were located upstream of the confluence. However, during August, equal numbers of juveniles were found in El Jaro and Salsipuedes (6). All steelhead/rainbow trout juveniles were found in pool habitats. In Salsipuedes, four of the six juveniles were found at or upstream of the confluence pool.

During the August survey no juveniles were collected from riffle or run habitats. Six juveniles were observed (three in El Jaro site #8 and three in site #9) during the August snorkel survey. It should be noted that visibility in El Jaro Creek was roughly four to five feet in site #8 and two to three feet in site #9. In addition, approximately 74% of Site #9 was covered in algae and could not be sampled.

Table 9. Results of spot electrofishing survey of tributary to Quiota Creek. Sunday October 2, 1994 - Juan Lolita Ranch

Species	Length (mm)
Stlhd/Rbt	221
Stlhd/Rbt	217
Stlhd/Rbt	202
Stlhd/Rbt	201
Stlhd/Rbt	199
Stlhd/Rbt	194
Stlhd/Rbt	188
Stlhd/Rbt	168
Stlhd/Rbt	167
Stlhd/Rbt	165
Stlhd/Rbt	71
Stlhd/Rbt	70
Stlhd/Rbt	51

Other snorkel and electrofishing surveys

Nojoqui Creek: Approximately 500 meters of the creek was electrofished randomly in riffles, runs, and shallow pool areas where steelhead/rainbow trout might be found. Snorkeling was centered on deeper pool areas where over-summering trout might be found. Both types of surveys resulted in no steelhead/rainbow trout observed or captured. A few pools have small populations of green sunfish and largemouth bass. Abundant populations of arroyo chub and stickleback were observed in all habitat areas.

Tributary to Quiota Creek: The creek is located within a steep gully with little riparian vegetation, however, it has a large amount of boulder cover and adequate pool depth in some places to provide refuge for trout. Significant canopy in the form of large oaks and cotton woods shade a significant portion of the creek.

Water chemistry at 0930 hours:
Air Temp. - 15.5 C
Water Temp. - 14.5 C
Conductivity - 820 umhos
Dissolved Oxygen- 7.6 ppm

Thirteen trout were captured (Table 9) ranging in size from 51-221 millimeters. Three of the captured fish were YOY (51, 70, 71 millimeters). Six of the captured trout ranged in size between 165-199 millimeters. The remaining four were between 202-221 millimeters. There were at least 100 YOY trout observed over the entire reach (visual estimate). Another 20-30 juvenile/adults were also observed. All trout captured were in good condition if not robust in size. All were very colorful and had no eroded or clubbed fins. The Juan Lolita Ranch Foreman informed me that this population of trout has managed to sustain itself through out the drought. He also informed me that he has never seen a trout in this reach larger than the one we captured in the tributary. Scale and tissue samples will be taken at a later date pending permission.

Downstream Migrant Trapping

From April 6 to April 27 no trout were captured. From late April until July, six young of the year trout ranging in size between 36-57 millimeters were captured and released downstream. The first trout was captured on May 17. The remaining five trout were captured during a one week period from June 1 to June 6. Whether these trout were migrating to the ocean or dispersing downstream remains unknown. Other fish species captured included arroyo chub, stickleback, fathead minnow, and riffle sculpin (Table 10). Belostomatids, a large predacious aquatic insect species, were also captured in large numbers during trapping. This insect was responsible for most if not all of the fish

mortalities associated with the trapping. No steelhead/rainbow trout predation were observed by this insect.

Morning water temperatures from April to June ranged between 13.6 (C) and 17 (C). Water temperatures became moderately warmer as the day progressed. The highest recorded temperature 23 (C) and occurred on June 10, 1994. However, most late afternoon temperatures from April to June ranged between 17 (C) and 20 (C).

Another downstream migrant trap was deployed at the same location on October 20, 1994. The reason for deploying the trap early was to see if trout are migrating out of Salsipuedes Creek and into the SYR at the beginning of the rainy season. As of December 27, 1994 four steelhead/rainbow trout ranging in size between 80-93 mm have been captured and released downstream. Some darkening of the caudal fin and dorsal fin was observed, however, the fish were lacking the silver coloration indicative of smolting and were instead very colorful with visible parr marks. No fish species has been captured in Salsipuedes Creek as of February 15, 1995. Excessive storm activity has prevented long term installation of the weir.

SCALE ANALYSIS FROM 1993-94 SCALE SAMPLES

None of the 13 samples appeared to reflect a typical steelhead scale growth pattern, based on the readers experience from other streams. However, one apparent consistency among the trout sampled in fall 1993 was the good growth in the year of capture, relative to their growth in earlier years, based on relative spacing between circuli. This pattern was seen in seven of the eight scale samples taken during that period. Scales taken from trout in early 1994 also suggested relatively good growth during the proceeding year. Some trout exhibited a high degree of homogeneity in circulus formation during their early life history, which might be indicative of rearing in a hatchery environment. Most though appeared to have a natural growth pattern as reflected in the heterogeneity of their circulus formation.

It is conseivable that the relative good growth in 1993 was the result of a short sojourn in the marine environment, perhaps the SYR lagoon. Another explaination is that the trout responded favorably to enhanced in-river conditions provided by the higher flow conditions during late 1992-early 1993.

Table 10. Salsipuedes Creek Trap Results April-July 1994

Date	Species	Species Totals	Mortalities	Air Temp.(C)	Water Temp.(C)	Time	Trap Depth (cm)
Apr. 27	Arroyo C.	14	0	N/R	14.5	730	N/R
	Stickleback	12	0				
	Belostomatid	5	0				
Apr. 29	Arroyo C.	4	1	15	15.5	730	N/R
	Stickleback	7	0				
	Belostomatid	1	0				
May 2	Arroyo C.	11	0	13.6	13.6	830	N/R
	Stickleback	7	0				
	Belostomatid	20	0				
May 4	Arroyo C.	12	0	18.5	15	1010	N/R
	Stickleback	2	0				
	Belostomatid	16	0				
May 9	Arroyo C.	19	4	17.2	16	930	N/R
	Stickleback	4	0				
	Belostomatid	20	0				
	Trout	1	0				
May 10	Arroyo C.	31	2	16.5	16	1045	14
	Stickleback	6	2				
	Belostomatid	20	0				
May 12	Arroyo C.	9	3	13.5	15	1030	10
	Stickleback	1	0				
	Fathead	3	0				
	Belostomatid	24	0				
May 17	Arroyo C.	26	2	18	17	1400	14.5
	Stickleback	2	1				
	Fathead	3	0				
	Sculpin	1	0				
	Belostomatid	17	0				
May 20	Arroyo C.	22	9	18.3	20	1630	10
	Stickleback	7	1				
	Fathead	3	1				
	Belostomatid	30	0				
May 22	Arroyo C.	5	2	18	21.3	1520	13.1
	Stickleback	5	0				
	Fathead	3	1				
	Sculpin	1	0				
	Belostomatid	23	0				
May 26	Arroyo C.	1	0	18	17.5	1345	11.5
	Stickleback	0	0				
	Fathead	1	0				
	Belostomatid	19	0				

Date	Species	Species Totals	Mortalities	Air Temp.(C)	Water Temp.(C)	Time	Trap Depth (cm)
June 27	Arroyo C.	8	0	20.3	19.3	1130	6
	Stickleback	2	0				
	Belostomatid	9	0				
July 1	Arroyo C.	2	2	19	17	930	5.5
	Stickleback	2	1				
	Belostomatid	26	0				

Species Totals:

Arroyo C.	248	53
Stickleback	85	19
Trout	6	0
Sculpin	2	2
Crawdad	1	0
Belostomatic	500	0

Date	Species	Species Totals	Mortalities	Air Temp.(C)	Water Temp.(C)	Time	Trap Depth (cm)
May 28	Arroyo C.	15	2	28.5	19	1130	10.5
	Stickleback	2	1				
	Fathead	7	3				
	Belostomatid	31	0				
June 1	Arroyo C.	11	2	19.2	21.2	1530	13
	Stickleback	3	1				
	Fathead	6	1				
	Trout	1	0				
	Belostomatid	23	0				
June 3	Arroyo C.	2	2	20	18.5	1215	11.5
	Stickleback	3	1				
	Fathead	2	1				
	Trout	2	0				
	Belostomatid	27	0				
June 6	Arroyo C.	10	0	19.8	18.9	1120	N/R
	Stickleback	0	0				
	Fathead	1	0				
	Trout	2	0				
	Belostomatid	35	0				
June 7	Arroyo C.	7	3	19.8	18.5	1200	7.5
	Stickleback	3	0				
	Fathead	1	0				
	Belostomatid	3	0				
June 10	Arroyo C.	2	3	27.3	23	1530	7.5
	Stickleback	3	1				
	Fathead	1	3				
	Belostomatid	17	0				
June 15	Arroyo C.	3	4	17	18.5	1645	7
	Stickleback	3	2				
	Fathead	3	3				
	Crayfish	1	0				
	Belostomatid	51	0				
June 19	Arroyo C.	12	7	16.8	17.8	1100	7
	Stickleback	3	6				
	Fathead	1	2				
	Belostomatid	41	0				
June 21	Arroyo C.	13	2	17.5	17.3	1000	7
	Stickleback	2	3				
	Fathead	1	0				
	Belostomatid	21	0				
June 24	Arroyo C.	9	5	19.8	18	1045	7
	Stickleback	6	0				
	Fathead	0	1				
	Belostomatid	21	0				

RECOMMENDATIONS FOR THE 1995 STUDY PLAN BASED ON 1994 FINDINGS

The following is a list of recommendations based on results from snorkel, electrofishing, and walking surveys in the SYR and tributaries in 1994. These recommendations would help in gathering crucial information on habitat preferences and geographic location of steelhead/rainbow trout and other fish species in the basin.

Temperature Monitoring

Expansion of the temperature monitoring network to include other areas. These areas include the Long Pool, confluence area of Salsipuedes and El Jaro Creeks, upstream and downstream migrant trap areas, and possible the Cargaschi Ranch. Currently there is very little data as to the temperature conditions and preferences of steelhead/rainbow trout in the SYR and tributaries. The long pool, where steelhead/rainbow trout were observed during the summer months, needs closer temperature monitoring to determine when upwelling areas begin to play an important role in offering cool water refugia to steelhead/rainbow trout.

The confluence area of Salsipuedes and El Jaro Creeks requires additional data on temperature preferences and conditions. This would provide useful information in assessing the quality of areas where steelhead/rainbow trout are present.

Information received from Maurice Cardenas of DFG suggests cool water upwelling areas may be present around the Cargaschi Ranch area near Lompoc. Additional temperature monitoring here could be useful in identifying other areas which may support steelhead/rainbow trout during the hot summer months.

Pool refugia in the mainstem needs closer monitoring of both temperature and dissolved oxygen. This is one area in the 1994 study plan that was not addressed sufficiently due to time constraints and equipment delays. In 1995, this area of effort will be increased.

Electrofishing and Snorkel Surveys

Electrofishing and snorkel surveys need to be expanded in the area of El Jaro Creek above the confluence with Salsipuedes Creek. Increases in YOY trout in El Jaro Creek between the spring and summer surveys indicate possible seeding of YOY steelhead/rainbow trout from above the confluence study area. This information would assist in determining the relative abundance of steelhead/rainbow trout within the lower tributaries.

Additional sampling should be performed in the area of Quiota Creek to determine if the trout present are a resident population

of trout or if steelhead utilize Quiota Creek and its tributaries for spawning and rearing. Further sampling needs to be performed in Alisal Creek especially since the concrete drop structure that had impeded adult passage in the past has been washed away in the January 1995 storms.

Useful information on growth, survival, and movement of steelhead/rainbow trout could be obtained by performing quarterly sampling, either by snorkel, electrofishing, or both, in those areas where steelhead/rainbow trout have been observed. These surveys when compared with the previous surveys could provide needed information as to the conditions the steelhead/rainbow trout live in.

Upstream and Downstream Migrant Trapping

Very little is known as to the migrating potential of juvenile and adult steelhead/rainbow trout inhabiting the SYR and its tributaries.
Upstream and downstream migrant trapping should continue in the mainstem and tributaries where it is ongoing and expand into other areas that could potentially hold remnant populations of steelhead/rainbow trout. Specific areas of interest are; Alisal Creek, Nojoqui Creek, and Quiota Creek. This information would help in determining if there are other areas within the SYR watershed capable of supporting steelhead/rainbow trout.

In addition to expanding migrant traps in the tributaries, a downstream (and upstream) migrant trap should be placed at or near the inflow into the lagoon. This would enable us to determine if steelhead/rainbow trout juveniles are completing their migration to the lagoon.

Lagoon Sampling

Lagoons are especially important in the development of juvenile steelhead/rainbow trout. To date there is little information available as to lagoon usage by juvenile steelhead/rainbow trout. Additional surveys including snorkel surveys, seining, trawling, and non-destructive surveys would be useful in learning the extent juvenile steelhead/rainbow trout utilize the lagoon. The presence of the tide water goby may however preclude any type of sampling in the lagoon.

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Part 2

1995-96 Study Plan for the Santa Ynez River

1995-96 Study Plan for the Santa Ynez River

FISH ACCOUNT USAGE

As part of the Memorandum of Understanding (MOU), the Technical Advisory Committee (TAC) was allocated 2,000 acre feet (af) of water from Lake Cachuma. The Biological Subcommittee of the TAC developed a hierarchy for the use of the fish account. Uses of the MOU fish account are: 1) to maintain aquatic resources, especially steelhead/rainbow trout, threatened or endangered species, and/or their habitat, in the portion of the Santa Ynez River (SYR) immediately downstream of Bradbury Dam; 2) to utilize water for the conducting of flow related studies deemed by the TAC to be important for addressing questions relative to the State Water Resources Control Board hearing process; and 3) to utilize the water at the end of peak storm flows to improve or lengthen the migration period or corridor for upstream passage of adult steelhead/rainbow trout.

The Biological Subcommittee has used the water during the past two years: 1) to alleviate adverse environmental conditions for steelhead/rainbow trout observed to be holding in pools downstream of Bradbury Dam particularly in the Long Pool immediately downstream of the spill basin; 2) to conduct fish abundance and distribution/movement studies among habitats in the mainstem during low flow conditions; and 3) to collect water temperature information during low flow periods. These uses of water have added greatly to the knowledge of existing aquatic resources and habitats in the SYR and were used in the development of the Cachuma Project EIR/EIS. The TAC will continue to gather this type of "baseline" data, where necessary. Moreover, the TAC intends to collect habitat, temperature, and flow base data to better understand the SYR system under different flow regimes. The TAC also intends to build upon the information collected and analyzed for the Cachuma Project EIR/EIS. Fish account water will be utilized to collect these type of data as will.

It will also be the intent of the TAC to, whenever possible, take advantage of planned or non-planned releases from Cachuma Reservoir. For example, in 1994-95 the TAC had intended to gather information regarding passage flows using fish account water "piggybacked" on to peak storm events. However, two situations precluded this study; 1) the 1995 storms and 2) the need to release water from storage because of dam safety issues. Therefore, the TAC studies focused on upstream passage into tributaries since mainstem flows would be continuous throughout the upstream migration period. More upstream migrant traps were utilized this year, resulting in more information being gathered to describe tributary utilization by adult steelhead/rainbow trout than in past years. Further, more scale samples and tissue

samples have also been collected from adult fish this year than in past years. In addition, tributary flow data during upstream migration is being collected. Moreover, depth and velocity data from redds were collected for the first time.

ADULT TROUT/FISHERY SURVEYS

Due to the flashy nature of water flows in the Santa Ynez River Watershed, two separate study strategies are planned for 1995 for the surveys within the Santa Ynez River and its tributaries. These strategies address the level of survey effort between wet years (lagoon breaches), and dry years (lagoon does not breach).

Wet Years

A monitoring program will be initiated for the period from January-March (or sooner if the lagoon is breached) with the objectives of (1) documenting and quantifying the seasonal timing and numbers of adult trout and other fish species migrating from the ocean into the Santa Ynez River and other tributaries including but not limited to Hilton Creek, Salsipuedes Creek, El Jaro Creek, Alisal Creek, Quiota Creek, and possibly Alamo Pintado Creek and (2) documenting the geographic location, and numbers of trout and other fish species spawning within the mainstem and tributaries. The monitoring program includes deployment of upstream and downstream migrant traps on the mainstem SYR and most of the tributaries listed above. The trapping program on some of the creeks listed above is pending on property owner permission. Weir and panel construction have been completed and are ready for deployment in most of the above tributaries. Depending on conditions, the weirs will be checked and maintained on a daily basis by the TAC project biologist with help from the USFWS fisheries biologist, the TAC biologist seasonal aide, and interested volunteers and members involved with the TAC.

The fishery surveys (described below) will be performed throughout the monitoring program period through use of weirs on the mainstem and tributaries to monitor adult upstream migration, direct observation techniques provided water velocities are safe and water clarity is good, and walking surveys along the mainstem and tributaries to document spawning habitat steelhead/rainbow trout utilize. If spawning areas are observed, they will be flagged and studied (possibly using emergence traps) to determine conditions surrounding fry emergence. Photographs, scale and tissue samples will be collected from all captured trout for evidence of saltwater residence.

Length of captured fish will be recorded and relative condition assessed and documented for both upmigrating and outmigrating adults.

Methods

A-Frame Alaskan Style Weirs will be constructed and deployed spanning the Santa Ynez River approximately 1.5 miles above Refugio Road on the Gainey Winery Property and upstream of the lagoon. These weirs will be in operation during the period that the lagoon is breached, and dismantled and stored when the flows recede and the lagoon spit is reformed. Lagoon breaching will be monitored during storm events. Time of weir installation will depend on the existence of a live stream from Refugio Road downstream to the ocean. Installation time will also depend on flow magnitude. A scaled down and altered version of the Alaskan Style Weir will be deployed on the tributaries. These weirs will be deployed during the same duration as the mainstem trapping. After upstream migration by adults has been observed, downstream traps will be added to capture the adults as they migrate back to the ocean. Captured adult steelhead/rainbow trout will be marked using fin clips to determine upon possible later capture if data has already been collected for that fish. Lengths will be measured and recorded for each fish captured.

Scale samples will be collected below the anterior end of the dorsal fin, just above the lateral line. A small tissue sample (1/4 inch square piece) will be removed from the right pectoral fin for future analysis.Water quality (temperature, dissolved oxygen, conductivity, alkalinity, and hardness) and water flow will be measured at trap sites periodically in order to evaluate conditions upmigrants and downmigrants prefer.

Dry Years

The level of upstream trapping will be scaled down to downstream migrant trapping in the event the lagoon is not breached. Downstream trapping will allow enumeration and timing of any downstream migrating smolts. During the winter when the lagoon is not breached the effort will focus on identifying habitat in the Santa Ynez River Watershed capable of supporting steelhead/rainbow trout during these dry years. Surveys will be conducted along the tributaries and mainstem to seek out likely habitats (refuge pools) where steelhead/rainbow trout might be found. Physical habitat and water chemistry will be evaluated in order to assess the conditions necessary to support steelhead/rainbow trout.

JUVENILE TROUT/FISHERY PRODUCTION

Wet Years

Surveys (electroshocking, snorkeling, walking) will be performed during the period from March through June with the objectives of (1) documenting the abundance of juvenile trout and other fish species in the mainstem and tributaries for use in evaluating hatching and reproductive success, (2) determining the geographic distribution of juvenile trout and other fish species within the mainstem and tributaries which can subsequently be related to information on habitat conditions, flow, and water temperature, (3) collecting data on growth, survival, and conditions of fish inhabiting various areas within the mainstem and tributaries, and (4) determining timing, numbers, flow, and water quality parameters associated with any outmigrating smolts through use of weirs to trap outmigrants and the use of water quality equipment and flow meters. The fishery surveys will be performed to characterize the relative abundance of various fish species and life stages within various habitat areas.

Methods

Previous study locations utilized in 1994 will be sampled to gain data on present trout population age structure, and any observed changes. New study sites will be located through electrofishing, snorkel surveys, and walking surveys to determine additional areas which might house remnant populations of steelhead/rainbow trout. If new areas of trout populations are identified by any surveys, the reaches will be quantitatively sampled, habitat mapped, water quality tested and flow measured. This data will be compared with other trout population areas to see if there are any similarities in habitat requirements. No areas will be disturbed which show evidence of recent spawning until enough time has passed to assure fry have emerged.

Salsipuedes and El Jaro Creeks are two tributaries that have a remnant populations of steelhead/rainbow trout. A weir will be deployed on Salsipuedes Creek to determine if a portion of the trout population will undergo smoltification and migrate to the ocean. The weir will be put in place during the month of December 1995. The reason for the early placement of the weir is to answer the question if steelhead/rainbow trout in this watershed outmigrate at the earliest convenience (i.e., the first major storm event) or wait until the spring. Length and weight will be measured and condition will be assessed on all captured trout prior to release downstream. Flow and water quality will be measured when any outmigrants are captured to evaluate the stream conditions outmigrants prefer.

A marking program may be developed (upon further discussion with the Biological Subcommittee) using freeze brand, pan jet, or fin

clip. Marking a representative sample of the juvenile fish with individualized marks would enable more effective monitoring of growth and movement throughout the year.

Dry Years

Little will change in the 1995 sampling methods or effort to find new areas of remnant steelhead/rainbow trout populations or continuing the historical data collection of known trout population areas in dry years. In the event of a dry rain year, the effort will focus on the surveying tributaries which have water, the lagoon, and areas of the mainstem that might serve as refuge areas.

SUMMER AND FALL POPULATION SURVEYS

Wet and Dry Years

Fishery surveys will be performed periodically throughout the period from July through December with the objective of documenting (1) species composition of the fisheries community inhabiting various reaches of the mainstem Santa Ynez River, tributaries which have water in them, and the lagoon, (2) the relative abundance of various fish species and their health and condition by habitat area and the relative importance of the various habitat areas, (3) the response of various fish species to seasonal variations in environmental conditions including instream flow and water temperatures, and (4) scientific information regarding life history characteristics and habitat requirements for various fish species inhabiting the Santa Ynez River system.

Methods

The surveys will be performed using electrofishing, direct observation techniques, and trapping. Three pass removal or mark and recapture methods will be used. When utilizing direct observation techniques, observers will pay close attention along margin areas where juvenile steelhead/rainbow trout may be utilizing algae mats or other aquatic vegetation for cover. Location of study areas will be those areas already identified as having trout populations present (i.e., confluence area of Salsipuedes and El Jaro Creeks). New study areas will be located during the adult and juvenile trout surveys. Water quality (temperature, dissolved oxygen) and flow will be measured at locations where steelhead/rainbow trout have been observed.

Lagoon sampling will take place, conditions permitting. Lagoon sampling methodology that may be employed include direct observation techniques (water clarity allowing), seining, trawling, and other non-destructive methods.

FLOW MONITORING

Flow monitoring will be performed at each weir site during and after storm events, or in the event of fish migrant capture, using both cross-sectional measurements to establish stage-discharge relationships and routine monitoring from established staff gauges. The purpose of this monitoring is to evaluate flow conditions which favor up or outmigration.

Flow will also be measured at the temperature units each time a temperature check is performed or during different flow releases (i.e., WR 89-18, Fish Reserve Account, or releases resulting from dam safety issues). The purpose is to correlate water releases from Bradbury with water temperatures in the mainstem.

WATER QUALITY MONITORING

Water quality monitoring will be performed throughout the year with the objective of documenting water temperature and dissolved oxygen at various locations within the mainstem and major tributaries. Water temperature monitoring will be an extension of the ongoing data collection program initiated in 1993 by DFG and Hanson Environmental. Temperature monitoring will continue at the six mainstem locations using DFG and Hanson Environmental equipment (three DFG and three Hanson Environmental). Additional locations will be identified during adult steelhead/rainbow trout surveys in the mainstem. . At least one additional monitoring site may be added at the Cargaschi Ranch. This will be the lower most temperature unit in the river (not counting the lagoon). Temperature units will also be deployed in the tributaries, specifically those reaches which have remnant steelhead/trout populations. Deployment of temperature units in these areas will give a more through understanding of the conditions present for steelhead and other fish species throughout the year. Periodically, manual temperature readings will be made at the location of the temperature units at the time the units are set to record in order to assess their accuracy.

Vertical water temperatures will be measured within the mainstem and tributaries (deep pools) six times per year. Location of some of these pool measurements will be where temperature units are currently deployed and other sites (locations where steelhead/rainbow trout are known to inhabit, sites of cool water upwelling). Vertical profiles of dissolved oxygen will also be monitored within deeper pools within the mainstem and tributaries six times per year in addition to water temperature and dissolved oxygen monitoring conducted at these sites and at each location where fisheries surveys are performed. Vertical temperature, dissolved oxygen, and salinity measurements will be made at several set locations from the head of the lagoon to the lagoon mouth six times per year. Vertical profiles of temperature, dissolved oxygen, salinity will also be made along transect lines

bank to bank at the locations of the previously mentioned sites three times per year. Vertical profiles of temperature and dissolved oxygen will be performed in Lake Cachuma at three locations six times per year.

Experimental releases using the Fish Account Water will be made during a specified period during the hot summer months for the purpose of determining the level of flows necessary to provide rearing conditions adequate for juvenile steelhead and assess the extent of habitat available where such conditions could exist during this critical time of year. Water flows would be maintained at a constant level for a period of 3-5 days for each flow level between Bradbury Dam and Alisal Road bridge. During this time, water and air temperatures and dissolved oxygen will be measured at different locations (including potential cool water refuge sites) at intervals throughout 24 hour periods. These measurements would be repeated during the course of decreasing flow levels (30, 20, 15, 10, 5 cfs totaling 1050 acre feet) that will each last for a period of five days. During the course of these releases, if it is determined that water is entering the lagoon, vertical temperature, dissolved oxygen, and salinity measurements will be made at the lagoon to investigate changes in water quality that may be more conducive for juvenile steelhead rearing.

A similar study may be accomplished using 89-18 water released at incremental rates similar to the above or including higher flow rates. This would be dependent on close cooperation and coordination between Bureau of Reclamation and TAC members.

HABITAT MAPPING AND INVENTORY

Aerial photos will be taken of the mainstem SYR to assess areas of passage bottlenecks. Once these areas are identified, habitat mapping will be performed using DFG habitat typing criteria to validate photo interpretation of bottlenecks. The habitat mapping information will be used in conjunction with flow studies to determine when flows become insufficient to upstream passage.

Habitat mapping will be performed at the survey locations in which steelhead/trout populations are observed. These and future sites will be mapped during inventory surveys and population estimates made. No other areas will be mapped unless the presence of trout are observed.