SANTA ANA RIVER WATERMASTER

FOR

ORANGE COUNTY WATER DISTRICT Vs. CITY OF CHINO, et al

CASE No. 117628 - COUNTY OF ORANGE

FIFTH

ANNUAL REPORT

OF THE

SANTA ANA RIVER WATERMASTER

1974-75

FEBRUARY 27, 1976

SANTA ANA RIVER WATERMASTER

FOR
ORANGE COUNTY WATER DISTRICT VS. CITY OF CHINO, ET AL
CASE NO. 117628 – COUNTY OF ORANGE

WATERMASTER
MAX BOOKMAN
WILLIAM J. CARROLL
JAMES C. HANSON
DONALD L. HARRIGER
JOHN M. TOUPS

March 3, 1976

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P. O. BOX 11465
SANTA ANA, CALIFORNIA 92711
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To: Clerk of Superior Court of Orange County
and All Parties

Gentlemen:

On behalf of the Santa Ana River Watermaster, transmitted herewith is the "Fifth Annual Report of the Santa Ana River Watermaster - 1974-75," dated February 27, 1976.

Sincerely yours,

Santa Ana River Watermaster

By: Max Bookman
Max Bookman, Chairman

Attachment (Distribution List)

Enclosure

cc: Watermasters:
William J. Carroll
James C. Hanson
John M. Toups
Donald L. Harriger

GLF + L.R.
See page 31

SANTA ANA RIVER WATERMASTER

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Clerk of Superior Court
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SANTA ANA RIVER WATERMASTER

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WATERMASTER
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JOHN M. TOUPS

February 27, 1976

MAILING ADDRESS
P. O. BOX 11465
SANTA ANA, CALIFORNIA 92711
TELEPHONE: (714) 835-4447

To: Clerk of Superior Court of Orange County
and all Parties

Re: Watermaster Report for 1974-75

Gentlemen:

We have the honor of submitting the fifth annual report of the Santa Ana River Watermaster.

The principal findings of the Watermaster for the water year 1974-75 are as follows:

At Prado

(1)	Base Flow at Prado	52,504 acre-feet
(2)	Annual Weighted TDS of Total Flow	687 ppm
(3)	Annual Adjusted Base Flow	53,073 acre-feet
(4)	Cumulative Adjusted Base Flow	227,191 acre-feet
(5)	Cumulative Entitlement of OCWD at Prado	210,000 acre-feet
(6)	Cumulative Credit (4)-(5)	17,191 acre-feet
(7)	One-third of Cumulative Debit	0 acre-feet
(8)	Minimum Required Base Flow in 1975-76	37,000 acre-feet

At Riverside Narrows

(1)	Base Flow at Riverside Narrows	15,445 acre-feet
(2)	Annual Weighted TDS of Base Flow at Riverside Narrows	731 ppm
(3)	Annual Adjusted Base Flow	15,100 acre-feet
(4)	Cumulative Adjusted Base Flow	81,437 acre-feet
(5)	Cumulative Entitlement of CBMWD and WMWD at Riverside Narrows	76,250 acre-feet
(6)	Cumulative Credit	15,187 acre-feet
(7)	One-third of Cumulative Debit	0 acre-feet
(8)	Minimum Required Base Flow in 1975-76	13,420 acre-feet

The above findings show that at the end of the water year 1974-75 there existed a credit of 17,191 acre-feet in the obligations of Chino Basin Municipal Water District and Western Municipal Water District in the discharge of Base Flow downstream from Prado Dam. During the following water year, 1975-76, the minimum required Base Flow is 37,000 acre-feet. At Riverside Narrows, there existed a credit of 5,187 acre-feet. The obligation of San Bernardino Valley Municipal Water District during the water year 1975-76 is a minimum Base Flow of 13,420 acre-feet.

During the water year 1974-75, Nontributary water was purchased by Orange County Water District and released from the Rialto Reach of the Foothill Feeder at OC-59T and OC-59 into San Antonio Creek near Upland. The Committee studied several methods of determining how much of the released water passed Prado but, based on data available, the Committee was unable to make a final determination. The Committee intends to continue investigation of the disposition of Nontributary water and to make a final determination and adjustment at some subsequent time. The details on the assumptions made in arriving at the quantities for Nontributary Flow and Base Flow for the water year 1974-75 are described in Chapter IV.

The Committee arrived at a final determination for the credit to be applied for Nontributary water released to the Santa Ana River upstream from Riverside Narrows. The application of the credits determined are discussed in Appendix F.

Sincerely yours,

SANTA ANA RIVER WATERMASTER

By: Max Bookman
Max Bookman

Donald L. Harriger

William J. Carroll

John M. Toups

James C. Hanson

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SANTA ANA RIVER WATERMASTER

Max Bookman
Chairman

John M. Toups
Secretary

Albert A. Webb

William J. Carroll

James C. Hanson

Donald L. Harriger

CHAPTER I

INTRODUCTION

Prior to 1963, limited flows in the Santa Ana River resulted in many years of controversy between the water users in the lower portion of the Watershed and those in the upper watershed. On October 18, 1963 a complaint was filed with the court against more than 2,500 water users in the area upstream of Prado Dam. Cross complaints were subsequently filed, extending the adjudication to include an additional 1,500 water users in the area downstream from Prado Dam.

As a means of settling this controversy, the parties agreed to a stipulated Judgment which was subsequently entered by the court on April 17, 1969. This stipulated Judgment became effective on October 1, 1970 and contains a declaration of rights of the entities in the lower area as against those in the upper area, and provided for a physical solution to implement the Judgment. The physical solution arrived at accomplishes, in general, a regional interbasin allocation of the surface flow of the Santa Ana River System. The numerous individual water users involved in the litigation were dismissed as Parties to the Judgment. The obligations to maintain the flow of the river at specified minimum annual amounts at Riverside Narrows and Prado were assumed by the four major public water districts within the Santa Ana River Watershed; namely the San Bernardino Valley Municipal Water District, Western Municipal Water District of Riverside County, Chino Basin Municipal Water District and Orange County Water District. This arrangement leaves to each of the major hydrologic units in the watershed, the determination and regulation of individual rights therein, and the development and implementation of its own basin management plan.

In order to administer the provisions of the Judgment, the court appointed a Watermaster composed of five persons and required that the Watermaster report annually to the court and the parties. During the 1974-75 water year the Santa Ana River Watermaster Committee consisted of Max Bookman, William J. Carroll, James C. Hanson, John M. Toups and Albert A. Webb. Watermaster Albert A. Webb resigned as of August 1, 1975 and the Court appointed Donald L. Harriger who was nominated by W.M.W.D. to replace Mr. Webb. Mr. Bookman served as Chairman during the 1974-75 water year. With the resignation of Secretary Albert A. Webb on August 1, 1975, John M. Toups was elected to the office of Secretary and the office of the Santa Ana River Watermaster was moved to 1010 North Main Street, P.O. Box 11465, Santa Ana, California 92711. This report, for the water year 1974-75, is the fifth annual report to be issued since the Judgment became effective.

Scope of Report

Section 7(c) of the Judgment requires the Watermaster to report to the Court and to each party not more than five months after the end of each water year starting with 1970-71. The items to be reported upon are as follows:

(a) Prado Accounting

(1) Base Flow at Prado

(2) Annual Weighted TDS of Total Flow at Prado

(3) Annual Adjusted Base Flow

(4) Cumulative Adjusted Base Flow

(5) Cumulative Entitlement of OCWD at Prado

(6) Cumulative Credit or Debit

(7) One-third of Cumulative Debit

(8) Minimum Required Base Flow in Following Year

(b) Riverside Narrows Accounting

(1) Base Flow at Riverside Narrows

(2) Annual Weighted TDS of Base Flow at Riverside Narrows

(3) Annual Adjusted Base Flow

(4) Cumulative Adjusted Base Flow

(5) Cumulative Entitlement of CBMWD and WMWD at Riverside Narrows

(6) Cumulative Credit or Debit

(7) One-third of Cumulative Debit

(8) Minimum Required Base Flow in Following Year

The above listed items as determined by the Watermaster for the water year 1974-75, in addition to other data compiled by the Watermaster, are hereinafter set forth. This first chapter is followed by Chapter II, "Activities for 1974-75", Chapter III, "Water Supply Conditions", Chapter IV, "Base Flow at Prado", and Chapter V, "Base Flow at Riverside Narrows". As a matter of information, the Appendices of this report contain a brief history of the litigation, a summary of the Judgment, summaries of Nontributary flows and records of water quality below Prado Dam and at Riverside Narrows.

CHAPTER II

ACTIVITIES FOR 1974-75

As previously stated, the organization of the Watermaster Committee was changed with the resignation of Albert A. Webb who was replaced by Donald L. Harriger. John M. Toups was elected to the office of Secretary and the office of the Watermaster was moved to Santa Ana.

Watermaster meetings were held during 1975 on January 23, on April 25, on December 5, and on December 22. Copies of the minutes of the meetings held are available in the Watermaster office.

As required by the Judgment, the Watermaster prepared the "Fourth Annual Report of the Santa Ana River Watermaster, 1973-74" which was published under date of February 18, 1975, and copies were submitted to the Court and the Parties. The Watermaster continued the work of collection and analysis of data, maintenance of records and preparation of the 1974-75 annual report. The Watermaster also compiled records and accounts for the Nontributary water from the State Water Project released in the Upper Area at the request of the Orange County Water District. This chapter describes the Watermaster activities and briefly summarizes important related activities of the four major public water districts in the watershed.

Watermaster Service

Stream Flow and Water Quality Measurements

Stream flow measurements and water quality data required by the Watermaster are for the most part furnished by the U.S. Geological Survey (USGS). The financing of the cooperative monitoring program with the USGS was shared by the parties to the Judgment. Such costs are set forth in Table 1. Additional data related to the operation of Prado Reservoir were obtained from the Corps of Engineers and water quality data were supplied to the Watermaster by the State Department of Water Resources, the Riverside and Corona City Sanitation Departments and the Chino Basin Municipal Water District. Data regarding the discharge of Nontributary water into the Santa Ana River were provided by the Metropolitan Water District and the State Department of Water Resources.

The USGS measured and computed the mean daily discharge of the Santa Ana River at Mission Boulevard, MWD Crossing, Prado Park, and Below Prado Dam as well as the daily discharge of the Riverside Water Quality Control Plant into the Santa Ana River. Discharge measurements were also provided for three smaller streams tributary to Prado Reservoir; Temescal Creek at Corona, Chino Creek at Schaefer Avenue and Cucamonga Creek near Mira Loma.

USGS Gaging Station on Chino Creek at Schaefer Avenue
(Photo: Courtesy of SBVMWD)

TABLE 1

COSTS TO THE PARTIES AND USGS
FOR MEASUREMENTS WHICH PROVIDE DATA
USED BY THE SANTA ANA RIVER WATERMASTER
July 1, 1974 to June 30, 1975

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT		
At Riverside Water Quality Control Plant		
Surface Water Gage	$ 346.00	
Water Quality Monitor	600.00	
TDS Samples	114.00	
At MWD Crossing		
Water Quality Monitor	633.00	
TDS Samples	113.00	
Dozer	100.00	
At Prado Park	358.00	
At Mission Boulevard	278.00	
		$ 2,542.00
WESTERN MUNICIPAL WATER DISTRICT		
Same as SBVMWD ($1.00 difference due to rounding)	$2,543.00	
Temescal Creek Discharge	180.00	
Cucamonga Creek Discharge	608.00	
Chino Creek Discharge	607.00	
		$ 3,938.00
CHINO BASIN MUNICIPAL WATER DISTRICT		
Same as WMWD		3,938.00
ORANGE COUNTY WATER DISTRICT		
At Prado Dam		
Water Quality Monitor, Conductivity Program, and Counsel to SARWM	$8,700.00	
TDS Determination	850.00	
At Prado Park	716.00	
At Mission Boulevard	556.00	
San Antonio Creek Water Quality Sampling	1,120.00	11,942.00
TOTAL FOR PARTIES		$22,360.00
UNITED STATES GEOLOGICAL SURVEY		22,360.00
GRAND TOTAL		$44,720.00

During 1975 the low-water control constructed in 1974 by the Watermaster at the gaging station on the Santa Ana River at MWD Crossing continued to provide an improved discharge record. Dozer work was required on March 26 and August 6, 1975 to confine the water to the controlled section.

Water quality data are developed for monitoring stations located at MWD Crossing, River Water Quality Control Plan, and Below Prado Dam.

The conductivity meters at these stations were modified by installation of new probes and new electronic equipment which has improved the reliability of the measurements.

Construction of the Santa Ana Regional Interceptor across the river below Prado Dam was accomplished in October of 1975. The construction work interfered with the operation of the gaging station and in order to provide a continuous record of discharge a temporary gage was installed below the dam outlet works.

Compilation and Analysis of Basic Data

The Watermaster has established records and procedures for compiling and analyzing the basic data necessary in order to carry out the provisions of the Judgment. These records include the following:

(1) Daily precipitation at San Bernardino County Hospital.

(2) Flow of Santa Ana River at USGS gaging station below Prado Dam.

(3) Flow of Santa Ana River at USGS gaging station at Prado Park.

(4) Flow of the Santa Ana River at MWD Crossing.

(5) Discharge of Riverside Water Quality Control Plant into the Santa Ana River.

(6) Flow of the Santa Ana River at Mission Boulevard Bridge.

(7) Specific conductance and TDS of the waters of the Santa Ana River Below Prado Dam.

(8) Specific conductance and TDS of the waters of the Santa Ana River at MWD Crossing.

(9) Specific conductance and TDS of the discharge of the Riverside Water Quality Control Plant.

(10) U.S. Army Corps of Engineers Records of Water Storage at Prado Dam.

(11) Flow of Chino Creek at Schaefer Avenue.

(12) Flow of Cucamonga Creek near Mira Loma.

(13) Flow of Temescal Creek at Corona.

(14) Flow in Rialto Reach of Foothill Feeder at Devil Canyon.

(15) Discharge of Chino Basin MWD Water Quality Control Plant at Chino Creek.

(16) Discharge of Chino Basin MWD Water Quality Control Plant to 30-inch outfall line to Prado Flood Basin.

(17) Discharge of City of Corona Water Quality Control Plant to Temescal Creek.

(18) Daily precipitation at several recording Stations above Prado Dam.

(19) Records of deliveries by MWD at OC-59T and Thompson Creek.

Based on these data, determinations were made of the Base Flow, Storm Flow, Nontributary water and relationships between specific conductance and TDS. These determinations are explained in detail in Chapters IV and V.

Administration Costs

In accordance with Paragraph 7(d) of the Judgment, the fees and expenses of each of the members of the Watermaster are to be borne by the district which nominated such member. All other Watermaster administrative costs and expenses are borne by the parties, with OCWD assuming 40 percent of the cost and CBMWD, SBVMWD and WMWD each bearing 20 percent of the cost. The Judgment further provides that the Watermaster may from time to time, in its discretion, require advances of operating capital from the parties.

At its meeting on May 14, 1974 the Watermaster adopted a budget for the fiscal year 1974-75 in the amount of $8,500. At its meeting on April 25, 1975 the Watermaster adopted a budget for the fiscal year 1975-76 in the amount of $14,000. Table 2 shows the items and amounts included in said budgets.

TABLE 2

SANTA ANA RIVER WATERMASTER BUDGET

	July 1, 1974 to June 30, 1975	July 1, 1975 to June 30, 1976
Administration	$ 2,000.00	$ 3,000.00
Supporting Engineering Services	5,000.00	7,000.00
Reproduction of Annual Report	1,500.00	1,500.00
Additional gaging and monitoring stations, including construction, operation and maintenance		2,500.00
Total	$ 8,500.00	$ 14,000.00

Table 3 is a statement showing the income and expenses of the Santa Ana River Watermaster for the fiscal year 1974-75. The expenses as shown total $9,663.65.

TABLE 3

INCOME AND EXPENSES
July 1, 1974-June 30, 1975

INCOME		
Balance June 30, 1974		$14,732.89
Payments by Parties for Fiscal 1974-75		0
Total Balance June 30, 1974 plus Income Fiscal 1974-75		$14,732.89
EXPENSE		
Secretary-Office Expense	$1,933.70	
Bookman-Edmonston Engineering, Inc. Preparation of 1973-74 Annual Report, including graphs and diagrams	790.28	
James C. Hanson Preparation of Riverside Narrows hydrograph and work on Annual Report	148.60	
Albert A. Webb Associates Preparation of data from U.S. Corps of Engineers for Prado Reservoir surface charts; work on Annual Report; preparation of Riverside Narrows hydrograph; conference on liability insurance; work with MWD on sources of natural water and deliveries of State water from OC-59	2,537.16	
James M. Montgomery, Consulting Engineers, Inc. Printing of 1973-74 Annual Report	1,013.26	
Toups Corporation Preparation of EC and TDS information at Prado and Riverside Narrows; ED hydrograph; Prado hydrograph; work on Annual Report	2,503.65	
LeeSmith, Harrison, Zeppegno & Bristol Public Liability Insurance premiums	737.00	9,663.65
Balance June 30, 1975		$ 5,069.24

Related Activities of Other Agencies

San Bernardino Valley Municipal Water District

During 1975, the last section of 78-inch steel pipe was placed in the trench completing Phase II of San Bernardino Valley Municipal Water District's Master Distribution System. When this phase of the work is finished, water can be transported from Devil Canyon Powerplant afterbay, SBVMWD's turnout from the State Water Project to the mouth of the Santa Ana River, or a distance of 16 miles along the foothills of the San Bernardino mountains.

Spreading continued between Devil Canyon and Waterman Canyon (Phase I) on a rather sporadic and minimal schedule due to construction at Devil Canyon Powerplant, minor construction on the outlet tower and controls at Silverwood Lake and other maintenance requirements by the Department of Water Resources. During the past year, the District has continued their water quality monitoring program and added sampling points in order to evaluate the affects of recharge with State Project Water on the existing ground water system.

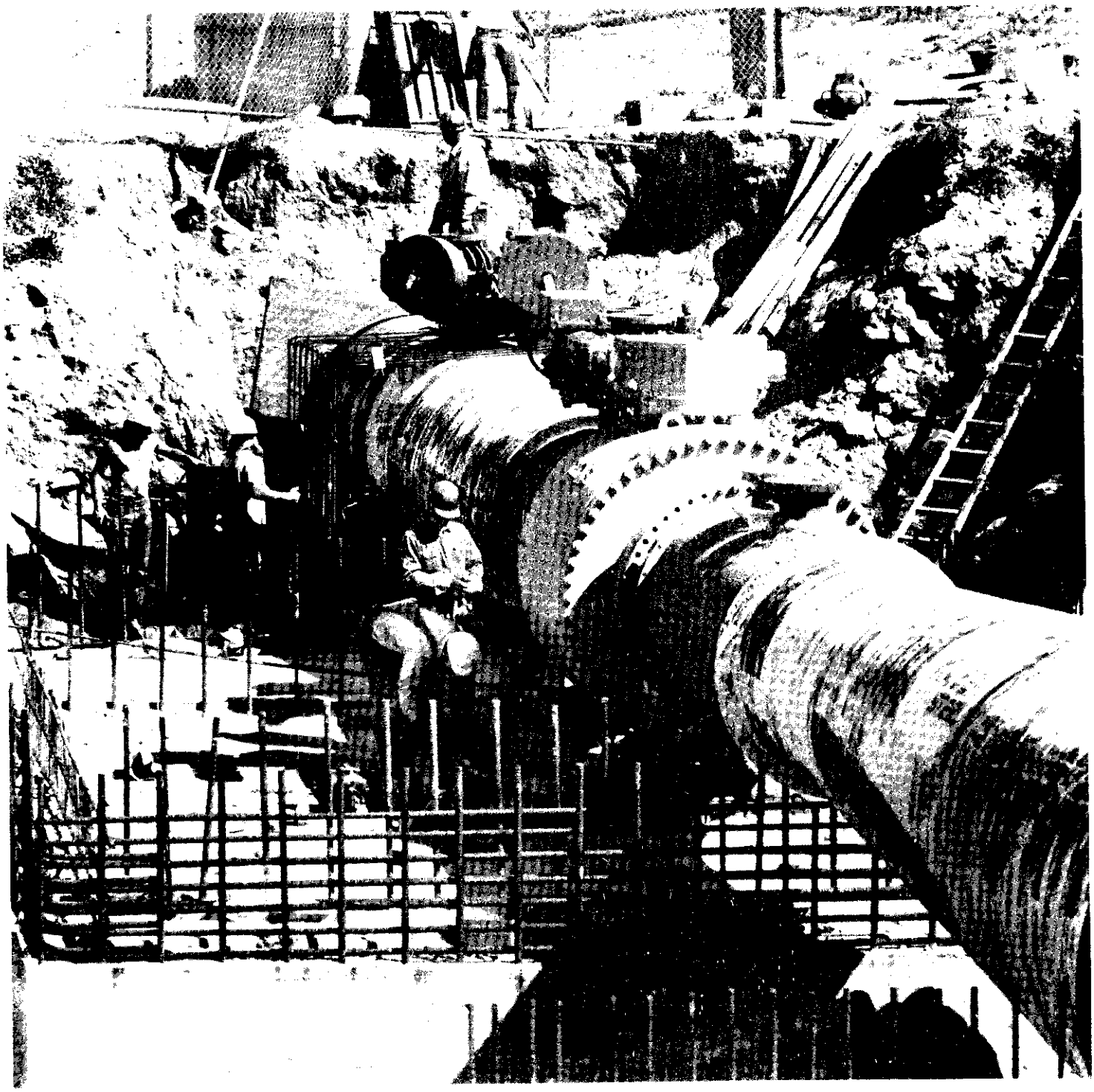
Western Municipal Water District of Riverside County

During 1975, the Metropolitan Water District of Southern California commenced construction of the first reach of the Box Springs Feeders. This pipeline will transport State Project water from the DWR Santa Ana Valley Pipeline to the proposed MWD Riverside Filtration Plant. The filtration plant is scheduled for completion in 1978. This will make treated State Project water available to water users within WMWD.

Chino Basin Municipal Water District

The activities of CBMWD involved both water and wastewater matters again this year. Relative to wastewater, a grant has been secured for the construction of additional sludge handling facilities at Regional Plant No. 1 ($1,983,077), and requests have been prepared on the financing of constructing an expansion to Regional Plant No. 2 and the construction of a tertiary plant on this same site. A pilot study during the year indicated that ozone injection was preferable to chemical feeding (aluminum sulfate) and sedimentation prior to filtration in the tertiary plant. A Facilities Plan was also prepared and submitted to EPA and the SWRCB for enlarging Regional Plant No. 1 from 16 to 24 mgd at an estimated cost of $17,000,000.

On the water side, considerable planning and discussions have been held relative to the complaint for adjudication of the water supply in Chino Basin which was filed in January 1975. An



Workmen Tie in Phase I and Phase II at the Waterman Canyon Turnout on
San Bernardino Valley Municipal Water District's Master Distribution System
(Photo: Courtesy of SBVMWD)

Advisory Committee of interested parties and several subcommittees have been formed and are meeting regularly. This is also the first year that a pump tax has been assessed in Chino Basin. The District assessed a $2 per acre foot charge on all pumping larger than 10 acre-feet per year per owner, and at this time has collected over $300,000 from this tax. This money is being used to proceed with the adjudication procedures, and to further study the hydrogeology of the basin.

Orange County Water District

The Orange County Water District continued its efforts to supplement the natural replenishment and to protect the groundwater supplies of Orange County.

Construction of Water Factory 21, the District wastewater reclamation–seawater desalting plant, was completed and some desalted seawater and deep well water has been injected into the barrier system. However, the seawater desalting plant probably will not be expanded to the full 15 mgd size as originally planned due to the Federal Government's lack of funding for the seawater distillation test module. As an alternative to seawater desalting, the District awarded a $2,520,000 contract for the design and construction of a 5 mgd wastewater demineralization facility. In addition, three deep wells, which will provide an interim additional freshwater supply, were designed and drilled.

The District continued its water conservation operations at Anaheim Lake and the spreading areas adjacent to the Santa Ana River. During the past year, 43,784 acre-feet of imported Colorado River water were released for spreading. During the same period, as discussed in Chapter IV, State Project water was purchased and released above Prado Dam for conveyance to spreading facilities in Orange County.

The construction of a 66-inch pipeline between the Santa Ana River and Anaheim Lake was completed. The purpose of the pipeline is to enable the District to route Santa Ana River and State Water Project water to Anaheim Lake. Also, to spread State water at Orange County Flood Control District facilities downstream of Anaheim Lake, the District began construction of an outlet structure at Anaheim Lake.

Santa Ana Watershed Project Authority

The Santa Ana Watershed Project Authority took up the work effort previously executed by the County Sanitation Districts of Orange County and Chino Basin Municipal Water District in the continuing phased construction of the Santa Ana Regional Interceptor. At the end of calendar 1974

the Interceptor was completed from the Coast to a point within the City of Anaheim. The section between the City of Anaheim and Prado Dam will be completed by early 1977.

The County of Orange provided SAWPA with the use of 3,600 feet of 60-inch pipeline under Prado Dam on a no-cost, long-term lease. This pipeline was previously used as a water delivery line but had not been utilized since the mid-1950's. SAWPA's plans and specifications call for the refurbishment of this line to provide the necessary protection against the anticipated brine flows.

In addition to the design and construction of the Interceptor from Prado to the connection in Orange County, SAWPA is also working on the reaches of the Interceptor above Prado. Federal and State Clean Water Grants have been obtained for the purposes of finalizing alignments and gaining both point and nonpoint discharger commitments to this facility. It is anticipated that this will be complete in April 1976, and that design for the Interceptor above Prado Dam will begin sometime after July 1976.

State Water Resources Control Board

On December 9, 1975 a report entitled "Water Quality Control Plan Report-Santa Ana River Basin (8), Part 1, Vol. 1" was distributed by the Regional Water Quality Control Board, Santa Ana Region (8). This report contains the final plan adopted by the Regional Water Quality Control Board, Santa Ana Region, on April 11, 1975, approved by the State Water Resources Control Board on April 17, 1975 and submitted to the Federal and Environmental Protection Agency in compliance with Regulation 40 CFR 131.202 pursuant to the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500).

The recommended plan includes specific water quality objectives, a determination of water supply and waste disposal programs and projects, and suggested implementation strategies found to be the most cost effective institutional means of protecting and enhancing the quality of water resources within the Santa Ana River Basin. The Santa Ana River is divided into reaches for purposes of this report. with Reach No. 2 extending from 17th Street in Santa Ana to Prado Dam, and Reach No. 3 extending from Prado Dam to Mission Boulevard in Riverside. Water quality objectives for Reaches No. 2 and 3 require that effective July 1, 1975 the weighted Base Flow, which includes rising water and waste water components, should not contain a concentration in excess of 770 mg/l of filterable residue at Prado Dam. Effective July 1, 1979 the objective of this item is decreased to 700 mg/l, and the weighted total flow for this same item which is defined as five-year moving average, including rising water, wastewater and storm flow components, should not exceed 650 mg/l. It is interesting to note that in the Fifth Annual Report of the Santa Ana River

Watermaster for the water year 1974-75, the weighted average annual TDS of the total flow was 687 ppm at Prado Dam and the annual weighted concentration of Base Flow at Riverside Narrows was 731 ppm.

Corps of Engineers

In accordance with a request by Congress the U.S. Army Corps of Engineers has completed a report on the need for flood control and related purposes in the Santa Ana River Basin. The report entitled "Review Report on the Santa Ana River Main Stem and Santiago Creek" is dated August 1975. A supplemental report adding the "Oak Street Drain, Corona" was issued October 1975. In addition, a draft of an environmental statement was prepared accompanying these reports.

The recommended plan by the Corps of Engineers includes six major elements: the Mentone Dam, the reach between Mentone Dam site and Prado Reservoir, the enlargement of Prado Dam and Reservoir, the channelization of the Santa Ana River below Prado Dam, the channelization of Lower Santiago Creek, and improvement of Oak Street Drain in Corona. The upstream Mentone Reservoir in San Bernardino County would have an estimated storage capacity of 151,000 acre-feet for flood control purposes. Prado Dam would be raised 30 feet in height increasing the storage capacity to spillway crest from a present amount of about 198,000 acre-feet to 363,000 acre-feet. The channel of Santiago Creek would be improved to control a discharge of 23,000 cfs. The lower Santa Ana River channel in Orange County would be improved and capable of handling a discharge at Imperial Highway of 45,000 cfs and a discharge at Pacific Coast Highway of 55,000 cfs.

The channel capacity of Oak Street Drain in Corona would be improved so as to have a capacity of 11,500 cfs compared to its original capacity of 600 cfs. Recreation improvements are included at Mentone, the Upper Santa Ana River, Prado, the Lower Santa Ana River and Santiago Creek. The total first cost of the recommended improvements has been estimated at $732.6 million, of which amount $24.1 million is for recreational features.

The reports prepared by the Corps of Engineers have been circulated for review and comment. In December public meetings were held in Corona, San Bernardino and Santa Ana. It is planned to finalize these reports in February 1976; thereafter, the final reports will be forwarded through channels to the Chief Engineer in Washington, D.C. and considered by the Board of Rivers and Harbors. Should the report receive the necessary approvals, authorization of the project will require that it be included in an omnibus bill by Congress.

CHAPTER III

WATER SUPPLY CONDITIONS

The 1974-75 precipitation in the watershed was again below normal. With the exception of five above normal precipitation years as shown in Figure 1, the general trend of below normal rainfall since 1944-45 continues. The total flow in the Santa Ana River during the water year 1974-75 decreased. In addition to the decrease in Storm Flow at Prado, the Base Flow also decreased. This decrease in Base Flow was partly offset by the increased discharge of treated wastewater into Prado Reservoir from the Ontario-Upland Treatment Plant in the Chino Basin.

Precipitation During 1974-75

During the 1974-75 water year the precipitation at the San Bernardino County Hospital amounted to 13.49 inches, which is 75 percent of the Base Period average. Most of the precipitation occurred during the months of December, February, and March with monthly amounts of 2.92 inches, 2.37 inches and 4.33 inches respectively.

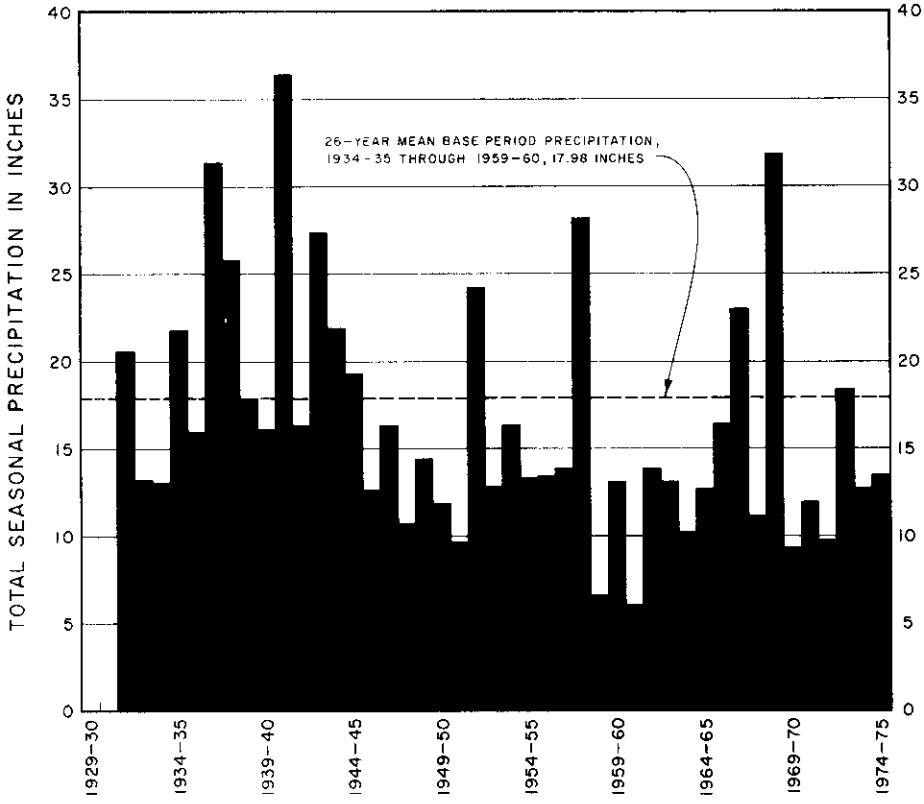
Figure 1 shows the seasonal precipitation from 1931-32 through 1974-75 and the accumulated departure from the 1934-35 through 1959-60 Base Period average.

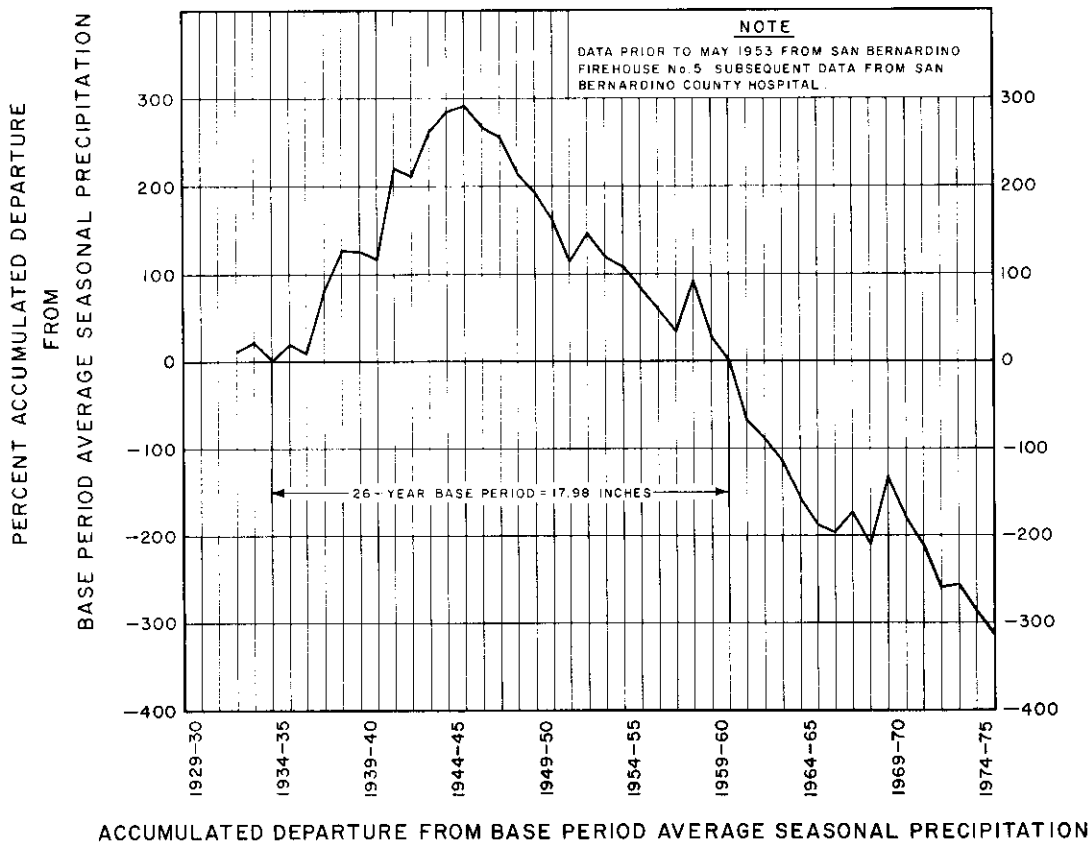
Runoff During 1974-75

Below Prado Dam

The total flow of the Santa Ana River at Prado Dam, less the 1974-75 credit for Nontributary water, during 1974-75 was 64,159 acre-feet, which is below the 26-year Base Period (1934-35 through 1959-60) average of 78,780 acre-feet per year. This compares to the flow during the prior year of 63,312 acre-feet when a lesser amount of precipitation occurred.

The Base Flow at Prado Dam decreased progressively during the extended drought period and reached a low in 1960-61 of 26,190 acre-feet. Since that year, the Base Flow has generally increased. During 1969-70 the Base Flow amounted to 39,075 acre-feet. The below normal rainfall of the 1970-71 water year was evidenced by a decline in the Base Flow to 38,402 acre-feet; however, during 1971-72 it had again risen to 40,416 acre-feet. During 1972-73 the Base Flow increased to 48,999 acre-feet as compared to the 26-year Base Period average of 47,470 acre-feet. During 1973-74 the Base Flow dropped to 43,769 acre-feet. The 1974-75 Base Flow amounted to 52,504 acre-feet, an increase of 8,735 acre-feet over the 1973-74 amount.





VARIATION IN PRECIPITATION AT SAN BERNARDINO

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FIGURE 1

Figure 2 shows the Storm and Base Flow components of the Total Flow in the Santa Ana River below Prado Dam.

At Riverside Narrows

The total natural flow (excluding City of Riverside's sewage effluent and State Project water) at Riverside Narrows for the 1974-75 water year was again below the 26-year Base Period average, amounting to 19,644 acre-feet as compared to the Base Period annual average of 44,650 acre-feet.

The Base Flow at Riverside Narrows decreased from 27,120 acre-feet in 1943-44 to 16,410 acre-feet in 1954-55, increased to 19,470 acre-feet in 1957-58, then decreased to an all-time low of 13,450 acre-feet in 1965-66. Since that time the Base Flow at Riverside Narrows gradually increased to 17,223 acre-feet in 1969-70. The Base Flow at Riverside Narrows decreased to 17,061 acre-feet in 1970-71, to 16,157 acre-feet in 1971-72, increased to 17,105 acre-feet in 1972-73, decreased to 16,203 acre-feet in 1973-74, and decreased to 15,445 acre-feet in 1974-75. This amount compares to the 26-year Base Period annual average of 22,190 acre-feet.

Figure 3 shows the components of natural flow in the Santa Ana River at Riverside Narrows and the sewage effluent from the Riverside Water Quality Control Plant for the period from 1934-35 through 1973-74.

Sewage Effluent from Riverside Water Quality Control Plants

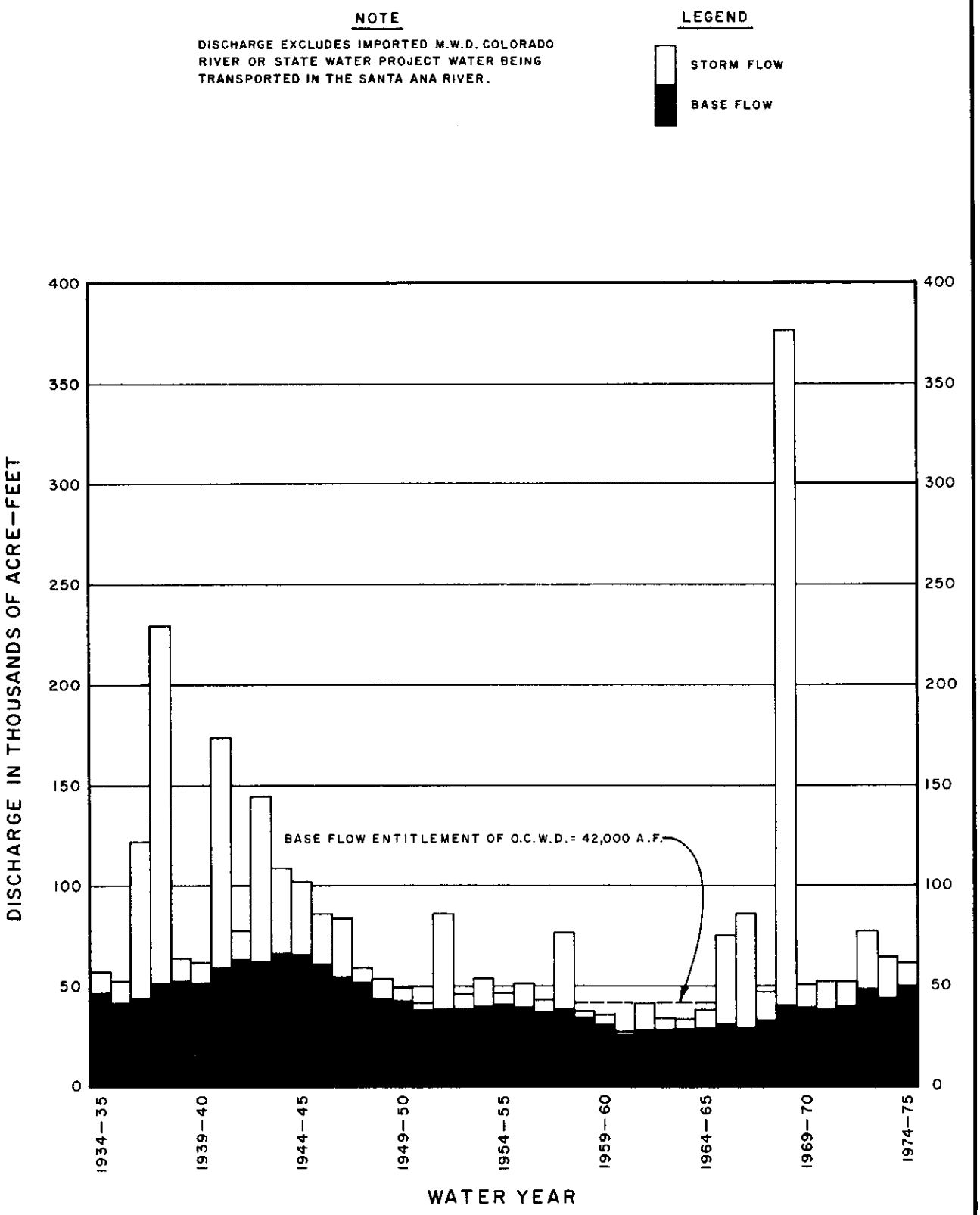
Since the late 1940's the sewage effluent from the Riverside Water Quality Control Plants, which is discharged at the Riverside Narrows between Pedley Bridge and the MWD Crossing, has been increasing in amount. In 1949-50, the amount of treated effluent from Riverside No. 1 and No. 2 plants was 3,960 acre-feet. By 1959-60, the discharge from these plants had increased to 9,900 acre-feet. By 1969-70, the discharge of sewage effluent from the combined treatment plants was 18,657 acre-feet. Thus the contribution of wastewater flow effluent by the City of Riverside has been increasing at a rate of about 800 acre-feet per year. This trend is illustrated on Figure 3. The wastewater flow discharge of the Riverside Water Quality Control Plants during 1974-75 was 19,343 acre-feet.

Effluent from Ontario-Upland and Chino Wastewater Treatment Plants

In late December 1971 and continuing to date, wastewater effluent from the recently constructed tertiary plant serving Ontario and Upland (now called CBMWD's Regional Plant No. 1) has been discharged through a 30-inch pipeline and ditch to Prado Reservoir. Effluent from the City

NOTE

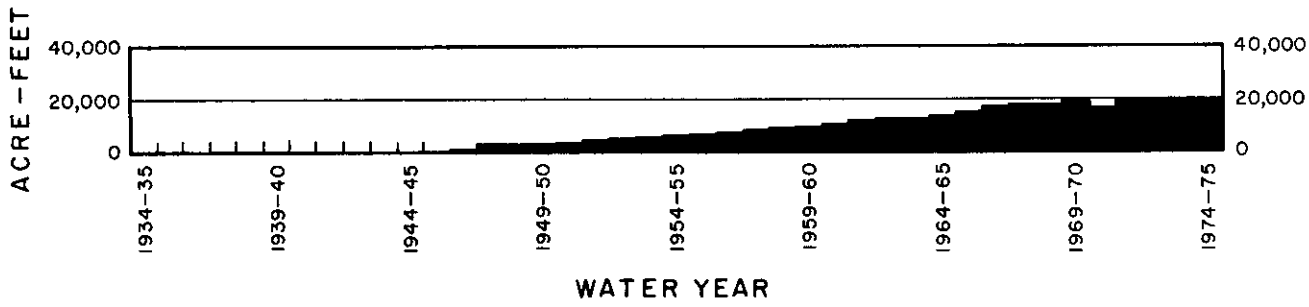
DISCHARGE EXCLUDES IMPORTED M.W.D. COLORADO RIVER OR STATE WATER PROJECT WATER BEING TRANSPORTED IN THE SANTA ANA RIVER.



DISCHARGE OF SANTA ANA RIVER BELOW PRADO DAM

FEBRUARY 1976

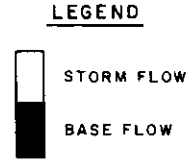
FIGURE 2

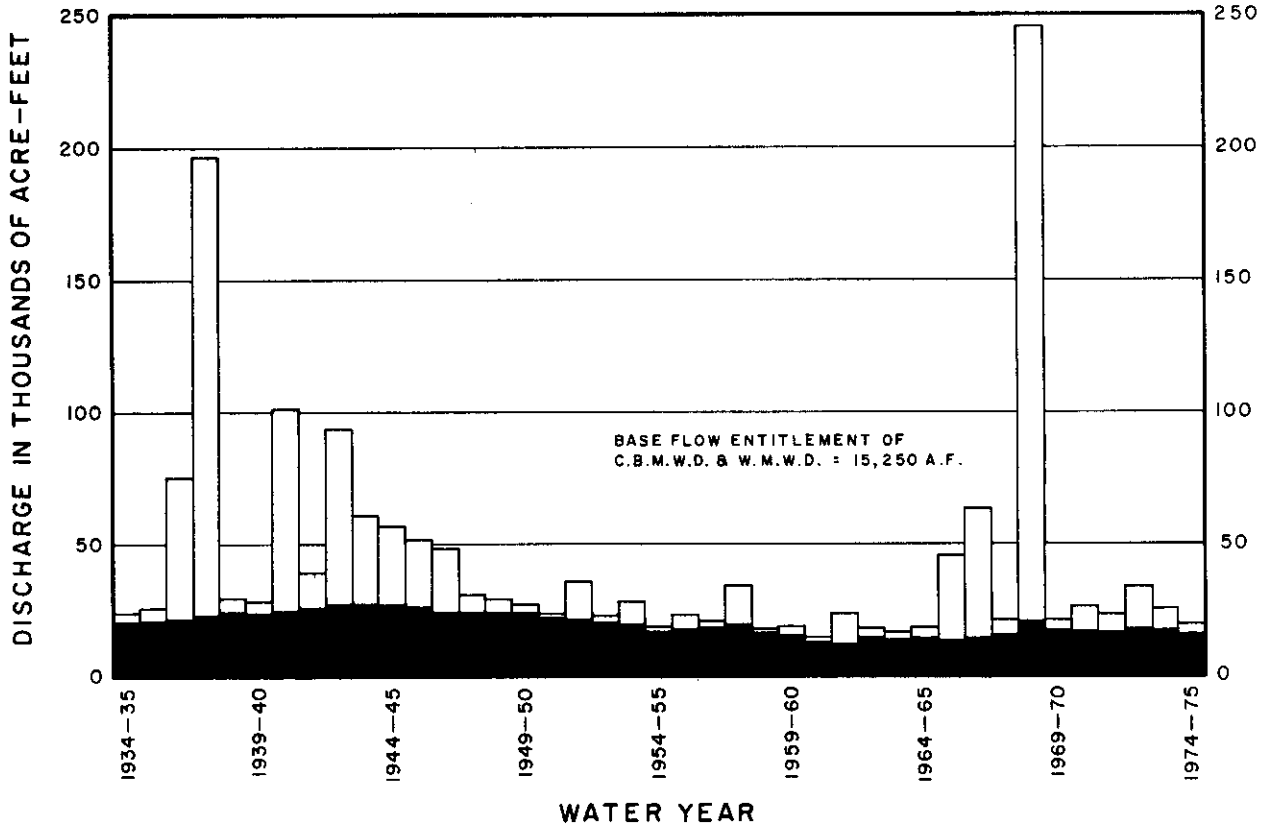


SEWAGE EFFLUENT FROM RIVERSIDE WATER QUALITY CONTROL PLANTS

NOTE

DISCHARGE EXCLUDES SEWAGE EFFLUENT FROM THE RIVERSIDE WATER QUALITY CONTROL PLANTS AND IMPORTED M.W.D. COLORADO RIVER OR STATE WATER PROJECT WATER BEING TRANSPORTED IN THE SANTA ANA RIVER.





DISCHARGE OF SANTA ANA RIVER AT RIVERSIDE NARROWS

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FIGURE 3

of Chino's STP (now called CBMWD's Regional Plant No. 2) is also discharged to Prado Reservoir. The quality of effluent during the water year 1974-75 amounted to 17,242 acre-feet.

Source of Water Supply at Prado Dam

Prior to the regional allocation of water accomplished under the Judgment, the flow in the Santa Ana River reaching Prado Dam originated as a result of storm runoff and rising water. Using the Base Period 1934-35 through 1959-60 for negotiating purposes, agreement between the parties to the Judgment determined that the Base Flow entitlement of Orange County Water District, in the future, should average 42,000 acre-feet. As stated, historically the Base Flow was comprised of rising water; however, under the Judgment, Base Flow is defined as that portion of the total surface flow passing a point of measurement which remains after deduction of storm flow. As discussed herein, in more recent years treated wastewater has been discharged to the River from a number of wastewater treatment plants. It is interesting to note that during the water year 1974-75 the discharge to the River from the Riverside Quality Control Plants, the CBMWD Regional Plants Nos. 1 and 2, and the Corona Sewage Treatment Plant total 40,600 acre-feet. The total amount of Base Flow at Prado Dam during this year amounted to 52,504 acre-feet.

CHAPTER IV

BASE FLOW AT PRADO

This chapter deals with the analysis of the flow at Prado Dam, the calculation of the amount of Base Flow at Prado credited to CBMWD and WMWD, and the calculation of the Adjusted Base Flow.

Total Discharge at Prado

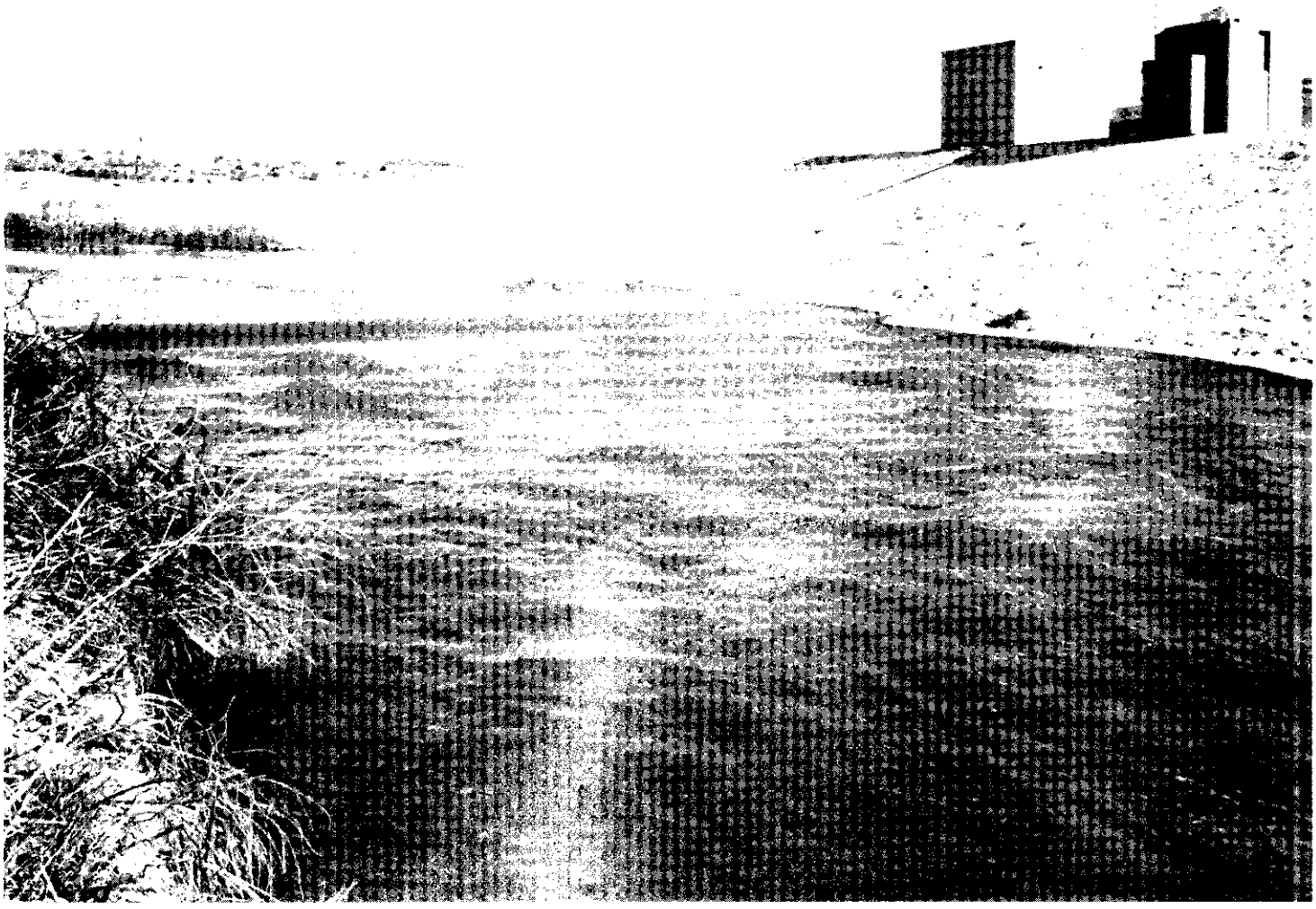
The total discharge of the Santa Ana River at Prado during 1974-75 water year amounted to 93,397 acre-feet, as measured at the USGS gaging station below Prado Dam. This amount includes the State water released into San Antonio Creek during 1974-75 and additional rising water from the Riverside groundwater basin due to the release of State water into Santa Ana River during 1972-73. With an adjustment for the 1974-75 State water flows, the total discharge of local water at Prado is about 14,700 acre-feet less than the 26-year average annual flow of 78,780 acre-feet during the Base Period of 1934-35 through 1959-60. In terms of the total flow passing Prado during the water year 1974-75, the minimum monthly discharge of 4,697 acre-feet occurred in May and the maximum monthly discharge of 10,979 acre-feet occurred in December.

Nontributary Flow

Since May 1973, OCWD has purchased State Water Project water for the replenishment of the groundwater basins in Orange County. The water has been released at two general locations: Santa Ana River above Riverside Narrows and San Antonio Creek near Upland. In order to determine the annual Adjusted Base Flow at Prado Dam as required by the Judgment, the effects of the State water releases in terms of increased flows and changes in water quality at Prado must be determined.

Releases Above Riverside Narrows

The Watermaster Committee made a determination of a schedule of credits to OCWD for State water released above Riverside Narrows during 1972-73. The disposition of these Nontributary flows is discussed in Chapter V and Appendix F.



USGS Gaging Station Below Prado Dam
(Photo: Courtesy of SBVMWD)

For 1974-75, the credit at Prado Dam for this water is 1,414 acre-feet. However, an adjustment must be made for 1973-74 when a credit of 980 acre-feet was assumed. The credit should have been 865 acre-feet. Accordingly, the credit for the 1974-75 Nontributary flow is reduced by 115 acre-feet to 1,299 acre-feet. The 1,299 acre-feet was assumed to be distributed uniformly throughout the year, as shown on Table 4.

Releases to San Antonio Creek

During water year 1974-75, Nontributary water was purchased by OCWD and released from the Rialto Reach of the Foothill Feeder at OC-59T and OC-59 into San Antonio Creek near Upland. The measured flows at OC-59T and OC-59 are set forth in Appendix C. The Committee studied several methods of determining how much of the released water passed Prado in water year 1974-75 and the disposition of the water that did not pass Prado in water year 1974-75. The Committee was not able to make a final determination. Therefore, it intends to continue investigation of the disposition of Nontributary water released into San Antonio Creek in water years 1973-74 and 1974-75 and to make a final determination and adjustment for both of these years at some subsequent time.

For the purpose of arriving at findings in this report, the Committee assumed that 90 percent of the water released in water year 1974-75 passed Prado in water year 1974-75 and assumed a 12-hour delay for travel time. Of the other 10 percent, it was further assumed, subject to revision in subsequent years, that a large portion percolated underground between Los Serranos Road and Prado Dam, and that it will probably cause a corresponding increase in flow at Prado in subsequent years; probably water year 1975-76. The Committee recognizes that some part of the 10 percent can be accounted for by measurement inaccuracies, evaporation and transpiration, and other such items.

TABLE 4

COMPONENTS OF FLOW AT PRADO DAM FOR WATER YEAR 1974-75 (Acre-Feet)

Month	USGS Measured Outflow	Change in Storage	Computed Inflow	Storm Flow	Base Flow	Nontributary Water	
						San Antonio Creek*	Riverside Narrows**
1974							
Oct.	10,013	0	10,013	556	3,447	5,902	108
Nov.	6,938	0	6,938	110	4,113	607	108
Dec.	10,979	0	10,979	3,967	4,871	2,303	108
1975							
Jan.	6,815	0	6,815	104	5,616	987	108
Feb.	7,246	+2	7,248	1,726	5,414	0	108
Mar.	10,332	-2	10,330	4,164	6,058	0	108
Apr.	6,829	0	6,829	1,298	5,423	0	108
May	4,697	0	4,697	0	4,589	0	108
June	7,039	0	7,039	0	3,778	3,153	108
July	9,997	0	9,997	0	3,481	6,407	109
Aug.	7,067	0	7,067	0	2,890	4,068	109
Sept.	5,445	0	5,445	0	2,824	2,512	109
Totals	93,397	0	93,397	11,655	52,504	27,939	1,299

* State water released into San Antonio Creek during 1974-75, assumed to have reached Prado Dam in 1974-75.

** That portion of State water released during water year 1972-73 upstream of Riverside Narrows, assumed to have reached Prado Dam in 1974-75, including an adjustment for 1973-74.

Based on the above assumptions, 27,939 acre-feet of the Nontributary water, which was released to San Antonio Creek, passed Prado Dam during 1974-75. The assumed monthly and annual credits are shown on Table 4.

Components of Flow

Of the total discharge at Prado during the 1974-75 water year, Base Flow was 52,504 acre-feet, Storm Flow was 11,655 acre-feet, Nontributary water due to the release of State water above Riverside Narrows was 1,299 acre-feet, Nontributary water due to State water released into San Antonio Creek was 27,939 acre-feet. Because of the assumptions used to determine the Nontributary flow, adjustments to both Nontributary flow and Base Flow may be required in a subsequent year.

The components of flow were independently determined by each of the five members of the Watermaster using the general procedure set forth in the Work Papers of the engineers for the parties in reaching the physical solution provided for in the Judgment. The Base Flow of 52,504 acre-feet represents an average value of the computations submitted by the five members of the Watermaster. Details of the scalping procedure are described in the following section and the results are graphically shown on Plate 2. The components of flow of the Santa Ana River at Prado Dam for each month in the 1974-75 water year are listed in Table 4.

Operation of Prado Dam and Reservoir

Generally during storms, the Corps of Engineers operated the Prado gates so that some of the storm runoff was temporarily held in storage behind the dam. As the storm ended, Prado Reservoir storage was gradually reduced by the controlled releases to the downstream water conservation facilities operated by Orange County Water District.

During the 1974-75 water year, water was stored behind Prado Dam during the periods October 28 to October 30; December 4 to December 5; February 3 to February 27; March 6 to March 29; and April 9. During these periods, the water stored in Prado Reservoir varied up to a maximum of 2,309 acre-feet and the maximum mean daily flow released to the Santa Ana River was 798 cfs.

During May and June 1975, approximately 10 cfs was pumped from the channel upstream of Prado Dam as a part of the construction of the Santa Ana Regional Interceptor. The water was used to flush the deposition in the existing 60-inch pipeline which became a part of the Interceptor. The outflows from the pipeline were ponded, and desilted flows were allowed to return to the Santa Ana River below the USGS measuring station. The USGS determined the amounts bypassing the station and adjusted the data accordingly.

Base Flow

The determination of Base Flow was complicated, as in the previous two years, by the significant quantity of State water which was released upstream of Prado Dam and by the release of stored Storm Flow over extended periods.

The general procedure used by the members of the Watermaster to separate the 1974-75 flow components is outlined below:

(1) The daily records at Prado Dam, as measured by the USGS, were plotted for the entire water year as shown on Plate 2.

(2) To facilitate the separation of the Storm Flow component from the Base Flow component, the daily inflow to Prado Reservoir was estimated. This was done by using reservoir stage records secured from the Corps of Engineers and the daily outflows as measured by the USGS. Daily reservoir water surface elevations were converted to acre-feet of storage by use of Corps of Engineers' relationships between the water surface elevation and the storage capacity. Daily reservoir inflow was computed by use of the equation: Inflow = Outflow + Change in Reservoir Storage.

(3) The daily flow component due to the release of State water into San Antonio Creek during 1974-75 was determined by the method discussed in the previous section entitled "Nontributary Flow," and subtracted from the daily inflows as determined in Item (2) above. The resultant Nontributary water reaching Prado amounted to 27,939 acre-feet. The estimated daily inflows to Prado, reduced by the amount of said Nontributary flow, were plotted for the entire water year as shown on Plate 2.

(4) The daily precipitation recorded at the San Bernardino County Hospital was plotted for the entire water year as shown on Plate 2.

(5) Using the above data, an initial determination was made of those days having no Storm Flow component. Non-storm periods exclude the time from commencement of rainfall until the end of the recession flow following each storm period.

(6) Utilizing the above segments during non-storm periods, a continuous smooth curve was drawn and extended across the balance of the time when storms occurred. During periods of Storm Flow when changes in storage occurred in Prado Reservoir, the inflow hydrograph was used as a guide. The shape of the curve throughout the year is generally similar to those of prior years.

(7) Arriving at an opinion of the location of the curve separating the two components of flow required the exercise of judgment, taking into consideration items (1) through (6) above and, to some extent, the variation in Base Flow which occurred in previous water years.

(8) The resulting curve is used for separation of components of flow during storm intervals. Mean daily Storm Flow was computed by subtracting the value of the above referenced curve from the computed total mean daily inflow.

(9) For those days outside the storm periods, the computed inflow less the Nontributary Flow from OC-59T and OC-59 represents the Base Flow and the State Project Water releases upstream of Riverside Narrows.

(10) The Base Flow was determined from the results obtained in Item (3) above, less the Storm Flow determined in Item (8) above, and less the Nontributary Flow originating from the discharges above Riverside Narrows distributed uniformly throughout the year and totaling 1299 acre feet for 1974-75.

Water Quality

During the water year 1974-75, the weighted average total dissolved solids (TDS) for the total flow, including Nontributary Flow, passing Prado was found to be 539 ppm. This determination of the water quality at the USGS gaging station below Prado Dam was made using measurements obtained by the USGS which operates a water quality recorder at this station. A continuous record of water quality data are recorded on a punched tape for determination of specific conductivity and temperature. Average daily values for TDS which were developed from this specific conductance data are shown on Plate 3.

The plot of TDS on Plate 3 shows the effects of the State Project water. In general, the TDS fluctuated in the 350 to 500 ppm range when the State Project water was being released. When the releases of State Project water were terminated or reduced substantially, there were corresponding increases in TDS to the 600 to 800 ppm range. There was a substantial reduction in TDS during March due to storm runoff.

Personnel from the USGS make frequent inspections of the station to determine if equipment is operating satisfactorily and secure grab samples of water from the river for laboratory determinations of total dissolved solids and for specific conductance. During periods of storm runoff the USGS visits the station more frequently for the purpose of taking additional grab samples to provide a more detailed record of possible changes in water quality during periods of Storm Flow. The results of the water quality sampling for the year 1974-75 are shown in Table D-1, Appendix D.

At the end of each month, the punched tape from the Prado recorder is processed and a summary tabulation of mean daily conductivity data is obtained. Utilizing the USGS water quality records, the following analyses were performed by the Watermaster to determine the annual weighted TDS:

(1) The specific conductivity of the Santa Ana River below Prado was relatively uniform for most days of the year. On these days, the mean specific conductance, as computed by the USGS, was accepted as representative of the daily weighted value.

(2) During periods when the daily discharge varied, numerous flow measurements, together with the respective specific conductance measurement, were used to determine the weighted mean daily specific conductance value.

(3) Laboratory analyses of the 51 grab samples taken by the USGS below Prado Dam during the 1974-75 season were run to determine both specific conductance and TDS. Results of these analyses were used to prepare a correlation between specific conductance and the corresponding TDS. A detailed discussion of this statistical analysis is presented in the following section.

(4) The resulting equation from the curve fitting operation was then used to determine the mean daily TDS corresponding to the mean daily specific conductance values for each day of the year.

(5) The mean daily TDS values were then multiplied by the mean daily flow. These products were then summed and divided by the total flow for the year to determine the weighted average TDS value for the water year. This value for TDS for the total flow including Nontributary water was 539 ppm of total dissolved solids for the 1974-75 water year. This value hereinafter is adjusted for the quality of the Nontributary flow. The weighted TDS calculations for the water year 1974-75 are shown in Tables D-2 and D-3, Appendix D.

Statistical Analysis of EC and TDS Relationships

An analysis of the correlation of electrical conductivity versus total dissolved solids in the Santa Ana River below Prado Dam for the water year 1974-75 was analyzed through the use of a statistical computer program. This is a linear regression program for data sets in two variables; x and y. From input data points, described in their x and y coordinates, an equation is produced that best fits these points from a least squares viewpoint. The computer program calculates six different types of equations based on the assumption that y (TDS) is a function of the independent variable x (EC). The computer output results of the analysis of the 1974-75 data is shown below:

Form of Equation	Curve Type	Correlation Coefficient	Y-Intercept (A)	Slope (B)
(1) TDS=A+B (EC)	Linear	0.9970	-32.41	0.6426
(2) TDS=A[EXP_B(BxEC)]	Exponential	0.9892	174.52	12.29×10^{-4}
(3) TDS=A (EC)	Power Function	0.9969	0.4227	1.053
(4) TDS=A+B/EC	Hyperbolic	0.9359	1023.1	-39.90×10^{4}
(5) TDS=1/[A+B(EC)]	Hyperbolic	0.9543	42.10×10^{-4}	-24.88×10^{-7}
(6) TDS=EC/[A+B(EC)]	Hyperbolic	0.9970	1.720	-72.60×10^{-6}

Note that the value of the correlation coefficient for equations (1) and (6) most nearly approaches 1.000 the value which represents a perfect correlation between x and y data points. Equation (1) was selected as the relationship for relating the 1974-75 USGS mean daily electrical conductivity values to mean daily TDS values. The equation, as shown on Figure 4, used for this relationship was:

$$TDS = -32.41 + (0.6426)\,(EC)$$

Water Quality Adjustment for Nontributary Water

The weighted average annual TDS value of 539 ppm, as stated previously, includes the effects of the State Project water during this water year and the preceding water years. Therefore, the annual amounts of the flow components were multiplied by their respective average annual TDS and summed, as shown below. This sum, which is proportional to the total amount of salt transported through Prado Dam, was equated to the value of the total annual outflow multiplied by the average annual TDS of 539 ppm. The flow-weighted average TDS of the State Project water released to San Antonio Creek during water year 1974-75 was 214 ppm, as shown in Table D-4, Appendix D. The flow-weighted average TDS of State water released during 1972-73 was 235 ppm, which was adjusted to 242 ppm due to the three percent evapotranspiration loss. After adjusting for these releases the weighted average annual TDS value for 1974-75 was determined to be 687 ppm as shown on the following calculation:

		Annual Flow	Avg TDS	(Annual Flow) x (Avg TDS)
(1)	Total Flow	93,397 A.F.	539 ppm =	50,340,983 A.F.-ppm
(2)	Nontributary Water Riverside Narrows	1,299 A.F.	242 ppm =	314,358 A.F.-ppm
(3)	Nontributary Water San Antonio Creek	27,939 A.F.	214 ppm =	5,978,946 A.F.-ppm
(4)	Total Outflow Less Nontributary Water	64,159 A.F.	Avg. TDS=	44,047,679
(5)	Avg. TDS of Total Outflow:			= 44,047,679 ÷ 64,159
				687 ppm

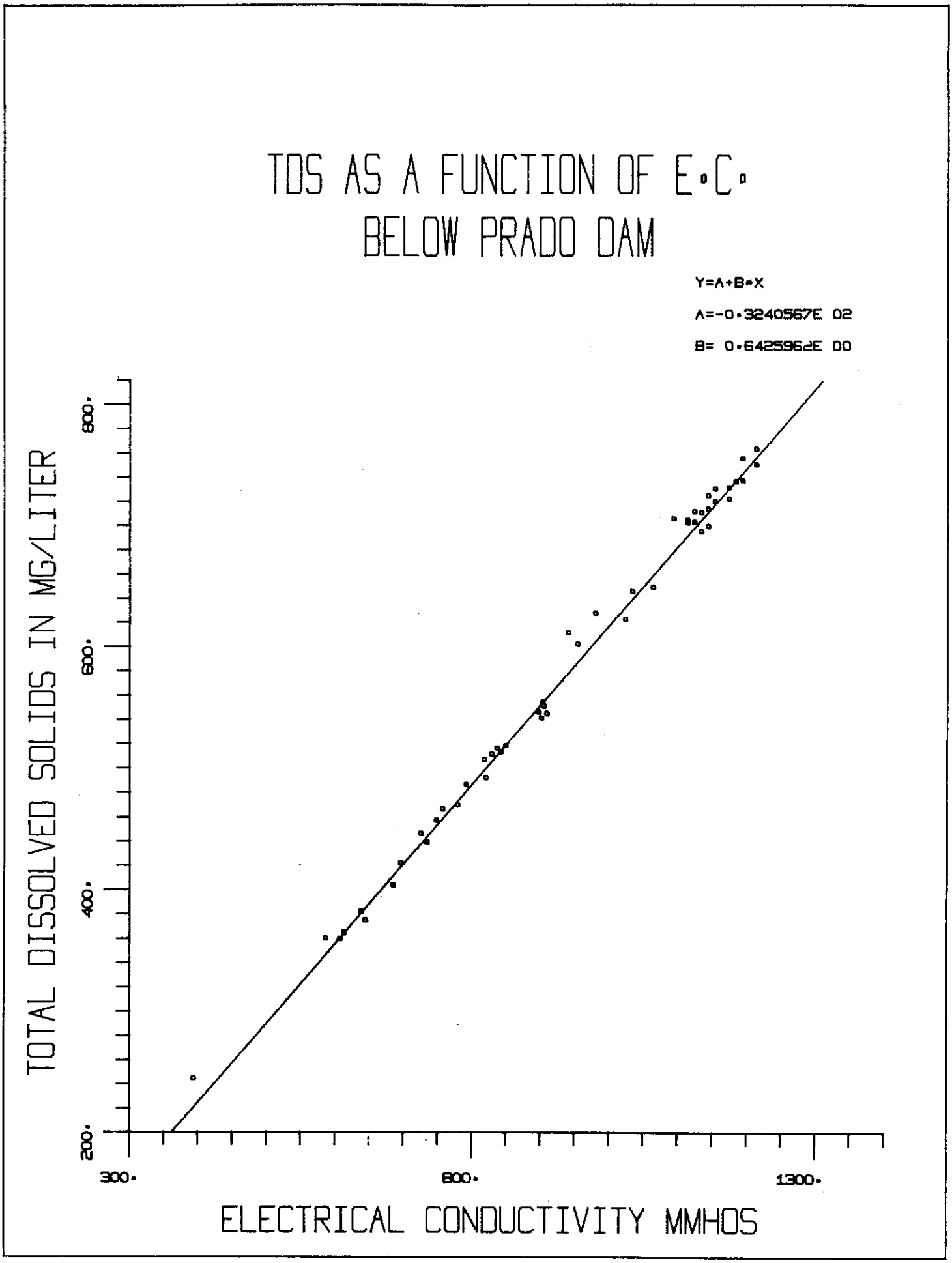


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FIGURE 4

Adjusted Base Flow

According to the Judgment, "The amount of Base Flow at Prado received during any year shall be subjected to adjustment based on weighted average annual TDS in Base Flow and Storm Flow at Prado as follows:

If the Weighted Average TDS in Base Flow and Storm Flow at Prado is:	Then the Adjusted Base Flow shall be determined by the formula:
Greater than 800 ppm	$Q - \frac{35}{42,000} Q (TDS-800)$
700 ppm-800 ppm	Q
Less than 700 ppm	$Q + \frac{35}{42,000} Q (700-TDS)$

Where Q = Base Flow actually received."

The adjusted average annual TDS of 687 ppm is less than 700 ppm. Therefore, the Base Flow of 52,504 acre-feet must be adjusted by the equation above for TDS less than 700 ppm. Thus the Adjusted Base Flow is as follows:

$$(52,504 \text{ A.F.}) + \frac{35}{42,000} (52,504 \text{ A.F.}) (700-687) = 53,073 \text{ A.F.}$$

Entitlement and Credit or Debit

From pages 12 and 13 of the Judgment, the following description of the obligation of the CBMWD and WMWD is given: "CBMWD and WMWD shall be responsible for an average annual adjusted Base Flow of 42,000 acre-feet at Prado...CBMWD and WMWD each year shall be responsible for not less than 37,000 acre-feet of Base Flow at Prado, plus one-third of any cumulative debit..."

The Watermaster is required to maintain a continuing account of a list of permanent items at Prado for each year. A list of these items and the 1974-75 values are shown below:

(1)	Base Flow at Prado	52,504 acre-feet
(2)	Annual Weighted TDS of Total Flow	687 ppm
(3)	Annual Adjusted Base Flow	53,073 acre-feet
(4)	Cumulative Adjusted Base Flow	227,191 acre-feet
(5)	Cumulative Entitlement of OCWD at Prado	210,000 acre-feet

(6)	Cumulative Credit (4)-(5)	17,191 acre-feet
(7)	One-third of Cumulative Debit	0 acre-feet
(8)	Minimum Required Base Flow in 1975-76	37,000 acre-feet

CHAPTER V

BASE FLOW AT RIVERSIDE NARROWS

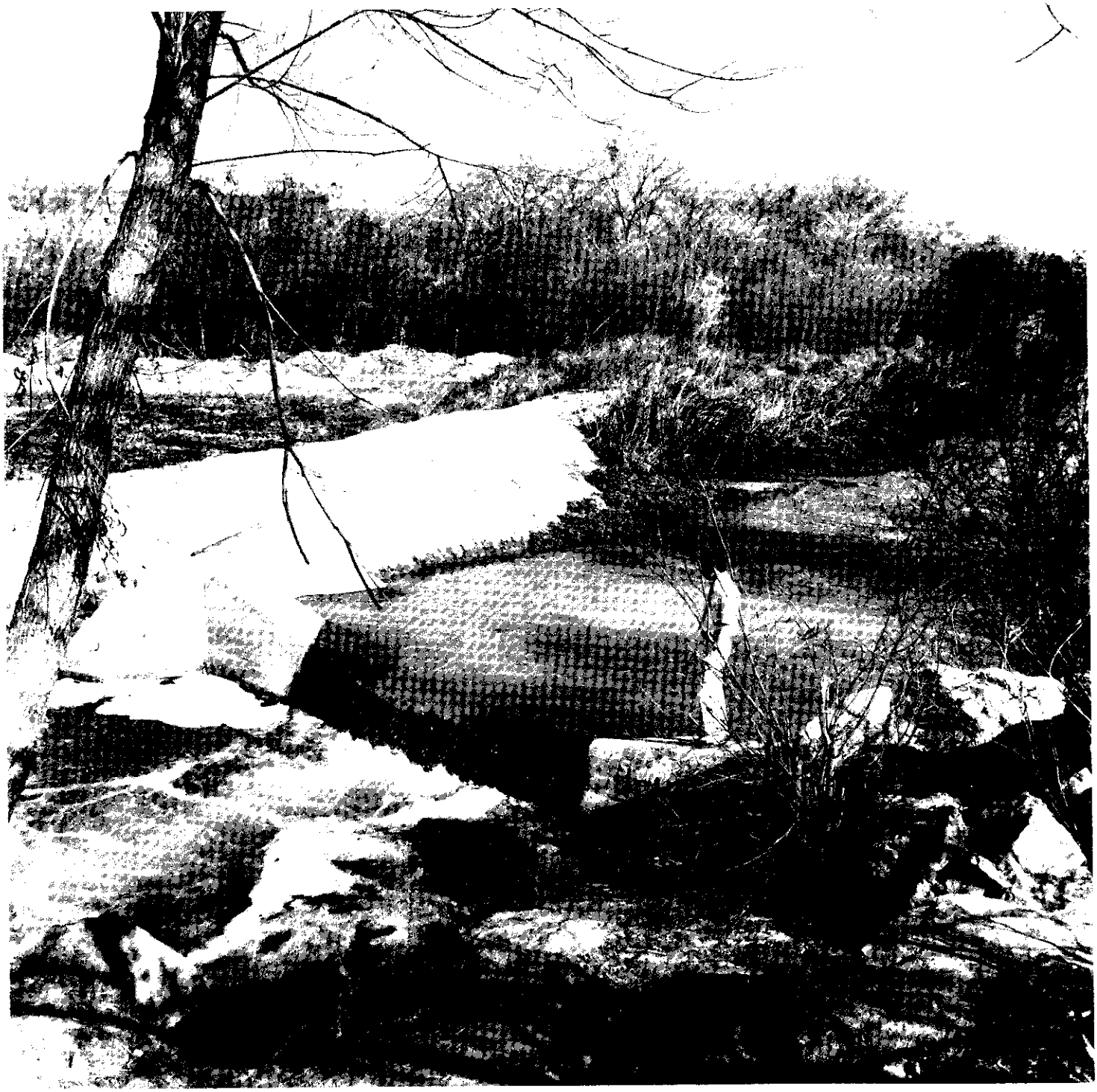
The Judgment states that SBVMWD is "responsible for an average annual Adjusted Base Flow of 15,250 acre-feet at Riverside Narrows". This chapter deals with the analysis of the flow at Riverside Narrows, the calculation of the amount of Base Flow received and credited to SBVMWD, and the calculation of the Adjusted Base Flow, the adjustment being made on the basis of the weighted average annual TDS in the Base Flow.

Total Discharge at Riverside Narrows

The surface flow of the river at the Riverside Narrows has been measured by the USGS since 1929, first at a gaging station located approximately one-half mile downstream from the Union Pacific Railroad Bridge, which was moved in 1943 to a downstream location at Pedley crossing, now known as Van Buren Boulevard. A flood which occurred during the 1968-69 water year washed out a portion of the bridge across the river at this location. This increased the difficulty of maintaining the surface gage at Van Buren Boulevard, and led to the installation of a surface water gaging station upstream a short distance above The Metropolitan Water District Upper Feeder Bridge crossing which is situated on the opposite side of the river from the original location of the Riverside Narrows surface water gaging station. This surface water gaging station, which is 1½ miles upstream from Van Buren Boulevard, also houses a monitor for the determination of electrical conductivity.

In 1947, the City of Riverside constructed a sewage treatment plant a short distance upstream from Van Buren Boulevard. This plant was enlarged in 1968 and the effluent was discharged directly to the Santa Ana River upstream from Van Buren Boulevard, with the result that the surface water flow at Van Buren Boulevard includes the sewage effluent from the Riverside Water Quality Control Plant.

For the year of 1971-72, the Base Flow component was calculated at the two gaging stations, one at Van Buren Boulevard and the other at the MWD Upper Feeder crossing. The Base Flow, as calculated at the Upper Feeder crossing, was found to be slightly higher than that calculated at Van Buren Boulevard, and for the year of 1971-72 it was the Watermaster's decision that the Base Flow at the Riverside Narrows would be defined as that portion of the total surface flow passing the gaging station at Van Buren Boulevard which remained after the deduction of Storm Flow and the wastewater discharge to the river by the City of Riverside above the measuring point.



USGS Gaging Station at Riverside Narrows
(Photo: Courtesy of SBVMWD)

Dual measurements were continued during the year of 1972-73 through June of 1973, at which time the USGS discontinued measurements at the Van Buren Boulevard gaging station. The surface water gaging station just upstream of the MWD Upper Feeder Bridge crossing has been used as the source of flow data for the 1973-74 water year.

Nontributary Flow

During the period May through September 1973, 11,617 acre-feet of nontributary water from the East Branch of the California Aqueduct was purchased by the Orange County Water District and released into the Santa Ana River in the vicinity of Colton. It became the duty of the Watermaster to determine the effect of this release on the surface flow at both Riverside Narrows and at the Prado Gage, as the Judgment requires the Watermaster in determining Base Flow to "exclude any nontributary water or reclaimed sewage water purchased by OCWD and delivered into the river upstream and which subsequently passes Prado".

The Watermaster has made a determination of the effect of this recharge program and this determination is discussed in Appendix F. In Appendix F, Table 1 details the annual amount of Nontributary water considered to arrive at Riverside Narrows as a result of the 1973 Recharge Program, and for the water year 1974-75 this amount is 1,443 acre-feet.

However, for this year, a correction has to be made to account for an approximation made last year. It was agreed that for 1973-74, a value of 1,000 acre-feet be used as a temporary expedient because the study as detailed in Appendix F was not complete. It also was agreed that upon a final determination, a modification to correct the 1973-74 assumption would be made in the 1974-75 value. The accepted figure for 1973-74 is 883 acre-feet, therefore the difference between this amount and the 1,000 acre-feet actually utilized for 1973-74 is 117 acre-feet, and this amount must be subtracted from the quantity of 1,443 acre-feet. This results in a Nontributary water credit at Riverside Narrows of 1,326 acre-feet for 1974-75.

Components of Flow

The components of the total flow of the Santa Ana River at Riverside Narrows at MWD Crossing for the 1974-75 water year include Nontributary, Storm, and Base Flow. These components, by months, as listed in Table 5, represent an average value derived from calculations made by the five members of the Watermaster.

TABLE 5

COMPONENTS OF FLOW AT RIVERSIDE NARROWS FOR WATER YEAR 1974-75
(Quantities in Acre-Feet)

Month		Total Flow USGS Measurement	Nontributary Flow	Storm Flow	Base Flow
1974	October	1,300	111	25	1,164
	November	1,260	111	16	1,133
	December	2,650	111	1,185	1,354
1975	January	1,590	111	16	1,463
	February	1,850	111	389	1,350
	March	3,880	111	2,240	1,529
	April	1,860	110	293	1,457
	May	1,430	110	27	1,293
	June	1,370	110	8	1,252
	July	1,340	110	0	1,230
	August	1,250	110	0	1,140
	September	1,190	110	0	1,080
Total - Acre Feet		20,970	1,326	4,199	15,445

The total flow, as shown in Table 5, consists of 6.32% of Nontributary Flow, 20.02% of Storm Flow, and 73.65% of Base Flow.

Base Flow

The hydrograph of the river flow at the MWD Crossing shows the scalped Storm Flow component colored in red on Plate 4. Based on this hydrograph and utilizing in general the same procedures as are reflected in the Work Papers of the engineers (as referenced in Paragraph 2 of the Engineering Appendix of the Judgment), a separation was made between Storm Flow and the sum of Base Flow and Nontributary water. Nontributary water was assumed to be equally distributed

throughout the year (1,326 acre-feet divided by 12 months) and subtracted from the sum of the Base Flow and Nontributary water to arrive at Base Flow.

Each of the five members of the Watermaster independently made a determination of each component, based on his own judgment and his own interpretation of the method used in the previously referenced Work Papers. The value for Base Flow of 15,445 acre-feet, as shown on Table 5, is the mathematical average of the five determinations. Plate 4 is indicative of scalping done by the Watermaster.

Water Quality

Under the terms of the Judgment it is necessary to determine the weighted average total dissolved solids (TDS) content of the Base Flow at Riverside Narrows.

To accomplish this, the USGS has installed a specific conductance measuring device and recorder immediately upstream from the river crossing of the Upper Feeder of MWD, which is also upstream from the point of discharge of the effluent from the Riverside Water Quality Control Plant to the river. The USGS operates and maintains this monitoring device in the same manner as the station operated at below Prado Dam. The data collected from this monitor are augmented by periodic grab samples. However, during the period October 1, 1974 through March 25, 1975, the USGS specific conductance (EC) recorder was not providing reliable data. Therefore, daily average EC values were computed by interpolating periodic sample data and by use of a relationship between EC and flowrate developed from historic data at Riverside Narrows for the period 1970-75.

During the water year 1974-75, 47 samples were taken from the waters of the Santa Ana River at the MWD Crossing for laboratory analysis, to determine the TDS and EC of each sample. All 47 samples were used in a statistical analysis for the determination of the relationship of EC to TDS. Appendix E includes the complete statistical analysis.

Statistical Analysis of EC and TDS Relationships

Six different types of equations were utilized, based upon the assumption that TDS was a function of the independent variable EC, to determine the equation providing the best correlation. The analysis was made utilizing a multiple regression computer program which determined the best curve fitting equation for the 47 laboratory samples.

The results of the computer analysis of the 1974-75 data are shown as follows:

Form of Equation	Curve Type	Multiple Correlation Coefficient	Coefficient Term (A)	Constant Term (B)
(1) $TDS = A(EC)+B$	Linear	0.996	0.6309	0.9033
(2) $TDS = A[\ln(EC)]+B$	Logarithmic	0.983	435.0519	-2355.6738
(3) $TDS = \frac{1.0}{A(EC)+B}$	Hyperbolic	0.978	-3.386×10^{-6}	5.135×10^{-3}
(4) $TDS = A[e^{B(EC)}]$	Exponential	0.994	150.68627	.00139
(5) $TDS = \frac{1.0}{A(EC)+B}$	Hyperbolic	0.998	8.5×10^{-5}	1.49506
(6) $TDS = A(EC)^B$	Exponential	0.997	0.73609	0.9780

Note that the value of the multiple correlation coefficient for equation (5) most nearly approaches 1.000 - the value which represents a perfect correlation between TDS and EC samples. Based on the above computer analysis, equation (5) was selected as the relationship for relating the 1974-75 mean daily electrical conductivity values to the adjusted daily TDS values. The equation used for this relationship was:

$$TDS = \frac{EC}{0.000085\,(EC)+1.495056}$$

The daily TDS calculated by the above equation was then multiplied by the mean daily flow for each day of the year as shown on Table No. E-2, Appendix E, entitled "Weighted TDS Calculation Sheet".

Because the Judgment provides that only the Base Flow at the Riverside Narrows may be used for determining the weighted average annual TDS, the calculation sheets separate the total flow into two parts, the Storm Flow and the sum of Nontributary and Base Flow. The monthly totals of the product of the adjusted TDS and the three flows (Total, Storm, and Nontributary + Base) were calculated for each month.

The TDS of the Base Flow and Nontributary Flow during the period of Storm Flow was developed by averaging the TDS on the day before and the day after the storm as shown on Table No. E-2 of Appendix E. This TDS was then multiplied by the Nontributary and Base Flow component only and has been noted by one asterisk on the calculation sheets on said Table.

The calculation sheets on said Table No. E-2 have been summarized on Table No. E-3 of Appendix E, entitled "Summary of Water Quality for the Riverside Narrows at Metropolitan Water

District (MWD) Crossing". The weighted average annual total dissolved solids in parts per million (ppm) of the Santa Ana River at MWD Crossing for water year 1974-75, for the Nontributary and Base Flow component was 692 ppm. To adjust this for Base Flow only, it was assumed that the Nontributary water had an original quality of 235 ppm, but due to a 1% evaporation loss during the recharging operation the adjusted water quality for Nontributary water was assumed to be 237 ppm. The adjustment for the Nontributary water results in a TDS for Base Flow only of 731 ppm.

A plot of the TDS of the total daily flow, including Nontributary water, at the MWD Crossing for the water year 1974-75 is shown on Plate 5, together with the San Bernardino rainfall.

Adjusted Base Flow at Riverside Narrows

The Judgment provides that the amount of Base Flow at Riverside Narrows received during any year shall be subject to adjustment based on the weighted average annual TDS in such Base Flow as follows:

If the Weighted Average TDS in Base Flow at Riverside Narrows is:	**Then the Adjusted Base Flow shall be Determined by the Formula:**
Greater than 700 ppm	$Q - \frac{11}{15,250} Q\ (TDS-700)$
600 ppm - 700 ppm	Q
Less than 600 ppm	$Q + \frac{11}{15,250} Q\ (600-TDS)$

Where Q = Base Flow actually received.

From the previous subsection, the weighted average annual TDS in the Base Flow at Riverside Narrows for the water year 1974-75 was 731 ppm. Therefore, an adjustment to the Base Flow of 15,445 acre-feet is necessary, and the Adjusted Base Flow for 1974-75 is 15,100.

Entitlement and Credit or Debit

Paragraph 5(b) of the Judgment states that "SBVMWD shall be responsible for an average annual Adjusted Base Flow of 15,250 acre-feet at Riverside Narrows....SBVMWD each year shall be responsible at Riverside Narrows for not less than 13,420 acre-feet of Base Flow plus one-third of any cumulative debit...."

A list of the accounting items and the 1974-75 values for these items, as required by Paragraph 4 of the Engineering Appendix to the Judgment is detailed below:

(1)	Base Flow at Riverside Narrows	15,445 acre-feet
(2)	Annual Weighted TDS of Base Flow at Riverside Narrows	731 ppm
(3)	Annual Adjusted Base Flow	15,100 acre-feet
(4)	Cumulative Adjusted Base Flow	81,437 acre-feet
(5)	Cumulative Entitlement of CBMWD and WMWD at Riverside Narrows	76,250 acre-feet
(6)	Cumulative Credit (4)-(5)	5,187 acre-feet
(7)	One-third Cumulative Debit	0
(8)	Minimum Required Base Flow in 1975-76	13,420 acre-feet

APPENDIX A

HISTORY OF LITIGATION

HISTORY OF LITIGATION

The complaint in this case was filed by the Orange County Water District on October 18, 1963 seeking an adjudication of water rights against more than 2,500 water users in the area tributary to Prado Dam within the Santa Ana River Watershed. Thirteen cross-complaints were filed in 1968 extending the adjudication to include an additional 1,500 water users in the area downstream from Prado Dam. Thus, there were involved in this case some 4,000 parties. It became obvious that every effort should be made to arrive at a settlement and a physical solution in order to avoid the enormous and unwieldy litigation that would be involved.

Efforts to arrive at a settlement and physical solution were pursued by public officials, individuals, attorneys, and engineers. Attorneys for the parties organized in order to further this objective. Among other things, they provided guidance for the formation and activities of an engineering committee to provide them with information on the physical facts.

An initial meeting of the engineers representing the parties was held on January 10, 1964. Agreement was reached that it would be beneficial to jointly undertake the compilation of basic data. Liaison was established with the Department of Water Resources, State of California, on requests for information to be obtained from the State's studies for use by the parties. Engineers representing the parties were divided into sub-committees which were given the responsibility of investigating such things as the boundary of the Santa Ana River watershed and its subareas, standardization of the terminology, the location and description of wells and diversion facilities, waste disposal and transfers of water between subareas.

On April 30, 1964, the joint engineering committee prepared a list of preliminary engineering studies directed toward settlement of the Santa Ana River water rights litigation. This list of basic information was in response to a request from the attorneys' committee at a meeting held April 17, 1964. Special assignments were made on selected items to individual engineers to provide information requested by the attorneys' committee.

The attorneys and engineers for the defendants then commenced a series of meetings separate from the representatives of the plaintiff in order to consolidate their position and to determine their course of action. On October 7, 1964 engineers for the defendants presented the results of the studies made by the joint engineering committee. The defendants' attorneys requested that additional information be provided on the methods of measuring flow at Prado and the historical supply and disposal of water passing Prado Dam segregated into the components of flow and

designating the amount of supply which was usable by the downstream area. On December 11, 1964, this supplemental information was presented to the defendants' attorneys.

During 1965, engineers and attorneys for the defendants held numerous conferences and conducted additional studies in an attempt to determine their respective positions in the case. Early in 1966, the plaintiff and defendants exchanged drafts of possible principles of settlement. Commencing March 22 and ending April 13, 1966, four meetings were held by the engineers to discuss the draft of principles for settlement.

On February 25, 1968 the defendants submitted a request to the Court that an Order of Reference be issued requesting the State Department of Water Resources to determine the physical facts. On May 9, 1968 the plaintiff's attorney submitted motions opposing the Order of Reference and requesting that a preliminary injunction be issued. In the meantime, every effort was being made to come to an agreement on a stipulated judgment. Commencing on February 28, 1968 and extending until May 14, 1968, six meetings were held to determine the scope of physical facts on which agreement could be reached so that if an Order of Reference were to be approved by the Court, the work under the proposed reference would not repeat the extensive basic data collection and compilation which had already been completed and on which engineers for both plaintiffs and defendants had reached substantial agreement. Such basic data were compiled and published in two volumes under date of May 14, 1968 entitled "Appendix A. Basic Data."

On May 21, 1968 an outline of a proposal for settlement of the case was prepared and a committee of attorneys and engineers for the parties commenced preparation of the settlement documents. On June 16, 1968, the Court held a hearing on the motions it had received requesting a preliminary injunction and an Order of Reference. The parties requested that the Court delay the hearings on these motions in view of the efforts toward settlement that were underway. The plaintiff, however, was concerned regarding the necessity of bringing the case to trial within the statutory limitation and, accordingly, on July 15, 1968 submitted a motion to set the complaint in the case for trial. On October 15, 1968 the trial was commenced and was adjourned after one-half day of testimony on behalf of the plaintiff. Thereafter, the parties filed with the Court the necessary Settlements Documents including a Stipulation for Judgment. The Court entered the Judgment on April 17, 1969. This terminated the many years of controversy over water rights along the Santa Ana River involving the issues and parties embraced in Orange County Water District versus City of Chino, et al.

APPENDIX B

SUMMARY OF JUDGMENT

SUMMARY OF JUDGMENT

Provisions of the Judgment became effective on October 1, 1970. The Judgment does not define the water rights of the individual claimants. Instead, it provides for a regional allocation of water supply of the Santa Ana River system and establishes entitlements and obligations among the four existing major public water districts overlying the aggregate of substantially all of the major areas of water use in the watershed. Dismissals were entered as to all defendants and cross defendants other than these four major public districts. These districts, the locations of which are shown on Plate 1, "Santa Ana River Watershed," are the remaining parties to the Judgment and are as follows:

(1) Orange County Water District (OCWD), representing all lower basin entities which are located within Orange County downstream from Prado Dam.

(2) Western Municipal Water District (WMWD), representing middle basin entities located within Riverside County on both sides of the Santa Ana River primarily upstream from Prado Dam.

(3) Chino Basin Municipal Water District (CBMWD), located in San Bernardino County Chino Basin area, representing middle basin entities within its boundaries and located primarily upstream from Prado Dam.

(4) San Bernardino Valley Municipal Water District (SBVMWD), representing all entities within its boundaries, and embraced within the upper portion of the Riverside Basin Area, the Colton Basin area (being an upstream portion of the middle basin) and the San Bernardino Basin area, being essentially the upper basin.

A physical solution under the stipulated Judgment provides, in general, that SBVMWD shall be responsible for the delivery of an average annual amount of Base Flow at Riverside Narrows and CBMWD and WMWD shall jointly be responsible for an average annual amount of Base Flow at Prado. Essential to the understanding of the provisions of the Judgment is the definition of certain important terms. The total surface flow passing a point of measurement is divided into components, which are defined in the Judgment as follows:

"(1) Storm Flow - That portion of the total surface flow passing a point of measurement, which originates from precipitation and runoff without having first percolated to ground water storage in the zone of saturation, calculated in accordance with procedures referred to in Exhibit B.

(2) Base Flow - That portion of the total surface flow passing a point of measurement which remains after deduction of storm flow.

(3) Adjusted Base Flow - Actual base flow in each year adjusted for quality as provided . . ."

The Judgment sets forth a declaration of rights. Briefly stated, the Judgment provides that the water users in the area downstream from Prado Dam have rights, as against the upstream users, to receive an average annual supply of 42,000 acre-feet of Base Flow at Prado Dam, together with the right to all Storm Flow reaching Prado Dam. Water users in the area upstream of Prado Dam, as against the downstream users, have the right to divert, pump, extract, conserve, store and use all surface and ground water supplies originating within the upper area, so long as the lower area receives the water to which it is entitled.

The physical solution set forth in the Judgment requires that SBVMWD shall be responsible for an average annual Adjusted Base Flow of 15,250 acre-feet at Riverside Narrows subject each year to the following:

(1) A minimum Base Flow of 13,420 acre-feet plus one-third of any cumulated debit.

(2) After October 2, 1986, if no cumulated debit exists, the minimum quantity shall be 12,420 acre-feet.

(3) Prior to 1986, if the cumulated credit exceeds 10,000 acre-feet the minimum quantity shall be 12,420 acre-feet.

(4) All cumulated debits shall be removed by the discharge of a sufficient Base Flow at Riverside Narrows at least once in every ten consecutive years following October 1, 1976. Any accumulated credits shall remain on the books of account until used to offset any subsequent debits or until otherwise disposed of by SBVMWD.

(5) The Base Flow at Riverside Narrows shall be adjusted using weighted average annual TDS in such Base Flow in accordance with the formula set forth in the Judgment.

The obligations under the physical solutions for meeting the Adjusted Base Flow of 42,000 acre-feet at Prado Dam for the benefit of the downstream water users as shared by CBMWD and WMWD are as follows:

(1) Minimum Base Flow at Prado shall not be less than 37,000 acre-feet plus one-third of any cumulated debit.

(2) After October 1, 1986, if no cumulated debit exists, the minimum quantity shall be 34,000 acre-feet.

(3) Prior to 1986, if the cumulated credit exceeds 30,000 acre-feet, the minimum quantity shall be 34,000 acre-feet.

(4) Sufficient quantities of Base Flow shall be provided at Prado to discharge completely any cumulated debits at least once in any ten consecutive years following October 1, 1976. Any cumulative credits shall remain on the books of account until used to offset any subsequent debits, or until otherwise disposed of by CBMWD and WMWD.

(5) The Base Flow at Prado during any year shall be adjusted using the weighted average annual TDS in the total flow at Prado (Base Flow plus Storm Flow) in accordance with the formula set forth in the Judgment.

The accounting provided for under the Judgment allows credit to be earned when the average annual Adjusted Base Flow exceeds 15,250 acre-feet at Riverside Narrows and 42,000 acre-feet at Prado. Debits accrue when the average annual Adjusted Base Flow falls below the above quantities at the respective locations. The adjustment of Base Flow for water quality is to provide an incentive to maintain a better quality water as a result of implementation of the physical solution. That is, when the water quality is improved over a certain amount, the quantitative amount of the obligation is decreased; but when that water quality is impaired beyond a specified limit, the quantity of the obligation is increased. This is one of the first comprehensive adjudications in Southern California which includes provisions applicable to the quality of water in addition to the determination of quantitative rights.

APPENDIX C

NONTRIBUTARY WATER DELIVERED TO ORANGE COUNTY WATER DISTRICT BY MWD FROM THE FOOTHILL FEEDER TO SAN ANTONIO CREEK NEAR UPLAND

(CONNECTIONS OC-59T and OC-59)

1974-75

Prepared by

Donald L. Harriger

TABLE C-1

SUMMARY OF NONTRIBUTARY WATER
RELEASED FROM MWD FOOTHILL FEEDER AT OC-59T AND OC-59

WATER YEAR 1974-75

Month	Acre Feet
October	6,518 1/
November	2,907 1/
December	2,487 1/
January	1,096 1/
February	0
March	0
April	0
May	0
June	3,602 2/
July	7,110 2/
August	4,476 2/
September	2,790 2/
Total	30,986

1/ Quantity of nontributary water determined by subtracting the corrected average daily flowrates of delivery by MWD to Thompson Creek from the sum of daily flowrates through the DWR 36" and 90" Venturi Meters at Devil Canyon Power Plant. The Thompson Creek meter correction used in this report is +5.03%.

2/ Quantity of nontributary water determined using records from the MWD 42" Venturi Meter at OC-59. Monthly totals are based on flow through the meter from midnight on the first day of the month to midnight of the last day of the month.

TABLE C-2

NONTRIBUTARY WATER RELEASED
FROM MWD FOOTHILL FEEDER AT OC-59T

October 1974

Day	Total Released from Devil Canyon to Rialto Pipeline		Less Delivery to Thompson Creek from Rialto Pipeline		Total Released at OC-59T	
	A.F.	cfs	A.F.	cfs	A.F.	cfs
1	201.32	101.50	0	0	201.32	101.50
2	201.32	101.50	0	0	201.32	101.50
3	201.32	101.50	0	0	201.32	101.50
4	201.32	101.50	0	0	201.32	101.50
5	201.32	101.50	0	0	201.32	101.50
6	201.32	101.50	0	0	201.32	101.50
7	201.32	101.50	0	0	201.32	101.50
8	16.20	8.17	0	0	16.20	8.17
9	0	0	0	0	0	0
10	0	0	0	0	0	0
11	185.12	93.33	91.23	46.00	93.88	47.33
12	422.64	213.08	200.83	101.25	221.81	111.83
13	408.89	206.15	200.83	101.25	208.07	104.90
14	408.75	206.08	200.61	101.14	208.15	104.94
15	408.83	206.12	238.33	120.16	170.50	85.96
16	447.57	225.65	270.82	136.54	176.75	89.11
17	469.49	236.70	267.49	134.86	202.00	101.84
18	471.35	237.64	267.49	134.86	203.86	102.78
19	473.30	238.62	267.49	134.86	205.80	103.76
20	475.26	239.61	267.71	134.97	207.55	104.64
21	550.95	277.77	267.49	134.86	283.46	142.91
22	580.16	292.50	267.49	134.86	312.67	157.64
23	577.53	291.17	267.49	134.86	310.04	156.31
24	581.12	292.98	267.71	134.97	313.41	158.01
25	583.00	293.93	267.49	134.86	315.51	159.07
26	578.30	291.56	267.49	134.86	310.81	156.70
27	597.34	301.16	278.74	140.53	318.60	160.63
28	403.52	203.44	115.42	58.19	288.10	145.25
29	312.91	157.76	0	0	312.91	157.76
30	305.51	154.03	0	0	305.51	154.03
31	123.37	62.20	0	0	123.37	62.20
	10,790.35	5,440.15	4,272.16	2,153.88	6,518.20	3,286.27

TABLE C-2

NONTRIBUTARY WATER RELEASED
FROM MWD FOOTHILL FEEDER AT OC-59T

November 1974

Day	Total Released from Devil Canyon to Rialto Pipeline		Less Delivery to Thompson Creek from Rialto Pipeline		Total Released at OC-59T	
	A.F.	cfs	A.F.	cfs	A.F.	cfs
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	157.92	79.62	157.92	79.62	0	0
4	263.60	132.90	263.60	132.90	0	0
5	259.10	130.63	259.10	130.63	0	0
6	257.57	129.86	257.57	129.86	0	0
7	162.66	82.01	162.66	82.01	0	0
8	145.75	73.48	145.75	73.48	0	0
9	262.99	132.59	262.99	132.59	0	0
10	258.64	130.40	258.64	130.40	0	0
11	363.25	183.14	263.33	132.76	99.93	50.38
12	412.80	208.12	263.52	132.86	149.28	75.26
13	412.78	208.11	263.33	132.76	149.45	75.35
14	412.80	208.12	263.52	132.86	149.28	75.26
15	412.78	208.11	263.33	132.76	149.45	75.35
16	412.80	208.12	263.52	132.86	149.28	75.26
17	412.78	208.11	263.33	132.76	149.45	75.35
18	412.80	208.12	263.52	132.86	149.28	75.26
19	412.78	208.11	263.33	132.76	149.45	75.35
20	412.80	208.12	270.82	136.54	141.98	71.58
21	265.51	133.86	141.04	71.11	124.46	62.75
22	157.76	79.54	0	0	157.77	79.54
23	333.12	167.95	157.90	79.61	175.22	88.34
24	404.05	203.71	259.36	130.76	144.69	72.95
25	404.07	203.72	259.36	130.76	144.71	72.96
26	404.05	203.71	259.36	130.76	144.69	72.95
27	404.07	203.72	259.36	130.76	144.71	72.96
28	404.05	203.71	259.36	130.76	144.69	72.95
29	404.07	203.72	259.36	130.76	144.71	72.96
30	404.05	203.71	259.36	130.76	144.69	72.95
	9,431.40	4,755.02	6,324.24	3,289.31	2,907.17	1,465.71

TABLE C-2

NONTRIBUTARY WATER RELEASED
FROM MWD FOOTHILL FEEDER AT OC-59T

December 1974

Day	Total Released from Devil Canyon to Rialto Pipeline		Less Delivery to Thompson Creek from Rialto Pipeline		Total Released at OC-59T	
	A.F.	cfs	A.F.	cfs	A.F.	cfs
1	404.07	203.72	259.36	130.76	144.71	72.96
2	407.76	205.58	237.08	119.53	170.68	86.05
3	78.51	39.58	0	0	78.51	39.58
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	91.10	45.93	91.10	45.93	0	0
7	267.77	135.00	267.77	135.00	0	0
8	262.69	132.44	262.69	132.44	0	0
9	262.45	132.32	262.45	132.32	0	0
10	259.68	130.92	259.68	130.92	0	0
11	381.46	192.32	263.74	132.97	117.72	59.35
12	452.59	228.18	263.94	133.07	188.65	95.11
13	451.79	227.78	263.74	132.97	188.05	94.81
14	455.60	229.70	263.74	132.97	191.86	96.73
15	457.49	230.65	263.94	133.07	193.50	97.58
16	452.25	228.01	263.74	132.97	188.51	95.04
17	386.99	195.11	263.74	132.97	123.25	62.14
18	357.06	180.02	263.94	133.07	93.12	46.95
19	356.33	179.65	263.74	132.97	92.59	46.68
20	344.53	173.70	263.74	132.97	80.79	40.73
21	350.30	176.61	263.94	133.07	86.36	43.54
22	352.40	177.67	263.74	132.97	88.66	44.70
23	221.20	111.52	124.17	62.60	97.03	48.92
24	99.41	50.12	0	0	99.41	50.12
25	101.34	51.09	0	0	101.34	51.09
26	100.90	50.87	0	0	100.90	50.87
27	60.54	30.52	0	0	60.54	30.52
28	0	0	0	0	0	0
29	0	0	0	0	0	0
30	0.46	0.23	0	0	0.46	0.23
31	0	0	0	0	0	0
	7,416.67	3,739.24	4,929.98	2,485.54	2,486.64	1,253.70

TABLE C-2

NONTRIBUTARY WATER RELEASED
FROM MWD FOOTHILL FEEDER AT OC-59T

January 1975

Day	Total Released from Devil Canyon to Rialto Pipeline		Less Delivery to Thompson Creek from Rialto Pipeline		Total Released at OC-59T	
	A.F.	cfs	A.F.	cfs	A.F.	cfs
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	235.48	118.72	152.29	76.78	83.19	41.94
4	406.93	205.16	259.58	130.87	147.35	74.29
5	406.41	204.90	259.58	130.87	146.84	74.03
6	385.03	194.12	259.36	130.67	125.67	63.36
7	358.51	180.75	259.36	130.76	99.15	49.99
8	148.34	74.79	129.78	65.43	18.57	9.36
9	0	0	0	0	0	0
10	156.63	78.97	156.63	78.97	0	0
11	258.31	130.23	258.31	130.23	0	0
12	257.04	129.59	257.04	129.59	0	0
13	290.92	146.67	263.33	132.76	27.59	13.91
14	306.96	154.76	263.52	132.86	43.44	21.90
15	306.96	154.76	263.52	132.86	43.44	21.90
16	306.96	154.76	263.33	132.76	43.64	22.00
17	306.96	154.76	263.52	132.86	43.44	21.90
18	306.96	154.76	263.33	132.76	43.64	22.00
19	306.96	154.76	263.52	132.86	43.44	21.90
20	306.96	154.76	263.52	132.86	43.44	21.90
21	306.96	154.76	263.33	132.76	43.64	22.00
22	306.96	154.76	263.52	132.86	43.44	21.90
23	306.96	154.76	263.33	132.76	43.64	22.00
24	125.26	63.15	112.92	56.93	12.34	6.22
25	0	0	0	0	0	0
26	0	0	0	0	0	0
27	0	0	0	0	0	0
28	0	0	0	0	0	0
29	0	0	0	0	0	0
30	0	0	0	0	0	0
31	0	0	0	0	0	0
	6,098.46	3,074.65	5,002.62	2,522.15	1,095.90	552.50

TABLE C-3

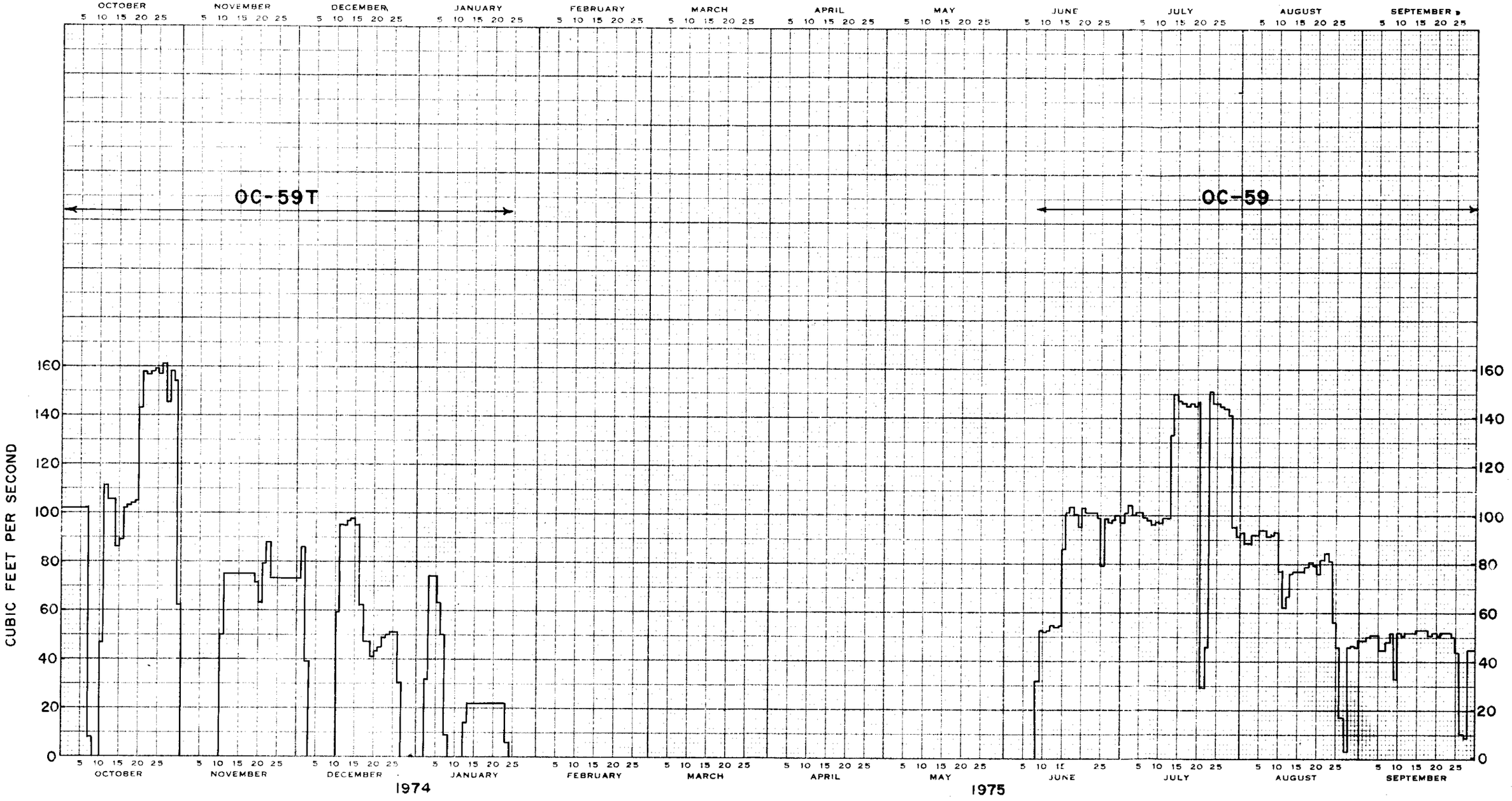
NONTRIBUTARY WATER RELEASED
FROM MWD FOOTHILL FEEDER AT OC-59

	June 1975			July 1975	
Day	A.F.	cfs	Day	A.F.	cfs
1	0	0	1	191.59	96.59
2	0	0	2	199.48	100.57
3	0	0	3	207.12	104.42
4	0	0	4	197.81	99.73
5	0	0	5	200.73	101.20
6	0	0	6	200.73	101.20
7	0	0	7	197.02	99.33
8	0	0	8	194.48	98.05
9	64.25	32.39	9	191.23	96.41
10	104.59	52.73	10	193.49	97.55
11	102.86	51.86	11	193.07	97.34
12	104.35	52.61	12	195.47	98.55
13	109.49	55.20	13	195.47	98.55
14	107.90	54.40	14	263.61	132.90
15	108.00	54.45	15	298.42	150.45
16	169.79	85.60	16	291.22	146.82
17	200.35	101.01	17	291.22	146.32
18	205.03	103.37	18	288.40	145.40
19	198.77	100.21	19	289.23	145.82
20	188.08	94.82	20	287.73	145.06
21	204.86	103.28	21	291.51	146.97
22	199.52	100.59	22	58.95	29.72
23	200.33	101.00	23	91.94	46.35
24	199.44	100.55	24	299.79	151.14
25	195.87	98.75	25	288.70	145.55
26	155.82	78.56	26	289.33	145.87
27	197.02	99.33	27	288.08	145.24
28	192.62	97.11	28	285.19	143.78
29	194.54	98.08	29	278.80	140.56
30	198.89	100.27	30	188.83	95.20
			31	181.43	91.47
	3,602.37	1,816.17		7,110.07	3,584.61

TABLE C-3

NONTRIBUTARY WATER RELEASED
FROM MWD FOOTHILL FEEDER AT OC-59

	August 1975		September 1975	
Day	A.F.	cfs	A.F.	cfs
1	183.61	92.57	97.97	49.39
2	175.38	88.42	97.29	49.05
3	175.38	88.42	98.30	49.56
4	183.14	92.33	101.34	51.09
5	182.32	91.92	100.17	50.50
6	186.05	93.80	89.10	44.92
7	186.79	94.17	88.17	44.45
8	180.50	91.00	94.00	47.39
9	182.14	91.83	102.84	51.85
10	184.31	92.92	66.41	33.48
11	152.13	76.70	103.88	52.37
12	123.35	62.19	101.38	51.11
13	132.24	66.67	103.62	52.24
14	152.59	76.93	102.84	51.85
15	153.68	77.48	103.82	52.34
16	152.77	77.02	105.88	53.38
17	152.17	76.72	105.11	52.99
18	156.74	79.02	105.62	53.25
19	160.01	80.67	101.38	51.11
20	156.84	79.07	103.20	52.03
21	151.24	76.25	101.81	51.33
22	162.92	82.14	103.74	52.30
23	167.67	84.53	102.61	51.73
24	159.57	80.45	102.61	51.73
25	112.48	56.71	99.25	50.04
26	91.34	46.05	86.96	43.84
27	34.33	17.31	22.49	11.34
28	6.23	3.14	17.02	8.58
29	93.09	46.93	90.88	45.82
30	92.49	46.63	90.80	45.78
31	91.99	46.38		
	4,475.51	2,256.37	2,790.47	1,406.84



NONTRIBUTARY WATER RELEASED AT OC-59T AND OC-59
FROM M.W.D. FOOTHILL FEEDER

PLATE C-1
Water Year 1974-75

APPENDIX D

WATER QUALITY OF
SURFACE WATER FLOW OF
SANTA ANA RIVER BELOW PRADO DAM

Prepared by

John M. Toups

1974-75

TABLE NO. D-1

U.S.G.S. WATER QUALITY SAMPLES
BELOW PRADO DAM
WATER YEAR 1974-75

Date	E.C.	T.D.S.	Date	E.C.	T.D.S.
Oct. 1974	614	357	April 1975	1160	722
	1180	714		755	454
	645	380		1120	695
	620	363		1120	697
Nov. 1974	1220	742	May 1975	1140	703
	1220	755		1150	692
	843	512		1130	704
	836	507		1120	695
Dec. 1974	856	514	June 1975	1140	688
	947	605		986	622
	961	596		849	509
	1200	747		764	463
	916	540		741	436
	904	541	July 1975	703	419
Jan. 1975	1200	729		651	373
	912	546	Aug. 1975	692	401
	1160	712		732	443
	1070	643	Sept. 1975	798	482
	1180	723		786	466
Feb. 1975	1030	617			
	827	488			
	908	536			
	910	549			
	1130	695			
	1190	728			
	1150	717			
Mar. 1975	1150	706			
	400	245			
	593	358			
	825	502			
	1040	639			
	1100	698			

TABLE D-2

WEIGHTED T.D.S. CALCULATION SHEET

BELOW PRADO DAM

WATER YEAR 1974-1975 TDS= 0.64259620(EC)+ -32.405670

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
OCT 1	132.0	606	357	47124.
OCT 2	133.0	618	365	48545.
OCT 3	139.0	629	372	51708.
OCT 4	143.0	643	381	54483.
OCT 5	145.0	653	387	56115.
OCT 6	143.0	645	382	54626.
OCT 7	142.0	651	386	54812.
OCT 8	110.0	757	454	49940.
OCT 9	57.0	1110	681	38817.
OCT 10	54.0	1160	713	38502.
OCT 11	55.0	1170	719	39545.
OCT 12	137.0	725	433	59321.
OCT 13	142.0	662	393	55806.
OCT 14	145.0	678	403	58435.
OCT 15	140.0	676	402	56280.
OCT 16	145.0	731	437	63365.
OCT 17	154.0	683	406	62524.
OCT 18	149.0	639	378	56322.
OCT 19	156.0	669	397	61932.
OCT 20	160.0	683	406	64960.
OCT 21	174.0	674	401	69774.
OCT 22	218.0	620	366	79788.
OCT 23	216.0	622	367	79272.
OCT 24	211.0	626	370	78070.
OCT 25	211.0	618	365	77015.
OCT 26	209.0	627	371	77539.
OCT 27	215.0	670	398	85570.
OCT 28	259.0	652	387	100233.
OCT 29	294.0	747	448	131712.
OCT 30	245.0	723	432	105840.
OCT 31	215.0	742	444	95460.
TOTAL	5048.			2053435.
MONTHLY WEIGHTED T.D.S.			407	

TABLE D-2

WEIGHTED T.D.S. CALCULATION SHEET

BELOW PRADO DAM

WATER YEAR 1974-1975 TDS= 0.64259620(EC)+ -32.405670

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
NOV 1	87.0	1170	719	62553.
NOV 2	74.0	1230	758	56092.
NOV 3	70.0	1240	764	53480.
NOV 4	71.0	1230	758	53818.
NOV 5	75.0	1200	739	55425.
NOV 6	68.0	1240	764	51952.
NOV 7	65.0	1220	752	48880.
NOV 8	63.0	1220	752	47376.
NOV 9	65.0	1210	745	48425.
NOV 10	63.0	1220	752	47376.
NOV 11	71.0	1136	698	49558.
NOV 12	128.0	821	495	63360.
NOV 13	135.0	823	496	66960.
NOV 14	138.0	814	491	67758.
NOV 15	143.0	819	494	70642.
NOV 16	143.0	826	498	71214.
NOV 17	144.0	831	502	72288.
NOV 18	145.0	832	502	72790.
NOV 19	148.0	833	503	74444.
NOV 20	147.0	839	507	74529.
NOV 21	146.0	856	518	75628.
NOV 22	150.0	854	516	77400.
NOV 23	158.0	803	484	76472.
NOV 24	144.0	815	491	70704.
NOV 25	141.0	822	496	69936.
NOV 26	143.0	820	495	70785.
NOV 27	146.0	833	503	73438.
NOV 28	149.0	836	505	75245.
NOV 29	142.0	829	500	71000.
NOV 30	136.0	819	494	67184.
TOTAL	3498.			1936712.
MONTHLY WEIGHTED T.D.S.			554	

TABLE D-2

WEIGHTED T.D.S. CALCULATION SHEET

BELOW PRADO DAM WATER YEAR 1974-1975 TDS= 0.64259620(EC)+ -32.405670

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
DEC 1	140.0	833	503	70420.
DEC 2	150.0	834	504	75600.
DEC 3	172.0	803	484	83248.
DEC 4	536.0	796	479	256744.
DEC 5	798.0	929	565	450870.
DEC 6	177.0	1334	825	146025.
DEC 7	123.0	1290	797	98031.
DEC 8	106.0	1260	777	82362.
DEC 9	104.0	1230	758	78832.
DEC 10	108.0	1210	745	80460.
DEC 11	118.0	1178	725	85550.
DEC 12	191.0	847	512	97792.
DEC 13	190.0	828	500	95000.
DEC 14	187.0	812	489	91443.
DEC 15	186.0	793	477	88722.
DEC 16	187.0	786	473	88451.
DEC 17	167.0	806	486	81162.
DEC 18	127.0	918	557	70739.
DEC 19	129.0	911	553	71337.
DEC 20	126.0	915	556	70056.
DEC 21	128.0	919	558	71424.
DEC 22	136.0	940	572	77792.
DEC 23	131.0	944	574	75194.
DEC 24	129.0	917	557	71853.
DEC 25	120.0	917	557	66840.
DEC 26	117.0	899	545	63765.
DEC 27	124.0	902	547	67828.
DEC 28	151.0	947	576	86976.
DEC 29	231.0	1010	617	142527.
DEC 30	133.0	1190	732	97356.
DEC 31	113.0	1200	739	83507.
TOTAL	5535.			3167906.
MONTHLY WEIGHTED T.D.S.			572	

TABLE D-2

WEIGHTED T.D.S. CALCULATION SHEET

BELOW PRADO DAM WATER YEAR 1974-1975 TDS= 0.64259620(EC)+ -32.405670

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
JAN 1	92.0	1200	739	67988.
JAN 2	87.0	1200	739	64293.
JAN 3	92.0	1197	737	67804.
JAN 4	170.0	874	529	89930.
JAN 5	169.0	844	510	86190.
JAN 6	171.0	840	507	86697.
JAN 7	146.0	901	547	79862.
JAN 8	142.0	925	562	79804.
JAN 9	99.0	1140	700	69300.
JAN 10	92.0	1170	719	66148.
JAN 11	90.0	1180	726	65340.
JAN 12	86.0	1180	726	62436.
JAN 13	87.0	1170	719	62553.
JAN 14	113.0	1060	649	73337.
JAN 15	116.0	1040	636	73776.
JAN 16	113.0	1050	642	72546.
JAN 17	109.0	1060	649	70741.
JAN 18	108.0	1060	649	70092.
JAN 19	113.0	1060	649	73337.
JAN 20	117.0	1060	649	75933.
JAN 21	117.0	1060	649	75933.
JAN 22	118.0	1050	642	75756.
JAN 23	120.0	1040	636	76320.
JAN 24	116.0	1040	636	73776.
JAN 25	93.0	1160	713	66309.
JAN 26	89.0	1190	732	65148.
JAN 27	90.0	1190	732	65880.
JAN 28	92.0	1180	726	66792.
JAN 29	93.0	1180	726	67518.
JAN 30	96.0	1180	726	69696.
JAN 31	100.0	1180	726	72600.
TOTAL	3436.			2233835.
MONTHLY WEIGHTED T.D.S.			650	

TABLE D-2

WEIGHTED T.D.S. CALCULATION SHEET

BELOW PRADO DAM

WATER YEAR 1974-1975 TDS= 0.64259620(EC)+ -32.405670

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
FEB 1	94.0	1180	726	68244.
FEB 2	94.0	1180	726	68244.
FEB 3	140.0	1071	656	91840.
FEB 4	125.0	962	586	73250.
FEB 5	147.0	853	516	75852.
FEB 6	158.0	942	573	90534.
FEB 7	165.0	1040	636	104940.
FEB 8	179.0	1110	681	121899.
FEB 9	175.0	1160	713	124775.
FEB 10	178.0	1070	655	116590.
FEB 11	148.0	942	573	84804.
FEB 12	92.0	1050	642	59064.
FEB 13	92.0	1110	681	62652.
FEB 14	107.0	1150	707	75649.
FEB 15	131.0	1160	713	93403.
FEB 16	130.0	1170	719	93470.
FEB 17	128.0	1150	707	90496.
FEB 18	126.0	1160	713	89838.
FEB 19	138.0	1150	707	97566.
FEB 20	159.0	1160	713	113367.
FEB 21	154.0	1160	713	109802.
FEB 22	144.0	1210	745	107280.
FEB 23	130.0	1210	745	96850.
FEB 24	106.0	1170	719	76214.
FEB 25	98.0	1160	713	69874.
FEB 26	100.0	1140	700	70000.
FEB 27	107.0	1130	694	74258.
FEB 28	108.0	1130	694	74952.
TOTAL	3653.			2475707.
MONTHLY WEIGHTED T.D.S.			678	

TABLE D-2

WEIGHTED T.D.S. CALCULATION SHEET

BELOW PRADO DAM WATER YEAR 1974-1975 TDS= 0.64259620(EC)+ -32.405670

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
MAR 1	100.0	1150	707	70700.
MAR 2	98.0	1150	707	69286.
MAR 3	98.0	1160	713	69874.
MAR 4	104.0	1150	707	73528.
MAR 5	107.0	1150	707	75649.
MAR 6	185.0	624	369	68265.
MAR 7	180.0	760	456	82080.
MAR 8	181.0	867	525	95025.
MAR 9	194.0	774	465	90210.
MAR 10	194.0	654	388	75272.
MAR 11	194.0	785	472	91568.
MAR 12	195.0	690	411	80145.
MAR 13	192.0	700	417	80064.
MAR 14	191.0	761	457	87287.
MAR 15	189.0	813	490	92610.
MAR 16	188.0	893	541	101708.
MAR 17	186.0	916	556	103416.
MAR 18	174.0	969	590	102660.
MAR 19	162.0	1020	623	100926.
MAR 20	160.0	1050	642	102720.
MAR 21	159.0	1070	655	104145.
MAR 22	158.0	1090	668	105544.
MAR 23	158.0	1090	668	105544.
MAR 24	157.0	1080	662	103934.
MAR 25	172.0	1040	636	109392.
MAR 26	207.0	1020	623	128961.
MAR 27	246.0	1050	642	157932.
MAR 28	238.0	1090	668	158984.
MAR 29	222.0	1180	726	161172.
MAR 30	123.0	1224	754	92742.
MAR 31	97.0	1180	726	70422.
TOTAL	5209.			3011765.
MONTHLY WEIGHTED T.D.S.			578	

TABLE D-2

WEIGHTED T.D.S. CALCULATION SHEET

BELOW PRADO DAM WATER YEAR 1974-1975 TDS= 0.64259620(EC)+ -32.405670

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
APR 1	103.0	1150	707	72821.
APR 2	102.0	1140	700	71400.
APR 3	102.0	1130	694	70788.
APR 4	106.0	1140	700	74200.
APR 5	106.0	1120	687	72822.
APR 6	163.0	965	588	95844.
APR 7	135.0	1049	642	86670.
APR 8	123.0	1120	687	84501.
APR 9	347.0	781	469	162743.
APR 10	165.0	1079	661	109065.
APR 11	115.0	1140	700	80500.
APR 12	106.0	1140	700	74200.
APR 13	105.0	1140	700	73500.
APR 14	103.0	1130	694	71482.
APR 15	105.0	1120	687	72135.
APR 16	104.0	1130	694	72176.
APR 17	116.0	1080	662	76792.
APR 18	111.0	1110	681	75591.
APR 19	102.0	1140	700	71400.
APR 20	99.0	1130	694	68706.
APR 21	97.0	1130	694	67318.
APR 22	98.0	1130	694	68012.
APR 23	96.0	1150	707	67872.
APR 24	96.0	1140	700	67200.
APR 25	104.0	1090	668	69472.
APR 26	91.0	1120	687	62517.
APR 27	85.0	1130	694	58990.
APR 28	86.0	1110	681	58566.
APR 29	86.0	1120	687	59082.
APR 30	86.0	1140	700	60200.
TOTAL	3443.			2276565.
MONTHLY WEIGHTED T.D.S.			661	

TABLE D-2

WEIGHTED T.D.S. CALCULATION SHEET

BELOW PRADO DAM — WATER YEAR 1974-1975 — TDS= 0.64259620(EC)+ -32.405670

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
MAY 1	90.0	1130	694	62460.
MAY 2	91.0	1130	694	63154.
MAY 3	87.0	1140	700	60900.
MAY 4	85.0	1150	707	60095.
MAY 5	85.0	1160	713	60605.
MAY 6	80.0	1150	707	56560.
MAY 7	79.0	1150	707	55853.
MAY 8	78.0	1160	713	55614.
MAY 9	77.0	1170	719	55363.
MAY 10	76.0	1160	713	54188.
MAY 11	75.0	1160	713	53475.
MAY 12	75.0	1150	707	53025.
MAY 13	75.0	1150	707	53025.
MAY 14	75.0	1150	707	53025.
MAY 15	76.0	1140	700	53200.
MAY 16	76.0	1140	700	53200.
MAY 17	75.0	1150	707	53025.
MAY 18	75.0	1130	694	52050.
MAY 19	74.0	1130	694	51356.
MAY 20	74.0	1140	700	51800.
MAY 21	74.0	1130	694	51356.
MAY 22	74.0	1120	687	50838.
MAY 23	74.0	1120	687	50838.
MAY 24	74.0	1130	694	51356.
MAY 25	73.0	1130	694	50662.
MAY 26	71.0	1130	694	49274.
MAY 27	71.0	1120	687	48777.
MAY 28	69.0	1120	687	47403.
MAY 29	69.0	1110	681	46989.
MAY 30	69.0	1110	681	46989.
MAY 31	72.0	1120	687	49464.
TOTAL	2368.			1655919.
MONTHLY WEIGHTED T.D.S.			699	

TABLE D-2

WEIGHTED T.D.S. CALCULATION SHEET

BELOW PRADO DAM WATER YEAR 1974-1975 TDS= 0.64259620(EC)+ -32.405670

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
JUN 1	72.0	1120	687	49464.
JUN 2	70.0	1120	687	48090.
JUN 3	70.0	1120	687	48090.
JUN 4	70.0	1120	687	48090.
JUN 5	70.0	1110	681	47670.
JUN 6	69.0	1110	681	46989.
JUN 7	66.0	1120	687	45342.
JUN 8	65.0	1110	681	44265.
JUN 9	66.0	1090	668	44088.
JUN 10	111.0	970	591	65601.
JUN 11	119.0	861	521	61999.
JUN 12	114.0	849	513	58482.
JUN 13	116.0	838	506	58696.
JUN 14	112.0	836	505	56560.
JUN 15	113.0	831	502	56726.
JUN 16	125.0	827	499	62375.
JUN 17	161.0	747	448	72128.
JUN 18	159.0	728	435	69165.
JUN 19	159.0	720	430	68370.
JUN 20	148.0	727	435	64380.
JUN 21	155.0	703	419	64945.
JUN 22	158.0	711	424	66992.
JUN 23	157.0	713	426	66882.
JUN 24	160.0	720	430	68800.
JUN 25	153.0	723	432	66096.
JUN 26	151.0	709	423	63873.
JUN 27	128.0	749	449	57472.
JUN 28	149.0	711	424	63176.
JUN 29	143.0	697	415	59345.
JUN 30	140.0	687	409	57260.
TOTAL	3549.			1751411.
MONTHLY WEIGHTED T.D.S.			493	

TABLE D-2

WEIGHTED T.D.S. CALCULATION SHEET

BELOW PRADO DAM

WATER YEAR 1974-1975 TDS= 0.64259620(EC)+ -32.405670

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
JUL 1	140.0	694	414	57960.
JUL 2	143.0	695	414	59202.
JUL 3	150.0	687	409	61350.
JUL 4	150.0	695	414	62100.
JUL 5	148.0	686	408	60384.
JUL 6	146.0	676	402	58692.
JUL 7	145.0	678	403	58435.
JUL 8	148.0	695	414	61272.
JUL 9	144.0	703	419	60336.
JUL 10	142.0	702	419	59498.
JUL 11	140.0	696	415	58100.
JUL 12	141.0	698	416	58656.
JUL 13	145.0	701	418	60610.
JUL 14	157.0	693	413	64841.
JUL 15	204.0	653	387	78948.
JUL 16	195.0	653	387	75465.
JUL 17	195.0	648	384	74880.
JUL 18	193.0	644	381	73533.
JUL 19	194.0	642	380	73720.
JUL 20	194.0	638	378	73332.
JUL 21	191.0	627	371	70861.
JUL 22	158.0	659	391	61778.
JUL 23	48.0	1060	649	31152.
JUL 24	153.0	753	451	69003.
JUL 25	200.0	631	373	74600.
JUL 26	197.0	644	381	75057.
JUL 27	194.0	625	369	71586.
JUL 28	191.0	612	361	68951.
JUL 29	194.0	630	372	72168.
JUL 30	165.0	672	399	65835.
JUL 31	135.0	692	412	55620.
TOTAL	5040.			2007925.
MONTHLY WEIGHTED T.D.S.			398	

TABLE D-2

WEIGHTED T.D.S. CALCULATION SHEET

BELOW PRADO DAM WATER YEAR 1974-1975 TDS= 0.64259620(EC)+ -32.405670

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
AUG 1	133.0	691	412	54796.
AUG 2	133.0	694	414	55062.
AUG 3	128.0	691	412	52736.
AUG 4	123.0	680	405	49815.
AUG 5	130.0	682	406	52780.
AUG 6	131.0	688	410	53710.
AUG 7	130.0	678	403	52390.
AUG 8	127.0	669	397	50419.
AUG 9	132.0	673	400	52800.
AUG 10	139.0	682	406	56434.
AUG 11	134.0	690	411	55074.
AUG 12	109.0	742	444	48396.
AUG 13	108.0	759	455	49140.
AUG 14	120.0	729	436	52320.
AUG 15	122.0	727	435	53070.
AUG 16	122.0	720	430	52460.
AUG 17	123.0	713	426	52398.
AUG 18	122.0	714	426	51972.
AUG 19	126.0	712	425	53550.
AUG 20	125.0	714	426	53250.
AUG 21	125.0	725	433	54125.
AUG 22	128.0	724	433	55424.
AUG 23	132.0	705	421	55572.
AUG 24	126.0	692	412	51912.
AUG 25	111.0	700	417	46287.
AUG 26	81.0	779	468	37908.
AUG 27	81.0	788	474	38394.
AUG 28	45.0	1000	610	27450.
AUG 29	56.0	948	577	32312.
AUG 30	78.0	813	490	38220.
AUG 31	83.0	773	464	38512.
TOTAL	3563.			1528688.
MONTHLY WEIGHTED T.D.S.			429	

TABLE D-2

WEIGHTED T.D.S. CALCULATION SHEET

BELOW PRADO DAM — WATER YEAR 1974-1975 — TDS= 0.64259620(EC)+ -32.405670

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
SEP 1	81.0	762	457	37017.
SEP 2	81.0	761	457	37017.
SEP 3	85.0	770	462	39270.
SEP 4	86.0	754	452	38872.
SEP 5	86.0	749	449	38614.
SEP 6	88.0	758	455	40040.
SEP 7	87.0	774	465	40455.
SEP 8	90.0	771	463	41670.
SEP 9	103.0	767	460	47380.
SEP 10	99.0	776	466	46134.
SEP 11	89.0	826	498	44322.
SEP 12	104.0	777	467	48568.
SEP 13	106.0	777	467	49502.
SEP 14	104.0	781	469	48776.
SEP 15	102.0	776	466	47532.
SEP 16	98.0	768	461	45178.
SEP 17	98.0	769	462	45276.
SEP 18	98.0	763	458	44884.
SEP 19	96.0	757	454	43584.
SEP 20	96.0	761	457	43872.
SEP 21	96.0	754	452	43392.
SEP 22	94.0	740	443	41642.
SEP 23	94.0	739	442	41548.
SEP 24	94.0	751	450	42300.
SEP 25	96.0	753	451	43296.
SEP 26	90.0	771	463	41670.
SEP 27	83.0	787	473	39259.
SEP 28	52.0	1020	623	32396.
SEP 29	74.0	915	556	41144.
SEP 30	95.0	796	479	45505.
TOTAL	2745.			1280115.
MONTHLY WEIGHTED T.D.S.			466	

TABLE NO. D-3

SUMMARY OF WEIGHTED TDS
BELOW PRADO DAM
WATER YEAR 1974-75

	Monthly Flow cfs-day	Monthly Flow Times TDS	Monthly Weighted TDS
October	5,048	2,053,435	407
November	3,498	1,936,712	554
December	5,535	3,167,906	572
January	3,436	2,233,835	650
February	3,653	2,475,707	678
March	5,209	3,011,765	578
April	3,443	2,276,565	661
May	2,368	1,655,919	699
June	3,549	1,751,411	493
July	5,040	2,007,925	398
August	3,563	1,528,688	429
September	2,745	1,280,115	466
Total	47,087	25,379,938	
Yearly Weighted TDS			539

TABLE NO. D-4

SUMMARY OF WEIGHTED TDS
OF
NONTRIBUTARY WATER RELEASED FROM OC-59T & OC-59
FOR
WATER YEAR 1974-75

	Monthly Flow cfs-day	Monthly Flow Times TDS	Monthly Weighted TDS
October	3,325	593,583	179
November	1,455	239,489	165
December	1,326	240,101	181
January	552	103,239	187
February	0	0	--
March	0	0	--
April	0	0	--
May	0	0	--
June	1,715	391,264	228
July	3,586	870,075	243
August	2,288	580,374	254
September	1,402	328,991	235
Total	15,649	3,347,116	
Yearly Weighted TDS			214

APPENDIX E

WATER QUALITY OF SURFACE WATER FLOW OF SANTA ANA RIVER AT RIVERSIDE NARROWS

and

WATER QUALITY OF THE RIVERSIDE WATER QUALITY CONTROL PLANT AT RIVERSIDE NARROWS

1974-75

Prepared by

Donald L. Harriger

TABLE NO. E-1

U.S.G.S. WATER QUALITY SAMPLES
SANTA ANA RIVER AT "MWD" CROSSING

WATER YEAR 1974-75

Date		E.C. @ 25° C	T.D.S. mg/l
1974 October	2	1100	690
	9	1090	684
	16	1100	690
	24	1090	696
November	4	1090	680
	11	1100	700
	12	1110	*
	19	1100	697
	25	1090	701
December	2	1100	691
	4	384	254
	5	961	612
	10	1130	719
	12	1130	*
	18	1110	696
	27	1110	700
1975 January	3	1110	695
	8	1100	690
	13	1100	690
	16	1100	*
	24	1100	692
	29	1100	683
February	4	1040	648
	10	1040	652
	21	1100	698
	26	1110	694
March	4	1110	693
	6	720	439
	8	338	225
	11	938	591
	19	1090	687
	26	1100	687
	27	1080	*
	28	1070/1090	*
	31	1080	690
April	8	1060	*
	9	608	365
	14	1070	681
	22	1090	684
May	1	1070	*
	6	1070	676
	12	1090	685
	20	1090	700
	28	1090	668
June	2	1090	681
	12	1100	691
	16	1090	694
	25	1100	699
July	1	1100	708
	17	1100	694
August	5	1090	697
	18	1110	720
September	2	1100	720
	15	1100	716

Note: Station E.C. Meter out October 1 through March 26
* Total Dissolved Solids not run

TABLE NO. E-2

WEIGHTED T.D.S. CALCULATION SHEET

M.W.D. CROSSING

WATER YEAR 1974-75

T.D.S.= EC / 0.000085(EC)=1.495056

Month-Day	U.S.G.S.Mean Daily Flow (cfs-Day)	Storm Flow (cfs-Day)	Base Flow (cfs-Day)	U.S.G.S. Mean Daily Specific Conductance (E.C.) (Micromhos)	Mean Daily Adjusted T.D.S. (PPM)	Adjusted T.D.S. Times Mean Daily Flow: U.S.G.S. Total Flow	Storm Flow	Base Flow
OCT 1	18.0	0.0	18.0	1100 (1)	692	12456.	0.	12456.
OCT 2	19.0	0.0	19.0	1100 (1)	692	13148.	0.	13148.
OCT 3	19.0	0.0	19.0	1098 (1)	691	13129.	0.	13129.
OCT 4	19.0	0.0	19.0	1096 (1)	690	13110.	0.	13110.
OCT 5	19.0	0.0	19.0	1095 (1)	689	13091.	0.	13091.
OCT 6	19.0	0.0	19.0	1095 (1)	689	13091.	0.	13091.
OCT 7	20.0	0.0	20.0	1094 (1)	689	13780.	0.	13780.
OCT 8	20.0	0.0	20.0	1092 (1)	688	13760.	0.	13760.
OCT 9	20.0	0.0	20.0	1090 (1)	687	13740.	0.	13740.
OCT 10	20.0	0.0	20.0	1092 (1)	688	13760.	0.	13760.
OCT 11	20.0	0.0	20.0	1094 (1)	689	13780.	0.	13780.
OCT 12	19.0	0.0	19.0	1095 (1)	689	13091.	0.	13091.
OCT 13	20.0	0.0	20.0	1095 (1)	689	13780.	0.	13780.
OCT 14	19.0	0.0	19.0	1096 (1)	690	13110.	0.	13110.
OCT 15	19.0	0.0	19.0	1098 (1)	691	13129.	0.	13129.
OCT 16	18.0	0.0	18.0	1100 (1)	692	12456.	0.	12456.
OCT 17	17.0	0.0	17.0	1099 (1)	692	11764.	0.	11764.
OCT 18	18.0	0.0	18.0	1098 (1)	691	12438.	0.	12438.
OCT 19	18.0	0.0	18.0	1096 (1)	690	12420.	0.	12420.
OCT 20	19.0	0.0	19.0	1095 (1)	689	13091.	0.	13091.
OCT 21	20.0	0.0	20.0	1094 (1)	689	13780.	0.	13780.
OCT 22	21.0	0.0	21.0	1092 (1)	688	14448.	0.	14448.
OCT 23	22.0	0.0	22.0	1091 (1)	687	15114.	0.	15114.
OCT 24	21.0	0.0	21.0	1090 (1)	687	14427.	0.	14427.
OCT 25	20.0	0.0	20.0	1090 (1)	687	13740.	0.	13740.
OCT 26	21.0	0.0	21.0	1090 (1)	687	14427.	0.	14427.
OCT 27	21.0	0.0	21.0	1090 (1)	687	14427.	0.	14427.
OCT 28	26.0	5.0	21.0	1080 (1)	681 687 *	17706.	3279.	14427.
OCT 29	21.0	0.0	21.0	1090 (1)	687	14427.	0.	14427.
OCT 30	21.0	0.0	21.0	1090 (1)	687	14427.	0.	14427.
OCT 31	23.0	2.0	21.0	1090 (1)	687 687 *	15801.	1374.	14427.
	617.	7.0	610.			424848.	4653.	420195.
MONTHLY WEIGHTED T.D.S.					689			

(1) Daily mean E.C. not recorded by U.S.G.S., E.C. estimated by interpolation.

* Adjusted T.D.S. for Base Flow, calculated by averaging the T.D.S. on the day before and the day after Storm Flow.

WEIGHTED T.D.S. CALCULATION SHEET

M.W.D. CROSSING

WATER YEAR 1974-75

$$T.D.S. = \frac{EC}{0.000085(EC)=1.495056}$$

Month-Day	U.S.G.S. Mean Daily Flow (cfs-Day)	Storm Flow (cfs-Day)	Base Flow (cfs-Day)	U.S.G.S. Mean Daily Specific Conductance (E.C.) (Micromhos)	Mean Daily Adjusted T.D.S. (PPM)		Adjusted T.D.S. Times Mean Daily Flow: U.S.G.S. Total Flow	Storm Flow	Base Flow
NOV 1	23.0	2.0	21.0	1090 (1)	687	687 *	15801.	1374.	14427.
NOV 2	21.0	0.0	21.0	1090 (1)	687		14427.	0.	14427.
NOV 3	21.0	0.0	21.0	1090 (1)	687		14427.	0.	14427.
NOV 4	21.0	0.0	21.0	1090 (1)	687		14427.	0.	14427.
NOV 5	21.0	0.0	21.0	1092 (1)	688		14448.	0.	14448.
NOV 6	21.0	0.0	21.0	1094 (1)	689		14469.	0.	14469.
NOV 7	20.0	0.0	20.0	1095 (1)	689		13780.	0.	13780.
NOV 8	20.0	0.0	20.0	1095 (1)	689		13780.	0.	13780.
NOV 9	21.0	0.0	21.0	1096 (1)	690		14490.	0.	14490.
NOV 10	20.0	0.0	20.0	1098 (1)	691		13820.	0.	13820.
NOV 11	20.0	0.0	20.0	1100 (1)	692		13840.	0.	13840.
NOV 12	19.0	0.0	19.0	1110 (1)	698		13262.	0.	13262.
NOV 13	20.0	0.0	20.0	1108 (1)	697		13940.	0.	13940.
NOV 14	19.0	0.0	19.0	1106 (1)	696		13224.	0.	13224.
NOV 15	20.0	0.0	20.0	1105 (1)	695		13900.	0.	13900.
NOV 16	20.0	0.0	20.0	1105 (1)	695		13900.	0.	13900.
NOV 17	21.0	0.0	21.0	1104 (1)	695		14595.	0.	14595.
NOV 18	21.0	0.0	21.0	1102 (1)	694		14574.	0.	14574.
NOV 19	22.0	0.0	22.0	1100 (1)	692		15224.	0.	15224.
NOV 20	21.0	0.0	21.0	1098 (1)	691		14511.	0.	14511.
NOV 21	21.0	0.0	21.0	1096 (1)	690		14490.	0.	14490.
NOV 22	21.0	0.0	21.0	1095 (1)	689		14469.	0.	14469.
NOV 23	20.0	0.0	20.0	1094 (1)	689		13780.	0.	13780.
NOV 24	20.0	0.0	20.0	1092 (1)	688		13760.	0.	13760.
NOV 25	20.0	0.0	20.0	1090 (1)	687		13740.	0.	13740.
NOV 26	21.0	0.0	21.0	1092 (1)	688		14448.	0.	14448.
NOV 27	21.0	0.0	21.0	1094 (1)	689		14469.	0.	14469.
NOV 28	21.0	0.0	21.0	1095 (1)	689		14469.	0.	14469.
NOV 29	20.0	0.0	20.0	1095 (1)	689		13780.	0.	13780.
NOV 30	20.0	0.0	20.0	1096 (1)	690		13800.	0.	13800.
	617.	2.	615.				426044.	1374.	424670.
MONTHLY WEIGHTED T.D.S.					691				

(1) Daily mean E.C. not recorded by U.S.G.S., E.C. estimated by interpolation.

* Adjusted T.D.S. for Base Flow, calculated by averaging the T.D.S. on the day before and the day after Storm Flow.

TABLE NO. E-2

WEIGHTED T.D.S. CALCULATION SHEET

M.W.D. CROSSING

WATER YEAR 1974-75

$$T.D.S. = \frac{EC}{0.000085(EC)=1.495056}$$

Month-Day	U.S.G.S.Mean Daily Flow (cfs-Day)	Storm Flow (cfs-Day)	Base Flow (cfs-Day)	U.S.G.S. Mean Daily Specific Conductance (E.C.) (Micromhos)	Mean Daily Adjusted T.D.S. (PPM)		Adjusted T.D.S. Times Mean Daily Flow: U.S.G.S. Total Flow	Storm Flow	Base Flow
DEC 1	21.0	0.0	21.0	1098 (1)	691		14511.	0.	14511.
DEC 2	20.0	0.0	20.0	1100 (1)	692		13840.	0.	13840.
DEC 3	21.0	0.0	21.0	1100 (1)	692		14532.	0.	14532.
DEC 4	386.0	364.5	21.5	384 (1)	251	699 *	96886.	81857.	15029.
DEC 5	49.0	27.0	22.0	961 (1)	609	699 *	29841.	14463.	15378.
DEC 6	30.0	7.5	22.5	1100 (1)	692	699 *	20760.	5032.	15728.
DEC 7	26.0	3.0	23.0	1107 (1)	697	699 *	18122.	2045.	16077.
DEC 8	25.0	1.5	23.5	1114 (1)	701	699 *	17525.	1098.	16427.
DEC 9	24.0	0.0	24.0	1121 (1)	705		16920.	0.	16920.
DEC 10	24.0	0.0	24.0	1130 (1)	710		17040.	0.	17040.
DEC 11	24.0	0.0	24.0	1130 (1)	710		17040.	0.	17040.
DEC 12	24.0	0.0	24.0	1130 (1)	710		17040.	0.	17040.
DEC 13	24.0	0.0	24.0	1126 (1)	708		16992.	0.	16992.
DEC 14	24.0	0.0	24.0	1122 (1)	705		16920.	0.	16920.
DEC 15	24.0	0.0	24.0	1120 (1)	704		16896.	0.	16896.
DEC 16	24.0	0.0	24.0	1118 (1)	703		16872.	0.	16872.
DEC 17	25.0	0.0	25.0	1114 (1)	701		17525.	0.	17525.
DEC 18	25.0	0.0	25.0	1110 (1)	698		17450.	0.	17450.
DEC 19	24.0	0.0	24.0	1110 (1)	698		16752.	0.	16752.
DEC 20	24.0	0.0	24.0	1110 (1)	698		16752.	0.	16752.
DEC 21	25.0	0.0	25.0	1110 (1)	698		17450.	0.	17450.
DEC 22	25.0	0.0	25.0	1110 (1)	698		17450.	0.	17450.
DEC 23	25.0	0.0	25.0	1110 (1)	698		17450.	0.	17450.
DEC 24	25.0	0.0	25.0	1110 (1)	698		17450.	0.	17450.
DEC 25	25.0	0.0	25.0	1110 (1)	698		17450.	0.	17450.
DEC 26	24.0	0.0	24.0	1110 (1)	698		16752.	0.	16752.
DEC 27	24.0	0.0	24.0	1110 (1)	698		16752.	0.	16752.
DEC 28	46.0	21.7	24.3	900 (1)	573	698 *	26358.	9397.	16961.
DEC 29	73.0	48.3	24.7	670 (1)	432	698 *	31536.	14295.	17241.
DEC 30	29.0	4.0	25.0	1100 (1)	692	698 *	20068.	2618.	17450.
DEC 31	30.0	4.7	25.3	1100 (1)	692	698 *	20760.	3101.	17659.
	1219.	482.2	1736.8				649692.	133906.	515786.

MONTHLY WEIGHTED T.D.S. — — — — — — — — — — — — — — 533.

(1) Daily mean E.C. not recorded by U.S.G.S., E.C. estimated by interpolation.

* Adjusted T.D.S. for Base Flow, calculated by averaging the T.D.S. on the day before and the day after Storm Flow.

TABLE NO. E-2

WEIGHTED T.D.S. CALCULATION SHEET

M.W.D. CROSSING

WATER YEAR 1974-75

$$T.D.S. = \frac{EC}{0.000085(EC)+1.495056}$$

Month-Day	U.S.G.S. Mean Daily Flow (cfs-Day)	Storm Flow (cfs-Day)	Base Flow (cfs-Day)	U.S.G.S. Mean Daily Specific Conductance (E.C.) (Micromhos)	Mean Daily Adjusted T.D.S. (PPM)		Adjusted T.D.S. Times Mean Daily Flow: U.S.G.S. Total Flow	Storm Flow	Base Flow
JAN 1	28.0	2.3	25.7	1110 (1)	698	698 *	19544.	1605.	17939.
JAN 2	26.0	0.0	26.0	1110 (1)	698		18148.	0.	18148.
JAN 3	26.0	0.0	26.0	1110 (1)	698		18148.	0.	18148.
JAN 4	24.0	0.0	24.0	1108 (1)	697		16728.	0.	16728.
JAN 5	26.0	0.0	26.0	1106 (1)	696		18096.	0.	18096.
JAN 6	25.0	0.0	25.0	1104 (1)	695		17375.	0.	17375.
JAN 7	25.0	0.0	25.0	1102 (1)	694		17350.	0.	17350.
JAN 8	26.0	0.0	26.0	1100 (1)	692		17992.	0.	17992.
JAN 9	24.0	0.0	24.0	1110 (1)	698		16752.	0.	16752.
JAN 10	24.0	0.0	24.0	1110 (1)	698		16752.	0.	16752.
JAN 11	25.0	0.0	25.0	1110 (1)	698		17450.	0.	17450.
JAN 12	26.0	0.0	26.0	1110 (1)	698		18148.	0.	18148.
JAN 13	26.0	0.0	26.0	1100 (1)	692		17992.	0.	17992.
JAN 14	27.0	0.0	27.0	1100 (1)	692		18684.	0.	18684.
JAN 15	26.0	0.0	26.0	1100 (1)	692		17992.	0.	17992.
JAN 16	25.0	0.0	25.0	1100 (1)	692		17300.	0.	17300.
JAN 17	26.0	0.0	26.0	1100 (1)	692		17992.	0.	17992.
JAN 18	25.0	0.0	25.0	1100 (1)	692		17300.	0.	17300.
JAN 19	24.0	0.0	24.0	1100 (1)	692		16608.	0.	16608.
JAN 20	24.0	0.0	24.0	1100 (1)	692		16608.	0.	16608.
JAN 21	26.0	0.0	26.0	1100 (1)	692		17992.	0.	17992.
JAN 22	26.0	0.0	26.0	1100 (1)	692		17992.	0.	17992.
JAN 23	26.0	0.0	26.0	1100 (1)	692		17992.	0.	17992.
JAN 24	26.0	0.0	26.0	1100 (1)	692		17992.	0.	17992.
JAN 25	26.0	0.0	26.0	1100 (1)	692		17992.	0.	17992.
JAN 26	26.0	0.0	26.0	1100 (1)	692		17992.	0.	17992.
JAN 27	26.0	0.0	26.0	1100 (1)	692		17992.	0.	17992.
JAN 28	26.0	0.0	26.0	1100 (1)	692		17992.	0.	17992.
JAN 29	27.0	0.0	27.0	1100 (1)	692		18684.	0.	18684.
JAN 30	28.0	0.0	28.0	1100 (1)	692		19376.	0.	19376.
JAN 31	29.0	0.0	29.0	1100 (1)	692		20068.	0.	20068.
	800.	2.3	797.7				555023.	1605.	553418
MONTHLY WEIGHTED T.D.S.					694				

(1) Daily mean E.C. not recorded by U.S.G.S., E.C. estimated by interpolation.

* Adjusted T.D.S. for Base Flow, calculated by averaging the T.D.S. on the day before and the day after Storm Flow.

TABLE NO. E-2

WEIGHTED T.D.S. CALCULATION SHEET

M.W.D. CROSSING

WATER YEAR 1974-75

T.D.S.= EC / 0.000085(EC)=1.495056

Month-Day	U.S.G.S.Mean Daily Flow (cfs-Day)	Storm Flow (cfs-Day)	Base Flow (cfs-Day)	U.S.G.S. Mean Daily Specific Conductance (E.C.) (Micromhos)	Mean Daily Adjusted T.D.S. (PPM)		Adjusted T.D.S. Times Mean Daily Flow: U.S.G.S. Total Flow	Storm Flow	Base Flow
FEB 1	27.0	0.0	27.0	1100 (1)	692		18684.		18684.
FEB 2	29.0	0.0	29.0	1100 (1)	692		20068.		20068.
FEB 3	145.0	116.3	28.7	500 (1)	325	692*	47125.		19860.
FEB 4	38.0	9.7	28.3	1040 (1)	657	692*	24966.	27265.	19584.
FEB 5	35.0	7.0	28.0	1080 (1)	681	692*	23835.	5382.	19376.
FEB 6	30.0	2.3	27.7	1100 (1)	692	692*	20760.	4459.	19168.
FEB 7	28.0	0.7	27.3	1100 (1)	692	692*	19376.	1592.	18892.
FEB 8	27.0	0.0	27.0	1100 (1)	692	692*	18684.	484.	18684.
FEB 9	53.0	26.0	27.0	980 (1)	621	692*	32913.	0.	18684.
FEB 10	42.0	15.0	27.0	1040 (1)	657	692*	27594.	14229.	18684.
FEB 11	29.0	2.0	27.0	1100 (1)	692	692*	20068.	8910.	18684.
FEB 12	28.0	1.0	27.0	1100 (1)	692	692*	19376.	1384.	18684.
FEB 13	27.0	0.0	27.0	1100 (1)	692		18684.	692.	18684.
FEB 14	28.0	0.0	28.0	1100 (1)	692		19376.	0.	18684.
FEB 15	27.0	0.0	27.0	1100 (1)	692		18684.	0.	19376.
FEB 16	27.0	0.0	27.0	1100 (1)	692		18684.	0.	18684.
FEB 17	27.0	0.0	27.0	1100 (1)	692		18684.	0.	18684.
FEB 18	27.0	0.0	27.0	1100 (1)	692		18684.	0.	18684.
FEB 19	26.0	0.0	26.0	1100 (1)	692		17992.	0.	17992.
FEB 20	25.0	0.0	25.0	1100 (1)	692		17300.	0.	17300.
FEB 21	25.0	0.0	25.0	1100 (1)	692		17300.	0.	17300.
FEB 22	24.0	0.0	24.0	1100 (1)	692		16608.	0.	16608.
FEB 23	23.0	0.0	23.0	1100 (1)	692		15916.	0.	15916.
FEB 24	24.0	0.0	24.0	1100 (1)	692		16608.	0.	16608.
FEB 25	25.0	0.0	25.0	1100 (1)	692		17300.	0.	17300.
FEB 26	26.0	0.0	26.0	1110 (1)	698		18148.	0.	18148.
FEB 27	29.0	0.0	29.0	1110 (1)	698		20242.	0.	20242.
FEB 28	26.0	0.0	26.0	1110 (1)	698		18148.		18148.
	927.	180.0	747.0				581807.	64397.	517410.
MONTHLY WEIGHTED T.D.S.					628				

(1) Daily mean E.C. not recorded by U.S.G.S., E.C. estimated by interpolation.

* Adjusted T.D.S. for Base Flow, calculated by averaging the T.D.S. on the day before and the day after Storm Flow.

TABLE NO. E-2

WEIGHTED T.D.S. CALCULATION SHEET

M.W.D. CROSSING

WATER YEAR 1974-75

$$T.D.S. = \frac{EC}{0.000085(EC) + 1.495056}$$

Month-Day	U.S.G.S. Mean Daily Flow (cfs-Day)	Storm Flow (cfs-Day)	Base Flow (cfs-Day)	U.S.G.S. Mean Daily Specific Conductance (E.C.) (Micromhos)	Mean Daily Adjusted T.D.S. (PPM)		Adjusted T.D.S. Times Mean Daily Flow: U.S.G.S. Total Flow	Storm Flow	Base Flow
MAR 1	26.0	0.0	26.0	1100 (1)	692		17992.	0.	17992.
MAR 2	26.0	0.0	26.0	1110 (1)	698		18148.	0.	18148.
MAR 3	25.0	0.0	25.0	1110 (1)	698		17450.	0.	17450.
MAR 4	26.0	0.0	26.0	1110 (1)	698		18148.	0.	18148.
MAR 5	27.0	0.0	27.0	1110 (1)	698		18846.	0.	18846.
MAR 6	96.0	68.7	27.3	720 (1)	463	692 *	44448.	25556.	18892.
MAR 7	37.0	9.4	27.6	870 (1)	554	692 *	20498.	1399.	19099.
MAR 8	680.0	652.1	27.9	338 (1)	222	692 *	150960.	131653.	19307.
MAR 9	125.0	96.8	28.2	540 (1)	350	692 *	43750.	24236.	19514.
MAR 10	223.0	194.5	28.5	450 (1)	293	692 *	65339.	45617.	19722.
MAR 11	73.0	44.1	28.9	938 (1)	596	692 *	43508.	23509.	19999.
MAR 12	38.0	8.8	29.2	1040 (1)	657	692 *	24966.	4760.	20206.
MAR 13	36.0	6.5	29.5	1050 (1)	663	692 *	23868.	3454.	20414.
MAR 14	35.0	5.2	29.8	1060 (1)	669	692 *	23415.	2793.	20622.
MAR 15	34.0	3.9	30.1	1070 (1)	675	692 *	22950.	2121.	20829.
MAR 16	33.0	2.6	30.4	1080 (1)	681	692 *	22473.	1436.	21037.
MAR 17	32.0	1.3	30.7	1090 (1)	687	692 *	21984.	740.	21244.
MAR 18	31.0	0.0	31.0	1090 (1)	687		21297.	0.	21297.
MAR 19	31.0	0.0	31.0	1090 (1)	687		21297.	0.	21297.
MAR 20	30.0	0.0	30.0	1090 (1)	687		20610.	0.	20610.
MAR 21	30.0	0.0	30.0	1090 (1)	687		20610.	0.	20610.
MAR 22	29.0	0.0	29.0	1092 (1)	688		19952.	0.	19952.
MAR 23	29.0	0.0	29.0	1094 (1)	689		19981.	0.	19981.
MAR 24	29.0	0.0	29.0	1096 (1)	690		20010.	0.	20010.
MAR 25	28.0	0.0	28.0	1098 (1)	691		19348.	0.	19348.
MAR 26	28.0	0.0	28.0	1100	692		19376.	0.	19376.
MAR 27	28.0	0.0	28.0	1080	681		19068.	0.	19068.
MAR 28	27.0	0.0	27.0	1080	681		18387.	0.	18387.
MAR 29	27.0	0.0	27.0	1080	681		18387.	0.	18387.
MAR 30	26.0	0.0	26.0	1090	687		17862.	0.	17862.
MAR 31	26.0	0.0	26.0	1080	681		17706.	0.	17706.
	1971.	1093.9	877.1				872634.	267274.	605360.
MONTHLY WEIGHTED T.D.S.					443				

(1) Daily mean E.C. not recorded by U.S.G.S., E.C. estimated by interpolation.

* Adjusted T.D.S. for Base Flow, calculated by averaging the T.D.S. on the day before and the day after Storm Flow.

TABLE NO. E-2

WEIGHTED T.D.S. CALCULATION SHEET

M.W.D. CROSSING

WATER YEAR 1974-75

T.D.S.= EC / 0.000085(EC)=1.495056

Month-Day	U.S.G.S.Mean Daily Flow (cfs-Day)	Storm Flow (cfs-Day)	Base Flow (cfs-Day)	U.S.G.S. Mean Daily Specific Conductance (E.C.) (Micromhos)	Mean Daily Adjusted T.D.S. (PPM)		Adjusted T.D.S. Times Mean Daily Flow: U.S.G.S. Total Flow	Adjusted T.D.S. Times Mean Daily Flow: Storm Flow	Adjusted T.D.S. Times Mean Daily Flow: Base Flow
APR 1	25.0	0.0	25.0	1090	687		17175.	0.	17175.
APR 2	26.0	0.0	26.0	1080	681		17706.	0.	17706.
APR 3	27.0	0.0	27.0	1070	675		18225.	0.	18225.
APR 4	28.0	0.0	28.0	1060	669		18732.	0.	18732.
APR 5	40.0	12.1	27.9	999	632	678 *	25280.	6364.	18916.
APR 6	60.0	32.1	27.9	841	537	678 *	32220.	13304.	18916.
APR 7	38.0	10.2	27.8	1000	633	678 *	24054.	5206.	18848.
APR 8	51.0	23.2	27.8	939	596	678 *	30396.	11548.	18848.
APR 9	66.0	38.3	27.7	752	482	678 *	31812.	13031.	18781.
APR 10	31.0	3.4	27.6	1030	651	678 *	20181.	1468.	18713.
APR 11	32.0	4.4	27.6	1060	669	678 *	21408.	2695.	18713.
APR 12	28.0	0.5	27.5	1080	681	678 *	19068.	423.	18645.
APR 13	30.0	2.5	27.5	1070	675	678 *	20250.	1605.	18645.
APR 14	28.0	0.6	27.4	1070	675	678 *	18900.	323.	18577.
APR 15	28.0	0.6	27.4	1070	675	678 *	18900.	323	18577.
APR 16	28.0	0.7	27.3	1080	681	678 *	19068.	559.	18509.
APR 17	29.0	1.8	27.2	1070	675	678 *	19575.	1133.	18442.
APR 18	29.0	1.8	27.2	1100	692	678 *	20068.	1626.	18442.
APR 19	28.0	.9	27.1	1090	687	678 *	19236.	862.	18374.
APR 20	28.0	.9	27.1	1100	692	678 *	19376.	1002.	18374.
APR 21	27.0	0.0	27.0	1090	687		18549.	0.	18549.
APR 22	27.0	0.0	27.0	1090	687		18549.	0.	18549.
APR 23	26.0	0.0	26.0	1100	692		17992.	0.	17992.
APR 24	26.0	0.0	26.0	1090	687		17862.	0.	17862.
APR 25	27.0	0.0	27.0	1100	692		18684.	0.	18684.
APR 26	24.0	0.0	24.0	1110	698		16752.	0.	16752.
APR 27	28.0	0.0	28.0	1070	675		18900.	0.	18900.
APR 28	26.0	0.0	26.0	1100	692		17992.	0.	17992.
APR 29	24.0	0.0	24.0	1090	687		16488.	0.	16488.
APR 30	24.0	0.0	24.0	1050	663		15912.	0.	15912.
	939.	134.	805.				609310.	61472.	547838.
MONTHLY WEIGHTED T.D.S.					649				

* Adjusted T.D.S. for Base Flow, calculated by averaging the T.D.S. on the day before and the day after Storm Flow.

TABLE NO. E-2

WEIGHTED T.D.S. CALCULATION SHEET

M.W.D. CROSSING

WATER YEAR 1974-75

$$T.D.S. = \frac{EC}{0.000085(EC)=1.495056}$$

Month-Day	U.S.G.S.Mean Daily Flow (cfs-Day)	Storm Flow (cfs-Day)	Base Flow (cfs-Day)	U.S.G.S. Mean Daily Specific Conductance (E.C.) (Micromhos)	Mean Daily Adjusted T.D.S. (PPM)	Adjusted T.D.S. Times Mean Daily Flow: U.S.G.S. Total Flow	Storm Flow	Base Flow
MAY 1	25.0	0.0	25.0	1080	681	17025.	0.	17025.
MAY 2	25.0	0.0	25.0	1090	687	17175.	0.	17175.
MAY 3	24.0	0.0	24.0	1090	687	16488.	0.	16488.
MAY 4	25.0	0.0	25.0	1090	687	17175.	0.	17175.
MAY 5	24.0	0.0	24.0	1090	687	16488.	0.	16488.
MAY 6	27.0	0.0	27.0	1070	675	18225.	0.	18225.
MAY 7	24.0	0.0	24.0	1072 (1)	676	16224.	0.	16224.
MAY 8	24.0	0.0	24.0	1074 (1)	677	16248.	0.	16248.
MAY 9	24.0	0.0	24.0	1075 (1)	678	16272.	0.	16272.
MAY 10	23.0	0.0	23.0	1076 (1)	678	15594.	0.	15594.
MAY 11	22.0	0.0	22.0	1078 (1)	679	14938.	0.	14938.
MAY 12	23.0	0.0	23.0	1080	681	15663.	0.	15663.
MAY 13	23.0	0.0	23.0	1090	687	15801.	0.	15801.
MAY 14	23.0	0.0	23.0	1080	681	15663.	0.	15663.
MAY 15	22.0	0.0	22.0	1100	692	15224.	0.	15224.
MAY 16	24.0	0.0	24.0	1090	687	16488.	0.	16488.
MAY 17	23.0	0.0	23.0	1100	692	15916.	0.	15916.
MAY 18	22.0	0.0	22.0	1110	698	15356.	0.	15356.
MAY 19	24.0	0.0	24.0	1110	698	16752.	0.	16752.
MAY 20	24.0	0.0	24.0	1110	698	16752.	0.	16752.
MAY 21	23.0	0.0	23.0	1110	698	16054.	0.	16054.
MAY 22	23.0	0.0	23.0	1100	692	15916.	0.	15916.
MAY 23	23.0	0.0	23.0	1100	692	15916.	0.	15916.
MAY 24	21.0	0.0	21.0	1100	692	14532.	0.	14532.
MAY 25	23.0	0.0	23.0	1090	687	15801.	0.	15801.
MAY 26	22.0	0.0	22.0	1090	687	15114.	0.	15114.
MAY 27	23.0	0.0	23.0	1090	687	15801.	0.	15801.
MAY 28	22.0	0.0	22.0	1080	681	14982.	0.	14982.
MAY 29	21.0	0.0	21.0	1090	687	14427.	0.	14427.
MAY 30	22.0	0.0	22.0	1100	692	15224.	0.	15224.
MAY 31	21.0	0.0	21.0	1100	692	14532.	0.	14532.
	719.	0.	719.			493766.	0.	493766.
MONTHLY WEIGHTED T.D.S.					687			

(1) Daily mean E.C. not recorded by U.S.G.S., E.C. estimated by interpolation.

TABLE NO. E-2

WEIGHTED T.D.S. CALCULATION SHEET

M.W.D. CROSSING

WATER YEAR 1974-75

T.D.S. = $\frac{EC}{0.000085(EC)=1.495056}$

Month-Day	U.S.G.S. Mean Daily Flow (cfs-Day)	Storm Flow (cfs-Day)	Base Flow (cfs-Day)	U.S.G.S. Mean Daily Specific Conductance (E.C.) (Micromhos)	Mean Daily Adjusted T.D.S. (PPM)		Adjusted T.D.S. Times Mean Daily Flow: U.S.G.S. Total Flow	Storm Flow	Base Flow
JUN 1	21.0	0.0	21.0	1100	692		14532.	0.	14532.
JUN 2	23.0	0.0	23.0	1100	692		15916.	0.	15916.
JUN 3	23.0	0.0	23.0	1090	687		15801.	0.	15801.
JUN 4	21.0	0.0	21.0	1100	692		14532.	0.	14532.
JUN 5	22.0	0.0	22.0	1100	692		15224.	0.	15224.
JUN 6	21.0	0.0	21.0	1100	692		14532.	0.	14532.
JUN 7	21.0	0.0	21.0	1100	692		14532.	0.	14532.
JUN 8	22.0	0.0	22.0	1100	692		15224.	0.	15224.
JUN 9	21.0	0.0	21.0	1100	692		14532.	0.	14532.
JUN 10	22.0	0.0	22.0	1100	692		15224.	0.	15224.
JUN 11	22.0	0.0	22.0	1100	692		15224.	0.	15224.
JUN 12	22.0	0.0	22.0	1110	698		15356.	0.	15356.
JUN 13	22.0	0.0	22.0	1100	692		15224.	0.	15224.
JUN 14	22.0	0.0	22.0	1100	692		15224.	0.	15224.
JUN 15	22.0	0.0	22.0	1100	692		15224.	0.	15224.
JUN 16	24.0	0.0	24.0	1090	687		16488.	0.	16488.
JUN 17	23.0	0.0	23.0	1100	692		15916.	0.	15916.
JUN 18	23.0	0.0	23.0	1090	687		15801.	0.	15801.
JUN 19	25.0	2.3	22.7	1090	687	692 *	17175.	1467.	15708.
JUN 20	24.0	1.7	22.3	1110	698	692 *	16752.	1320.	15432.
JUN 21	22.0	0.0	22.0	1110	698		15356.	0.	15356.
JUN 22	22.0	0.0	22.0	1110	698		15356.	0.	15356.
JUN 23	23.0	0.0	23.0	1100	692		15916.	0.	15916.
JUN 24	23.0	0.0	23.0	1100	692		15916.	0.	15916.
JUN 25	23.0	0.0	23.0	1110	698		16054.	0.	16054.
JUN 26	25.0	0.0	25.0	1110	698		17450.	0.	17450.
JUN 27	24.0	0.0	24.0	1110	698		16752.	0.	16752.
JUN 28	22.0	0.0	22.0	1110	698		15356.	0.	15356.
JUN 29	22.0	0.0	22.0	1110	698		15356.	0.	15356.
JUN 30	23.0	0.0	23.0	1110	698		16054.	0.	16054.
	675.	4.0	671.				467999.	2787.	465212.
MONTHLY WEIGHTED T.D.S.					693				

* Adjusted T.D.S. for Base Flow, calculated by averaging the T.D.S. on the day before and the day after Storm Flow.

TABLE NO. E-2

WEIGHTED T.D.S. CALCULATION SHEET

M.W.D. CROSSING

WATER YEAR 1974-75

$$T.D.S. = \frac{EC}{0.000085(EC)=1.495056}$$

Month-Day	U.S.G.S.Mean Daily Flow (cfs-Day)	Storm Flow (cfs-Day)	Base Flow (cfs-Day)	U.S.G.S. Mean Daily Specific Conductance (E.C.) (Micromhos)	Mean Daily Adjusted T.D.S. (PPM)	Adjusted T.D.S. Times Mean Daily Flow: U.S.G.S. Total Flow	Storm Flow	Base Flow
JUL 1	23.0	0.0	23.0	1100	692	15916.	0.	15916.
JUL 2	23.0	0.0	23.0	1090	687	15801.	0.	15801.
JUL 3	22.0	0.0	22.0	1090	687	15114.	0.	15114.
JUL 4	23.0	0.0	23.0	1090	687	15801.	0.	15801.
JUL 5	22.0	0.0	22.0	1080	681	14982.	0.	14982.
JUL 6	22.0	0.0	22.0	1090	687	15114.	0.	15114.
JUL 7	22.0	0.0	22.0	1100	692	15224.	0.	15224.
JUL 8	22.0	0.0	22.0	1100	692	15224.	0.	15224.
JUL 9	22.0	0.0	22.0	1090	687	15114.	0.	15114.
JUL 10	21.0	0.0	21.0	1100	692	14532.	0.	14532.
JUL 11	22.0	0.0	22.0	1090	687	15114.	0.	15114.
JUL 12	23.0	0.0	23.0	1090	687	15801.	0.	15801.
JUL 13	22.0	0.0	22.0	1100	692	15224.	0.	15224.
JUL 14	22.0	0.0	22.0	1100	692	15224.	0.	15224.
JUL 15	23.0	0.0	23.0	1100	692	15916.	0.	15916.
JUL 16	22.0	0.0	22.0	1080	681	14982.	0.	14982.
JUL 17	22.0	0.0	22.0	1110	698	15356.	0.	15356.
JUL 18	22.0	0.0	22.0	1110	698	15356.	0.	15356.
JUL 19	22.0	0.0	22.0	1110	698	15356.	0.	15356.
JUL 20	22.0	0.0	22.0	1110	698	15356.	0.	15356.
JUL 21	23.0	0.0	23.0	1110	698	16054.	0.	16054.
JUL 22	21.0	0.0	21.0	1110	698	14658.	0.	14658.
JUL 23	22.0	0.0	22.0	1100	692	15224.	0.	15224.
JUL 24	21.0	0.0	21.0	1110	698	14658.	0.	14658.
JUL 25	21.0	0.0	21.0	1130	710	14910.	0.	14910.
JUL 26	21.0	0.0	21.0	1130	710	14910.	0.	14910.
JUL 27	21.0	0.0	21.0	1127 (1)	708	14868.	0.	14868.
JUL 28	20.0	0.0	20.0	1124 (1)	707	14140.	0.	14140.
JUL 29	20.0	0.0	20.0	1121 (1)	705	14100.	0.	14100.
JUL 30	20.0	0.0	20.0	1118 (1)	703	14060.	0.	14060.
JUL 31	20.0	0.0	20.0	1115 (1)	701	14020.	0.	14020.
	674.	0.	674.			468109.	0.	468109.
MONTHLY WEIGHTED T.D.S.					695			

(1) Daily mean E.C. not recorded by U.S.G.S., E.C. estimated by interpolation.

TABLE NO. E-2

WEIGHTED T.D.S. CALCULATION SHEET

M.W.D. CROSSING

WATER YEAR 1974-75

$$T.D.S. = \frac{EC}{0.000085(EC)=1.495056}$$

Month-Day	U.S.G.S. Mean Daily Flow (cfs-Day)	Storm Flow (cfs-Day)	Base Flow (cfs-Day)	U.S.G.S. Mean Daily Specific Conductance (E.C.) (Micromhos)	Mean Daily Adjusted T.D.S. (PPM)	Adjusted T.D.S. Times Mean Daily Flow: U.S.G.S. Total Flow	Storm Flow	Base Flow
AUG 1	20.0	0.0	20.0	1112 (1)	700	14000.	0.	14000.
AUG 2	20.0	0.0	20.0	1109 (1)	698	13960.	0.	13960.
AUG 3	20.0	0.0	20.0	1106 (1)	696	13920.	0.	13920.
AUG 4	20.0	0.0	20.0	1103 (1)	694	13880.	0.	13880.
AUG 5	20.0	0.0	20.0	1100	692	13840.	0.	13840.
AUG 6	20.0	0.0	20.0	1100	692	13840.	0.	13840.
AUG 7	20.0	0.0	20.0	1110	698	13960.	0.	13960.
AUG 8	20.0	0.0	20.0	1110	698	13960.	0.	13960.
AUG 9	20.0	0.0	20.0	1110	698	13960.	0.	13960.
AUG 10	20.0	0.0	20.0	1120	704	14080.	0.	14080.
AUG 11	20.0	0.0	20.0	1110	698	13960.	0.	13960.
AUG 12	20.0	0.0	20.0	1120	704	14080.	0.	14080.
AUG 13	20.0	0.0	20.0	1110	698	13960.	0.	13960.
AUG 14	21.0	0.0	21.0	1120	704	14784.	0.	14784.
AUG 15	21.0	0.0	21.0	1120	704	14784.	0.	14784.
AUG 16	21.0	0.0	21.0	1110	698	14658.	0.	14658.
AUG 17	21.0	0.0	21.0	1120	704	14784.	0.	14784.
AUG 18	21.0	0.0	21.0	1110	698	14658.	0.	14658.
AUG 19	21.0	0.0	21.0	1110	698	14658.	0.	14658.
AUG 20	21.0	0.0	21.0	1110	698	14658.	0.	14658.
AUG 21	21.0	0.0	21.0	1110	698	14658.	0.	14658.
AUG 22	21.0	0.0	21.0	1110	698	14658.	0.	14658.
AUG 23	20.0	0.0	20.0	1110	698	13960.	0.	13960.
AUG 24	20.0	0.0	20.0	1120	704	14080.	0.	14080.
AUG 25	20.0	0.0	20.0	1110	698	13960.	0.	13960.
AUG 26	20.0	0.0	20.0	1110	698	13960.	0.	13960.
AUG 27	20.0	0.0	20.0	1110	698	13960.	0.	13960.
AUG 28	19.0	0.0	19.0	1120	704	13376.	0.	13376.
AUG 29	20.0	0.0	20.0	1110	698	13960.	0.	13960.
AUG 30	20.0	0.0	20.0	1110	698	13960.	0.	13960.
AUG 31	20.0	0.0	20.0	1110	698	13960.	0.	13960.
	628.	0.	628.			438876.	0.	438876.
MONTHLY WEIGHTED T.D.S.					699			

(1) Daily mean E.C. not recorded by U.S.G.S., E.C. estimated by interpolation.

TABLE NO. E-2

WEIGHTED T.D.S. CALCULATION SHEET

M.W.D. CROSSING

WATER YEAR 1974-75

T.D.S. = EC / 0.000085(EC)=1.495056

Month-Day	U.S.G.S.Mean Daily Flow (cfs-Day)	Storm Flow (cfs-Day)	Base Flow (cfs-Day)	U.S.G.S. Mean Daily Specific Conductance (E.C.) (Micromhos)	Mean Daily Adjusted T.D.S. (PPM)		Adjusted T.D.S. Times Mean Daily Flow: U.S.G.S. Total Flow	Storm Flow	Base Flow
SEP 1	20.0	0.0	20.0	1110	698		13960.	0.	13960.
SEP 2	19.0	0.0	19.0	1100	692		13148.	0.	13148.
SEP 3	19.0	0.0	19.0	1100	692		13148.	0.	13148.
SEP 4	19.0	0.0	19.0	1100	692		13148.	0.	13148.
SEP 5	19.0	0.0	19.0	1100	692		13148.	0.	13148.
SEP 6	19.0	0.0	19.0	1100	692		13148.	0.	13148.
SEP 7	20.0	0.0	20.0	1100	692		13840.	0.	13840.
SEP 8	22.0	2.0	20.0	1100	692	695 *	15224.	1324.	13900.
SEP 9	20.0	0.0	20.0	1110	698		13960.	0.	13960.
SEP 10	21.0	0.0	21.0	1100	692		14532.	0.	14532.
SEP 11	21.0	0.0	21.0	1110	698		14658.	0.	14658.
SEP 12	21.0	0.0	21.0	1100	692		14532.	0.	14532.
SEP 13	20.0	0.0	20.0	1100	692		13840.	0.	13840.
SEP 14	20.0	0.0	20.0	1110	698		13960.	0.	13960.
SEP 15	21.0	0.0	21.0	1110	698		14658.	0.	14658.
SEP 16	21.0	0.0	21.0	1110	698		14658.	0.	14658.
SEP 17	21.0	0.0	21.0	1100	692		14532.	0.	14532.
SEP 18	20.0	0.0	20.0	1110	698		13960.	0.	13960.
SEP 19	20.0	0.0	20.0	1100	692		13840.	0.	13840.
SEP 20	20.0	0.0	20.0	1110	698		13960.	0.	13960.
SEP 21	20.0	0.0	20.0	1110	698		13960.	0.	13960.
SEP 22	19.0	0.0	19.0	1110	698		13262.	0.	13262.
SEP 23	19.0	0.0	19.0	1110	698		13262.	0.	13262.
SEP 24	19.0	0.0	19.0	1110	698		13262.	0.	13262.
SEP 25	20.0	0.0	20.0	1110	698		13960.	0.	13960.
SEP 26	19.0	0.0	19.0	1110	698		13262.	0.	13262.
SEP 27	20.0	0.0	20.0	1110	698		13960.	0.	13960.
SEP 28	20.0	0.0	20.0	1110	698		13960.	0.	13960.
SEP 29	20.0	0.0	20.0	1100	692		13840.	0.	13840.
SEP 30	20.0	0.0	20.0	1100	692		13840.	0.	13840.
	599.	2.0	597.				416422.	1324.	415098.
MONTHLY WEIGHTED T.D.S.					695				

* Adjusted T.D.S. for Base Flow, calculated by averaging the T.D.S. on the day before and the day after Storm Flow.

TABLE NO. E-3

SUMMARY
OF
WATER QUALITY FOR THE RIVERSIDE NARROWS
AT
METROPOLITAN WATER DISTRICT (MWD) CROSSING
WATER YEAR 1974-75

Month	Mean Daily Flow			Monthly Weighted Average Adjusted T.D.S. (ppm)	Mean Daily Flow Times Adjusted T.D.S.		
	U.S.G.S. Total Flow (cfs-Days)	Storm Flow (cfs-Days)	Base Flow (cfs-Days)		U.S.G.S. Total Flow	Storm Flow	Base Flow
1974 October	617.	7.0	610.	689	424848.	4653.	420195.
November	617.	2.0	615.0	691	426044.	1374.	424670.
December	1219.	482.2	736.8	533	649692.	133906.	515786.
1975 January	800.	2.3	797.7	694	555023.	1605.	553418.
February	927.	180.0	747.0	628	581807.	64397.	517410.
March	1971.	1093.9	877.1	433	872634.	267274.	605360.
April	939.	134.0	805.0	649	609310.	61472.	547838.
May	719.	0.0	719.0	687	493766.	0.	493766.
June	675	4.0	671.0	693	467999.	2787.	465212.
July	674.	0.0	674.0	695	468109.	0.	468109.
August	628.	0.0	628.0	699	438876.	0.	438876.
September	599.	2.0	597.0	695	416422.	1324.	415098.
Total	10385.	1907.4	8477.6		6404530.	538792.	5865738.
Total A.F.	20598.6	3783.3	16815.3				

Weighted Average Annual (Base Flow) T.D.S. = $\frac{5865738}{8477.6}$ = 692

Weighted Average Annual (Storm Flow) T.D.S. = $\frac{538792}{1907.4}$ = 282

Weighted Average Annual (Total Flow) T.D.S. = $\frac{6404530}{10385}$ = 617

TABLE NO. E-4

U.S.G.S. WATER QUALITY SAMPLES
RIVERSIDE QUALITY CONTROL PLANT

WATER YEAR 1974-75

Date		E.C. @ 25° C	T.D.S. mg/l
1974 October	2	1110	651
	9	979	562
	16	1040	606
	24	999	598
November	4	954	572
	11	1140	693
	19	1160	710
	25	1010	614
December	2	1110	648
	10	956	573
	18	1010	600
	27	937	554
1975 January	3	1010	617
	8	926	541
	13	909	548
	24	1170	716
	29	1150	679
February	4	994	576
	10	1000	573
	18	906	*
	21	1020	607
	28	956	545
March	4	1140	674
	10	927	548
	19	1050	606
	27	1020	576
April	1	1020	577
	8	1070	631
	14	978	555
	22	1150	689
May	1	1160	*
	6	1140	679
	12	1120	627
	20	1110	675
	28	1040	595
June	2	1050	609
	12	1080	640
	16	1020	594
	25	1090	656
	27	1040	*
July	2	1090	645
	17	1090	663
August	4	1080	658
	18	1050	651
September	3	997	612
	15	1020	631

* Total Dissolved Solids not run

WEIGHTED T.D.S. CALCULATION SHEET

WATER YEAR 1974-75

RIVERSIDE QUALITY CONTROL PLANT

$T.D.S. = 0.3399353(EC)^{1.0798}$

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
OCT 1	29.0	1070	634	18386.
OCT 2	29.0	1110	660	19140.
OCT 3	29.0	1060	628	18212.
OCT 4	29.0	1040	615	17835.
OCT 5	27.0	1040	615	16605.
OCT 6	26.0	978	575	14950.
OCT 7	29.0	948	556	16124.
OCT 8	29.0	991	584	16936.
OCT 9	28.0	989	582	16296.
OCT 10	28.0	961	565	15820.
OCT 11	28.0	991	584	16352.
OCT 12	27.0	989	582	15714.
OCT 13	26.0	1000	589	15314.
OCT 14	29.0	1030	609	17661.
OCT 15	28.0	1020	602	16856.
OCT 16	27.0	1050	621	16767.
OCT 17	27.0	1060	628	16956.
OCT 18	27.0	1070	634	17118.
OCT 19	27.0	1090	647	17469.
OCT 20	26.0	1010	596	15496.
OCT 21	29.0	972	572	16588.
OCT 22	28.0	990	583	16324.
OCT 23	29.0	1010	596	17284.
OCT 24	29.0	1020	602	17458.
OCT 25	29.0	997	588	17052.
OCT 26	27.0	1030	609	16443.
OCT 27	27.0	1020	602	16254.
OCT 28	29.0	974	573	16617.
OCT 29	29.0	1010	596	17284.
OCT 30	29.0	996	587	17023.
OCT 31	27.0	972	572	15444.
TOTAL	867.			519778.
MONTHLY WEIGHTED T.D.S.			600	

TABLE NO. E-5

WEIGHTED T.D.S. CALCULATION SHEET

WATER YEAR 1974-75

RIVERSIDE QUALITY CONTROL PLANT

$T.D.S. = 0.3399353(EC)^{1.0798}$

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
NOV 1	29.0	952	559	16211.
NOV 2	27.0	997	588	15876.
NOV 3	26.0	1030	609	15834.
NOV 4	29.0	996	587	17023.
NOV 5	28.0	1050	621	17388.
NOV 6	28.0	1090	647	18116.
NOV 7	28.0	1080	641	17948.
NOV 8	28.0	1110	660	18480.
NOV 9	26.0	1180	705	18330.
NOV 10	25.0	1190	711	17775.
NOV 11	30.0	1150	686	20580.
NOV 12	28.0	1160	692	19376.
NOV 13	28.0	1190	711	19908.
NOV 14	28.0	1210	724	20272.
NOV 15	26.0	1240	744	19344.
NOV 16	26.0	1230	737	19162.
NOV 17	25.0	1200	718	17950.
NOV 18	27.0	1180	705	19035.
NOV 19	27.0	1190	711	19197.
NOV 20	27.0	1180	705	19035.
NOV 21	27.0	1200	718	19386.
NOV 22	27.0	1210	724	19548.
NOV 23	26.0	1140	679	17654.
NOV 24	25.0	1070	634	15850.
NOV 25	27.0	1050	621	16767.
NOV 26	27.0	1120	666	17982.
NOV 27	27.0	1140	679	18333.
NOV 28	24.0	1160	692	16608.
NOV 29	25.0	1180	705	17625.
NOV 30	25.0	1210	724	18100.
TOTAL	806.			544693.
MONTHLY WEIGHTED T.D.S.			676	

WEIGHTED T.D.S. CALCULATION SHEET

WATER YEAR 1974-75

RIVERSIDE QUALITY CONTROL PLANT

$$T.D.S. = 0.3399353(EC)^{1.0798}$$

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
DEC 1	25.0	1130	673	16825.
DEC 2	28.0	1120	666	18648.
DEC 3	27.0	1170	698	18846.
DEC 4	31.0	1110	660	20460.
DEC 5	27.0	1090	647	17469.
DEC 6	27.0	1040	615	16605.
DEC 7	26.0	989	582	15132.
DEC 8	25.0	942	553	13825.
DEC 9	28.0	936	549	15372.
DEC 10	27.0	987	581	15687.
DEC 11	27.0	987	581	15687.
DEC 12	27.0	987	581	15687.
DEC 13	26.0	1010	596	15496.
DEC 14	25.0	973	572	14300.
DEC 15	25.0	980	577	14425.
DEC 16	27.0	1020	602	16254.
DEC 17	27.0	1040	615	16605.
DEC 18	28.0	1040	615	17220.
DEC 19	28.0	1030	609	17052.
DEC 20	27.0	1110	660	17820.
DEC 21	25.0	1120	666	16650.
DEC 22	24.0	1040	615	14760.
DEC 23	25.0	989	582	14550.
DEC 24	25.0	995	586	14650.
DEC 25	21.0	951	558	11718.
DEC 26	23.0	944	554	12742.
DEC 27	24.0	981	577	13848.
DEC 28	24.0	1000	589	14136.
DEC 29	23.0	946	555	12765.
DEC 30	25.0	921	539	13475.
DEC 31	25.0	981	577	14425.
TOTAL	802.			483134.
MONTHLY WEIGHTED T.D.S.			602	

TABLE NO. E-5

WEIGHTED T.D.S. CALCULATION SHEET

WATER YEAR 1974-75

RIVERSIDE QUALITY CONTROL PLANT

$T.D.S. = 0.3399353(EC)^{1.0798}$

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
JAN 1	25.0	975	574	14350.
JAN 2	26.0	992	584	15184.
JAN 3	27.0	1020	602	16254.
JAN 4	26.0	1010	596	15496.
JAN 5	25.0	1000	589	14725.
JAN 6	28.0	941	552	15456.
JAN 7	27.0	956	561	15147.
JAN 8	27.0	947	556	15012.
JAN 9	28.0	970	570	15960.
JAN 10	28.0	991	584	16352.
JAN 11	26.0	979	576	14976.
JAN 12	26.0	937	549	14274.
JAN 13	28.0	928	544	15232.
JAN 14	28.0	967	568	15904.
JAN 15	28.0	1020	602	16856.
JAN 16	28.0	1100	653	18284.
JAN 17	28.0	1160	692	19376.
JAN 18	27.0	1170	698	18846.
JAN 19	26.0	1150	686	17836.
JAN 20	29.0	1160	692	20068.
JAN 21	28.0	1200	718	20104.
JAN 22	28.0	1210	724	20272.
JAN 23	28.0	1220	731	20468.
JAN 24	27.0	1180	705	19035.
JAN 25	27.0	1190	711	19197.
JAN 26	26.0	1150	686	17836.
JAN 27	28.0	1170	698	19544.
JAN 28	28.0	1210	724	20272.
JAN 29	28.0	1200	718	20104.
JAN 30	28.0	1220	731	20468.
JAN 31	28.0	1150	686	19208.
TOTAL	845.			542096.
MONTHLY WEIGHTED T.D.S.			642	

WEIGHTED T.D.S. CALCULATION SHEET

WATER YEAR 1974-75

RIVERSIDE QUALITY CONTROL PLANT

$T.D.S. = 0.3399353(EC)^{1.0798}$

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
FEB 1	26.0	1110	660	17160.
FEB 2	26.0	1010	596	15496.
FEB 3	29.0	980	577	16733.
FEB 4	28.0	1040	615	17220.
FEB 5	28.0	1050	621	17388.
FEB 6	28.0	1070	634	17752.
FEB 7	28.0	1100	653	18284.
FEB 8	27.0	1100	653	17631.
FEB 9	27.0	1030	609	16443.
FEB 10	28.0	1040	615	17220.
FEB 11	28.0	1040	615	17220.
FEB 12	28.0	1060	628	17584.
FEB 13	29.0	1040	615	17835.
FEB 14	29.0	1000	589	17081.
FEB 15	27.0	984	579	15633.
FEB 16	24.0	940	551	13224.
FEB 17	25.0	923	541	13525.
FEB 18	28.0	967	568	15904.
FEB 19	27.0	1010	596	16092.
FEB 20	25.0	1020	602	15050.
FEB 21	24.0	1020	602	14448.
FEB 22	26.0	967	568	14768.
FEB 23	25.0	918	537	13425.
FEB 24	27.0	952	559	15093.
FEB 25	31.0	1010	596	18476.
FEB 26	26.0	1020	602	15652.
FEB 27	27.0	966	568	15336.
FEB 28	27.0	968	569	15363.
TOTAL	758.			453036.
MONTHLY WEIGHTED T.D.S.			598	

WEIGHTED T.D.S. CALCULATION SHEET

WATER YEAR 1974-75

RIVERSIDE QUALITY CONTROL PLANT

$T.D.S. = 0.3399353(EC)^{1.0798}$

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
MAR 1	26.0	986	581	15106.
MAR 2	25.0	1010	596	14900.
MAR 3	27.0	1090	647	17469.
MAR 4	28.0	1160	692	19376.
MAR 5	28.0	1150	686	19208.
MAR 6	28.0	1070	634	17752.
MAR 7	28.0	1050	621	17388.
MAR 8	29.0	1020	602	17458.
MAR 9	26.0	934	547	14222.
MAR 10	30.0	963	566	16980.
MAR 11	28.0	997	588	16464.
MAR 12	28.0	1050	621	17388.
MAR 13	28.0	1050	621	17388.
MAR 14	28.0	1050	621	17388.
MAR 15	26.0	1040	615	15990.
MAR 16	26.0	1000	589	15314.
MAR 17	28.0	1010	596	16688.
MAR 18	28.0	1080	641	17948.
MAR 19	28.0	1090	647	18116.
MAR 20	28.0	1100	653	18284.
MAR 21	28.0	1120	666	18648.
MAR 22	26.0	1060	628	16328.
MAR 23	25.0	988	582	14550.
MAR 24	29.0	963	566	16414.
MAR 25	28.0	1000	589	16492.
MAR 26	28.0	990	583	16324.
MAR 27	28.0	1020	602	16856.
MAR 28	27.0	1020	602	16254.
MAR 29	27.0	1020	602	16254.
MAR 30	25.0	948	556	13900.
MAR 31	27.0	973	572	15444.
TOTAL	849.			518291.
MONTHLY WEIGHTED T.D.S.			610	

WEIGHTED T.D.S. CALCULATION SHEET

WATER YEAR 1974-75

RIVERSIDE QUALITY CONTROL PLANT

$T.D.S. = 0.3399353(EC)^{1.0798}$

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
APR 1	28.0	1020	602	16856.
APR 2	28.0	986	581	16268.
APR 3	28.0	1050	621	17388.
APR 4	28.0	1060	628	17584.
APR 5	27.0	1080	641	17307.
APR 6	25.0	1090	647	16175.
APR 7	28.0	1130	673	18844.
APR 8	28.0	1070	634	17752.
APR 9	29.0	1070	634	18386.
APR 10	28.0	1030	609	17052.
APR 11	27.0	993	585	15795.
APR 12	25.0	1010	596	14900.
APR 13	25.0	979	576	14400.
APR 14	28.0	971	571	15988.
APR 15	26.0	989	582	15132.
APR 16	27.0	1020	602	16254.
APR 17	27.0	1070	634	17118.
APR 18	27.0	1130	673	18171.
APR 19	26.0	1100	653	16978.
APR 20	25.0	1090	647	16175.
APR 21	26.0	1090	647	16822.
APR 22	28.0	1150	686	19208.
APR 23	26.0	1140	679	17654.
APR 24	27.0	1130	673	18171.
APR 25	24.0	1110	660	15840.
APR 26	27.0	1120	666	17982.
APR 27	24.0	1100	653	15672.
APR 28	28.0	1110	660	18480.
APR 29	28.0	1180	705	19740.
APR 30	29.0	1220	731	21199.
TOTAL	807.			515291.
MONTHLY WEIGHTED T.D.S.			639	

WEIGHTED T.D.S. CALCULATION SHEET

WATER YEAR 1974-75

RIVERSIDE QUALITY CONTROL PLANT

$T.D.S. = 0.3399353(EC)^{1.0798}$

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
MAY 1	28.0	1180	705	19740.
MAY 2	28.0	1200	718	20104.
MAY 3	25.0	1190	711	17775.
MAY 4	24.0	1180	705	16920.
MAY 5	28.0	1170	698	19544.
MAY 6	28.0	1170	698	19544.
MAY 7	29.0	1210	724	20996.
MAY 8	28.0	1220	731	20468.
MAY 9	28.0	1200	718	20104.
MAY 10	25.0	1120	666	16650.
MAY 11	24.0	1120	666	15984.
MAY 12	28.0	1140	679	19012.
MAY 13	28.0	1110	660	18480.
MAY 14	28.0	1120	666	18648.
MAY 15	28.0	1110	660	18480.
MAY 16	28.0	1130	673	18844.
MAY 17	26.0	1050	621	16146.
MAY 18	25.0	1020	602	15050.
MAY 19	29.0	1050	621	18009.
MAY 20	28.0	1110	660	18480.
MAY 21	28.0	1050	621	17388.
MAY 22	28.0	1020	602	16856.
MAY 23	29.0	1090	647	18763.
MAY 24	26.0	1090	647	16822.
MAY 25	24.0	1090	647	15528.
MAY 26	26.0	1050	621	16146.
MAY 27	30.0	1040	615	18450.
MAY 28	30.0	1060	628	18840.
MAY 29	28.0	1090	647	18116.
MAY 30	28.0	1120	666	18648.
MAY 31	27.0	1110	660	17820.
TOTAL	847.			562355.
MONTHLY WEIGHTED T.D.S.			664	

WEIGHTED T.D.S. CALCULATION SHEET

WATER YEAR 1974-75

RIVERSIDE QUALITY CONTROL PLANT

$T.D.S. = 0.3399353(EC)^{1.0798}$

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
JUN 1	26.0	1130	673	17498.
JUN 2	29.0	1090	647	18763.
JUN 3	27.0	1130	673	18171.
JUN 4	27.0	1130	673	18171.
JUN 5	27.0	1090	647	17469.
JUN 6	27.0	1090	647	17469.
JUN 7	25.0	1100	653	16325.
JUN 8	23.0	1050	621	14283.
JUN 9	27.0	1060	628	16956.
JUN 10	27.0	1080	641	17307.
JUN 11	27.0	1110	660	17820.
JUN 12	27.0	1090	647	17469.
JUN 13	27.0	1150	686	18522.
JUN 14	24.0	1130	673	16152.
JUN 15	23.0	1110	660	15180.
JUN 16	27.0	1060	628	16956.
JUN 17	27.0	1100	653	17631.
JUN 18	27.0	1120	666	17982.
JUN 19	27.0	1080	641	17307.
JUN 20	27.0	1060	628	16956.
JUN 21	24.0	1070	634	15216.
JUN 22	23.0	1060	628	14444.
JUN 23	27.0	1070	634	17118.
JUN 24	27.0	1080	641	17307.
JUN 25	27.0	1100	653	17631.
JUN 26	28.0	1110	660	18480.
JUN 27	28.0	1150	686	19208.
JUN 28	24.0	1120	666	15984.
JUN 29	23.0	1080	641	14743.
JUN 30	28.0	1000	589	16492.
TOTAL	787.			511010.
MONTHLY WEIGHTED T.D.S.			649	

WEIGHTED T.D.S. CALCULATION SHEET

WATER YEAR 1974-75

RIVERSIDE QUALITY CONTROL PLANT

$T.D.S. = 0.3399353(EC)^{1.0798}$

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
JUL 1	27.0	1060	628	16956.
JUL 2	27.0	1100	653	17631.
JUL 3	27.0	1110	660	17820.
JUL 4	24.0	1140	679	16296.
JUL 5	23.0	1160	692	15916.
JUL 6	23.0	1130	673	15479.
JUL 7	27.0	1110	660	17820.
JUL 8	28.0	1180	705	19740.
JUL 9	28.0	1170	698	19544.
JUL 10	28.0	1160	692	19376.
JUL 11	28.0	1170	698	19544.
JUL 12	26.0	1160	692	17992.
JUL 13	23.0	1140	679	15617.
JUL 14	27.0	1110	660	17820.
JUL 15	28.0	1130	673	18844.
JUL 16	28.0	1160	692	19376.
JUL 17	27.0	1140	679	18333.
JUL 18	28.0	1120	666	18648.
JUL 19	24.0	1110	660	15840.
JUL 20	23.0	1130	673	15479.
JUL 21	27.0	1130	673	18171.
JUL 22	28.0	1160	692	19376.
JUL 23	27.0	1170	698	18846.
JUL 24	28.0	1140	679	19012.
JUL 25	28.0	1160	692	19376.
JUL 26	25.0	1120	666	16650.
JUL 27	24.0	1110	660	15840.
JUL 28	28.0	1090	647	18116.
JUL 29	29.0	1150	686	19894.
JUL 30	27.0	1140	679	18333.
JUL 31	27.0	1140	679	18333.
TOTAL	822.			556018.
MONTHLY WEIGHTED T.D.S.			676	

WEIGHTED T.D.S. CALCULATION SHEET

WATER YEAR 1974-75

RIVERSIDE QUALITY CONTROL PLANT

$T.D.S. = 0.3399353(EC)^{1.0798}$

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
AUG 1	28.0	1110	660	18480.
AUG 2	24.0	1130	673	16152.
AUG 3	23.0	1090	647	14881.
AUG 4	27.0	1080	641	17307.
AUG 5	27.0	1150	686	18522.
AUG 6	27.0	1140	679	18333.
AUG 7	27.0	1130	673	18171.
AUG 8	27.0	1130	673	18171.
AUG 9	24.0	1130	673	16152.
AUG 10	23.0	1110	660	15180.
AUG 11	27.0	1100	653	17631.
AUG 12	26.0	1140	679	17654.
AUG 13	26.0	1140	679	17654.
AUG 14	26.0	1130	673	17498.
AUG 15	26.0	1120	666	17316.
AUG 16	23.0	1100	653	15019.
AUG 17	22.0	1080	641	14102.
AUG 18	26.0	1080	641	16666.
AUG 19	26.0	1080	641	16666.
AUG 20	26.0	1100	653	16978.
AUG 21	26.0	1090	647	16822.
AUG 22	26.0	1080	641	16666.
AUG 23	23.0	1060	628	14444.
AUG 24	22.0	1020	602	13244.
AUG 25	26.0	1020	602	15652.
AUG 26	26.0	1060	628	16328.
AUG 27	26.0	1080	641	16666.
AUG 28	26.0	1070	634	16484.
AUG 29	26.0	1070	634	16484.
AUG 30	23.0	1060	628	14444.
AUG 31	22.0	1040	615	13530.
TOTAL	783.			509297.
MONTHLY WEIGHTED T.D.S.			650	

WEIGHTED T.D.S. CALCULATION SHEET

WATER YEAR 1974-75

RIVERSIDE QUALITY CONTROL PLANT

$T.D.S. = 0.3399353(EC)^{1.0798}$

MONTH-DAY	U.S.G.S. MEAN DAILY FLOW (CFS-DAY)	U.S.G.S. MEAN DAILY SPECIFIC CONDUCTANCE (E.C.) (MICROMHOS)	MEAN DAILY ADJUSTED T.D.S. (PPM)	MEAN DAILY FLOW TIMES ADJUSTED T.D.S.
SEP 1	23.0	1020	602	13846.
SEP 2	26.0	1000	589	15314.
SEP 3	26.0	1030	609	15834.
SEP 4	26.0	1060	628	16328.
SEP 5	27.0	1060	628	16956.
SEP 6	25.0	1070	634	15850.
SEP 7	24.0	1080	641	15384.
SEP 8	27.0	1040	615	16605.
SEP 9	27.0	1070	634	17118.
SEP 10	27.0	1030	609	16443.
SEP 11	27.0	1060	628	16956.
SEP 12	26.0	1120	666	17316.
SEP 13	25.0	1100	653	16325.
SEP 14	24.0	1070	634	15216.
SEP 15	27.0	1060	628	16956.
SEP 16	27.0	1100	653	17631.
SEP 17	27.0	1080	641	17307.
SEP 18	27.0	1070	634	17118.
SEP 19	26.0	1070	634	16484.
SEP 20	25.0	1030	609	15225.
SEP 21	24.0	1010	596	14304.
SEP 22	27.0	1010	596	16092.
SEP 23	26.0	1030	609	15834.
SEP 24	27.0	1040	615	16605.
SEP 25	27.0	1060	628	16956.
SEP 26	27.0	1120	666	17982.
SEP 27	25.0	1130	673	16825.
SEP 28	24.0	1120	666	15984.
SEP 29	27.0	1110	660	17820.
SEP 30	26.0	1090	647	16822.
TOTAL	779.			491436.
MONTHLY WEIGHTED T.D.S.			631	

TABLE NO.E-6

SUMMARY OF WATER QUALITY
FOR THE
RIVERSIDE WATER QUALITY CONTROL PLANT
AT
RIVERSIDE NARROWS
WATER YEAR 1974-75

Month	Monthly Flow Sec. Ft. Days	Mean Daily Flow Times Adjusted TDS	Average Monthly TDS
October	867	519,778	600
November	806	544,693	676
December	802	483,134	602
January	845	542,096	642
February	758	453,036	598
March	849	518,291	610
April	807	515,291	639
May	847	562,355	664
June	787	511,010	649
July	822	556,018	676
August	783	509,297	650
September	779	491,436	631
Totals	9,752	6,206,435	
Total A.F.	19,343		

Note: Monthly totals from Table No. 5

Weighted Average Annual TDS at the Riverside Quality Control Plant $= \frac{6,206,435}{9,752} = 636$ ppm

APPENDIX F

NONTRIBUTARY FLOW

AT

RIVERSIDE NARROWS

During the period May through September, 1973, Nontributary water from the East Branch of the California Aqueduct was released into the Santa Ana River in the vicinity of Colton. This release was made at the request of the Orange County Water District and totaled 11,617 acre-feet. The loss of Nontributary water through evapotranspiration between the point of release and Riverside Narrows was estimated to be 116 acre-feet. During presentation of the 1972-73 Annual Report the Watermaster concluded that by September 30, 1973, 477 acre-feet had passed Riverside Narrows as surface flow.

At the beginning of the 1973-74 water year, the remaining 11,024 acre-feet of Nontributary water existed as water in storage in the Riverside Basin, moving toward the Riverside Narrows where either all or part of it may appear as rising water. Because of the nature of its movement, it is impossible to distinguish this Nontributary water from normal Base Flow at Riverside Narrows by means of scalping procedures used by the Watermaster.

Accordingly, the Orange County Water District conducted a detailed mathematical analysis of the recharge operation based on the Dupuit-Forcheimer approximations to Darcy's Law for flow through porous media. For this analysis, they retained the services of Dr. Richard Brock, Chairman of the Department of Civil Engineering and Engineering Mechanics, California State University, Fullerton. An analysis of this nature, working with as complex a system as an alluvium-formed aquifer must incorporate many simplifying assumptions so that the resulting equations can be solved. Because of the indeterminate nature of the problem, Western Municipal Water District and Chino Basin Municipal Water District retained the services of Dr. Norman H. Brooks, Professor of Environmental Science and Civil Engineer, California Institute of Technology, to review the work of Dr. Brock and examine the sensitivity of the results to various assumptions.

Upon receipt and analysis of the two studies, the Chairman of the Watermaster Committee at a meeting on April 25, 1975, appointed a subcommittee of two of its members, Mr. Albert Webb and Mr. William Carroll, to review the studies and present a recommendation to the Watermaster on how much of this Nontributary water should be credited to the Orange County Water District each year at Riverside Narrows, and, in addition, to recommend what quantity of this same water would pass through the Prado Gaging Station.

By letters dated June 16 and June 19, 1975 from Mr. Webb to the Watermaster Committee, Mr. Webb and Mr. Carroll presented their recommendations to the Watermaster Committee. These recommendations were discussed by the Watermaster Committee at its meeting on December 22, 1975, and the following decisions were reached:

(1) A total quantity of 11,617 acre-feet on Nontributary water was released.

(2) Of this quantity, 116 acre-feet were lost through evapotranspiration and 477 acre-feet continued as surface flow past Riverside Narrows.

(3) The remaining 11,024 acre-feet was percolated into the Riverside Basin.

(4) The 11,024 acre-feet shall be considered to arrive at Riverside Narrows as Nontributary water in accordance with Table 1, included herein.

(5) The annual quantity credited at Prado Gaging Station to OCWD as a result of the 1973 Recharge Program to Riverside Basin shall be 98 percent of that same water passing Riverside Narrows.

TABLE 1

Year	Total at R.N. (Ac. Ft.)	Annual Credit at R.N. (Ac. Ft.)	Annual Credit at Prado (Ac. Ft.)
73-74	883	883	865
74-75	2,326	1,443	1,414
75-76	3,413	1,087	1,065
76-77	4,306	893	875
77-78	5,046	740	725
78-79	5,664	618	606
79-80	6,180	516	506
80-81	6,600	420	412
81-82	6,942	342	335
82-83	7,284	342	335
83-84	7,626	342	335
84-85	7,968	342	335
85-86	8,310	342	335
86-87	8,651	341	334
87-88	8,992	341	334
88-89	9,333	341	334
89-90	9,674	341	334
90-91	10,015	341	334
91-92	10,356	341	334
92-93	10,697	341	334
93-94	11,024	327	321
Total		11,024	10,802

APPENDIX G

SANTA ANA RIVER WATERMASTER

FINANCIAL STATEMENTS

WITH REPORT ON EXAMINATION BY CERTIFIED PUBLIC ACCOUNTANTS

JUNE 30, 1975

ELLIS C. DIEHL, C. P. A. (1925-1956)
BRYN B. EVANS, C. P. A.
WIN G. PETERS, C. P. A.
DONALD H. PETERSON, C. P. A.
DONALD E. CALLAHAN, C. P. A.
L. PETER SCHERER, C. P. A.
JOHN A. RAABERG, C. P. A.
JAMES M. GAISER, C. P. A.
PHILIP H. HOLTKAMP, C. P. A.

DIEHL, EVANS AND COMPANY
CERTIFIED PUBLIC ACCOUNTANTS
1910 NORTH BUSH STREET
SANTA ANA, CALIFORNIA 92706
(714) 542-4453

OTHER OFFICES AT:
705 EAST MAIN STREET
SANTA MARIA, CALIFORNIA
(805) 925-2579
2965 ROOSEVELT STREET
CARLSBAD, CALIFORNIA 92008
(714) 744-4411

February 10, 1976

ACCOUNTANTS' REPORT

Santa Ana River Watermaster
Santa Ana, California

We have examined the statement of assets and liabilities resulting from cash transactions of the Santa Ana River Watermaster as of June 30, 1975 and the related statement of revenues collected, expenses disbursed and changes in fund balance for the period from inception (April 23, 1969) to June 30, 1975. Our examination was made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying statements present fairly the assets and liabilities, resulting from cash transactions, of the Santa Ana River Watermaster at June 30, 1975 and its revenues collected and expenses disbursed during the period from inception (April 23, 1969) to June 30, 1975 on a consistent basis.

Diehl, Evans and Company

SANTA ANA RIVER WATERMASTER

STATEMENT OF ASSETS AND LIABILITIES
RESULTING FROM CASH TRANSACTIONS

June 30, 1975

ASSETS

Cash in checking account	$ 5,069
TOTAL ASSETS	$ 5,069

LIABILITIES AND FUND BALANCE

Liabilities	$ -
Fund balance	5,069
TOTAL LIABILITIES AND FUND BALANCE	$ 5,069

See accompanying accountants' report and notes to financial statements.

SANTA ANA RIVER WATERMASTER

STATEMENT OF REVENUES COLLECTED, EXPENSES
DISBURSED AND CHANGES IN FUND BALANCE

For the period from inception (April 23, 1969) to June 30, 1975

REVENUES COLLECTED:		
Water district contributions:		
Orange County Water District		$ 34,918
Chino Basin Municipal Water District		11,500
San Bernardino Valley Municipal Water District		11,500
Western Municipal Water District		11,500
TOTAL REVENUES COLLECTED		69,418
EXPENSES DISBURSED:		
Professional engineering services	$ 38,059	
Office and secretarial expense	7,386	
Construction and gage installation	13,700	
Annual reports	4,460	
Insurance	737	
Bank charges	7	
TOTAL EXPENSES DISBURSED		64,349
EXCESS OF REVENUES COLLECTED OVER EXPENSES DISBURSED		5,069
FUND BALANCE AT INCEPTION		-
FUND BALANCE AT JUNE 30, 1975		$ 5,069

See accompanying accountants' report and notes to financial statements.

SANTA ANA RIVER WATERMASTER

NOTES TO FINANCIAL STATEMENTS

June 30, 1975

1. SIGNIFICANT ACCOUNTING POLICIES:

The Watermaster uses the cash receipts and disbursed method of accounting for all of its financial activity.

2. ORGANIZATION AND HISTORY:

The Santa Ana River Watermaster is composed of a committee of five representatives of four water district. Two representatives serve from Orange County Water District and one representative each serves from Chino Basin Municipal Water District, Western Municipal Water District and San Bernardino Valley Municipal Water District. The committee was established on April 23, 1969 by order of the Superior Court of California in Orange County as part of a judgment resulting from a lawsuit by Orange County Water District as plaintiff vs City of Chino, et al, as defendants.

Costs and expenses incurred by the individual representatives are reimbursed directly from the water districts. Collective Watermaster costs and expenses are budgeted and paid for by the Watermaster after receiving contributions from the water districts. Water district contributions are made in the following ratios:

Orange County Water District	40%
Chino Basin Municipal Water District	20
Western Municipal Water District	20
San Bernardino Valley Municipal Water District	20
Total	100%

The Watermaster issues a report each year to satisfy its obligation to monitor and test water flows from the Upper Area to the Lower Area of the Santa Ana River.

See accompanying accountants' report.

SANTA ANA RIVER WATERSHED

MT. SAN ANTONIO
ELEV. 10080'

CAJON SUMMIT
ELEV. 4259'

SAN GABRIEL MOUNTAINS

SAN BERNARDINO COUNTY

LOS ANGELES COUNTY

SAN ANTONIO WASH

CUCAMONGA CREEK

CAJON WASH

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

CHINO BASIN MUNICIPAL WATER DISTRICT

POMONA
ELEV. 848'

ONTARIO
ELEV. 998'

CHINO
ELEV. 730'

CHINO CREEK

PRADO RESERVOIR

RIVERSIDE NARROWS GAGING STATION

RIVERSIDE NARROWS

PRADO GAGING STATION

PRADO DAM

CORONA
ELEV. 678'

TEMESCAL WASH

WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY

ELEV. 1049'
SAN BERNARDINO

EAST TWIN CREEK

BERNARDINO CREEK

WARM CREEK

CITY CREEK

SAN TIMOTEO CANYON

COLTON

SLOVER MOUNTAIN
ELEV. 980'

JURUPA MOUNTAINS

PEDLEY HILLS

LA LOMA HILLS

RIVERSIDE COUNTY

ELEV. 858'
RIVERSIDE

REDLANDS
ELEV. 1357'

MENTONE
ELEV. 1640'

CRAFTON HILLS

YUCAIPA PLAIN

YUCAIPA
ELEV. 2682'

YUCAIPA HILLS

BEAR CREEK

ELEV. 6738'
BIG BEAR LAKE

SANTA ANA RIVER

SAN GORGONIO MOUNTAIN
ELEV. 11502'

PIGEON PASS
ELEV. 1910'

BADLANDS

BEAUMONT PLAIN

ELEV. 2600'
BEAUMONT

SAN GORGONIO PASS
ELEV. 2616'

SAN JACINTO MOUNTAINS

SAN JACINTO FAULT

SANTIAGO CREEK

SANTA ANA MOUNTAINS

SANTIAGO PEAK
ELEV. 5687'

THE GAVILAN

TEMESCAL PLATEAU

PUENTE HILLS

BUENA PARK
ELEV. 75'

FULLERTON
ELEV. 164'

ANAHEIM
ELEV. 157'

SEAL BEACH

SANTA ANA
ELEV. 111'

NEWPORT BEACH

ORANGE COUNTY WATER DISTRICT

SAN JOAQUIN HILLS

PACIFIC OCEAN

N

SCALE OF MILES
4 0 4 8

PLATE 1

0.96"	0.17"	2.92"	0.35"	2.37"	4.33"	1.81"	0.22"	0.23"	0.00"	0.00"	0.13"
OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER

SAN BERNARDINO RAINFALL
(COUNTY HOSPITAL)

INCHES

CUBIC FEET PER SECOND

209 211 211 216 218 215 259 294 245 215
922 536 798 402 231
372 252 204
551 390 529 270 365 207 246 238 222 356 347
204

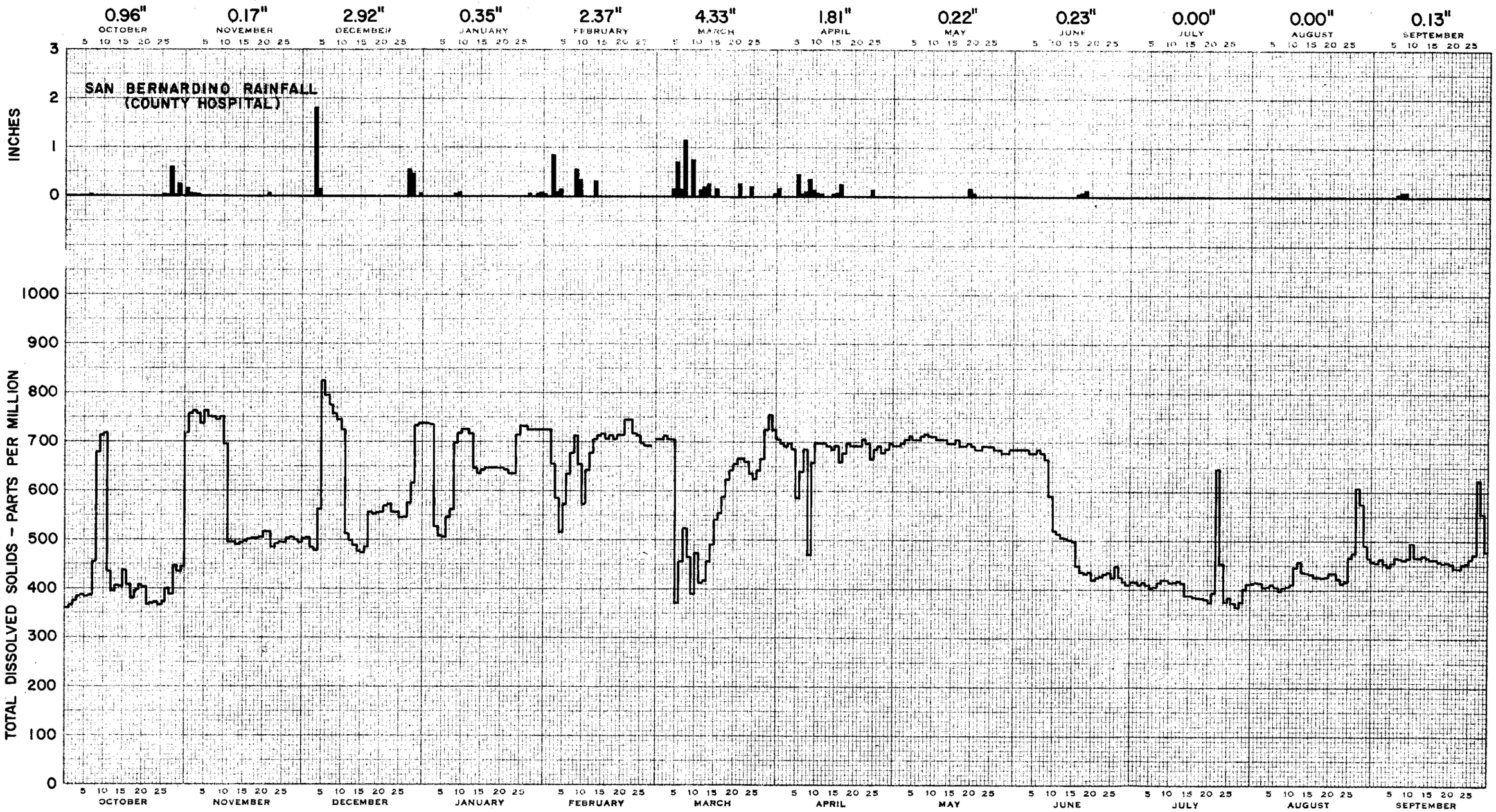
INFLOW TO PRADO DAM LESS
NON-TRIBUTARY RELEASES
FROM OC-59T & OC-59

OUTFLOW FROM
PRADO DAM

1974 1975

DISCHARGE OF SANTA ANA RIVER BELOW PRADO DAM

PLATE 2
(WATER YEAR 74/75)



DISSOLVED SOLIDS IN THE SANTA ANA RIVER BELOW PRADO DAM
AS DERIVED FROM SPECIFIC CONDUCTIVITY VALUES
MEASURED BY THE USGS MONITORING STATION

PLATE 3
(WATER YEAR 74/75)

OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
0.96"	0.17"	2.92"	0.35"	2.37"	4.33"	1.81"	0.22"	0.23"	0.00"	0.00"	0.13"

INCHES

SAN BERNARDINO RAINFALL (County Hospital)

C.F.S.

SANTA ANA RIVER SURFACE FLOW AT MISSION BOULEVARD

CUBIC FEET PER SECOND

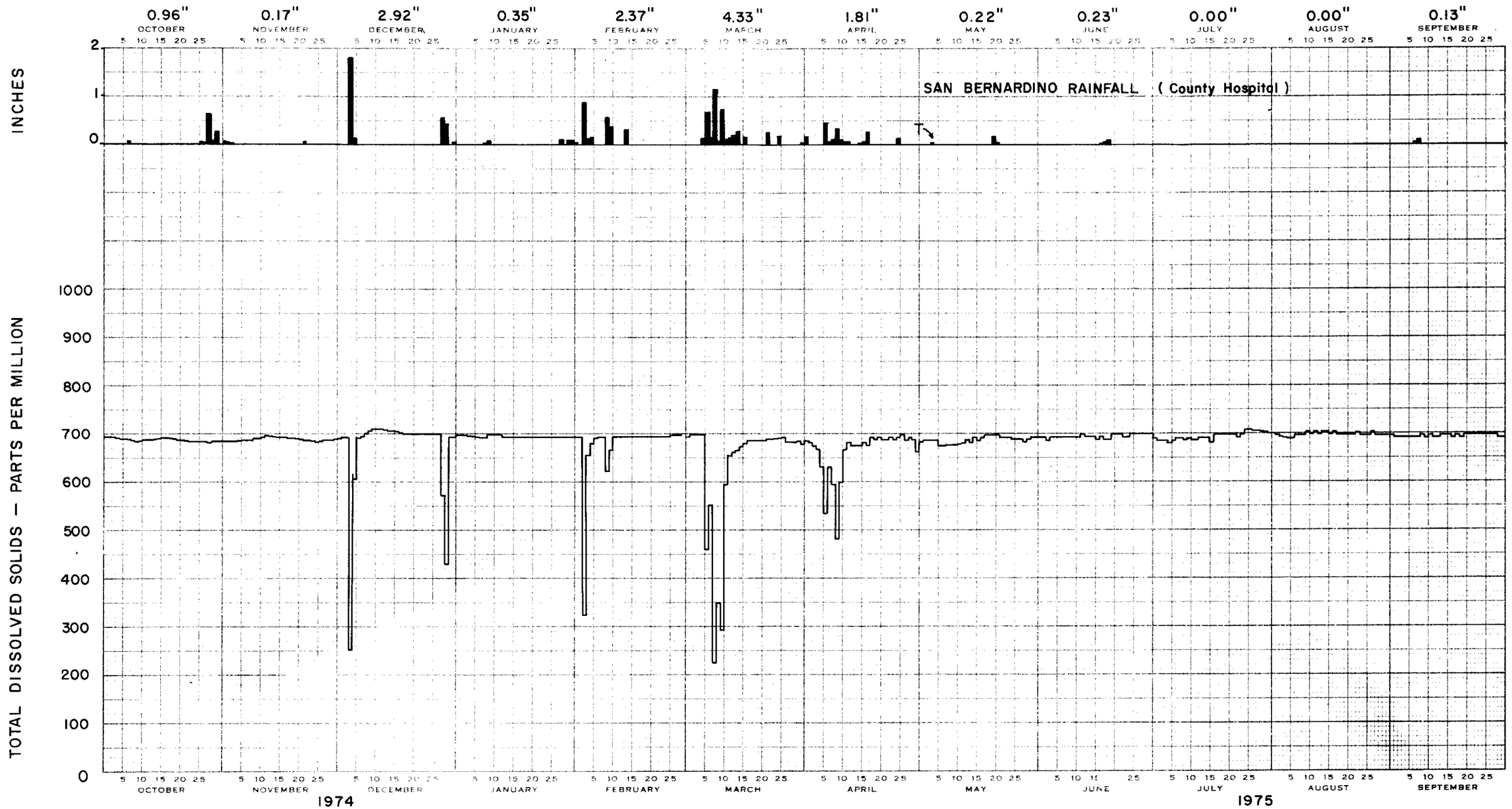
SANTA ANA RIVER SURFACE FLOW AT M.W.D. CROSSING

1974 1975

HYDROGRAPH – SANTA ANA RIVER AT M.W.D. CROSSING

PLATE 4

Water Year 1974 – 75



DISSOLVED SOLIDS IN THE SANTA ANA RIVER AT THE M.W.D. CROSSING
AS DERIVED FROM SPECIFIC CONDUCTIVITY VALUES
MEASURED BY THE USGS MONITORING STATION

PLATE 5
Water Year 1974-75