

SANTA ANA RIVER WATERMASTER

FOR

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

CASE No. 117628 – COUNTY OF ORANGE

SEVENTH

ANNUAL REPORT

OF THE

SANTA ANA RIVER WATERMASTER

1976-77

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JANUARY 27, 1978

SANTA ANA RIVER WATERMASTER

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

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

Re: Watermaster Report for 1976-77

Gentlemen:

We have the honor of submitting herewith the Seventh Annual Report of the Santa Ana River Watermaster.

The principal findings of the Watermaster for the water year 1976-77 are as follows:

At Prado

(1) Base Flow at Prado	48,378 acre-feet
(2) Annual Weighted TDS of Total Flow	668 ppm
(3) Annual Adjusted Base Flow	49,668 acre-feet
(4) Cumulative Adjusted Base Flow	322,877 acre-feet
(5) Cumulative Entitlement of OCWD	294,000 acre-feet
(6) Cumulative Credit	28,877 acre-feet
(7) One-third of Cumulative Debit	0 acre-feet
(8) Minimum Required Base Flow in 1977-78	37,000 acre-feet

At Riverside Narrows

(1) Base Flow at Riverside Narrows	18,581 acre-feet
(2) Annual Weighted TDS of Base Flow	722 ppm
(3) Annual Adjusted Base Flow	18,286 acre-feet
(4) Cumulative Adjusted Base Flow	116,700 acre-feet
(5) Cumulative Entitlement of CBMWD and WMWD	106,750 acre-feet
(6) Cumulative Credit	9,950 acre-feet
(7) One-third of Cumulative Debit	0 acre-feet
(8) Minimum Required Base Flow in 1977-78	13,420 acre-feet

SANTA ANA RIVER WATERMASTER

Clerk of Superior Court of Orange County
and All Parties

January 27, 1978
Page Two

The above findings show that at the end of the water year 1976-77 there was a credit of 28,877 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 water year 1977-78, the minimum required Base Flow is 37,000 acre-feet. At Riverside Narrows, there was a credit of 9,950 acre-feet. The obligation of San Bernardino Valley Municipal Water District during the water year 1977-78 is a minimum Base Flow of 13,420 acre-feet.

During the water year 1976-77, State water (Nontributary Flow) was purchased by Orange County Water District and released from the Rialto Reach of the Foothill Feeder at OC-59 into San Antonio Creek near Upland. The Committee continued to study methods of determining the quantity and quality of released Nontributary Flow that actually passed Prado. Based on data available, the Committee did not make a final determination. The Committee intends to continue investigation of this matter and to make a final determination and adjustment at some subsequent time.

Sincerely yours,

SANTA ANA RIVER WATERMASTER

By: Max Bookman
Max Bookman

Donald L. Harriger
Donald L. Harriger

William J. Carroll
William J. Carroll

John M. Toups
John M. Toups

James C. Hanson
James C. Hanson

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CHAPTER I

WATERMASTER ACTIVITIES

The stipulated Judgment in the case of Orange County Water District vs City of Chino, et al was 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 downstream of Prado Dam as against those in the upstream area, and provides a physical solution to implement the Judgment. The physical solution accomplishes, in general, a regional interbasin allocation of the surface flow of the Santa Ana River System. All defendants and cross-defendants were dismissed except 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 (See Plate 1). 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. The history of the litigation and the Summary of the Judgment have been included in prior annual reports.

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 1976-77 water year the Santa Ana River Watermaster Committee consisted of Max Bookman, William J. Carroll, James C. Hanson, John M. Toups and Donald L. Harriger. Mr. Bookman served as Chairman during the 1976-77 water year, and John M. Toups served as Secretary. The office of the Santa Ana River Watermaster is located at 972 Town and Country Road, P. O. Box 5367, Orange, California 92667.

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 listed in the letter of transmittal of this report.

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. The USGS measured and computed the mean daily discharge of Santa Ana River at Mission Boulevard, MWD Crossing, Prado Park, and Below Prado Dam as well as the daily discharge

TABLE 1
COSTS TO THE PARTIES AND USGS
FOR MEASUREMENTS WHICH PROVIDE DATA
USED BY THE SANTA ANA RIVER WATERMASTER
July 1, 1976 to June 30, 1977

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT		
At Riverside Water Quality Control Plant		
Surface Water Gage	\$ 423.00	
Water Quality Monitor/TDS Samples	875.00	
At Riverside Narrows (MWD Crossing)		
Water Quality Monitor/TDS Samples	908.00	
Dozer	134.00	
At Prado Park		
Surface Water Gage	437.00	
Place Rip-Rap and Stabilize Orifice	125.00	
At Mission Boulevard		
Surface Water Gage	<u>340.00</u>	\$ 3,242.00
WESTERN MUNICIPAL WATER DISTRICT		
Same as SBVMWD	\$3,243.00	
Cucamonga Creek Discharge	725.00	
Chino Creek		
Surface Water Gage	483.00	
Cleaning Control Area	<u>84.00</u>	4,535.00
CHINO BASIN MUNICIPAL WATER DISTRICT		
Same as WMWD		4,533.00
ORANGE COUNTY WATER DISTRICT		
At Prado Dam		
Water Quality Monitor/TDS Samples, Water		
Quality Sampling and Conductivity Programs	\$7,550.00	
At Prado Park		
Surface Water Gage	874.00	
Place Rip-Rap and Stabilize Orifice	250.00	
At Mission Boulevard		
Surface Water Gage	680.00	
San Antonio Creek Water Quality Program	1,400.00	
Chino Creek		
Surface Water Gage	483.00	
Cleaning Control Area	<u>83.00</u>	<u>\$11,320.00</u>
TOTAL FOR PARTIES		\$23,630.00
UNITED STATES GEOLOGICAL SURVEY		<u>23,630.00</u>
GRAND TOTAL		\$47,260.00

of the Riverside Water Quality Control Plant into the Santa Ana River. Discharge measurements were also provided for two smaller streams tributary to Prado Reservoir; Chino Creek at Schaefer Avenue and Cucamonga Creek near Mira Loma.

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 State water into the Santa Ana River were provided by the Metropolitan Water District and the State Department of Water Resources.

Compilation and Analysis of Basic Data

The Watermaster has established procedures for compiling and analyzing the basic data necessary in order to carry out the provisions of the Judgment. The records maintained by the Watermaster have been listed in prior annual reports. Based on these data, determinations were made of the Base Flow, Storm Flow, Nontributary Flow and relationships between electrical conductivity (EC) and total dissolved solids (TDS). These determinations are explained in detail in Chapters III and IV.

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 paying 40 percent of the cost and CBMWD, SBVMWD and WMWD each paying 20 percent of the cost. The Judgment further provides that the Watermaster may from time to time, at its discretion, require advances of operating capital from the parties.

At its meeting on May 14, 1976 the Watermaster adopted a budget for the fiscal year 1976-77 in the amount of \$13,000. At its meeting on May 31, 1977 the Watermaster adopted a budget for the fiscal year 1977-78 in the amount of \$15,000. Table 2 shows the items and amounts included in said budgets and expenses.

TABLE 2
SANTA ANA RIVER WATERMASTER BUDGET AND EXPENSES

	<u>July 1, 1976 to June 30, 1977 Budget</u>	<u>July 1, 1976 to June 30, 1977 Expenses</u>	<u>July 1, 1977 to June 30, 1978 Budget</u>
Administration	\$ 4,000.00	\$ 2,173.00	\$ 5,000.00
Support Engineering Services	8,000.00	9,285.00	8,000.00
Reproduction of Annual Report	<u>1,000.00</u>	<u>*</u>	<u>2,000.00</u>
Total	\$13,000.00	\$11,458.00	\$15,000.00

*Billing for publication \$1,061.49 paid November 21, 1977.

An audit prepared by Diehl, Evans and Company showing the details of income and expenses of the Santa Ana River Watermaster for the fiscal year 1976-77 is included herein as Appendix E.

CHAPTER II WATER SUPPLY CONDITIONS

The 1976-77 precipitation in the watershed, as represented by rainfall measured at San Bernardino, 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. Even so, the Total Flow less the Nontributary Flow in the Santa Ana River below Prado Dam during the water year 1976-77 increased to 63,053 acre-feet compared to 59,355 acre-feet last year. There was an increase in both Storm Flow and Base Flow at Prado compared to the prior year.

Precipitation During 1976-77

During the 1976-77 water year, the precipitation at the San Bernardino County Hospital amounted to 11.95 inches, which is 66 percent of the Base Period average. Unseasonal precipitation occurred during the months of May and August, 1977 when 2.70 inches and 2.40 inches of rainfall occurred. The only other large rainfall occurred in January amounting to 2.93 inches.

Figure 1 shows the seasonal precipitation from 1931-32 through 1976-77 and the accumulated departure from the 1934-35 through 1959-60 Base Period average.

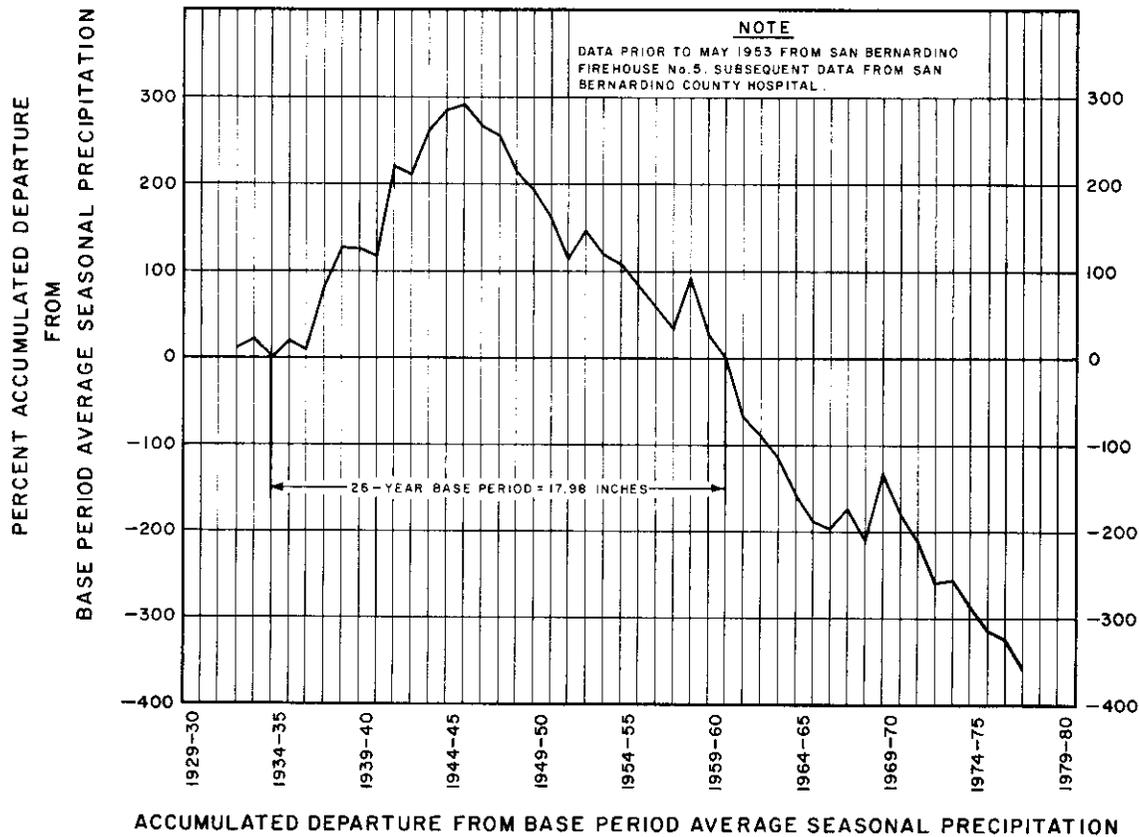
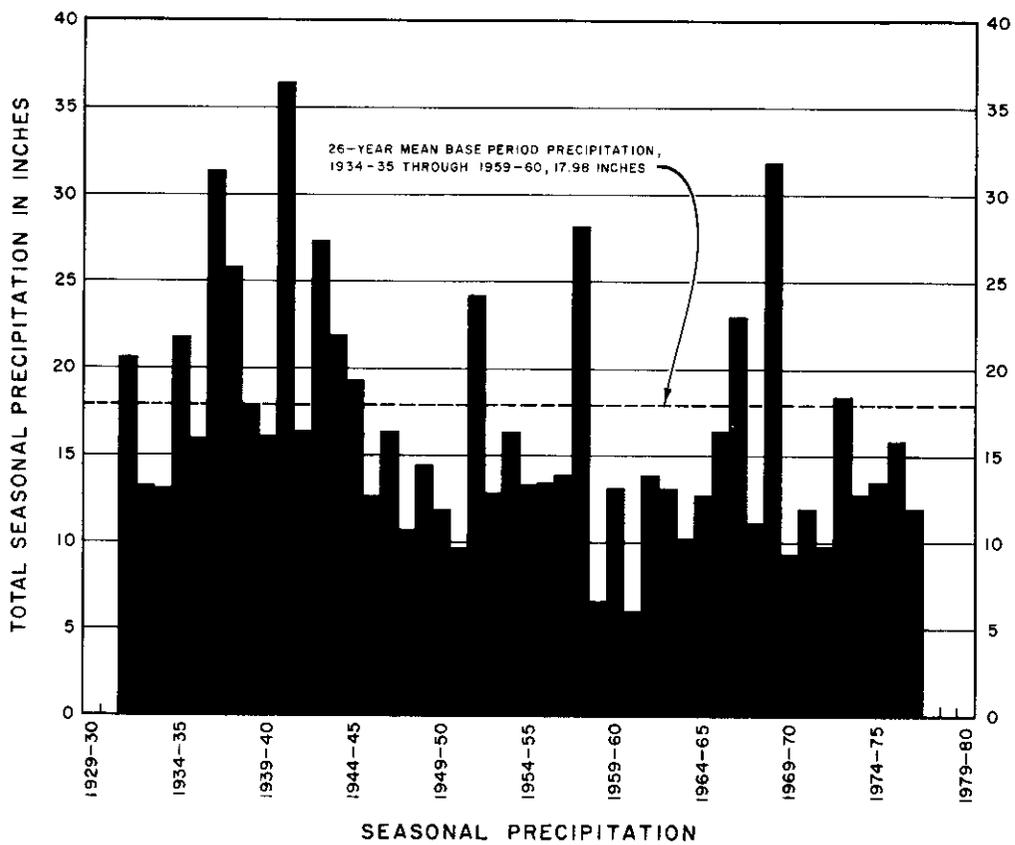
Runoff During 1976-77

Below Prado Dam

During 1976-77, the Total Flow of the Santa Ana River at Prado Dam, less Nontributary Flow, was 63,053 acre-feet, which is below the 16-year Base Period (1934-35 through 1959-60) average of 78,780 acre-feet per year.

Since 1943-44, the Base Flow at Prado Dam has progressively decreased and reached a low in 1960-61 of 26,190 acre-feet. Since that year, the Base Flow has generally increased. During the seven-year period (1970-71 through 1976-77) since the Judgment went into effect, the Base Flow has averaged 45,433 acre-feet per year. This compares to the 26-year Base Period average of 47,470 acre-feet. The 1976-77 Base Flow amounted to 48,378 acre-feet, an increase of 2,945 acre-feet over the seven-year average.

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



VARIATION IN PRECIPITATION AT SAN BERNARDINO

At Riverside Narrows

The Total Flow less Nontributary Flow at Riverside Narrows for the 1976-77 water year was 23,978 acre-feet.

The Base Flow at Riverside Narrows decreased from 27,120 acre-feet in 1943-44 to an all-time low of 13,450 acre-feet in 1965-66. Since that time, the Base Flow at Riverside Narrows has gradually increased. During the seven-year period 1970-71 through 1976-77, the Base Flow has averaged 16,831 acre-feet per year. The 1976-77 Base Flow amounted to 18,581 acre-feet, an increase of 1,750 acre-feet over the seven-year average.

Figure 3 shows the components of Total 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 1976-77.

Sewage Effluent From Riverside Water Quality Control Plant

Since the late 1940's, the sewage effluent from the Riverside Water Quality Control Plant, 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 discharged was 3,960 acre-feet. By 1959-60, the discharge had increased to 9,900 acre-feet. By 1969-70, the discharge of sewage effluent from the treatment plant was 18,657 acre-feet. During this period, wastewater effluent discharged by the City of Riverside increased at a rate of about 800 acre-feet per year. Since 1969-70, the wastewater effluent discharge has not varied significantly. This trend is illustrated on Figure 3. The wastewater discharge of the Riverside Water Quality Control Plant during 1976-77 was 18,766 acre-feet.

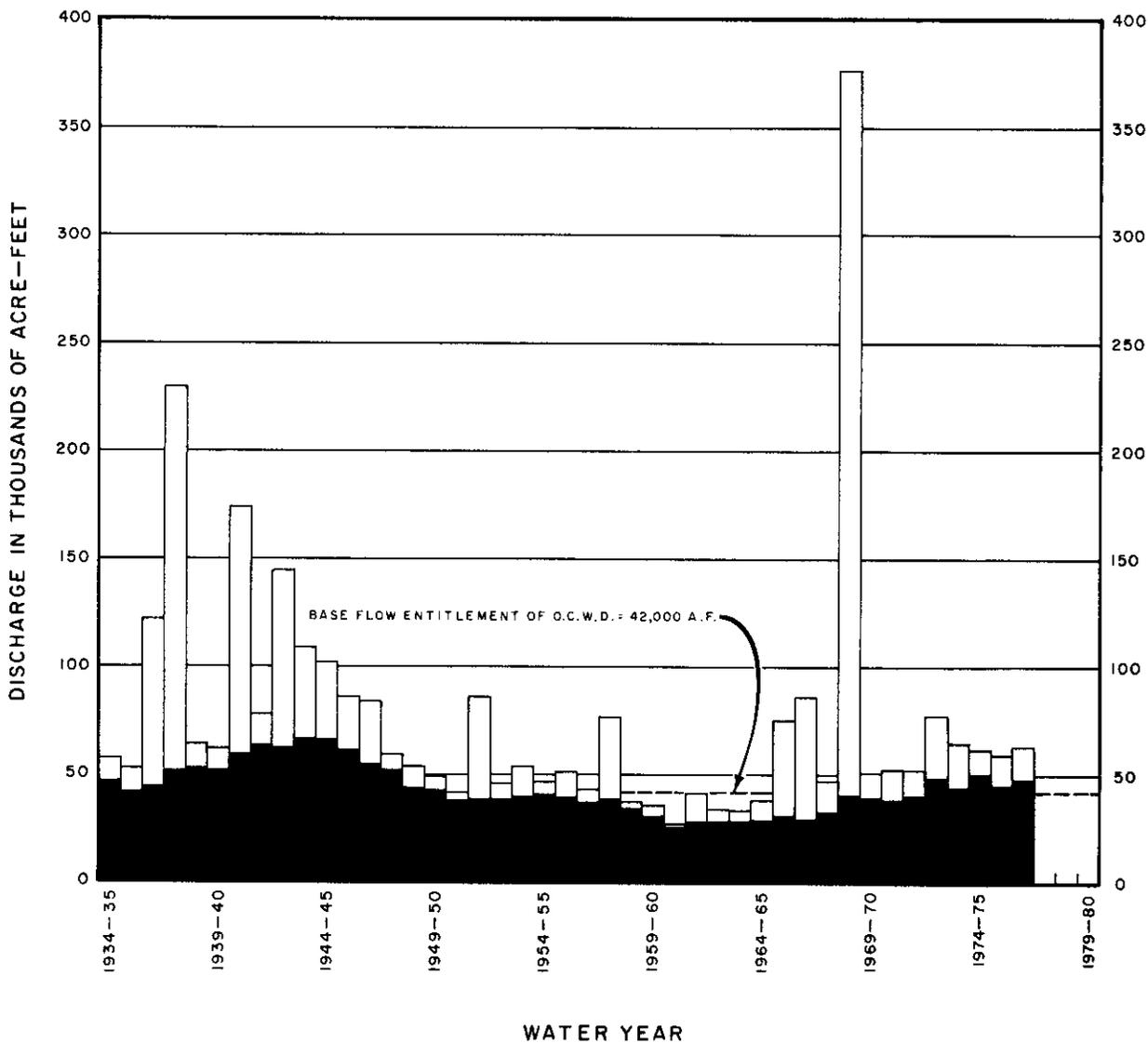
Effluent From CBMWD Regional Wastewater Treatment Plants

During the 1976-77 water year, CBMWD's Regional Plants No. 1 and 2 discharged 18,688 acre-feet of effluent to the Santa Ana River.

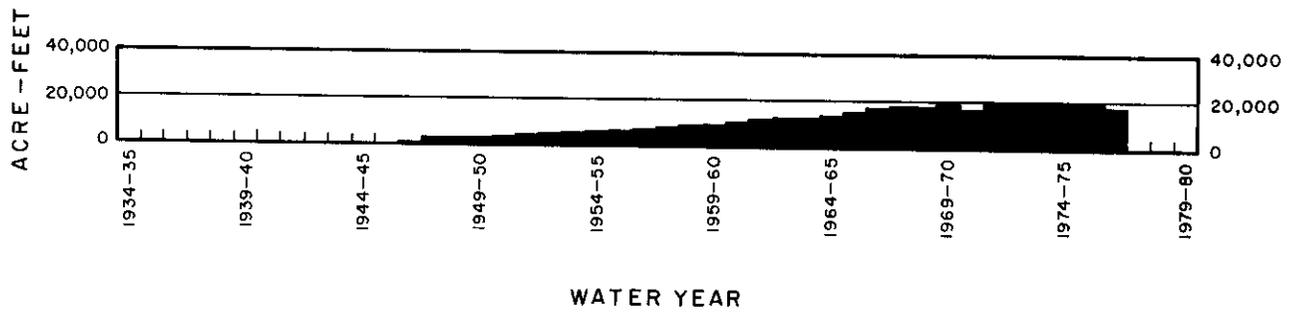
NOTE

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

LEGEND



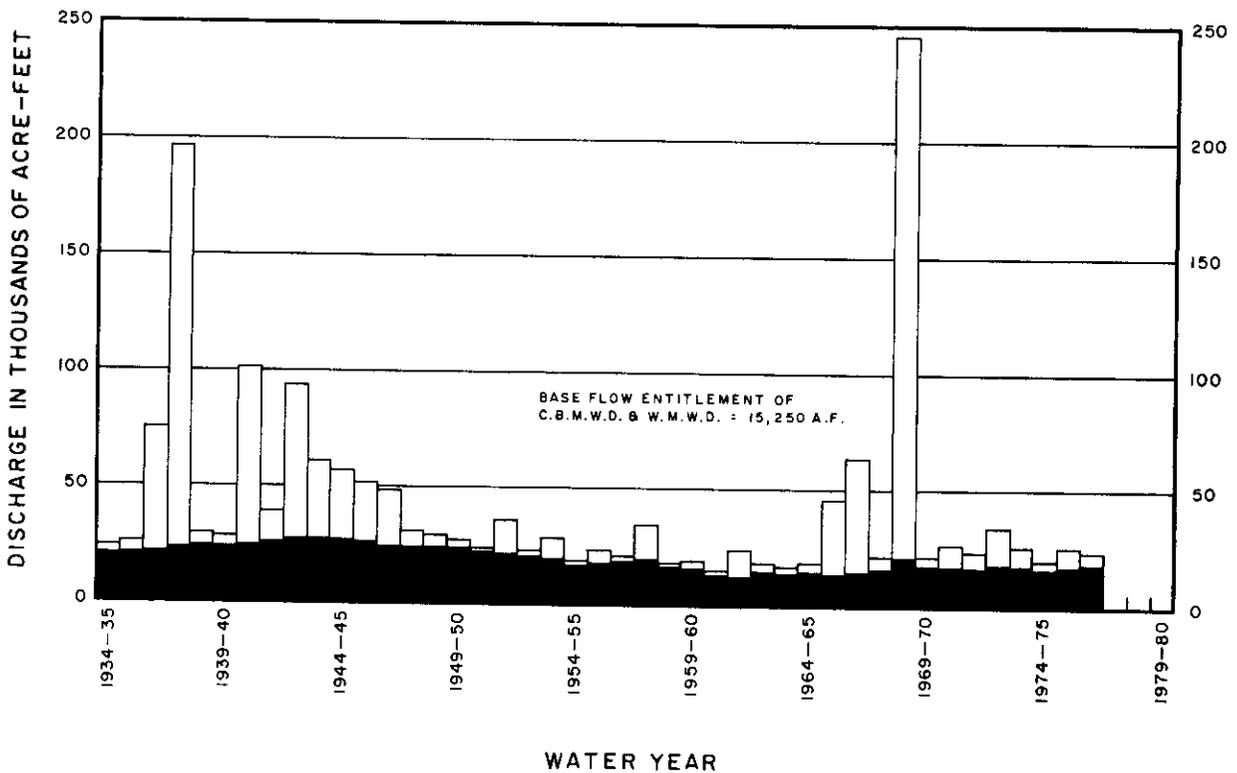
DISCHARGE OF SANTA ANA RIVER BELOW PRADO DAM



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.

LEGEND
 STORM FLOW
 BASE FLOW



DISCHARGE OF SANTA ANA RIVER AT RIVERSIDE NARROWS

CHAPTER III

BASE FLOW AT PRADO

This chapter deals with determinations of: 1) the components of flow at Prado Dam, which include Nontributary Flow; Storm Flow, and Base Flow; and 2) the adjusted Base Flow at Prado credited to CBMWD and WMWD.

Total Flow at Prado

The total flow of the Santa Ana River at Prado amounted to 72,278 acre-feet, measured at the USGS gaging station below Prado Dam. Separated into its components, Base Flow was 48,378 acre-feet, Storm Flow was 14,675 acre-feet, Nontributary Flow during 1976-77 due to the release of State water above Riverside Narrows during 1972-73 was 875 acre-feet, and Nontributary Flow due to State water that passed Prado Dam was assumed to be 8,350 acre-feet. The above determination of Nontributary Flow resulting from releases at San Antonio Creek is based on the assumption that 98 percent of the State water released at OC-59 passed Prado. This assumption is subject to review and the above amounts are subject to revision in subsequent years. The components of flow of the Santa Ana River at Prado Dam for each month in the 1976-77 water year are listed in Table 3, and are shown graphically on Plate 2.

Nontributary Flow

Since May 1973, OCWD has purchased State water for the replenishment of the groundwater basins in Orange County. The water has been released at two locations: Santa Ana River above Riverside Narrows and San Antonio Creek near Upland.

Releases Above Riverside Narrows

As fully discussed in Appendix F, the Fifth Annual Report, the Watermaster Committee made a determination of a schedule of credits to OCWD for State water released above Riverside Narrows during 1972-73. For 1976-77, the credit is 875 acre-feet, assumed to be distributed uniformly throughout the year, as shown in Table 3.

Releases to San Antonio Creek

During water year 1976-77, 8,420 acre-feet of State water were purchased by OCWD and released from the Rialto Reach of the Foothill Feeder at OC-59 into San Antonio Creek near

TABLE 3
COMPONENTS OF FLOW AT PRADO DAM FOR WATER YEAR 1976-77 (acre-feet)

Month	USGS Measured Outflow	Change in Storage ¹	Computed Inflow	Storm Flow	Base Flow	Nontributary Water	
						San Antonio Creek ²	Riverside Narrows ³
October	6,283	-0-	6,283	1,432	3,541	1,237	73
November	4,864	-0-	4,864	314	4,477	-0-	73
December	5,498	-0-	5,498	343	5,082	-0-	73
January	16,947	8	16,955	5,746	5,356	5,780	73
February	7,081	(8)	7,073	754	4,913	1,333	73
March	6,434	-0-	6,434	1,248	5,113	-0-	73
April	4,802	-0-	4,802	123	4,606	-0-	73
May	6,815	-0-	6,815	2,501	4,241	-0-	73
June	3,662	-0-	3,662	34	3,555	-0-	73
July	2,626	-0-	2,626	-0-	2,533	-0-	73
August	4,229	-0-	4,229	1,920	2,236	-0-	73
September	3,037	-0-	3,037	260	2,705	-0-	72
Total	72,278	-0-	72,278	14,675	48,378	8,350	875

1. The monthly change in storage included in the monthly components of flow.
2. State water released into San Antonio Creek during 1976-77 assumed to have reached Prado Dam in 1976-77.
3. That portion of State water released during 1972-73 upstream of Riverside Narrows, determined to have reached Prado Dam in 1976-77.

Upland. The measured flows at OC-59 are set forth in Appendix A. The Committee continued the study of methods of determining how much of the released water passed Prado in water year 1976-77. In addition, the Watermaster made studies of water quality of various components of flow in respect to the discharge of Nontributary Flow. The Watermaster determined that additional testing and sampling programs should be made as soon as State water is discharged into Chino Creek and that the programs would greatly assist in arriving at a final determination. The Committee did not make a final determination and intends to continue investigation of the disposition of State water released into San Antonio Creek since the water year 1973-74, and to make a final determination and adjustment for each of these years at some subsequent time.

For the purpose of arriving at findings in this report, the Committee assumed that 98 percent of the State water released passed Prado and assumed a 12-hour delay for travel time. Based on the above assumptions, 8,350 acre-feet of the State water released to San Antonio Creek passed Prado Dam during 1976-77. The monthly and annual amounts are shown in Table 3.

Storm Flow

Generally during storms, the Corps of Engineers operates the Prado gates so that some of the storm runoff is temporarily held in storage behind the dam. As the storm ends, Prado Reservoir storage is gradually reduced by the controlled releases to the downstream water conservation facilities operated by Orange County Water District. Monthly and annual quantities of Storm Flow are shown in Table 3.

During the 1976-77 water year, water was stored behind Prado Dam during the periods December 30; January 3 to January 20; January 24 to February 3; February 24; March 25 to March 26; May 8 to May 11; and August 17 to August 22. During these periods, the water stored in Prado Reservoir varied up to a maximum of 2,120 acre-feet and the maximum mean daily flow released to the Santa Ana River was 420 cfs.

Base Flow

The determination of Base Flow was affected, as in the previous four years, by the State water which was released upstream of Prado Dam.

The general procedure used by the members of the Watermaster to separate the 1976-77 flow components was the same as used for previous years and is fully described in the Fifth Annual Report. The monthly and annual amounts are shown in Table 3.

Water Quality

The weighted average total dissolved solids (TDS) for the total flow passing Prado, including Nontributary Flow, was found to be 620 ppm. This determination was based on continuous measurements of electrical conductivity (EC) by the USGS at the Santa Ana River below Prado and a statistical correlation of EC and TDS.

The EC of the river was recorded hourly on a punched tape by the USGS. The USGS also collected 36 samples and performed laboratory analyses for EC and TDS. Results of these analyses, listed in Table B-1, Appendix B, were used to develop the correlation between EC and TDS as shown on Figure 4.

Application of the equation relating EC to TDS provided hourly TDS values. Using hourly data, flow weighted average daily values for TDS were computed and are listed in Table B-2, Appendix B.

The plot of TDS on Plate 3 shows the effects of the State water. In general, the TDS fluctuated in the 460 to 540 ppm range when State water was being released. When the releases of State water were terminated or reduced substantially, there were corresponding increases in TDS to the 650 to 750 ppm range.

Water Quality Adjustment for Nontributary Flow

The weighted average annual TDS value of 620 ppm, shown in Table B-3, Appendix B, represents the quality of Total Flow which includes Nontributary Flow from release of State water to San Antonio Creek and Santa Ana River above Riverside Narrows. The Judgment requires that Base Flow shall be subject to adjustment based on the TDS of Base Flow and Storm Flow only. Hence, the following determination of Base Flow plus Storm Flow TDS has been made.

	<u>Annual Flow</u>	<u>Avg. TDS</u>	<u>(Annual Flow) x (Avg. TDS)</u>
1. Total Flow	72,278 A.F.	620 ppm	44,812,360 A.F.-ppm
2. Nontributary Flow Riverside Narrows	875 A.F.	242 ppm	211,750 A.F.-ppm
3. Nontributary Flow San Antonio Creek	8,350 A.F.	298 ppm	2,488,300 A.F.-ppm
4. Total Flow Less Nontributary Flow	63,053 A.F.		42,112,310 A.F.-ppm
5. Av. TDS of Total Flow Less Nontributary Flow	42,112,320 divided by 63,053 = 668 ppm		

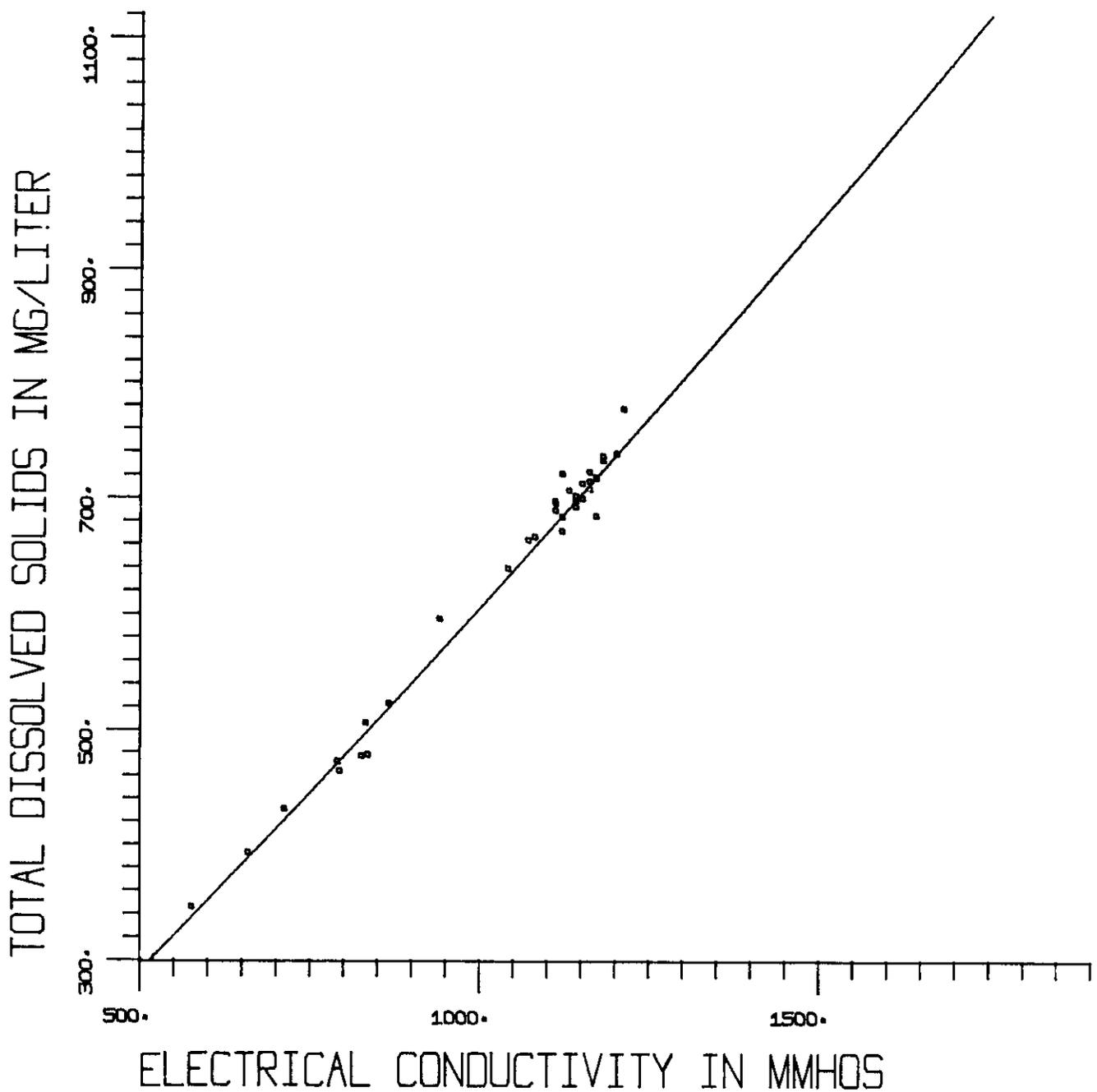
The flow weighted average TDS of the State water released to San Antonio Creek in 1976-77 was 196 ppm as shown in Table C-1, Appendix C. This was adjusted to 298 ppm for use in the above calculation to reflect the evapotranspiration associated with the assumption that 2 percent of the water released was lost. The flow weighted average TDS of State water released above Riverside Narrows during 1972-73 was 235 ppm and was similarly adjusted to 242 ppm to reflect a 3 percent evapotranspiration loss.

TDS AS A FUNCTION OF E.C. BELOW PRADO DAM

$$Y = X / (A + B * X)$$

$$A = 0.1778537E 01$$

$$B = -0.1139799E -03$$



After adjusting for releases of State water, the weighted average annual TDS of Storm Flow and Base Flow for 1976-77 was 668 ppm. It is understood that the water quality adjustment will be changed for years subsequent to 1973-74 at the same time the final determination of the disposition of State water released into San Antonio Creek is made.

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:

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

Where: Q = Base Flow actually received."

The weighted average annual TDS of 668 ppm is less than 700 ppm. Therefore, the Base Flow of 48,378 acre-feet must be adjusted by the equation above for TDS less than 700 ppm. Thus the Adjusted Base Flow is as follows:

$$(48,378 \text{ A.F.}) + \frac{35}{42,000} (48,378 \text{ A.F.}) (700-668) = 49,668 \text{ A.F.}$$

Entitlement and Credit or Debit

From pages 12 and 13 of the Judgment, the following 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's findings at Prado for 1976-77 required under the Judgment are as follows:

1. Base Flow at Prado	48,378 acre-feet
2. Annual Weighted TDS of Total Flow	668 ppm
3. Annual Adjusted Base Flow	49,668 acre-feet
4. Cumulative Adjusted Base Flow	322,877 acre-feet
5. Cumulative Entitlement of OCWD	294,000 acre-feet
6. Cumulative Credit	28,877 acre-feet
7. One-Third of Cumulative Debit	0 acre-feet
8. Minimum Required Base Flow in 1977-78	37,000 acre-feet

CHAPTER IV
BASE FLOW AT RIVERSIDE NARROWS

This chapter deals with determination of 1) the components of flow at Riverside Narrows, which include Nontributary Flow, Storm Flow, and Base Flow; and 2) the adjusted Base Flow at Riverside Narrows credited to SBVMWD.

Total Flow at Riverside Narrows

The total flow of the Santa Ana River at Riverside Narrows amounted to 24,871 acre-feet, measured at the USGS gaging station just upstream of the MWD Upper Feeder Crossing. Separated into its components, Base Flow was 18,581 acre-feet, Storm Flow was 5,397 acre-feet, and Nontributary Flow due to the release of State water above Riverside Narrows was 893 acre-feet. The components of flow of the Santa Ana River at Riverside Narrows for each month in the 1976-77 water year are listed in Table 4 and graphically shown on Plate 4.

TABLE 4
COMPONENTS OF FLOW AT RIVERSIDE NARROWS FOR
WATER YEAR 1976-77
(Quantities in Acre-Feet)

		<u>Total Flow USGS Measurement</u>	<u>Storm Flow</u>	<u>Base Flow</u>	<u>Nontributary Flow</u>
1976	October	1,753	204	1,474	75
	November	1,712	135	1,502	75
	December	1,791	87	1,629	75
1977	January	3,400	1,656	1,669	75
	February	1,636	166	1,395	75
	March	1,981	369	1,538	74
	April	1,670	0	1,596	74
	May	3,150	1,438	1,638	74
	June	1,644	0	1,570	74
	July	1,515	0	1,441	74
	August	3,062	1,342	1,646	74
	September	1,557	0	1,483	74
Total - Acre Feet		24,871	5,397	18,581	893

Nontributary Flow

During the period May through September, 1973, 11,617 acre-feet of State 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.

The Watermaster's determination of the effect of these releases has been discussed in previous reports. For the water year 1976-77 the amount of State water reaching Riverside Narrows has been agreed upon as 893 acre-feet.

Base Flow

Based on the hydrograph shown on Plate 4 and utilizing in general the same procedures 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 Flow. Nontributary Flow was assumed to be equally distributed throughout the year (893 acre-feet divided by 12 months) and subtracted from the sum of the Base Flow and Nontributary Flow to arrive at Base Flow. The Base Flow was determined to be 18,581 acre-feet, as shown on Table 4.

Water Quality

The weighted average total dissolved solids (TDS) for the Base Flow plus Nontributary Flow at Riverside Narrows was found to be 700 ppm and for Base Flow only was found to be 722 ppm. This determination of the water quality was made using periodic grab samples taken and analyzed for EC and TDS by the USGS, which operates a continuous EC recorder at the Riverside Narrows. The data for this analysis are listed in Table D-4, Appendix D. The relationship between EC and TDS at Riverside Narrows is shown on Figure 5.

A plot of the TDS of the total daily flow, including Nontributary Flow, at Riverside Narrows for the year 1976-77, is shown on Plate 5.

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 and
Riverside Narrows is:

Then the Adjusted Base
Flow shall be determined
by the formula:

Greater than 700 ppm

$$Q - \frac{11}{15,250} Q (\text{TDS}-700)$$

600 ppm - 700 ppm

$$Q$$

Less than 600 ppm

$$Q + \frac{11}{15,250} Q (600-\text{TDS})$$

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 1976-77 was 722 ppm. Therefore, a downward adjustment to the Base Flow of 295 acre-feet is necessary, and the Adjusted Base Flow for 1976-77 is 18,286 acre-feet.

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 13,240 acre-feet of Base Flow plus one-third of any cumulative debit . . ."

The Watermaster's findings at Riverside Narrows for 1976-77 required under the Judgment are as follows:

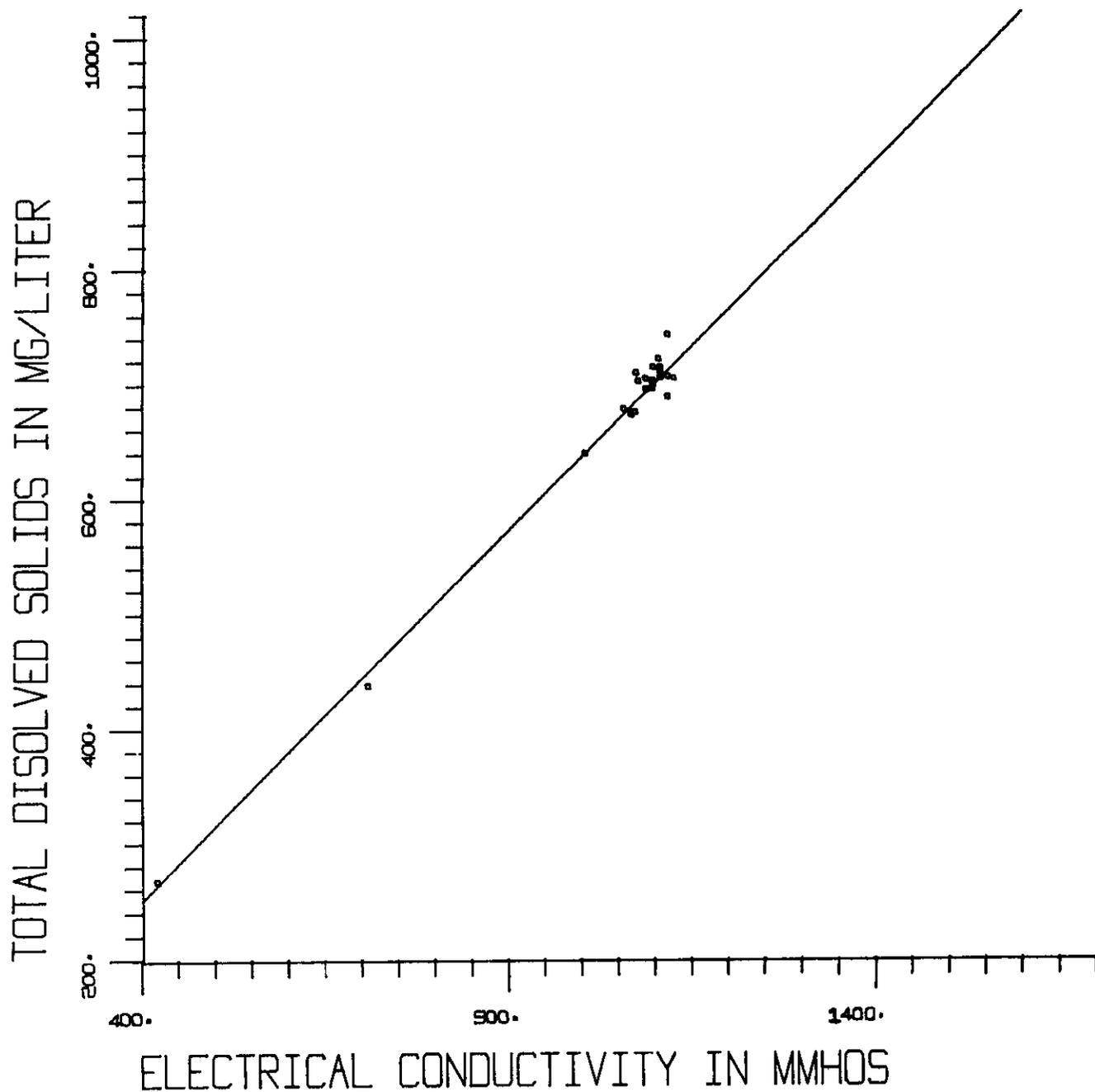
(1) Base Flow at Riverside Narrows	18,581 acre-feet
(2) Annual Weighted TDS of Base Flow	722 ppm
(3) Annual Adjusted Base Flow	18,286 acre-feet
(4) Cumulative Adjusted Base Flow	116,700 acre-feet
(5) Cumulative Entitlement of CBMWD and WMWD	106,750 acre-feet
(6) Cumulative Credit	9,950 acre-feet
(7) One-Third Cumulative Debit	0 acre-feet
(8) Minimum Required Base Flow in 1977-78	13,420 acre-feet

TDS AS A FUNCTION OF E.C. AT RIVERSIDE NARROWS

$$Y=X/(A+B*X)$$

$$A= 0.158819E 01$$

$$B=-0.5530285E-05$$



APPENDIX A

STATE WATER RELEASED BY MWD
TO SAN ANTONIO CREEK NEAR UPLAND

CONNECTION OC--59

1976-77

PREPARED BY
DONALD L. HARRIGER

Table A-1

SUMMARY

OC-59 RELEASED AND DELAYED

MONTH TOTALS
(in Acre Feet)

Water Year 1976-77

<u>Month</u>	<u>Released</u>	<u>Delayed</u>
October	1162	1262
November	0	0
December	0	0
January	6095	5898
February	1163	1360
March	0	0
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	<u>0</u>	<u>0</u>
Total	8420	8520

NONTRIBUTARY WATER FROM OC-59

in cfs days

October 1976

Day	Released	12 hour delay
1	101.32	101.32
2	101.32	101.32
3	101.32	101.32
4	100.56	100.77
5	101.95	102.37
6	79.35	99.90
7	0	29.48
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
	<hr/>	<hr/>
	585.82 cfs days	636.48 cfs days
	1,161.97 A.F.	1,262.46 A.F.

NONTRIBUTARY WATER FROM OC-59

in cfs days

January 1977

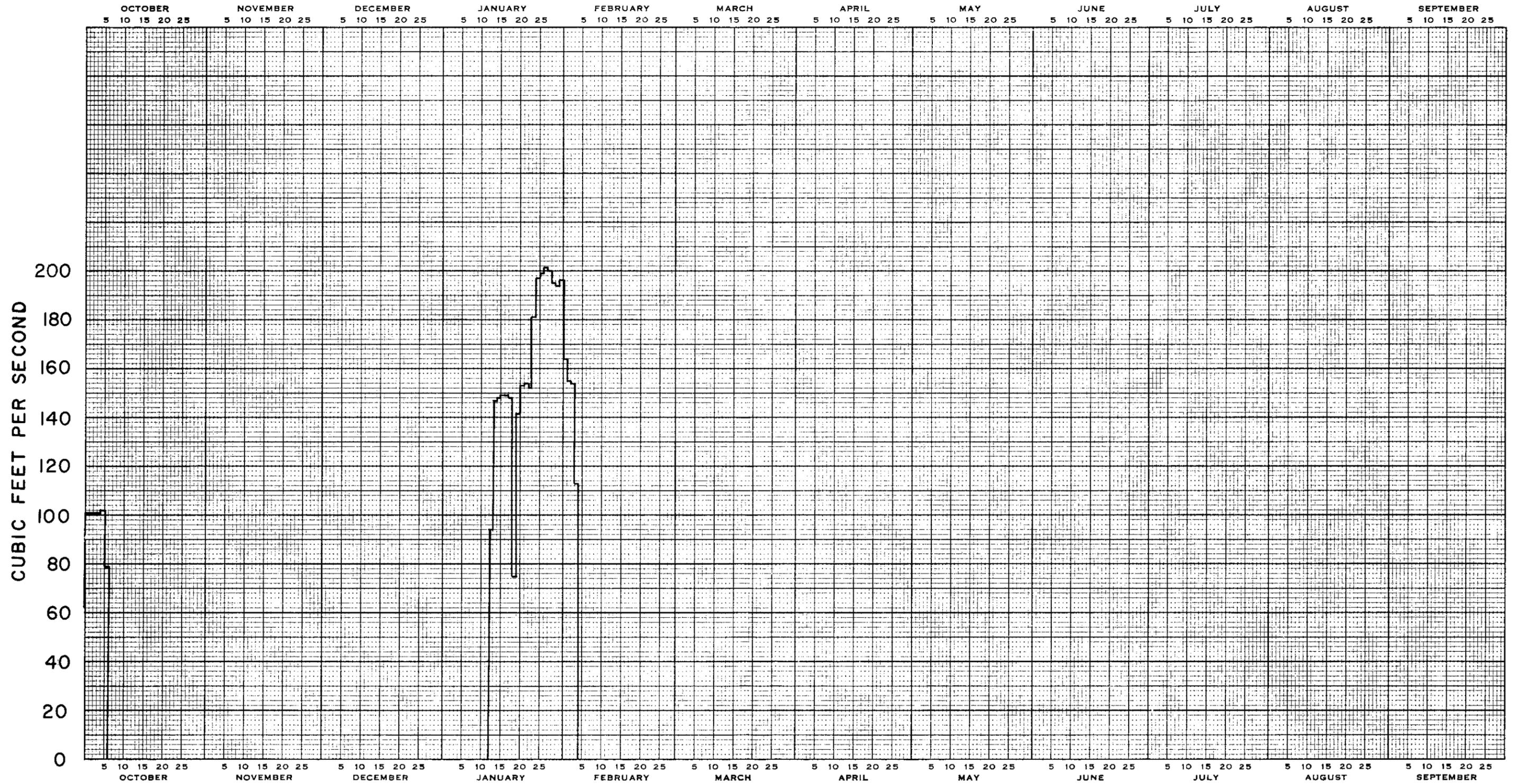
Day	Released	12 hour delay
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	93.52	18.99
14	147.18	147.90
15	147.90	147.52
16	148.97	148.41
17	148.71	149.05
18	147.72	146.13
19	74.56	113.01
20	141.24	101.80
21	153.40	154.13
22	154.34	153.39
23	152.49	154.30
24	181.37	155.90
25	197.05	198.27
26	198.51	198.98
27	201.12	199.86
28	199.69	201.75
29	194.84	196.36
30	194.25	194.17
31	<u>196.31</u>	<u>193.75</u>
	3,073.17 cfs days	2,973.67 cfs days
	6,095.63 A.F.	5,898.27 A.F.

NONTRIBUTARY WATER FROM OC-59

in cfs days

February 1977

Day	Released	12 hour delay
1	164.43	188.20
2	154.57	153.02
3	154.05	154.05
4	113.05	154.49
5	0	35.85
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	-	-
30	-	-
31	-	-
	<hr/>	<hr/>
	586.10 cfs days	685.61 cfs days
	1,162.53 A.F.	1,359.91 A.F.



NONTRIBUTARY WATER RELEASED
AT OC 59

PLATE A-1

WATER YEAR 1976-77

APPENDIX B

WATER QUALITY—
SANTA ANA RIVER BELOW PRADO DAM

1976-77

PREPARED BY
JOHN M. TOUPS

METHOD OF ANALYZING WATER QUALITY DATA

Utilizing the USGS water quality records, the following analyses were performed by the Watermaster to determine the annual weighted TDS:

1. Mean daily flow weighted specific conductivity was calculated using the punched tape from the Prado water quality recorder, processed by a newly developed computer program designed by USGS. Input to the program included hourly specific conductivity data from the recorder tape, which was flow weighted using hourly discharge measurements from the water stage recorder.
2. Laboratory analyses of the 36 grab samples taken by the USGS below Prado Dam during the 1976-77 season were run to determine both specific conductance and TDS. Data from the grab samples is given in Table B-1. 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 Fifth Annual Watermaster Report. The resulting graph of plotted data points and equation of the best fit line are shown in Chapter III of this report.
3. The 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. This data is given in Table B-2.

4. The mean daily TDS values were then multiplied by the mean daily flow as shown in Table B-2. 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 620 ppm of total dissolved solids for the 1976-77 water year. The weighted TDS calculation for the water year 1976-77 is shown in Table B-3.

TABLE B-1

U.S.G.S. WATER QUALITY SAMPLES
BELOW PRADO DAM
WATER YEAR 1976-77

Date	E.C.	T.D.S.	Date	E.C.	T.D.S.
Oct. 1976	841	504	April 1977	1,160	696
	800	472		1,160	698
	950	593		1,150	689
	1,120	693	May 1977	1,120	686
	1,180	681		586	347
Nov. 1976	1,220	772	1,150	694	
	1,170	719	June 1977	1,090	663
	1,210	734		1,130	668
Dec. 1976	1,190	732	1,130	680	
	1,130	717	July 1977	1,180	713
	1,180	714		1,160	709
Jan. 1977	721	432	Aug. 1977	1,160	696
	875	521		1,050	636
	835	477	Sept. 1977	1,080	660
Feb. 1977	844	478		1,120	692
	803	464			
Mar. 1977	1,190	728			
	1,140	703			
	1,170	704			
	668	393			
	1,170	710			

TABLE B-2

TOUPS CORPORATION

WEIGHTED T.D.S. CALCULATION SHEET

BELOW PRADO DAM

WATER YEAR 1976-1977

TDS=EC/(-0.000114(EC)+ 1.778537)

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	181.0	854	508	91948.
OCT 2	196.0	888	529	103684.
OCT 3	185.0	825	490	90650.
OCT 4	183.0	797	472	86376.
OCT 5	179.0	779	461	82519.
OCT 6	176.0	766	453	79728.
OCT 7	125.0	910	543	67875.
OCT 8	80.0	1060	639	51120.
OCT 9	76.0	1080	652	49552.
OCT 10	77.0	1090	659	50745.
OCT 11	78.0	1090	659	51402.
OCT 12	77.0	1110	672	51744.
OCT 13	80.0	1110	672	53760.
OCT 14	82.0	1130	685	56170.
OCT 15	85.0	1120	678	57630.
OCT 16	79.0	1150	698	55142.
OCT 17	78.0	1160	705	54990.
OCT 18	82.0	1130	685	56170.
OCT 19	82.0	1130	685	56170.
OCT 20	86.0	1160	705	60630.
OCT 21	82.0	1160	705	57810.
OCT 22	77.0	1150	698	53746.
OCT 23	126.0	981	589	74214.
OCT 24	100.0	1110	672	67200.
OCT 25	92.0	1150	698	64216.
OCT 26	80.0	1170	711	56880.
OCT 27	67.0	1170	711	47637.
OCT 28	73.0	1180	718	52414.
OCT 29	70.0	1180	718	50260.
OCT 30	67.0	1200	731	48977.
OCT 31	67.0	1190	724	48508.
TOTAL MONTHLY WEIGHTED T.D.S.	3168.		609	1929865.

B-4

TABLE B-2 (Continued)

BELOW PRADO DAM		TOUPS CORPORATION WEIGHTED T.D.S. CALCULATION SHEET			
		WATER Y EAR 1976-1977	TDS=EC/(-0.000114(EC)+ 1.778537)		
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	76.0	1230	751	57076.	
NOV 2	72.0	1180	718	51696.	
NOV 3	70.0	1180	718	50260.	
NOV 4	64.0	1190	724	46336.	
NOV 5	65.0	1180	718	46670.	
NOV 6	68.0	1200	731	49708.	
NOV 7	70.0	1210	738	51660.	
NOV 8	69.0	1170	711	49059.	
NOV 9	71.0	1170	711	50481.	
NOV 10	72.0	1190	724	52128.	
NOV 11	79.0	1180	718	56722.	
NOV 12	140.0	1070	646	90440.	
NOV 13	124.0	1080	652	80848.	
NOV 14	96.0	1170	711	68256.	
NOV 15	92.0	1160	705	64860.	
NOV 16	78.0	1170	711	55458.	
NOV 17	78.0	1190	724	56472.	
NOV 18	84.0	1200	731	61404.	
NOV 19	82.0	1210	738	60516.	
NOV 20	79.0	1200	731	57749.	
NOV 21	79.0	1190	724	57196.	
NOV 22	83.0	1170	711	59013.	
NOV 23	86.0	1150	698	60028.	
NOV 24	85.0	1150	698	59330.	
NOV 25	84.0	1150	698	58632.	
NOV 26	83.0	1130	685	56855.	
NOV 27	73.0	1130	685	50005.	
NOV 28	81.0	1140	692	56052.	
NOV 29	85.0	1140	692	58820.	
NOV 30	84.0	1150	698	58632.	
TOTAL MONTHLY WEIGHTED T.D.S.	2452.		707	1732362.	

B-5

TABLE B-2 (Continued)

TOUPS CORPORATION
WEIGHTED T.D.S. CALCULATION SHEET

BELOW PRADO DAM

WATER YEAR 1976-1977

$TDS = EC / (-0.000114(EC) + 1.778537)$

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	83.0	1170	711	59013.
DEC 2	84.0	1190	724	60816.
DEC 3	86.0	1190	724	62264.
DEC 4	85.0	1180	718	61030.
DEC 5	83.0	1170	711	59013.
DEC 6	81.0	1150	698	56538.
DEC 7	84.0	1150	698	58632.
DEC 8	85.0	1160	705	59925.
DEC 9	86.0	1160	705	60630.
DEC 10	84.0	1150	698	58632.
DEC 11	77.0	1160	705	54285.
DEC 12	77.0	1150	698	53746.
DEC 13	77.0	1140	692	53284.
DEC 14	81.0	1140	692	56052.
DEC 15	80.0	1150	698	55840.
DEC 16	77.0	1160	705	54285.
DEC 17	78.0	1160	705	54990.
DEC 18	78.0	1170	711	55458.
DEC 19	78.0	1160	705	54990.
DEC 20	84.0	1160	705	59220.
DEC 21	91.0	1170	711	64701.
DEC 22	92.0	1190	724	66608.
DEC 23	93.0	1180	718	66774.
DEC 24	93.0	1190	724	67332.
DEC 25	90.0	1170	711	63990.
DEC 26	81.0	1160	705	57105.
DEC 27	84.0	1160	705	59220.
DEC 28	86.0	1160	705	60630.
DEC 29	89.0	1160	705	62745.
DEC 30	130.0	1060	659	83070.
DEC 31	215.0	986	592	127280.
TOTAL	2772.		696	1928098.
MONTHLY WEIGHTED T.D.S.				

B-6

TABLE B-2 (Continued)

TOUPS CORPORATION
WEIGHTED T.D.S. CALCULATION SHEET

BELOW PRADO DAM

WATER Y EAR 1976-1977

TDS=EC/(-0.000114(EC)+ 1.778537)

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	249.0	759	449	111801.
JAN	2	106.0	1160	705	74730.
JAN	3	297.0	724	427	126819.
JAN	4	357.0	762	450	160650.
JAN	5	324.0	1040	627	203148.
JAN	6	227.0	765	452	102604.
JAN	7	271.0	670	394	106774.
JAN	8	317.0	553	322	102074.
JAN	9	310.0	587	343	106330.
JAN	10	375.0	740	437	163875.
JAN	11	420.0	931	557	233940.
JAN	12	387.0	1180	718	277866.
JAN	13	143.0	1210	738	105534.
JAN	14	247.0	881	525	129675.
JAN	15	257.0	879	524	134668.
JAN	16	247.0	858	510	125970.
JAN	17	241.0	839	499	120259.
JAN	18	246.0	841	500	123000.
JAN	19	213.0	904	540	115020.
JAN	20	206.0	903	539	111034.
JAN	21	226.0	797	472	124608.
JAN	22	256.0	819	486	124416.
JAN	23	254.0	816	484	122936.
JAN	24	257.0	802	475	122075.
JAN	25	298.0	780	462	137676.
JAN	26	307.0	787	466	143062.
JAN	27	305.0	784	464	141520.
JAN	28	305.0	781	462	140910.
JAN	29	298.0	796	472	140656.
JAN	30	285.0	798	473	134805.
JAN	31	275.0	787	466	128150.
TOTAL		8544.		491	4196585.
MONTHLY WEIGHTED T.D.S.					

B-7

TABLE B-2 (Continued)

TOUPS CORPORATION
WEIGHTED T.D.S. CALCULATION SHEET

BELOW PRADO DAM WATER YEAR 1976-1977 TDS=EC/(-0.000114(EC)+ 1.778537)

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.
FFB 1	277.0	809	480	132960.
FFB 2	242.0	841	500	121000.
FFB 3	234.0	829	492	115128.
FFB 4	234.0	823	489	114426.
FFB 5	124.0	1080	652	80848.
FFB 6	100.0	1140	692	69200.
FFB 7	100.0	1130	685	68500.
FFB 8	103.0	1130	685	70555.
FFB 9	99.0	1150	696	69102.
FFB 10	97.0	1170	711	68967.
FFB 11	91.0	1200	731	66521.
FFB 12	82.0	1240	757	62074.
FFB 13	94.0	1180	718	67492.
FFB 14	92.0	1170	711	65412.
FFB 15	88.0	1160	705	62040.
FFB 16	88.0	1180	718	63184.
FFB 17	88.0	1190	724	63712.
FFB 18	86.0	1200	731	62866.
FFB 19	85.0	1190	724	61540.
FFB 20	85.0	1180	718	61030.
FFB 21	85.0	1160	705	58515.
FFB 22	85.0	1160	705	59925.
FFB 23	96.0	1150	698	67008.
FFB 24	180.0	1000	601	108180.
FFB 25	293.0	997	599	175507.
FFB 26	123.0	1200	731	89913.
FFB 27	112.0	1200	731	81872.
FFB 28	109.0	1170	711	77499.
TOTAL MONTHLY WEIGHTED T.D.S.	3570.		634	2264976.

B-8

TABLE B-2 (Continued)

BELOW PRADO DAM		TOUPS CORPORATION WEIGHTED T.D.S. CALCULATION SHEET			
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	107.0	1170	711	76077.
MAR	2	103.0	1170	711	73233.
MAR	3	98.0	1150	698	68404.
MAR	4	87.0	1150	698	60726.
MAR	5	81.0	1160	705	57105.
MAR	6	80.0	1140	692	55360.
MAR	7	79.0	1140	692	54668.
MAR	8	80.0	1140	692	55360.
MAR	9	79.0	1150	698	55142.
MAR	10	79.0	1150	698	55142.
MAR	11	84.0	1160	705	59220.
MAR	12	87.0	1150	698	60726.
MAR	13	85.0	1150	698	59330.
MAR	14	83.0	1140	692	59330.
MAR	15	80.0	1170	692	57436.
MAR	16	114.0	1100	711	56880.
MAR	17	157.0	954	665	75810.
MAR	18	102.0	1140	571	89647.
MAR	19	90.0	1180	692	70584.
MAR	20	87.0	1170	718	64620.
MAR	21	87.0	1150	711	61857.
MAR	22	84.0	1160	698	60726.
MAR	23	92.0	1160	705	59220.
MAR	24	94.0	1130	685	63020.
MAR	25	238.0	1120	678	63732.
MAR	26	276.0	833	495	117810.
MAR	27	132.0	867	516	142416.
MAR	28	109.0	1160	705	93060.
MAR	29	99.0	1160	705	76845.
MAR	30	96.0	1180	718	71082.
MAR	31	95.0	1190	724	69504.
			1180	718	68210.
TOTAL		3244.		664	2152952.
MONTHLY WEIGHTED T.D.S.					

TABLE B-2 (Continued)

TOUPS CORPORATION				
WEIGHTED T.D.S. CALCULATION SHEET				
BELOW PRADO DAM		WATER YEAR 1976-1977		TDS=EC/(-0.000114(EC)+ 1.778537)
MONTH-DAY	U.S.G.S. MEAN	U.S.G.S. MEAN	MEAN DAILY	MEAN DAILY FLOW
	DAILY FLOW	DAILY SPECIFIC	ADJUSTED T.D.S.	TIMES
	(CFS-DAY)	CONDUCTANCE (E.C.)	(PPM)	ADJUSTED T.D.S.
		(MICROMHOS)		
APR 1	95.0	1170	711	67545.
APR 2	93.0	1190	724	67332.
APR 3	91.0	1170	711	64701.
APR 4	89.0	1140	692	61588.
APR 5	88.0	1140	692	60896.
APR 6	86.0	1160	705	60630.
APR 7	85.0	1170	711	60435.
APR 8	84.0	1180	718	60312.
APR 9	83.0	1160	705	58515.
APR 10	82.0	1140	692	56744.
APR 11	80.0	1120	678	54240.
APR 12	84.0	1140	692	58128.
APR 13	81.0	1160	705	57105.
APR 14	81.0	1150	698	56538.
APR 15	79.0	1140	692	54668.
APR 16	79.0	1120	678	53562.
APR 17	77.0	1130	685	52745.
APR 18	77.0	1140	692	53284.
APR 19	74.0	1130	685	50690.
APR 20	77.0	1130	685	52745.
APR 21	77.0	1130	685	52745.
APR 22	79.0	1120	678	53562.
APR 23	78.0	1120	678	52884.
APR 24	75.0	1110	672	50400.
APR 25	76.0	1090	659	50084.
APR 26	76.0	1120	678	51528.
APR 27	77.0	1140	692	53284.
APR 28	74.0	1150	698	51652.
APR 29	73.0	1160	705	51465.
APR 30	71.0	1160	705	50055.
TOTAL	2421.		694	1680062.
MONTHLY WEIGHTED T.D.S.				

B-10

TABLE B-2 (Continued)

BELOW PRADO DAM		TOUPS CORPORATION WEIGHTED T.D.S. CALCULATION SHEET			
		WATER YEAR 1976-1977	TDS=EC/(-0.000114(EC)+ 1.778537)		
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	74.0	1140	692	51208.	
MAY 2	72.0	1130	685	49320.	
MAY 3	74.0	1120	678	50172.	
MAY 4	75.0	1140	692	51900.	
MAY 5	74.0	1130	685	50690.	
MAY 6	74.0	1120	678	50172.	
MAY 7	71.0	1120	678	48138.	
MAY 8	125.0	937	561	70125.	
MAY 9	320.0	618	362	115840.	
MAY 10	346.0	594	347	120062.	
MAY 11	331.0	738	436	144316.	
MAY 12	233.0	1100	665	154945.	
MAY 13	113.0	1170	711	80343.	
MAY 14	102.0	1170	711	72522.	
MAY 15	95.0	1170	711	67545.	
MAY 16	91.0	1150	698	63518.	
MAY 17	82.0	1170	711	58302.	
MAY 18	79.0	1160	705	55695.	
MAY 19	76.0	1150	698	53048.	
MAY 20	74.0	1130	685	50690.	
MAY 21	68.0	1140	692	47056.	
MAY 22	69.0	1130	685	47265.	
MAY 23	72.0	1110	672	48384.	
MAY 24	93.0	1020	614	57102.	
MAY 25	89.0	1040	627	55803.	
MAY 26	81.0	1090	659	53379.	
MAY 27	80.0	1080	652	52160.	
MAY 28	79.0	1100	665	52535.	
MAY 29	78.0	1090	659	51402.	
MAY 30	70.0	1100	665	46550.	
MAY 31	74.0	1080	652	48248.	
TOTAL MONTHLY WEIGHTED T.D.S.	3434.		588	2018435.	

TABLE B-2 (Continued)

BELOW PRADO DAM		TOUPS CORPORATION		WEIGHTED T.D.S. CALCULATION SHEET	
		WATER Y EAR 1976-1977		TDS=EC/(-0.000114(EC)+ 1.778537)	
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	73.0	1090	659	48107.	
JUN 2	70.0	1120	678	47460.	
JUN 3	69.0	1120	678	46782.	
JUN 4	64.0	1130	685	43840.	
JUN 5	64.0	1130	685	43840.	
JUN 6	63.0	1130	685	43155.	
JUN 7	67.0	1130	685	45895.	
JUN 8	74.0	1100	665	49210.	
JUN 9	70.0	1120	678	47460.	
JUN 10	70.0	1130	685	47950.	
JUN 11	67.0	1130	685	45895.	
JUN 12	67.0	1130	685	45895.	
JUN 13	66.0	1130	685	45210.	
JUN 14	65.0	1130	685	44525.	
JUN 15	61.0	1140	692	42212.	
JUN 16	65.0	1140	692	44980.	
JUN 17	61.0	1130	685	41785.	
JUN 18	55.0	1150	698	38390.	
JUN 19	55.0	1140	692	38060.	
JUN 20	54.0	1130	685	36990.	
JUN 21	57.0	1120	678	38646.	
JUN 22	57.0	1140	692	39444.	
JUN 23	57.0	1120	678	38646.	
JUN 24	56.0	1120	678	37968.	
JUN 25	58.0	1140	692	40136.	
JUN 26	57.0	1140	692	39444.	
JUN 27	51.0	1150	698	35598.	
JUN 28	51.0	1160	705	35955.	
JUN 29	52.0	1160	705	36660.	
JUN 30	50.0	1160	705	35250.	
TOTAL		1846.		1265388.	
MONTHLY WEIGHTED T.D.S.			685		

B-12

TABLE B-2 (Continued)

BELOW PRADO DAM		TOUPS CORPORATION WEIGHTED T.D.S. CALCULATION SHEET			
		WATER YEAR 1976-1977	TDS=EC/(-0.000114(EC)+ 1.778537)		
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	50.0	1180	718	35900.	
JUL 2	46.0	1170	711	32706.	
JUL 3	43.0	1160	705	30315.	
JUL 4	42.0	1160	705	29610.	
JUL 5	41.0	1170	711	29151.	
JUL 6	39.0	1200	731	28509.	
JUL 7	41.0	1200	731	29971.	
JUL 8	40.0	1190	724	28960.	
JUL 9	41.0	1190	724	29684.	
JUL 10	40.0	1200	731	29240.	
JUL 11	42.0	1170	711	29862.	
JUL 12	44.0	1170	711	31284.	
JUL 13	45.0	1180	718	32310.	
JUL 14	46.0	1160	705	32430.	
JUL 15	48.0	1150	698	33504.	
JUL 16	48.0	1150	698	33504.	
JUL 17	44.0	1150	698	30712.	
JUL 18	38.0	1170	711	27018.	
JUL 19	41.0	1170	711	29151.	
JUL 20	42.0	1170	711	29862.	
JUL 21	40.0	1200	731	29240.	
JUL 22	41.0	1190	724	29684.	
JUL 23	42.0	1180	718	30156.	
JUL 24	44.0	1180	718	31592.	
JUL 25	42.0	1160	705	29610.	
JUL 26	40.0	1150	698	27920.	
JUL 27	36.0	1160	705	25380.	
JUL 28	44.0	1150	698	30712.	
JUL 29	45.0	1150	698	31410.	
JUL 30	44.0	1150	698	30712.	
JUL 31	45.0	1150	698	31410.	
TOTAL	1324.		711	941509.	
MONTHLY WEIGHTED T.D.S.					

B-13

TABLE B-2 (Continued)

BELOW PRADO DAM		TOUPS CORPORATION WEIGHTED T.D.S. CALCULATION SHEET		
		WATER YEAR 1976-1977	TDS=EC/(-0.000114(EC)+ 1.778537)	
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	41.0	1180	718	29438.
AUG 2	42.0	1160	705	29610.
AUG 3	40.0	1160	705	28200.
AUG 4	41.0	1170	711	29151.
AUG 5	36.0	1170	711	25596.
AUG 6	35.0	1170	711	24885.
AUG 7	36.0	1180	718	25848.
AUG 8	35.0	1180	718	25130.
AUG 9	36.0	1170	711	25596.
AUG 10	37.0	1170	711	26307.
AUG 11	40.0	1160	705	28200.
AUG 12	40.0	1160	705	28200.
AUG 13	38.0	1160	705	26790.
AUG 14	37.0	1160	705	26085.
AUG 15	31.0	1150	698	21638.
AUG 16	38.0	1120	678	25764.
AUG 17	112.0	1100	665	74480.
AUG 18	128.0	929	555	71040.
AUG 19	128.0	900	537	68736.
AUG 20	126.0	913	545	68670.
AUG 21	124.0	999	600	74400.
AUG 22	237.0	1070	646	153102.
AUG 23	127.0	1150	698	88646.
AUG 24	71.0	1140	692	49132.
AUG 25	71.0	1130	685	48635.
AUG 26	69.0	1140	692	47748.
AUG 27	68.0	1150	698	47464.
AUG 28	65.0	1130	685	44525.
AUG 29	63.0	1120	678	42714.
AUG 30	69.0	1090	659	45471.
AUG 31	71.0	1090	659	46789.
TOTAL	2132.		656	1397990.
MONTHLY WEIGHTED T.D.S.				

B-14

TABLE B-2 (Continued)

TOUPS CORPORATION
WEIGHTED T.D.S. CALCULATION SHEET

WATER Y EAR 1976-1977 TDS=EC/(-0.000114(EC)+ 1.778537)

BELOW PRADO DAM

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.
SFP 1	66.0	1120	678	44748.
SFP 2	61.0	1180	718	43798.
SFP 3	62.0	1170	711	44082.
SFP 4	66.0	1180	718	40208.
SFP 5	55.0	1170	711	36972.
SFP 6	51.0	1160	705	35955.
SFP 7	52.0	1160	705	36660.
SFP 8	52.0	1150	698	36296.
SFP 9	51.0	1160	705	35955.
SFP 10	47.0	1170	711	33417.
SFP 11	50.0	1170	711	35550.
SFP 12	50.0	1170	711	35550.
SFP 13	47.0	1180	718	33746.
SFP 14	49.0	1170	711	34839.
SFP 15	51.0	1160	705	35955.
SFP 16	53.0	1130	685	36305.
SFP 17	47.0	1150	698	32806.
SFP 18	48.0	1130	685	32806.
SFP 19	51.0	1090	659	33609.
SFP 20	48.0	1100	665	31920.
SFP 21	46.0	1150	698	32108.
SFP 22	47.0	1150	698	32806.
SFP 23	48.0	1140	692	3216.
SFP 24	50.0	1130	685	34250.
SFP 25	47.0	1140	692	32524.
SFP 26	49.0	1120	678	33222.
SFP 27	49.0	1150	685	34250.
SFP 28	50.0	1150	685	34250.
SFP 29	49.0	1150	685	34202.
SFP 30	51.0	1140	692	35292.
SFP 30	50.0	1150	698	34908.
TOTAL	1531.		698	1068021.
MONTHLY WEIGHTED T.D.S.				

TABLE B-3
 SUMMARY OF WEIGHTED TDS
 BELOW PRADO DAM
 WATER YEAR 1976-1977

	Monthly Flow cfs-day	Monthly Flow Times TDS	Monthly Weighted TDS
October	3,168	1,929,865	609
November	2,452	1,732,362	707
December	2,772	1,928,098	696
January	8,544	4,196,585	491
February	3,570	2,264,976	634
March	3,244	2,152,952	664
April	2,421	1,680,062	694
May	3,434	2,018,435	588
June	1,846	1,265,388	685
July	1,324	941,509	711
August	2,132	1,397,990	656
September	1,531	1,068,021	698
Total	36,438	22,576,243	
Yearly Weighted TDS			620

APPENDIX C

**WATER QUALITY—
STATE WATER RELEASED
AT OC-59**

1976-77

**PREPARED BY
JOHN M. TOUPS**

TABLE C-1
 SUMMARY OF WEIGHTED TDS
 OF NONTRIBUTARY WATER RELEASED
 FROM OC-59 FOR
 WATER YEAR 1976-1977

	Monthly Flow cfs-day	Monthly Flow Times TDS	Monthly Weighted TDS
October	586	136,449	233
November	-0-	-0-	-0-
December	-0-	-0-	-0-
January	3,073	933,290	304
February	586	186,730	319
March	-0-	-0-	-0-
April	-0-	-0-	-0-
May	-0-	-0-	-0-
June	-0-	-0-	-0-
July	-0-	-0-	-0-
August	-0-	-0-	-0-
September	-0-	-0-	-0-
Total	4,245	1,256,469	
Yearly Weighted TDS			296

APPENDIX D

WATER QUALITY – SANTA ANA
RIVER AT RIVERSIDE NARROWS

1976-77

PREPARED BY
DONALD L. HARRIGER

TABLE D-1

U.S.G.S. WATER QUALITY SAMPLES
SANTA ANA RIVER AT RIVERSIDE NARROWS
WATER YEAR 1976-77

<u>Date</u>	<u>E.C.</u> <u>@25° C</u>	<u>T.D.S.</u> <u>mg/l</u>
1976 October 1	1080	669
14	1080	703
29	1110	715
November 12	711	438
16	1110	705
December 1	1120	701
23	1100	697
1977 January 3	426	270
4	1010	634
18	1130	698
February 1	1100	690
17	1100	696
March 2	1120	683
15	1100	693
31	1070	668
April 1	1100	694
13	1110	699
May 3	1070	670
17	1110	708
June 2	1080	696
16	1090	689
July 1	1100	696
12	1090	698
August 2	1100	708
23	1110	702
September 1	1060	673
16	1120	736

Source: U.S.G.S.

TABLE D-2

WEIGHTED T.D.S. CALCULATION SHEET

RIVERSIDE NARROWS

WATER YEAR 1976-77

T.D.S. = 0.000005 (EC) + 1.588198

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. (mg/L.)	Adjusted T.D.S. Times Mean Daily Flow		
						U.S.G.S. Total Flow	Storm Flow	Base Flow
OCT 01	26.0	0.0	26.0	1110 (1)	702	18252.	0.	18252.
OCT 02	26.0	0.0	26.0	1110 (1)	702	18252.	0.	18252.
OCT 03	25.0	0.0	25.0	1110 (1)	702	17550.	0.	17550.
OCT 04	25.0	0.0	25.0	1110 (1)	702	17550.	0.	17550.
OCT 05	24.0	0.0	24.0	1110 (1)	702	16848.	0.	16848.
OCT 06	25.0	0.0	25.0	1110 (1)	702	17550.	0.	17550.
OCT 07	25.0	0.0	25.0	1110	702	17550.	0.	17550.
OCT 08	24.0	0.0	24.0	1110	702	16848.	0.	16848.
OCT 09	24.0	0.0	24.0	1110	702	16848.	0.	16848.
OCT 10	24.0	0.0	24.0	1120	708	16992.	0.	16992.
OCT 11	24.0	0.0	24.0	1110	702	16848.	0.	16848.
OCT 12	24.0	0.0	24.0	1100	695	16680.	0.	16680.
OCT 13	25.0	0.0	25.0	1090	689	17225.	0.	17225.
OCT 14	25.0	0.0	25.0	1090	689	17225.	0.	17225.
OCT 15	24.0	0.0	24.0	1110	702	16848.	0.	16848.
OCT 16	24.0	0.0	24.0	1120	708	16992.	0.	16992.
OCT 17	24.0	0.0	24.0	1120	708	16992.	0.	16992.
OCT 18	24.0	0.0	24.0	1110	702	16848.	0.	16848.
OCT 19	26.0	0.0	26.0	1090	689	17914.	0.	17914.
OCT 20	25.0	0.0	25.0	1100	695	17375.	0.	17375.
OCT 21	26.0	0.0	26.0	1080	683	17758.	0.	17758.
OCT 22	26.0	0.0	26.0	1100	695	18070.	0.	18070.
OCT 23	95.0	69.0	26.0	623	393 * 695	37335.	19265.	18070.
OCT 24	42.0	16.0	26.0	760	480 * 695	20160.	2090.	18070.
OCT 25	34.0	8.0	26.0	901	569 * 695	19346.	1276.	18070.
OCT 26	33.0	6.0	27.0	1050 (1)	664 * 695	21912.	3147.	18765.
OCT 27	29.0	2.0	27.0	1075 (1)	679 * 695	19691.	926.	18765.
OCT 28	27.0	0.0	27.0	1100 (1)	695	18765.	0.	18765.
OCT 29	27.0	0.0	27.0	1100 (1)	695	18765.	0.	18765.
OCT 30	25.0	0.0	25.0	1100 (1)	695	17375.	0.	17375.
OCT 31	27.0	0.0	27.0	1100 (1)	695	18765.	0.	18765.
	884.	191.	783.			573129.	26704.	546425

(1) MEAN DAILY E.C. ESTIMATED

* ADJUSTED BASE FLOW T.D.S. ESTIMATED

WEIGHTED T.D.S. CALCULATION SHEET

RIVERSIDE NARROWS

WATER YEAR 1976-77

T.D.S. = 0.000005 (EC) + 1.588198

Month-Day				Adjusted T.D.S. Times Mean Daily Flow				
	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. (mg/l)	U.S.G.S. Total Flow	Storm Flow	Base Flow
NOV 01	25.0	0.0	25.0	1080 (1)	683	17075.	0.	17075.
NOV 02	26.0	0.0	26.0	1080 (1)	683	17758.	0.	17758.
NOV 03	25.0	0.0	25.0	1080 (1)	683	17075.	0.	17075.
NOV 04	27.0	0.0	27.0	1080 (1)	683	18441.	0.	18441.
NOV 05	25.0	0.0	25.0	1080 (1)	683	17075.	0.	17075.
NOV 06	25.0	0.0	25.0	1090 (1)	689	17225.	0.	17225.
NOV 07	24.0	0.0	24.0	1090 (1)	689	16536.	0.	16536.
NOV 08	25.0	0.0	25.0	1090 (1)	689	17225.	0.	17225.
NOV 09	26.0	0.0	26.0	1090 (1)	689	17914.	0.	17914.
NOV 10	26.0	0.0	26.0	1090 (1)	689	17914.	0.	17914.
NOV 11	28.0	0.0	28.0	1090	689	19292.	0.	19292.
NOV 12	84.0	56.0	28.0	1090	689 *698	57876.	38332.0	19824.
NOV 13	34.0	6.0	28.0	1120	708 *698	24072.	4528.0	19824.
NOV 14	32.0	3.0	28.0	1120 (1)	708 *698	22656.	3112.0	19824.
NOV 15	29.0	0.0	29.0	1120 (1)	708	20532.	0.	20532.
NOV 16	29.0	0.0	29.0	1120	708	20532.	0.	20532.
NOV 17	27.0	0.0	27.0	1100	695	18765.	0.	18765.
NOV 18	25.0	0.0	25.0	1110	702	17550.	0.	17550.
NOV 19	26.0	0.0	26.0	1130	714	18564.	0.	18564.
NOV 20	24.0	0.0	24.0	1150	727	17448.	0.	17448.
NOV 21	24.0	0.0	24.0	1140	721	17304.	0.	17304.
NOV 22	26.0	0.0	26.0	1140	721	18746.	0.	18746.
NOV 23	27.0	0.0	27.0	1130	714	19278.	0.	19278.
NOV 24	27.0	0.0	27.0	1130	714	19278.	0.	19278.
NOV 25	27.0	0.0	27.0	1140	721	19467.	0.	19467.
NOV 26	28.0	0.0	28.0	1110	702	19656.	0.	19656.
NOV 27	28.0	0.0	28.0	1110	702	19656.	0.	19656.
NOV 28	27.0	0.0	27.0	1120	708	19116.	0.	19116.
NOV 29	29.0	0.0	29.0	1110	702	20358.	0.	20358.
NOV 30	28.0	0.0	28.0	1110	702	19656.	0.	19656.
	863.	65.	798.			604040.	45972.	558068.

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(1) MEAN DAILY E.C. ESTIMATED

* ADJUSTED BASEFLOW T.D.S. ESTIMATED

WEIGHTED T.D.S. CALCULATION SHEET

RIVERSIDE NARROWS

WATER YEAR 1976-77

T.D.S. = 0.000005 (EC) + 1.588198

Month-Day	Adjusted T.D.S. Times Mean Daily Flow							
	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. (mg/l)	U.S.G.S. Total Flow	Storm Flow	Base Flow
DEC 01	27.0	0.0	27.0	1130	714	19278.	0.	19278.
DEC 02	28.0	0.0	28.0	1130	714	19992.	0.	19992.
DEC 03	28.0	0.0	28.0	1140	721	20188.	0.	20188.
DEC 04	27.0	0.0	27.0	1140	721	19467.	0.	19467.
DEC 05	28.0	0.0	28.0	1130 (1)	714	19992.	0.	19992.
DEC 06	29.0	0.0	29.0	1130 (1)	714	20706.	0.	20706.
DEC 07	30.0	0.0	30.0	1130 (1)	714	21420.	0.	21420.
DEC 08	29.0	0.0	29.0	1130 (1)	714	20706.	0.	20706.
DEC 09	30.0	0.0	30.0	1130 (1)	714	21420.	0.	21420.
DEC 10	31.0	0.0	31.0	1130 (1)	714	22134.	0.	22134.
DEC 11	31.0	0.0	31.0	1130 (1)	714	22134.	0.	22134.
DEC 12	29.0	0.0	29.0	1130 (1)	714	20706.	0.	20706.
DEC 13	27.0	0.0	27.0	1130 (1)	714	19278.	0.	19278.
DEC 14	29.0	0.0	29.0	1130 (1)	714	20706.	0.	20706.
DEC 15	29.0	0.0	29.0	1130 (1)	714	20706.	0.	20706.
DEC 16	29.0	0.0	29.0	1130 (1)	714	20706.	0.	20706.
DEC 17	28.0	0.0	28.0	1130 (1)	714	19992.	0.	19992.
DEC 18	27.0	0.0	27.0	1130 (1)	714	19278.	0.	19278.
DEC 19	29.0	0.0	29.0	1130 (1)	714	20706.	0.	20706.
DEC 20	28.0	0.0	28.0	1130 (1)	714	19992.	0.	19992.
DEC 21	28.0	0.0	28.0	1130 (1)	714	19992.	0.	19992.
DEC 22	29.0	0.0	29.0	1130 (1)	714	20706.	0.	20706.
DEC 23	27.0	0.0	27.0	1130 (1)	714	19278.	0.	19278.
DEC 24	27.0	0.0	27.0	1130 (1)	714	19278.	0.	19278.
DEC 25	25.0	0.0	25.0	1130 (1)	714	17850.	0.	17850.
DEC 26	25.0	0.0	25.0	1130 (1)	714	17850.	0.	17850.
DEC 27	24.0	0.0	24.0	1130 (1)	714	17136.	0.	17136.
DEC 28	25.0	0.0	25.0	1130 (1)	714	17850.	0.	17850.
DEC 29	25.0	0.0	25.0	1130 (1)	714	17850.	0.	17850.
DEC 30	45.0	20.0	25.0	750 (1)	473 *708	21285.	3585.	17700.
DEC 31	50.0	24.0	26.0	700 (1)	442 *708	22100.	3692.	18408.
Σ	903.0	44.0	859.0			620682.	7277.	613405

(1) MEAN DAILY E.C. ESTIMATED

* ADJUSTED BASE FLOW T.D.S. ESTIMATED

WEIGHTED T.D.S. CALCULATION SHEET

RIVERSIDE NARROWS

WATER YEAR 1976-77

T.D.S. = 0.000005 (EC) + 1.588198

Month-Day							Adjusted T.D.S. Times Mean Daily Flow		
	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. (mg/l)	U.S.G.S. Total Flow	Storm Flow	Base Flow	
JAN 01	43.0	17.0	26.0	750 (1)	473 *708	20339.	1931.	18408.	
JAN 02	35.0	9.0	26.0	900 (1)	568 *708	19880.	1472.	18408.	
JAN 03	417.0	391.0	26.0	430 (1)	271 *708	113007.	94599.	18408.	
JAN 04	53.0	26.0	27.0	880 (1)	556 *708	29468.	10352.	19116.	
JAN 05	69.0	42.0	27.0	760 (1)	480 *708	33120.	14004.	19116.	
JAN 06	253.0	226.0	27.0	500 (1)	315 *708	79695.	60579.	19116.	
JAN 07	106.0	79.0	27.0	670 (1)	423 *708	44838.	25722.	19116.	
JAN 08	48.0	21.0	27.0	800 (1)	505 *708	24240.	2100.	19116.	
JAN 09	36.0	8.0	28.0	1000 (1)	632 *708	22752.	2928.	19824.	
JAN 10	35.0	7.0	28.0	1000 (1)	632 *708	22120.	2296.	19824.	
JAN 11	35.0	6.0	29.0	1000 (1)	632 *708	22120.	1588.	20532.	
JAN 12	32.0	3.0	29.0	1050 (1)	664 *708	21248.	716.	20532.	
JAN 13	29.0	0.0	29.0	1100 (1)	695	20155.	0.	20155.	
JAN 14	30.0	0.0	30.0	1120 (1)	708	21240.	0.	21240.	
JAN 15	29.0	0.0	29.0	1120 (1)	708	20532.	0.	20532.	
JAN 16	29.0	0.0	29.0	1120 (1)	708	20532.	0.	20532.	
JAN 17	29.0	0.0	29.0	1120 (1)	708	20532.	0.	20532.	
JAN 18	28.0	0.0	28.0	1120 (1)	708	19824.	0.	19824.	
JAN 19	29.0	0.0	29.0	1120 (1)	708	20532.	0.	20532.	
JAN 20	29.0	0.0	29.0	1120 (1)	708	20532.	0.	20532.	
JAN 21	31.0	0.0	31.0	1120 (1)	708	21948.	0.	21948.	
JAN 22	29.0	0.0	29.0	1120 (1)	708	20532.	0.	20532.	
JAN 23	29.0	0.0	29.0	1120 (1)	708	20532.	0.	20532.	
JAN 24	30.0	0.0	30.0	1120 (1)	708	21240.	0.	21240.	
JAN 25	29.0	0.0	29.0	1120 (1)	708	20532.	0.	20532.	
JAN 26	30.0	0.0	30.0	1120 (1)	708	21240.	0.	21240.	
JAN 27	31.0	0.0	31.0	1120 (1)	708	21948.	0.	21948.	
JAN 28	29.0	0.0	29.0	1120 (1)	708	20532.	0.	20532.	
JAN 29	29.0	0.0	29.0	1120 (1)	708	20532.	0.	20532.	
JAN 30	27.0	0.0	27.0	1120 (1)	708	19116.	0.	19116.	
JAN 31	26.0	0.0	26.0	1120 (1)	708	18408.	0.	18408.	
	1714.	835.	879.			843266.	218287.	624979.	

(1) MEAN DAILY E.C. ESTIMATED

* ADJUSTED BASE FLOW T.D.S. ESTIMATED

WEIGHTED T.D.S. CALCULATION SHEET

RIVERSIDE NARROWS

WATER YEAR 1976-77

T.D.S. = 0.000005 (EC) + 1.588198

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. (mg/l.)	Adjusted T.D.S. Times Mean Daily Flow		
						U.S.G.S. Total Flow	Storm Flow	Base Flow
FEB 01	27.0	0.0	27.0	1120 (1)	708	19116.	0.	19116.
FEB 02	26.0	0.0	26.0	1120 (1)	708	18408.	0.	18408.
FEB 03	27.0	0.0	27.0	1120 (1)	708	19116.	0.	19116.
FEB 04	28.0	0.0	28.0	1120 (1)	708	19824.	0.	19824.
FEB 05	30.0	0.0	30.0	1120 (1)	708	21240.	0.	21240.
FEB 06	31.0	0.0	31.0	1120 (1)	708	21948.	0.	21948.
FEB 07	31.0	0.0	31.0	1120 (1)	708	21948.	0.	21948.
FEB 08	27.0	0.0	27.0	1120 (1)	708	19116.	0.	19116.
FEB 09	26.0	0.0	26.0	1120 (1)	708	18408.	0.	18408.
FEB 10	26.0	0.0	26.0	1120 (1)	708	18408.	0.	18408.
FEB 11	24.0	0.0	24.0	1120 (1)	708	16992.	0.	16992.
FEB 12	24.0	0.0	24.0	1120 (1)	708	16992.	0.	16992.
FEB 13	25.0	0.0	25.0	1120 (1)	708	17700.	0.	17700.
FEB 14	24.0	0.0	24.0	1130	714	17136.	0.	17136.
FEB 15	26.0	0.0	26.0	1120	708	18408.	0.	18408.
FEB 16	25.0	0.0	25.0	1120	708	17700.	0.	17700.
FEB 17	27.0	0.0	27.0	1130	714	19278.	0.	19278.
FEB 18	25.0	0.0	25.0	1130	714	17850.	0.	17850.
FEB 19	25.0	0.0	25.0	1130	714	17850.	0.	17850.
FEB 20	26.0	0.0	26.0	1140	721	18746.	0.	18746.
FEB 21	25.0	0.0	25.0	1140	721	18025.	0.	18025.
FEB 22	26.0	0.0	26.0	1130 (1)	714	18564.	0.	18564.
FEB 23	27.0	0.0	27.0	1120 (1)	708	19116.	0.	19116.
FEB 24	91.0	64.0	27.0	766	484 *702	44044.	25090.	18954.
FEB 25	42.0	15.0	27.0	808	510 *702	21420.	2466.	18954.
FEB 26	32.0	5.0	27.0	888	561 *650	17952.	402.	17952.
FEB 27	27.0	0.0	27.0	1110	702	18954.	0.	18954.
FEB 28	25.0	0.0	25.0	1110	702	17550.	0.	17550.
	825.	84.	741.			551809.	27958.	523851.

(1) MEAN DAILY E.C. ESTIMATED

* ADJUSTED BASE FLOW T.D.S. ESTIMATED

WEIGHTED T.D.S. CALCULATION SHEET

RIVERSIDE NARROWS

WATER YEAR 1976-77

T.D.S. = 0.000005 (EC) + 1.588198

Month-Day	Adjusted T.D.S. Times Mean Daily Flow							
	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. (mg/l.)	U.S.G.S. Total Flow	Storm Flow	Base Flow
MAR 01	26.0	0.0	26.0	1110	702	18252.	0.	18252.
MAR 02	24.0	0.0	24.0	1120	708	16992.	0.	16992.
MAR 03	25.0	0.0	25.0	1120	708	17700.	0.	17700.
MAR 04	26.0	0.0	26.0	1110	702	18252.	0.	18252.
MAR 05	24.0	0.0	24.0	1090	689	16536.	0.	16536.
MAR 06	22.0	0.0	22.0	1110	702	15444.	0.	15444.
MAR 07	24.0	0.0	24.0	1120	708	16992.	0.	16992.
MAR 08	24.0	0.0	24.0	1120	708	16992.	0.	16992.
MAR 09	25.0	0.0	25.0	1100	695	17375.	0.	17375.
MAR 10	25.0	0.0	25.0	1110	702	17550.	0.	17550.
MAR 11	25.0	0.0	25.0	1120	708	17700.	0.	17700.
MAR 12	25.0	0.0	25.0	1120	708	17700.	0.	17700.
MAR 13	24.0	0.0	24.0	1110	702	16848.	0.	16848.
MAR 14	25.0	0.0	25.0	1110	702	17550.	0.	17550.
MAR 15	27.0	0.0	27.0	1110	702	18954.	0.	18954.
MAR 16	29.0	2.0	27.0	1010	638 *675	18502.	277.	18225.
MAR 17	32.0	5.0	27.0	960	606 *675	19392.	1167.	18225.
MAR 18	25.0	0.0	25.0	1110	702	17550.	0.	17550.
MAR 19	27.0	0.0	27.0	1110	702	18954.	0.	18954.
MAR 20	27.0	0.0	27.0	1110	702	18954.	0.	18954.
MAR 21	26.0	0.0	26.0	1110	702	18252.	0.	18252.
MAR 22	27.0	0.0	27.0	1100 (1)	695	18765.	0.	18765.
MAR 23	27.0	0.0	27.0	1090	689	18603.	0.	18603.
MAR 24	28.0	0.0	28.0	1080	683	19124.	0.	19124.
MAR 25	190.0	161.0	29.0	481	303 *685	57570.	37705.	57570.
MAR 26	41.0	12.0	29.0	983	621 *685	25461.	5596.	25461.
MAR 27	30.0	0.0	30.0	1090	689	20670.	0.	20670.
MAR 28	30.0	0.0	30.0	1100	695	20850.	0.	20850.
MAR 29	29.0	0.0	29.0	1100	695	20155.	0.	20155.
MAR 30	29.0	0.0	29.0	1080	683	19807.	0.	19807.
MAR 31	31.0	0.0	31.0	1050	664	20584.	0.	20584.
	999.	180.	819.			614030.	44745.	569285.

(1) MEAN DAILY E.C. ESTIMATED

* ADJUSTED BASE FLOW T.D.S. ESTIMATED

WEIGHTED T.D.S. CALCULATION SHEET

RIVERSIDE NARROWS

WATER YEAR 1976-77

T.D.S. = 0.000005 (EC) + 1.588198

Adjusted T.D.S. Times Mean Daily Flow

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. (mg/L)	U.S.G.S. Total Flow	Storm Flow	Base Flow
APR 01	30.0	0.0	30.0	1090	689	20670.	0.	20670.
APR 02	28.0	0.0	28.0	1100	695	19460.	0.	19460.
APR 03	29.0	0.0	29.0	1080	683	19807.	0.	19807.
APR 04	30.0	0.0	30.0	1080	683	20490.	0.	20490.
APR 05	33.0	0.0	33.0	1070	676	22308.	0.	22308.
APR 06	29.0	0.0	29.0	1100	695	20155.	0.	20155.
APR 07	28.0	0.0	28.0	1110	702	19656.	0.	19656.
APR 08	27.0	0.0	27.0	1110	702	18954.	0.	18954.
APR 09	27.0	0.0	27.0	1120	708	19116.	0.	19116.
APR 10	27.0	0.0	27.0	1120	708	19116.	0.	19116.
APR 11	27.0	0.0	27.0	1100	695	18765.	0.	18765.
APR 12	28.0	0.0	28.0	1090	689	19292.	0.	19292.
APR 13	28.0	0.0	28.0	1110	702	19656.	0.	19656.
APR 14	29.0	0.0	29.0	1090	689	19981.	0.	19981.
APR 15	29.0	0.0	29.0	1100	695	20155.	0.	20155.
APR 16	28.0	0.0	28.0	1110	702	19656.	0.	19656.
APR 17	27.0	0.0	27.0	1110	702	18954.	0.	18954.
APR 18	27.0	0.0	27.0	1110	702	18954.	0.	18954.
APR 19	28.0	0.0	28.0	1100	695	19460.	0.	19460.
APR 20	30.0	0.0	30.0	1100	695	20850.	0.	20850.
APR 21	27.0	0.0	27.0	1110	702	18954.	0.	18954.
APR 22	26.0	0.0	26.0	1110 (1)	702	18252.	0.	18252.
APR 23	26.0	0.0	26.0	1110 (1)	702	18252.	0.	18252.
APR 24	27.0	0.0	27.0	1110 (1)	702	18954.	0.	18954.
APR 25	30.0	0.0	30.0	1110 (1)	702	21060.	0.	21060.
APR 26	27.0	0.0	27.0	1110 (1)	702	18954.	0.	18954.
APR 27	27.0	0.0	27.0	1110 (1)	702	18954.	0.	18954.
APR 28	27.0	0.0	27.0	1110 (1)	702	18954.	0.	18954.
APR 29	28.0	0.0	28.0	1110	702	19656.	0.	19656.
APR 30	28.0	0.0	28.0	1090	689	19292.	0.	19292.
	842.	0.	842.			586737.	0.	586737.

(1) MEAN DAILY E.C. ESTIMATED

WEIGHTED T.D.S. CALCULATION SHEET

RIVERSIDE NARROWS

WATER YEAR 1976-77

T.D.S. = 0.000005 (EC) + 1.588198

Month-Day	U.S.G.S. Mean			U.S.G.S. Mean		Adjusted T.D.S. Times Mean Daily Flow		
	Daily Flow (cfs-day)	Storm Flow (cfs-day)	Base Flow (cfs-day)	Daily Specific Conductance (E.C.) (Micromhos)	Mean Daily Adjusted T.D.S. (mg/L)	U.S.G.S. Total Flow	Storm Flow	Base Flow
MAY 01	28.0	0.0	28.0	1110	702	19656.	0.	19656.
MAY 02	28.0	0.0	28.0	1100	695	19460.	0.	19460.
MAY 03	27.0	0.0	27.0	1090	689	18603.	0.	18603.
MAY 04	26.0	0.0	26.0	1090	689	17914.	0.	17914.
MAY 05	27.0	0.0	27.0	1080	683	18441.	0.	18441.
MAY 06	25.0	0.0	25.0	1100	695	17375.	0.	17375.
MAY 07	26.0	0.0	26.0	1100	695	18070.	0.	18070.
MAY 08	110.0	84.0	26.0	732	462 *702	50820.	32568.	18252.
MAY 09	504.0	477.0	27.0	363	229 *702	115416.	96462.	18954.
MAY 10	142.0	115.0	27.0	789	498 *702	70716.	51762.	18954.
MAY 11	50.0	23.0	27.0	1060	670 *702	33500.	14546.	18954.
MAY 12	35.0	7.0	28.0	1070	676 *702	23660.	4004.	19656.
MAY 13	33.0	5.0	28.0	1090	689 *702	22737.	3081.	19656.
MAY 14	31.0	3.0	28.0	1100	695 *702	21545.	1889.	19656.
MAY 15	30.0	1.0	29.0	1120	708 *702	21240.	882.	20358.
MAY 16	29.0	0.0	29.0	1120	708	20532.	0.	20532.
MAY 17	29.0	0.0	29.0	1120	708	20532.	0.	20532.
MAY 18	29.0	0.0	29.0	1110	702	20358.	0.	20358.
MAY 19	28.0	0.0	28.0	1100	695	19460.	0.	19460.
MAY 20	29.0	0.0	29.0	1110	702	20358.	0.	20358.
MAY 21	28.0	0.0	28.0	1100	695	19460.	0.	19460.
MAY 22	28.0	0.0	28.0	1100	695	19460.	0.	19460.
MAY 23	30.0	2.0	28.0	1060	670 * 683	20100.	976.	19124.
MAY 24	37.0	8.0	28.0	960	606 * 683	22422.	3298.	19124.
MAY 25	29.0	0.0	29.0	1070	676	19604.	0.	19604.
MAY 26	29.0	0.0	29.0	1070	676	19604.	0.	19604.
MAY 27	28.0	0.0	28.0	1080	683	19124.	0.	19124.
MAY 28	28.0	0.0	28.0	1080	683	19124.	0.	19124.
MAY 29	28.0	0.0	28.0	1080	683	19124.	0.	19124.
MAY 30	28.0	0.0	28.0	1080 (1)	683	19124.	0.	19124.
MAY 31	29.0	0.0	29.0	1080 (1)	683	19807.	0.	19807.
	1588.	725.	863.			807346.	209468.	597878.

(1) MEAN DAILY E.C. ESTIMATED

* ADJUSTED BASE FLOW T.D.S. ESTIMATED

WEIGHTED T.D.S. CALCULATION SHEET

RIVERSIDE NARROWS

WATER YEAR 1976-77

T.D.S. = 0.000005 (EC) + 1.588198

Month-Day	U.S.G.S. Mean			Adjusted T.D.S. Times Mean Daily Flow				
	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. (mg/L)	U.S.G.S. Total Flow	Storm Flow	Base Flow
JUN 01	29.0	0.0	29.0	1080 (1)	683	19807.	0.	19807.
JUN 02	27.0	0.0	27.0	1090	689	18603.	0.	18603.
JUN 03	25.0	0.0	25.0	1110	702	17550.	0.	17550.
JUN 04	25.0	0.0	25.0	1110	702	17550.	0.	17550.
JUN 05	25.0	0.0	25.0	1110 (1)	702	17550.	0.	17550.
JUN 06	25.0	0.0	25.0	1110 (1)	702	17550.	0.	17550.
JUN 07	25.0	0.0	25.0	1110 (1)	702	17550.	0.	17550.
JUN 08	26.0	0.0	26.0	1110 (1)	702	18252.	0.	18252.
JUN 09	26.0	0.0	26.0	1110 (1)	702	18252.	0.	18252.
JUN 10	25.0	0.0	25.0	1110 (1)	702	17550.	0.	17550.
JUN 11	24.0	0.0	24.0	1110 (1)	702	16848.	0.	16848.
JUN 12	24.0	0.0	24.0	1110 (1)	702	16848.	0.	16848.
JUN 13	24.0	0.0	24.0	1110 (1)	702	16848.	0.	16848.
JUN 14	25.0	0.0	25.0	1110 (1)	702	17550.	0.	17550.
JUN 15	26.0	0.0	26.0	1110 (1)	702	18252.	0.	18252.
JUN 16	32.0	0.0	32.0	1110 (1)	702	22464.	0.	22464.
JUN 17	37.0	0.0	37.0	1110 (1)	702	25974.	0.	25974.
JUN 18	35.0	0.0	35.0	1110 (1)	702	24570.	0.	24570.
JUN 19	34.0	0.0	34.0	1110 (1)	702	23868.	0.	23868.
JUN 20	32.0	0.0	32.0	1110 (1)	702	22464.	0.	22464.
JUN 21	32.0	0.0	32.0	1110 (1)	702	22464.	0.	22464.
JUN 22	29.0	0.0	29.0	1110	702	20358.	0.	20358.
JUN 23	29.0	0.0	29.0	1110	702	20358.	0.	20358.
JUN 24	29.0	0.0	29.0	1110	702	20358.	0.	20358.
JUN 25	27.0	0.0	27.0	1120	708	19116.	0.	19116.
JUN 26	27.0	0.0	27.0	1120	708	19116.	0.	19116.
JUN 27	27.0	0.0	27.0	1110	702	18954.	0.	18954.
JUN 28	25.0	0.0	25.0	1110	702	17550.	0.	17550.
JUN 29	25.0	0.0	25.0	1110	702	17550.	0.	17550.
JUN 30	28.0	0.0	28.0	1120	708	19824.	0.	19824.
D	829.	0.	829.			581548.	0.	581548.

D - 10

(1) MEAN DAILY E.C. ESTIMATED

WEIGHTED T.D.S. CALCULATION SHEET

WATER YEAR 1976-77

T.D.S. = 0.000005 (EC) + 1.588198

RIVERSIDE NARROWS

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. (mg/L)	U.S.G.S. Total Flow	Storm Flow	Base Flow
							Adjusted T.D.S. Times Mean Daily Flow		
JUL 01		22.0	0.0	22.0	1120	708	15576.	0.	15576.
JUL 02		23.0	0.0	23.0	1120	708	16284.	0.	16284.
JUL 03		24.0	0.0	24.0	1120	708	16992.	0.	16992.
JUL 04		24.0	0.0	24.0	1110	702	16848.	0.	16848.
JUL 05		24.0	0.0	24.0	1110	702	16848.	0.	16848.
JUL 06		24.0	0.0	24.0	1110	702	16848.	0.	16848.
JUL 07		23.0	0.0	23.0	1100	695	15985.	0.	15985.
JUL 08		25.0	0.0	25.0	1100	695	17375.	0.	17375.
JUL 09		22.0	0.0	22.0	1110	702	15444.	0.	15444.
JUL 10		27.0	0.0	27.0	1110	702	18954.	0.	18954.
JUL 11		25.0	0.0	25.0	1110	702	17550.	0.	17550.
JUL 12		25.0	0.0	25.0	1100	695	17375.	0.	17375.
JUL 13		25.0	0.0	25.0	1110	702	17550.	0.	17550.
JUL 14		25.0	0.0	25.0	1100	695	17375.	0.	17375.
JUL 15		25.0	0.0	25.0	1110	702	17550.	0.	17550.
JUL 16		24.0	0.0	24.0	1110	702	16848.	0.	16848.
JUL 17		24.0	0.0	24.0	1110	702	16848.	0.	16848.
JUL 18		23.0	0.0	23.0	1100	695	15985.	0.	15985.
JUL 19		21.0	0.0	21.0	1100	695	14595.	0.	14595.
JUL 20		20.0	0.0	20.0	1100	695	13900.	0.	13900.
JUL 21		24.0	0.0	24.0	1100	695	16680.	0.	16680.
JUL 22		24.0	0.0	24.0	1090	689	16536.	0.	16536.
JUL 23		24.0	0.0	24.0	1110	702	16848.	0.	16848.
JUL 24		24.0	0.0	24.0	1100	695	16680.	0.	16680.
JUL 25		26.0	0.0	26.0	1090	689	17914.	0.	17914.
JUL 26		28.0	0.0	28.0	1090	689	19292.	0.	19292.
JUL 27		27.0	0.0	27.0	1090	689	18603.	0.	18603.
JUL 28		27.0	0.0	27.0	1090	689	18603.	0.	18603.
JUL 29		29.0	0.0	29.0	1090	689	19981.	0.	19981.
JUL 30		29.0	0.0	29.0	1090	689	19981.	0.	19981.
JUL 31		27.0	0.0	27.0	1090	689	18603.	0.	18603.
		764.	0.	764.			532451.	0.	532451.

WEIGHTED T.D.S. CALCULATION SHEET

RIVERSIDE NARROWS

WATER YEAR 1976-77

T.D.S.= 0.000005 (EC) + 1.588198

Month-Day	U.S.G.S. Mean			U.S.G.S. Mean		Adjusted T.D.S. Times Mean Daily Flow		
	Daily Flow (cfs-day)	Storm Flow (cfs-day)	Base Flow (cfs-day)	Daily Specific Conductance (E.C.) (Micromhos)	Mean Daily Adjusted T.D.S. (mg/l.)	U.S.G.S. Total Flow	Storm Flow	Base Flow
AUG 01	29.0	0.0	29.0	1090	689	19981.	0.	19981
AUG 02	29.0	0.0	29.0	1100	695	20155.	0.	20155
AUG 03	29.0	0.0	29.0	1100	695	20155.	0.	20155
AUG 04	27.0	0.0	27.0	1110	702	18954.	0.	18954
AUG 05	27.0	0.0	27.0	1110	702	18954.	0.	18954
AUG 06	28.0	0.0	28.0	1110	702	19656.	0.	19656
AUG 07	29.0	0.0	29.0	1110	702	20358.	0.	20358
AUG 08	28.0	0.0	28.0	1110 (1)	702	19656.	0.	19656
AUG 09	30.0	0.0	30.0	1110 (1)	702	21060.	0.	21060
AUG 10	28.0	0.0	28.0	1110 (1)	702	19656.	0.	19656
AUG 11	30.0	0.0	30.0	1110 (1)	702	21060.	0.	21060
AUG 12	29.0	0.0	29.0	1110 (1)	702	20358.	0.	20358
AUG 13	29.0	0.0	29.0	1110 (1)	702	20358.	0.	20358
AUG 14	29.0	0.0	29.0	1110 (1)	702	20358.	0.	20358
AUG 15	30.0	0.0	30.0	1110 (1)	702	21060.	0.	21060
AUG 16	51.0	22.0	29.0	1060 (1)	670 *695	34170.	14015.	20155.
AUG 17	483.0	454.0	29.0	360 (1)	227 *695	109641.	89486.	20155.
AUG 18	159.0	131.0	28.0	790 (1)	499 *695	79341.	59881.	19460.
AUG 19	65.0	37.0	28.0	900 (1)	568 *695	36920.	17460.	19460.
AUG 20	46.0	18.0	28.0	1000 (1)	632 *695	29072.	9612.	19460.
AUG 21	37.0	10.0	27.0	1050 (1)	664 *695	24568.	5803.	18765.
AUG 22	32.0	5.0	27.0	1070 (1)	676 *695	21632.	2867.	18765.
AUG 23	28.0	2.0	26.0	1100 (1)	695 *695	19460.	1390.	18070.
AUG 24	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
AUG 25	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
AUG 26	25.0	0.0	25.0	1100 (1)	695	17375.	0.	17375.
AUG 27	25.0	0.0	25.0	1100 (1)	695	17375.	0.	17375.
AUG 28	25.0	0.0	25.0	1100 (1)	695	17375.	0.	17375.
AUG 29	25.0	0.0	25.0	1100 (1)	695	17375.	0.	17375.
AUG 30	29.0	0.0	29.0	1100 (1)	695	20155.	0.	20155.
AUG 31	31.0	0.0	31.0	1100 (1)	695	21545.	0.	21545.
	1544.	697.	865.			803923.	200514.	603409.

(1) MEAN DAILY E.C. ESTIMATED

* ADJUSTED BASE FLOW T.D.S. ESTIMATED

WEIGHTED T.D.S. CALCULATION SHEET

WATER YEAR 1976-77

T.D.S. = 0.000005 (EC) + 1.588198

RIVERSIDE NARROWS

Adjusted T.D.S. Times Mean Daily Flow

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. (mg/L)	U.S.G.S. Total Flow	Storm Flow	Base Flow
SEP 01	34.0	0.0	34.0	1100 (1)	695	23630.	0.	23630.
SEP 02	29.0	0.0	29.0	1100 (1)	695	20155.	0.	20155.
SEP 03	28.0	0.0	28.0	1100 (1)	695	19460.	0.	19460.
SEP 04	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
SEP 05	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
SEP 06	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
SEP 07	25.0	0.0	25.0	1100 (1)	695	17375.	0.	17375.
SEP 08	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
SEP 09	25.0	0.0	25.0	1100 (1)	695	17375.	0.	17375.
SEP 10	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
SEP 11	25.0	0.0	25.0	1100 (1)	695	17375.	0.	17375.
SEP 12	25.0	0.0	25.0	1100 (1)	695	17375.	0.	17375.
SEP 13	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
SEP 14	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
SEP 15	27.0	0.0	27.0	1100 (1)	695	18765.	0.	18765.
SEP 16	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
SEP 17	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
SEP 18	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
SEP 19	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
SEP 20	25.0	0.0	25.0	1100 (1)	695	17375.	0.	17375.
SEP 21	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
SEP 22	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
SEP 23	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
SEP 24	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
SEP 25	25.0	0.0	25.0	1100 (1)	695	17375.	0.	17375.
SEP 26	25.0	0.0	25.0	1100 (1)	695	17375.	0.	17375.
SEP 27	25.0	0.0	25.0	1100 (1)	695	17375.	0.	17375.
SEP 28	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
SEP 29	26.0	0.0	26.0	1100 (1)	695	18070.	0.	18070.
SEP 30	25.0	0.0	25.0	1100 (1)	695	17375.	0.	17375.
	785.	0.	785.			545575.	0.	545575.

(1) MEAN DAILY E.C. ESTIMATED

TABLE D-3

SUMMARY
OF
WATER QUALITY FOR THE SANTA ANA RIVER
AT
RIVERSIDE NARROWS
 Water Year 1976-77

Month	Mean Daily Flow			Monthly Weighted Average Adjusted T.D.S. (mg/l)	Mean Daily Flow Times Adjusted T.D.S.		
	U.S.G.S. Total Flow (cfs-days)	Storm Flow (cfs-day)	Base * Flow (cfs-days)		U.S.G.S. Total Flow	Storm Flow	Base * Flow
October	854	101	783	648	573,129	26,704	546,425
1976 November	863	65	798	700	604,040	45,972	558,068
December	903	44	859	687	620,682	7,277	613,405
January	1714	835	879	491	843,266	218,287	624,979
February	825	84	741	669	551,809	27,958	523,851
March	999	180	819	615	614,030	44,745	569,285
April	842	0	842	697	586,737	0	586,737
May	1588	725	863	508	807,346	209,468	597,878
1977 June	829	0	829	702	581,548	0	581,548
July	764	0	764	697	532,451	0	532,451
August	1544	679	865	521	803,923	200,514	603,409
September	785	0	785	695	545,575	0	545,575
TOTAL cfs	12,540	2,713	9,827	---	7,664,536	780,925	6,883,611
TOTAL a.f.	24,874	5,381	19,493	---	----	----	----

Weighted Average Annual (Base Flow*) T.D.S. = $\frac{6,883,611}{9827} = 700 \text{ mg/l}$

Weighted Average Annual (Storm Flow) T.D.S. = $\frac{780,925}{2,713} = 287 \text{ mg/l}$

Weighted Average Annual (Total Flow) T.D.S. = $\frac{7,664,536}{12,540} = 611 \text{ mg/l}$

* Including Nontributary water released from WR-23 and OC-2T in 1973.

APPENDIX E

**SANTA ANA RIVER WATERMASTER
FINANCIAL STATEMENTS WITH REPORT
ON
EXAMINATION BY CERTIFIED PUBLIC ACCOUNTANTS**

DIEHL, EVANS AND COMPANY

CERTIFIED PUBLIC ACCOUNTANTS

1910 NORTH BUSH STREET

SANTA ANA, CALIFORNIA 92706

(714) 542-4453

ELLIS C. DIEHL, C. P. A. (1925-1966)
BRYN B. EVANS, C. P. A.
WIN G. PETERS, C. P. A.
DONALD H. PETERSON, C. P. A.
DONALD E. CALLAMAN, C. P. A.
L. PETER SCHERER, C. P. A.
JOHN A. RAABERG, C. P. A.
JAMES M. GAISER, C. P. A.
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OTHER OFFICES AT:
705 EAST MAIN STREET
SANTA MARIA, CALIFORNIA
(805) 925-2579

2965 ROOSEVELT STREET
CARLSBAD, CALIFORNIA 92008
(714) 744-4411

July 18, 1977

ACCOUNTANTS' REPORT

**Santa Ana River Watermaster
Santa Ana, California**

We have examined the statement of assets and liabilities arising from cash transactions of the Santa Ana River Watermaster as of June 30, 1977 and the related statement of revenue collected and expenses paid and changes in fund balance for the year then ended. 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.

As described in Note 1, the Company's policy is to prepare its financial statements on the basis of cash receipts and disbursements; consequently, revenue and the related assets are recognized when received rather than when the obligation is incurred. Accordingly, the accompanying financial statements are not intended to present financial position and results of operations in conformity with generally accepted accounting principles.

In our opinion, the aforementioned financial statements present fairly the assets and liabilities arising from cash transactions of the Santa Ana River Watermaster at June 30, 1977, and the revenue collected and expenses paid for the year then ended, on the basis of accounting described in Note 1, which basis has been applied in a manner consistent with that of the preceding year.

Diehl, Evans and Company

SANTA ANA RIVER WATERMASTER
STATEMENT OF ASSETS AND LIABILITIES
ARISING FROM CASH TRANSACTIONS

ASSETS

Cash in checking account	\$ 500
Cash in savings account	<u>2,554</u>
TOTAL ASSETS	<u>\$ 3,054</u>

LIABILITIES AND FUND BALANCE

Liabilities	\$ -
Fund balance	<u>3,054</u>
TOTAL LIABILITIES AND FUND BALANCE	<u>\$ 3,054</u>

See accompanying accountants' report and notes to financial statements.

SANTA ANA RIVER WATERMASTER

STATEMENT OF REVENUE COLLECTED, EXPENSES PAID AND CHANGES IN FUND BALANCE

For the year ended June 30, 1977

	<u>Actual</u>	<u>Budget</u>	Over (Under) <u>Budget</u>
REVENUE COLLECTED:			
Water district contributions:			
Orange County Water District	\$ 4,000	\$ 4,000	\$ -
Chino Basin Municipal Water District	2,000	2,000	-
San Bernardino Valley Municipal Water District	2,000	2,000	-
Western Municipal Water District	2,000	2,000	-
Interest from savings account	<u>242</u>	<u>-</u>	<u>242</u>
TOTAL REVENUE COLLECTED	<u>10,242</u>	<u>10,000</u>	<u>242</u>
EXPENSES PAID:			
Professional engineering services	9,285	8,000	1,285
Administrative expenses:			
Office and secretarial expense	\$ 1,205		
Insurance	588		
Auditing services	<u>380</u>	4,000	(1,827)
Annual reports	<u>-</u>	<u>1,000</u>	<u>(1,000)</u>
TOTAL EXPENSES PAID	<u>11,458</u>	<u>13,000</u>	<u>(1,542)</u>
EXCESS OF EXPENSES PAID OVER REVENUE COLLECTED	(1,216)	<u>\$ (3,000)</u>	<u>\$ (1,784)</u>
FUND BALANCE AT JULY 1, 1976	<u>4,270</u>		
FUND BALANCE AT JUNE 30, 1977	<u><u>\$ 3,054</u></u>		

See accompanying accountants' report and notes to financial statements.

SANTA ANA RIVER WATERMASTER
NOTES TO FINANCIAL STATEMENTS

June 30, 1977

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:

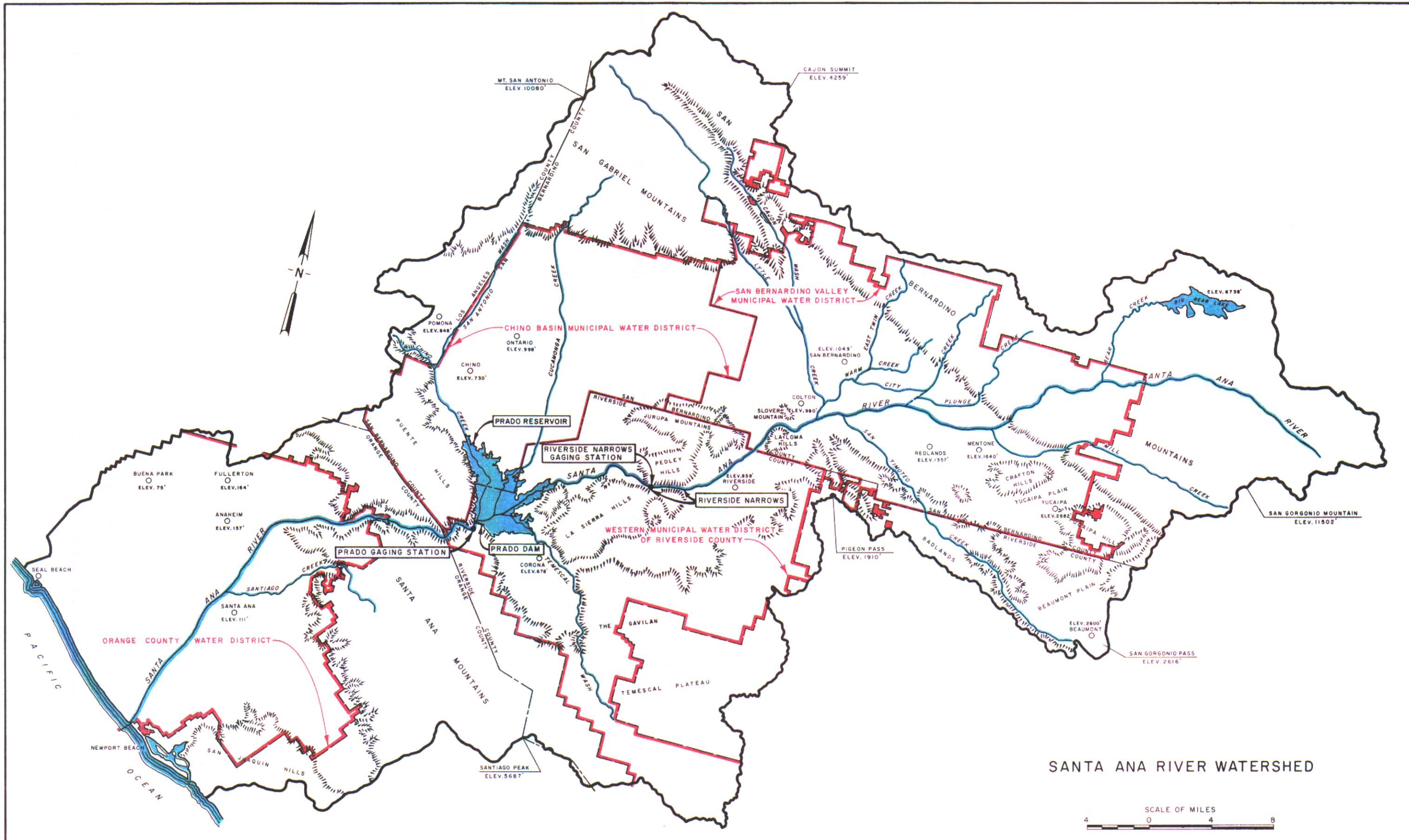
The Santa Ana River Watermaster is composed of a committee of five representatives of four water districts. Two representatives serve from Orange County Water District and one representative each serves from Chino Basin Municipal Water District, Western Municipal Water District and San Bernardino Valley 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	<u>20</u>
Total	<u>100%</u>

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

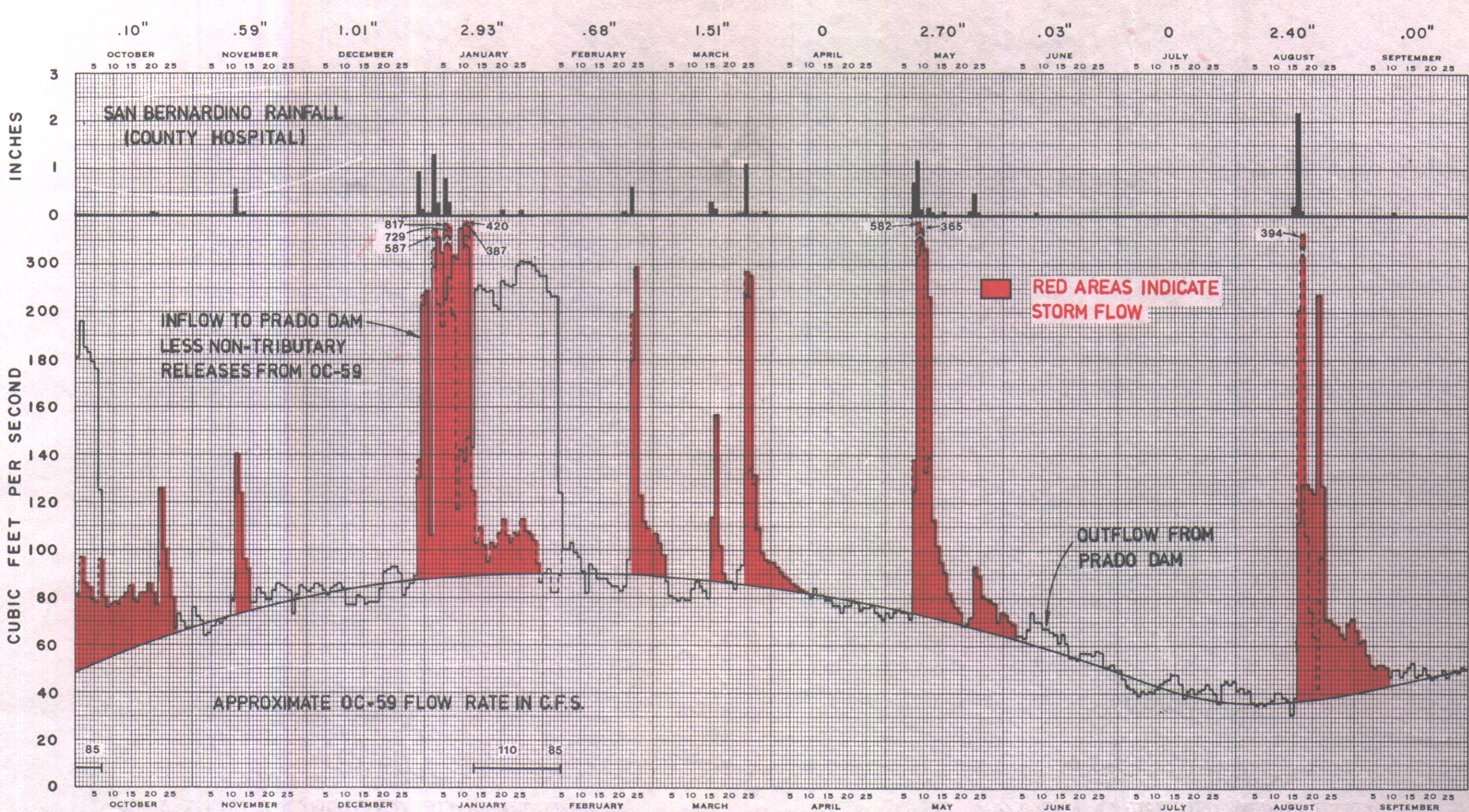
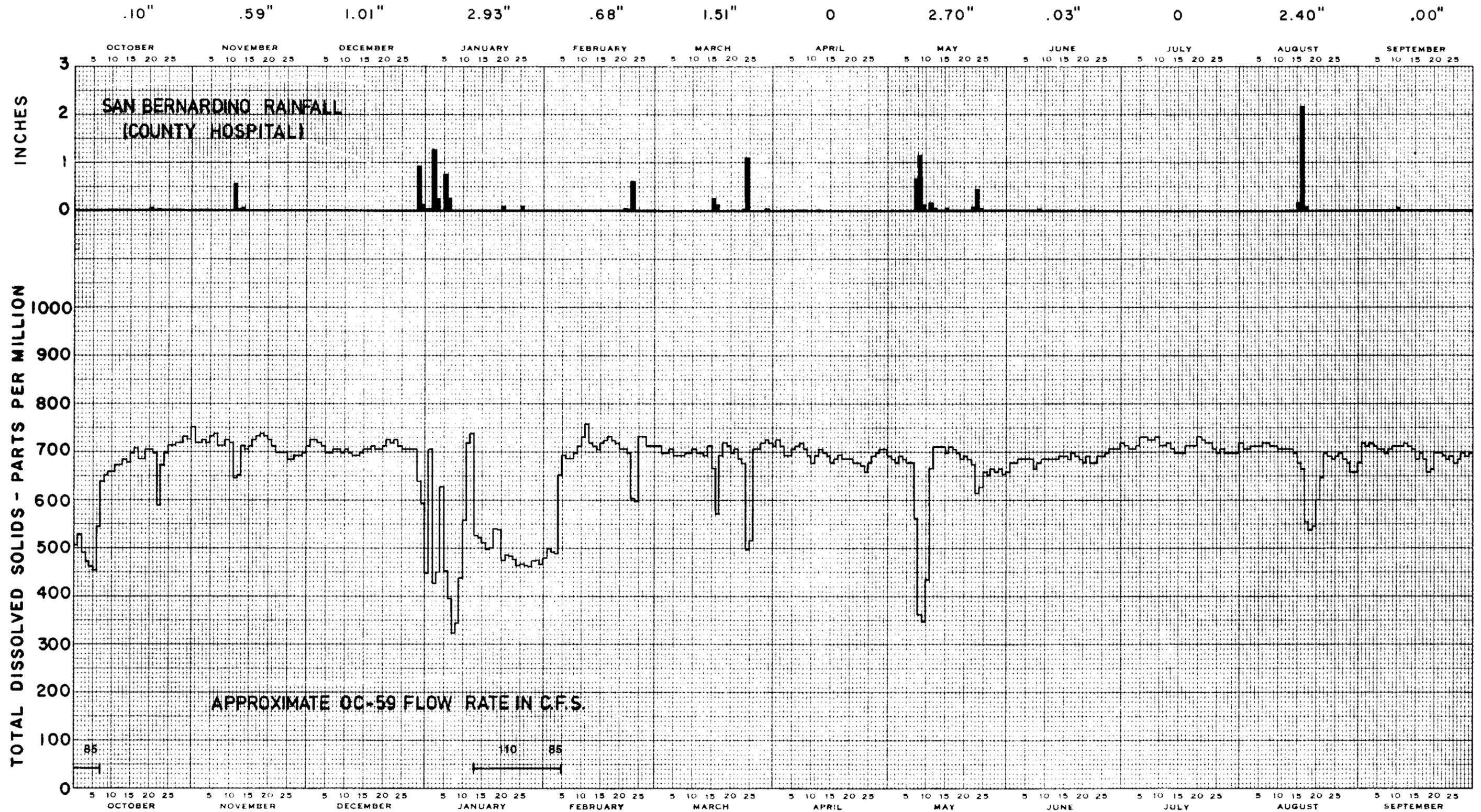


PLATE 2

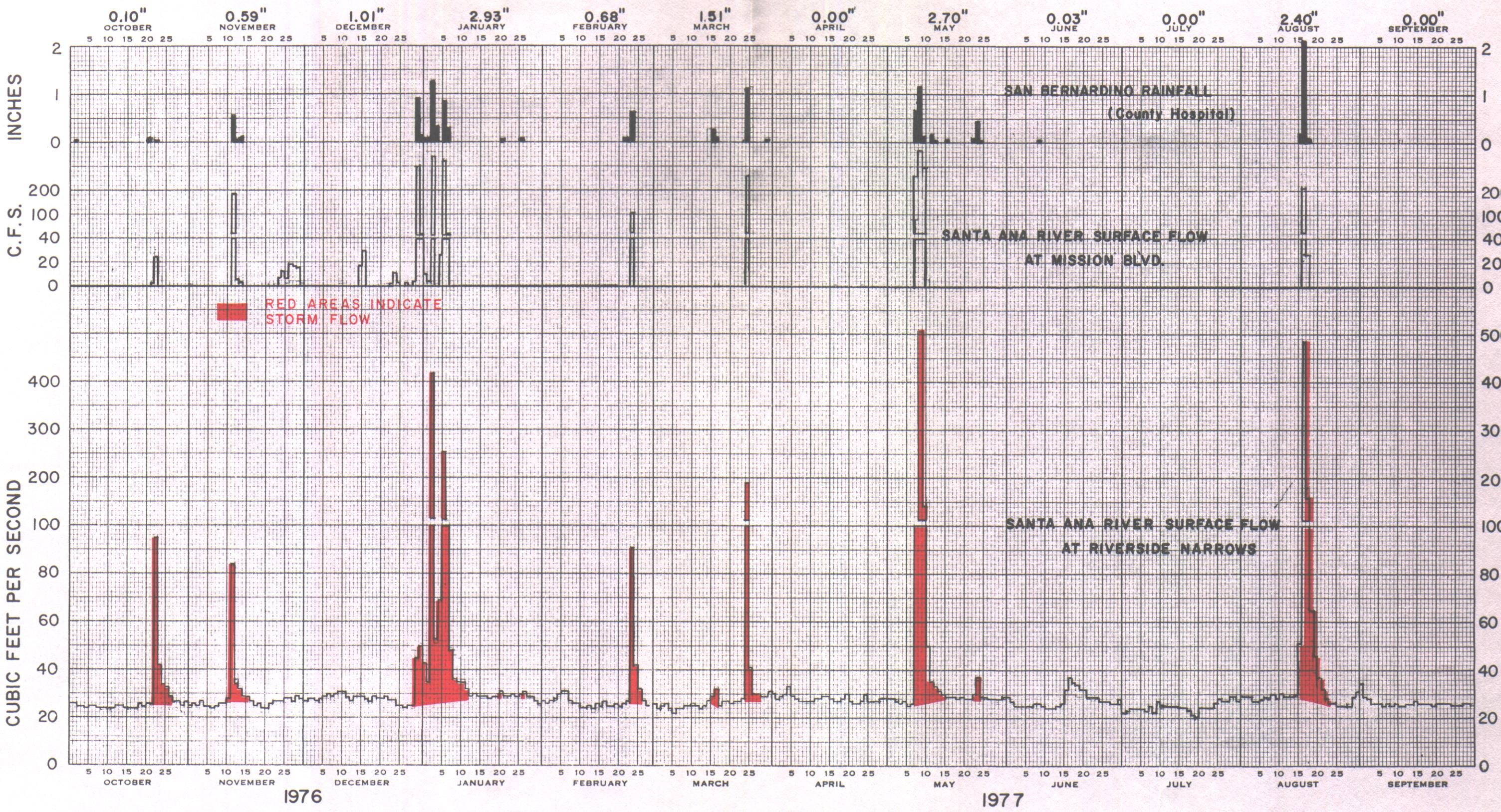
FLOW OF SANTA ANA RIVER BELOW PRADO DAM

WATER YEAR 1976-77

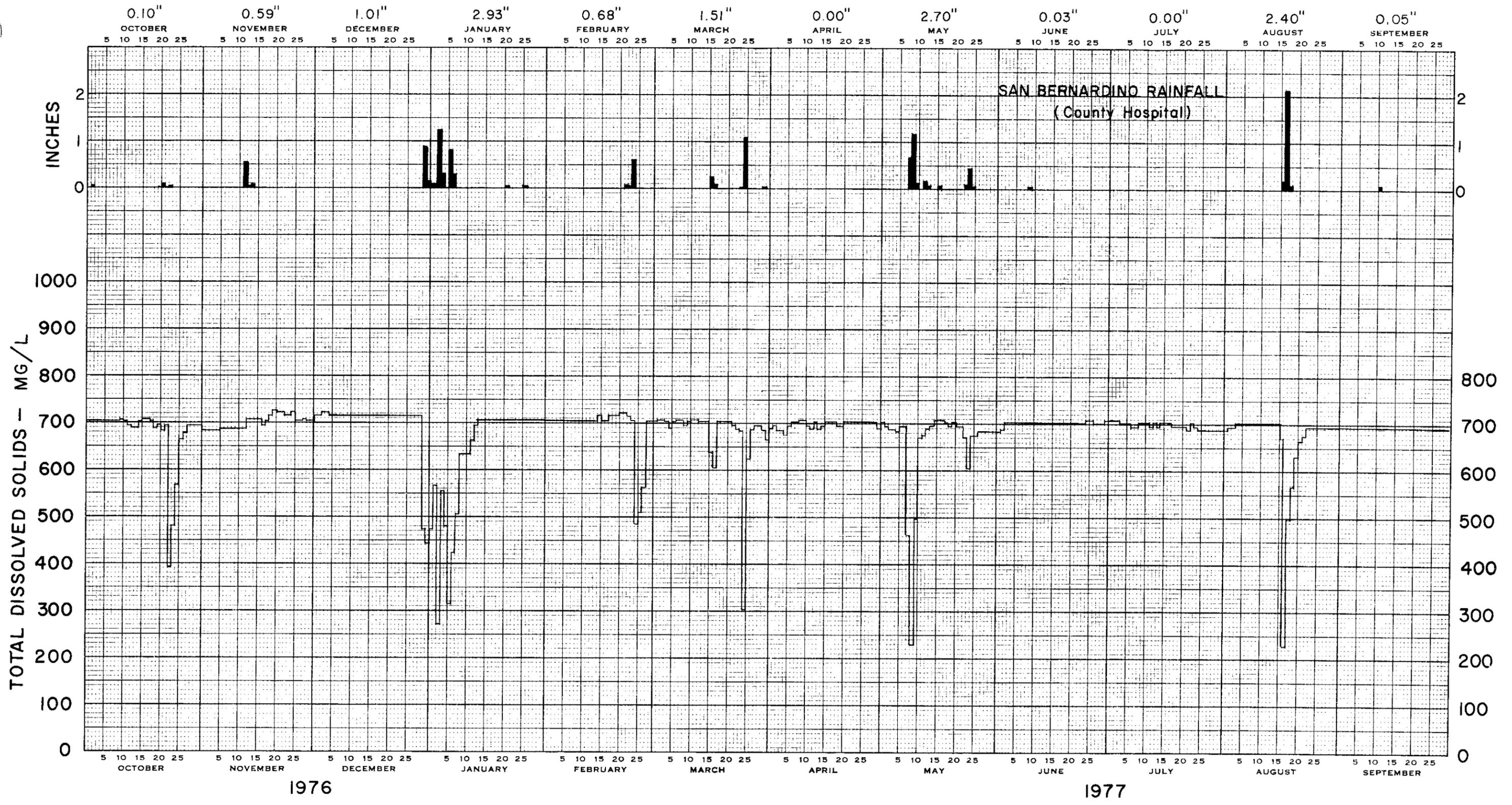


DISSOLVED SOLIDS IN SANTA ANA RIVER BELOW PRADO DAM

(11.95" total)



FLOW OF - SANTA ANA RIVER AT RIVERSIDE NARROWS



DISSOLVED SOLIDS IN THE SANTA ANA RIVER AT THE RIVERSIDE NARROWS