State of California

The Resources Agency

Memorandum

Date : February 28, 2001

To : Joe Karkoski
303(d) List Update Coordinator
Central Valley Region
California Regional Water Quality Control Board
3443 Routier Road, Suite A
Sacramento, California 95827-3003

R2-A

SWP

From : **Department of Water Resources**

Subject : Solicitation of Water Quality Information

In response to the February 21, 2001 "Public Solicitation of Water Quality Information", I am sending you two copies each of *Department of Water Resources Water Quality Assessment of the State Water Project, 1996-1997* and *Department of Water Resources Water Quality Assessment of the State Water Project, 1998-1999*.

If after review of these publications, you would like additional information or raw data, please contact me or your staff may contact Chris Erickson at (916) 653-1154.

Larry Joyce

Larry Joyce, Chief
Water Quality Section
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(916) 653-7213

Gene,
Please record in tracking sheet.
Put one copy aside for us and one copy for State Bd.
Joe

California Department of Water Resources
Division of Operations and Maintenance
Water Quality Section

R2-b

Water Quality Assessment of the State Water Project, 1996-97

September 1999

Gray Davis
Governor
State of California

Mary D. Nichols
Secretary for Resources
The Resources Agency

Thomas M. Hannigan
Director
Department of Water Resources

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Acronyms and Abbreviations

af	acre-feet
Ag	silver
Al	aluminum
As	arsenic
B	boron
Ba	barium
Br	bromide
Ca	calcium
Cd	cadmium
cfs	cubic feet per second
Cl	chloride
CO_3	carbonate
Cr	chromium
Cu	copper
CVP	Central Valley Project
DHS	Department of Health Services
DMC	Delta-Mendota Canal
DOC	dissolved organic carbon
DWR	Department of Water Resources
EC	electrical conductivity
EPA	Environmental Protection Agency
F	fluoride
Fe	iron
Hg	mercury
K	potassium
MCL	maximum contaminant level
MFL	million fibers per liter
mg/L	milligrams per liter
Mg	magnesium
Mn	manganese
mp	milepost
MTBE	methyl-tertiary-butyl ether
n	number
N	nitogren
Na	sodium
NH_4	ammonia
NO_2	nitrite
NO_3	nitrate
NTU	nephelometric turbidity unit
P	phosphorus
Pb	lead
pH	negative log of the hydrogen ion activity
PO_4	phosphate
Se	selenium
SLC	San Luis Canal
SO_4	sulfate
SRI	Sacramento River Index
SWP	State Water Project
TDS	total dissolved solids
TOC	total organic carbon
TSS	total suspended solids
THM	trihalomethane
TTHMFP	total trihalomethane formation potential
USBR	United States Bureau of Reclamation
μg/L	micrograms per liter
μmole/L	micromoles per liter
μS/cm	microseimens per centimeter
WQT	water quality threshold
Zn	Zinc

I. Executive Summary

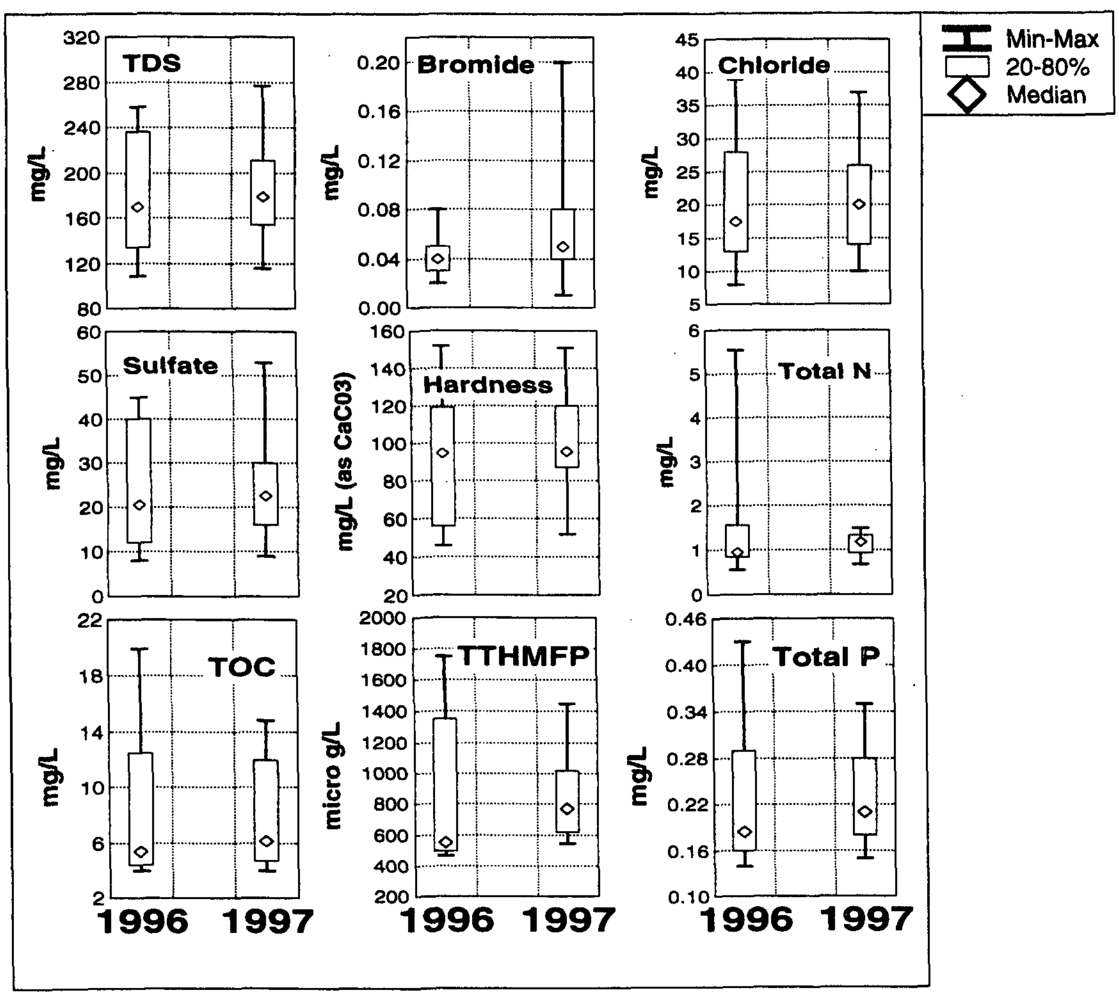
Water quality in the State Water Project was affected by several specific events during 1996-97. Above-normal runoff contributed to higher levels of organic carbon and trihalomethane formation potential in the California Aqueduct during 1996. Runoff also produced increases in organic carbon, turbidity, dissolved metals, and nutrients by up to two orders of magnitude in the North Bay Aqueduct. Alternately, saltwater intrusion in the Delta produced a fourfold increase in bromide in the California Aqueduct toward the end of 1997. Another source of salinity was year-round inflows to Pyramid Lake from Piru Creek that contributed substantially to West Branch salt loads. The Executive Summary discusses these and other trends with respect to important drinking water parameters such as salts, organic carbon, and nutrients.

Annual and Seasonal Trends

North Bay Aqueduct

In the North Bay Aqueduct at Barker Slough Pumping Plant, TOC, TTHMFP, and nutrients were more variable in 1996, while bromide varied greatest in 1997 (Figure 1-1). Most parameters were highest during the rainy season of both years. During 1996, TOC ranged between 3 to 5 mg/L during the summer, but increased to 20 mg/L during a December storm event. Winter increases were also observed

Figure 1-1
Annual Water Quality Summary in the North Bay Aqueduct, Barker Slough Pumping Plant



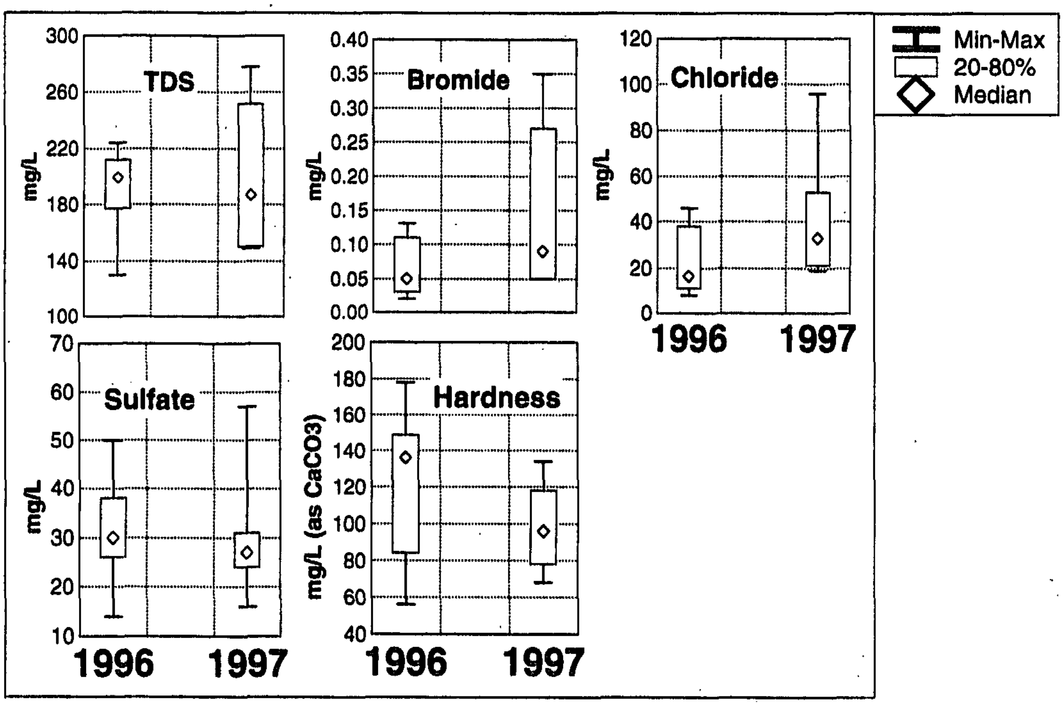
for TTHMFP, total phosphorus, and total nitrogen. Concentration increases were related to rainfall runoff in the upstream watershed.

Parameters such as sulfate, chloride, and hardness were highest during the spring months of both 1996 and 1997. A similar trend was observed for bromide when concentrations increased through winter, peaked in April or May, then declined towards the end of summer. The higher spring concentrations were likely due to increased groundwater accretion from the upstream watershed. One sample collected in October 1997 contained bromide at 0.2 mg/L—more than twice the level in all other samples. Such an increase might indicate salinity intrusion, but a corresponding rise in TDS did not occur.

South Bay Aqueduct

In the South Bay Aqueduct at Santa Clara Terminal Tank, TDS, bromide, and chloride were highest in 1997 (Figure 1-2). The higher 1997 levels occurred during the last few months of the year when salinity intrusion in the Delta affected salt concentrations throughout the Project. Conversely, hardness was higher in 1996 than 1997 and coincided with releases from Del Valle Reservoir. Monitoring for nutrients, TTHMFP, and TOC began in 1997 at Check 7 on the South Bay Aqueduct, and all were routinely detected above their reporting limits.

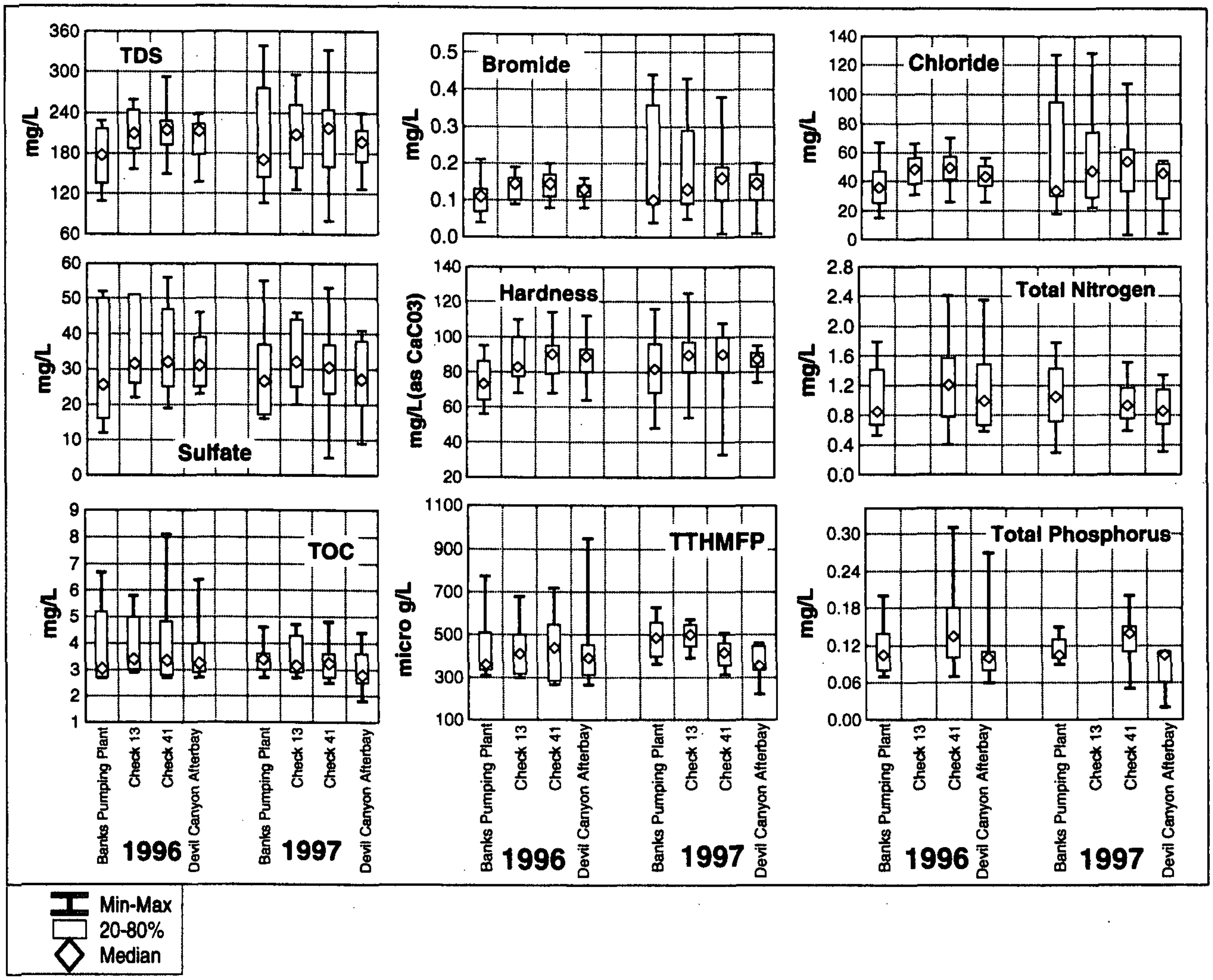
Figure 1-2
Annual Water Quality Summary in the South Bay Aqueduct, Santa Clara Terminal Tank



California Aqueduct

Chloride, bromide, and TDS were more variable in 1997 than 1996 at most Aqueduct stations (Figure 1-3) and this variability was the result of two distinct events. First, salt levels increased toward the end of 1997 due to salinity intrusion in the Delta. At Banks Pumping Plant, TDS exceeded 250 mg/L and

Figure 1-3
Annual Water Quality Summary in the California Aqueduct

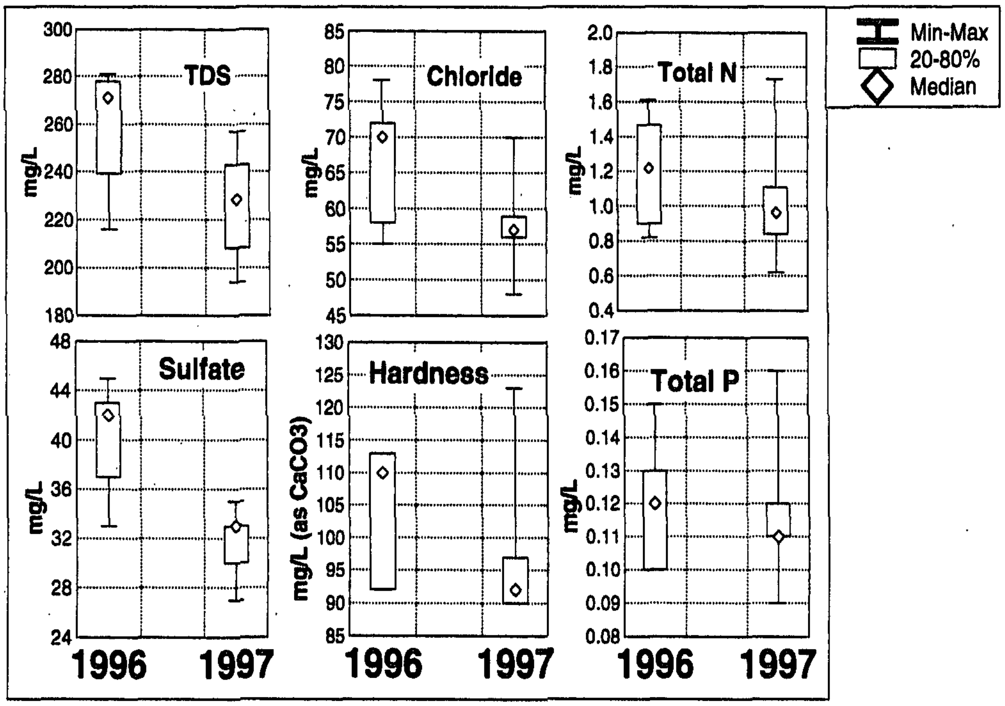


bromide exceeded 0.3 mg/L from October to December 1997. Conversely, Kern River inflows lowered TDS and other salt-related parameters at stations south of Check 29 during January and February 1997. TOC at all Aqueduct stations was higher in 1996 when concentrations ranged from 2.7 to 8.1 mg/L, compared to 1.8 to 4.8 mg/L in 1997. During both years, the highest levels were usually measured in winter when rainfall runoff from the Central Valley was greatest. An unusually high TOC value of 8.1 mg/L was detected at Check 41 in July 1996, but there was no corresponding increase in TTHMFP. No non-Project inflows were reported for that month. Both compounds were elevated at Devil Canyon Afterbay during February 1996, possibly from upstream floodwater inflows to the San Luis Canal. The following February at the same station, TOC and TTHMFP dropped to the lowest levels measured in the Project during the 2-year period. Kern River inflows and local runoff contributed to this decline. Monthly total nitrogen and phosphorus trends were similar to those for TOC and TTHMFP during 1996 but not 1997.

San Luis Reservoir

Median annual TDS in San Luis Reservoir declined from 271 mg/L in 1996 to 228 mg/L in 1997 (Figure 1-4). A similar reduction was observed for chloride, sulfate, and hardness. Monthly salt concentrations remained relatively constant in 1996 until October when they began declining. This decline was related to reservoir filling (from Delta pumping) that started in September and continued into 1997. Reservoir salinity has been steadily decreasing since 1993—the end of the 1987-92 drought. Median total nitrogen and phosphorus levels were also higher in 1996 than 1997, but the highest concentrations were detected in the fall of 1997.

Figure 1-4
Annual Water Quality Summary in San Luis Reservoir



Pyramid Lake

Average TDS, sulfate, and hardness levels in Pyramid Lake declined between 1996 and 1997 (Table 1-1). Concentration declines were greatest in 1996 while monthly levels in 1997 remained relatively constant. Piru Creek was responsible for the higher 1996 levels due to extremely high inflows the previous year that accounted for about 35 percent of all inputs to the lake. Chloride did not exhibit the same trends, because Piru Creek contains very little chloride compared to Project inflows. The highest levels of total nitrogen and phosphorus were measured in 1996, but seasonal trends were not consistent.

Table 1-1
Annual Water Quality Summary in Pyramid Lake

	1996				1997			
Parameter, mg/L	Mean	Low	High	# of Samples	Mean	Low	High	# of Samples
Total Dissolved Solids	277	233	339	4	236	232	240	4
Sulfate	74	55	107	4	51	45	57	4
Hardness (as CaCO3)	127	112	160	4	109	100	115	4
Chloride	46	43	49	4	46	42	52	4
Total Nitrogen	1.0	0.5	2.4	11	0.8	0.7	1.0	12
Total Phosphorus	0.09	0.05	0.27	12	0.07	0.01	0.09	12

Castaic Lake

TDS, sulfate, and hardness levels in Castaic Lake declined between 1996 and 1997 (Table 1-2), and the decline occurred steadily throughout the 2-year period. TOC and TTHMFP levels were similar between years, although peak TOC levels occurred in May of each year while TTHMFP peaked in August 1996 and May 1997. Annual summaries of total nitrogen and phosphorus were similar between years, while seasonal trends were not.

Table 1-2
Annual Water Quality Summary in Castaic Lake

	1996				1997			
Parameter, mg/L	Mean	Low	High	# of Samples	Mean	Low	High	# of Samples
Total Dissolved Solids	378	331	406	4	308	279	325	4
Sulfate	121	102	129	4	89	78	98	4
Hardness (as CaCO3)	181	161	192	4	150	138	161	4
Chloride	52	50	54	4	45	43	48	4
Total Nitrogen	0.6	0.4	0.7	11	0.6	0.4	0.8	12
Total Phosphorus	0.04	0.02	0.07	11	0.03	0.02	0.06	12
Total Organic Carbon	4.6	3.4	5.7	4	4.0	2.9	5.8	4
Total Trihalomethane FP *	398	321	464	4	405	360	454	4

Special Investigations

Non-Project Inflows

Floodwater Inflows to the San Luis Canal. Floodwater inflows to the SLC were relatively minor in 1996 (341 acre-feet) and 1997 (2,136 af), compared to the 26,000 af discharged in 1995. Eighty-four percent of the 1996 inflows and 60 percent of the 1997 inflows originated from Cantua Creek. Floodwaters were greatest during January 1997, but water quality impacts to the Aqueduct downstream were minimized by deliveries made from the SLC. During this month, federal contractors took 74 percent of the water entering the SLC from both Project and floodwater sources. Further, Aqueduct flows were limited during the same month because of Kern River inflows.

Kern River Intertie. In January and February 1997, 52,858 af of water was admitted to the California Aqueduct from the Kern River Intertie to relieve flooding east of the Aqueduct. Soon after inflows began, conductivity at Check 29 dropped from 387 µS/cm to between 80 and 100 µS/cm and remained at those levels for the duration of inflow—about 55 days. Similar trends were observed 62 miles downstream at Check 41.

Turbidity in the Aqueduct at Check 29 increased from 9 to 22 NTU the day after inflows began and remained between 20 and 70 NTU throughout the event. Turbidity at Check 41—62 miles downstream—did not change much as a result of Kern River inflows.

Pyramid Lake. Piru Creek inflows to Pyramid Lake totaled 19,352 af in 1996 and 19,496 af in 1997, amounting to about 5 percent of all inflows. In comparison, Piru Creek composed 35 percent of all inflows during 1995. These inflows had a major influence on the mineralogy of Pyramid Lake due to the creek's naturally high salt levels.

The mineral composition of Piru Creek is unique in that it contains an average concentration of chloride that is nine times lower than Project levels while sulfate averages eight times higher. This difference in water types is reflected in Pyramid Lake, which, on average, contained an equal amount of chloride and sulfate in its anionic makeup during 1996-97, as opposed to Project water in which chloride was the dominant anion. The cationic composition was also altered from creek inflows.

Piru Creek accounted for about 12 percent of the total TDS load to Pyramid Lake during 1996-97 and 58 percent during 1995 (1995 was included to assess a high rainfall season). Contributions of individual minerals varied from less than 1 percent for chloride to about 28 percent for sulfate during 1996-97; in 1995, these values were 7 and 74 percent, respectively. Nitrogen and phosphorus loads from Piru Creek ranged from 1 to 3 percent during 1996-97 and from 15 to 31 percent in 1995.

Silverwood Lake. Local watershed inflows to Silverwood Lake totaled 11,714 af in 1996 and 8,980 af in 1997, amounting to about 2 percent of all inflows. Most inflows originate from Miller and Cleghorn creeks that, combined, drain about 60 square miles of watershed surrounding the lake. Salinity in both creeks is usually lower than Project water. Water quality changes from these streams were only apparent when Project inflows were low or non-existent. One such event occurred from November 1996 to February 1997, when local inflows increased and Project inflows decreased for 4 consecutive months. As a result, TDS in the lake and at Devil Canyon Afterbay declined by more than 50 mg/L. Miller and Cleghorn creeks contributed less than 2 percent of the TDS loads to Silverwood Lake in 1996-97 and 15 percent during 1995.

Effects of Dredging on San Luis Canal Water Quality

Dredging was conducted in the California Aqueduct during 1996 to remove sediment deposited by floodwater inflows the previous season. Sediment was dredged using a low-profile cutter head that suctioned material onto land west of the levee. Several locations between mileposts 157 and 163 were dredged. Extensive monitoring determined that no substantial changes in Aqueduct water quality occurred during the operation.

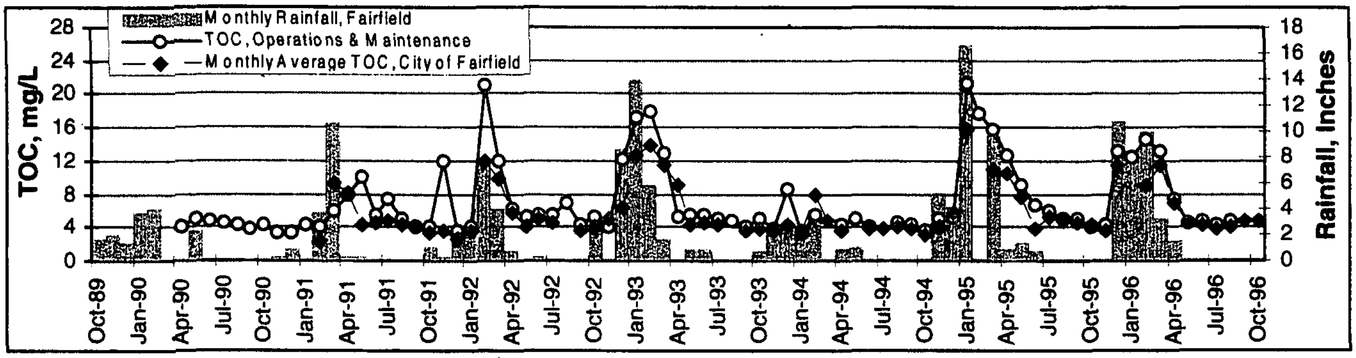
Oil Release in the California Aqueduct

On August 9, 1997, a small portion of California Aqueduct liner slumped into the water at milepost 62 when the Aqueduct was shut down for repairs upstream. On startup, oil was observed in the Aqueduct and flows were stopped until it could be contained. Absorbent booms were deployed downstream and monitoring for hydrocarbons began on a daily basis. Benzene, toluene, xylene, and ethylbenzene were detected in the Aqueduct for 6 days at various locations and all but one sample contained levels below the State MCLs. The oil was residual leftover from a 1984 pipeline leak at an Aqueduct crossing. Soil was excavated and a physical barrier was installed to intercept any further movement of groundwater toward the Aqueduct. Groundwater in the area continues to be treated by granular activated carbon.

Water Quality Assessment of the North Bay Aqueduct

Water treatment plants on the North Bay Aqueduct periodically experience surges of organic carbon in their raw water. Background TOC concentrations at Barker Slough Pumping Plant range between 3 and 5 mg/L during the summer months but can increase to over 20 mg/L during the rainy season. These surges coincide with rainfall events that produce runoff in the upstream watershed (Figure 1-5). Parameters such as total and fecal coliforms, dissolved ammonia, and organic nitrogen also increase during these events. During extremely wet seasons, rainfall lowers the pH in Barker Slough, increasing the levels of dissolved metals such as iron and manganese.

Figure 1-5
Rainfall and Total Organic Carbon at Barker Slough Pumping Plant, 1989-96



II. Introduction

Objectives

The Water Quality Section and five field divisions of the Division of Operations and Maintenance are responsible for overseeing and monitoring water quality in the State Water Project. Objectives of this monitoring are to:

(1) assess the influence of hydrological conditions and water operations on Project water quality,
(2) document long-term changes in Project water quality,
(3) provide Project contractors with water quality data to assess water treatment plant operational needs,
(4) identify, monitor, and respond to water quality emergencies and determine impacts to the Project,
(5) assess the relative quality of Project water by comparing concentration data to Article 19 Objectives or Department of Health Services Drinking Water Standards, and
(6) address water quality issues of particular concern.

Monitoring data from 1996-97 was assessed in this report to meet the above objectives. Prior water quality reports include DWR 1993, DWR 1995, and DWR 1997.

Monitoring Strategy

Water quality samples are routinely collected at 29 stations throughout the Project (Table A-1, Appendix A). Stations are distributed over a distance of more than 500 miles, from the upper Feather River watershed in Plumas County to Lake Perris in Riverside County (Figure A-1, Plates 1 to 5). Monitoring is conducted in the Feather River watershed, North Bay Aqueduct, South Bay Aqueduct, Coastal Branch, California Aqueduct—including its four terminus lakes—and the Central Valley Project's Delta-Mendota Canal.

Grab samples are collected by staff from the Oroville, Delta, San Luis, San Joaquin, and Southern field divisions on a monthly, quarterly, or as needed schedule. Subsurface samples are collected from a depth of between 1 to 9 feet at both channel and lake stations. Samples are transported to the Department's Bryte Chemical Laboratory within 24 hours of collection. Laboratory analyses have included inorganic and organic parameters such as major minerals, metals, and pesticides (Table A-1). Further details of field and lab methods can be found in Appendix A, Methods.

Automated water quality monitoring stations measure conventional parameters such as conductivity, temperature, or turbidity at 20 locations throughout the Project (Table A-2, Figure A-1, and Plates 1 to 5). Data are logged on an hourly basis and uploaded to O&M's Water Quality Homepage at http://wwwomwq.water.ca.gov. Data are also used to define hourly or daily water quality trends.

III. Annual and Seasonal Trends

This chapter describes annual and seasonal water quality trends in the State Water Project during 1996-97. Annual summaries for each monitoring station are presented in box and whisker plots or tables. Box and whisker plots show the median, 20th to 80th percentile range, minimums/maximums, and values one-and-a-half times outside the range of 20 to 80 percent. The latter values usually highlighted specific water quality events that were detailed in Special Investigations (Chapter IV).

Water quality parameters are presented in the following order: conventional parameters (e.g., pH, hardness) and major minerals, minor elements, nutrients, and organics (e.g., organic carbon, pesticides).

Standards and Objectives

Primary Drinking Water Standards, or Maximum Contaminant Levels, are the maximum permissible levels in a public drinking water supply. These standards must be met in finished drinking water (potable water) to protect human health. Since raw water in the Project is not required to meet MCL standards, comparisons are made with Project data to provide a relative indication of concentration.

Secondary Drinking Water Standards are consumer acceptance standards designed to protect taste, odor, color, and other aesthetic aspects of drinking water that do not present a health risk. Similar to Primary MCLs, they are used for comparison purposes only. Primary and Secondary MCLs are presented in Appendix B.

Article 19 objectives are included as standard provisions in the Department's water supply contracts. They require the collection and analysis of water quality samples in the Project and the compilation of records. Article 19(a) states:

> "It shall be the objective of the State and the State shall take all reasonable measures to make available, at all delivery structures for the delivery of Project water to the District, Project water of such quality that the following constituents do not exceed the concentrations stated."

These objectives are listed along with MCLs in Appendix B.

Conventional Parameters and Major Minerals

Conventional parameters include conductivity, hardness, lab pH, suspended solids, suspended volatile solids, field temperature, total dissolved solids (TDS), and turbidity. Major minerals include the cations calcium magnesium, potassium, and sodium, and the anions bicarbonate (alkalinity), chloride, nitrate, and sulfate.

Existing MCLs and Article 19 objectives for conventional parameters and major minerals are listed in Appendix B, Table B-1.

Feather River Watershed

All data from Project stations in the Feather River watershed during 1996-97 were below the Article 19 objectives or MCLs for finished drinking (Table 3-1). TDS ranged from 66 to 79 mg/L in Antelope and Frenchman lakes and from 40 to 59 mg/L in Lake Davis and Thermalito Afterbay. Calcium, magnesium, potassium, and sodium were 10 mg/L or less at all stations. Bicarbonate dominated the anionic composition while chloride, nitrate, and sulfate levels were near or below their respective reporting limits at all stations.

Table 3-1
Conventional Parameters and Major Minerals in the Feather River Watershed, 1996-97

Parameter	Station Name	I.D. #	1996 Median	1996 Low	1996 High	1996 # of Samples	1997 Median	1997 Low	1997 High	1997 # of Samples
Conductivity	Antelope Lake	AN001000	66			1	78			1
(Specific Conductance)	Frenchman Lake	FR001000	99			1	100			1
µS/cm	Lake Davis	LD001000	63			1	61			1
	Thermalito Afterbay	TA001000	75	71	80	11	73	60	81	12
Hardness	Antelope Lake	AN001000	26			1	28			1
mg/L as CaCO3	Frenchman Lake	FR001000	42			1	42			1
	Lake Davis	LD001000	23			1	23			1
	Thermalito Afterbay	TA001000	30	28	32	12	32	23	32	12
pH, Lab	Antelope Lake	AN001000	6.8			1	6.7			1
	Frenchman Lake	FR001000	7.0			1	6.8			1
	Lake Davis	LD001000	6.7			1	6.6			1
	Thermalito Afterbay	TA001000	6.8	6.7	7.1	11	6.7	6.6	7.8	12
Suspended Solids	Thermalito Forebay	TF001000	2			1				
mg/L	Thermalito Afterbay	TA001000	2	2	2	2	15	8	28	2
Suspended Volatile Solids	Thermalito Forebay	TF001000	1			1				
mg/L	Thermalito Afterbay	TA001000	2	1	2	3	2	2	3	3
Temperature	Antelope Lake	AN001000	12.4				18.0			1
Degrees C	Frenchman Lake	FR001000	11.8			1	17.0			1
	Lake Davis	LD001000	13.0			1	18.0	16.0	21.0	5
	Thermalito Forebay	TF001000	10.6	11.1	13.9	3	14.4	8.9	14.6	4
	Thermalito Afterbay	TA001000	12.8	8.9	18.9	12	13.9	7.2	18.9	8
Total Dissolved Solids	Antelope Lake	AN001000	69			1	68			1
mg/L	Frenchman Lake	FR001000	79			1	66			1
	Lake Davis	LD001000	54			1	47			1
	Thermalito Afterbay	TA001000	54	45	58	11	49	40	59	12
Turbidity, NTU	Thermalito Afterbay	TA001000	2	2	4	5	12	7	54	10
Calcium	Antelope Lake	AN001000	7			1	8			1
mg/L	Frenchman Lake	FR001000	10			1	10			1
	Lake Davis	LD001000	6			1	6			1
	Thermalito Afterbay	TA001000	7	6	8	11	7	6	8	12
Magnesium	Antelope Lake	AN001000	2			1	2			1
mg/L	Frenchman Lake	FR001000	4			1	4			1
	Lake Davis	LD001000	2			1	2			1
	Thermalito Afterbay	TA001000	3	3	3	11	3	2	3	12
Potassium	Antelope Lake	AN001000	1.2			1	1.6			1
mg/L	Frenchman Lake	FR001000	1.4			1	1.2			1
	Lake Davis	LD001000	1.1			1	1.0			1
Sodium	Antelope Lake	AN001000	4			1	4			1
mg/L	Frenchman Lake	FR001000	5			1	5			1
	Lake Davis	LD001000	3			1	3			1
	Thermalito Afterbay	TA001000	3	2	4	11	3	2	3	12
Bicarbonate	Antelope Lake	AN001000	32			1	44			1
(Alkalinity)	Frenchman Lake	FR001000	48			1	54			1
mg/L as CaCO3	Lake Davis	LD001000	30			1	33			1
	Thermalito Afterbay	TA001000	36	30	41	11	34	27	38	12
Chloride	Antelope Lake	AN001000	<1			1	1			1
mg/L	Frenchman Lake	FR001000	<1			1	1			1
	Lake Davis	LD001000	<1			1	1			1
	Thermalito Afterbay	TA001000	1	<1	2	11	1	1	1	12
Nitrate	Antelope Lake	AN001000	<0.1			1	<0.1			1
mg/L as NO3	Frenchman Lake	FR001000	<0.1			1	<0.1			1
	Lake Davis	LD001000	<0.1			1	<0.1			1
	Thermalito Afterbay	TA001000	<0.1	<0.1	0.2	11	<0.1	<0.1	0.2	12
Sulfate	Antelope Lake	AN001000	2			1	1			1
mg/L	Frenchman Lake	FR001000	2			1	1			1
	Lake Davis	LD001000	2			1	<1			1
	Thermalito Afterbay	TA001000	2	1	2	11	2	<1	2	12

North Bay and South Bay Aqueducts

On the North Bay Aqueduct at Barker Slough Pumping Plant and Cordelia Forebay, all data were below the MCLs for finished drinking water or applicable Article 19 objectives (Figures 3-1 and 3-2). Several parameters were highest during the winter, when Barker Slough Pumping Plant receives rainfall runoff from the upstream watershed. These seasonal events caused certain parameters to exceed background levels: turbidity, suspended solids, and nitrate in 1996, and pH and turbidity in 1997 (Figures 3-1 and 3-2). Figure 3-3 shows turbidity at Barker Slough Pumping Plant during 1997 was highest during January and February. An extremely low pH of 4.5 was measured in March 1997, but did not correspond with elevated levels of dissolved iron and manganese (see Minor Elements Section). Since a pH of this magnitude would usually be associated with elevated dissolved metal concentrations, the low measurement may have been field or laboratory error. Although it is not uncommon for pH at Barker Slough to decline when heavy rainfall overwhelms the buffering capacity of the watershed, pH at this station has never been measured below 6. Water quality issues in Barker Slough are detailed in Special Investigations (Chapter IV).

Sulfate, chloride, and hardness increased at Barker Slough Pumping Plant during the spring months of both 1996 and 1997 (Figure 3-4). This trend would suggest groundwater influence from the upstream watershed since accretion into Barker Slough would be greatest after the rainy season. Coastal range sediments are known for their calcareous deposits containing calcium and magnesium.

On the South Bay Aqueduct, sampling is performed at Check 7, the Santa Clara Terminal Tank, Lake Del Valle, and the release point for Lake Del Valle. With the exception of one sample on the South Bay Aqueduct, all data were below the applicable Article 19 objectives or MCLs for finished drinking water (Figures 3-1 and 3-2). One sample collected at Check 7 on the South Bay Aqueduct contained chloride at 131 mg/L and was above the Monthly Average Article 19 Objective of 110 mg/L. The sample was collected at the end of 1997, when salinity intrusion in the Delta affected mineral levels throughout most of the Project (Figures 3-3 and 3-4).

TDS ranged from 145 to 349 mg/L at Check 7 during 1997 (the only period of sampling) and from 130 to 278 mg/L at the Santa Clara Terminal Tank during 1996-97 (Figure 3-1). Bicarbonate and hardness levels in Del Valle Reservoir and reservoir release samples were consistently higher than those at Check 7 or the Santa Clara Terminal Tank (Figures 3-1 and 3-2). The reverse was true for chloride and sodium. Releases from the reservoir coincided with increases in hardness and decreases in chloride at the Terminal Tank during February to March and September to December, 1996 (Figure 3-4).

Figure 3-1
Conventional Parameters in the North Bay and South Bay Aqueducts, 1996-97

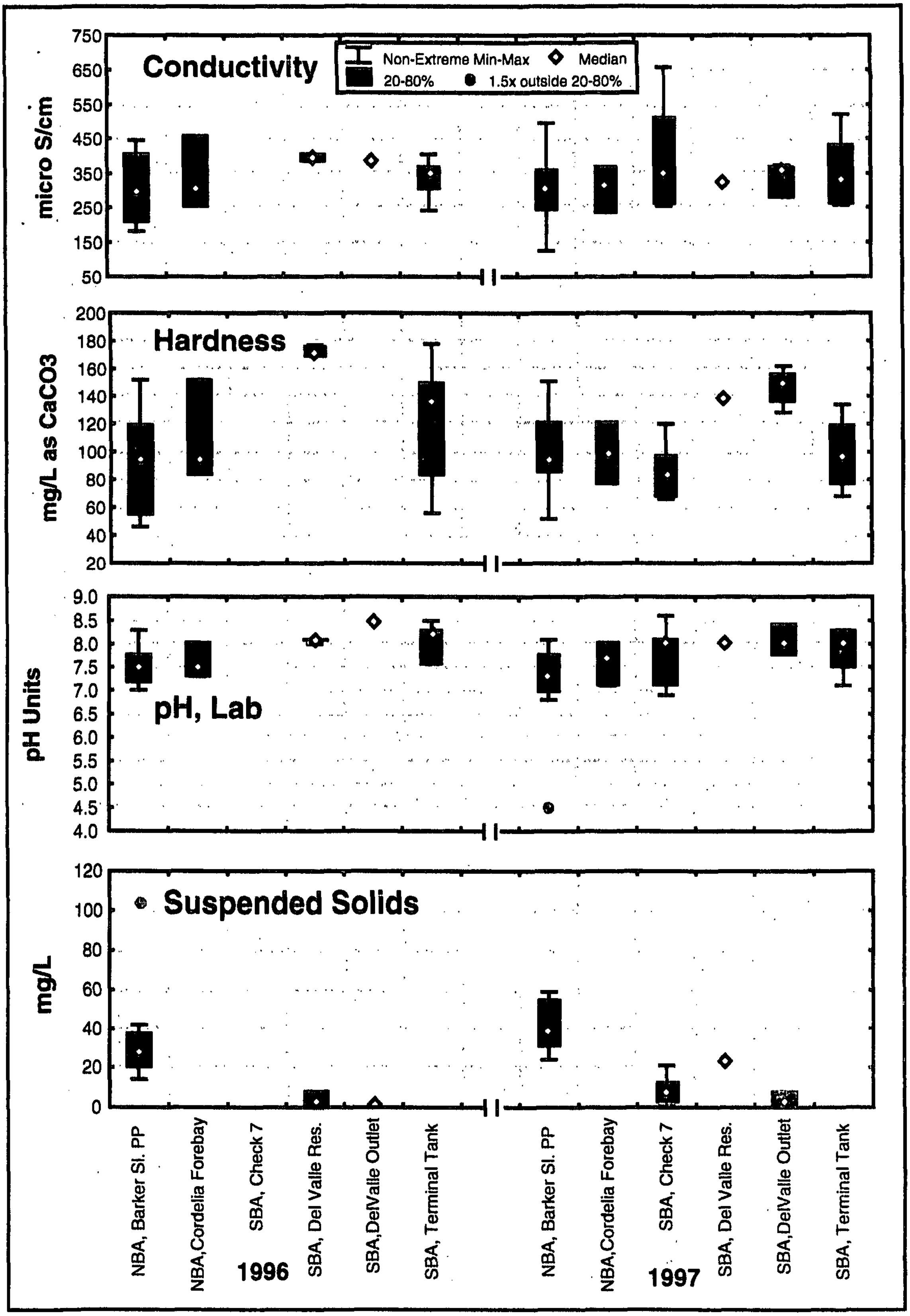


Figure 3-1 (Con't)
Conventional Parameters in the North Bay and South Bay Aqueducts, 1996-97

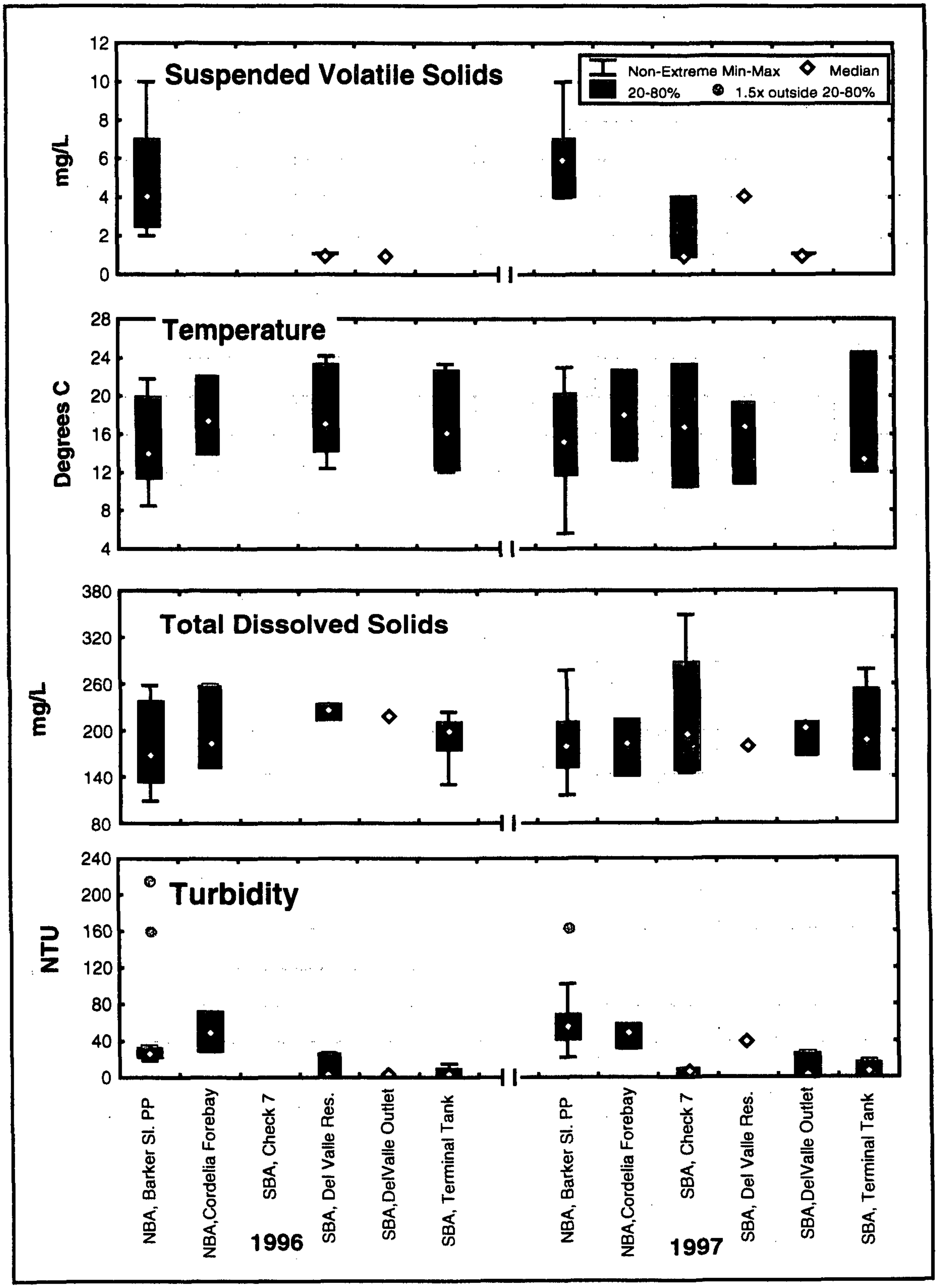


Figure 3-2
Major Minerals in the North Bay and South Bay Aqueducts, 1996-97

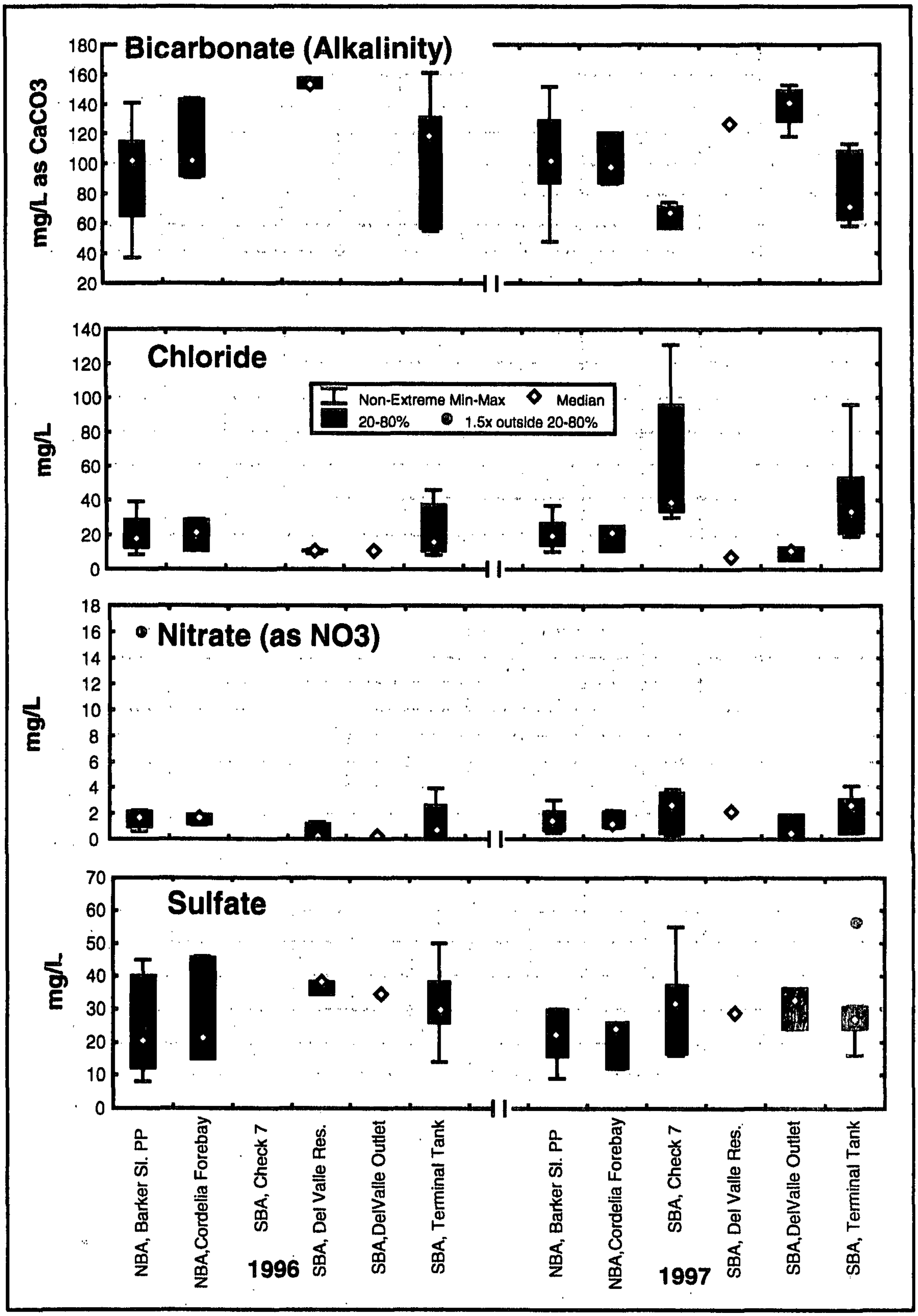


Figure 3-2 (Con't)
Major Minerals in the North Bay and South Bay Aqueducts, 1996-97

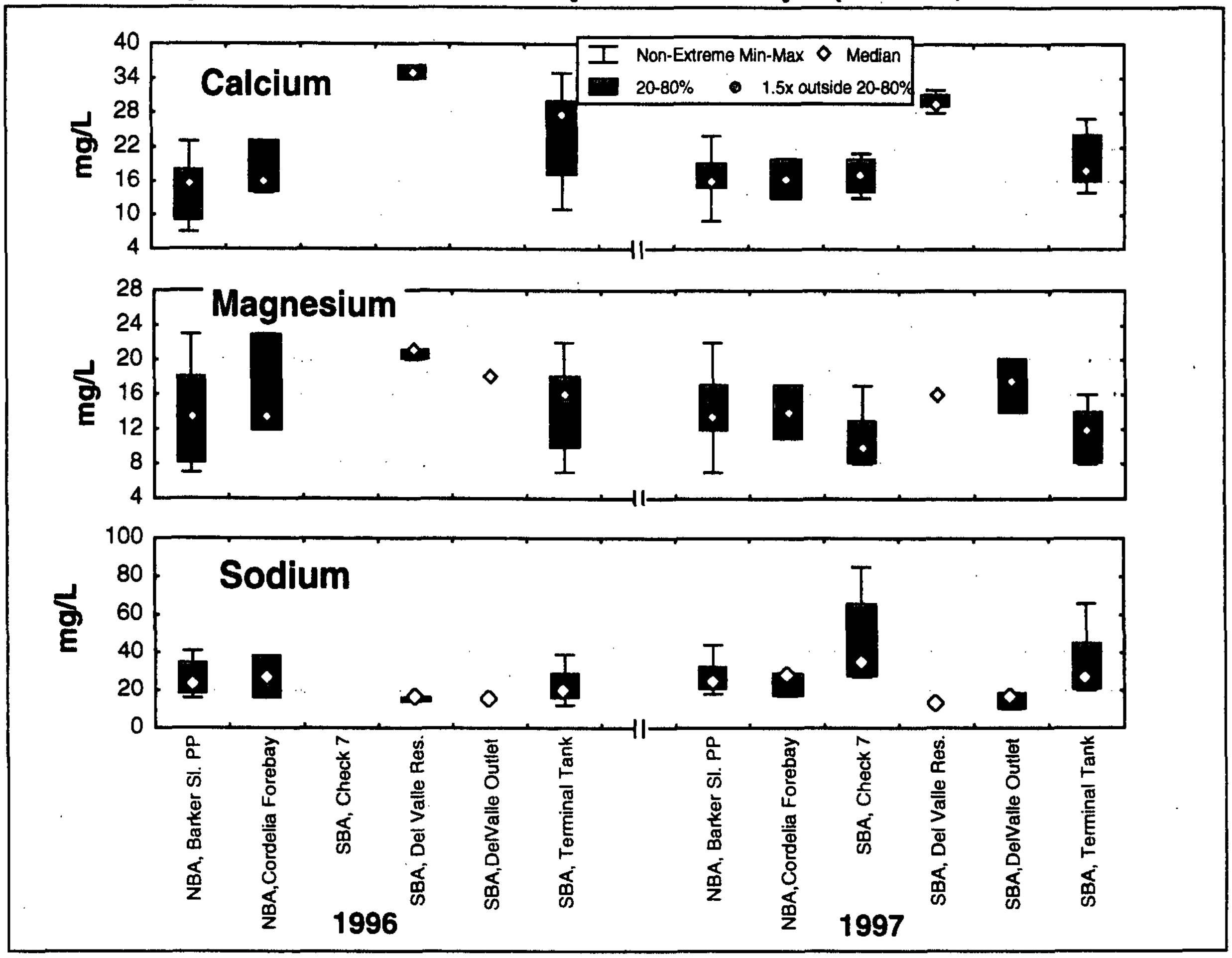


Figure 3-3
Monthly TDS and Turbidity in the North Bay and South Bay Aqueducts

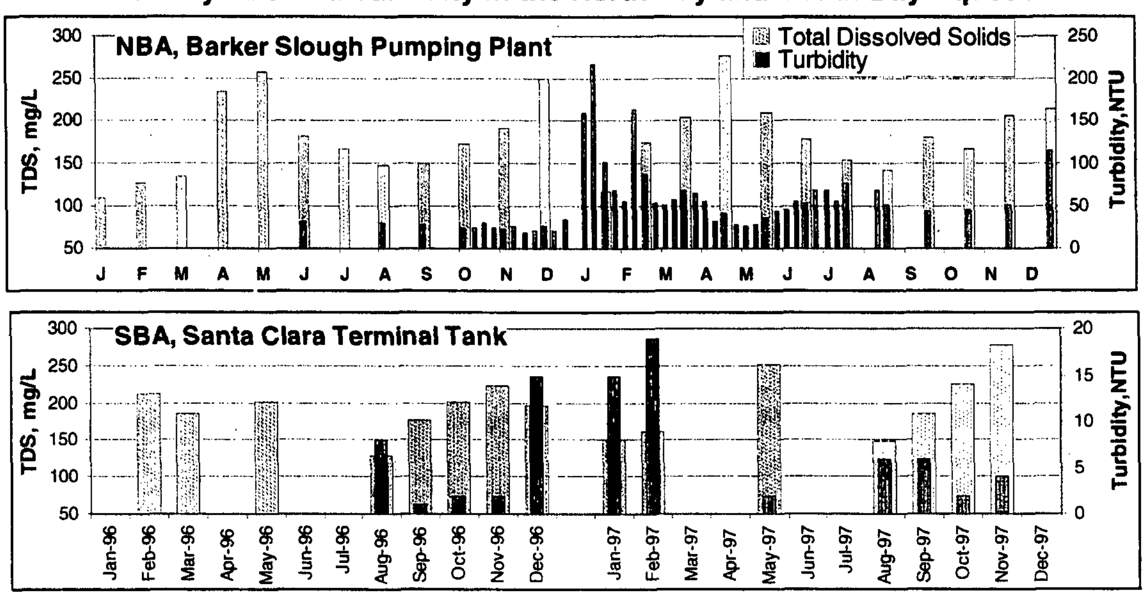
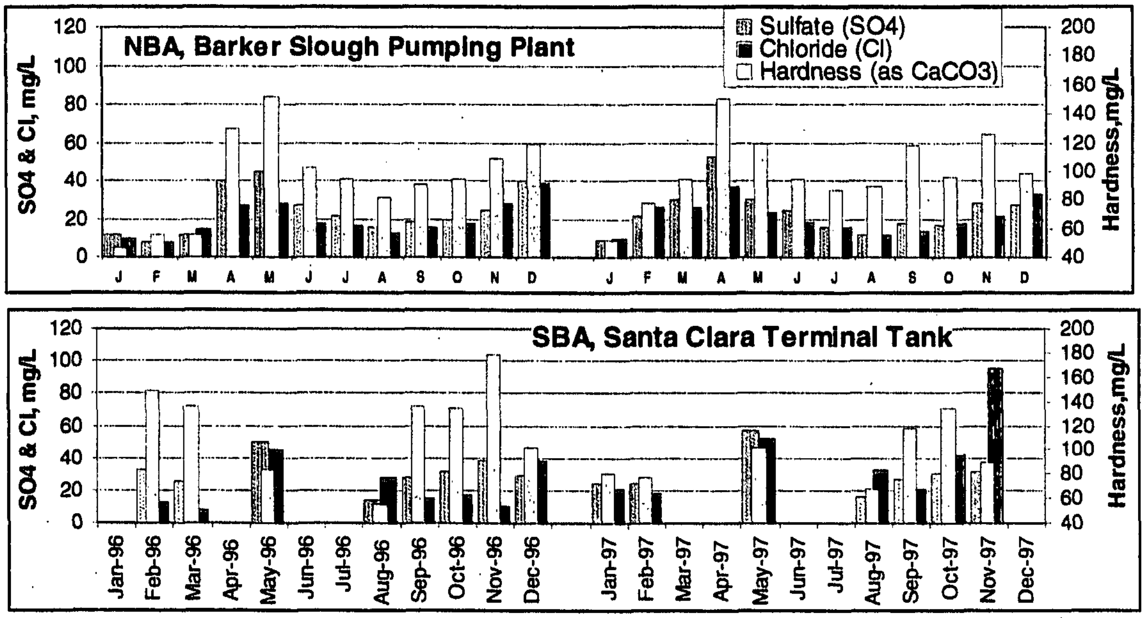


Figure 3-4
Monthly Sulfate, Chloride, and Hardness in the North Bay and South Bay Aqueducts



California Aqueduct and Coastal Branch

With the exception of chloride and sodium, all major minerals and conventional parameters measured in the California Aqueduct and Coastal Branch were below the MCLs for finished drinking water or applicable Article 19 objectives (Figures 3-5 and 3-6). Chloride was detected above the Monthly Average Article 19 Objective of 110 mg/L on several occasions during the end of 1997, when salinity intrusion in the Delta increased mineral concentrations Aqueduct-wide. Sodium levels were also above the Article 19 Objective in the same samples.

TDS was more variable during 1997 than 1996 at most Aqueduct stations, and this variability was largely due to two distinct events. First, TDS (as well as sodium and chloride) increased at the end of 1997 due to salinity intrusion in the Delta (Figures 3-7 and 3-8). Second, some of the lowest mineral concentrations were measured in the Aqueduct during 1997, when Kern River inflows lowered salinity at stations south of Check 29 for about 55 consecutive days in January and February. Kern River inflows are discussed in detail in Special Investigations (Chapter IV).

The median pH increased by about one unit from Banks Pumping Plant to Check 41 during 1996 but varied around 7.5 at both stations in 1997 (Figure 3-5). Coastal Branch pH levels were generally higher than Aqueduct levels possibly due to greater algal growth which can lower the level of bicarbonate—a source of acidity.

Turbidity at all Aqueduct stations fluctuated between one and 48 NTU during both years (Figures 3-5 and 3-7). Turbidity is generally higher at Check 29 because samples are collected from an auto-station circulation system where the intake is situated near the invert (see Appendix A, Methods). Samples at most other stations are collected from between 1 to 9 feet where the particulate concentration in flowing water is usually lower. Turbidity at Check 41 is usually higher than other Aqueduct stations because water in Tehachapi Afterbay is fully mixed.

Figure 3-5
Conventional Parameters in the California Aqueduct and Coastal Branch, 1996-97

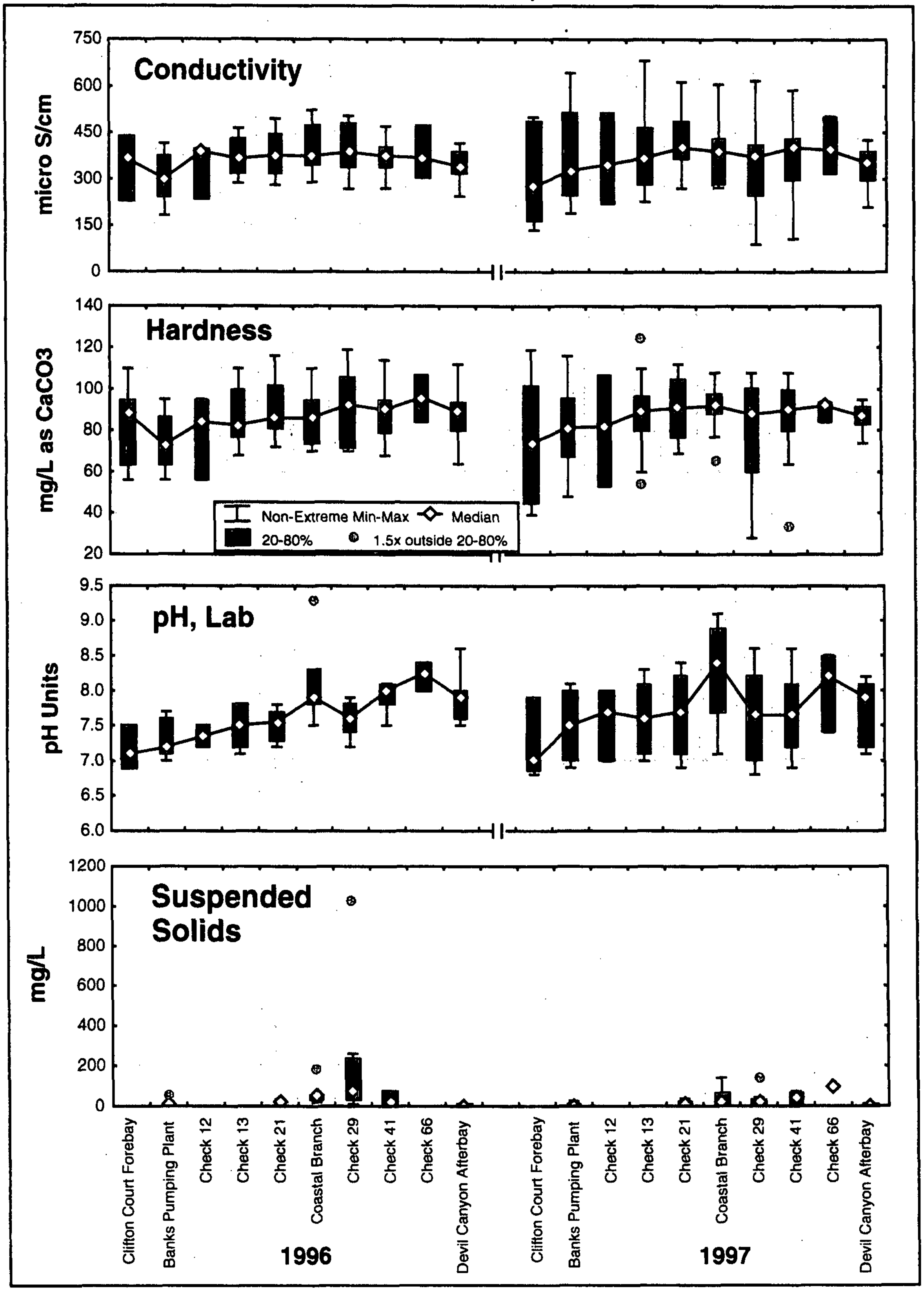


Figure 3-5 (Con't)
Conventional Parameters in the California Aqueduct and Coastal Branch, 1996-97

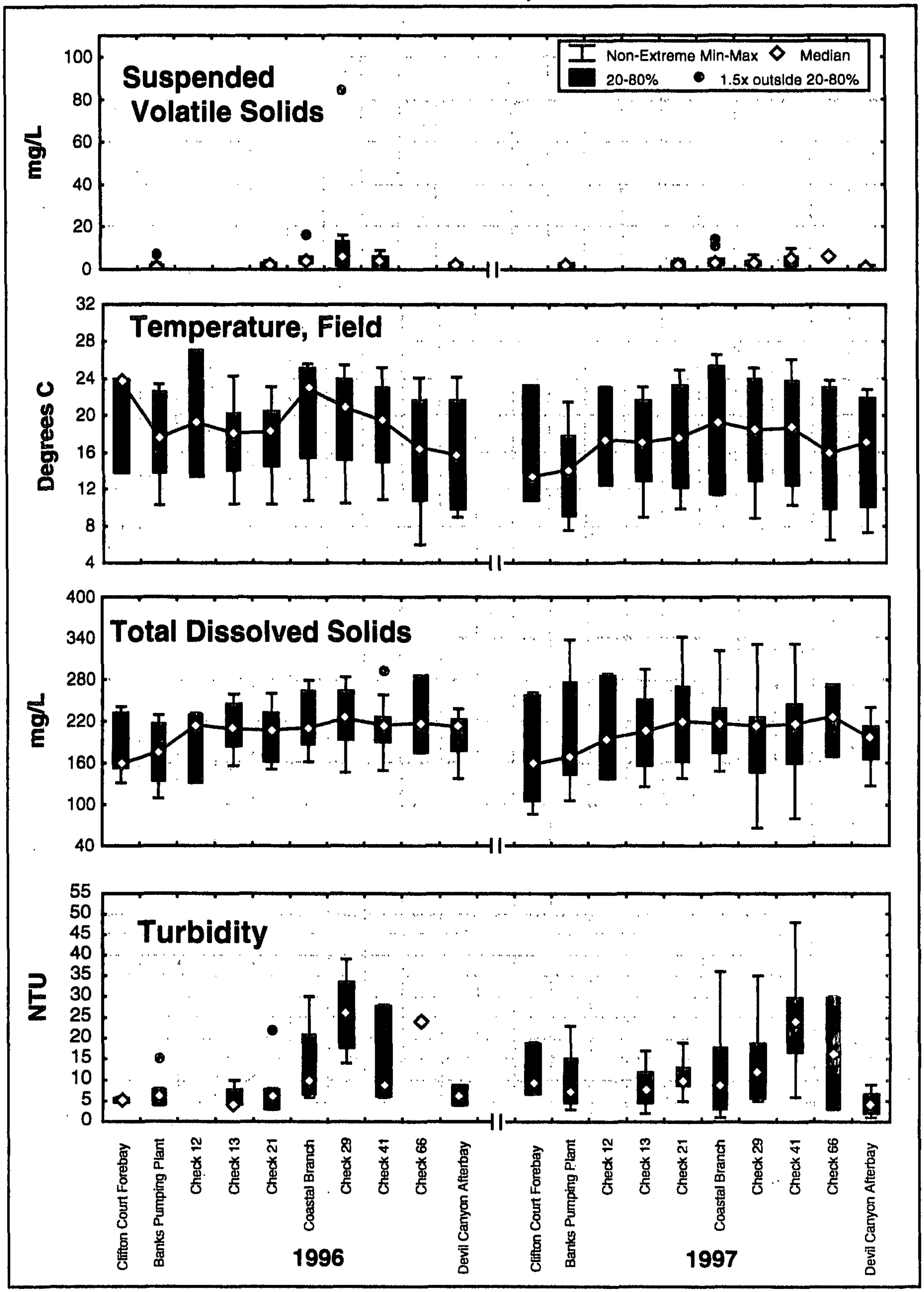


Figure 3-6
Major Minerals in the California Aqueduct and Coastal Branch, 1996-97

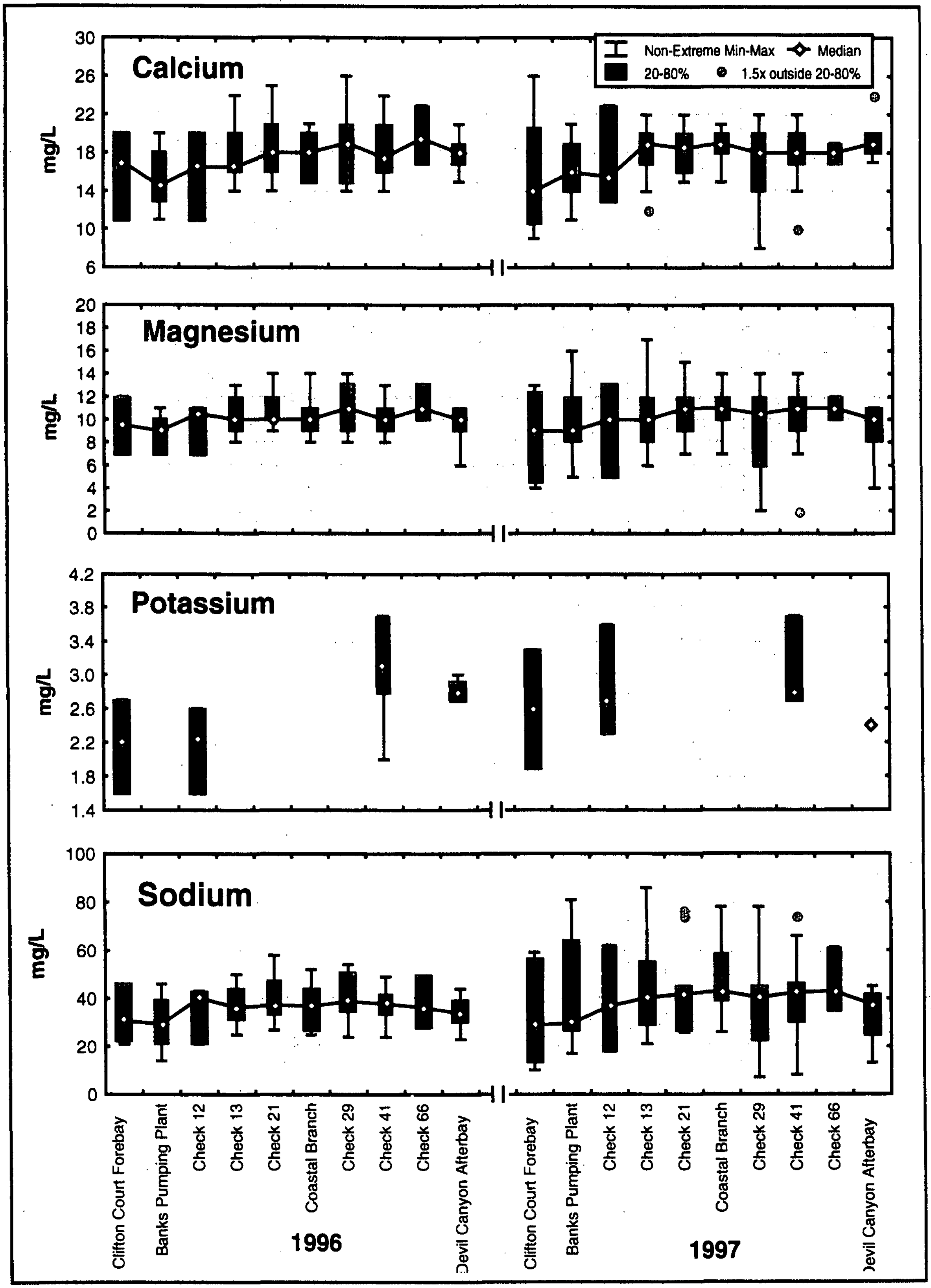


Figure 3-6 (Con't)
Major Minerals in the California Aqueduct and Coastal Branch, 1996-97

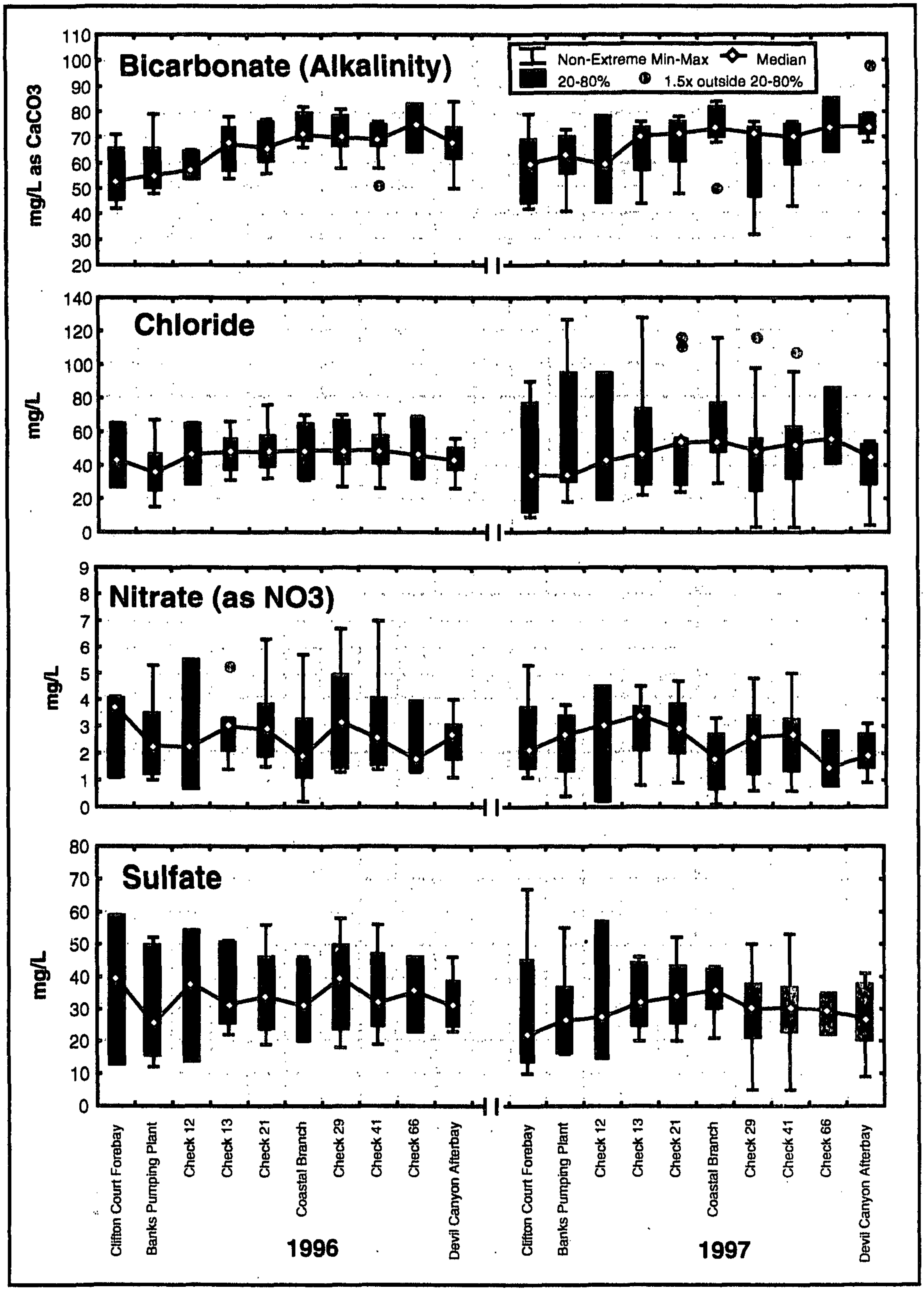


Figure 3-7
Monthly TDS and Turbidity in the California Aqueduct

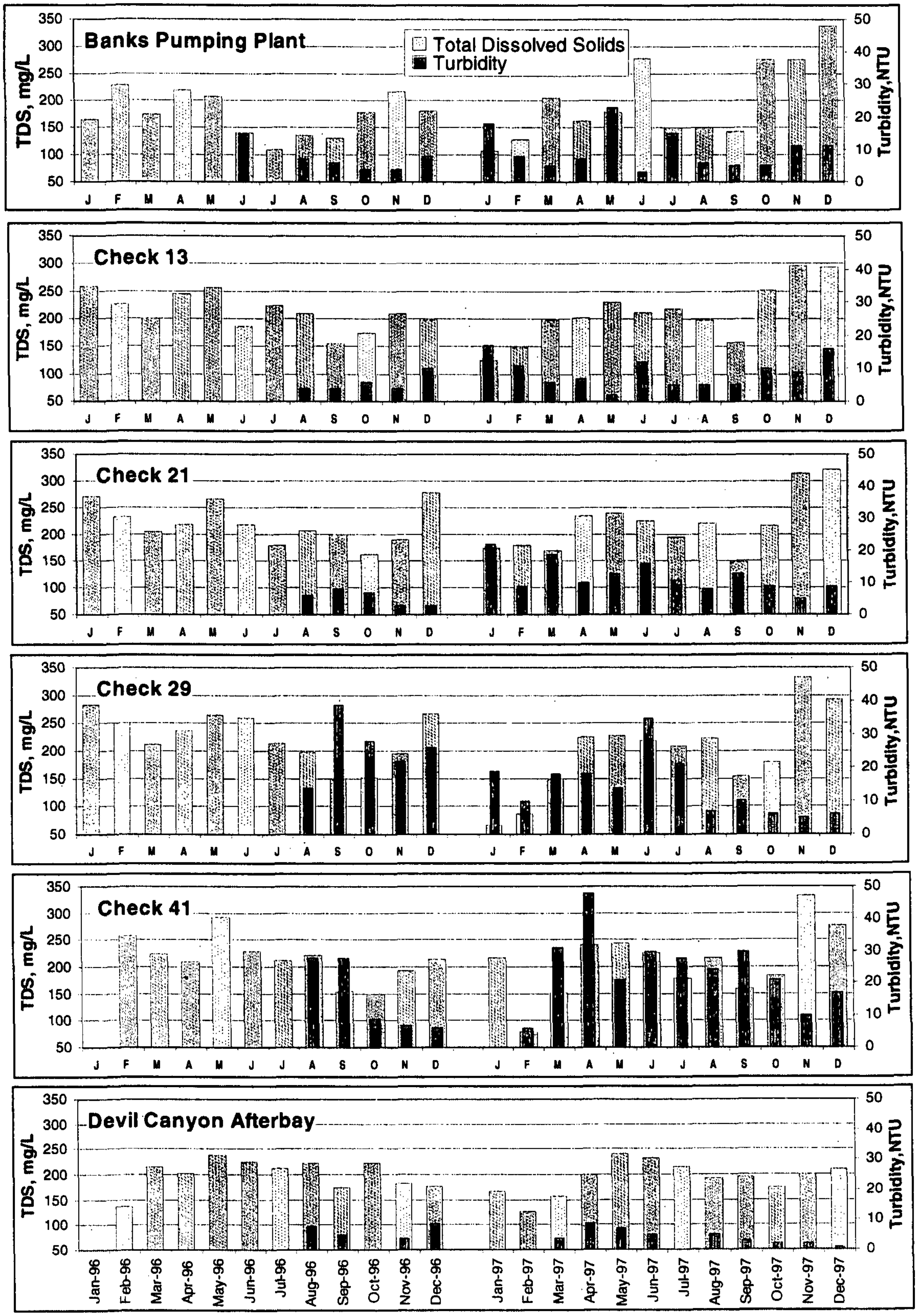
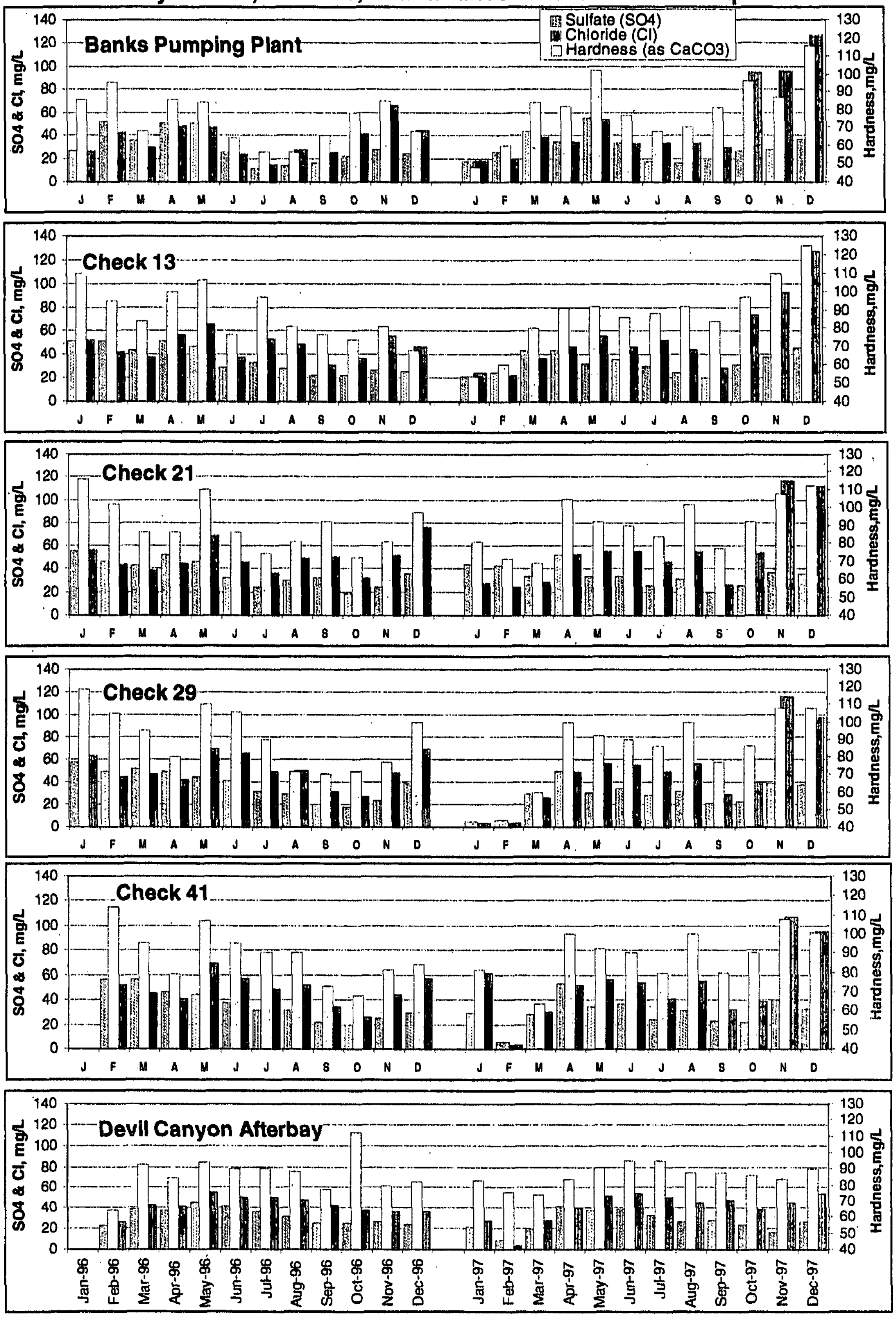


Figure 3-8
Monthly Sulfate, Chloride, and Hardness in the California Aqueduct



San Luis Reservoir and Southern California Lakes

Conventional parameters and major minerals measured in San Luis Reservoir during 1996-97 were below all MCLs for finished drinking water or applicable Article 19 objectives (Tables 3-2 and 3-3). TDS declined from an average of 263 mg/L in 1996 (range 216 to 281 mg/L) to 227 mg/L in 1997 (range 194 to 257 mg/L). Monthly TDS was relatively constant in 1996 until October when concentrations began declining (Figure 3-9). A similar decline was observed for hardness, sulfate, and chloride (Figure 3-10) and was related to reservoir filling (from Delta pumping) that started in September and continued into 1997. Salinity has been steadily decreasing in the reservoir since 1993—the end of the 1987-92 drought (DWR, *Effects of Water Operations on Water Quality in the California Aqueduct,* in preparation).

Table 3-2
Conventional Parameters in San Luis Reservoir and Southern California Lakes, 1996-97

			1996				1997			
Parameter	**Station Name**	**I.D. #**	**Mean**	**Low**	**High**	**# of Samples**	**Mean**	**Low**	**High**	**# of Samples**
Conductivity	San Luis Reservoir	SL001000	470	409	501	12	407	363	456	12
(Specific Conductance)	Pyramid Lake	PY001000	457	414	539	4	416	401	427	4
µS/cm	Castaic Lake	CA002000	599	560	627	4	516	480	540	4
	Silverwood Lake	SI002000	364	322	408	4	337	242	399	4
	Lake Perris	PE002000	693	663	712	4	633	609	660	4
Hardness	San Luis Reservoir	SL005000	106	92	113	12	95	90	123	12
mg/L as CaCO3	Pyramid Lake	PY001000	127	112	160	4	109	100	115	4
	Castaic Lake	CA002000	181	161	192	4	150	138	161	4
	Silverwood Lake	SI002000	90	84	94	4	88	84	91	4
	Lake Perris	PE002000	143	135	148	4	138	131	147	4
pH, Lab	San Luis Reservoir	SL001000	8.3	6.9	9.2	11	8.5	7.8	9.1	12
	Pyramid Lake	PY001000	8.3	8.0	9.2	12	8.2	7.9	8.9	11
	Castaic Lake	CA002000	8.6	8.0	9.2	12	8.5	8.0	9.2	12
	Silverwood Lake	SI002000	8.1	7.7	8.9	11	8.1	7.2	8.5	9
	Lake Perris	PE002000	8.6	7.9	9.1	11	8.4	7.9	9.1	12
Temperature	San Luis Reservoir	SL001000	19	14	23	11	19	13	27	12
Degrees C	Pyramid Lake	PY001000	18	12	24	12	18	11	24	11
	Castaic Lake	CA002000	19	14	26	12	19	13	25	12
	Silverwood Lake	SI002000	17	9	24	11	16	7	22	9
	Lake Perris	PE002000	21	14	28	11	20	12	27	12
Total Dissolved Solids	San Luis Reservoir	SL001000	263	216	281	12	227	194	257	12
mg/L	Pyramid Lake	PY001000	277	233	339	4	236	232	240	4
	Castaic Lake	CA002000	378	331	406	4	308	279	325	4
	Silverwood Lake	SI002000	215	187	246	4	198	152	234	4
	Lake Perris	PE002000	390	360	405	4	352	340	370	4
Turbidity	San Luis Reservoir	SL001000	2	<1	4	12	3	<1	12	12
NTU	Pyramid Lake	PY001000		2	10	2	2	<1	2	4
	Castaic Lake	CA002000		<1	2	2	2	<1	3	4
	Silverwood Lake	SI002000		4	6	2	4	<1	7	3
	Lake Perris	PE002000		<1	<1	2	2	<1	4	3

Monitoring for conventional parameters and major minerals at Pyramid, Castaic, and Silverwood lakes and Lake Perris is conducted quarterly. Except for hardness, chloride, and sodium, all data were below the MCLs for finished drinking water or applicable Article 19 objectives (Tables 3-2 and 3-3). Hardness was above the Monthly Average Article 19 Objective of 180 mg/L twice in 1996 at Castaic Lake. Chloride and sodium in Lake Perris were above their respective Article 19 objectives on several occasions in 1996.

TDS, sulfate, and hardness declined steadily throughout 1996 at Pyramid lake but remained somewhat constant during 1997 (Figures 3-9 and 3-10). The higher TDS levels in early 1996 were due to inflows from Piru Creek that were unusually high the previous year. Piru Creek is elevated in TDS from ancient marine sediments in the watershed and these inflows contribute substantially to Pyramid Lake's salinity.

Table 3-3
Major Minerals in San Luis Reservoir and Southern California Lakes, 1996-97

			1996				1997			
Parameter	Station Name	I.D. #	Mean	Low	High	# of Samples	Mean	Low	High	# of Samples
Calcium	San Luis Reservoir	SL001000	21	19	23	12	20	18	26	12
mg/L	Pyramid Lake	PY001000	29	25	37	4	24	22	26	4
	Castaic Lake	CA002000	42	38	45	4	35	32	38	4
	Silverwood Lake	SI002000	19	17	20	4	21	17	26	4
	Lake Perris	PE002000	27	26	28	4	27	26	29	4
Magnesium	San Luis Reservoir	SL001000	13	11	14	12	11	11	14	12
mg/L	Pyramid Lake	PY001000	14	12	16	4	12	11	12	4
	Castaic Lake	CA002000	18	16	19	4	15	14	16	4
	Silverwood Lake	SI002000	11	10	11	4	9	6	10	4
	Lake Perris	PE002000	19	17	20	4	17	16	18	4
Potassium	San Luis Reservoir	SL001000								
mg/L	Pyramid Lake	PY001000	3.0	2.9	3.1	3				
	Castaic Lake	CA002000	3.6	3.4	3.7	3				
	Silverwood Lake	SI002000	2.7	2.6	2.8	3				
	Lake Perris	PE002000	4.9	4.9	5.0	3				
Sodium	San Luis Reservoir	SL001000	50	42	56	12	44	39	52	12
mg/L	Pyramid Lake	PY001000	42	38	47	4	41	39	43	4
	Castaic Lake	CA002000	52	49	54	4	47	45	50	4
	Silverwood Lake	SI002000	37	31	43	4	32	12	42	4
	Lake Perris	PE002000	83	78	88	4	76	70	80	4
Bicarbonate	San Luis Reservoir	SL001000	79	76	84	12	76	73	89	12
mg/L as CaCO3	Pyramid Lake	PY001000	83	75	93	4	81	77	86	4
	Castaic Lake	CA002000	100	97	104	4	95	85	107	4
	Silverwood Lake	SI002000	69	66	74	4	79	68	97	4
	Lake Perris	PE002000	107	104	108	4	108	101	120	4
Chloride	San Luis Reservoir	SL001000	70	55	78	12	57	48	70	12
mg/L	Pyramid Lake	PY001000	46	43	49	4	46	42	52	4
	Castaic Lake	CA002000	52	50	54	4	45	43	48	4
	Silverwood Lake	SI002000	45	38	55	4	45	10	52	4
	Lake Perris	PE002000	114	102	121	4	96	91	109	4
Nitrate	San Luis Reservoir	SL001000	3.1	2.1	4.0	12	2.3	0.2	3.9	12
mg/L as NO3	Pyramid Lake	PY001000	1.5	0.2	2.5	4	2.2	1.8	2.5	4
	Castaic Lake	CA002000	0.7	<0.1	1.3	4	0.8	<0.1	1.8	4
	Silverwood Lake	SI002000	2.0	1.1	2.3	4	2.3	1.6	3.5	4
	Lake Perris	PE002000	0.1	<0.1	0.1	4	0.3	<0.1	0.6	4
Sulfate	San Luis Reservoir	SL001000	41	33	45	12	32	27	35	12
mg/L	Pyramid Lake	PY001000	74	55	107	4	51	45	57	4
	Castaic Lake	CA002000	121	102	129	4	89	78	98	4
	Silverwood Lake	SI002000	36	25	48	4	26	11	40	4
	Lake Perris	PE002000	56	40	64	4	56	53	60	4

Chloride did not exhibit similar trends because Piru Creek contains very little chloride compared to Project inflows (Figure 3-10) (see Special Investigations, Chapter IV). At Silverwood Lake, chloride and sulfate were lowest in February 1997, when Kern River inflows influenced water quality in the lake (Figure 3-10).

Sodium and chloride were highest in Lake Perris. Chloride levels at Lake Perris ranged from 91 to 121 mg/L during 1996-97, while levels at all other lakes ranged between 43 and 52 mg/L (Table 3-3). The higher levels are likely the result of simple evaporation, since local inflows are minimal.

Figure 3-9
Monthly TDS and Turbidity in San Luis Reservoir and Southern California Lakes

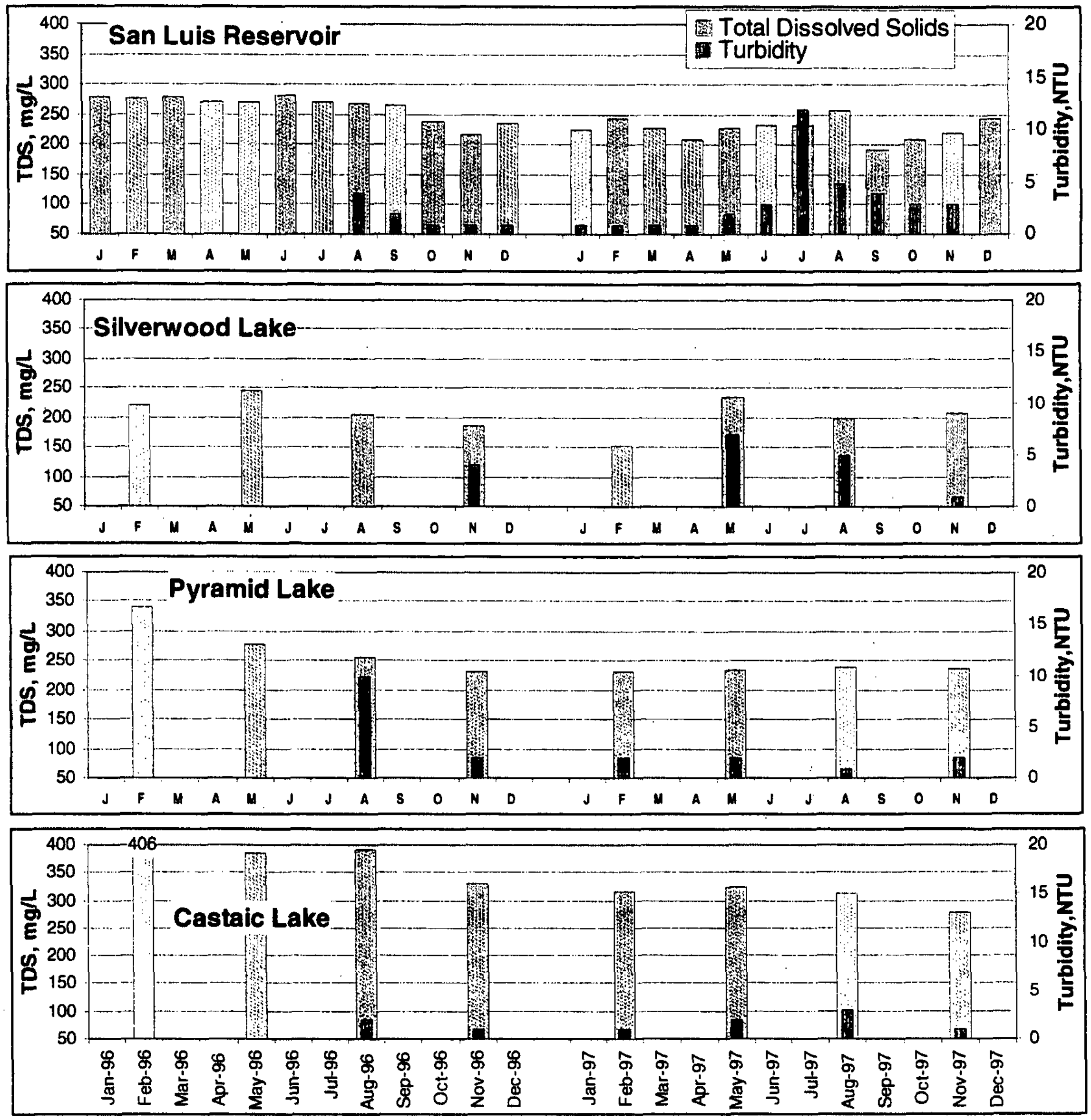
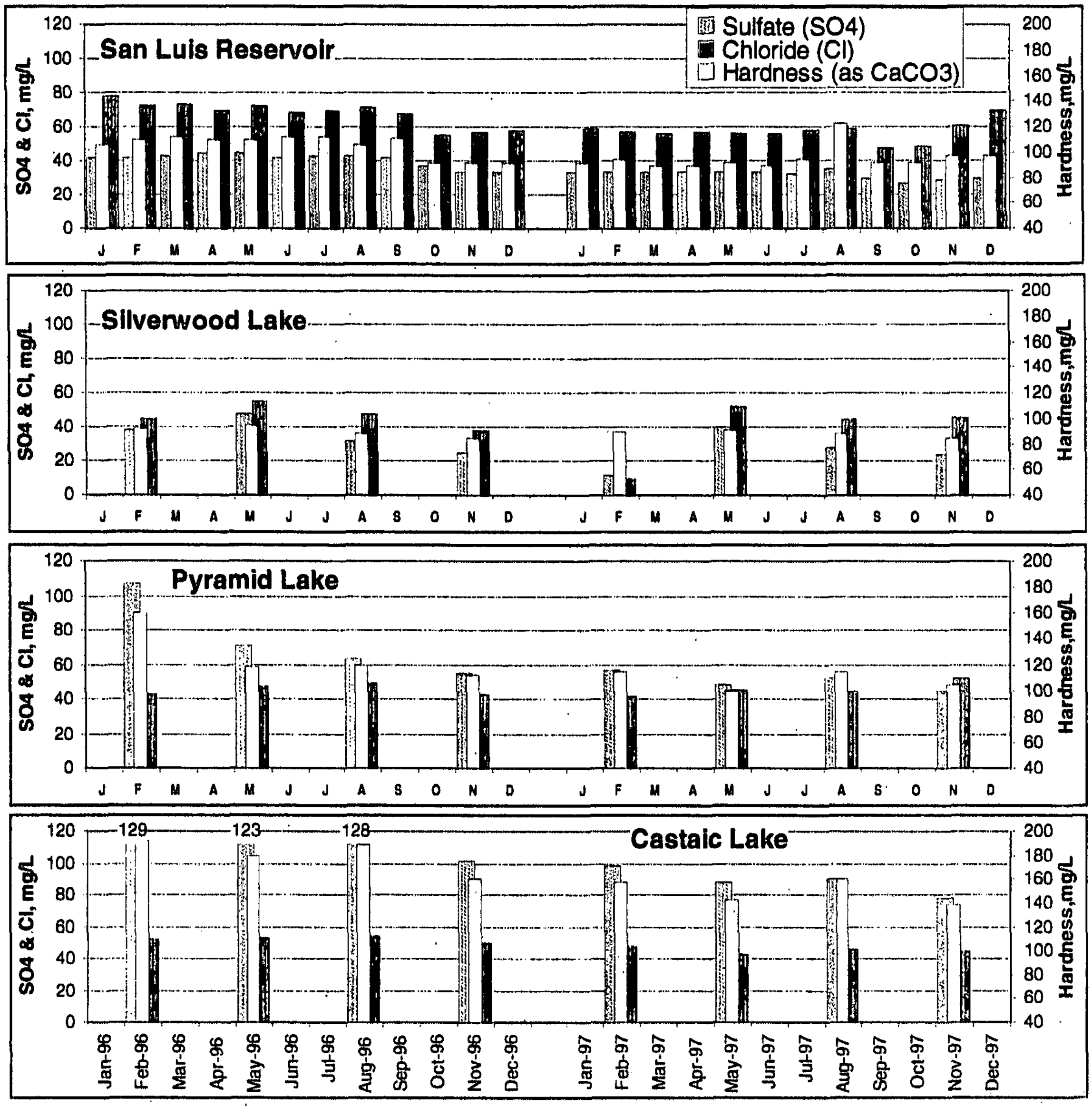


Figure 3-10
Monthly Sulfate, Chloride, and Hardness in San Luis Reservoir and Southern California Lakes



Minor Elements

Minor elements include metals such as copper, zinc, and iron, and non-metals such as arsenic and selenium. They are called minor elements because concentrations are usually below 1 part per million in natural surface waters. Existing MCLs and Article 19 objectives for these parameters are presented in Appendix B, Table B-2.

Feather River Watershed

Minor elements at Project stations in the Feather River Watershed during 1996-97 were below detection except for iron, manganese, aluminum, barium, and copper (Table 3-4). Iron was detected at 0.36 mg/L in one sample from Lake Davis and exceeded the MCL for finished drinking water of 0.3 mg/L. Manganese was also elevated in that sample at 0.819 mg/L, indicating the possibility of sample contamination.

Table 3-4
Minor Element Concentrations in the Feather River Watershed, 1996-97 (mg/L)

			1996				1997			
Parameter	Station Name	I.D. #	Median	Low	High	# of Samples	Median	Low	High	# of Samples
Aluminum	Thermalito Forebay	TF001000	< 0.010			1		< 0.010	< 0.010	3
	Thermalito Afterbay	TA001000		< 0.010	< 0.010	3	0.011	< 0.010	0.014	4
Cadmium	Thermalito Forebay	TF001000		< 0.005	< 0.005	4		< 0.001	< 0.001	3
	Thermalito Afterbay	TA001000		< 0.005	< 0.005	3		< 0.001	< 0.001	2
Copper	Antelope Lake	AN001000	< 0.005			1	< 0.005			1
	Frenchman Lake	FR001000	< 0.005			1	< 0.005			1
	Lake Davis	LD001000	< 0.005			1	< 0.005			1
	Thermalito Forebay	TF001000	< 0.005	< 0.005	< 0.005	3	< 0.001	< 0.001	< 0.005	4
	Thermalito Afterbay	TA001000	< 0.005	< 0.005	< 0.005	11	< 0.005	< 0.005	0.001	12
Chromium	Antelope Lake	AN001000	< 0.005			1	< 0.005			1
	Frenchman Lake	FR001000	< 0.005			1	< 0.005			1
	Lake Davis	LD001000	< 0.005			1	< 0.005			1
	Thermalito Forebay	TF001000		< 0.005	< 0.005	3		< 0.005	< 0.005	4
	Thermalito Afterbay	TA001000		< 0.005	< 0.005	11		< 0.005	< 0.005	12
Iron	Antelope Lake	AN001000	0.120			1	0.183			1
	Frenchman Lake	FR001000	0.026			1	0.067			1
	Lake Davis	LD001000	0.086	0.015	0.362	5	0.044	0.006	0.080	5
	Thermalito Forebay	TF001000	0.011	0.007	0.013	3	0.010	< 0.005	0.026	4
	Thermalito Afterbay	TA001000	0.009	0.005	0.021	11	0.008	< 0.005	0.016	12
Lead	Antelope Lake	AN001000	< 0.005			1	< 0.005			1
	Frenchman Lake	FR001000	< 0.005			1	< 0.005			1
	Lake Davis	LD001000	< 0.005			1	< 0.005			1
	Thermalito Forebay	TF001000	< 0.005	< 0.005	< 0.005	3	< 0.001	< 0.001	< 0.001	4
	Thermalito Afterbay	TA001000	< 0.005	< 0.005	< 0.005	11	< 0.001	< 0.001	< 0.001	12
Manganese	Antelope Lake	AN001000	0.006			1	0.013			1
	Frenchman Lake	FR001000	< 0.005			1	< 0.005			1
	Lake Davis	LD001000	0.113	< 0.005	0.819	5	0.114	< 0.005	0.338	5
	Thermalito Forebay	TF001000	< 0.005	< 0.005	< 0.005	3	< 0.005	< 0.005	< 0.005	4
	Thermalito Afterbay	TA001000	0.005	< 0.005	0.006	11	0.006	< 0.005	0.015	12
Mercury	Thermalito Forebay	TF001000		< 0.001	< 0.001	3		< 0.0002	< 0.0002	4
	Thermalito Afterbay	TA001000		< 0.001	< 0.001	2		< 0.0002	< 0.0002	3
Silver	Thermalito Forebay	TF001000	< 0.005	< 0.005	< 0.005	3	< 0.001	< 0.001	< 0.005	4
	Thermalito Afterbay	TA001000	< 0.005	< 0.005	< 0.005	2	< 0.001	< 0.001	< 0.005	3
Zinc	Antelope Lake	AN001000	< 0.005			1	< 0.005			1
	Frenchman Lake	FR001000	< 0.005			1	< 0.005			1
	Lake Davis	LD001000	< 0.005			1	< 0.005			1
	Thermalito Forebay	TF001000	< 0.005	< 0.005	< 0.005	3	< 0.005	< 0.005	< 0.005	4
	Thermalito Afterbay	TA001000	< 0.005	< 0.005	< 0.005	11	< 0.005	< 0.005	< 0.005	12
Arsenic	Antelope Lake	AN001000	< 0.001			1	< 0.001			1
	Frenchman Lake	FR001000	< 0.001			1	< 0.001			1
	Lake Davis	LD001000	< 0.001			1	< 0.001			1
	Thermalito Forebay	TF001000		< 0.001	< 0.001	3		< 0.001	< 0.001	4
	Thermalito Afterbay	TA001000		< 0.001	< 0.001	11		< 0.001	< 0.001	12
Barium	Thermalito Forebay	TA001000	< 0.05	< 0.05	0.05	4		< 0.05	< 0.05	5
	Thermalito Afterbay	TF001000		< 0.05	< 0.05	3		< 0.05	< 0.05	4
Boron	Antelope Lake	AN001000	< 0.1			1	< 0.1			1
	Frenchman Lake	FR001000	< 0.1			1	< 0.1			1
	Lake Davis	LD001000	< 0.1			1	< 0.1			1
	Thermalito Forebay	TF001000		< 0.1	< 0.1	3		< 0.1	< 0.1	4
	Thermalito Afterbay	TA001000		< 0.1	< 0.1	11		< 0.1	< 0.1	12
Bromide	Thermalito Forebay	TA001000	< 0.010			1				
	Thermalito Afterbay	TF001000		< 0.010	< 0.010	3		< 0.010	< 0.010	4
Fluoride	Antelope Lake	AN001000	< 0.1			1	< 0.1			1
	Frenchman Lake	FR001000	< 0.1			1	< 0.1			1
	Lake Davis	LD001000	< 0.1			1	< 0.1			1
	Thermalito Forebay	TF001000		< 0.1	< 0.1	3		< 0.1	< 0.1	4
	Thermalito Afterbay	TA001000		< 0.1	< 0.1	11		< 0.1	< 0.1	12
Selenium	Antelope Lake	AN001000	< 0.001			1	< 0.001			1
	Frenchman Lake	FR001000	< 0.001			1	< 0.001			1
	Lake Davis	LD001000	< 0.001			1	< 0.001			1
	Thermalito Forebay	TF001000		< 0.001	< 0.001	3		< 0.001	< 0.001	4
	Thermalito Afterbay	TA001000		< 0.001	< 0.001	11		< 0.001	< 0.001	12

Although both iron and manganese are naturally present in Lake Davis, all other iron concentrations were below 0.1 mg/L. Copper was detected at four times above the reporting limit of <0.001 mg/L in Thermalito Afterbay during 1997. Aluminum and barium were detected once each at Thermalito Afterbay and Forebay, respectively.

North Bay and South Bay Aqueducts

In the North Bay Aqueduct, cadmium, lead, mercury, and silver were below their respective reporting limits during 1996-97 (Table 3-5). All minor elements except iron and manganese were below the MCLs for finished drinking water or Article 19 objectives. At Barker Slough Pumping Plant, one sample contained iron at 0.517 mg/L, which was collected near the end of December 1996 when rainfall runoff from the upstream watershed dropped the pH to 6.3 (Figure 3-11). As pH decreases, metals solubility increases dramatically and more of the "total" fraction of iron becomes dissolved. Aluminum and manganese were also elevated in the same sample at 0.44 mg/L and 0.36 mg/L, respectively. Similar trends were observed in the past at this station and are detailed in Special Investigations (Chapter IV). In March 1997, the pH dropped to 4.5, but there was no substantial increase in iron or manganese (see Conventional Parameters and Major Minerals for further discussion) (Figure 3-11).

Similar to minerals, bromide began increasing at the start of each year, peaked in April or May, then declined throughout the summer (Figure 3-11). This indicates an influence from groundwater, since accretion into Barker Slough would be greatest after the rainy season. Another indicator of groundwater influence is the higher spring pH levels. Bromide was mostly below 0.1 mg/L at Barker Slough Pumping Plant, with the exception of one sample in October 1997 that contained 0.2 mg/L (Table 3-6). The higher bromide value might indicate salinity intrusion from the Delta, but a corresponding increase in TDS was not observed.

In the South Bay Aqueduct, aluminum, lead, mercury, and silver were below their respective reporting limits at all stations monitored during 1996-97 (Table 3-5). Other metallic elements were infrequently detected and all positives were below the MCLs for finished drinking water or Article 19 objectives. The copper values for the South Bay Aqueduct were, at times, biased due to copper sulfate treatments for algae control.

Zinc levels in Del Valle Reservoir were unusually elevated. Concentrations ranged from 0.025 to 0.437 mg/L in 1996 and from <0.05 to 0.232 mg/L in 1997. Although the values were well below the Secondary MCL of 5.0 mg/L for finished drinking water, they were the highest measured in the Project. Routinely high levels would suggest that sample contamination was not the source of the elevated zinc.

Historically, zinc has been higher in Del Valle Reservoir compared to other Project stations, but never over 0.1 mg/L. Although during a 4-month period in 1997, zinc contamination from the lab raised the reporting limit to <0.05 mg/L, it was well below levels in the reservoir.

A possible source of zinc in Del Valle Reservoir is an abandoned mine that was inundated when the lake was filled. At a nearby abandoned mine—Mount Diablo—zinc has been detected at elevated levels in its adit discharge. The mine is located about 20 miles north of Del Valle Reservoir, and the two regions may share the same geological characteristics. Barium levels were also routinely above the reporting limit and may be an indicator of the source or sources (Table 3-6). Further work is needed to determine if zinc is naturally present in Del Valle Reservoir.

Most nonmetallic elements in the South Bay Aqueduct were near or below their reporting limits, and none were above the MCLs for finished drinking water or Article 19 objectives (Table 3-6). The maximum bromide level at Santa Clara Terminal Tank was 0.13 mg/L in 1996 and 0.35 mg/L in 1997.

Table 3-5
Metallic Element Concentrations in the North Bay and South Bay Aqueducts, 1996-97 (mg/L)

			1996				1997			
Parameter	Station Name	I.D#	Median	Low	High	# of Samples	Median	Low	High	# of Samples
Aluminum	NBA, Barker Sl. Pumping Plant	KG000000	< 0.010	< 0.010	0.438	23	< 0.010	< 0.010	0.022	33
	NBA, Cordelia Forebay	KG002111		< 0.010	< 0.010	4		< 0.010	< 0.010	4
	SBA, Check 7	KB001638						< 0.010	< 0.010	9
	SBA, Del Valle Reservoir	DV001000		< 0.010	< 0.010	3	< 0.010			1
	SBA, Del Valle Outlet	DV000000	< 0.010			1		< 0.010	< 0.010	5
	SBA, Santa Clara Terminal Tank	KB004207		< 0.005	< 0.010	8	< 0.010	< 0.010	< 0.010	7
Cadmium	NBA, Barker Sl. Pumping Plant	KG000000		< 0.005	< 0.005	12	< 0.001	< 0.001	< 0.005	12
	NBA, Cordelia Forebay	KG002111		< 0.005	< 0.005	4	< 0.001	< 0.001	< 0.001	4
	SBA, Check 7	KB001638					< 0.001	< 0.001	< 0.005	9
	SBA, Del Valle Reservoir	DV001000		< 0.005	< 0.005	3	< 0.005			1
	SBA, Del Valle Outlet	DV000000	< 0.005			1	< 0.001	< 0.001	< 0.005	4
	SBA, Santa Clara Terminal Tank	KB004207		< 0.005	< 0.005	8		< 0.001	< 0.005	7
Copper	NBA, Barker Sl. Pumping Plant	KG000000		< 0.005	< 0.005	12	< 0.005	< 0.005	0.004	12
	NBA, Cordelia Forebay	KG002111	< 0.005	< 0.005	0.005	4	< 0.005	< 0.005	0.002	4
	SBA, Check 7	KB001638					0.003	< 0.005	0.015	9
	SBA, Del Valle Reservoir	DV001000		< 0.005	< 0.005	3	< 0.005			1
	SBA, Del Valle Outlet	DV000000	< 0.005			1	< 0.005	< 0.005	0.002	4
	SBA, Santa Clara Terminal Tank	KB004207	< 0.005	< 0.005	0.039	8	< 0.005	< 0.005	0.003	7
Chromium	NBA, Barker Sl. Pumping Plant	KG000000		< 0.005	< 0.005	12	< 0.005	< 0.005	0.007	12
	NBA, Cordelia Forebay	KG002111		< 0.005	< 0.005	4	< 0.005	< 0.005	0.005	4
	SBA, Check 7	KB001638						< 0.005	< 0.005	9
	SBA, Del Valle Reservoir	DV001000		< 0.005	< 0.005	3	< 0.005			1
	SBA, Del Valle Outlet	DV000000	< 0.005			1	< 0.005	< 0.005	0.008	4
	SBA, Santa Clara Terminal Tank	KB004207		< 0.005	< 0.005	8	< 0.005	< 0.005	0.006	7
Iron	NBA, Barker Sl. Pumping Plant	KG000000	0.014	< 0.005	0.517	23	0.013	< 0.005	0.155	32
	NBA, Cordelia Forebay	KG002111	0.011	< 0.005	0.070	4	0.007	< 0.005	0.075	4
	SBA, Check 7	KB001638					0.008	< 0.005	< 0.029	9
	SBA, Del Valle Reservoir	DV001000	< 0.005	< 0.005	0.006	3	0.007			1
	SBA, Del Valle Outlet	DV000000	< 0.005			1	< 0.005	< 0.005	0.009	4
	SBA, Santa Clara Terminal Tank	KB004207	0.006	< 0.005	0.022	8	0.019	< 0.005	0.006	7
Lead	NBA, Barker Sl. Pumping Plant	KG000000		< 0.005	< 0.005	12	< 0.001	< 0.001	< 0.005	12
	NBA, Cordelia Forebay	KG002111		< 0.005	< 0.005	4	< 0.001	< 0.001	< 0.005	4
	SBA, Check 7	KB001638					< 0.001	< 0.001	< 0.005	9
	SBA, Del Valle Reservoir	DV001000		< 0.005	< 0.005	3	< 0.001	< 0.001	< 0.005	1
	SBA, Del Valle Outlet	DV000000				1	< 0.001	< 0.001	< 0.005	4
	SBA, Santa Clara Terminal Tank	KB004207		< 0.005	< 0.005	8	< 0.001	< 0.001	< 0.005	7
Manganese	NBA, Barker Sl. Pumping Plant	KG000000	0.015	< 0.005	0.358	23	0.019	< 0.005	0.114	32
	NBA, Cordelia Forebay	KG002111	0.006	0.006	0.038	4	0.006	< 0.005	0.016	4
	SBA, Check 7	KB001638					0.008	< 0.005	0.012	9
	SBA, Del Valle Reservoir	DV001000	0.006	0.005	0.028	3	< 0.005			1
	SBA, Del Valle Outlet	DV000000	< 0.005			1		< 0.005	< 0.005	4
	SBA, Santa Clara Terminal Tank	KB004207	0.010	0.005	0.014	8	0.008	< 0.005	0.025	7
Mercury	NBA, Barker Sl. Pumping Plant	KG000000		< 0.001	< 0.001	12	< 0.0002	< 0.0002	< 0.0010	12
	NBA, Cordelia Forebay	KG002111		< 0.001	< 0.001	4	< 0.0002	< 0.0002	< 0.0010	4
	SBA, Check 7	KB001638					< 0.0002	< 0.0002	< 0.0010	9
	SBA, Del Valle Reservoir	DV001000		< 0.001	< 0.001	3	< 0.0002			1
	SBA, Del Valle Outlet	DV000000	< 0.001			1		< 0.0002	< 0.0002	4
	SBA, Santa Clara Terminal Tank	KB004207		< 0.001	< 0.001	8	< 0.0002	< 0.0002	< 0.0010	7
Silver	NBA, Barker Sl. Pumping Plant	KG000000		< 0.005	< 0.005	12		< 0.001	< 0.001	12
	NBA, Cordelia Forebay	KG002111		< 0.005	< 0.005	4		< 0.001	< 0.001	4
	SBA, Check 7	KB001638						< 0.001	< 0.001	9
	SBA, Del Valle Reservoir	DV001000		< 0.005	< 0.005	3	< 0.001			1
	SBA, Del Valle Outlet	DV000000	< 0.005			1		< 0.001	< 0.001	4
	SBA, Santa Clara Terminal Tank	KB004207		< 0.005	< 0.005	8		< 0.001	< 0.001	7
Zinc	NBA, Barker Sl. Pumping Plant	KG000000	< 0.005	< 0.005	0.012	23		< 0.005	< 0.05	32
	NBA, Cordelia Forebay	KG002111		< 0.005	< 0.005	4	< 0.05	< 0.005	0.016	4
	SBA, Check 7	KB001638						< 0.005	< 0.05	9
	SBA, Del Valle Reservoir	DV001000	0.240	0.025	0.282	3	0.129			1
	SBA, Del Valle Outlet	DV000000	0.437			1		< 0.05	0.232	4
	SBA, Santa Clara Terminal Tank	KB004207	0.005	< 0.005	0.017	8	< 0.005	< 0.005	0.016	7

The higher levels in 1997 were from salinity intrusion in the Delta that raised bromide levels throughout most of the Project (Figure 3-11).

Figure 3-11
Monthly Iron, Manganese, and Bromide in the North Bay and South Bay Aqueducts

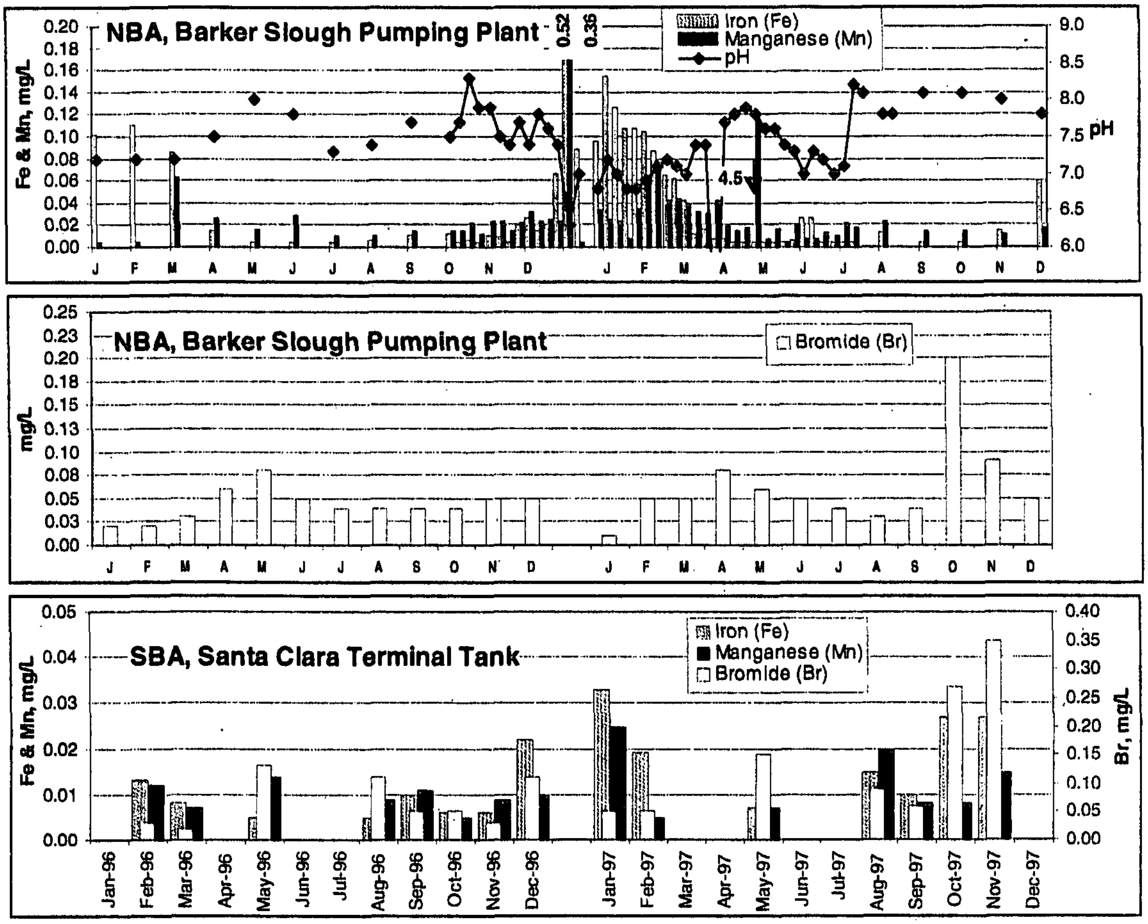


Table 3-6
Nonmetallic Element Concentrations in the North Bay and South Bay Aqueducts, 1996-97 (mg/L)

			1996				1997			
Parameter	**Station Name**	**I.D#**	**Median**	**Low**	**High**	**# of Samples**	**Median**	**Low**	**High**	**# of Samples**
Arsenic	NBA, Barker Sl. Pumping Plant	KG000000	0.002	0.001	0.003	12	0.002	0.002	0.003	12
	NBA, Cordelia Forebay	KG002111	0.002	0.002	0.003	4	0.003	0.002	0.003	4
	SBA, Check 7	KB001638					0.002	0.001	0.003	9
	SBA, Del Valle Reservoir	DV001000		0.002	0.002	3	0.001			1
	SBA, Del Valle Outlet	DV000000	0.002			1	0.001	< 0.001	0.003	4
	SBA, Santa Clara Terminal Tank	KB004207	0.002	0.001	0.003	8	0.002	0.001	0.002	7
Barium	NBA, Barker Sl. Pumping Plant	KG000000	< 0.050	< 0.050	0.057	12	< 0.050	< 0.050	0.066	12
	NBA, Cordelia Forebay	KG002111	< 0.050	< 0.050	0.059	4	< 0.050	< 0.050	0.059	4
	SBA, Check 7	KB001638					< 0.050	< 0.050	< 0.050	9
	SBA, Del Valle Reservoir	DV001000	0.078	0.073	0.082	3	0.062			1
	SBA, Del Valle Outlet	DV000000	0.070			1	0.064	0.052	0.076	4
	SBA, Santa Clara Terminal Tank	KB004207	< 0.050	< 0.050	0.080	8	< 0.050	< 0.050	0.059	7
Boron	NBA, Barker Sl. Pumping Plant	KG000000	0.2	0.1	0.4	12	0.2	0.1	0.4	12
	NBA, Cordelia Forebay	KG002111	0.2	0.1	0.4	4	0.1	0.1	0.2	4
	SBA, Check 7	KB001638		0.1	0.4		0.1	0.1	0.2	9
	SBA, Del Valle Reservoir	DV001000	0.2	0.1	0.2	3	0.1			1
	SBA, Del Valle Outlet	DV000000	0.1			1	0.1	0.1	0.2	4
	SBA, Santa Clara Terminal Tank	KB004207	0.1	< 0.1	0.2	8	0.1	0.1	0.2	7
Bromide	NBA, Barker Sl. Pumping Plant	KG000000	0.04	0.02	0.08	12	0.05	0.01	0.20	12
	NBA, Cordelia Forebay	KG002111	0.04	0.04	0.10	4	0.05	0.03	0.11	4
	SBA, Check 7	KB001638					0.11	0.09	0.46	9
	SBA, Del Valle Reservoir	DV001000					0.02			1
	SBA, Del Valle Outlet	DV000000	0.02			1		0.01	0.02	2
	SBA, Santa Clara Terminal Tank	KB004207	0.05	0.02	0.13	8	0.09	0.05	0.35	7
Fluoride	NBA, Barker Sl. Pumping Plant	KG000000	0.1	< 0.1	0.2	12	0.1	< 0.1	0.2	12
	NBA, Cordelia Forebay	KG002111	0.1	< 0.1	0.2	4	0.1	< 0.1	0.1	4
	SBA, Check 7	KB001638					< 0.1	< 0.1	< 0.1	9
	SBA, Del Valle Reservoir	DV001000	0.2	0.1	0.2	3	0.1			1
	SBA, Del Valle Outlet	DV000000	0.1			1	0.1	< 0.1	0.2	4
	SBA, Santa Clara Terminal Tank	KB004207	< 0.1	< 0.1	0.2	8	< 0.1	< 0.1	0.2	7
Selenium	NBA, Barker Sl. Pumping Plant	KG000000		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	NBA, Cordelia Forebay	KG002111		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	SBA, Check 7	KB001638						< 0.001	< 0.001	9
	SBA, Del Valle Reservoir	DV001000		< 0.001	< 0.001	3	< 0.001			1
	SBA, Del Valle Outlet	DV000000	< 0.001			1		< 0.001	< 0.001	4
	SBA, Santa Clara Terminal Tank	KB004207	< 0.001	< 0.001	0.001	8	< 0.001	< 0.001	0.001	7

California Aqueduct and Coastal Branch

With the exception of mercury and iron, minor elements in the California Aqueduct and Coastal Branch were below the MCLs for finished drinking water or Article 19 objectives during 1996-97 (Tables 3-7 and 3-8). One sample from Check 41contained 0.001 mg/L of mercury during 1997. The value was likely due to field or laboratory contamination, since the theoretical concentration of dissolved mercury is much lower. Further, unfiltered mercury concentrations in the Sacramento River are historically below 10 parts per trillion—0.00001 mg/L—or two orders of magnitude lower than the 0.001 mg/L value reported for Check 41 (Project samples are filtered before analysis for metals). One sample from Devil Canyon Afterbay contained 0.776 mg/L of iron during February 1996 and was over the MCL for finished drinking water of 0.3 mg/L (Figure 3-12). Similar to mercury, this number is artificially high for a sample with a field pH of 8.1. The most probable cause of the elevated iron is field contamination by the introduction of soil. Iron is one of the most common elements in soil, as is aluminum and manganese, that were also unusually elevated in the same sample. Two iron values of 0.16 and 0.18 mg/L were reported for Check 21 in January and February 1996 (Figure 3-12) and may have been related to SLC floodwater inflows, since certain floodwaters are iron enriched.

Table 3-7
Metallic Element Concentrations in the California Aqueduct and Coastal Branch, 1996-97 (mg/L)

			1996				1997			
Parameter	Station Name	I.D#	Median	Low	High	# of Samples	Median	Low	High	# of Samples
Aluminum	Clifton Court Forebay	KA000000						0.010	0.021	2
	Banks Pumping Plant	KA000331	< 0.010	< 0.010	0.010	12		< 0.010	< 0.010	12
	Check 13	KA007089	< 0.010	< 0.010	0.049	12	< 0.010	0.010	0.013	12
	Check 21	KA017226	< 0.010	< 0.010	0.080	12		< 0.010	< 0.010	12
	Coastal Branch	KC000934	< 0.010	< 0.010	0.015	8	< 0.010	< 0.010	0.014	12
	Check 29	KA024454		< 0.010	< 0.010	12	< 0.010	< 0.010	0.026	12
	Check 41	KA030341		< 0.010	< 0.010	12		< 0.010	< 0.010	12
	Check 66	KA040341						< 0.010	< 0.010	3
	Devil Canyon Afterbay	KA041288	0.015	< 0.010	0.539	12	< 0.010	< 0.010	< 0.050	12
Cadmium	Clifton Court Forebay	KA000000						< 0.005	< 0.005	2
	Banks Pumping Plant	KA000331		< 0.005	< 0.005	12	< 0.001	< 0.001	< 0.005	12
	Check 13	KA007089		< 0.005	< 0.005	12	< 0.005	< 0.001	< 0.005	12
	Check 21	KA017226		< 0.005	< 0.005	12	< 0.005	< 0.001	< 0.005	12
	Coastal Branch	KC000934		< 0.005	< 0.005	8	< 0.005	< 0.001	< 0.005	12
	Check 29	KA024454		< 0.005	< 0.005	12	< 0.005	< 0.001	< 0.005	12
	Check 41	KA030341		< 0.005	< 0.005	12	< 0.005	< 0.001	< 0.005	12
	Check 66	KA040341					< 0.001	< 0.001	< 0.005	3
	Devil Canyon Afterbay	KA041288		< 0.005	< 0.005	12	< 0.005	< 0.001	< 0.005	12
Copper	Clifton Court Forebay	KA000000						< 0.005	< 0.005	2
	Banks Pumping Plant	KA000331	< 0.005	< 0.005	0.095	12	< 0.002	< 0.002	0.025	12
	Check 13	KA007089		< 0.005	< 0.005	12	< 0.005	< 0.005	0.003	12
	Check 21	KA017226		< 0.005	< 0.005	12	< 0.005	< 0.005	0.006	12
	Coastal Branch	KC000934		< 0.005	< 0.005	9	0.003	< 0.005	0.016	12
	Check 29	KA024454		< 0.005	< 0.005	12	0.002	< 0.005	0.005	12
	Check 41	KA030341	< 0.005	< 0.002	< 0.005	12	0.002	< 0.005	0.005	12
	Check 66	KA040341					0.003	< 0.005	0.003	3
	Devil Canyon Afterbay	KA041288		< 0.005	< 0.005	12	0.002	< 0.005	0.005	12
Chromium	Clifton Court Forebay	KA000000						< 0.005	< 0.005	2
	Banks Pumping Plant	KA000331		< 0.005	< 0.005	12		< 0.005	< 0.005	12
	Check 13	KA007089		< 0.005	< 0.005	12		< 0.005	< 0.005	12
	Check 21	KA017226		< 0.005	< 0.005	12		< 0.005	< 0.005	12
	Coastal Branch	KC000934		< 0.005	< 0.005	9		< 0.005	< 0.005	12
	Check 29	KA024454		< 0.005	< 0.005	12		< 0.005	< 0.005	12
	Check 41	KA030341		< 0.005	< 0.005	12		< 0.005	< 0.005	12
	Check 66	KA040341						< 0.005	< 0.005	3
	Devil Canyon Afterbay	KA041288		< 0.005	< 0.005	12		< 0.005	< 0.005	12
Iron	Clifton Court Forebay	KA000000						< 0.005	0.057	2
	Banks Pumping Plant	KA000331	0.018	0.006	0.083	12	0.008	< 0.005	0.034	12
	Check 13	KA007089	0.018	0.006	0.094	12	< 0.005	< 0.005	0.036	12
	Check 21	KA017226	0.026	< 0.005	0.178	12	< 0.005	< 0.005	0.027	12
	Coastal Branch	KC000934	< 0.005	< 0.005	0.036	9	< 0.005	< 0.005	0.020	12
	Check 29	KA024454	< 0.005	< 0.005	0.036	12	< 0.005	< 0.005	0.039	12
	Check 41	KA030341	< 0.005	< 0.005	0.050	12	< 0.005	< 0.005	0.021	12
	Check 66	KA040341						< 0.005	< 0.005	3
	Devil Canyon Afterbay	KA041288	0.014	< 0.005	0.776	12	< 0.005	< 0.005	0.008	12
Lead	Clifton Court Forebay	KA000000						< 0.001	< 0.001	2
	Banks Pumping Plant	KA000331		< 0.005	< 0.005	12		< 0.001	< 0.001	12
	Check 13	KA007089		< 0.005	< 0.005	12		< 0.001	< 0.001	12
	Check 21	KA017226		< 0.005	< 0.005	12		< 0.001	< 0.001	12
	Coastal Branch	KC000934		< 0.005	< 0.005	9		< 0.001	< 0.001	12
	Check 29	KA024454		< 0.005	< 0.005	12		< 0.001	< 0.001	12
	Check 41	KA030341		< 0.005	< 0.005	12		< 0.001	< 0.001	12
	Check 66	KA040341						< 0.001	< 0.001	3
	Devil Canyon Afterbay	KA041288		< 0.005	< 0.005	12		< 0.001	< 0.001	12

Table 3-7 (Con't)
Metallic Element Concentrations in the California Aqueduct and Coastal Branch, 1996-97 (mg/L)

			1996				1997			
Parameter	**Station Name**	**I.D#**	**Median**	**Low**	**High**	**# of Samples**	**Median**	**Low**	**High**	**# of Samples**
Manganese	Clifton Court Forebay	KA000000						< 0.005	0.057	2
	Banks Pumping Plant	KA000331	0.017	0.010	0.034	12	0.021	0.007	0.034	12
	Check 13	KA007089	0.009	< 0.005	0.024	12	0.006	< 0.005	0.018	12
	Check 21	KA017226	< 0.005	< 0.005	0.007	12		< 0.005	< 0.005	12
	Coastal Branch	KC000934	< 0.005	< 0.005	0.026	9		< 0.005	< 0.005	12
	Check 29	KA024454	< 0.005	< 0.005	0.090	12		< 0.005	< 0.005	12
	Check 41	KA030341		< 0.005	< 0.005	12		< 0.005	< 0.005	12
	Check 66	KA040341						< 0.005	< 0.005	3
	Devil Canyon Afterbay	KA041288	< 0.005	< 0.005	0.134	12	< 0.005	< 0.005	0.210	12
Mercury	Clifton Court Forebay	KA000000						< 0.0002	< 0.0002	2
	Banks Pumping Plant	KA000331		< 0.001	< 0.001	12		< 0.0002	< 0.0002	12
	Check 13	KA007089		< 0.001	< 0.001	12		< 0.0002	< 0.0002	12
	Check 21	KA017226		< 0.001	< 0.001	12		< 0.0002	< 0.0002	12
	Coastal Branch	KC000934		< 0.001	< 0.001	8		< 0.0002	< 0.0002	9
	Check 29	KA024454		< 0.001	< 0.001	12		< 0.0002	< 0.0002	12
	Check 41	KA030341		< 0.001	< 0.001	12	< 0.0002	< 0.0002	0.0010	12
	Check 66	KA040341						< 0.0002	< 0.0002	2
	Devil Canyon Afterbay	KA041288		< 0.001	< 0.001	12		< 0.0002	< 0.0002	12
Silver	Clifton Court Forebay	KA000000						< 0.001	< 0.001	2
	Banks Pumping Plant	KA000331		< 0.005	< 0.005	12		< 0.001	< 0.001	12
	Check 13	KA007089		< 0.005	< 0.005	12		< 0.001	< 0.001	12
	Check 21	KA017226		< 0.005	< 0.005	12		< 0.001	< 0.001	12
	Coastal Branch	KC000934		< 0.005	< 0.005	8		< 0.001	< 0.001	9
	Check 29	KA024454		< 0.005	< 0.005	12		< 0.001	< 0.001	12
	Check 41	KA030341		< 0.005	< 0.005	12		< 0.001	< 0.001	12
	Check 66	KA040341						< 0.001	< 0.001	2
	Devil Canyon Afterbay	KA041288		< 0.005	< 0.005	12		< 0.001	< 0.001	12
Zinc	Clifton Court Forebay	KA000000						< 0.005	< 0.005	2
	Banks Pumping Plant	KA000331	< 0.005	< 0.005	0.006	12	< 0.005	< 0.005	< 0.050	12
	Check 13	KA007089	< 0.005	< 0.005	0.006	12	< 0.005	< 0.005	< 0.050	12
	Check 21	KA017226		< 0.005	< 0.005	12	< 0.005	< 0.005	< 0.050	12
	Coastal Branch	KC000934	< 0.005	< 0.005	0.019	9	< 0.005	< 0.005	< 0.050	9
	Check 29	KA024454		< 0.005	< 0.005	12	< 0.005	< 0.005	< 0.050	12
	Check 41	KA030341	0.005	< 0.005	0.006	12	< 0.005	< 0.005	0.006	12
	Check 66	KA040341						< 0.005	< 0.050	2
	Devil Canyon Afterbay	KA041288	< 0.005	< 0.005	0.007	12		< 0.005	< 0.050	12

Arsenic in the California Aqueduct ranged between 0.001 and 0.004 mg/L and was detected in all but two samples (Table 3-8). Selenium was detected once each year at both Banks Pumping Plant and Check 41 at the reporting limit of 0.001 mg/L. Maximum bromide levels at all stations ranged between 0.19 and 0.21 mg/L in 1996 and between 0.20 and 0.44 mg/L in 1997. The higher 1997 values were due to increased salinity intrusion in the Delta towards the end of 1997 that raised bromide levels throughout most of the California Aqueduct (Figure 3-12).

San Luis Reservoir and Southern California Lakes

In the San Luis Reservoir, all minor elements were below the MCLs for finished drinking water or Article 19 objectives except for manganese (Table 3-9). Manganese was detected once at 0.31 mg/L in August 1997 and was likely due to field or laboratory contamination, since positive detections were infrequent at that station (Figure 3-13).

Table 3-8
Nonmetallic Elements Concentrations in the California Aqueduct and Coastal Branch, 1996-97 (mg/L)

			1996				1997			
Parameter	**Station Name**	**I.D#**	**Median**	**Low**	**High**	**# of Samples**	**Median**	**Low**	**High**	**# of Samples**
Arsenic	Clifton Court Forebay	KA000000					0.002	0.001	0.002	2
	Banks Pumping Plant	KA000331	0.002	0.001	0.002	12	0.002	0.001	0.003	12
	Check 13	KA007089	0.002	0.001	0.002	12	0.002	0.001	0.003	12
	Check 21	KA017226	0.002	0.001	0.002	12	0.002	0.001	0.003	12
	Coastal Branch	KC000934	0.002	0.002	0.002	9	0.002	0.001	0.003	12
	Check 29	KA024454	0.002	0.002	0.002	12	0.002	0.001	0.003	12
	Check 41	KA030341	0.002	0.001	0.002	12	0.002	0.001	0.004	12
	Check 66	KA040341					0.003	0.002	0.003	3
	Devil Canyon Afterbay	KA041288	0.002	0.001	0.002	12	0.002	< 0.001	0.003	12
Barium	Clifton Court Forebay	KA000000						< 0.05	< 0.05	2
	Banks Pumping Plant	KA000331		< 0.05	< 0.05	12		< 0.05	< 0.05	12
	Check 13	KA007089		< 0.05	< 0.05	12		< 0.05	< 0.05	12
	Check 21	KA017226		< 0.05	< 0.05	12		< 0.05	< 0.05	12
	Coastal Branch	KC000934		< 0.01	< 0.05	8		< 0.05	< 0.05	12
	Check 29	KA024454		< 0.05	< 0.05	12		< 0.05	< 0.05	12
	Check 41	KA030341		< 0.05	< 0.05	12		< 0.05	< 0.05	12
	Check 66	KA040341						< 0.05	< 0.05	3
	Devil Canyon Afterbay	KA041288		< 0.05	< 0.05	12		< 0.05	< 0.05	12
Boron	Clifton Court Forebay	KA000000	0.2	< 0.1	0.3	4	0.1	< 0.1	0.3	5
	Banks Pumping Plant	KA000331	0.1	< 0.1	0.3	12	0.1	0.1	0.3	12
	Check 12	KA006633	0.1	< 0.1	0.3	4	0.1	0.1	0.2	4
	Check 13	KA007089	0.1	< 0.1	0.3	12	0.1	0.1	0.2	12
	Check 21	KA017226	0.1	0.1	0.3	12	0.1	0.1	0.2	12
	Coastal Branch	KC000934	0.1	< 0.1	0.2	9	0.1	0.1	0.2	12
	Check 29	KA024454	0.2	< 0.1	0.3	12	0.1	< 0.1	0.2	12
	Check 41	KA030341	0.1	< 0.1	0.3	11	0.1	< 0.1	0.2	12
	Check 66	KA040341	0.1	0.1	0.2	4	0.1	0.1	0.2	4
	Devil Canyon Afterbay	KA041288	0.1	< 0.1	0.2	11	0.1	0.1	0.2	12
Bromide	Clifton Court Forebay	KA000000	0.11	0.08	0.20	4	0.10	0.02	0.34	5
	Banks Pumping Plant	KA000331	0.11	0.04	0.21	12	0.10	0.04	0.44	12
	Check 13	KA007089	0.14	0.09	0.19	12	0.12	0.05	0.43	12
	Check 21	KA017226	0.14	0.12	0.21	4	0.15	0.06	0.39	12
	Check 41	KA030341	0.14	0.08	0.20	12	0.16	< 0.01	0.38	5
	Check 66	KA040341					0.16			1
	Devil Canyon Afterbay	KA041288	0.13	0.08	0.15	12	0.14	< 0.01	0.20	12
Fluoride	Clifton Court Forebay	KA000000						< 0.1	< 0.1	3
	Banks Pumping Plant	KA000331		< 0.1	< 0.1	12		< 0.1	< 0.1	12
	Check 13	KA007089		< 0.1	< 0.1	12		< 0.1	< 0.1	12
	Check 21	KA017226		< 0.1	< 0.1	9		< 0.1	< 0.1	12
	Coastal Branch	KC000934		< 0.1	< 0.1	12		< 0.1	< 0.1	12
	Check 29	KA024454		< 0.1	< 0.1	12	< 0.1	< 0.1	0.1	12
	Check 41	KA030341	< 0.1	< 0.1	0.1	11	< 0.1	< 0.1	0.1	12
	Check 66	KA040341	< 0.1	< 0.1	0.1	4		< 0.1	< 0.1	4
	Devil Canyon Afterbay	KA041288	< 0.1	< 0.1	0.1	11	< 0.1	< 0.1	0.3	12
Selenium	Clifton Court Forebay	KA000000						< 0.001	< 0.001	2
	Banks Pumping Plant	KA000331	< 0.001	< 0.001	0.001	12	< 0.001	< 0.001	0.001	12
	Check 13	KA007089		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Check 21	KA017226		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Coastal Branch	KC000934		< 0.001	< 0.001	9		< 0.001	< 0.001	12
	Check 29	KA024454		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Check 41	KA030341	< 0.001	< 0.001	0.001	12	< 0.001	< 0.001	0.001	12
	Check 66	KA040341						< 0.001	< 0.001	3
	Devil Canyon Afterbay	KA041288		< 0.001	< 0.001	12		< 0.001	< 0.001	12

Figure 3-12
Monthly Iron, Manganese, and Bromide in the California Aqueduct, 1996-97

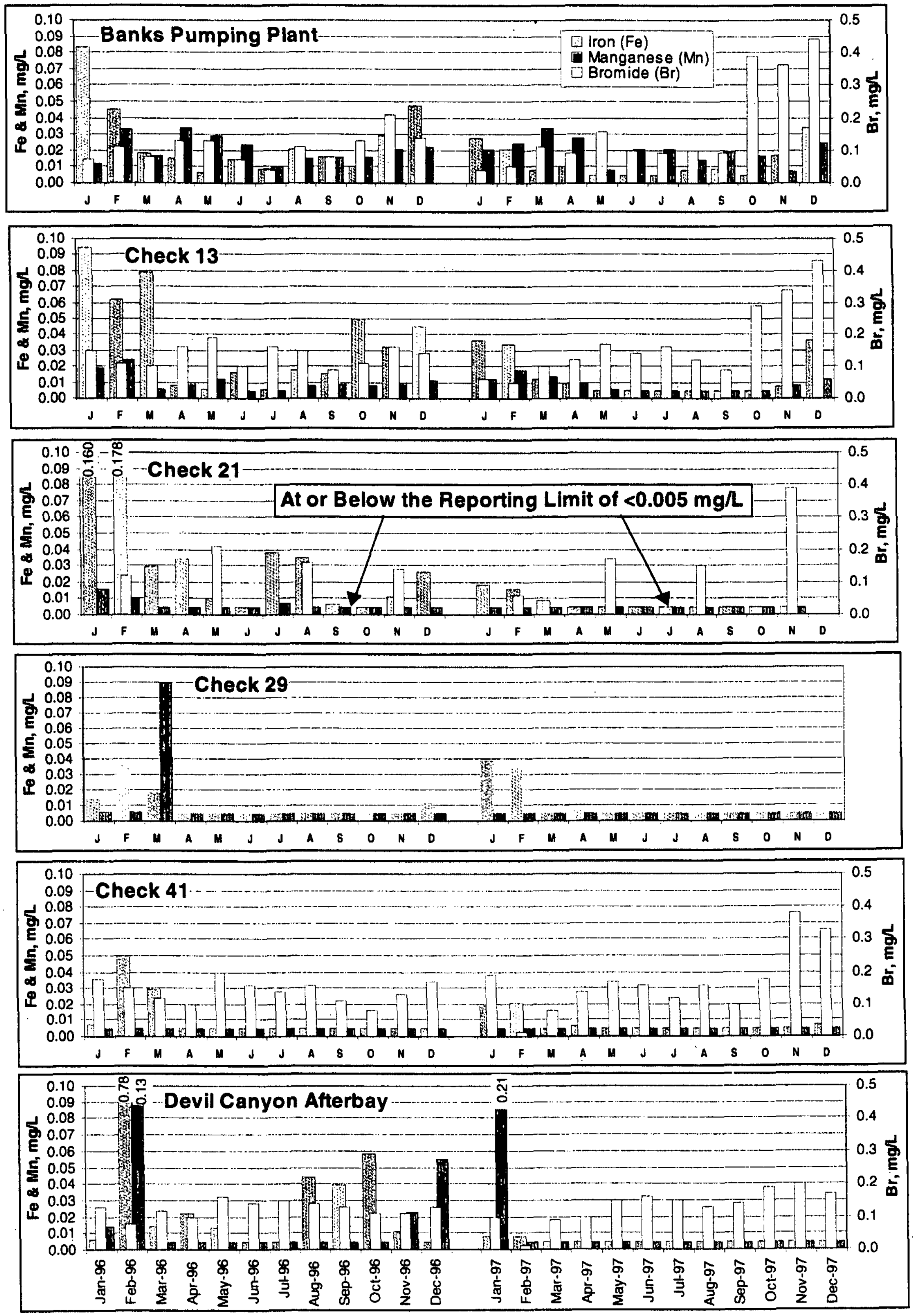
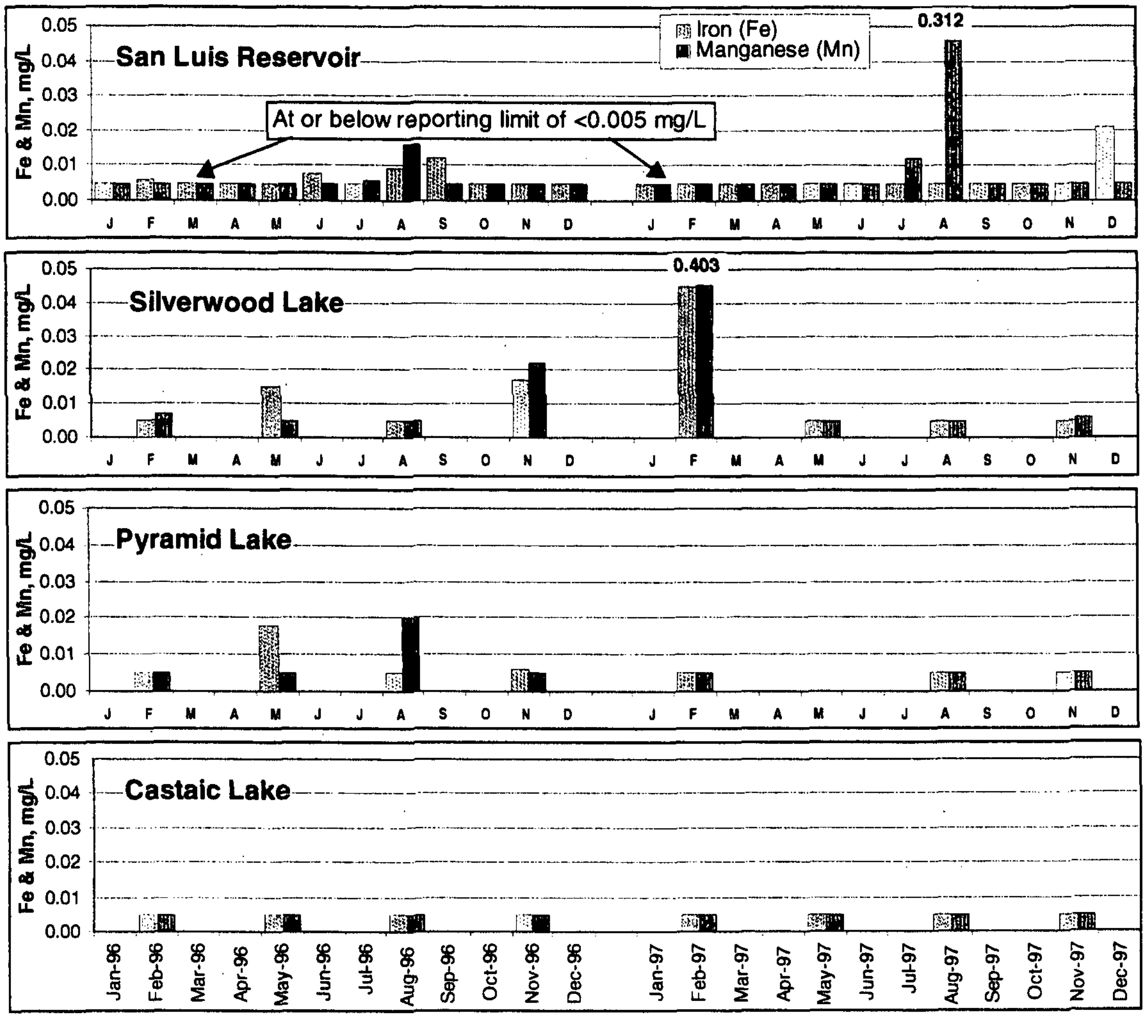


Table 3-9
Minor Element Concentrations in San Luis Reservoir and Southern California Lakes, 1996-97 (mg/L)

			1996				1997			
Parameter	Station Name	I.D#	Median	Low	High	# of Samples	Median	Low	High	# of Samples
Aluminum	San Luis Reservoir	SL001000	< 0.010	< 0.010	0.014	12	< 0.010	< 0.010	0.011	12
	Pyramid Lake	PY001000	< 0.010	< 0.010	0.017	4		< 0.010	< 0.010	3
	Castaic Lake	CA002000		< 0.010	< 0.010	4		< 0.010	< 0.010	4
	Silverwood Lake	SI002000	< 0.010	< 0.010	0.026	4		< 0.010	< 0.010	4
	Lake Perris	PE002000		< 0.010	< 0.010	4		< 0.010	< 0.010	4
Cadmium	San Luis Reservoir	SL001000		< 0.005	< 0.005	12	< 0.001	< 0.001	< 0.005	12
	Pyramid Lake	PY001000		< 0.005	< 0.005	4	< 0.001	< 0.001	< 0.005	3
	Castaic Lake	CA002000		< 0.005	< 0.005	4	< 0.001	< 0.001	< 0.005	4
	Silverwood Lake	SI002000		< 0.005	< 0.005	4	< 0.001	< 0.001	< 0.005	4
	Lake Perris	PE002000		< 0.005	< 0.005	4	< 0.001	< 0.001	< 0.005	4
Copper	San Luis Reservoir	SL001000		< 0.005	< 0.005	12	0.002	< 0.005	0.002	12
	Pyramid Lake	PY001000		< 0.005	< 0.005	4	0.002	< 0.005	0.003	3
	Castaic Lake	CA002000	< 0.005	< 0.005	0.011	4	0.003	< 0.005	0.008	4
	Silverwood Lake	SI002000		< 0.005	< 0.005	4	0.004	< 0.005	0.006	4
	Lake Perris	PE002000		< 0.005	< 0.005	4	0.010	0.007	0.017	4
Chromium	San Luis Reservoir	SL001000		< 0.005	< 0.005	12		< 0.005	< 0.005	12
	Pyramid Lake	PY001000		< 0.005	< 0.005	4		< 0.005	< 0.005	3
	Castaic Lake	CA002000		< 0.005	< 0.005	4		< 0.005	< 0.005	4
	Silverwood Lake	SI002000		< 0.005	< 0.005	4		< 0.005	< 0.005	4
	Lake Perris	PE002000		< 0.005	< 0.005	4		< 0.005	< 0.005	4
Iron	San Luis Reservoir	SL001000	< 0.005	< 0.005	0.012	12	< 0.005	< 0.005	0.021	12
	Pyramid Lake	PY001000	< 0.005	< 0.005	0.018	4		< 0.005	< 0.005	3
	Castaic Lake	CA002000		< 0.005	< 0.005	4		< 0.005	< 0.005	4
	Silverwood Lake	SI002000	< 0.005	< 0.005	0.017	4	< 0.005	< 0.005	0.045	4
	Lake Perris	PE002000		< 0.005	< 0.005	4		< 0.005	< 0.005	4
Lead	San Luis Reservoir	SL001000		< 0.005	< 0.005	12	< 0.001	< 0.001	< 0.005	12
	Pyramid Lake	PY001000		< 0.005	< 0.005	4	< 0.001	< 0.001	< 0.005	3
	Castaic Lake	CA002000		< 0.005	< 0.005	4	< 0.001	< 0.001	< 0.005	4
	Silverwood Lake	SI002000		< 0.005	< 0.005	4	< 0.001	< 0.001	< 0.005	4
	Lake Perris	PE002000		< 0.005	< 0.005	4	< 0.001	< 0.001	< 0.005	4
Manganese	San Luis Reservoir	SL001000	< 0.005	< 0.005	0.016	12	< 0.005	< 0.005	0.312	12
	Pyramid Lake	PY001000	< 0.005	< 0.005	0.020	4		< 0.005	< 0.005	3
	Castaic Lake	CA002000		< 0.005	< 0.005	4		< 0.005	< 0.005	4
	Silverwood Lake	SI002000	< 0.005	< 0.005	0.022	4	< 0.005	< 0.005	0.403	4
	Lake Perris	PE002000		< 0.005	< 0.005	4	< 0.005	< 0.005	0.006	4
Mercury	San Luis Reservoir	SL001000		< 0.001	< 0.001	12	< 0.0002	< 0.0002	< 0.001	12
	Pyramid Lake	PY001000		< 0.001	< 0.001	4	< 0.0002	< 0.0002	< 0.001	3
	Castaic Lake	CA002000		< 0.001	< 0.001	4	< 0.0002	< 0.0002	< 0.001	4
	Silverwood Lake	SI002000		< 0.001	< 0.001	4	< 0.0002	< 0.0002	< 0.001	4
	Lake Perris	PE002000		< 0.001	< 0.001	4	< 0.0002	< 0.0002	< 0.001	4
Silver	San Luis Reservoir	SL001000		< 0.005	< 0.005	12	< 0.001	< 0.001	< 0.005	12
	Pyramid Lake	PY001000		< 0.005	< 0.005	4	< 0.001	< 0.001	< 0.005	3
	Castaic Lake	CA002000		< 0.005	< 0.005	4	< 0.001	< 0.001	< 0.005	4
	Silverwood Lake	SI002000		< 0.005	< 0.005	4	< 0.001	< 0.001	< 0.005	4
	Lake Perris	PE002000		< 0.005	< 0.005	4	< 0.001	< 0.001	< 0.005	4
Zinc	San Luis Reservoir	SL001000		< 0.005	< 0.005	12	< 0.050	< 0.005	0.012	12
	Pyramid Lake	PY001000		< 0.005	< 0.005	4		< 0.005	< 0.050	3
	Castaic Lake	CA002000		< 0.005	< 0.005	4		< 0.005	< 0.050	4
	Silverwood Lake	SI002000		< 0.005	< 0.005	4		< 0.005	< 0.050	4
	Lake Perris	PE002000		< 0.005	< 0.005	4		< 0.005	< 0.050	4
Arsenic	San Luis Reservoir	SL001000		0.002	0.002	12	0.002	0.002	0.004	12
	Pyramid Lake	PY001000		0.002	0.002	4	0.002	0.002	0.003	3
	Castaic Lake	CA002000		0.002	0.002	4		0.002	0.002	4
	Silverwood Lake	SI002000		0.002	0.002	4	0.002	< 0.001	0.003	4
	Lake Perris	PE002000		0.002	0.002	4	0.002	0.002	0.002	4
Barium	San Luis Reservoir	SL001000		< 0.050	< 0.050	12		< 0.050	< 0.050	12
	Pyramid Lake	PY001000		< 0.050	0.050	4		< 0.050	< 0.050	3
	Castaic Lake	CA002000	< 0.050	< 0.050	0.050	4		< 0.050	< 0.050	4
	Silverwood Lake	SI002000		< 0.050	< 0.050	4		< 0.050	< 0.050	4
	Lake Perris	PE002000	0.052	< 0.050	0.059	4	0.054	< 0.050	0.057	4
Boron	San Luis Reservoir	SL001000	0.2	0.1	0.2	12	0.2	0.1	0.2	12
	Pyramid Lake	PY001000	0.3	0.3	0.4	4	0.2	0.2	0.3	4
	Castaic Lake	CA002000	0.4	0.4	0.4	4	0.3	0.3	0.4	4
	Silverwood Lake	SI002000	0.1	0.1	0.2	4	0.1	< 0.1	0.2	4
	Lake Perris	PE002000	0.2	0.2	0.3	4	0.2	0.2	0.3	4
Fluoride	San Luis Reservoir	SL001000	< 0.1	< 0.1	0.1	12		< 0.1	< 0.1	12
	Pyramid Lake	PY001000	0.2	0.2	0.2	4	0.1	0.1	0.2	4
	Castaic Lake	CA002000		0.3	0.3	4		0.2	0.2	4
	Silverwood Lake	SI002000	< 0.1	< 0.1	0.1	4	< 0.1	< 0.1	0.1	4
	Lake Perris	PE002000	0.2	0.1	0.2	4		0.1	0.1	4
Selenium	San Luis Reservoir	SL001000		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Pyramid Lake	PY001000	< 0.001	< 0.001	0.001	4		< 0.001	< 0.001	3
	Castaic Lake	CA002000		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	Silverwood Lake	SI002000		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	Lake Perris	PE002000		< 0.001	< 0.001	4		< 0.001	< 0.001	4

Figure 3-13
Monthly Iron and Manganese in San Luis Reservoir and Southern California Lakes



In Southern California lakes, copper, iron, manganese, arsenic, boron, and fluoride were the only minor elements routinely detected (Table 3-9). All values were below the MCLs for finished drinking water or Article 19 objectives, with the exception of one sample collected at Silverwood Lake that contained manganese at 0.403 mg/L (Figure 3-13). The sample, collected in February 1997, also contained iron at 0.045 mg/L, indicating the likelihood of sample contamination. Although water in Silverwood Lake was affected by Kern River inflows in February, iron and manganese were not elevated in those inflows and would not have been the cause of the elevated iron and manganese.

Nutrients

Nutrients enhance plant growth in surface waters and include nitrogen and phosphorus compounds. Nitrogen compounds monitored in the Project include nitrate+nitrite, organic nitrogen, and dissolved ammonia (present largely as the ammonium ion). Phosphorus analyses include total phosphorus and dissolved orthophosphate. The Primary MCL for nitrite as nitrogen is 0.4 mg/L and the MCL for nitrate+nitrite as nitrogen is 10 mg/L. No standards or objectives exist for the other nutrients.

Feather River Watershed

Nutrients were below all MCLs for finished drinking water in all samples collected from Project stations in the Feather River watershed during 1996-97 (Table 3-10). Organic nitrogen and total phosphorus were the only nutrients detected in Antelope and Frenchman lakes and Lake Davis. These compounds were also routinely detected at or near the reporting limits in Thermalito Afterbay and Oroville Lake.

Table 3-10
Nutrient Concentrations in the Feather River Watershed, 1996-97

			1996				1997			
Parameter	**Station Name**	**I.D. #**	**Mean**	**Low**	**High**	**# of Samples**	**Mean**	**Low**	**High**	**# of Samples**
Dissolved Ammonia mg/L as N	Antelope Lake	AN001000	< 0.01			1	< 0.01			1
	Frenchman Lake	FR001000	< 0.01			1	< 0.01			1
	Lake Davis	LD001000	< 0.01			1	< 0.01			1
	Oroville Lake	OR001000		< 0.01	< 0.01	8	0.01	< 0.01	0.02	8
	Thermalito Afterbay	TA001000		< 0.01	< 0.01	11		< 0.01	0.01	12
Nitrate + Nitrite mg/L as N	Antelope Lake	AN001000	< 0.01			1	< 0.01			1
	Frenchman Lake	FR001000	< 0.01			1	< 0.01			1
	Lake Davis	LD001000	< 0.01			1	< 0.01			1
	Oroville Lake	OR001000	0.02	< 0.01	0.04	8	0.01	< 0.01	0.02	8
	Thermalito Afterbay	TA001000	0.02	< 0.01	0.07	11	0.02	< 0.01	0.04	12
Organic Nitrogen mg/L	Antelope Lake	AN001000	0.30			1	0.30			1
	Frenchman Lake	FR001000	0.20			1	0.20			1
	Lake Davis	LD001000	0.30			1	0.03			1
	Oroville Lake	OR001000	0.16	< 0.10	0.30	8	0.15	0.10	0.20	8
	Thermalito Afterbay	TA001000	0.11	< 0.10	0.20	11	0.19	0.10	0.30	12
Dissolved Orthophosphate mg/L as P	Antelope Lake	AN001000	< 0.01			1	< 0.01			1
	Frenchman Lake	FR001000	< 0.01			1	< 0.01			1
	Lake Davis	LD001000	< 0.01			1	< 0.01			1
	Oroville Lake	OR001000		< 0.01	0.01	8		< 0.01	< 0.01	8
	Thermalito Afterbay	TA001000		< 0.01	0.01	11		< 0.01	0.01	12
Total Phosphorus mg/L	Antelope Lake	AN001000	0.02			1	0.03			1
	Frenchman Lake	FR001000	< 0.01			1	< 0.01			1
	Lake Davis	LD001000	0.02			1	0.01			1
	Oroville Lake	OR001000	0.03	0.01	0.12	8	0.01	< 0.01	0.02	8
	Thermalito Afterbay	TA001000	0.02	< 0.01	0.06	11	0.04	0.01	0.18	12

North Bay and South Bay Aqueducts

In the North Bay Aqueduct at Barker Slough Pumping Plant, nutrient levels during 1996-97 were below all MCLs for finished drinking water but routinely above their respective reporting limits (Table 3-11). Levels were highest during the rainy season months of December through February (Figure 3-14). Seasonal nutrient surges coincided with rainfall runoff from the upstream watershed. A detailed discussion of these trends is presented in Special Investigations (Chapter IV).

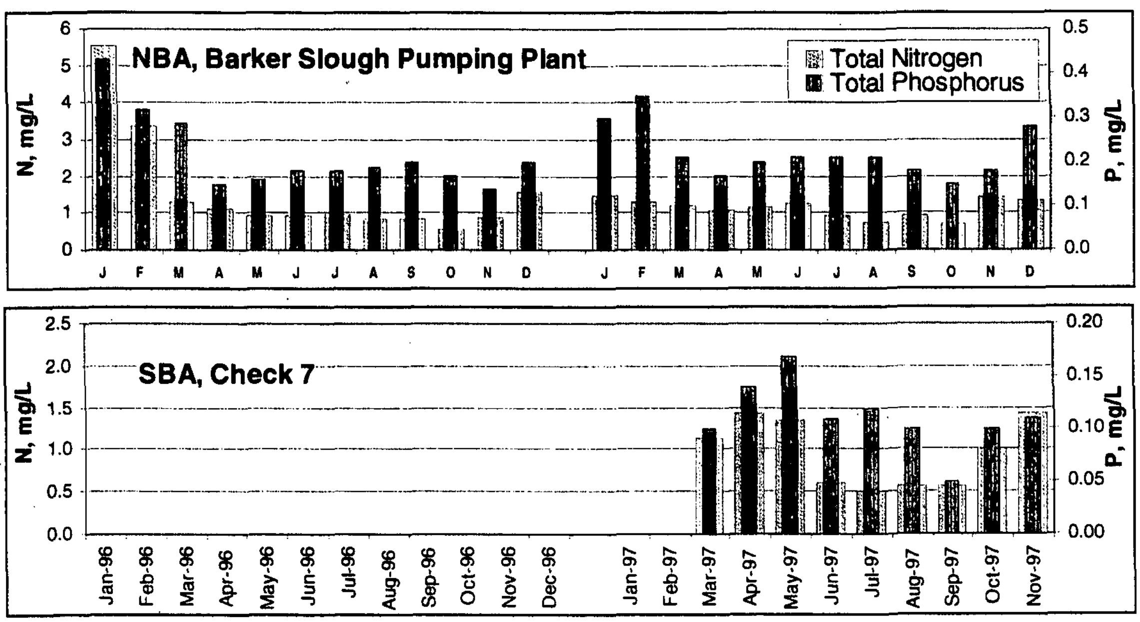
In the South Bay Aqueduct at Check 7, nutrients were below their respective MCLs for finished drinking water in all 1996-97 samples (Table 3-11). Monthly nutrient monitoring began in March 1997 at Check 7 in the South Bay Aqueduct (Figure 3-14).

The highest levels of nitrate+nitrite in Del Valle Reservoir were detected during the rainy season months of both years, indicating seasonal increases from the local watershed drained by Arroyo Valle Creek. During the dry season, nitrate+nitrite in reservoir water was usually near or below the reporting limit of <0.01 mg/L. Dissolved orthophosphate and ammonia were consistently near or below their respective reporting limits at both Del Valle stations.

Table 3-11
Nutrient Concentrations in the North Bay and South Bay Aqueducts, 1996-97

			1996				1997			
Parameter	Station Name	I.D. #	Mean	Low	High	# of Samples	Mean	Low	High	# of Samples
Dissolved Ammonia mg/L as N	NBA, Barker Sl. Pumping Plant	KG000000	0.03	0.01	0.08	12	0.04	0.01	0.07	12
	SBA, Check 7	KB001632					0.02	< 0.01	0.05	9
	SBA, Del Valle Reservoir	DV001000	0.01	< 0.01	0.03	7	0.01	< 0.01	0.03	9
	SBA, Del Valle Outlet	DV000000	< 0.01			1		< 0.01	< 0.01	4
Nitrate + Nitrite mg/L as N	NBA, Barker Sl. Pumping Plant	KG000000	0.65	0.13	3.50	12	0.32	0.11	0.61	12
	SBA, Check 7	KB001632					0.47	0.06	0.89	9
	SBA, Del Valle Reservoir	DV001000	0.07	< 0.01	0.39	7	0.07	< 0.01	0.47	9
	SBA, Del Valle Outlet	DV000000	0.05			1	0.13	< 0.01	0.38	4
Organic Nitrogen mg/L	NBA, Barker Sl. Pumping Plant	KG000000	0.9	0.4	2.0	12	0.8	0.4	1.3	12
	SBA, Check 7	KB001632					0.5	0.3	0.8	9
	SBA, Del Valle Reservoir	DV001000	0.3	0.3	0.4	7	0.4	0.3	0.6	9
	SBA, Del Valle Outlet	DV000000	0.2			1		0.3	0.3	4
Dissolved Orthophosphate mg/L as P	NBA, Barker Sl. Pumping Plant	KG000000	0.09	0.05	0.12	12	0.10	0.01	0.12	12
	SBA, Check 7	KB001632					0.06	0.04	0.12	9
	SBA, Del Valle Reservoir	DV001000		< 0.01	< 0.01	7		< 0.01	0.01	9
	SBA, Del Valle Outlet	DV000000	< 0.01			1	0.01	< 0.01	0.02	4
Total Phosphorus mg/L	NBA, Barker Sl. Pumping Plant	KG000000	0.22	0.14	0.43	12	0.22	0.15	0.35	12
	SBA, Check 7	KB001632					0.11	0.05	0.17	9
	SBA, Del Valle Reservoir	DV001000	0.02	< 0.01	0.04	7	0.02	< 0.01	0.06	9
	SBA, Del Valle Outlet	DV000000	0.07			1	0.03	< 0.01	0.06	4

Figure 3-14
Monthly Nutrient Concentrations in the North Bay and South Bay Aqueducts



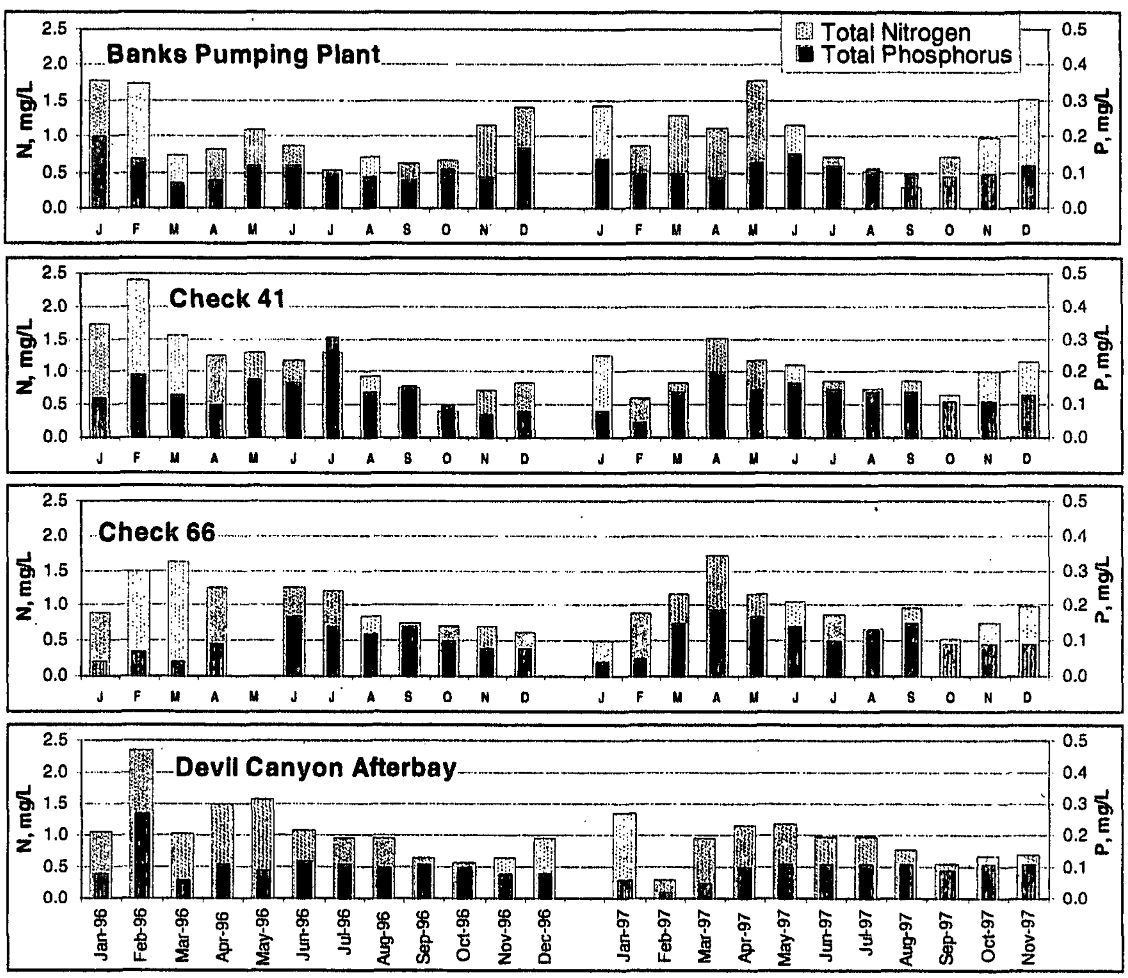
California Aqueduct

Nutrients in the California Aqueduct were routinely detected above their reporting limits, but below all MCLs for finished drinking water during 1996-97 (Table 3-12). Total nitrogen at most stations declined throughout the summer until October or November during both years (Figure 3-15). Total nitrogen was

Table 3-12
Nutrient Concentrations in the California Aqueduct, 1996-97

Parameter	Station Name	I.D. #	1996 Mean	1996 Low	1996 High	1996 # of Samples	1997 Mean	1997 Low	1997 High	1997 # of Samples
Dissolved Ammonia	Banks Pumping Plant	KA000331	0.05	0.02	0.14	12	0.08	0.02	0.25	12
mg/L as N	Check 41	KA030341	0.01	< 0.01	0.03	12	0.01	< 0.01	0.02	12
	Check 66	KA040341	0.02	< 0.01	0.04	11	0.02	< 0.01	0.10	12
	Devil Canyon Afterbay	KA041288	0.05	0.01	0.25	12	0.04	< 0.01	0.20	13
Nitrate + Nitrite	Banks Pumping Plant	KA000331	0.55	0.19	1.20	12	0.54	0.09	0.88	12
mg/L as N	Check 41	KA030341	0.68	0.20	1.58	12	0.56	0.14	1.00	12
	Check 66	KA040341	0.46	0.07	0.88	11	0.48	0.08	1.00	12
	Devil Canyon Afterbay	KA041288	0.54	0.24	0.90	12	0.43	0.20	0.72	13
Organic Nitrogen	Banks Pumping Plant	KA000331	0.4	0.2	0.9	12	0.4	0.3	0.8	12
mg/L	Check 41	KA030341	0.5	0.2	0.9	12	0.4	0.3	0.5	12
	Check 66	KA040341	0.6	0.4	0.9	11	0.4	0.3	0.7	12
	Devil Canyon Afterbay	KA041288	0.5	0.2	1.3	12	0.4	0.1	0.6	13
Dissolved Orthophosphate	Banks Pumping Plant	KA000331	0.07	0.02	0.12	12	0.07	0.04	0.10	12
mg/L as P	Check 41	KA030341	0.10	0.05	0.23	12	0.07	0.03	0.10	12
	Check 66	KA040341	0.06	0.01	0.10	11	0.07	0.01	0.10	12
	Devil Canyon Afterbay	KA041288	0.06	0.02	0.09	12	0.06	< 0.01	0.10	13
Total Phosphorus	Banks Pumping Plant	KA000331	0.11	0.07	0.20	12	0.11	0.09	0.15	12
mg/L	Check 41	KA030341	0.15	0.07	0.31	12	0.13	0.05	0.20	12
	Check 66	KA040341	0.10	0.03	0.10	11	0.12	0.04	0.19	12
	Devil Canyon Afterbay	KA041288	0.11	0.06	0.27	12	0.09	0.02	0.11	13

Figure 3-15
Monthly Nutrient Concentrations in the California Aqueduct



highest in the first few months of 1996, indicating increases caused by early season runoff from the Central Valley. The same trend was not observed in 1997 when total nitrogen levels increased in the spring. Seasonal trends for total phosphorus were not as well defined.

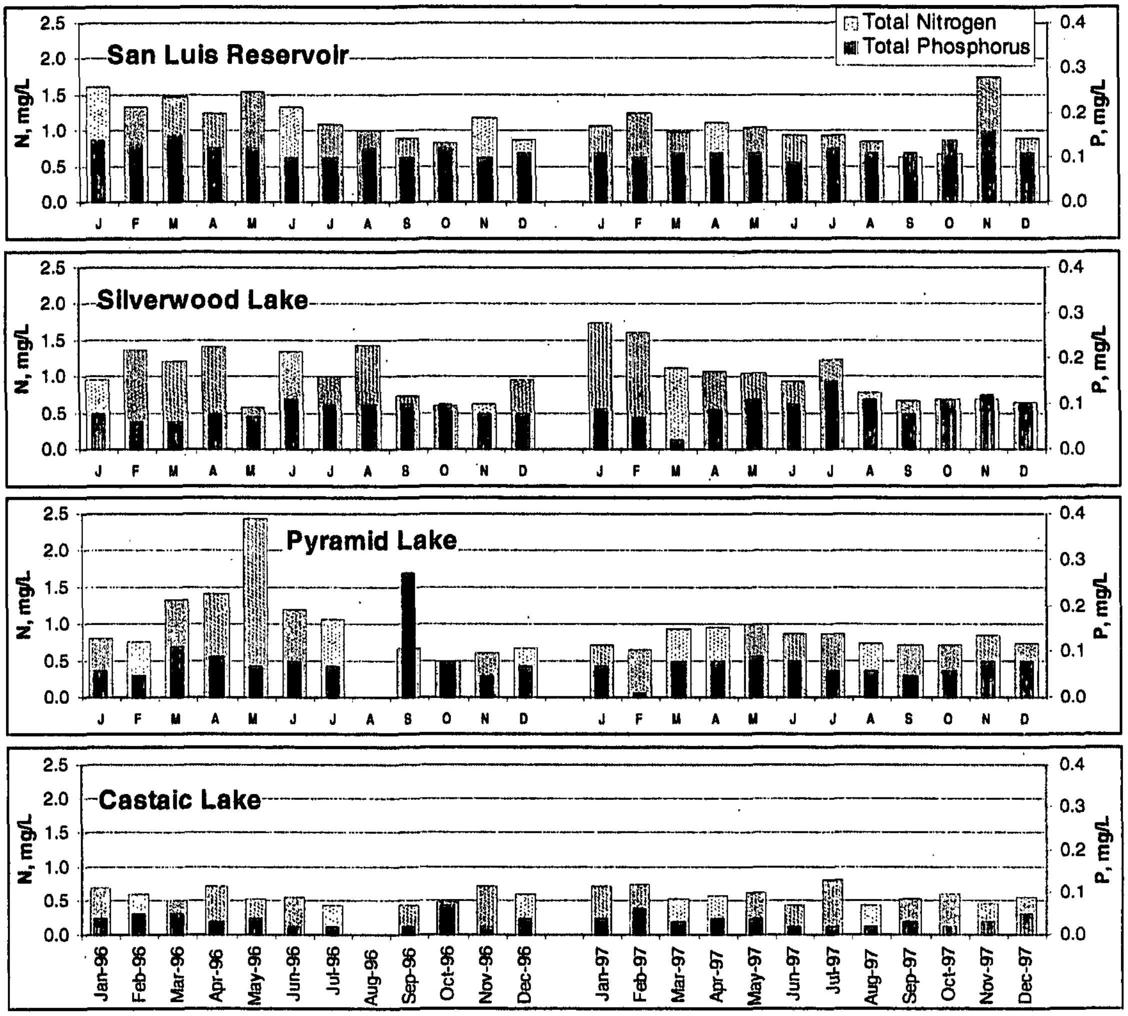
San Luis Reservoir and Southern California Lakes

All nutrients in San Luis Reservoir and Southern California lakes were below their respective MCLs for finished drinking water during 1996-97 (Table 3-13). Total nitrogen in San Luis Reservoir generally declined from January to October during each year. Seasonal nutrient trends were not consistent between any of the lake stations during 1996-97 but were lowest in Castaic Lake (Figure 3-16). Nutrient loads to Southern California lakes are discussed in Special Investigations (Chapter IV).

Table 3-13
Nutrient Concentrations in San Luis Reservoir and Southern California Lakes, 1996-97

			1996				1997			
Parameter	**Station Name**	**I.D. #**	**Mean**	**Low**	**High**	**# of Samples**	**Mean**	**Low**	**High**	**# of Samples**
Dissolved Ammonia	San Luis Reservoir	SL001000	0.02	< 0.01	0.04	12	0.02	< 0.01	0.07	12
mg/L as N	San Luis Res., Tunnel Isl.	SL005000	0.01	< 0.01	0.02	12	0.03	< 0.01	0.07	12
	Pyramid Lake	PY001000	0.02	< 0.01	0.06	11	0.01	< 0.01	0.03	12
	Castaic Lake	CA002000	0.01	< 0.01	0.03	11	0.01	< 0.01	0.03	12
	Silverwood Lake	SI002000	0.02	< 0.01	0.06	12	0.08	< 0.01	0.24	12
	Lake Perris	PE002000	0.02	< 0.01	0.06	12	0.06	< 0.01	0.04	12
Nitrate + Nitrite	San Luis Reservoir	SL001000	0.73	0.50	1.20	12	0.59	0.20	1.39	12
mg/L as N	San Luis Res., Tunnel Isl.	SL005000	0.68	0.46	0.90	12	0.54	0.05	1.20	12
	Pyramid Lake	PY001000	0.49	0.29	0.71	11	0.48	0.32	0.58	12
	Castaic Lake	CA002000	0.14	< 0.01	0.38	11	0.15	< 0.01	0.42	12
	Silverwood Lake	SI002000	0.51	0.25	0.70	12	0.53	0.23	0.77	12
	Lake Perris	PE002000	0.01	0.01	0.03	12	0.06	< 0.01	0.20	12
Organic Nitrogen	San Luis Reservoir	SL001000	0.5	0.3	0.9	12	0.4	0.2	0.6	12
mg/L	San Luis Res., Tunnel Isl.	SL005000	0.4	0.2	0.8	12	0.4	0.3	0.8	12
	Pyramid Lake	PY001000	0.5	0.2	2.1	11	0.3	< 0.1	0.6	12
	Castaic Lake	CA002000	0.4	0.2	0.6	11	0.4	0.2	0.8	12
	Silverwood Lake	SI002000	0.5	0.2	0.9	12	0.5	0.2	0.8	12
	Lake Perris	PE002000	0.6	0.3	1.2	12	0.4	0.3	0.6	12
Dissolved Orthophosphate	San Luis Reservoir	SL001000	0.08	0.06	0.10	12	0.08	0.05	0.10	12
mg/L as P	San Luis Res., Tunnel Isl.	SL005000	0.08	0.05	0.11	12	0.09	0.07	0.13	12
	Pyramid Lake	PY001000	0.05	0.05	0.07	11	0.05	0.03	0.06	12
	Castaic Lake	CA002000	0.02	< 0.01	0.03	11	0.02	< 0.01	0.04	12
	Silverwood Lake	SI002000	0.06	0.02	0.09	12	0.06	< 0.01	0.11	12
	Lake Perris	PE002000	0.02	< 0.01	0.04	12	0.02	< 0.01	0.05	12
Total Phosphorus	San Luis Reservoir	SL001000	0.12	0.10	0.50	12	0.12	0.09	0.09	12
mg/L	San Luis Res., Tunnel Isl.	SL005000	0.12	0.10	0.16	12	0.12	0.09	0.09	12
	Pyramid Lake	PY001000	0.09	0.05	0.27	11	0.07	0.01	0.01	12
	Castaic Lake	CA002000	0.04	0.02	0.07	11	0.03	0.02	0.02	12
	Silverwood Lake	SI002000	0.09	0.06	0.11	12	0.09	0.02	0.02	12
	Lake Perris	PE002000	0.04	< 0.01	0.08	12	0.04	< 0.01	0.08	12

Figure 3–16
Monthly Nutrient Concentrations in San Luis Reservoir and Southern California Lakes



Organic Compounds

Organic compound analyses include total organic carbon, total trihalomethane formation potential, as well as chemicals such as insecticides and herbicides. Measurements of UV 254—a spectrophotometric indicator of both dissolved and total organic carbon—also exists for Barker Slough Pumping Plant on the North Bay Aqueduct. Total organic carbon is a measure of all waterborne organic carbon including the trihalomethane precursors, humic and fulvic acids. TTHMFP is a measure of the capacity for trihalomethanes to form when disinfectants are added during the water treatment process. MCLs for organic chemicals such as pesticides and insecticides are presented in Appendix B, Table B-3.

Total Organic Carbon and Trihalomethane Formation Potential

North Bay and South Bay Aqueducts

On the North Bay Aqueduct at Barker Slough Pumping Plant, dissolved organic carbon levels were similar for both years, ranging from 4.3 to 14.5 mg/L in 1996 and from 4.6 to 13.8 mg/L in 1997 (Figure 3-17). This was not the case for TOC or TTHMFP, which exhibited higher peak values in 1996. Both TOC and DOC were well correlated with UV 254 (Figure 3-18). TOC and TTHMFP were highest

Figure 3-17
TOC, DOC, TTHMFP, and UV 254 Measurements in the North Bay Aqueduct at Barker Slough Pumping Plant, 1996-97

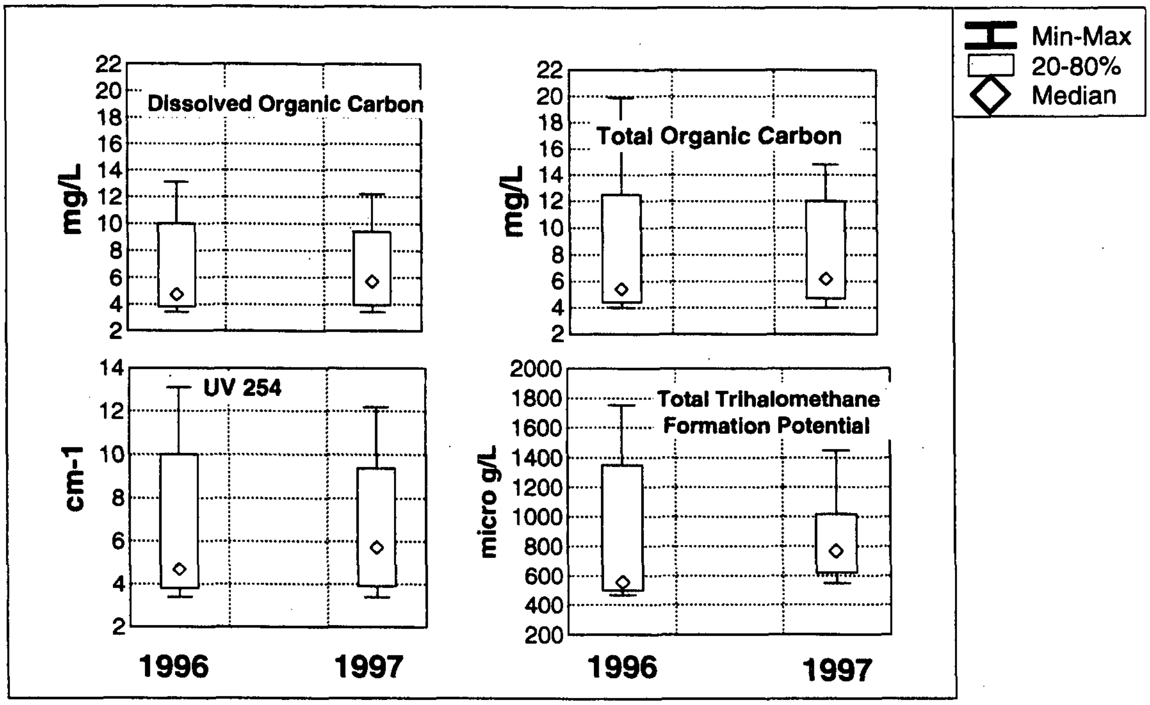
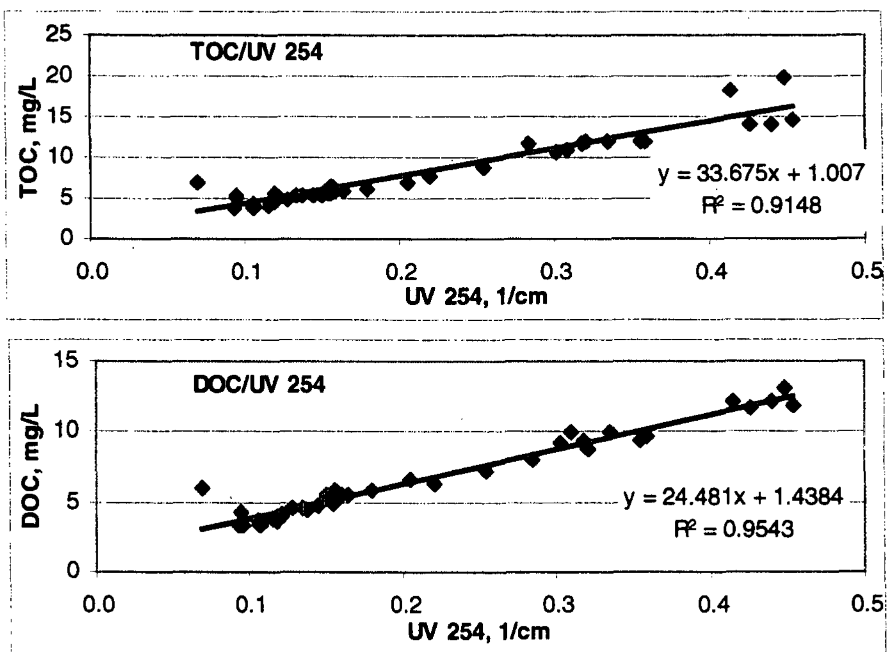


Figure 3-18
Correlation Between Total and Dissolved Organic Carbon and UV 254 at Barker Slough Pumping Plant



during the winter, when rainfall runoff flushes organic carbon, as well as other parameters, from the upstream watershed (Figure 3-19). Over 90 percent of the TTHMFP was made up of chloroform (Figure 3-20). A detailed discussion of these trends is presented in Special Investigations (Chapter IV).

On the South Bay Aqueduct at Check 7, monitoring for TOC and TTHMFP started in April 1997 (Figure 3-19).

Figure 3-19
Monthly TOC and TTHMFP in the North Bay and South Bay Aqueducts

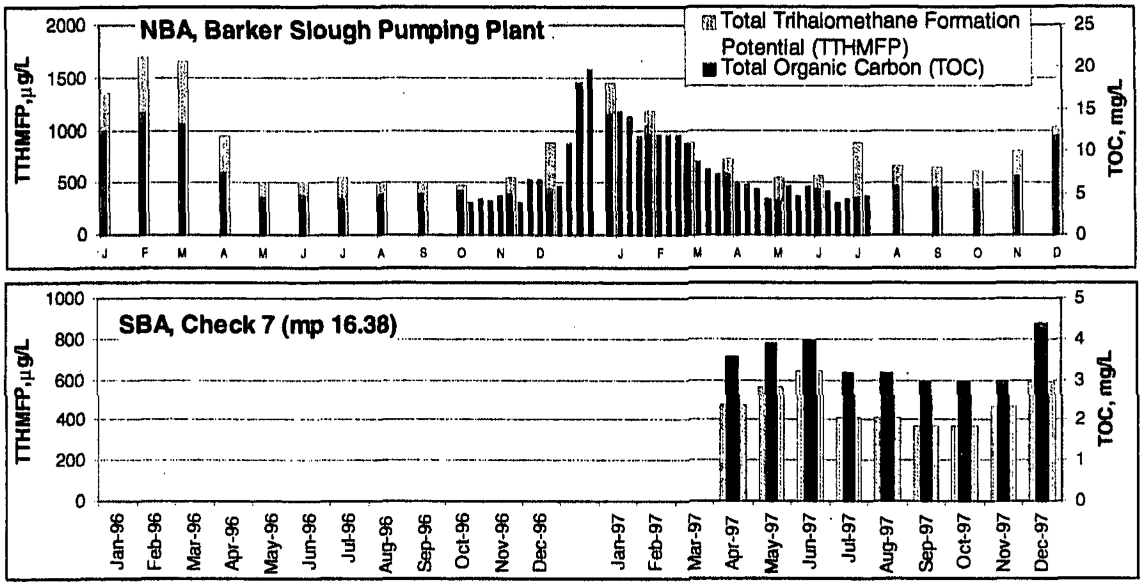


Figure 3-20
Percentage by Concentration of Individual Trihalomethanes Composing TTHMFP in the Project

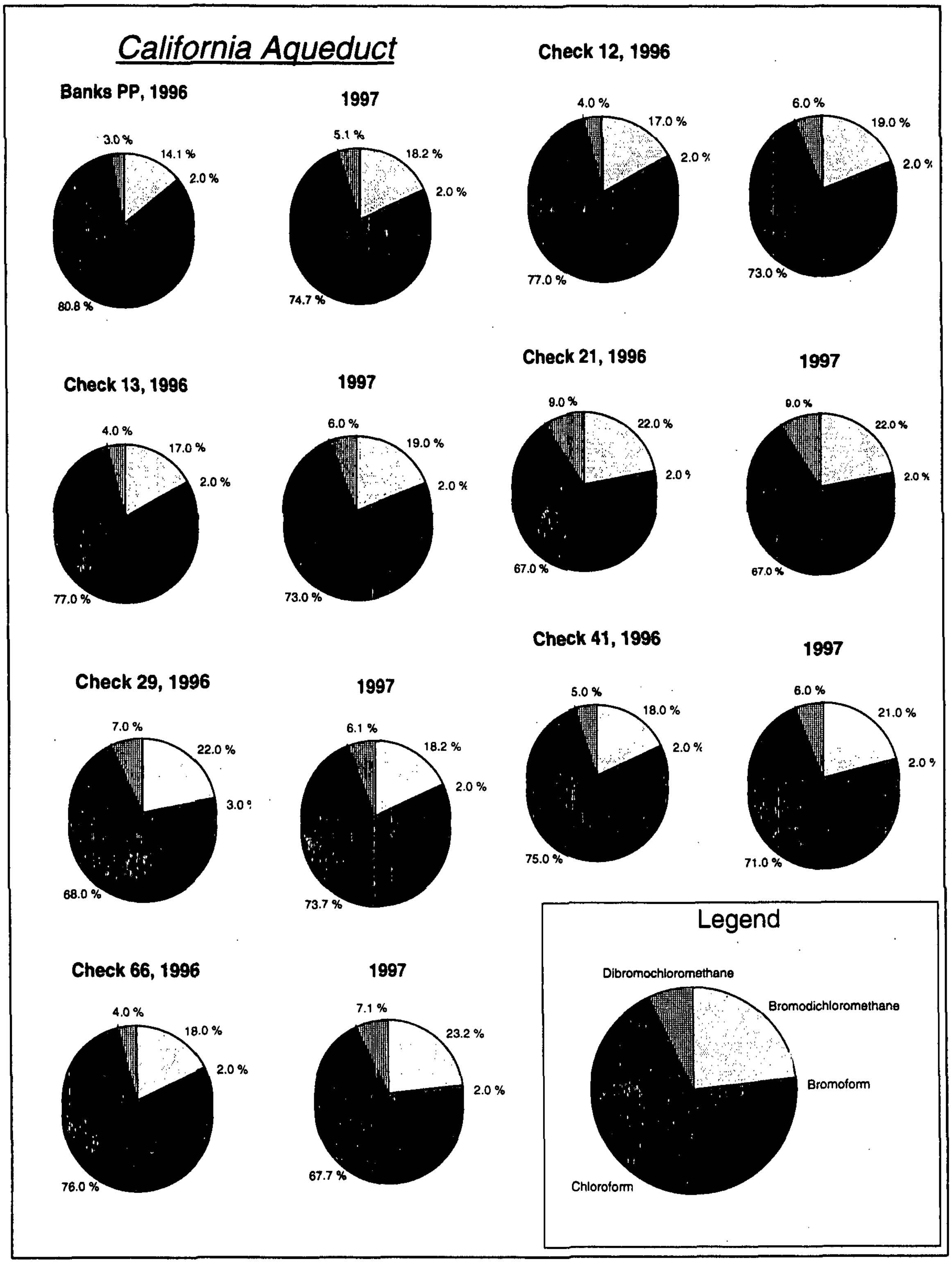
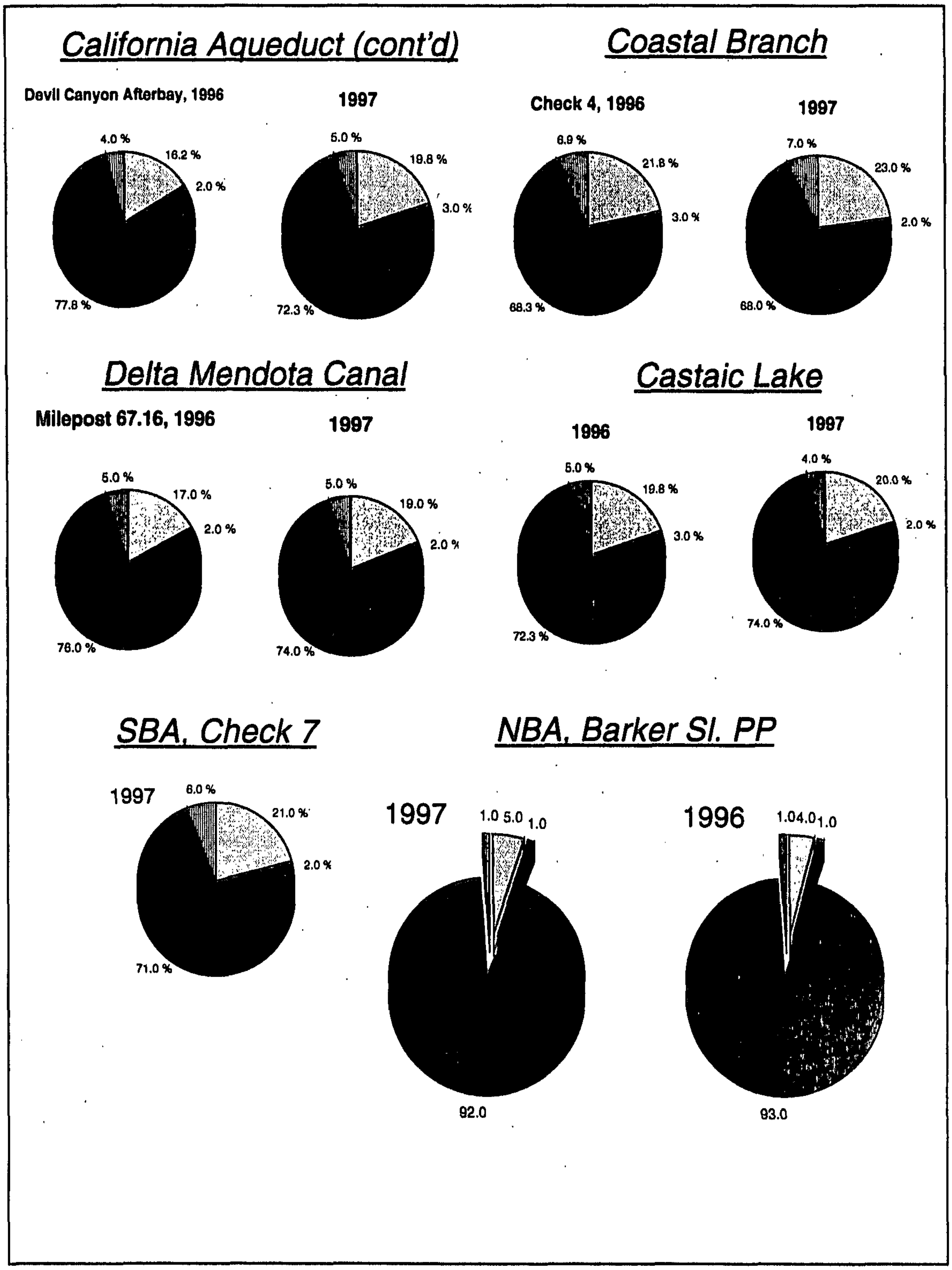


Figure 3-20 (Con't)
Percentage by Concentration of Individual Trihalomethanes Composing TTHMFP in the Project



California Aqueduct and Coastal Branch
Total organic carbon ranged between 2.7 and 8.1 mg/L in 1996 and between 1.8 and 4.8 mg/L in 1997 at all stations monitored in the California Aqueduct (Figure 3-21). The higher levels in 1996 were the result of several factors. First, increases in Aqueduct TOC coincided with early or late season runoff in the Central Valley (Figure 3-22). Second, a TOC value of 8.1 mg/L was reported at Check 41 in July 1996, while a corresponding increase in TTHMFP was not observed. No known non-Project inflows (which might explain the elevated TOC) occurred during that month. Lastly, TOC and TTHMFP were elevated at Devil Canyon Afterbay in February 1996 and may have been due to upstream floodwater inflows in the SLC. Local inflows were not suspect since the mineralogical makeup of that sample was more similar to Project inflows.

During both years, chloroform composed 67 to 81 percent of the TTHMFP concentrations, followed by bromodichloromethane with 14 to 22 percent, dibromochloromethane with 3 to 9 percent, and bromoform with 2 to 3 percent (Figure 3-20). Chloroform percentages were slightly higher in 1996 than 1997 at all stations except Check 29; the reverse was true for dibromo- and bromodichloromethane percentages that composed a larger percentage of the total during 1997 than 1996.

Southern California Lakes
At Castaic Lake, TOC and TTHMFP were highest in May or August of 1996 and 1997 (Figure 3-23). Chloroform composed 72 to 74 percent of the TTHMFP in both years, followed by bromodichloromethane with 20 percent (Figure 3-20).

Figure 3-21
TOC and TTHMFP in the California Aqueduct and Coastal Branch, 1996-97

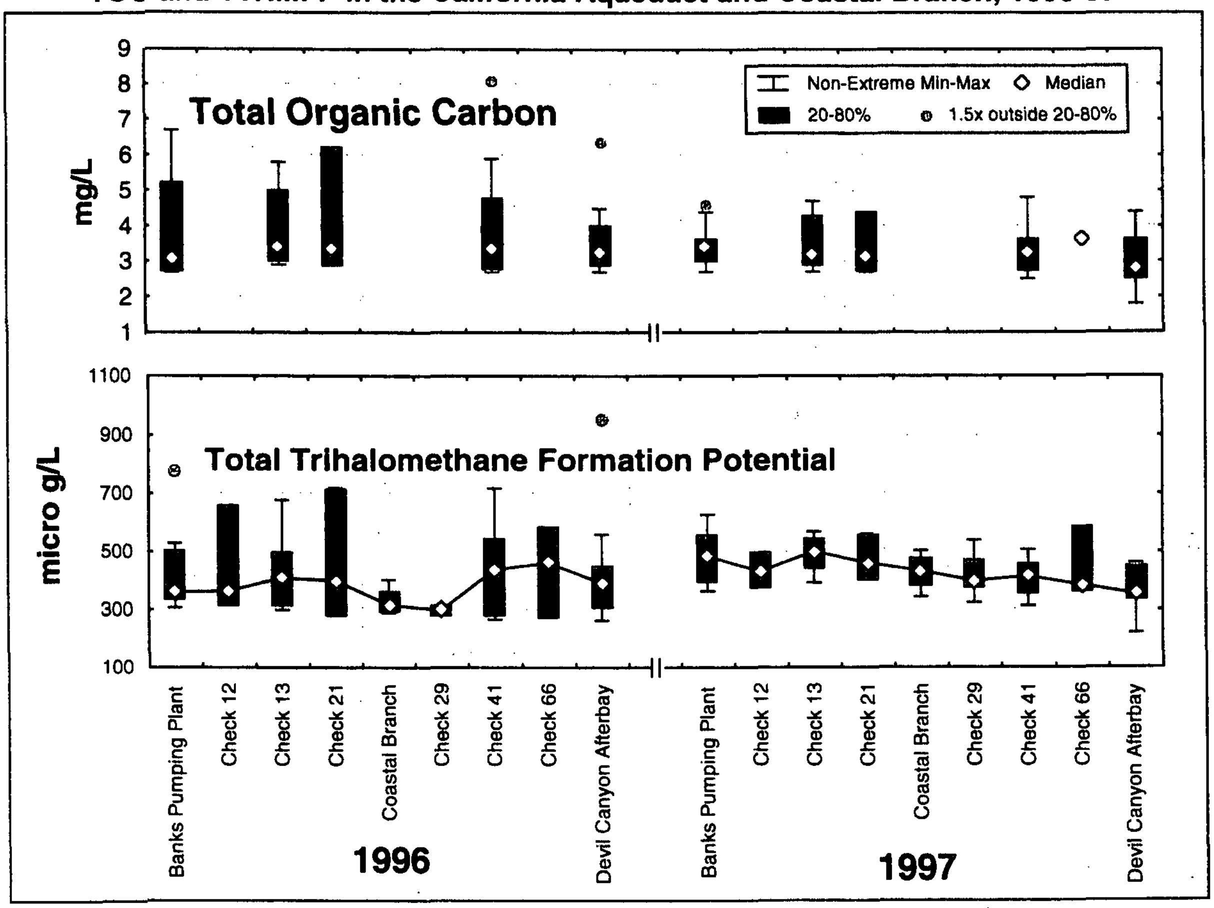


Figure 3-22
Monthly TOC and TTHMFP in the California Aqueduct

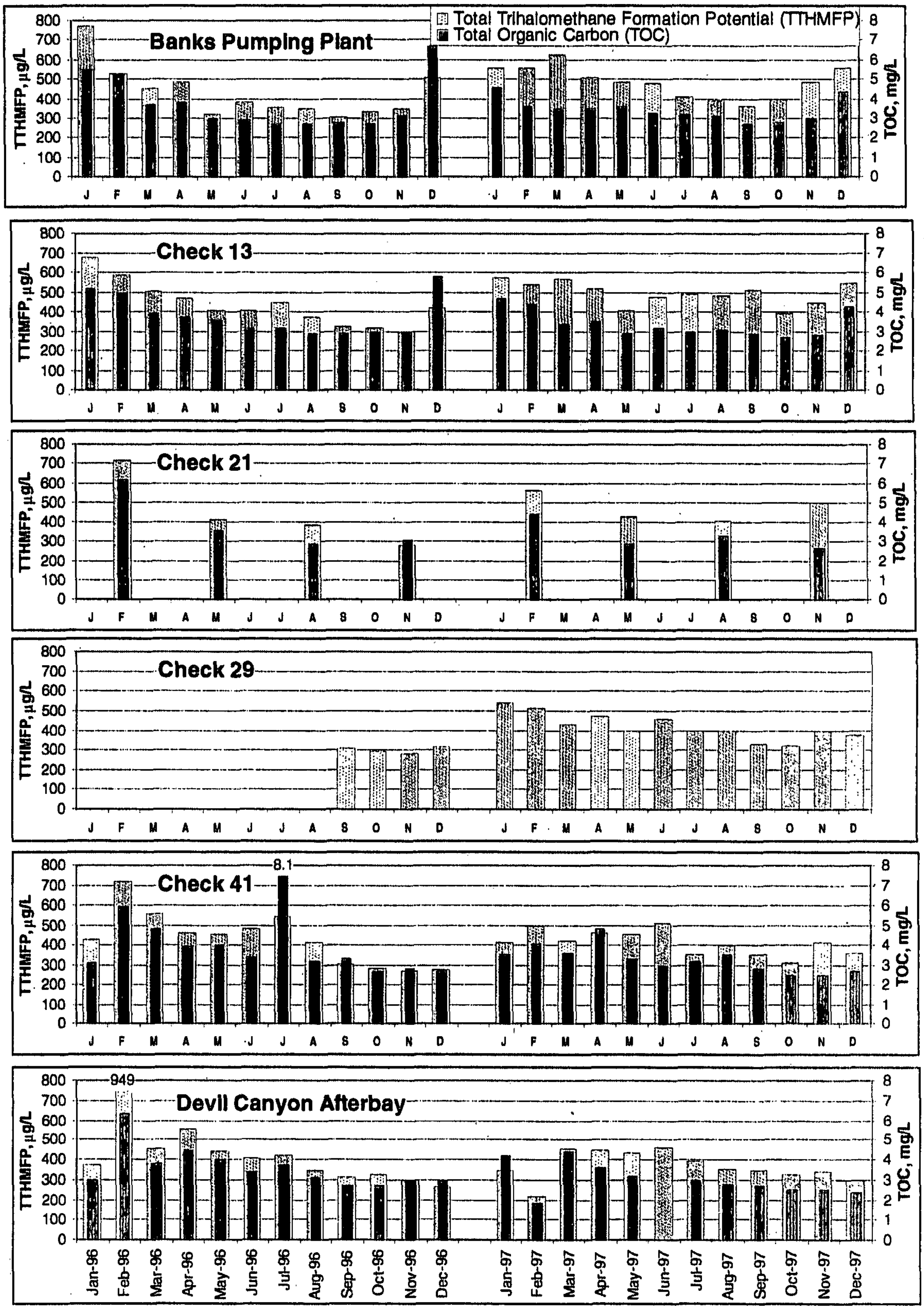
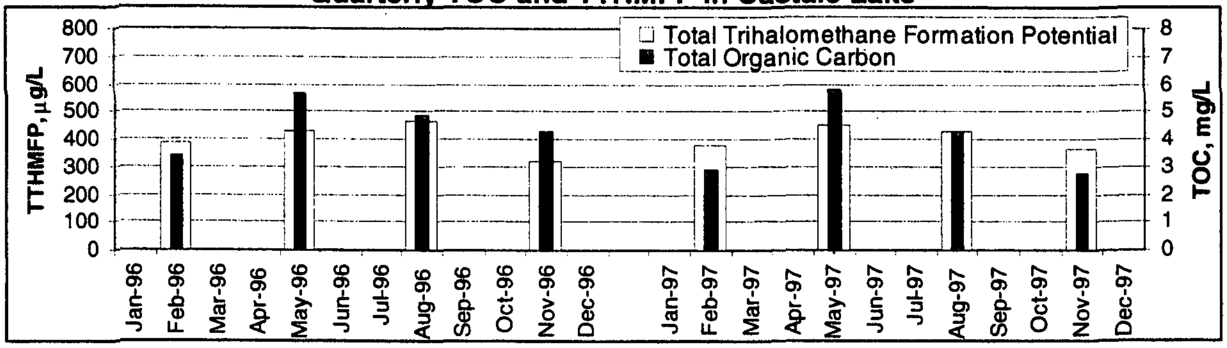


Figure 3-23
Quarterly TOC and TTHMFP in Castaic Lake



Organic Chemicals

Organic chemicals include insecticides, herbicides, petroleum compounds, and other synthetic chemicals. The chemicals analyzed in each sample are listed in Appendix A. All were below their reporting limits except those in Table 3-14, and all of those were below their respective MCLs for finished drinking water. Most were pesticides except several positives for MtBE (methyl tertiary-butyl ether), a gasoline additive. Although all MtBE values in Table 3-14 were below the Secondary MCL of 0.005 mg/L, more intense monitoring has shown the presence of higher levels at Project lakes in Southern California (DWR 1999).

Insecticides and herbicides were detected throughout the California Aqueduct on 10 occasions during 1996-97. The pesticides probably originated from the Delta via Banks Pumping Plant or the Delta-Mendota Canal because, on all occasions, they were detected either at Banks Pumping Plant, the DMC, or Check 13. The only other major potential source of pesticides to the Aqueduct is floodwater inflows in the SLC located downstream from all three stations (DWR, 1995).

The herbicides cyanazine, Dacthal, diuron, and simazine were detected throughout the Aqueduct in March 1996. All but simazine are pre-emergent herbicides used prior to planting or for weed control in fallow fields. Herbicides were also detected Aqueduct-wide in September and June 1996. During 1997, the herbicides 2,4-D and cyanazine were detected throughout most of the Aqueduct on two occasions; 2,4-D was detected in September at three stations from Check 13 to Check 29, and cyanazine was detected Aqueduct-wide in March 1997.

The only insecticide detected Aqueduct-wide was diazinon. Diazinon is frequently applied to stone fruit orchards between late winter and spring to prevent bud predation. The pesticide was detected throughout the Aqueduct in March and June of 1997. The insecticide phosalone was detected at the reporting level of 0.02 ug/L at Check 13 in June 1996.

In the North Bay Aqueduct, the insecticides chlorpyrphos and aldicarb were detected once each in March and June 1996, respectively. Cyanazine was detected several times during 1996-97, and Dacthal was detected in March 1996.

Table 3-14
Insecticides, Herbicides, and Organic Chemicals in the State Water Project, 1996-97
(Reported in µg/L)

- = Below the Reporting Limit

Chemical	R.L. 1/	MCL	Month	Barker Sl. P.P.		Banks P.P. (California Aqueduct)		Check 13 (California Aqueduct)		Check 21 (California Aqueduct)		Check 29 (California Aqueduct)		Check 41 (California Aqueduct)		Devil Canyon A.B. (California Aqueduct)		DMC(CVP)	
				1996	1997	1996	1997	1996	1997	1996	1997	1996	1997	1996	1997	1996	1997	1996	1997
2,4-D	0.1	70	March	-	-	0.33	-	-	-	-	-	-	-	-	-	-	-	-	-
			June	-	-	-	-	-	-	-	0.12	-	-	-	-	-	-	-	0.13
			September	-	-	0.33	-	0.24	0.38	0.15	0.16	0.25	0.12	0.33	-	0.15	-	0.29	-
Aldicarb	2		March	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			June	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			September	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorpyrphos	0.01		March	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			June	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			September	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanazine	0.01		March	-	0.03	-	0.07	0.12	0.09	0.14	0.07	0.17	0.04	0.19	0.02	-	0.01	-	0.12
			June	0.21	-	-	-	-	-	-	0.02	-	-	-	-	0.02	-	-	-
			September	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diazinon	0.01		March	-	-	-	-	0.02	-	0.04	-	0.03	-	0.03	-	0.03	-	-	-
			June	-	-	-	-	0.02	-	0.01	-	0.02	-	0.01	-	-	-	0.03	0.03
			September	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dacthal (DCPA)	0.01		March	0.05	-	0.05	-	0.07	-	0.07	-	0.08	-	0.06	-	0.06	-	0.04	-
			June	-	-	-	-	-	-	0.01	-	0.01	-	-	-	-	-	-	-
			September	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diuron	0.05		March	-	-	0.18	-	0.55	-	0.61	-	1.14	-	1.78	-	0.26	-	0.13	-
			June	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			September	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosalone	0.02		March	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			June	-	-	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-
			September	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Simazine	0.02	4	March	-	0.06	0.07	0.05	0.09	0.03	0.16	-	0.31	-	0.38	-	0.08	0.05	0.06	0.06
			June	-	-	0.03	-	0.08	-	0.19	-	0.26	0.06	0.23	-	0.17	-	0.04	-
			September	-	-	-	-	-	-	0.13	-	-	-	0.02	-	0.05	-	-	-
MtBE	0.1		March	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-
			June	-	-	-	1.8	-	-	-	-	-	-	-	-	-	4.0	-	-
			September	-	-	-	1.7	-	-	-	-	-	-	-	-	-	2.3	-	2.3

1/ Reporting Limit

IV. Special Investigations

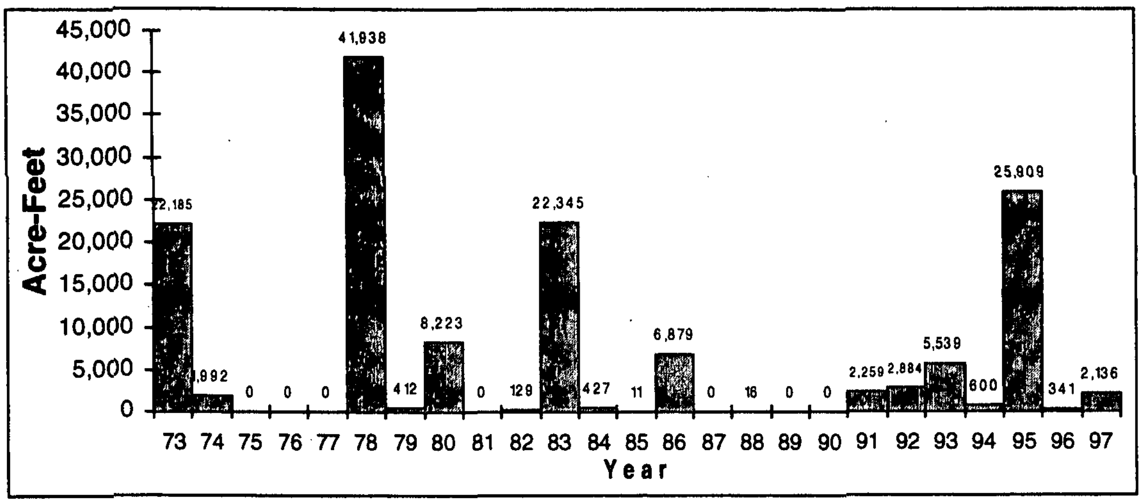
Non-Project Inflows

Non-Project inflows include floodwaters in the San Luis Canal, Kern River inflows, and local runoff to Project lakes in Southern California. The groundwater pump-in program ended in 1996, and only 121 af were admitted in November 1996.

Floodwater Inflows to the San Luis Canal

Inflow Volumes
Floodwater inflows to the San Luis Canal totaled 341 af in 1996 and 2,136 af in 1997 (Figure 4-1). These flows were relatively minor compared to the 26,000 af entering in 1995. Eighty-four percent of the 1996 inflows came from Cantua Creek, followed by Salt Creek (Figure 4-2). Almost all 1997 inflows occurred in January, and over 60 percent of those came from Cantua Creek, followed by Salt Creek (14 percent), Panoche Creek (10 percent), and pumping (10 percent). As in the past, Salt and Cantua creeks were the two largest contributors overall.

Figure 4-1
Annual SLC Floodwater Inflow Volumes, 1973-97



Floodwater Quality
High dissolved and suspended solids typify floodwater inflows (DWR 1995). Total dissolved solids ranged from 242 to 2,890 mg/L and suspended solids ranged from 15 to 596 mg/L between the six drain inlets monitored during 1996-97 (Table 4-1).

Figure 4-3 is a trilinear plot that graphically represents the geochemistry of Salt and Cantua creeks. It shows that Salt Creek contains a higher dissolved solids content than Cantua Creek as shown by the larger ring in the center matrix. Both drain inlets were sampled on the same day so the anionic/cationic composition is a good fingerprint of each watershed. Sulfate accounted for more than 90 percent of the anionic composition of Salt Creek as shown in the lower right matrix of Figure 4-3. In Cantua Creek, bicarbonate was dominant and accounted for about 55 percent of the total anionic content followed by sulfate with 40 percent. In both creeks, chloride composed less than 10 percent of the total anionic makeup.

Figure 4-2
Monthly Floodwater Inflow Volumes per Drain Inlet, 1996-97

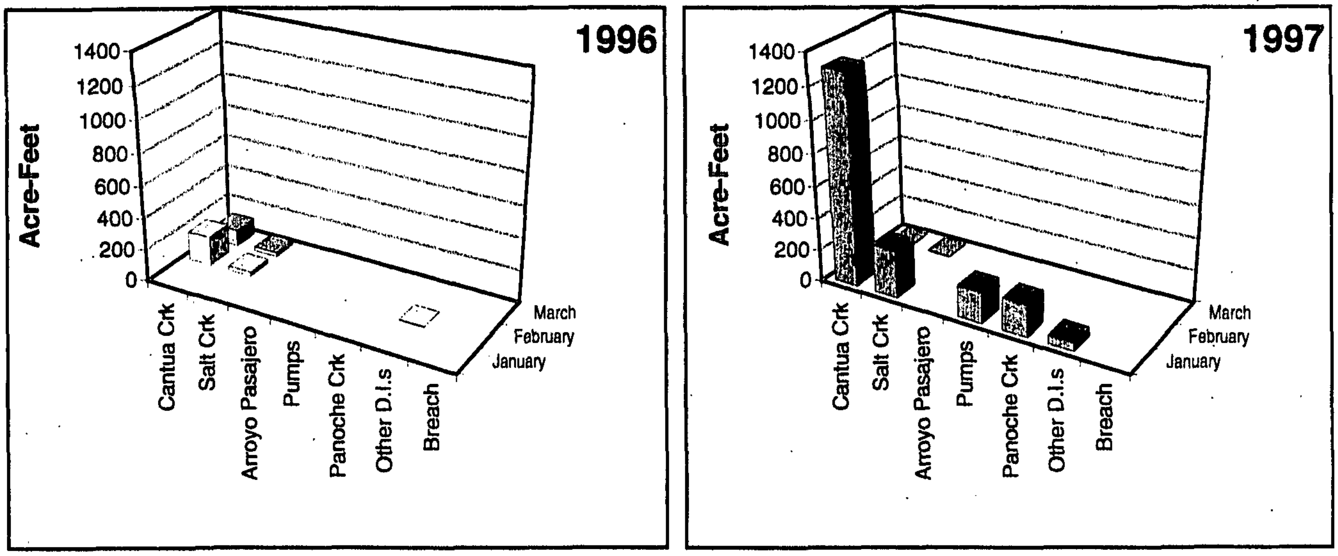


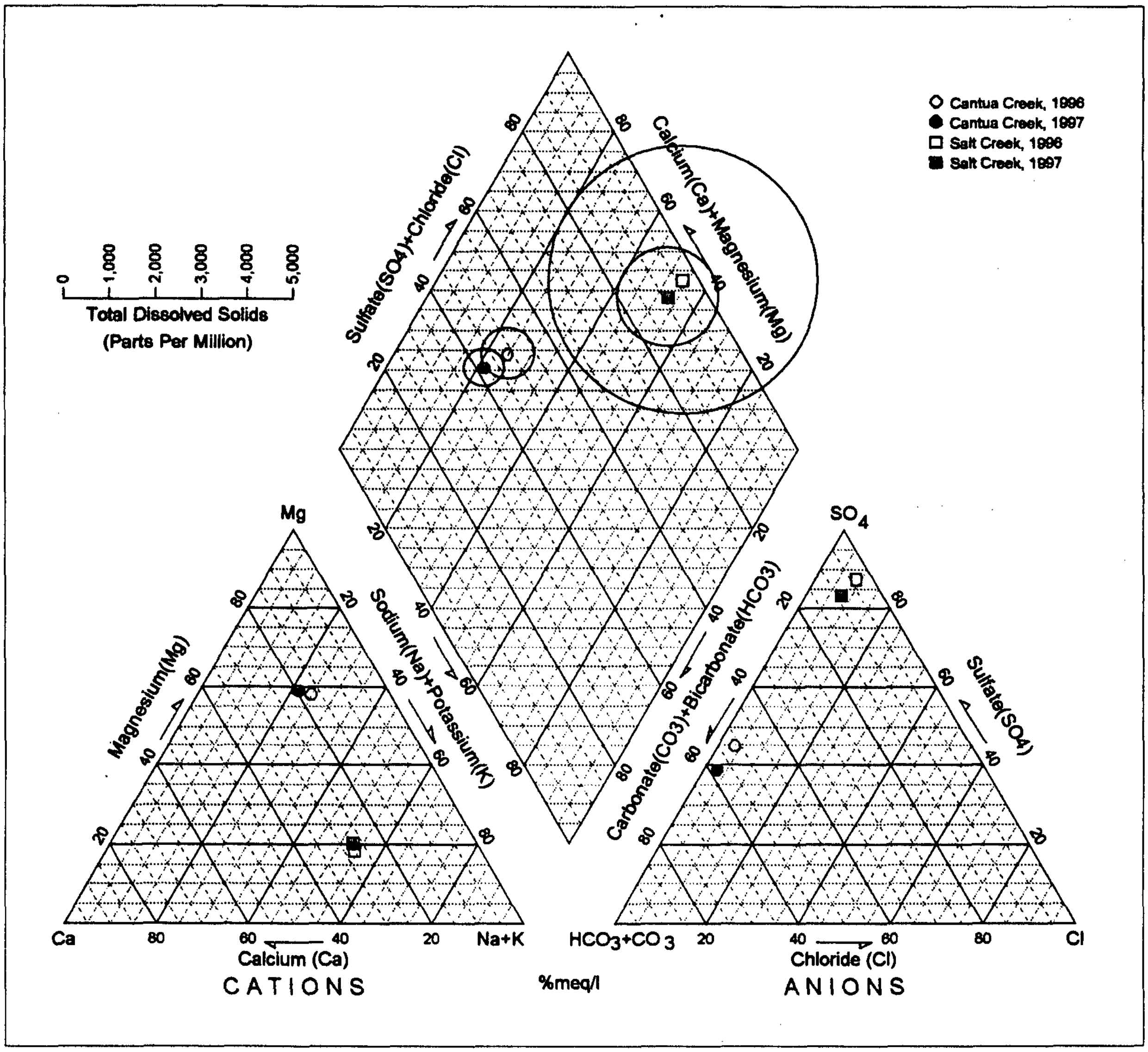
Table 4-1
General Water Quality Parameters in SLC Floodwater Inflows
(mg/L unless otherwise specified)

			Conventional Parameters										Anions				Cations				
Watershed	Milepost	Date	pH	Organic Carbon (Tot.)	Turbidity, NTU	Susp. Solids (Tot.)	Susp. Solids (Vol.)	TDS	Conductivity, µS/cm	Hardness (CaCO3)	Bicarbonate (CaCO3)	Calcium	Magnesium	Sodium	Potassium	Sulfate	Chloride	Nitrate (NO3)	Fluoride	Boron
Ortigalita Creek	82.67	1/27/97	8.3	14	480	596	56	606	1000	209	194	41	26	126	NA	155	96	3.7	0.3	1.3
Little Panoche Crk.	96.56	1/25/97	8.3	NA	50	NA	NA	1100	1920	349	246	74	40	260	NA	132	381	1.6	0.5	7.1
Monocline Ridge	115.43	3/3/96	7.1	5	NA	31	4	232	394	95	55	20	11	39	NA	52	44	5.0	< 0.1	0.3
Cantua Creek	134.81	2/5/96	8.7	7	NA	593	55	509	792	341	246	31	64	49	4.3	170	10	1.1	0.1	0.3
	134.81	1/3/97	8.5	5	NA	106	7	372	629	263	207	26	48	31	3.3	109	6	1.2	0.1	0.3
Salt Creek	136.00	2/1/96	7.9	14	NA	121	11	2890	3560	985	98	236	96	520	9.8	1840	140	12	0.5	2.1
	136.00	1/3/97	7.8	22	NA	472	35	1150	1600	393	88	90	41	198	4.9	638	44	3.8	0.5	0.9
Jorden Group	138.96	1/16/97	7.0	4	42	15	1	242	412	100	32	30	6	38	NA	118	17	5.0	0.2	0.4
		Average	8.0	10	191	276	24	888	1288	342	146	69	42	158	6	402	92	4.2	0.3	1.6

The cationic composition of Salt Creek was about half sodium, followed by calcium at 27 percent and magnesium at 20 percent. Conversely, the cationic composition of Cantua Creek was dominated by magnesium at 60 percent, followed by sodium and calcium at roughly 20 percent each.

Minor elements were largely below detection (Table 4-2). Arsenic, iron, and manganese levels were similar to those found in the Aqueduct. The exceptions included selenium that ranged from <1 to 16µg/L and barium that ranged from <50 to 128 µg/L.

Figure 4-3
Mineralogy of Salt and Cantua Creeks (see Appendix D for Trilinear Plot Description)



In most floodwaters sampled, organic chemicals were near or below the reporting limits. Chemicals that were present above the reporting limits included diuron, simazine, Dacthal, cyanazine, and diazinon. One sample from the Jorden Group contained 40 µg/L of Dacthal and 41 µg/L of cyanazine, the highest levels ever measured in floodwater inflows (Table 4-3). This sample was collected from a drain that was discharging 7 af per day when it was sampled. At that volume, the chemicals would be diluted to below detectable levels in the Aqueduct.

Table 4-2
Minor Element Concentrations in SLC Floodwater Inflows

Watershed	Milepost	Date	Aluminum	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc
			Concentration in µg/L												
Ortigalita Creek	82.67	1/27/97	< 10	3	56	< 5	< 5	< 5	34	< 5	34	< 1	1	< 5	< 5
Little Panoche Creek	95.56	1/25/97	< 10	2	116	< 5	< 5	< 5	< 5	< 5	9	< 1	< 1	< 5	< 5
Monocline Ridge Grp.	115.81	3/3/96	< 10	1	< 50	< 5	< 5	< 5	41	< 5	8	< 1	< 1	< 5	< 5
Cantua Creek	134.81	2/5/96	< 10	3	< 50	< 5	< 5	< 5	< 5	< 5	8	< 1	4	< 5	< 5
	134.81	1/3/97	< 10	2	< 50	< 5	< 5	< 5	< 5	< 5	< 5	< 1	3	< 5	< 5
Salt Creek	136.00	2/1/96	< 10	2	128	< 5	< 5	< 5	7	< 5	10	< 1	16	< 5	< 5
	136.00	1/3/97	< 10	1	101	< 5	< 5	< 5	6	< 5	7	< 1	7	< 5	< 5
Jorden Group	138.96	1/16/97	< 10	3	55	< 5	< 5	< 5	6	< 5	< 5	< 1	2	< 5	< 5

Table 4-3
Pesticides and Herbicides in SLC Floodwater Inflows

Watershed	Milepost	Date	EPA 608 Scan	Diuron	Simazine	Dacthal(DCPA)	Oxyfluorfen	EPA 614 Scan	Cyanazine	Diazinon	Methidathion	Trifluralin	EPA 615 Scan	2,4,-D	EPA 602 Scan	EPA 531.1 Scan
			Concentration in µg/L													
Ortigalita Creek	82.67	1/27/97	ND					ND					ND		ND	ND
Monocline Ridge Group	115.43	3/3/96		3.47	0.40	0.08	< 0.02		0.16	0.04	< 0.02	< 0.05		0.06	ND	ND
Cantua Creek	134.81	2/5/96		< 0.05	< 0.02	0.03	< 0.02		0.15	0.03	< 0.02	< 0.05	ND	< 0.10	ND	ND
	134.81	1/3/97		0.40	< 0.02	< 0.01	0.07		0.47	< 0.01	< 0.02	< 0.05	ND	< 0.10	ND	ND
Salt Creek	136.00	2/1/96		0.16	0.03	1.27	< 0.02		0.92	0.09	0.03	< 0.05	ND	< 0.10	ND	ND
	136.00	1/3/97	ND						1.02	< 0.01	< 0.02	0.12	ND	< 0.10	ND	ND
Jorden Group	138.96	1/16/97		0.24	0.60	41	1.16		40				ND		ND	ND

Aqueduct Water Quality

During 1997 when floodwaters were greatest, water quality effects in the Aqueduct were minimized by deliveries to federal contractors. About 68 turnouts exist in the SLC for deliveries to agricultural water districts. During the month of January, these deliveries amounted to about 76 percent of the water pumped into the SLC at Dos Amigos Pumping Plant. Since turnouts are located throughout the canal, floodwaters were removed along with Project water. Flow past Check 21 was reduced during most of January 1997 and especially when floodwaters were highest (Figure 4-4). During this month, 26 percent of the water entering the SLC from both Project and floodwater sources was released down the Aqueduct at Check 21. Flows were limited during this period to allow for Kern River inflows. As a result, water quality effects in the Aqueduct from floodwaters were limited.

Turbidity spikes from floodwaters were observed at Check 18 during early and late January 1997 (Figure 4-5). A corresponding conductivity spike was only observed during late January. Check 18 (milepost 143) is immediately downstream from the two largest floodwater sources—Salt and Cantua creeks (mileposts 136 and 134, respectively). Although conductivity at Check 18 was higher than at Check 13, a 72-mile travel distance separates these stations and a time differential exists between measurements. For instance, there was an 8-day delay between conductivity peaks at these stations in December, when flows into and out of the SLC were relatively constant. During January, flows were not so constant and daily comparisons of water types past each station would be very difficult. Regardless of these uncertainties, conductivity at Check 21 appeared to be affected by at least 50 µS/cm during January 10 to 20 and again for a short duration in mid-February.

Figure 4-4
Daily Pumping at Dos Amigos Pumping Plant, Check 21 Flows, and Floodwater Inflows to the San Luis Canal, December 1996 – February 1997

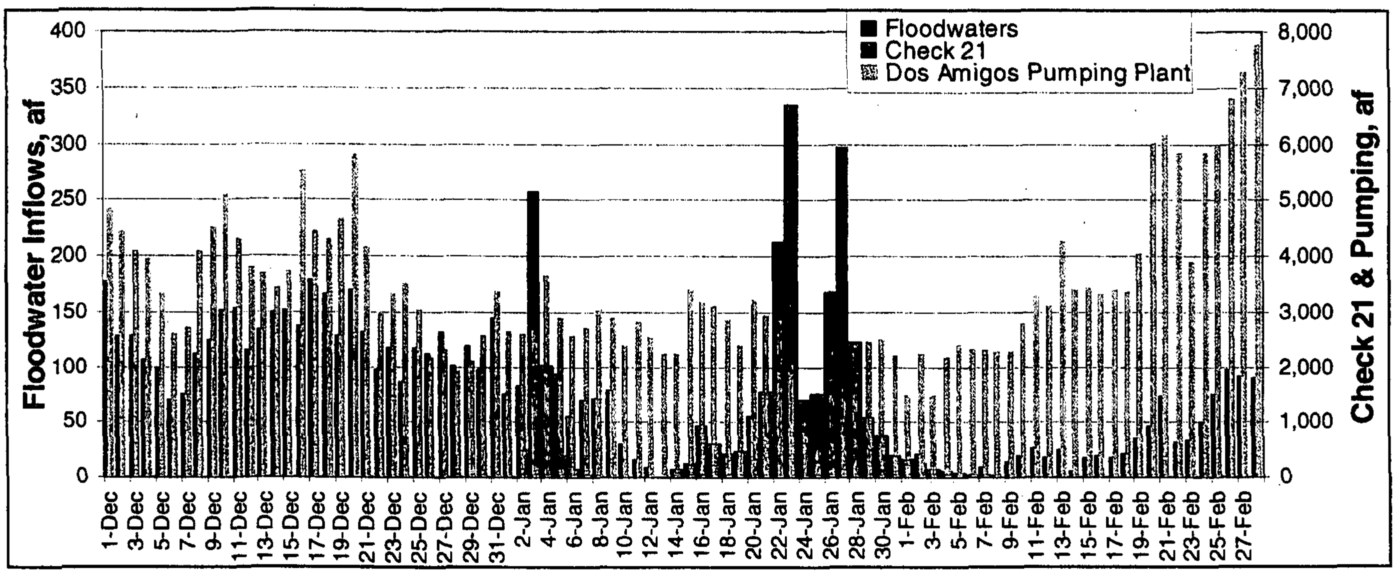
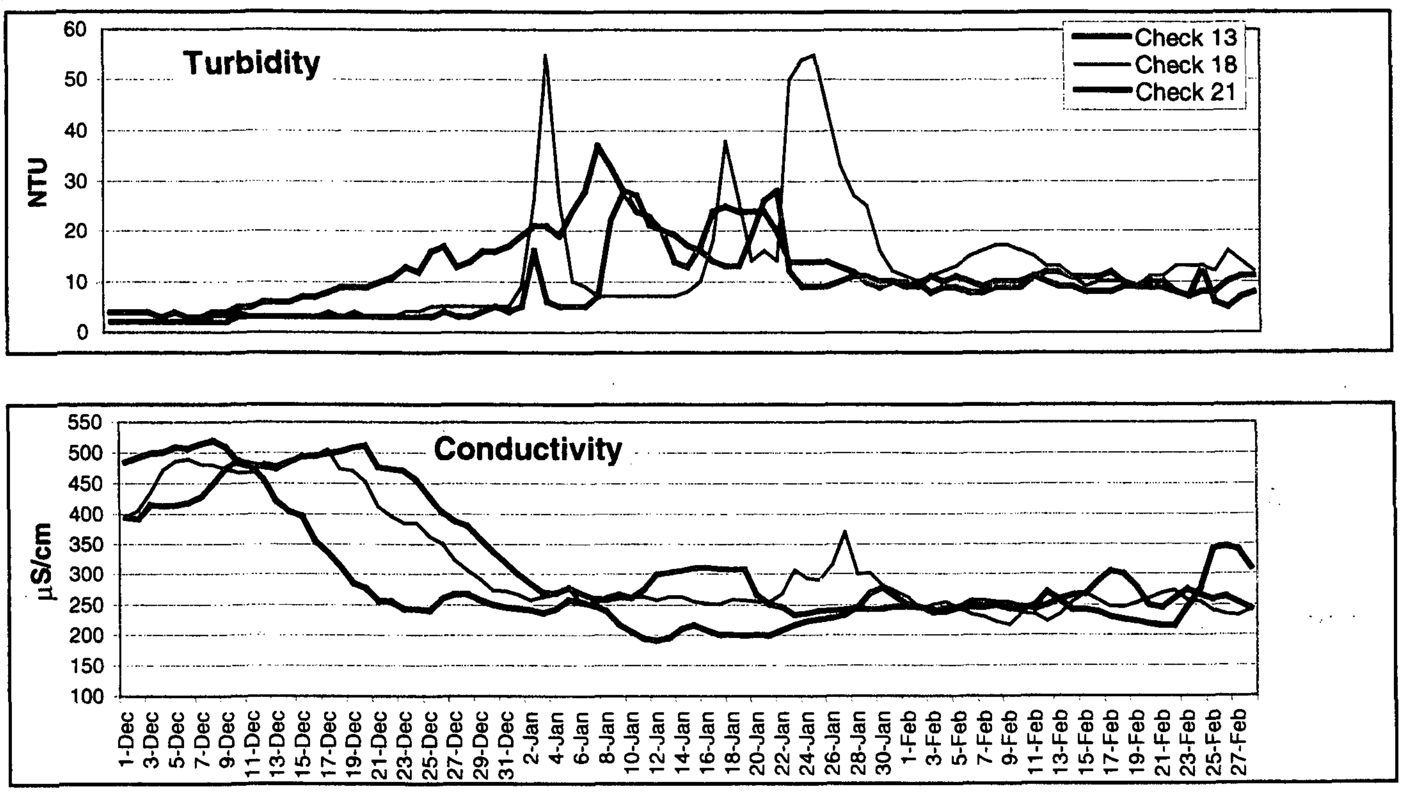


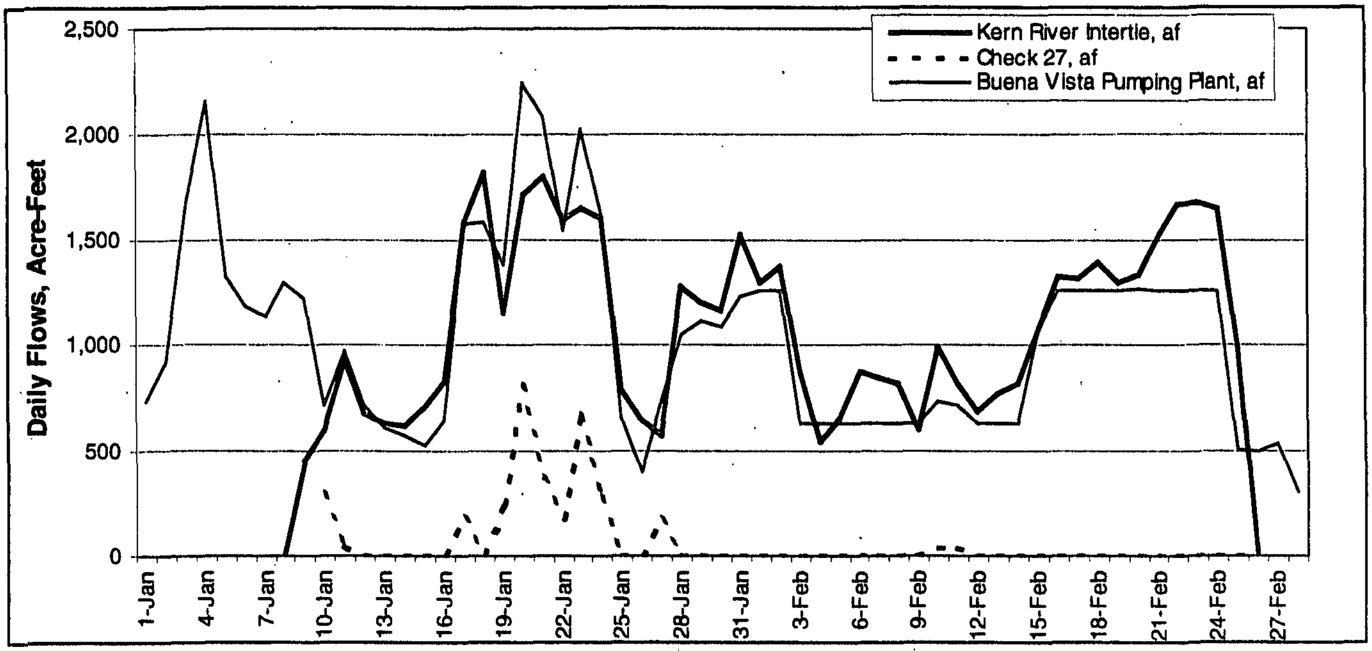
Figure 4-5
Daily Turbidity and Conductivity in the San Luis Canal at Checks 13, 18, and 21, December 1996 – February 1997



Kern River Intertie

In January and February 1997, 52,858 af of Kern River water was admitted to the California Aqueduct at the Kern River Intertie (mp 241). The Intertie is a controlled conveyance structure used to relieve flooding east of the Aqueduct. Inflows began on January 9 and ended 47 days later on February 25. During this time, Kern River water comprised most of the water pumped south at Buena Vista Pumping Plant (Figure 4-6). Intertie water dramatically affected water quality in the Aqueduct as far south as Devil Canyon Afterbay.

Figure 4-6
Kern River Intertie Inflows to the California Aqueduct, January – February 1997



Inflows decreased salinity and increased turbidity in the Aqueduct for almost two months. Intertie conductivity was low, ranging from 55 to 128 µS/cm—approximately one-third to one-fourth of Aqueduct levels (Table 4-4). Three-and-a-half miles downstream at Check 29, Aqueduct conductivity went from 387 µS/cm on January 9 to 85 µS/cm 4 days after the Intertie gates were opened (Figure 4-7). The same trend was observed 62 miles downstream at Check 41. Aqueduct conductivity remained similar to Intertie levels except during mid-January, when conductivity increased slightly from upstream Aqueduct flows. Conductivity upstream from the Intertie at Check 25 remained around 300 µS/cm throughout the event. Five days after the Intertie gates were closed, conductivity leveled off to about 300 µS/cm on March 4. The event affected Aqueduct water quality for about 55 consecutive days.

Intertie turbidity ranged from 18 to 85 NTU, with an average of 37 NTU (Table 4-4). Aqueduct turbidity increased from 9 NTU on January 10 to 22 NTU the next day as a result of Intertie inflows (Figure 4-8). During the period of inflow, turbidity upstream of the Intertie (Check 25) ranged from 6 to 17 NTU, with an average of 9 NTU. Although Aqueduct turbidity at Check 29 remained higher than at Check 25, upstream values largely represented standing water since flows there were limited during the entire event. Turbidity in the Aqueduct generally mimicked Intertie trends but at lower levels.

Table 4-4
Kern River Intertie Water Quality Summary, January – February 1997

Parameters	Parameter	Units	Average Intertie	Average Check 25	Minimum Intertie	Minimum Check 25	Maximum Intertie	Maximum Check 25	Number Intertie	Number Check 25
Conventional Parameters	Temperature	Degrees C	12		8		14		34	4
	pH	pH Units	7.3 a/	7.1 a/	6.8	7.0	7.7	7.2	34	4
	Conductivity	µS/cm	91	286	55	275	128	303	34	4
	TDS	mg/L	70	160	61	153	80	169	4	4
	Hardness	mg/L as CaCO3	31	64	28	62	36	64	4	4
	Turbidity	NTU	37	6	18	5	85	8	34	4
	TSS	mg/L	30	6	17	4	47	10	4	4
	VSS	mg/L	5	1.8	2	<1	6	3	4	4
Major Minerals	Calcium	mg/L	9.3	14	8	13	11	14	4	4
	Magnesium	mg/L	2	7	2	7	2	7	4	4
	Sodium	mg/L	6.8	28	6	27	8	28	4	4
	Potassium	mg/L	1.6	3.2					4	1
	Sulfate	mg/L	4.5	23	4	22	6	25	4	4
	Chloride	mg/L	2.8	34	2	33	3	35	4	4
	Bicarbonate	mg/L as CaCO3	37	53	32	51	44	56	4	4
	Nitrate	mg/L as NO3	1.3	3.9	1.1	3.5	1.7	4.3	4	4
Minor Elements d/	Arsenic	mg/L	0.003	0.002	0.002	0.001	0.003	0.002	4	4
	Aluminum	mg/L	0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	4	4
	Boron	mg/L	0.001	0.010	< 0.001	0.010	0.001	0.010	4	4
	Iron	mg/L	0.020	0.017	0.017	0.015	0.023	0.019	4	4
	Manganese	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.005	4	4
Organics	TOC	mg/L	4.5		4		4.9		4	
	TTHMFP	µg/L	510 c/	511	500 c/	466	520 c/	530	4	4
	Pesticides b/									
Pathogens e/	Fecal Coliform	MPN/100 mL	220							1
	Total Coliform	MPN/100 mL	1600							1
	Giardia	# Cysts/100 L	73							1
	Cryptosporidium	# Oocysts/100 L	10.4							1

a/ Median

b/ Two detections from a full oganic chemical scan: diuron (1.41 mg/L); simazine (0.39 mg/L).

c/ All chloroform

d/ Minor elements below detection included fluoride, barium, chromium, copper, lead, mercury, selenium, silver, zinc, and aluminum.

e/ Sampled on 1/9/97after inflows were initiated.

Turbidity in the Intertie spiked at 85 NTU on January 29 and Aqueduct turbidity correspondingly increased to 70 NTU. After that, Intertie values declined and generally leveled off to between 20 and 25 NTU. Intertie inflows ceased on February 25 and turbidity at Check 29 dropped to levels measured at Check 25. Sixty-two miles downstream at Check 41, turbidity was not strongly affected by Intertie inflows and fluctuated between 5 and 20 NTU (Figure 4-8).

Pathogens were the only other parameters of concern to Aqueduct water quality. *Giardia* in the Intertie numbered 73 cysts/100 liters and *Cryptosporidium* numbered 10.4 oocysts/100 L (Table 4-4). Past sampling in the Aqueduct has rarely detected these pathogens, although detection limits have sometimes been as high as <79/100 L for both parameters. *Giardia* and *Cryptosporidium* have both been detected at Banks Pumping Plant at 34 cysts/100 L and 169 oocysts/100 L, respectively. No other parameters measured in Intertie water posed a threat to Aqueduct water quality.

Figure 4-7
Conductivity in the Kern River Intertie and California Aqueduct, January – March 1997

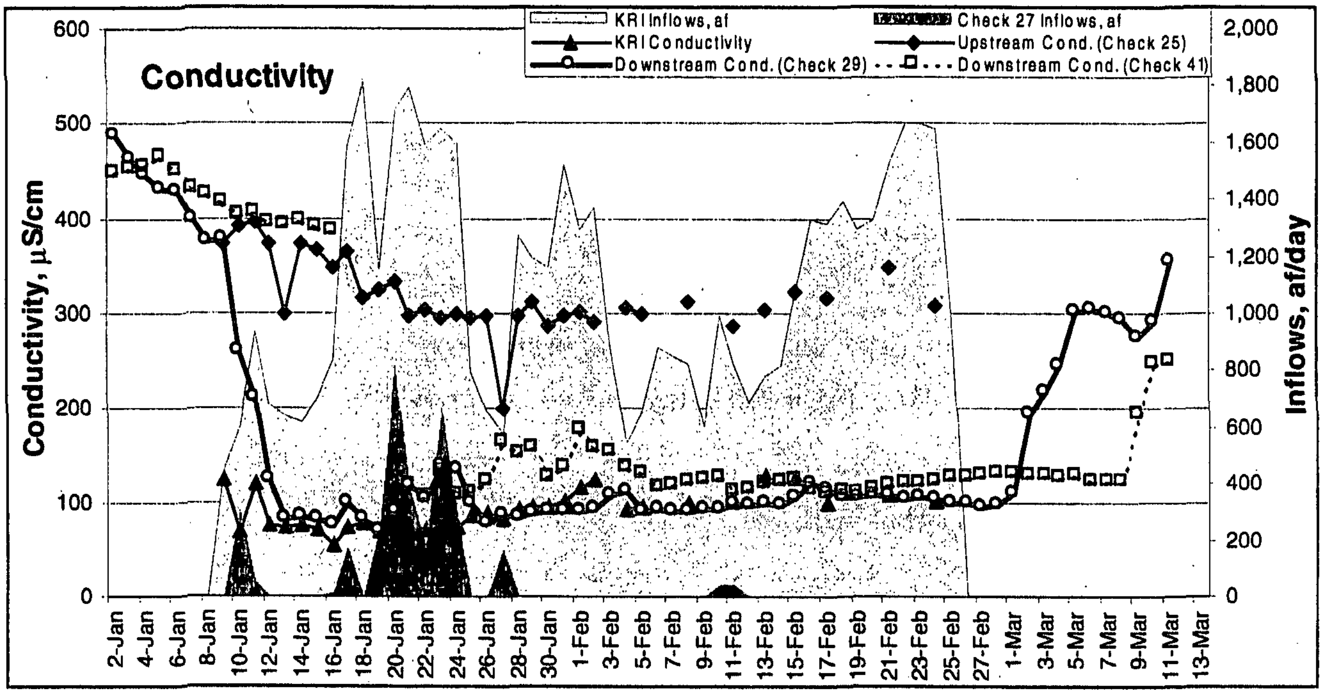
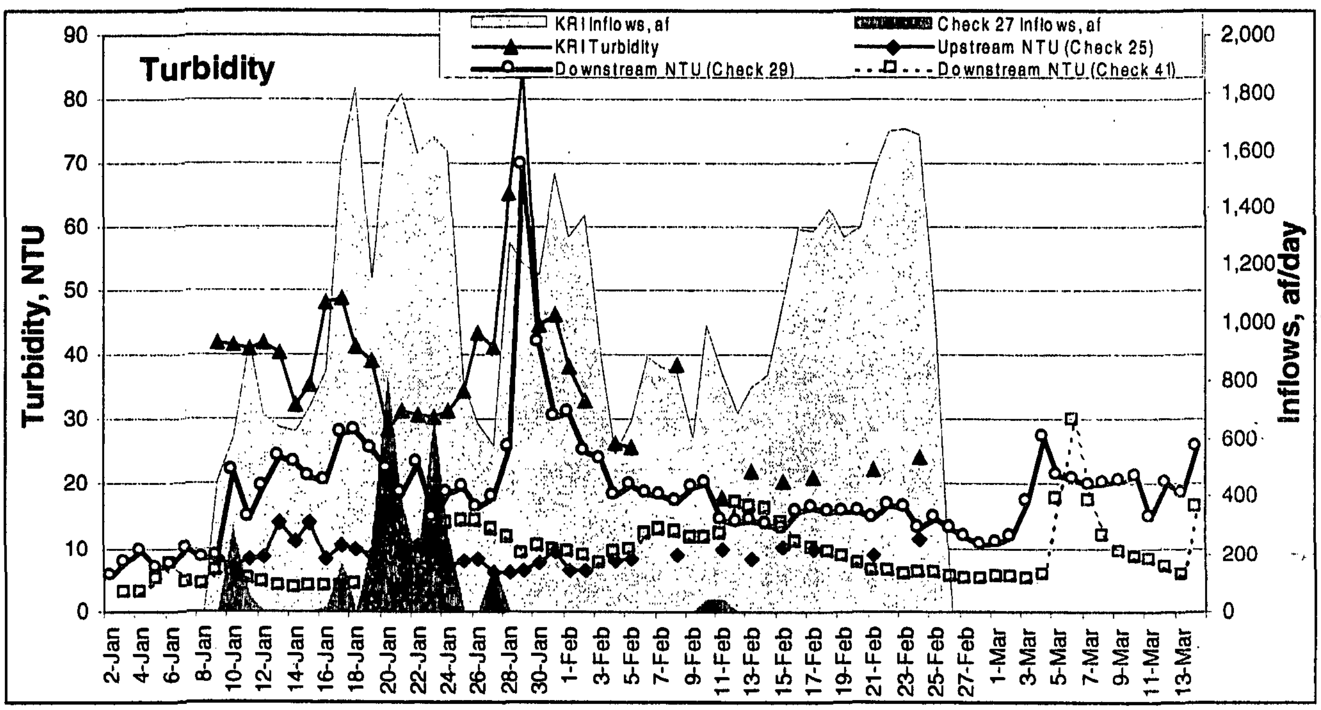


Figure 4-8
Turbidity in the Kern River Intertie and California Aqueduct, January – March 1997

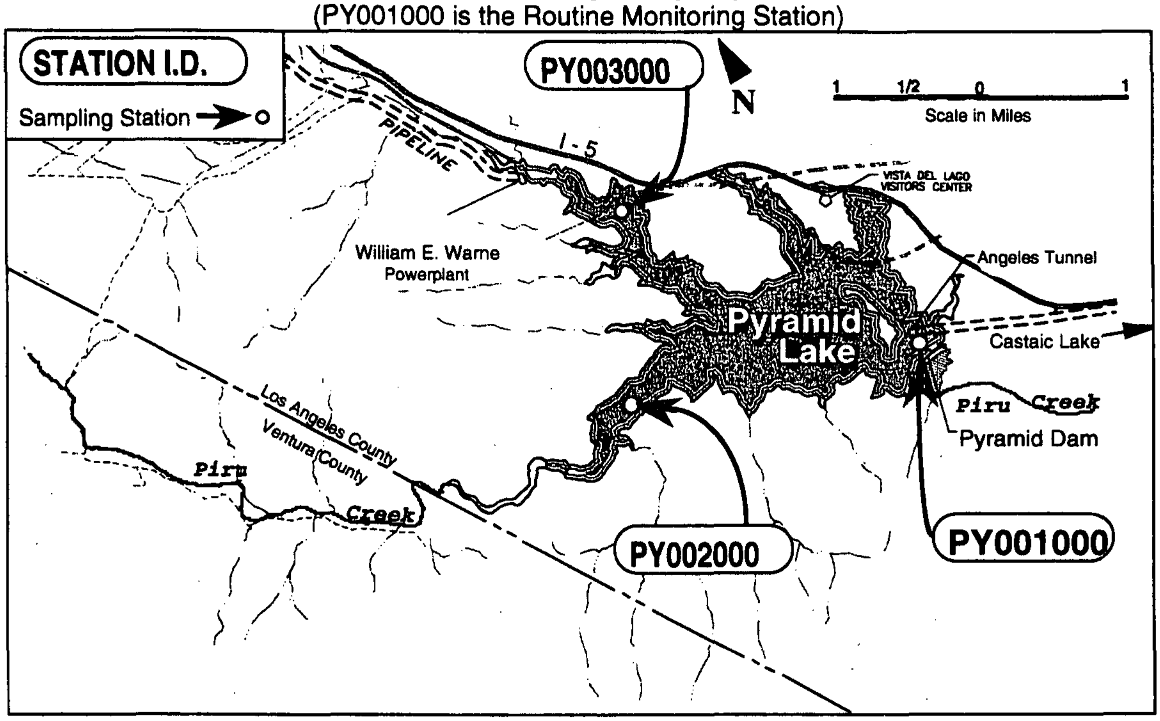


Natural Inflows to Southern California Lakes

Pyramid Lake

Natural inflows to Pyramid Lake totaled 19,352 af in 1996 and 19,496 af in 1997, amounting to about 5 percent of the total Project and non-Project inflows. In comparison, inflows in 1995 totaled 105,454 af or 35 percent of all inflows to the lake. Piru Creek drains a 372-square-mile watershed (Figure 4-9) and is the largest non-Project source to the lake. The creek is a clear perennial brook in summer and a muddy torrent during the rainy season. During 1996-97, creek flows composed about 2 percent of the monthly inputs during summer and fall, increasing to over 10 percent during the months of December, January, and February of both years (Figure 4-10). An exception to this trend occurred during June to August 1997, when Project inflows were limited to below 10,000 af per month, elevating creek contributions to between 4 and 13 percent.

Figure 4-9
Pyramid Lake and Water Quality Sampling Station Locations
(PY001000 is the Routine Monitoring Station)



Residence time of Pyramid Lake's 171,196 af capacity is 3 to 6 months during the summer when Project inflows are usually greatest. This capacity provides a buffer against short-term salinity changes. During 1996-97, TDS in the lake ranged from 232 to 339 mg/L—a concentration range of 107 mg/L (Figure 4-11). The largest change in TDS occurred in early 1996, when the concentration dropped from 339 mg/L in February 1996 to 278 mg/L 3 months later—a decline of 61 mg/L or about 20 mg/L a month. The decline coincided with high Project inflows containing lower TDS levels.

Piru Creek had a measurable influence on the minerology of Pyramid Lake. TDS averaged 211 mg/L in Project inflows during 1996-97 and 256 mg/L in Pyramid Lake (Table 4-5). The higher salinity in lake water is likely due to Piru Creek which exhibits an average TDS of 554 mg/L (from samples collected in 1994-95). Although evaporation and other inflows could also increase TDS in the lake, a mineralogical comparison of all three stations shows that Piru Creek affected lake salinity.

Figure 4-10
Monthly Non-Project Inflows to Pyramid Lake, 1996-97

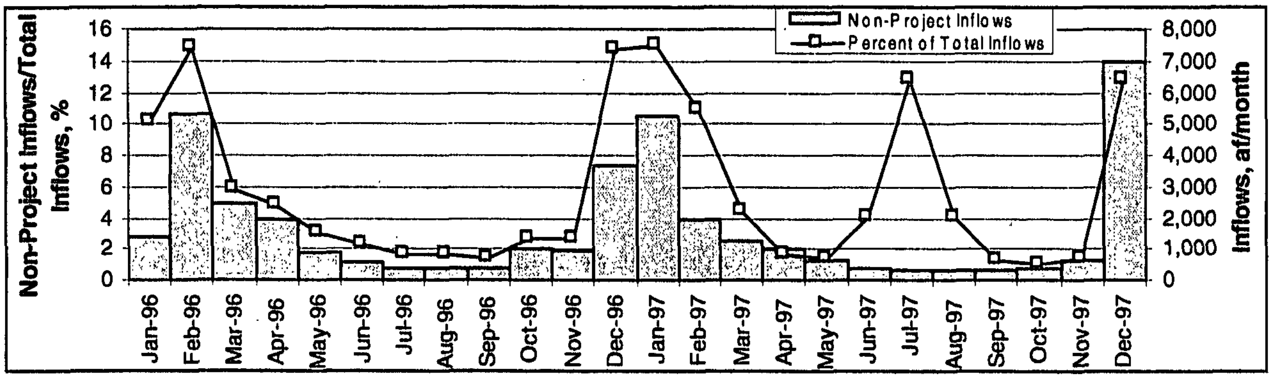


Figure 4-11
Total Dissolved Solids and Inflows to Pyramid Lake, 1996-97

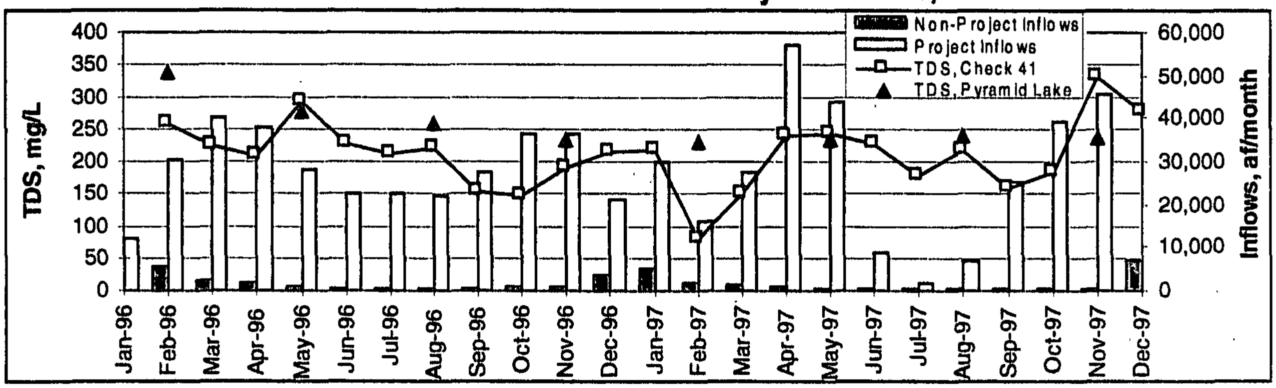
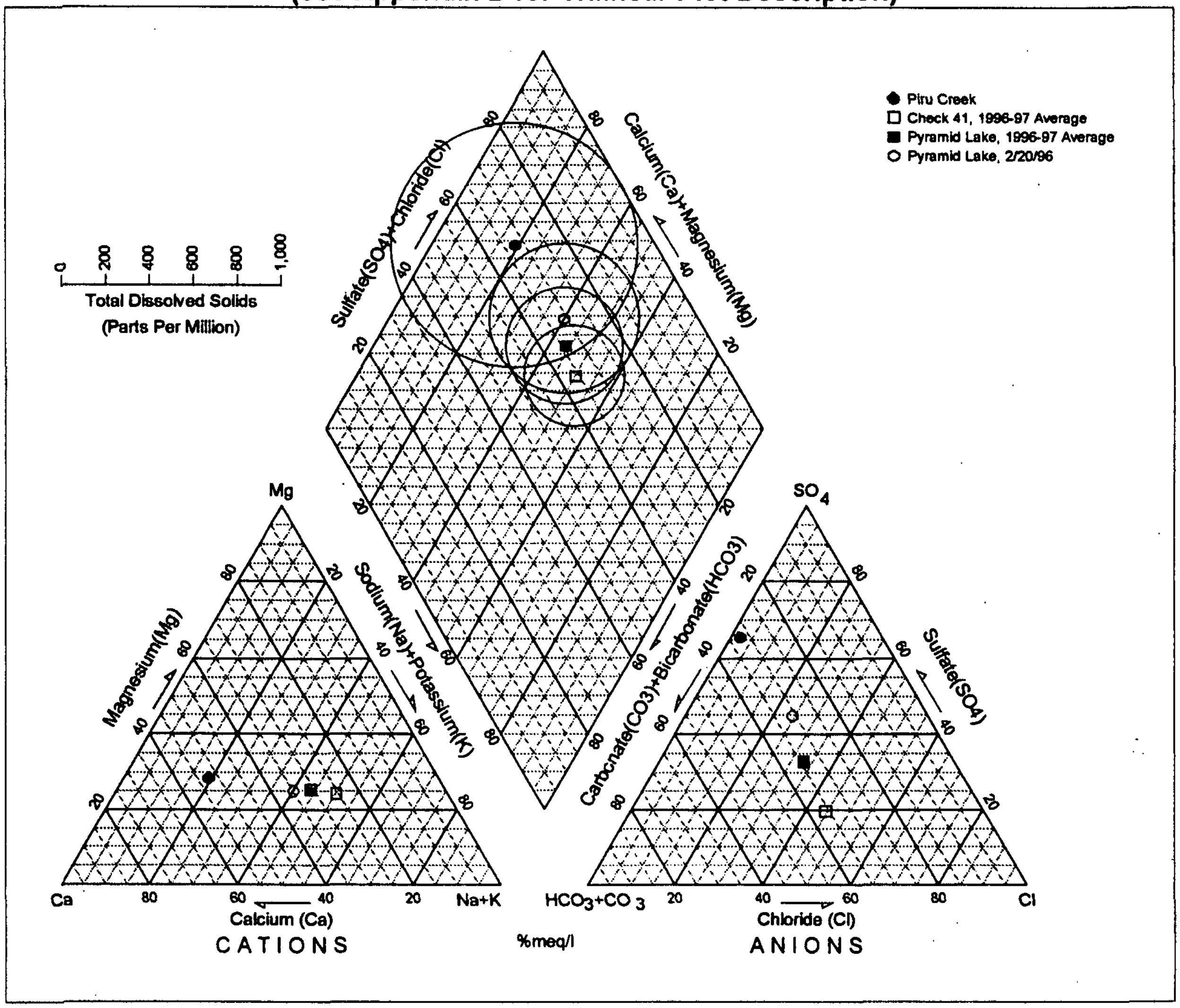


Table 4-5
Water Quality Summary of Piru Creek, Pyramid Lake, and the California Aqueduct at Check 41

		Concentration, mg/L									
Location		TSS	TDS	Sodium	Potassium	Calcium	Magnesium	Chloride	Bicarbonate (CaCO3)	Sulfate	Nitrate (NO3)
Piru Creek	average	31	554	35	3.3	88	29	6	156	249	1.45
(1994-95)	min	0.1	423	15	2.4	66	23	3	93	183	0.5
	max	278	763	52	4.2	136	41	8	191	374	4
	median	4.8	566	36	3.4	82	29	6	161	256	1.1
	number	17	17	17	17	17	17	17	17	17	17
Check 41	average	37	211	41	3.1	19	11	54	75	32	1.9
(1996-97)	min	3	80	28	2.7	17	10	32	65	22	0.8
	max	74	332	61	3.7	23	13	86	85	46	3.9
	median	36	217	40	2.8	18	11	52	76	30	1.8
	number	24	23	7	3	7	7	8	8	8	8
Pyramid Lake	average		256	41	3.0	26	13	46	82	62	1.8
(1996-97)	min		232	38	2.9	22	11	42	75	45	0.2
	max		339	47	3.1	37	16	52	93	107	2.5
	median		239	41	3.1	26	12	46	80	56	1.9
	number		8	8	3	8	8	8	8	8	8

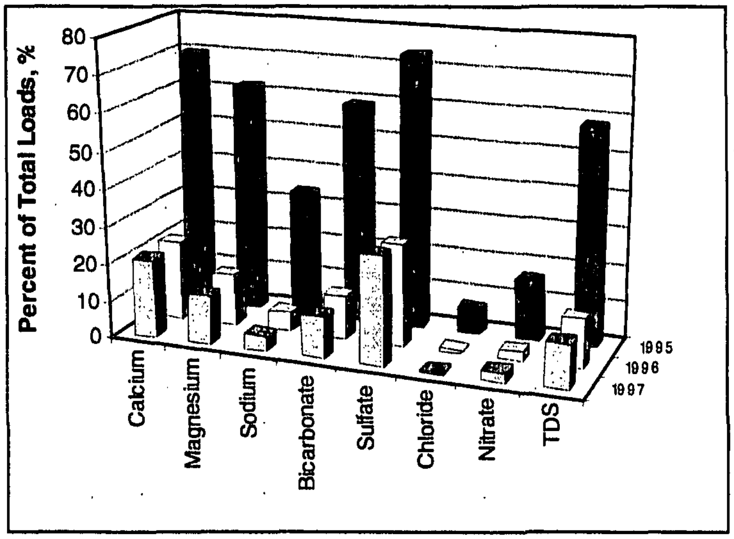
The mineralogical makeup of Pyramid Lake during 1996-97 was a composite of both Piru Creek and Project water. The average anionic composition of Project water was 20 percent sulfate, while the same percentage for Pyramid Lake was 33 percent—13 percent more (Figure 4-12). The most probable cause for this difference was Piru Creek, which has an average sulfate concentration that is 8 times greater than Project water (Table 4-5). Conversely, chloride made up 45 percent of the average anionic composition of Project water while Pyramid Lake averaged 33 percent—12 percent less. This change also appears to be influenced by Piru Creek, because chloride levels there average nine times less than Project water. Pyramid Lake exhibited an average cationic composition that was slightly higher in calcium and sodium than Project water. To confirm the cause of this mineralogical shift, Pyramid Lake data was plotted for February 20, 1996—the sample with the highest 2-year TDS level. The mineralogical shift was similar but more exaggerated (Figure 4-12) further implicating Piru Creek as a major influence on water quality in Pyramid Lake.

Figure 4-12
Mineralogical Composition of Pyramid Lake, Check 41, and Piru Creek Inflows, 1996-97
(see Appendix D for Trilinear Plot Description)



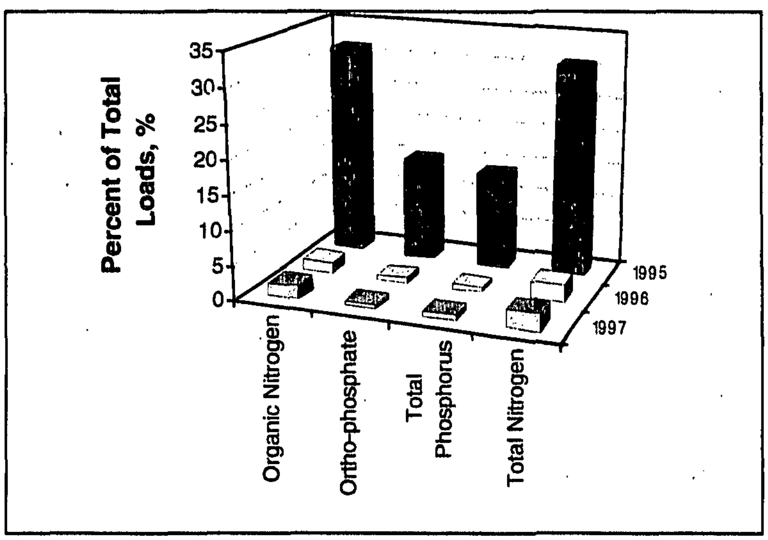
Piru Creek accounted for about 12 percent of the TDS loads to Pyramid Lake from Project and non-Project inflows during both 1996 and 1997 (Figure 4-13). This value reached 58 percent in 1995 due to heavy runoff and reduced Project inflows (1995 data was included to assess a high rainfall season). Load percentages for individual minerals varied from less than 1 percent for chloride to about 28 percent for sulfate during 1996-97. These values increased to 7 and 74 percent, respectively, during 1995. Load values for the other minerals ranged from 3 to 14 percent during 1996-97 and from 16 to 59 percent during 1995. Piru Creek is a major source of lake salinity and can become the largest source in high runoff years. Regardless of runoff volume, Piru Creek was not a major contributor of chloride.

Figure 4-13
Annual Mineral Load Percentages to Pyramid Lake from Piru Creek, 1995-97



Nutrient loads to Pyramid Lake from Piru Creek were substantially less than mineral loads. Loading percentages during 1996-97 ranged from 1.7 to 2.7 percent for organic and total nitrogen, and from 0.7 to 0.8 percent for orthophosphate and total phosphorus (Figure 4-14). During 1995, Piru Creek contributed about 31 percent of the nitrogen loads and around 15 percent of the phosphorus loads.

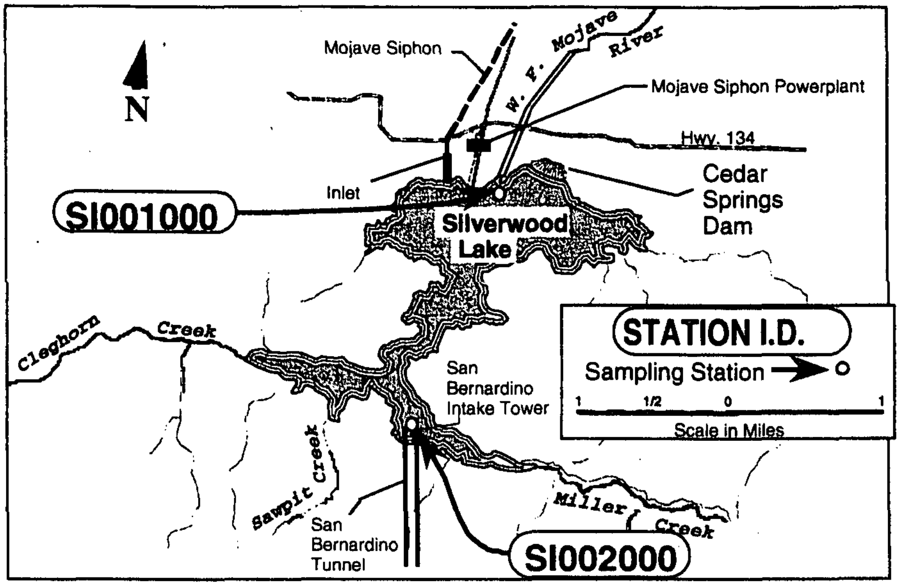
Figure 4-14
Annual Nutrient Load Percentages to Pyramid Lake from Piru Creek, 1995-97



Silverwood Lake

Natural inflows to Silverwood Lake totaled 11,714 af in 1996 and 8,980 af in 1997, amounting to about 2 percent of all Project and non-Project inflows. Miller Creek drains a 41.5 square mile watershed (Figure 4-15) and accounts for about 60 percent of all non-Project inflows to the lake. Cleghorn Creek drains 18.4 square miles and contributes about 30 percent. Not included is Sawpit Creek, which drains 3.63 square miles and accounts for less than 10 percent of all non-Project inflows to the lake. Miller and Cleghorn creeks are clear ephemeral streams, usually drying up in the lower stretches during mid- to late summer.

Figure 4-15
Water Quality Sampling Stations on Silverwood Lake
(S1002000 is the Routine Monitoring Station)



Project water usually dominates inflows to Silverwood Lake during the spring and summer months, when releases to Devil Canyon Afterbay are also high. The lake essentially becomes a conveyance during this period, with water entering the lake from the Mohave Siphon and leaving via the San Bernardino Intake Tower (Figure 4-15). The lake's residence time with high inflows is 10 to 20 days. During the rainy season, Project inflows are curtailed and local runoff can become dominant. Local runoff was limited in 1996-97 (Figure 4-16), but in early 1995 it accounted for 45 to 65 percent of the monthly inflows from January to April and 11 percent of all inflows that year.

TDS levels at Devil Canyon Afterbay were usually close to those measured in Silverwood Lake. The exception occurred in February 1996, when TDS in Silverwood Lake was higher than at Devil Canyon Afterbay. Lake samples are collected from the surface at the same location from which water is drawn and sent to Devil Canyon Afterbay—the San Bernardino Intake Tower. The lower concentration at Devil Canyon Afterbay indicates influence from local inflows and the higher value in Silverwood Lake was closer to Project inflows. This dichotomy in concentration suggests a stratification of these two waters by temperature. If one inflow is colder than water in the lake, the colder water moves under the warmer water and occupies the lower strata of the lake. When this happens, the composition of water sent to Devil

Figure 4-16
Monthly Project and Non-Project Inflows to Silverwood Lake, 1996-97

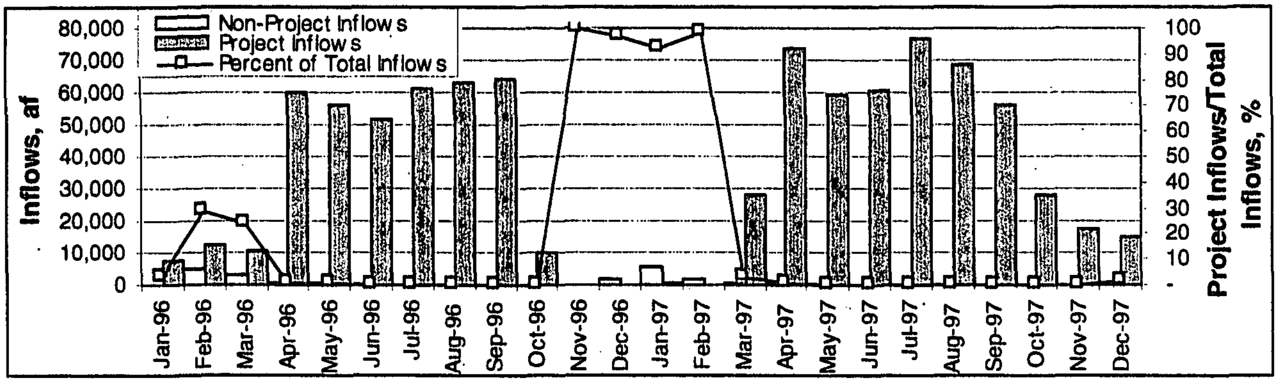
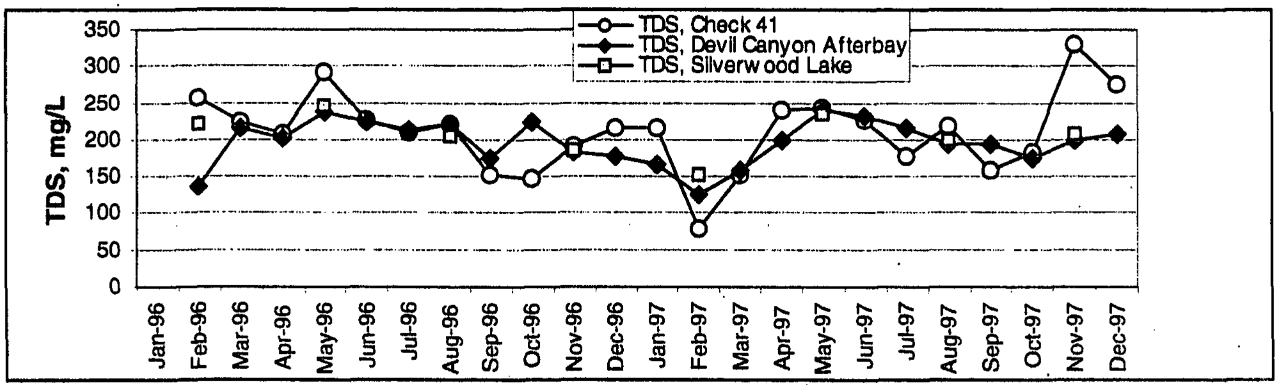


Figure 4-17
TDS in Silverwood Lake and Its Inflows/Outflows, 1996-97



Canyon Afterbay would be determined by which louver or louvers on the vertical tower are open. The San Bernardino Intake Tower has four louvers at 6, 12, 18, and 24 meters. The February 1996 data would suggest that local inflows were colder than lake water and the intake was drawing water at depth. Without specific temperature and intake information, further analysis is not possible.

Unlike Pyramid Lake, the TDS of local inflows to Silverwood Lake is similar to Project levels. TDS averages around 200 mg/L in both Cleghorn Creek and Project water, while it averages 142 mg/L in Miller Creek (Table 4-6, Figure 4-18). Cleghorn Creek is generally higher in bicarbonate and calcium than either Project inflows or Miller Creek, while chloride levels were higher in Project water. These differences are shown qualitatively in Figure 4-19, along with the average mineralogical makeup of water at Devil Canyon Afterbay during 1996-97. There was a slight difference in icon position for Check 41 and Devil Canyon Afterbay, indicating a possible influence from one or both creeks. This shift in the mineral composition at Devil Canyon Afterbay was greater during heavy runoff periods.

Table 4-6
Water Quality Summary of Silverwood Lake Inflows and Outflows

Station		TSS	TDS	Sodium	Potassium	Calcium	Magnesium	Chloride	Bicarbonate (CaCO3)	Sulfate	Nitrate (NO3)
		Concentration, mg/L									
Miller Creek	average	2	142	14	2	21	6	15	78	12	4
(1944-73)	min	0.1	67	1	1	8	1	1	27	1	0.2
	max	7.4	355	37	4	44	13	150	172	57	16
	median	1.2	130	14	2	19	6	11	71	11	3
	number	14	83	82	79	83	83	86	83	82	78
Cleghorn Creek	average	1.9	219	13	3	42	12	8	135	34	3
(1965-70)	min	0.1	70	3	2	9	2	2	32	2	0.1
	max	3.3	370	26	5	79	20	25	278	75	11
	median	2.0	212	12	3	41	12	9	134	35	2
	number	10	57	57	57	57	57	58	57	58	38
Check 41	average	37	211	41	3.1	19	11	54	75	32	1.9
(1996-97)	min	3	80	28	2.7	17	10	32	65	22	0.8
	max	74	332	61	3.7	23	13	86	85	46	3.9
	median	36	217	40	2.8	18	11	52	76	30	1.8
	number	24	23	7	3	7	7	8	8	8	8
Silverwood Lake	average	NA	206	34	2.7	20	10	42	74	31	2.2
(1996-97)	min	NA	152	12	2.6	17	6	10	66	11	1.1
	max	NA	246	43	2.8	26	11	55	97	48	3.5
	median	NA	206	37	2.8	19	10	46	72	30	2.3
	number	NA	8	8	3	8	8	8	8	8	8.0
Devil Canyon Afterbay	average	4.6	197	34	2.7	19	9	42	72	30	2.2
(1996-97)	min	2.0	127	13	2.4	15	4	4	50	9	0.9
	max	7.8	240	45	3.0	24	11	56	98	46	4.0
	median	4.5	200	35	2.7	18	10	43	73	27	2.1
	number	8	23	23	7	23	23	23	23	23	23

Figure 4-18
Average Mineral Concentrations in Project/Non-Project Inflows to Silverwood Lake, 1996-97

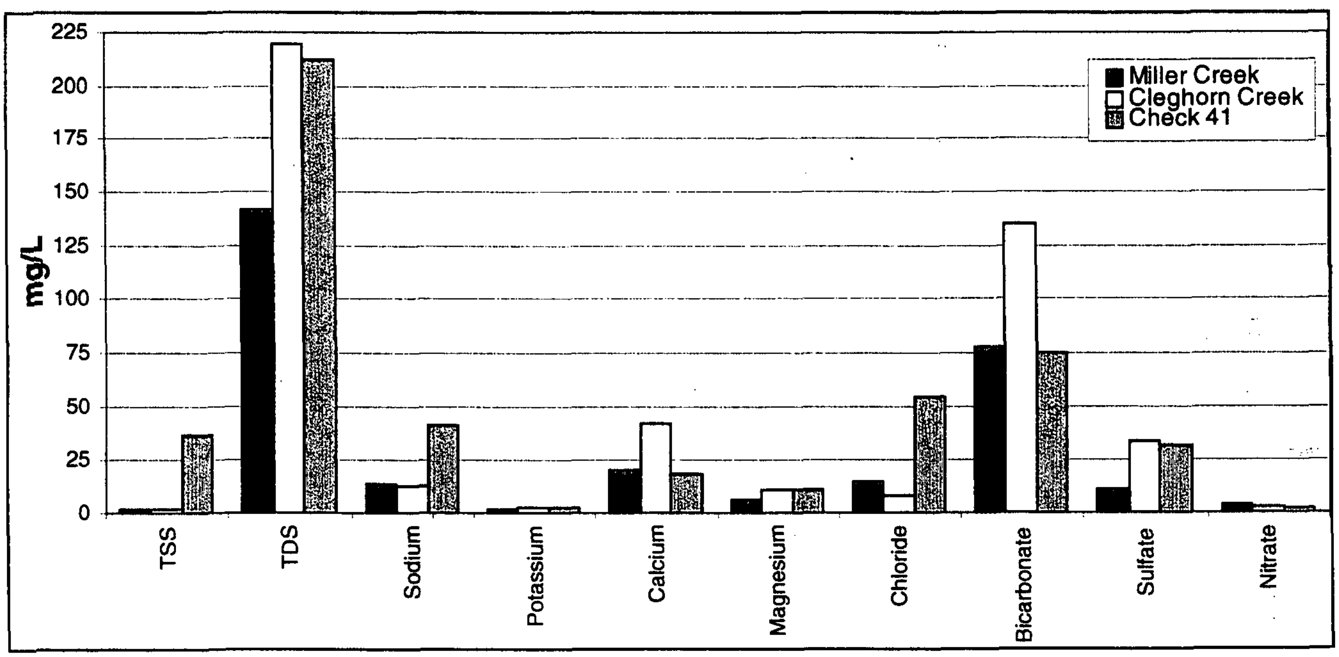
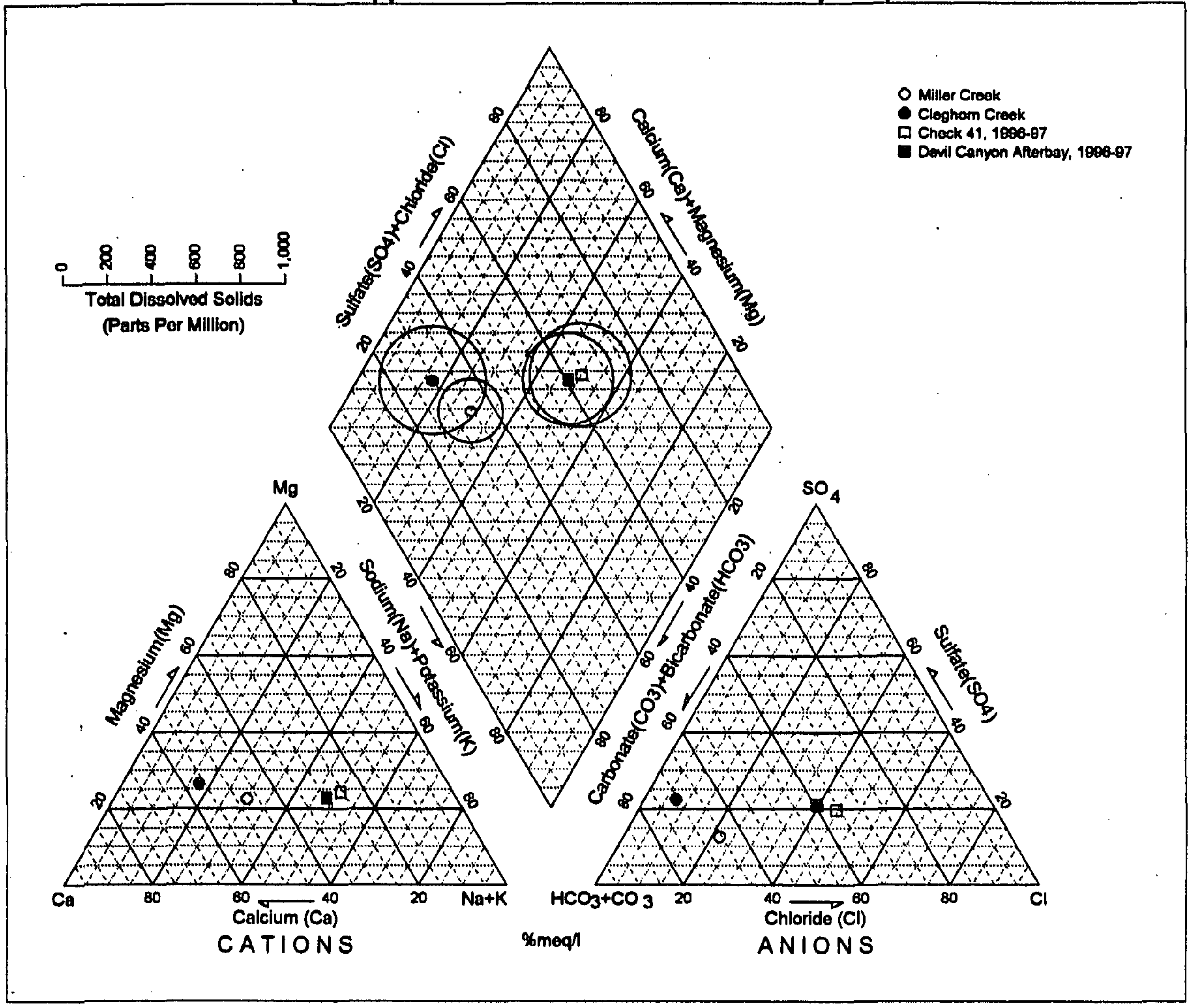
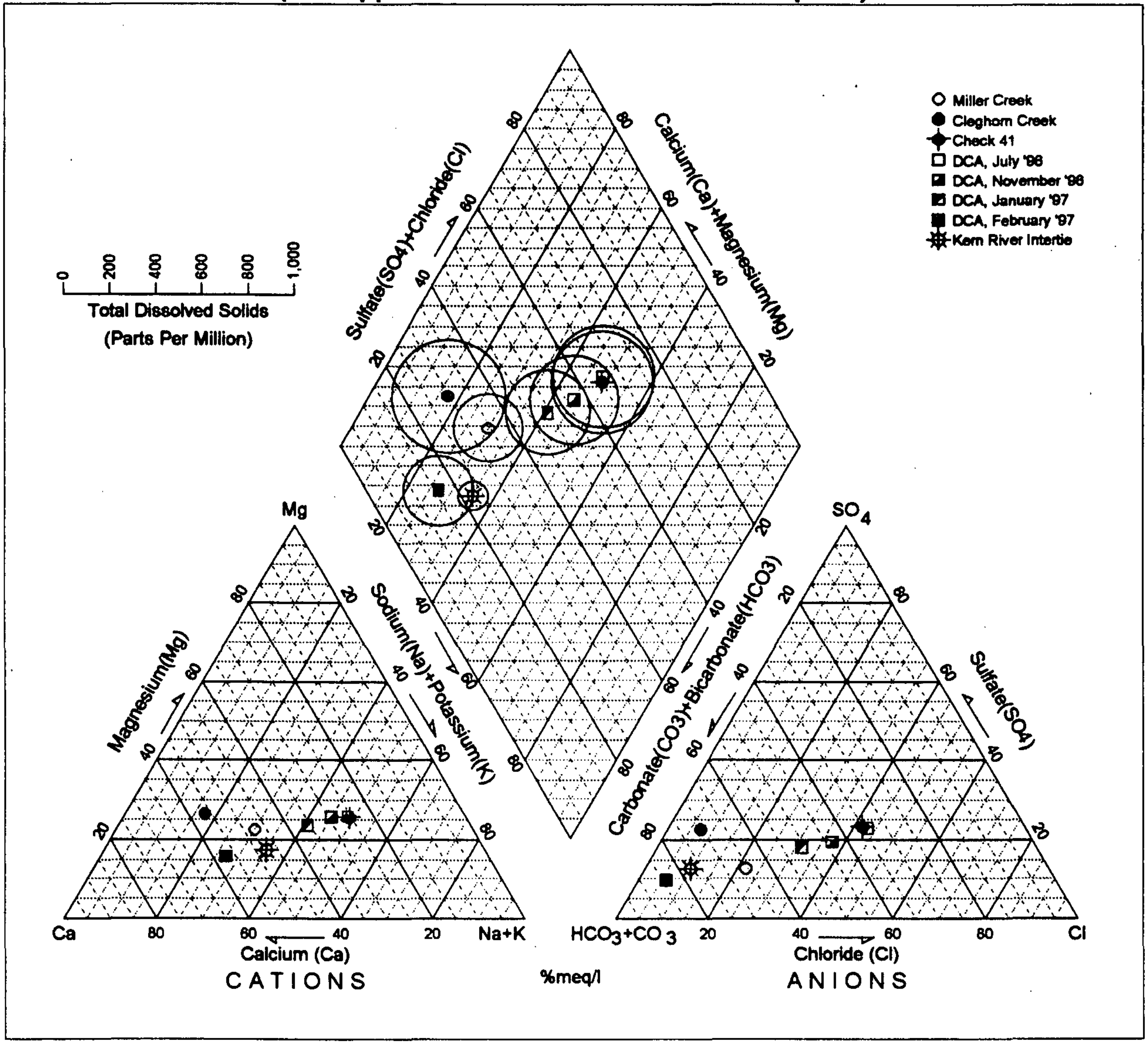


Figure 4-19
Mineralogical Composition of Silverwood Lake Inflows and Outflows
(see Appendix D for Trilinear Plot Description)



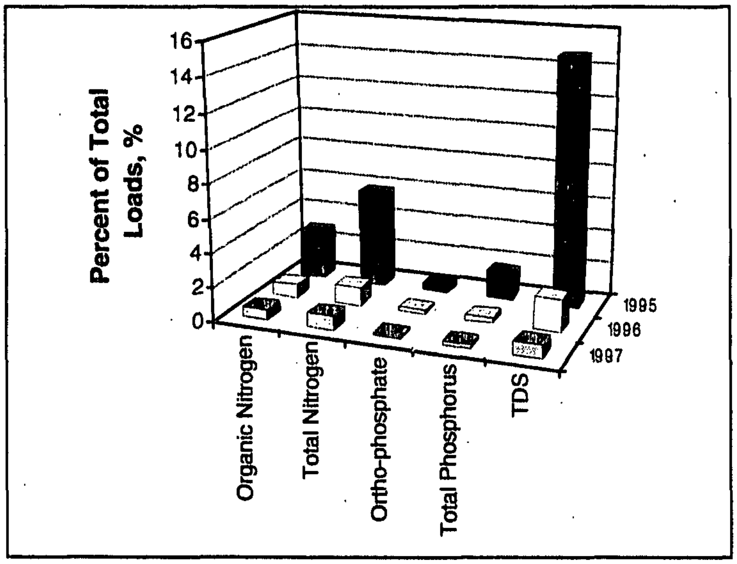
During November 1996 to February 1997, local inflows increased to between 269 and 5,671 af per month while monthly Project inflows remained below 485 af (Figure 4-16). Throughout this period, the mineralogical makeup of water at Devil Canyon Afterbay shifted from one identical to Project inflows to one closer to Miller Creek water. This is demonstrated in Figure 4-20, where the icon for Devil Canyon Afterbay moves progressively farther away from the Check 41 icon and closer to the Miller Creek icon over a 3-month period. The shift began in November 1996 and continued into January 1997—a month when local inflows peaked at 5,674 af and Project inflows were 485 af. In February, another shift occurred when afterbay mineralogy appeared to be more similar to Kern River water than either Project water or local inflows (Figure 4-20).

Figure 4-20
Mineralogical Shift at Devil Canyon Afterbay from Non-Project Inflows
(see Appendix D for Trilinear Plot Description)



Local inflows contributed less than 2 percent of the TDS loads from Project and non-Project inflows to Silverwood Lake during 1996-97 and 15 percent during 1995 (Figure 4-21). Annual load percentages for total and organic nitrogen ranged from 0.6 to 1.1 percent during 1996-97 and from 2.9 to 5.7 percent in 1995. Non-Project contributions for total phosphorus and orthophosphate ranged from 0.2 to 0.3 percent during 1996-97 and from 0.4 to 1.6 percent during 1995.

Figure 4-21
Annual Nutrient and TDS Load Percentages to Silverwood Lake from Miller and Cleghorn Creeks, 1995-97



Castaic Lake

Local inflows to Castaic Lake were 9,475 af in 1996 and 8,934 af in 1997, amounting to about 3 percent of total Project and non-Project inflows. About half of all non-Project inflows enter Elderberry Forebay. Water in the forebay is pumped back into Pyramid Lake for energy management purposes. Due to the difficulty in accounting for this activity, the effects of local inflows on Castaic Lake water quality were not investigated.

Effects of Dredging on San Luis Canal Water Quality

Dredging was conducted in the California Aqueduct during 1996 to remove sediment deposited by floodwaters the previous year. Sediment was dredged using a low-profile cutter head that hydraulically suctioned material onto land west of the levee. Three locations were dredged: (1) between mileposts 153.3 and 155.6; (2) around milepost 135 (just downstream from the Cantua Creek drain inlet); and (3) around the Arroyo Pasajero levee break at milepost 157.4. Volume estimates based on acoustic sounding and manual pole measurements indicated between 28,000 to 33,000 cubic yards of sediment were to be removed.

The Surveillance and Monitoring Unit initiated sampling for any potential water quality effects. Sequential upstream and downstream samples were collected and analyzed for a full suite of water quality parameters. More intensive monitoring was performed for turbidity during the first 10 days of dredging. Analysis of the data indicates that no substantial changes in Aqueduct water quality occurred as a result of dredging.

Dredging was initiated on May 5 at milepost 153.3. During the first 10 days of dredging, turbidity was measured at four stations every 6 hours when the dredge was active—one upstream of the dredger and three downstream at intervals of 100, 200, and 300 feet. Turbidity at each station was measured at 10 and 20 foot depths to account for heavier particulates transported near the bottom and lighter particulates higher in the water column. Multiple samples were needed to offset the inherent variability of turbidity measurements in flowing water.

Average daily turbidity along with standard deviation limits for depth measurements at 10 feet are plotted in Figure 4-22 (upper graph). From May 5 to 7, daily turbidity averaged between 7 and 9 NTU. Between May 8 and 11, it increased at both upstream and downstream stations. On May 8, the average turbidity was 13 NTU at the upstream site and around 15 NTU at the three downstream sites. The variability of all sample groups was high. For instance, standard deviation at the 300-foot downstream site ranged from 10 to 20 NTU. On May 9, the average turbidity at the upstream site (16 NTU) was the same as the 100-foot downstream station, lower than the 200-foot downstream site (17 NTU), and higher than the 300-foot downstream site (12 NTU). On May 11, the upstream turbidity (13 NTU) was equal to two of the downstream sites and higher than the 300-foot downstream station (10 NTU). Between May 12 and 13, average turbidity levels declined to 6 or 7 NTU. On May 12, turbidity at the upstream site averaged higher than the two other downstream sites, and on May 13, all averages were either 6 or 6.5 NTU. Turbidity began increasing on May 14. On May 15, turbidity averaged 17 NTU at the upstream site, 100-foot downstream, and 300-foot downstream stations, and 14 NTU at the 200-foot downstream station.

Trends in average daily turbidity at the 20-foot depth were similar but slightly higher; they ranged between 7 and 25 NTU (Figure 4-22, lower graph). The large degree of variability in the turbidity measurements hindered any high-resolution analysis of potential upstream/downstream differences. Although upstream turbidities sometimes averaged lower than downstream measurements during the same day, the reverse also occurred. Similar to the 10 feet measurements, multiple measurements taken on the same day were highly variable. The high variability at both depths was not related to dredging activities but to hourly flow changes.

Flows at Check 18 (mp 143) ranged between approximately 2,000 cfs and 8,000 cfs between May 1 and 15. Each time flow increased at Check 18, a corresponding increase in turbidity was observed several hours later at Check 21 (Figure 4-23). The increase in turbidity with flows is a result of in-canal turbulence that resuspends sediment and produces localized plumes of higher turbidity.

Figure 4-22
Turbidity in the San Luis Canal Upstream and Downstream of Dredging Activities

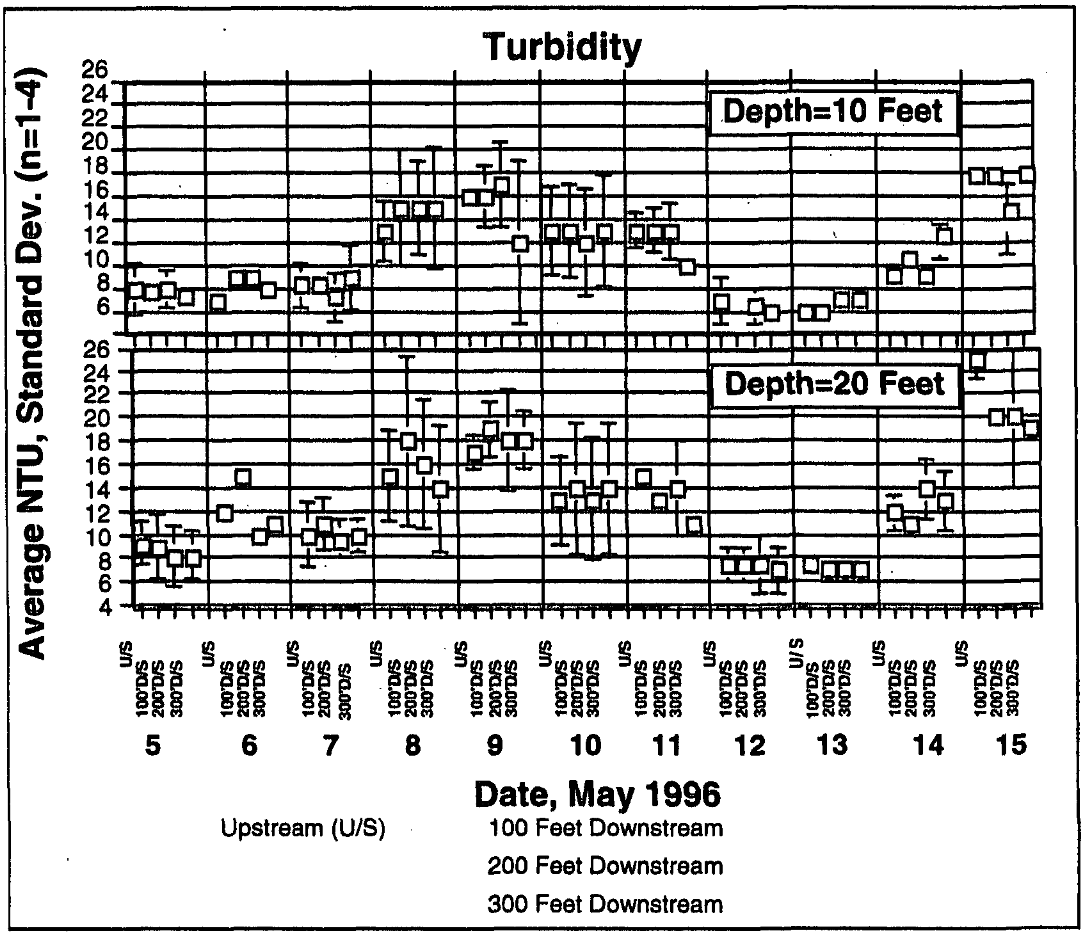


Figure 4-23
Hourly Aqueduct Flows at Check 18 and Turbidity at Check 21, May 1-15, 1996

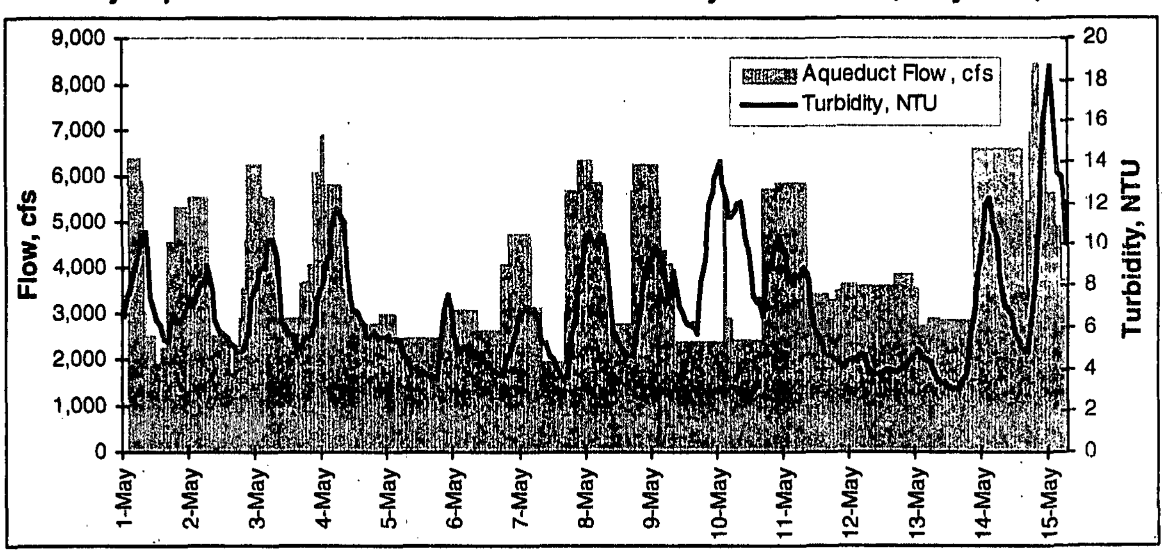
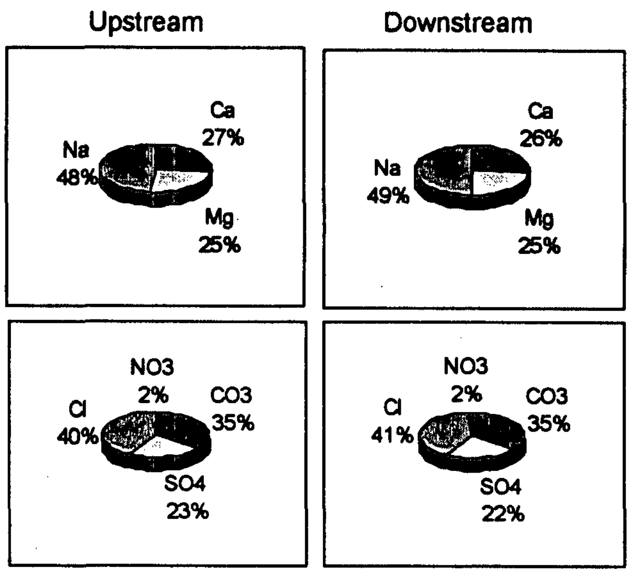


Figure 4-24 shows that anion and cation values on June 10, 1996, were nearly identical between upstream/downstream stations, indicating no change in dissolved minerals from dredging.

Figure 4-24
Anionic/Cationic Values between Upstream and Downstream Stations in the San Luis Canal, June 10, 1996



Most conventional parameters were similar in concentration between the upstream/downstream stations (Table 4-7). A slight increase in the concentration of suspended particles may have occurred from dredging, but all suspended particulate trends were overshadowed by fluctuations caused by flow. No substantial differences in minor element levels were observed between upstream and downstream sites (Table 4-7).

Five EPA organic chemical scans were performed on samples collected on May 6 and June 10, 1996. On May 6, upstream/downstream sampling occurred at milepost 135.42 and milepost 153.42. Of the five scans, Dacthal was detected both above and below the dredging operation (Table 4-7). On June 10, upstream/downstream sampling at mileposts 134.81 and 135.01 detected diazinon (ortho-phosphate) and simazine (chlorinated pesticide) at both stations. The pesticides apparently originated from upstream sources and not as a result of dredging activities.

Total asbestos was slightly lower at the downstream station compared to the upstream site. The reverse was true for the concentration of asbestos fibers greater than 10 microns in length. Since asbestos is affected by turbidity and can be just as variable, the differences are not necessarily significant.

Total coliforms averaged higher at the downstream location, but the difference, 40 MPN/100 mL at the downstream site versus 26 MPN/100 mL upstream, was not statistically significant. Of the 11 samples collected during dredging, approximately half of the total coliform results were higher at the upstream site. The likely explanation for the upstream/downstream difference is analytical imprecision. The multiple tube fermentation test used to detect and quantify coliforms provides an estimate with wide confidence limits that is not designed to be an absolute population value. Fecal coliform levels were 11 and 16 MPN/100 mL at the upstream and downstream sites, respectively. Similar to total coliform, fecal coliform averaged higher at the downstream site compared to upstream; however, the difference was not statistically significant.

Table 4-7
Summary of Water Quality Parameters in the SLC Upstream and Downstream Dredging Activities, June 1996

Parameter	Units	Upstream	Downstream	# of Samples
Conventional Parameters				
pH	pH	7.3	7.4	1
TDS	mg/l	202	204	1
EC	µS/cm	357	362	1
Boron	mg/l	0.2	0.2	1
Hardness	mg/l as CaCO3	86	84	1
TOC	mg/l	3.6	3.5	2
TSS	mg/l	6.5	8	2
VSS	mg/l	3	3.5	2
SS	ml/l	<0.1	<0.1	2
Minor Elements				
Arsenic	mg/l	0.002	0.002	1
Barium	mg/l	<0.050	<0.05	1
Cadmium	mg/l	<0.005	<0.005	1
Chromium	mg/l	<0.005	<0.005	1
Copper	mg/l	<0.005	<0.005	1
Iron	mg/l	0.008	<0.005	1
Lead	mg/l	<0.005	<0.005	1
Manganese	mg/l	<0.005	<0.005	1
Mercury	mg/l	<0.001	<0.001	1
Selenium	mg/l	<0.001	<0.001	1
Silver	mg/l	<0.005	<0.005	1
Zinc	mg/l	<0.005	<0.005	1
Asbestos				
Asbestos, total	MFL a	304	267	2
Asbestos, fibers >10 um	MFL a	2.3	1.78	2
Organic Chemicals				
Ortho-phosphates	µg/l	Diazinon (0.02)	Diazinon (0.02)	2
Chlorinated organics	µg/l	Simazine (0.1-0.19)	Simazine (0.1-0.19)	2
	µg/l	Diuron (0.19)	Diuron (0.12)	2
Chlorinated Phenoxys	µg/l	Dacthal (0.11)	Dacthal (0.10)	2
Miscellaneous	µg/l	None	None	2
Purgeables	µg/l	None	None	2
Coliforms				
Total	MPN/100 L b	26*	40*	11
Fecal	MPN/100 L b	11*	16*	11

a Million fibers per Liter.
b Most probable number per 0.1 Liter.
* Upstream and downstream averages not statistically different at 95% confidence level.

Oil Release in the California Aqueduct

On August 9, 1997, a small portion of Aqueduct liner slumped into the water at milepost 62.23 (near Butts Road). Adjacent groundwater pressure, problematic geology, and a partial de-watering of the Aqueduct for repairs caused the slippage. Oil was observed in the Aqueduct, and flows were stopped until it could be contained. The slippage occurred where an oil pipeline crosses the Aqueduct; however, the pipeline was inactive at the time, so investigators presumed the oil was residual, remaining from a leak that occurred in 1984. A pressure test of the line found no leaks and confirmed it. The 1984 leak was discovered when tainted groundwater began discharging from a Project sump pump 0.16 mile downstream from the pipe. Although soil and groundwater were cleaned up at that time, some residual contamination remained.

Civil Maintenance staff immediately placed sorbant booms in the Aqueduct around the slippage to prevent further oil migration. Booms were also deployed at several downstream locations. Oiled booms were removed and disposed of as needed. Emergency repairs were made and Aqueduct flows resumed on

August 14—five days after the slippage was discovered. The booms remain in place as of this publication date to prevent any residual oil from flowing into O'Neill Forebay, approximately 5 miles downstream.

Daily sampling in the Aqueduct was initiated by Surveillance and Monitoring staff on August 11 at three locations—two stations immediately adjacent the slippage and one downstream at milepost 63.32. As cleanup progressed, one upstream station was added and downstream stations were added or deleted as necessary. Samples were analyzed for purgeable organics, including benzene, toluene, ethyl-benzene, and xylene, as well as total petroleum hydrocarbons (diesel-grade fuel).

Purgeable organics were detected in the Aqueduct on a daily basis up until August 15—one day after flows resumed. Maximum concentrations ranged from 0.58 to 4.7 μg/L, depending on constituent and sample site. One sample collected on August 14 at milepost 62.26 contained benzene at 2.2 μg/L, above the state MCL of 1 μg/L. All other samples contained purgeable organics below their respective MCLs. Total petroleum hydrocarbon analyses were above the reporting limits at three downstream locations on August 15, 19, and 20, including a positive at the upstream site on August 19 indicating the possibility of sample contamination. No criteria or objective exists for TPH. Monitoring for purgeable organics and TPH continued into October with no positive detections.

The site was remediated by excavating tainted soil and treating the surrounding groundwater. Overburden was removed and stored on the Department's right-of-way land until petroleum levels could be determined for future removal and disposal. A physical barrier was installed to intercept any further movement of groundwater toward the Aqueduct.

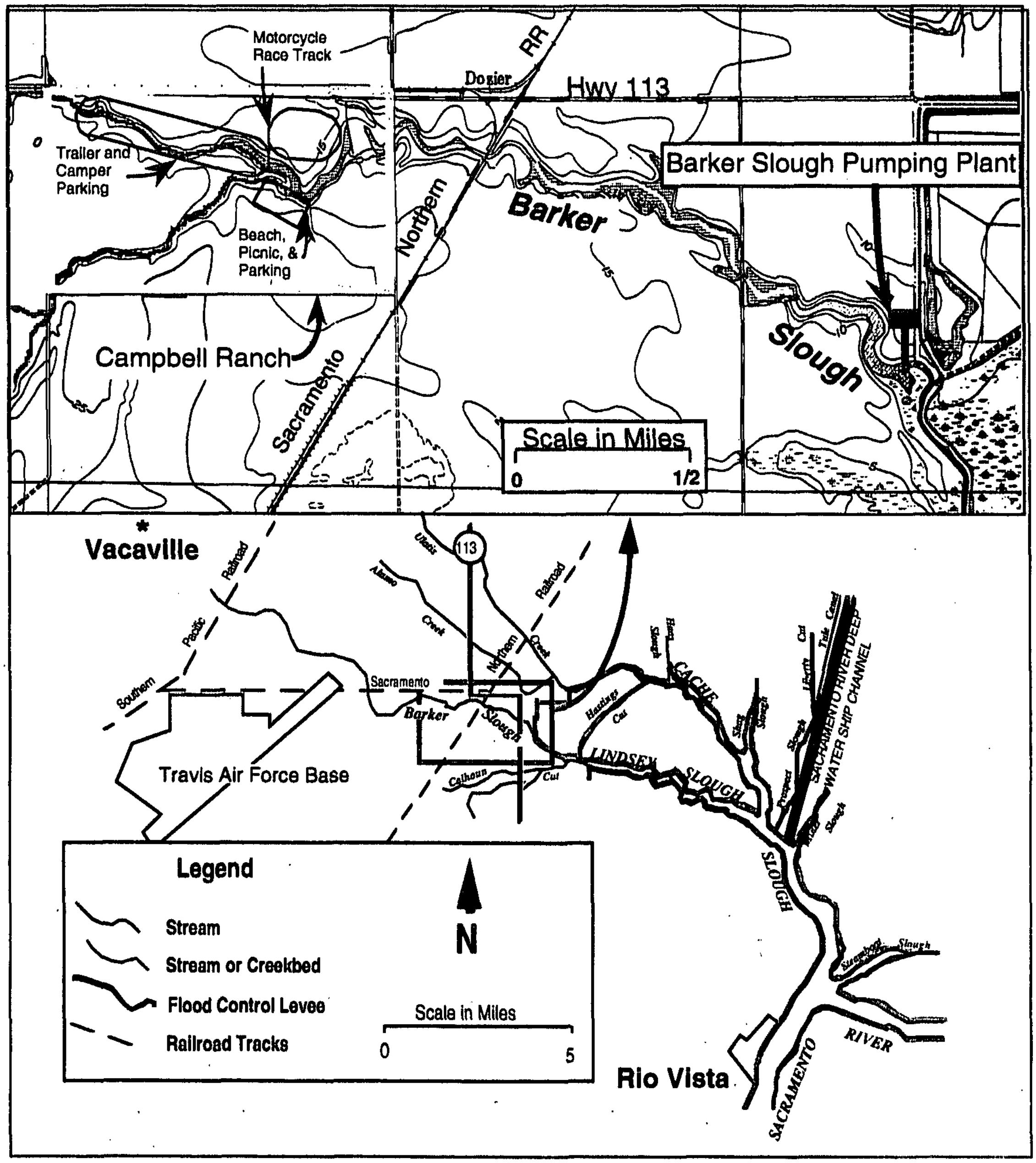
An existing treatment plant (installed in 1985 and operating as of this publication date) removes any hydrocarbons and discharges the clean water over the Aqueduct. A series of pumps skim water from the aquifer surface and send it to an oil/water separator to recover free product. The water is then passed through granular activated carbon to remove any remaining hydrocarbons. Pumpage from a nearby departmental sump pump is also intercepted and treated. Treated water is piped to an overchute and diverted over the Aqueduct to a seasonal streambed. The treatment plant will continue to operate until the site is fully cleaned up.

Water Quality Assessment of the North Bay Aqueduct

Water treatment plants on the North Bay Aqueduct periodically experience surges of total organic carbon in their raw water. These surges sometimes increase to over five times background levels and interfere with the water treatment process. Background TOC levels at Barker Slough Pumping Plant, the entrance to the North Bay Aqueduct (Figure 4-25), range between 3 to 6 mg/L during the summer but can increase to over 20 mg/L during the rainy season. For comparison, levels at Banks Pumping Plant in the south Delta typically range between 3 and 9 mg/L. Raw water with high organic carbon requires special treatment to limit the formation of trihalomethanes in drinking water. Trihalomethanes can be carcinogenic, and the Department of Health Services will be lowering the human health standard for these compounds in drinking water. The water treatment plants will have to comply. Data was analyzed to define the seasonal trends of TOC and other parameters that change with rainfall runoff in Barker Slough.

Water in Barker Slough originates from an upstream watershed that is approximately 15 square miles in size. Depending on season, 60 to 80 percent of the watershed is used for animal grazing such as cattle (DWR 1998). The remainder is largely agricultural and open space, with a small recreational park that offers watersports and a dirt track.

Figure 4-25
Barker Slough and Barker Slough Pumping Plant in the Northern Sacramento-San Joaquin Delta/Estuary



TOC Trends

Figure 4-26 shows TOC is highest during the rainy season months of December through March. It also shows that TOC increased during or just after major rainfall events and stayed elevated with continued seasonal rainfall. In 1991 and 1994, annual precipitation was less than 14 inches and TOC exceeded background levels on only a few occasions (Figures 4-27 and 4-28). Conversely, during years of high rainfall (15-29 inches), levels remained elevated for several months at a time. During the 1996 rainy season, an intense early season storm dropped 7 inches over 2 consecutive days. Soon after, TOC at Barker Slough Pumping Plant increased to 18 mg/L and stayed elevated until mid-April, as rain continued to fall throughout the season (Figure 4-28). Major TOC sources in Barker Slough have not been

Figure 4-26
Total Organic Carbon in the North Bay Aqueduct and Monthly Rainfall at the City of Fairfield, October 1989 to October 1996

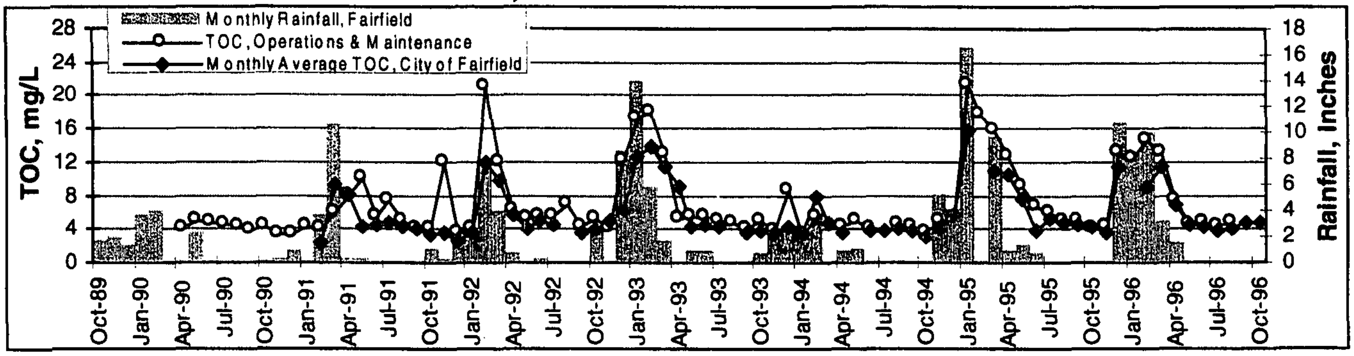


Figure 4-27
Total Organic Carbon in the North Bay Aqueduct and Rainfall in the City of Fairfield, 1991-93

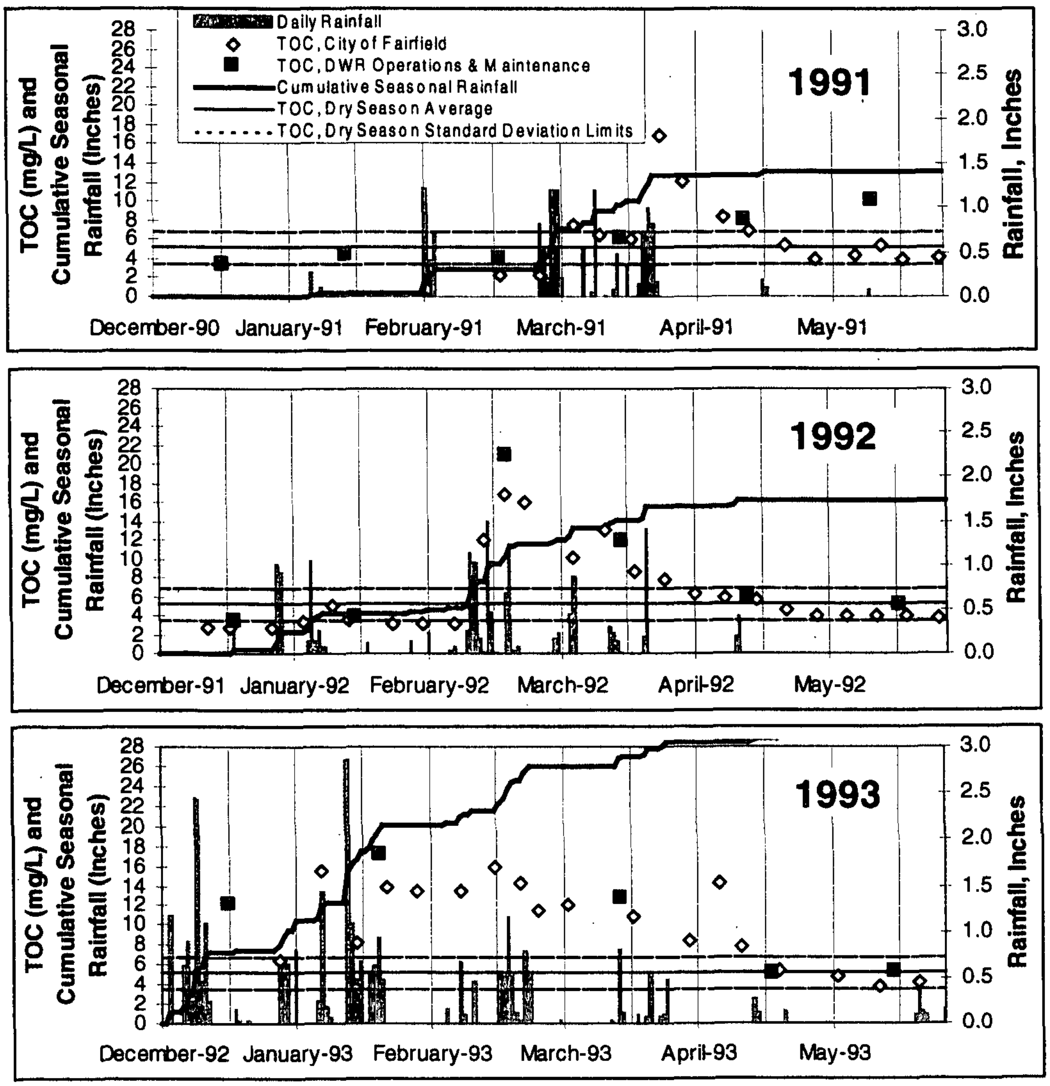
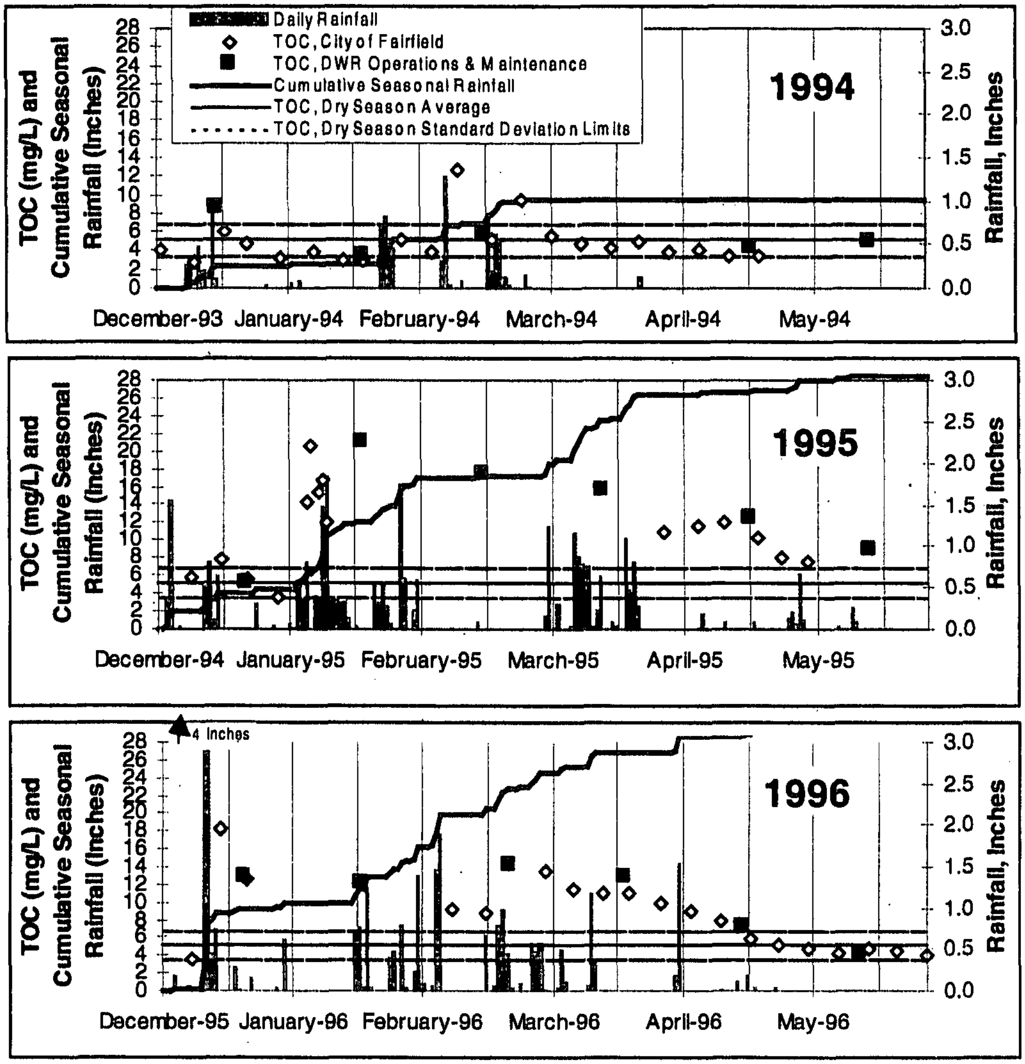


Figure 4-28
Total Organic Concentrations in the North Bay Aqueduct and Rainfall in the City of Fairfield, 1994-96



conclusively identified, but preliminary data indicates that peat soils and animal waste are probably two contributors.

TOC concentrations were not correlated with absolute rainfall totals since runoff from any undeveloped watershed depends on both rainfall intensity and soil saturation. Table 4-8 shows this relationship for Barker Slough. During each of the 1991-96 rainy seasons, TOC increased above background levels when seasonal rainfall totals reached 2.3 to 9 inches. During years when there was no intense rainfall, elevated TOC was first detected when the seasonal total was around 7 inches. Evidently, this is the amount of rainfall needed to saturate soil in the watershed and produce runoff. When seasonal rainfall totals were less than 7 inches, rainfall intensity generated runoff with high TOC. In 1994, for instance, seasonal cumulative rainfall at the time of the first elevated TOC sample (9 mg/L) was only 2.3 inches, while rainfall during the 3-day period prior to sampling totaled 0.98 inches. This trend occurred again in 1995 when 0.77 inches fell within a 3-day period with only 4 inches of seasonal rainfall (Table 4-8).

Table 4-8
Cumulative Seasonal Rainfall and Rainfall 3 Days Prior to the First Season's Elevated TOC Concentration at Barker Slough Pumping Plant, 1991 to 1996

	Elevated TOC			Rainfall 3 Days	
Water Year	Date Detected	Conc. mg/l	Cumulative Seasonal Rainfall	Prior to Elevated TOC	Day of Sample Since Recorded Rainfall
1991	8-Mar	8	7.11	0	3
1992	14-Feb	12	7.5	1.24	0
1993	16-Dec	12	7.25	0	4
1994	15-Dec	9	2.34	0.98	0
1995	16-Dec	8	4.11	0.77	1
1996	15-Dec	18	8.86	1.2	1

Coliforms

Coliform bacteria were also highest during the rainy season. From 1992 to 1996, total coliforms ranged from <2 to 5,500 MPN/100 mL (Figure 4-29) and fecal coliforms ranged from <10 to 5,500 MPN/100 mL (Figure 4-30). The highest levels were observed just before or during periods of substantial rainfall in the City of Fairfield. Pre-rainfall increases are thought to originate from increased outflows from an upstream reservoir. In the fall, flashboards are removed by the owner to drain the lake and increase storage capacity. These releases may be scouring the bottom of the lake and resuspending any settled coliforms.

Total and fecal coliform values were correlated in the high range (Figure 4-31, bottom left graph). This was not the case for coliforms at Banks Pumping Plant or in the Sacramento River. Although many different strains of bacteria are present in the environment, only fecal coliforms are enteric or can survive within the intestinal tract of mammals. The correlation indicates that most coliforms transported downstream via rainfall runoff originated from animal waste. Although coliforms are easily destroyed in the water treatment process, products of animal waste can also contain parasites such as *Cryptosporidium* and *Giardia*, which are not so easy to destroy in the water treatment process. These two organisms are known to cause intestinal sickness and even death if ingested by humans. Although water quality data on these two parameters exists, the method for analysis is not considered reliable.

Figure 4-29
Total Coliforms and Daily Rainfall at Barker Slough Pumping Plant, 1992-96

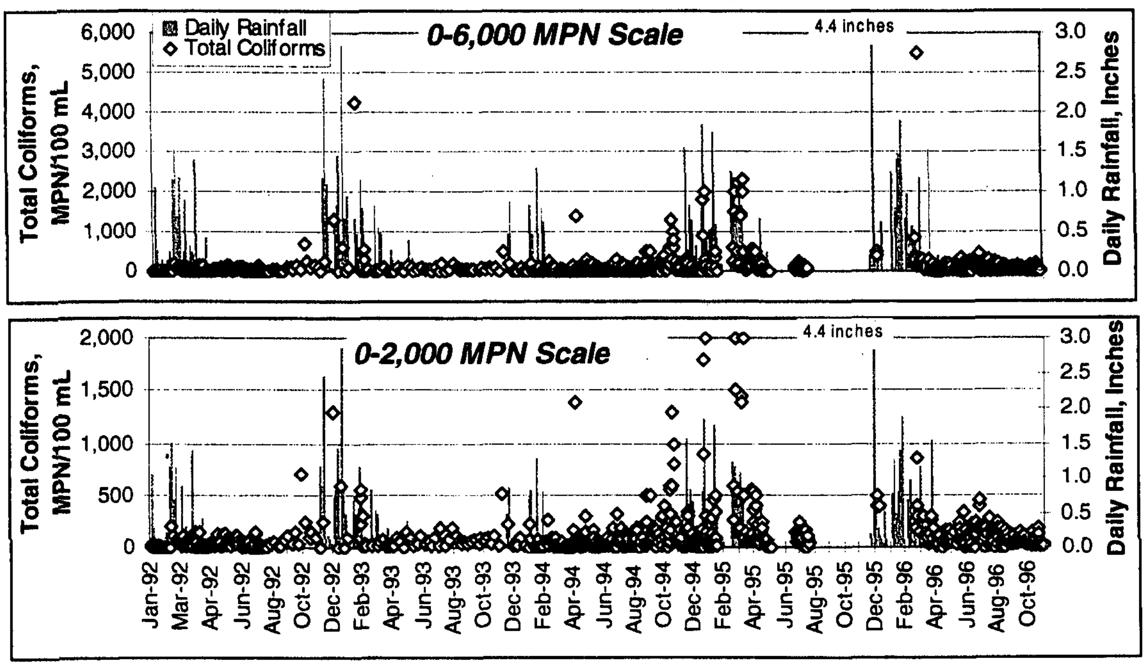


Figure 4-30
Fecal Coliforms and Daily Rainfall at Barker Slough Pumping Plant, 1992-96

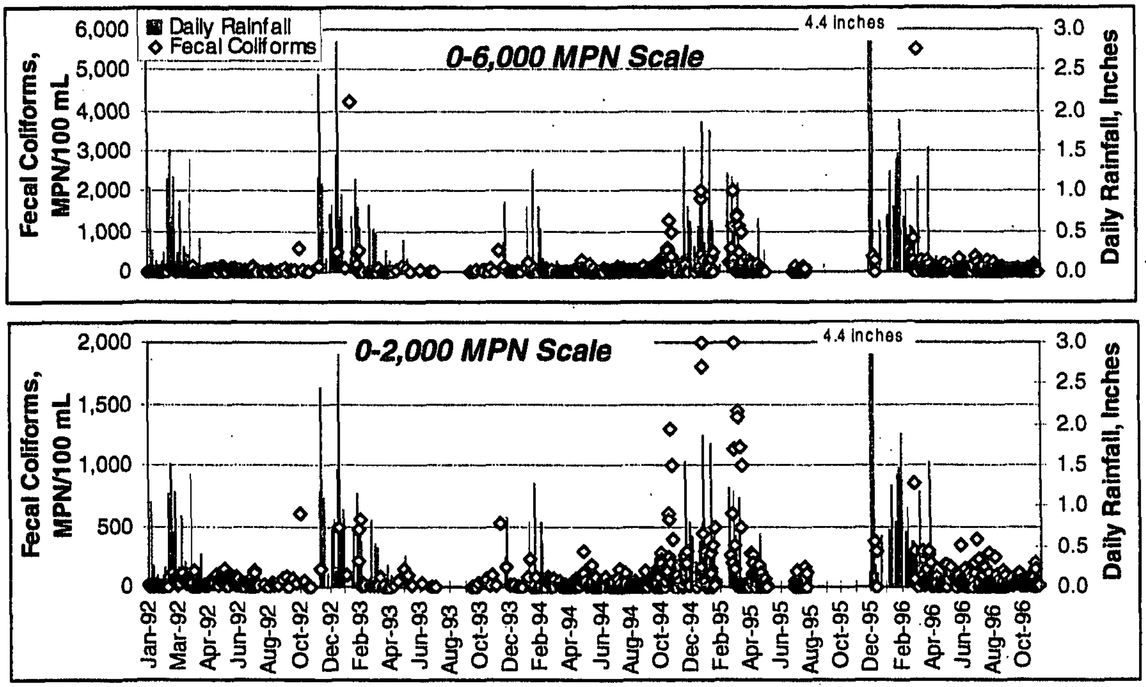
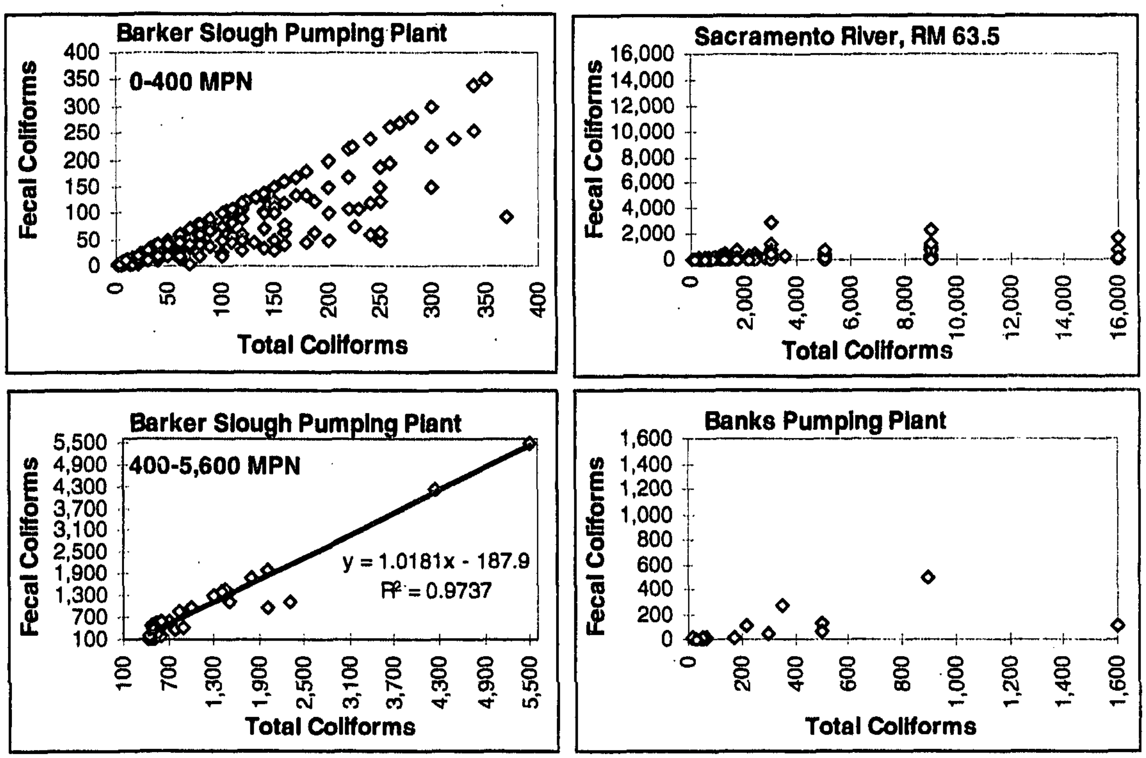


Figure 4-31
Total and Fecal Coliform Relationships at Barker Slough Pumping Plant, Sacramento River at the City of West Sacramento Water Treatment Plant, and Banks Pumping Plant (MPN/100 mL)



Other Parameters

Temperature, nitrogen compounds, pH, and certain metals in Barker Slough also fluctuated seasonally between 1992 and 1996. Monthly water temperatures at Barker Slough Pumping Plant varied annually by as much as 15 degrees, ranging from 8 degrees Celsius in fall and winter to more than 25 degrees Celsius during the summer (Figure 4-32, top graph). Temperature declined each fall prior to any rainfall and then reached a seasonal minimum, usually between December and February. The lowest temperatures occurred during periods of rainfall.

Although the data is not extensive, nitrogen compounds also fluctuated seasonally and increased during periods of rainfall. For instance, organic nitrogen and dissolved ammonia peaked in December 1995 after 2 days of heavy rainfall (Figure 4-32). These compounds remained elevated through January and March 1996, with continued on-and-off rainfall. Organic nitrogen is defined as organically-bound nitrogen and includes compounds such as proteins, peptides, nucleic acids, urea, and other organics present in animal excreta (as is ammonia). TOC was correlated with this compound but not nitrate (Figure 4-33). Nitrate in surface waters can originate from a number of sources including animal waste, fertilizers, and nitrification. Nitrates are also more likely to percolate through soil than organic nitrogen, reducing the amount available for transport via runoff.

Background pH ranged between 7.5 and 8.5 during the summer months, but declined below 7.5 for several months during the rainy seasons of 1993, 1995, and 1996 (Figure 4-32). The declines were likely caused by rainfall runoff. When rainfall—commonly exhibiting pHs below 6—is substantial enough, the increased acidity in runoff may be enough to overwhelm the buffering capacity of the watershed. The ammonium ion (NH4+), a weak acid, may also have a measurable effect on pH. Regardless of the source of acidity, pH declines can increase the solubility of waterborne metals.

Dissolved aluminum and iron often increased with a corresponding decrease in pH (Figure 4-32). The high levels are not necessarily a result of augmentation from the watershed, because the solubility of most metals is controlled more by physicochemical parameters such as temperature and pH. A more probable cause of the high iron and aluminum levels is that more of the available metals were solubilized when pH dropped.

Standard solubility relationships for iron predict a dissolved concentration of 0.006 mg/L in a pH range from slightly more than 7 to 11 (Hem 1985). However, when pH falls below about 7.2 (or increases above 11), the solubility of iron is highly dynamic. For instance, when pH decreases from 7 to 6.5, the solubility of iron is predicted to increase three orders of magnitude from 0.006 to 6 mg/L, assuming standard state conditions and an excess of available iron. This relationship was observed at least once at Barker Slough Pumping Plant. During 1993, pH declined to 6.9 in January, and the corresponding iron concentration increased from near 0.005 mg/L to 0.61 mg/L. Aluminum concentrations essentially mimicked those of iron during the 1993 rainy season, although during other rainy seasons, iron usually peaked at a higher level. The pH declined just as dramatically during subsequent rainy seasons, but increases in dissolved metals were not as great. Different filter types may have caused this discrepancy—cotton-based disk filters were used prior to 1995 and were replaced with polymer-based cartridge filters. In a few instances, metals increased without a corresponding decrease in pH; this may have been due to windblown dust, which is a known source of iron contamination. A detailed study of Barker Slough water quality can be found in DWR 1998.

Figure 4-32
Seasonal Temperature Fluctuations, Nitrogen Compounds, pH, and Certain Metals with Daily Rainfall in the North Bay Aqueduct at Barker Slough Pumping Plant

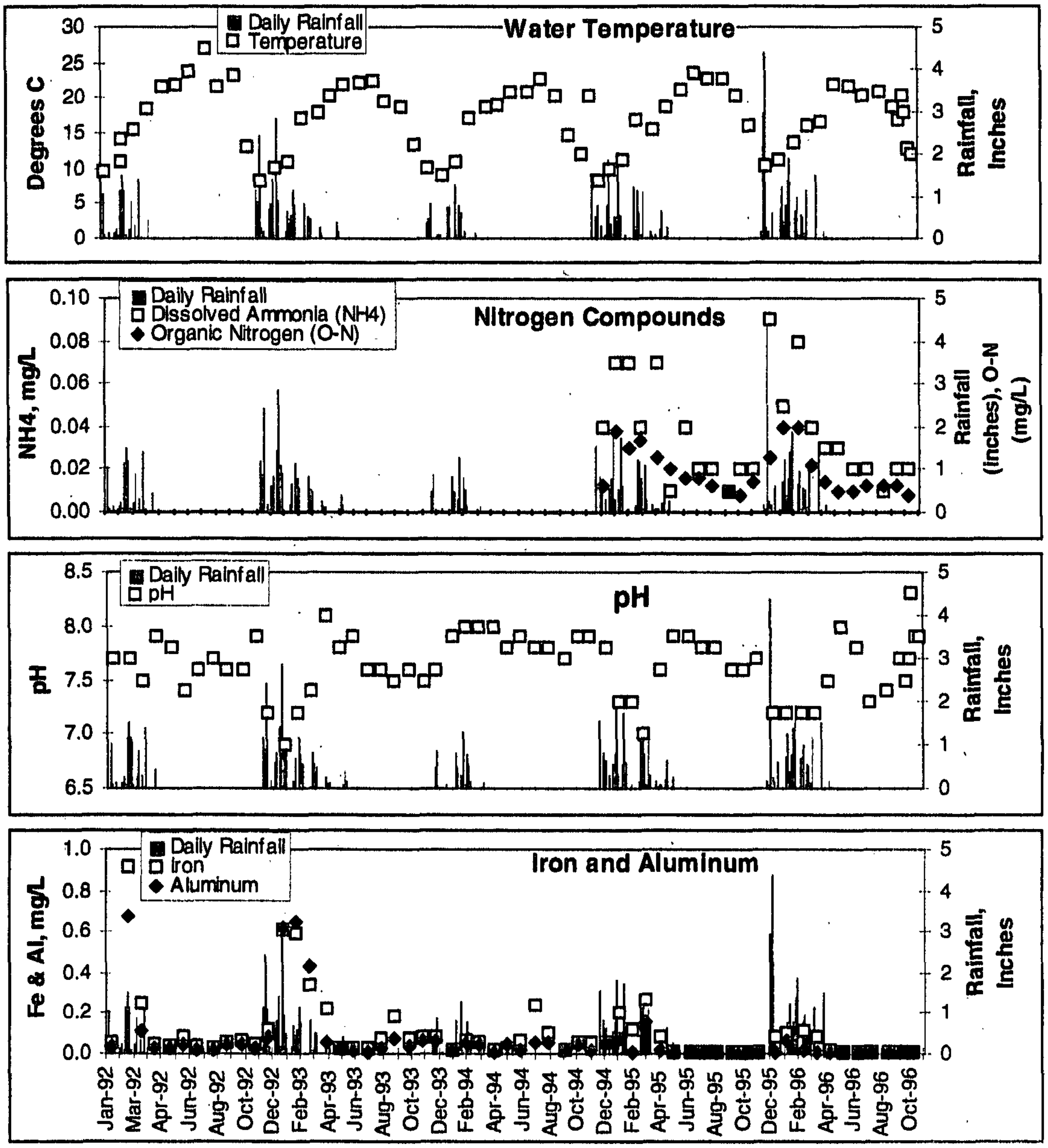
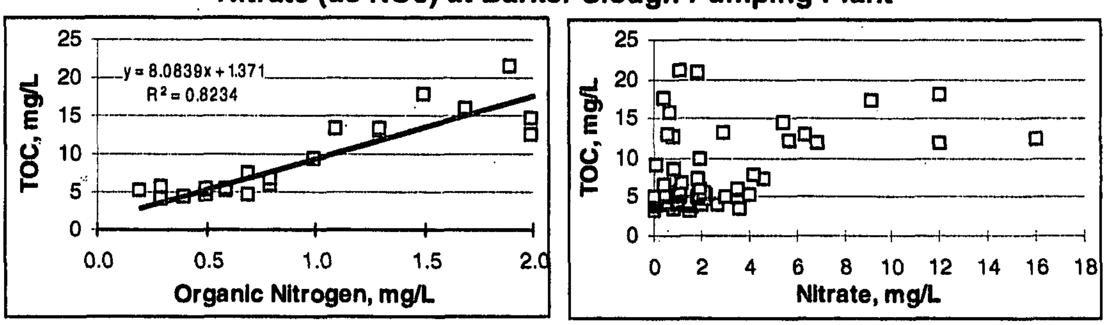


Figure 4-33
Relationship between Total Organic Carbon and Organic Nitrogen and Nitrate (as NO3) at Barker Slough Pumping Plant



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Appendix A

Methods

Contents

List of Tables

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Methods

Monitoring Stations

Water quality samples are routinely collected at 29 stations throughout the State Water Project (Table A-1, Figure A-1, and Plates 1 to 5). Automated water quality monitoring stations measure conventional parameters such as conductivity, temperature, or turbidity at 20 locations throughout the Project (Table A-2, Figure A-1, and Plates 1 to 5).

Water Collection

Water quality sampling, preservation, and transportation protocols were followed as per EPA 1983, USGS 1985, and *Standard Methods for the Examination of Water and Wastewater* (APHA et al. 1995). Specific collection practices varied depending on the site. Water was taken just below the surface at all lake stations, on the Delta-Mendota Canal, and at Thermalito Afterbay and Forebay stations. The collection device is either an acrylic Van Dorn Beta sampler with polypropylene stoppers, hand-dipped bottle, stainless steel bucket for organics, or plastic bucket for metals suspended by a rope.

At sites with automated stations, samples are collected directly from the circulation system. A spigot is opened and runs for 2 to 3 minutes before the bottle is filled. The circulation piping is PVC and the submerged pump forces around 3 to 5 GPM through the system. After the environmental samples and field blanks have been collected, the tubing is removed, rinsed with deionized water, and stored in a ziploc bag.

Filtration of samples is either performed in the field or at the field lab within an hour. At automated station sampling sites, water is filtered directly from the circulation system. A segment of Masterflex platinum-cured polypropylene tubing is connected to the system that is, in turn, connected to a Gelman 0.45 micron filter capsule. One capsule is used for all filtered samples, including the filtered field blanks.

Field blanks for dissolved metals are filtered with a peristaltic pump with the same tubing used for the environmental samples after it has been rinsed with deionized water. To collect field blanks for total metals, the device used to collected the environmental sample (e.g., bucket) is rinsed with deionized water, then filled with deionized water before the field blank bottle is filled. At stations where a sampler is not used, total field blanks are filled with the peristaltic pump setup without a filter. After sampling, the tubing is placed in a ziploc bag for transport and storage. A travel blank is included along with the purgeable organics vials.

All water samples are collected in accordance with the protocol prescribed for the specific method. Further precautions are taken to eliminate sample contamination in the field. These include use of a "clean" sampling box for storage and transport of items used in the filtration process. Clean items include unused filter cartridges, unused sample bottles, filter tubing, and unused baggies. Containers used include coolers with hinged tops or polyethylene security containers with flip lids. Once the samples are collected and filtered, they are placed immediately in a cooler with ice and transported to the lab within 24 hours.

Filtration and processing of samples is conducted on a clean surface. A clean piece of plastic wrapping is often used, as are unused garbage bags that are disposed of after use. The plastic is spread out on the sampling bench prior to sampling. Items set on this surface include sample bottles, filter tubing, preservatives, and unused filter cartridges. The plastic is removed after sample processing and thrown out.

Laboratory Methods

Water quality samples are transported to the Bryte Chemical Laboratory within 24 to 48 hours of collection. Analytical work was performed by Bryte Laboratory using the analytical methods shown in Table A-3. As required for environmental laboratory accreditation in California, Bryte Laboratory filed a Quality Assurance Plan with the California Department of Health Services. The plan covers items required by EPA, such as organization and responsibility, laboratory sample procedures and identification, analytical methods, internal quality control, and corrective action. Internal quality control checks include duplicates, spikes, check standards, reference standards, and control charts.

Table A-1
Water Quality Monitoring Schedule

			Sampling Frequency 1/																
			Inorganics							Organics									
Waterbody or Facility	Station Name or Description	Station I.D.	Project Standard 2/	Project Additional 3/	Nutrients	Bromide	Major Minerals	Iron and Manganese	Suspended Solids	Chlorinated Organics	Organo-Phosphorus Pesticides	Herbicides	Carbamates	Purgeable Organics	Trihalomethane Form. Pot.	Total Organic Carbon	Dissolved Organic Carbon	UV 254	Automated Monitoring Station
Feather River Watershed	Antelope Lake	AN001000	A		A														
	Frenchman Lake	FR001000	A		A														
	Lake Davis	LD001000	A		A			M3											
	Oroville Lake	OR001000			M2														
	Thermalito Forebay	TF001000	Q	Q															
	Thermalito Afterbay	TA001000	M		M2	Q			Q										
North and South Bay Aqueducts	NBA, Barker Sl. Pumping Plant	KG000000	M	M	M			W1	Q	T	T	T	T	T	M4	M4	M4	M4	X
	NBA, Cordelia Forebay	KG002111	Q	Q															X
	SBA, Check 7	KB001632	M	M	M										M	M			X
	SBA, Del Valle Reservoir	DV001000			M														
	SBA, Del Valle Res. Outlet	DV000000	M1	M1	M1				M1										X
	SBA, Santa Clara Terminal Tank	KB004207	Q1	Q1		Q1													X
California Aqueduct and Coastal Branch	Clifton Court Forebay	KA000000				Q	Q												X
	Banks Pumping Plant	KA000331	M	M	M	M			M	T	T	T	T	T	M	M			X
	Check 12	KA006633					Q								Q				X
	Check 13	KA007089	M	M		M				T	T	T	T	T	M	M			X
	Check 21	KA017226	M	M		M			M	T	T	T	T	T	Q	Q			X
	Coastal Branch	KĊ000934	M	M					M						M				X
	Check 29	KA024454	M	M					M	T	T	T	T	T	M				X
	Check 41	KA030341	M	M	M	M			M	T	T	T	T	T	M	M			X
	Check 66	KA040341	Q		M										Q				X
	Devil Canyon Afterbay	KA041288	M	M	M	M			Q	T	T	T	T	T	M	M			X
San Luis Reservoir and Project Lakes in Southern California	San Luis Res., Trashracks	SL001000	M	M	M														
	San Luis Res., Tunnel Island	SL005000	M	M	M														X
	Pyramid Lake	PY001000	Q	Q	M														
		PY002000					(Special Monitoring Studies)												
		PY003000					(Special Monitoring Studies)												
	Castaic Lake	CA001000					(Special Monitoring Studies)												
		CA002000	Q	Q	M										Q	Q			
		CA003000					(Special Monitoring Studies)												
	Silverwood Lake	SI001000																	
		SI002000	Q	Q	M														
	Lake Perris	PE001000																	
		PE002000	Q	Q	M														
		PE003000					(Special Monitoring Studies)												
Central Valley Project	Delta Mendota Canal	DMC06716	M	M						T	T	T	T	T	M	M			

1/ Sampling Frequency: A=Annual Q=Quarterly Q1=Feb, May, Aug-Dec M=Monthly M1=Monthly When Flowing
M2=Apr-Nov M3=May-Sep M4=Weekly in Winter else Monthly, T=Mar, Jun, Sep, W1=Weekly in Winter

2/ Project Standard: Arsenic, Chromium, Copper, Iron, Lead, Manganese, Selenium, Zinc, Calcium, Magnesium, Sodium, Alkalinity, Sulfate, Chloride, Fluoride, Boron, Nitrate, Dissolved Solids, Turbidity, and Conductivity

3/ Project Additional: Barium, Cadmium, Aluminum, Mercury, and Silver.

Figure A-1
Water Quality Monitoring Stations in the State Water Project

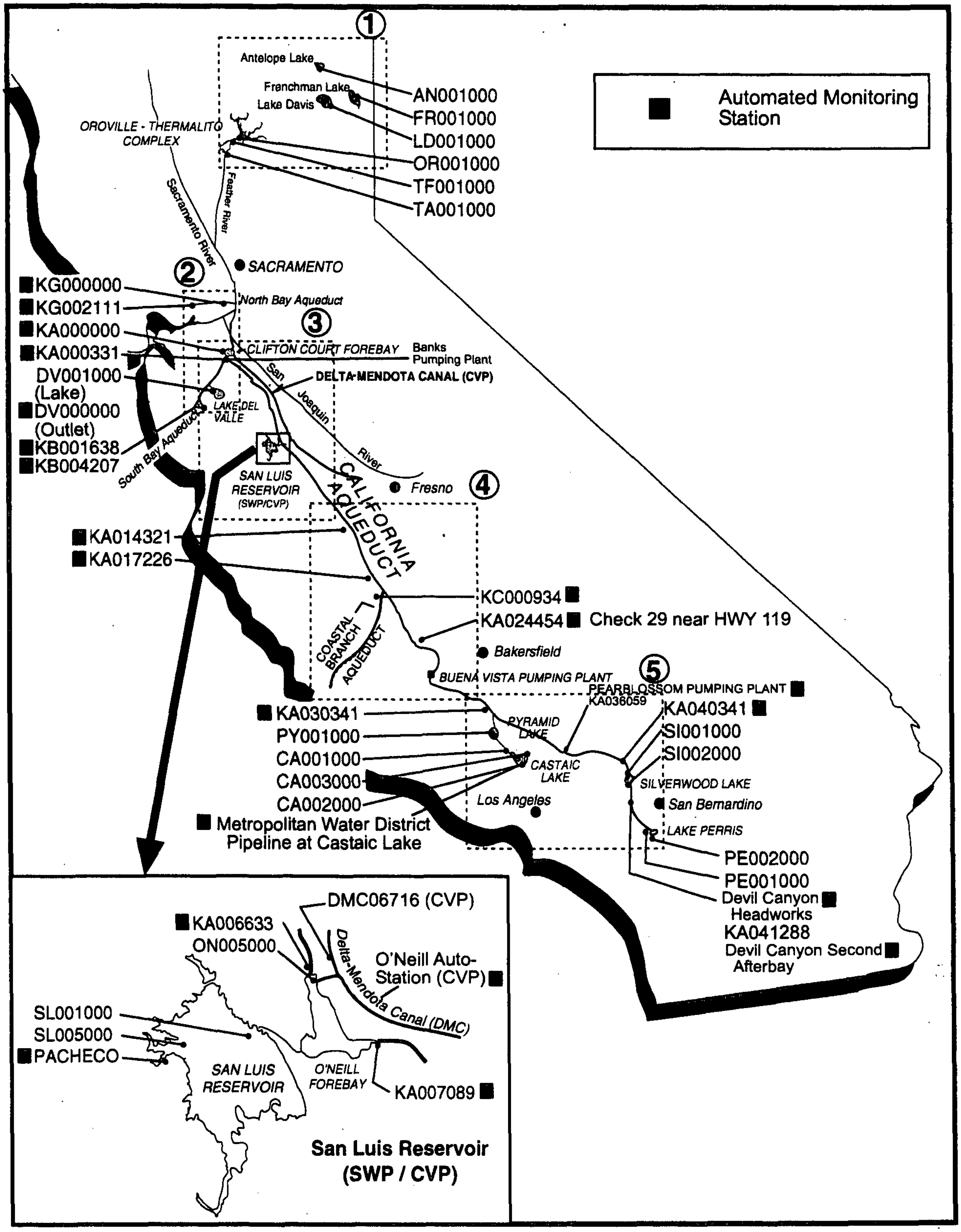
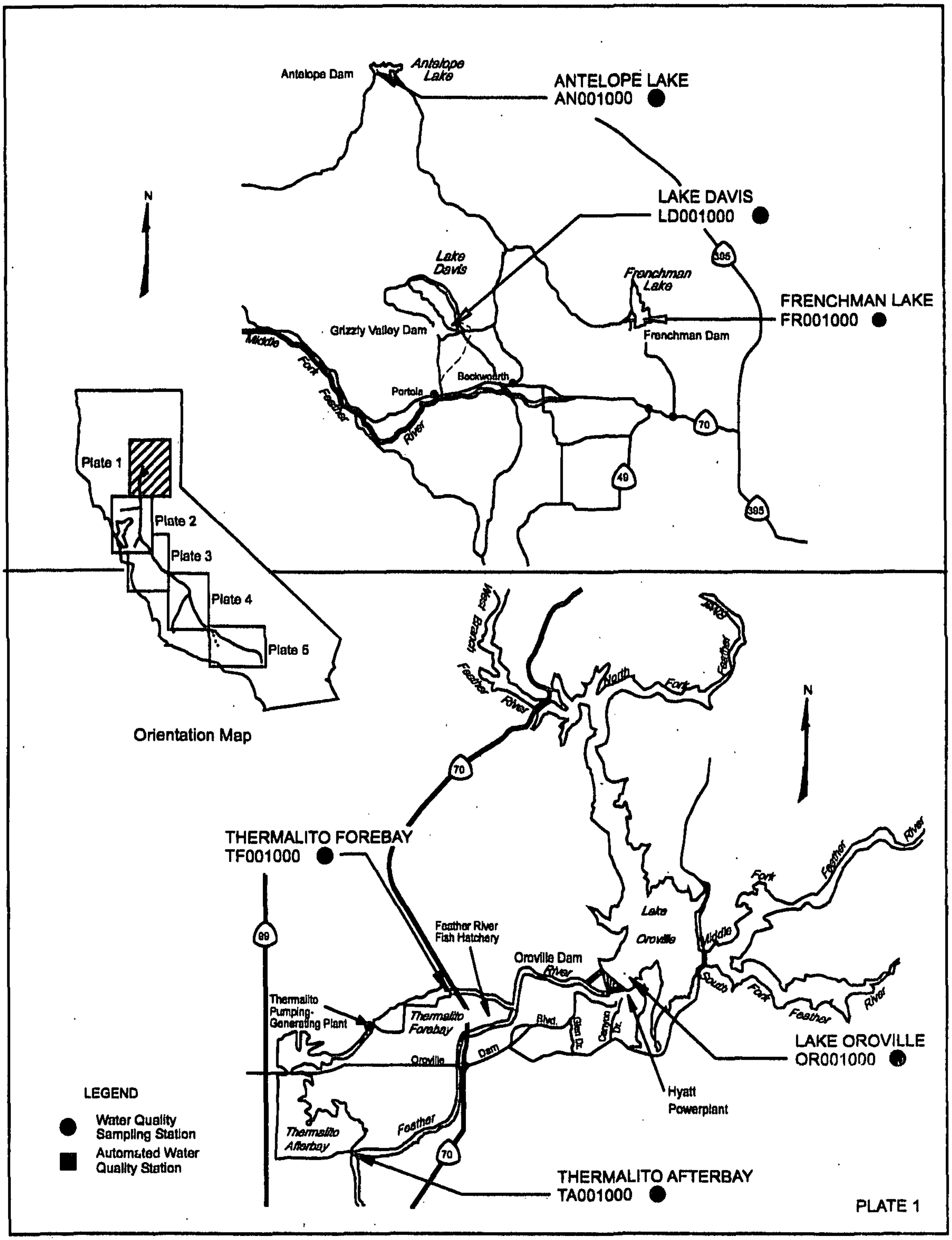
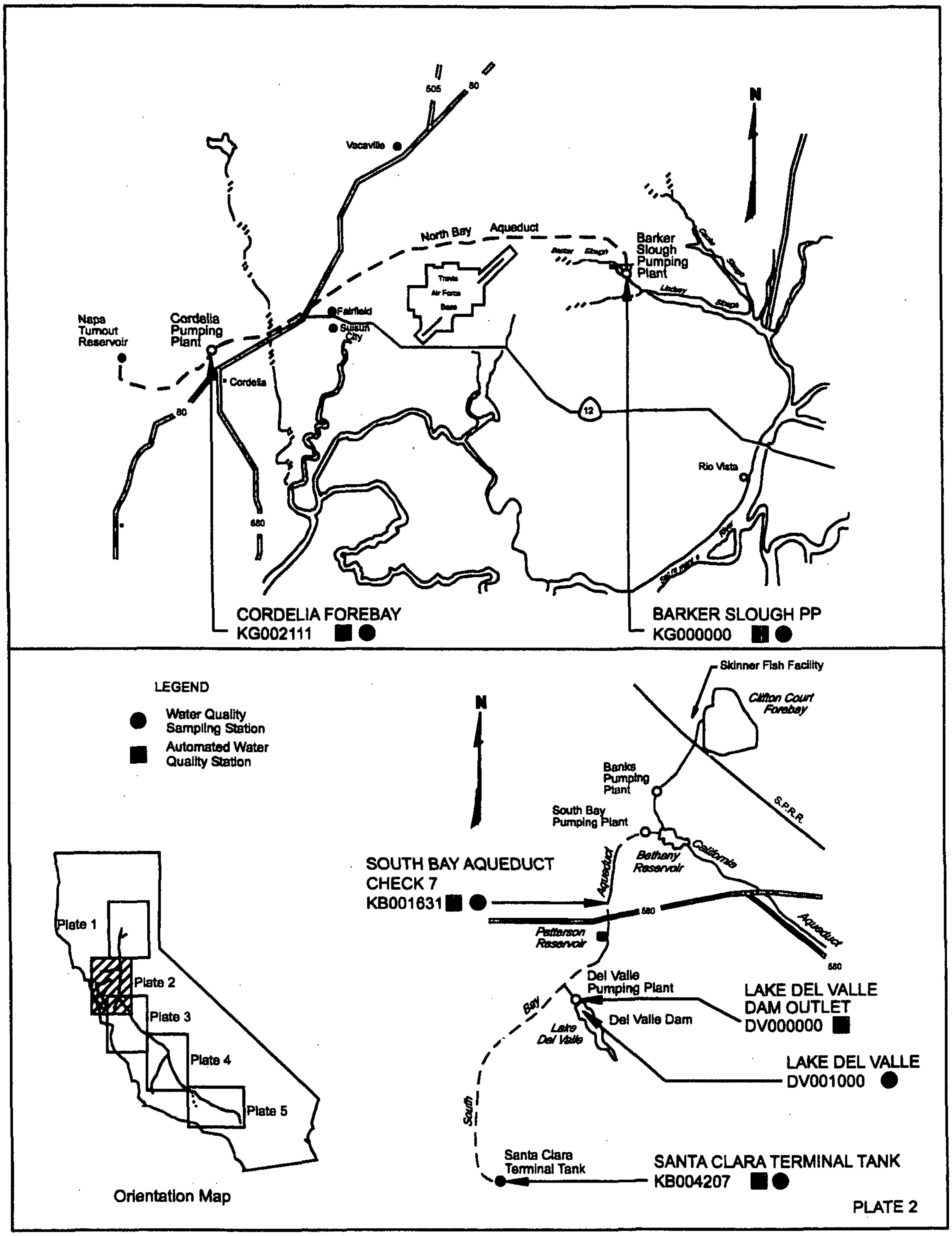


Plate 1



Antelope Dam
Antelope Lake
ANTELOPE LAKE
AN001000
LAKE DAVIS
LD001000
Lake Davis
Grizzly Valley Dam
Frenchman Lake
FRENCHMAN LAKE
FR001000
Frenchman Dam
Middle Fork Feather River
Portola
Beckwourth
70
49
395
N
Plate 1
Plate 2
Plate 3
Plate 4
Plate 5
Orientation Map
West Branch Feather River
North Fork Feather
THERMALITO FOREBAY
TF001000
99
Feather River Fish Hatchery
Oroville Dam
River
Lake Oroville
Middle Fork Feather River
South Fork Feather River
Thermalito Pumping-Generating Plant
Thermalito Forebay
Oroville Dam Blvd.
Glen Dr.
Canyon Dr.
LAKE OROVILLE
OR001000
Hyatt Powerplant
LEGEND
Water Quality Sampling Station
Automated Water Quality Station
Thermalito Afterbay
Feather
THERMALITO AFTERBAY
TA001000
PLATE 1

Plate 2



CORDELIA FOREBAY
KG002111
BARKER SLOUGH PP
KG000000
Napa Turnout Reservoir
Cordelia Pumping Plant
Cordelia
Vacaville
Fairfield
Suisun City
North Bay Aqueduct
Barker Slough Pumping Plant
Rio Vista
N
LEGEND
Water Quality Sampling Station
Automated Water Quality Station
Skinner Fish Facility
Clifton Court Forebay
Banks Pumping Plant
South Bay Pumping Plant
Bethany Reservoir
California
Aqueduct
S.P.R.R.
SOUTH BAY AQUEDUCT CHECK 7
KB001631
Patterson Reservoir
Del Valle Pumping Plant
Del Valle Dam
Lake Del Valle
LAKE DEL VALLE DAM OUTLET
DV000000
LAKE DEL VALLE
DV001000
Santa Clara Terminal Tank
SANTA CLARA TERMINAL TANK
KB004207
Plate 1
Plate 2
Plate 3
Plate 4
Plate 5
Orientation Map
PLATE 2

Plate 3

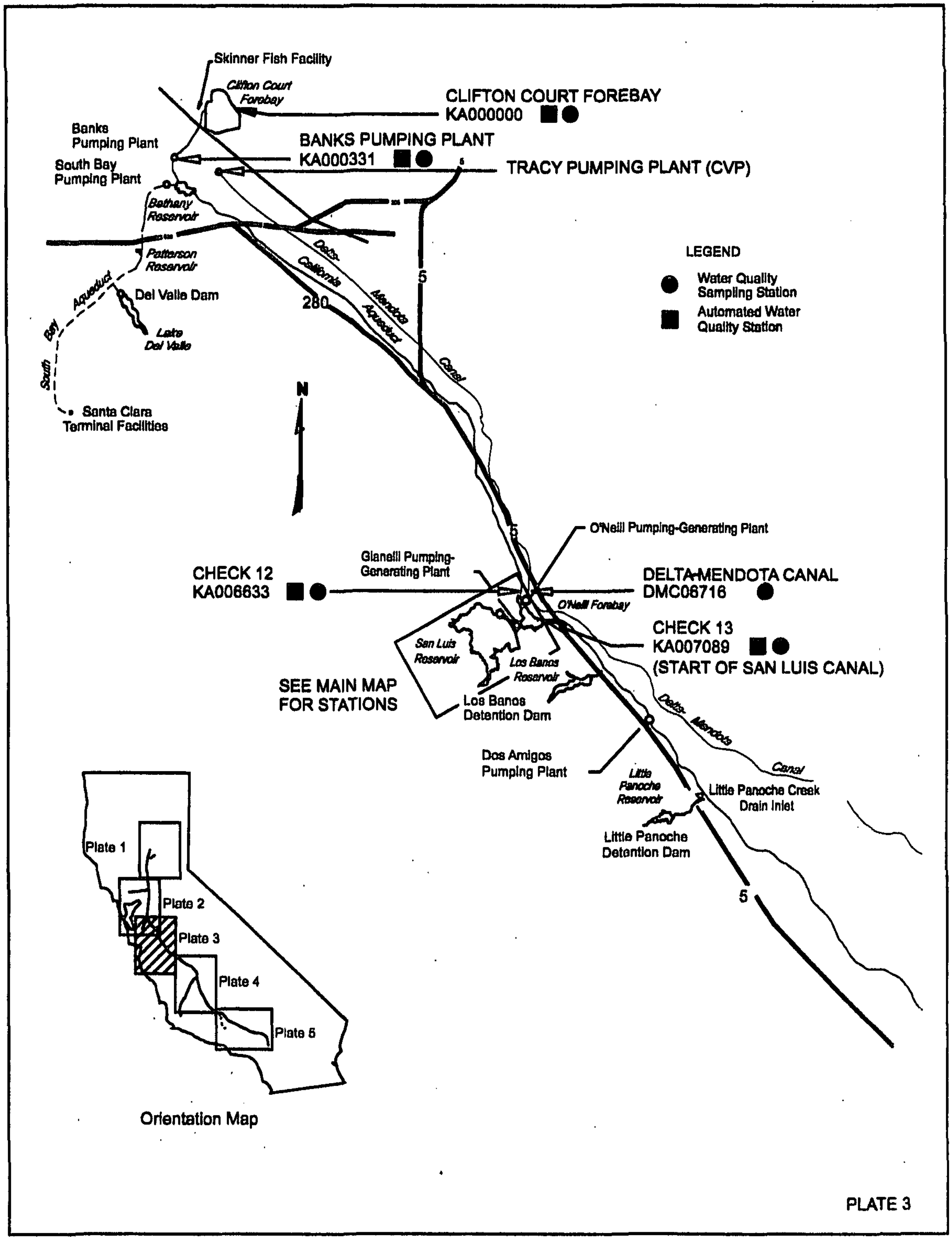
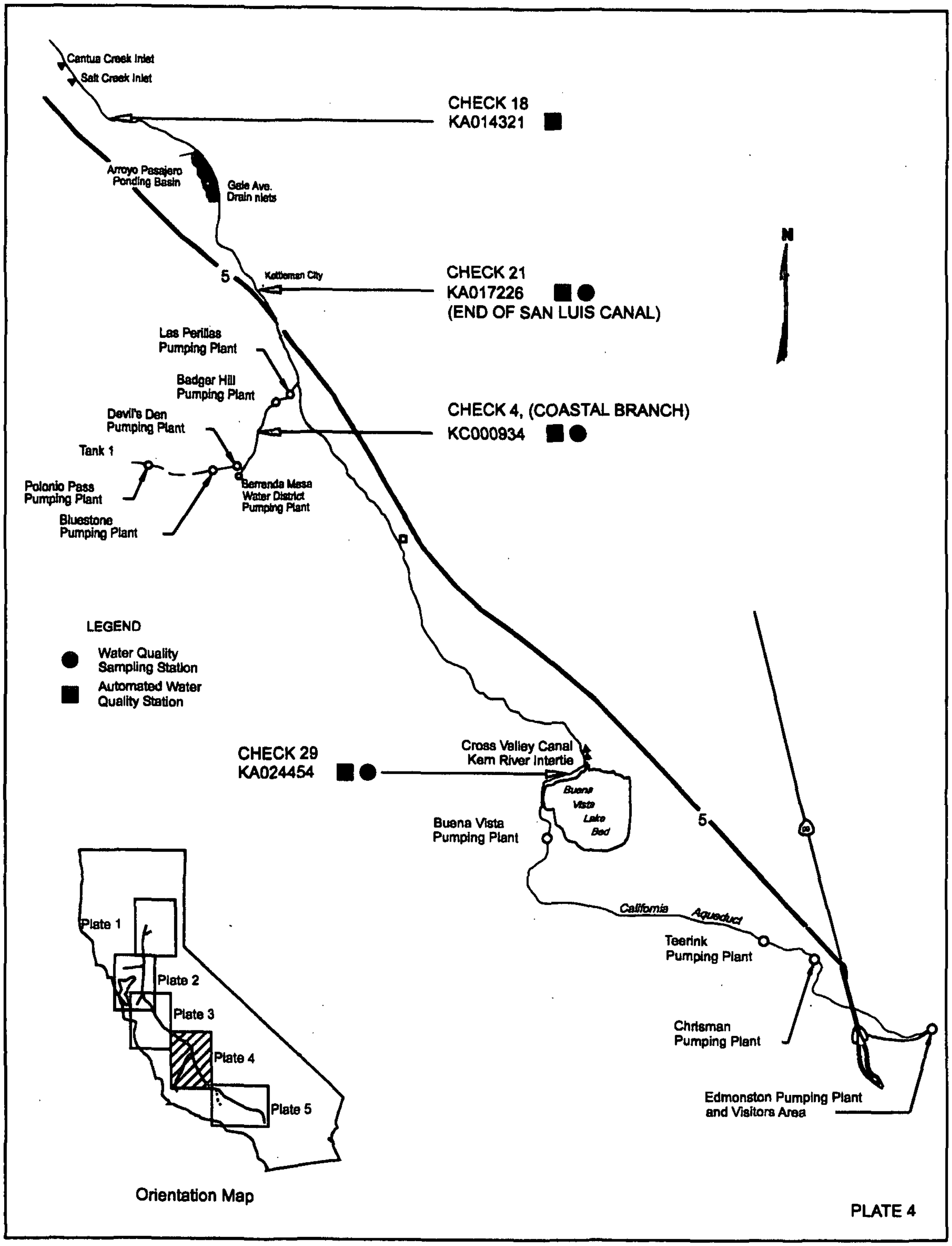

Skinner Fish Facility
Clifton Court Forebay
CLIFTON COURT FOREBAY
KA000000
Banks Pumping Plant
BANKS PUMPING PLANT
KA000331
South Bay Pumping Plant
TRACY PUMPING PLANT (CVP)
Bethany Reservoir
Patterson Reservoir
South Bay Aqueduct
Del Valle Dam
Lake Del Valle
Santa Clara Terminal Facilities
Delta-Mendota Canal
California Aqueduct
280
5
LEGEND
Water Quality Sampling Station
Automated Water Quality Station
N
O'Neill Pumping-Generating Plant
Gianelli Pumping-Generating Plant
CHECK 12
KA006633
DELTA-MENDOTA CANAL
DMC06716
O'Neill Forebay
CHECK 13
KA007089
(START OF SAN LUIS CANAL)
San Luis Reservoir
Los Banos Reservoir
SEE MAIN MAP FOR STATIONS
Los Banos Detention Dam
Dos Amigos Pumping Plant
Little Panoche Reservoir
Little Panoche Creek Drain Inlet
Little Panoche Detention Dam
Plate 1
Plate 2
Plate 3
Plate 4
Plate 5
Orientation Map
PLATE 3

Plate 4



Cantua Creek Inlet
Salt Creek Inlet
CHECK 18
KA014321
Arroyo Pasajero Ponding Basin
Gale Ave. Drain nlets
5
Kettleman City
CHECK 21
KA017226
(END OF SAN LUIS CANAL)
N
Las Perillas Pumping Plant
Badger Hill Pumping Plant
Devil's Den Pumping Plant
CHECK 4, (COASTAL BRANCH)
KC000934
Tank 1
Polonio Pass Pumping Plant
Bluestone Pumping Plant
Berrenda Mesa Water District Pumping Plant
LEGEND
Water Quality Sampling Station
Automated Water Quality Station
CHECK 29
KA024454
Cross Valley Canal Kern River Intertie
Buena Vista Lake Bed
Buena Vista Pumping Plant
5
California Aqueduct
Teerink Pumping Plant
Chrisman Pumping Plant
Edmonston Pumping Plant and Visitors Area
Plate 1
Plate 2
Plate 3
Plate 4
Plate 5
Orientation Map
PLATE 4

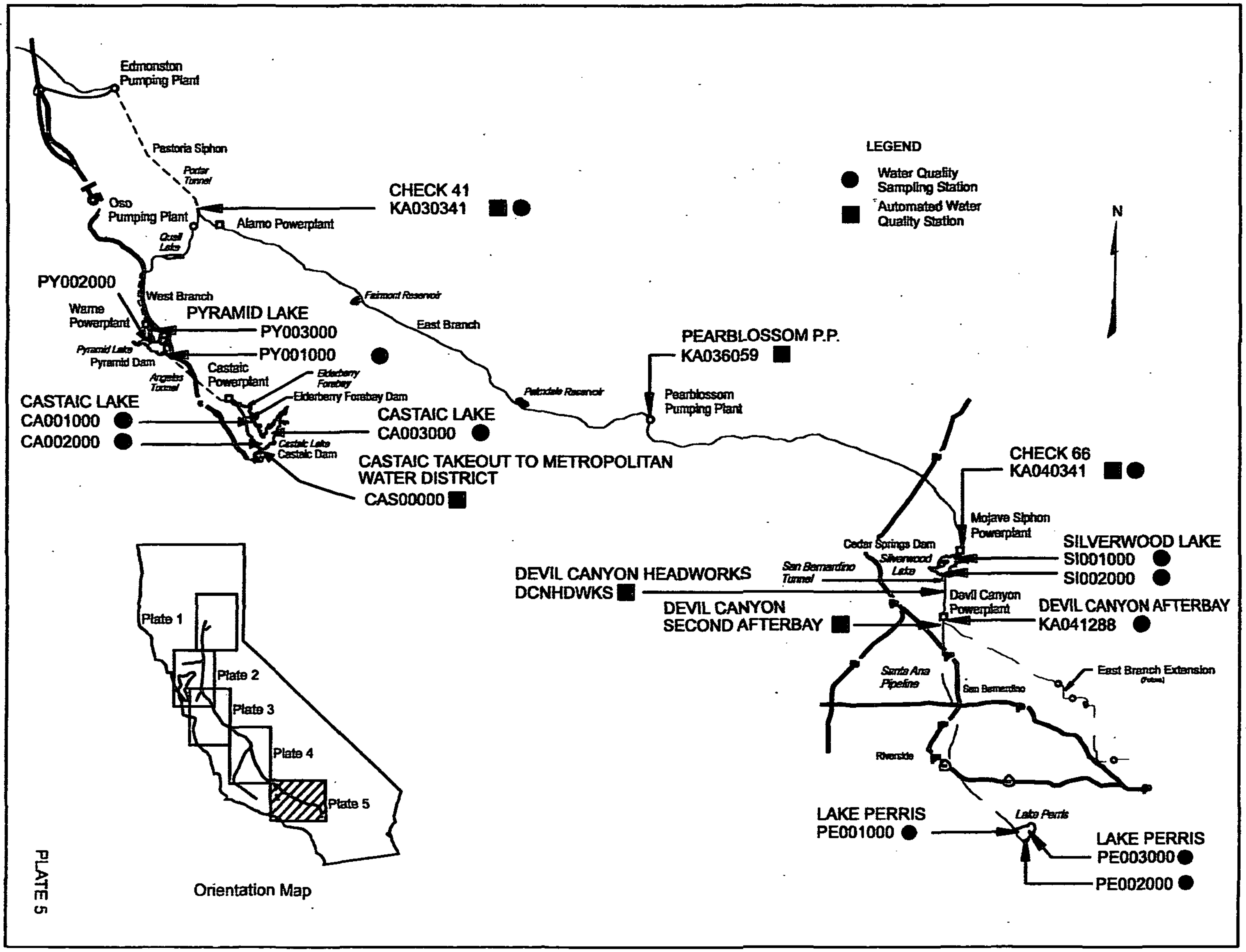

Edmonston Pumping Plant
Pastoria Siphon
Porter Tunnel
Oso Pumping Plant
Alamo Powerplant
CHECK 41
KA030341
Quail Lake
PY002000
West Branch
Warne Powerplant
PYRAMID LAKE
PY003000
PY001000
Pyramid Lake
Pyramid Dam
Angeles Tunnel
Castaic Powerplant
Elderberry Forebay
Elderberry Forebay Dam
CASTAIC LAKE
CA001000
CA002000
CASTAIC LAKE
CA003000
Castaic Lake
Castaic Dam
CASTAIC TAKEOUT TO METROPOLITAN WATER DISTRICT
CAS00000
Fairmont Reservoir
East Branch
Palmdale Reservoir
PEARBLOSSOM P.P.
KA036059
Pearblossom Pumping Plant
LEGEND
Water Quality Sampling Station
Automated Water Quality Station
N
CHECK 66
KA040341
Mojave Siphon Powerplant
Cedar Springs Dam
Silverwood Lake
SILVERWOOD LAKE
SI001000
SI002000
San Bernardino Tunnel
DEVIL CANYON HEADWORKS
DCNHDWKS
Devil Canyon Powerplant
DEVIL CANYON SECOND AFTERBAY
DEVIL CANYON AFTERBAY
KA041288
East Branch Extension
Santa Ana Pipeline
San Bernardino
Riverside
LAKE PERRIS
PE001000
Lake Perris
LAKE PERRIS
PE003000
PE002000
Plate 1
Plate 2
Plate 3
Plate 4
Plate 5
Orientation Map
PLATE 5

Plate 5

Table A-2
Automated Water Quality Monitoring Stations

Project Area or Facility	Station Name or Description	Conductivity	Temperature	Turbidity	pH	Fluorometry	Petroleum Hydrocarbons	Water Depth	Tank Depth	Rainfall	Flow	Tide Elevation
		Parameters Monitored										
		Water Quality						**Other**				
North and South Bay Aqueducts	NBA, Barker Sl. Pumping Plant	X	X	X	X	X				X	X	X
	NBA, Cordelia Forebay	X	X	X				X		X		
	SBA, Check 7	X	X	X	X	X						
	SBA, Del Valle Res. Outlet	X	X	X	X	X					X	
	SBA, Santa Clara Terminal Tank	X	X	X		X			X			
California Aqueduct and Coastal Branch	Clifton Court Forebay	X	X	X	X							X
	Banks Pumping Plant	X	X	X	X		X					
	Check 12	X	X									
	Check 13	X	X	X	X							
	Check 18	X	X	X								
	Check 21	X	X	X							X	
	Coastal Branch	X	X	X								
	Check 29	X	X	X								
	Check 41	X	X	X								
	Pearblossom Pumping Plant			X								
	Check 66			X								
	Devil Canyon Headworks	X	X	X	X							
	Devil Canyon Second Afterbay	X	X	X								
San Luis Reservoir	San Luis Res., Pacheco Pumping Plant	X	X	X	X	X						
Project Lakes in Southern California	Metropolitan Water District Pipeline at Castaic Lake	X	X	X	X							
Central Valley Project 1/	Delta-Mendota Canal near O'Neill PGP	X	X									

1/ Operated and Maintained by the U.S.BR.

Table A-3
Methods for Water Quality Analysis

Constituent	Method [a]	Reference	
MINERAL			
Calcium	AA, flame	EPA	215.1
Magnesium	AA, flame	EPA	242.1
Hardness	Calculated from calcium and magnesium	Std. Met.	
Sodium	AA, flame	EPA	273.1
Potassium	AA, flame	EPA	258.1
Alkalinity	Titrimetric	EPA	310.1
pH	Electrometric	EPA	150.1
Sulfate	Colorimetric, Automated MTB	EPA	375.2
Chloride	Colorimetric, Automated	EPA	325.2
Nitrate	Colorimetric, Automated Cd reduction	EPA	353.2
Fluoride	Potentiometric ISE	EPA	340.2
Boron	Colorimetric, Automated, Azomethine	USGS	I-2115-85
Turbidity	Nephelometric	EPA	180.1
Dissolved Solids	Gravimetric, 180°C	EPA	160.1
Specific Conductance	Wheatstone Bridge	EPA	120.1
Silica	Colorimetric, Molybdate Blue	USGS	I-1700-85
METALS			
Aluminum	AA, direct & furnace, Zeeman	EPA	202.1, 202.2
Arsenic	AA, hydride	EPA	206.3
Barium	AA, direct	EPA	208.1
Cadmium	AA, furnace, Zeeman	EPA	213.2
Chromium	AA, furnace, Zeeman	EPA	218.2
Chromium (+6)	AA, furnace, Zeeman	EPA	218.5
Colbalt	AA, furnace, Zeeman	EPA	219.2
Copper	AA, direct & furnace, Zeeman	EPA	220.1, 220.2
Iron	AA, direct & furnace, Zeeman	EPA	236.1, 236.2
Lead	AA, furnace, Zeeman	EPA	239.2
Lithium	AA, direct	USGS	I-1425-85
Manganese	AA, furnace, Zeeman	EPA	243.1, 243.2
Mercury	AA, cold vapor	EPA	245.1
Molybdenum	AA, furnace, Zeeman	EPA	246.2
Nickel	AA, direct & furnace, Zeeman	EPA	249.1, 249.2
Selenium	AA, hydride	EPA	270.3
Silver	AA, Zeeman	EPA	272.2
Strontium	AA, direct	USGS	I-1800-85
Zinc	AA, direct & furnace, Zeeman	EPA	289.1, 289.2
Barium	AA, furnace, Zeeman	EPA	208.2
Vanadium	AA, furnace, Zeeman	EPA	286.2

[a] Abbreviations:
AA — Atomic Absorption
GC — Gas Chromatography
HPLC — High Performance Liquid Chromotography

Table A-3 (Con't)
Methods for Water Quality Analysis

Constituent	Method [a]	Reference	
NUTRIENTS			
Ammonia	Colorimetric, Automated Phenate	EPA	350.1
Ammonia + Organic N	Colorimetric, Semi-Automated	EPA	351.2
Nitrate	Colorimetric, Auto Cd Reduction	EPA	353.2
Nitrite	Colorimetric, Auto Cd Reduction	EPA	353.2
Nitrate + Nitrite	Colorimetric, Auto Cd Reduction	EPA	353.2
Phosphate	Colorimetric, Ascorbic acid	EPA	365.1
Phosphorus	Colorimetric, Semi-Automated	EPA	365.4
MISCELLANEOUS			
Settleable Solids	Volumetric, Imhoff	EPA	160.5
Suspended Solids	Gravimetric, 105°C	EPA	160.2
Color, True	Colorimetric, Pt-Co	EPA	110.2
Methylene Blue Act Sub.	Colorimetric	EPA	425.1
COD	Titrimetric, low level	EPA	410.2
Tannin & Lignin	Colorimetric	Std. Met.	5550B
Oil & Grease	Gravimetric, extraction	EPA	413.1
Cyanide	Titrimetric, Spectrophotometric	EPA	335.1
Phenols	Spectrophotometric, Distillation	EPA	420.1
BOD	Incubation 20°C	EPA	405.1
Organic Carbon	Wet Oxidation, IR, Auto	EPA	415.1
Volatile Suspended Solids	550°C	EPA	160.4
Bromide	Ion Chromatography	Std. Met	4110B
ORGANICS			
THM Formation Potential	GC	EPA	502.2
Chloroform			
Bromodichloromethane			
Dibromochloromethane			
Bromoform			
Chlorinated Organics	GC	EPA	608
Pesticides			
Diuron	Reporting Limits in µg/l: 0.05		
BHC, alpha	0.01		
Chlopropham	0.02		
Dichloran	0.01		
Simazine	0.02		
BHC, gamma	0.01		

[a] ***Abbreviations:***
AA — Atomic Absorption
GC — Gas Chromatography
HPLC — High Performance Liquid Chromotography

Table A-3 (Con't)
Methods for Water Quality Analysis

Constituent	Method [a]		Reference	
ORGANICS (Continued)				
Chlorinated Organic Pesticides (Cont'd)	GC		EPA	608
BHC, beta	Reporting Limits in µg/l:	0.01		
Atrazine		0.02		
PCNB		0.01		
BHC, delta		0.01		
Chlorothalonil		0.01		
Alachlor		0.05		
Heptachlor		0.01		
Thiobencarb		0.02		
Chlorpyrifos		0.01		
Aldrin		0.01		
DCPA		0.01		
Captan		0.02		
Heptachlor Epoxide		0.01		
Chlordane		0.05		
Endosulfan I		0.01		
Dieldrin		0.01		
DDE		0.01		
Endrin		0.01		
Endosulfan II		0.01		
Endrin Aldehyde		0.01		
DDD		0.01		
Endosulfan Sulfate		0.01		
DDT		0.01		
Methoxychlor		0.01		
Dicofol		0.01		
Toxaphene		0.20		
PCB-1016		0.10		
PCB-1221		0.10		
PCB-1232		0.10		
PCB-1248		0.10		
PCB-1254		0.10		
PCB-1260		0.10		
Metolachlor		0.20		
Oxyfluorfen		0.20		

[a] Abbreviations:
AA — Atomic Absorption
GC — Gas Chromatography
HPLC — High Performance Liquid Chromotography

Table A-3 (Con't)
Methods for Water Quality Analysis

Constituent	Method [a]		Reference	
ORGANICS (Continued)				
Organic Phosphorus Pesticides	GC		EPA	614
Mevinphos	Reporting Limits in µg/l:	0.01		
Demeton		0.02		
Naled		0.02		
Phorate		0.01		
Dimethoate		0.01		
Diazinon		0.01		
Disulfoton		0.01		
Methyl Parathion		0.01		
Malathion		0.01		
Chlorpyrifos		0.01		
Parathion		0.01		
Methidathion		0.02		
Profenofos		0.01		
s,s,s-Tributyl Phosphorotrithioate (DEF)		0.01		
Ethion		0.01		
Carbophenothion (Trithion)		0.02		
Phosmet		0.02		
Phosalone		0.02		
Azinphosmethyl		0.05		
Bromacil		1.0		
Cyanazine		0.01		
Naproazmide		5.0		
Norflurazon		5.0		
Pendimethalin		5.0		
Prometryn		0.1		
Propetamphos		0.05		
Trifluralin		0.05		
Benfluralin		0.05		
Chlorinated Phenoxy Acid Herbicides	GC		EPA	615
Dicamba	Reporting Limits in µg/l:	0.1		
MCPP		0.1		
Pentachlorophenol (PCP)		0.1		
Dichlororop		0.1		
2,4, -D		0.1		
MCPA		0.1		
2,4,5 -TP		0.1		
2,4,5 -T		0.1		
2,4, -DB		0.1		
Picloram		0.1		
Triclophr		0.1		

[a] Abbreviations:
AA — Atomic Absorption
GC — Gas Chromatography
HPLC — High Performance Liquid Chromotography

Table A-3 (Con't)
Methods for Water Quality Analysis

Constituent	Method [a]	Reference	
ORGANICS (Continued)			
Purgeable Organics	GC	EPA	602
	Reporting Limits in µg/l:		
Dichlorodifluoromethane	0.5		
Chloromethane	0.5		
Vinyl chloride	0.5		
Bromomethane	0.5		
Chloroethane	0.5		
Trichlorofluoromethane	0.5		
1,1-Dichloroethene	0.5		
Methylene chloride	0.5		
trans- 1,2-Dichloroethene	0.5		
1,1-Dichloroethane	0.5		
2,2-Dichloropropane	0.5		
cis- 1,2-Dichloroethene	0.5		
Chloroform	0.5		
Bromochloromethane	0.5		
1,1,1- Trichloroethane	0.5		
1,1-Dichloropropene	0.5		
Carbon tetrachloride	0.5		
Benzene	0.5		
1,2-Dichloroethane	0.5		
Trichloroethene	0.5		
1,2-Dichloropropane	0.5		
Bromodichloromethane	0.5		
Dibromomethane	0.5		
cis-1,3-Dichloropropene	0.5		
Tolune	0.5		
trans-1, 3-Dichloropropene	0.5		
1,1,2-Trichloroethane	0.5		
1,3-Dichloropropane	0.5		
Tetrachloroethene	0.5		
Dibromochloromethane	0.5		
1,2-Dibromoethane	0.5		
Chlorobenzene	0.5		
Ethyl benzene	0.5		
1,1,1,2-Tetrachloroethane	0.5		
m-Xylene	0.5		
p-Xylene	0.5		
o-Xylene	0.5		
Styrene	0.5		
Isopropyl benzene	0.5		
Bromoform	0.5		

[a] Abbreviations:
AA — Atomic Absorption
GC — Gas Chromatography
HPLC — High Performance Liquid Chromotography

Table A-3 (Con't)
Methods for Water Quality Analysis

Constituent	Method [a]		Reference	
ORGANICS (Continued)				
Purgeable Organics (cont'd)	GC		EPA	602
1,1,2,2-Tetrachloroethane	Reporting Limits in µg/l:	0.5		
1,2,3-Trichloropropane		0.5		
n-Propyl benzene		0.5		
Bromobenzene		0.5		
1,3,5-Trimethylbenzene		0.5		
2-Chlorotoluene		0.5		
4-Chlorotoluene		0.5		
tert-Butylbenzene		0.5		
1,2,4-Trimethylbenzene		0.5		
sec-Butylbenzene		0.5		
4-Isopropyltoluene		0.5		
1,3-Dichlorobenzene		0.5		
1,4-Dichlorobenzene		0.5		
n-Butylbenzene		0.5		
1,2-Dichlorobenzene		0.5		
1,2-Dibromo-3-chloropropane		0.5		
1,2,4-Trichlorobenzene		0.5		
Hexachlorobutadiene		0.5		
Napthalene		0.5		
1,2,3- Trichlorobenzene		0.5		
Carbamates	HPLC		EPA	531.1
Aldicarb Sulfoxide	Reporting Limits in µg/l:	2		
Aldicarb Sulfone		2		
Oxamyl		2		
Methomyl		2		
3-Hydroxycarbofuran		2		
Aldicarb		2		
Carbofuran		2		
Carbaryl		2		
1-Naphthol		4		
Methiocarb		4		
Formetanate Hydrochloride		100		
Miscellaneous Pesticides	HPLC		EPA	531.1
Glyphosate	Reporting Limits in µg/l:	100		
Aminomethylphosphonic Acid		100		
Propargite		1		

[a] Abbreviations:
AA — Atomic Absorption
GC — Gas Chromatography
HPLC — High Performance Liquid Chromotography

Appendix B

Water Quality Standards and Objectives

Contents

List of Tables

Table B-1
MCLs and Article 19 Objectives for Inorganic Parameters

Parameter	Units	Primary MCL	Secondary MCLs Recommended	Secondary MCLs Upper	Secondary MCLs Short Term	Article 19 Objectives Monthly Average	Article 19 Objectives 10 year Average
Asbestos	MFL a/	7					
Conductivity (Specific Conductance)	µS/cm		900	1600	2200		
Chloride	mg/L		250	500	600	110	55
Nitrate as NO3	mg/L	45					
Nitrate + Nitrite sum as N	mg/L	10					
Nitrite as N	mg/L	0.4					
Sodium	% b/					50	40
Sulfate	mg/L		250	500	600		
Total Dissolved Solids	mg/L		500	1000	1500	440	220
Total Hardness as CaCO3	mg/L					180	110

a/ Million Fibers per Liter: MCL for fibers exceeding 10 um in length.

b/ Percentage of cationic composition

Table B-2
MCLs and Article 19 Objectives for Minor Elements

Minor Element	Article 19 Objectives Maximum (mg/L)	Primary MCL (mg/L)	Secondary MCL (mg/L)
Aluminum		1	0.2
Antimony		0.006	
Arsenic	0.05	0.05	
Barium		1	
Beryllium		0.004	
Boron	0.6 b/		
Cadmium		0.005	
Chromium		0.05	
Hexavalent Chromium	0.05		
Copper	3.0		1.0
Cyanide		0.2	
Fluoride	1.5	1.4-2.4 a/	
Iron			0.3
Iron+Manganese	0.3		
Lead	0.1		
Mercury		0.002	
Nickel		0.1	
Selenium	0.05	0.05	
Silver			0.1
Thallium		0.002	
Zinc	15		5.0

a/ Temperature Dependent

Degrees C	MCL (mg/L)
12.0 and below	2.4
12.1 to 14.6	2.2
14.7 to 17.6	2.0
17.7 to 21.4	1.8
21.5 to 26.2	1.6
26.3 to 32.5	1.4

b/ Monthly Average

Table B-3
Primary Maximum Contaminant Levels for Organic Chemicals

Volatile Organic Chemicals (VOCs)	MCL mg/L	Non-Volatile Synthetic Organic Chemicals	MCL mg/L
Benzene	0.001	Alachlor	0.002
Carbon Tetrachloride	0.0005	Atrazine	0.003
1,2-Dichlorobenzene	0.6	Bentazon	0.018
1,4-Dichlorobenzene	0.005	Benzo(a)pyrene	0.0002
1,1 -Dichloroethane	0.005	Carbofuran	0.018
1,2-Dichloroethane	0.0005	Chlordane	0.0001
1,1 -Dichloroethylene	0.006	2,4-D	0.07
cis- 1,2-Dichloroethylene	0.006	Dalapon	0.2
trans- 1,2-Dichloroethylene	0.01	Dacthal (DBCP)	0.0002
Dichloromethane	0.005	Di(2-ethylhexyl)adipate	0.4
1,2-Dichloropropane	0.005	Di(2-ethylhexyl)phthalate	0.004
1,3-Dichloropropene	0.0005	Dinoseb	0.007
Ethylbenzene	0.7	Diquat	0.02
Monochlorobenzene	0.07	Endothall	0.1
Styrene	0.1	Endrin	0.002
1,1,2,2-Tetrachloroethane	0.001	Ethylene Dibromide (EDP)	0.00005
Tetrachloroethylene	0.005	Glyphosate	0.7
Toluene	0.15	Heptachlor	0.00001
1,2,4-Trichlorobenzene	0.07	Heptachlor Epoxide	0.00001
1,1,1 -Trichloroethane	0.2	Hexachlorobenzene	0.001
1,1,2-Trichloroethane	0.005	Hexachlorocyclopentadiene	0.05
Trichloroethylene	0.005	Lindane	0.0002
Trichlorofluoromethane	0.15	Methoxychlor	0.04
1,1,2-Trichloro- 1,2,2-Trifluoroethane	1.2	Methyl tertiary-butyl ether (MtBE)	0.005 b/
Vinyl Chloride	0.0005	Molinate	0.02
Xylenes	1.750 a/	Oxamyl	0.2
		Pentachlorophenol	0.001
		Picloram	0.5
		Polychlorinated Biphenyls	0.0005
		simazine	0.004
		Thiobencarb c/	0.07
		Toxaphene	0.003
		2,3,7,8-TCDD (Dioxin)	3 x 10-8
		2,4,5-TP (Silvex)	0.05

a/ MCL is for either a single isomer or the sum of the isomers.
b/ Secondary MCL
c/ Secondary MCL=0.001 mg/L

Appendix C

Data Tables

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List of Tables

Table C-1
Conventional Parameter, Major Mineral, Fluoride, and Boron Concentrations in the SWP

CONCENTRATION (mg/L unless otherwise noted)

STATION	DATE	HARDNESS (as CaCO3)	CALCIUM	MAGNESIUM	SODIUM	POTASSIUM	TOTAL ALKALINITY (as CaCO3)	LAB pH (pH units)	SULFATE	CHLORIDE	NITRATE (as NO3)	FLUORIDE	BORON	TURBIDITY (NTU)	DISSOLVED SOLIDS	CONDUCTIVITY (µS/cm)
AN001000	5/22/96	26	7	2	4	1.2	32	6.8	2	< 1	< 0.1	< 0.1	< 0.1		69	66
AN001000	5/22/97	28	8	2	4	1.6	44	6.7	1	1	< 0.1	< 0.1	< 0.1		68	78
FR001000	5/22/96	42	10	4	5	1.4	48	7.0	2	< 1	< 0.1	< 0.1	< 0.1		79	99
FR001000	5/22/97	42	10	4	5	1.2	54	6.8	1	1	< 0.1	< 0.1	< 0.1		66	100
LD001000	5/23/96	23	6	2	3	1.1	30	6.7	2	< 1	< 0.1	< 0.1	< 0.1		54	63
LD001000	5/27/97	23	6	2	3	1.0	34	6.6	< 1	1	< 0.1	< 0.1	< 0.1		46	61
TA001000	1/17/96	28	6	3	3		33	7.0	2	1	< 0.1	< 0.1	< 0.1		50	75
TA001000	3/20/96	30	7	3	3		30	6.8	2	1	0.2	< 0.1	< 0.1		50	71
TA001000	4/17/96	30	7	3	3		34	6.7	2	1	< 0.1	< 0.1	< 0.1		56	74
TA001000	5/15/96	30	7	3	4		36	6.8	2	1	< 0.1	< 0.1	< 0.1		45	78
TA001000	6/19/96	30	7	3	3		34	6.9	1	< 1	< 0.1	< 0.1	< 0.1		57	72
TA001000	7/17/96	32	8	3	3		36	6.8	2	2	< 0.1	< 0.1	< 0.1		51	77
TA001000	8/20/96	30	7	3	2		36	6.7	2	1	< 0.1	< 0.1	< 0.1	2	54	78
TA001000	9/18/96	30	7	3	3		35	7.1	2	1	< 0.1	< 0.1	< 0.1	2	48	76
TA001000	10/16/96	30	7	3	3		41	7.1	2	1	< 0.1	< 0.1	< 0.1	4	56	75
TA001000	11/20/96	30	7	3	3		36	7.0	2	1	< 0.1	< 0.1	< 0.1	3	58	74
TA001000	12/18/96	32	8	3	3		39	6.9	2	1	< 0.1	< 0.1	< 0.1	2	54	80
TA001000	1/15/97	23	6	2	2		27	6.7	2	1	0.2	< 0.1	< 0.1	54	40	60
TA001000	2/19/97	23	6	2	2		30	6.6	2	1	0.2	< 0.1	< 0.1	50	48	62
TA001000	3/19/97	23	6	2	2		31	6.7	1	1	< 0.1	< 0.1	< 0.1	34	48	63
TA001000	4/16/97	23	6	2	2		30	6.6	2	1	< 0.1	< 0.1	< 0.1	23	40	63
TA001000	5/21/97	30	7	3	3		33	6.6	< 1	1	< 0.1	< 0.1	< 0.1	12	59	69
TA001000	6/18/97	30	7	3	3		34	6.6	2	1	< 0.1	< 0.1	< 0.1	14	50	73
TA001000	7/16/97	32	8	3	3		35	7.8	2	1	< 0.1	< 0.1	< 0.1	8	54	75
TA001000	8/20/97	32	8	3	3		37	7.7	2	1	< 0.1	< 0.1	< 0.1		55	77
TA001000	9/17/97	32	8	3	3		36	7.7	2	1	< 0.1	< 0.1	< 0.1		52	75
TA001000	10/15/97	32	8	3	3		35	7.7	1	1	< 0.1	< 0.1	< 0.1	12	48	74
TA001000	11/19/97	32	8	3	3		37	7.8	2	1	< 0.1	< 0.1	< 0.1	8	49	80
TA001000	12/17/97	32	8	3	3		38	7.7	2	1	< 0.1	< 0.1	< 0.1	7	49	81
TF001000	5/15/96	30	7	3	3		35	6.8	2	1	< 0.1	< 0.1	< 0.1		48	77
TF001000	8/20/96	30	7	3	2		36	6.7	2	2	< 0.1	< 0.1	< 0.1	< 1	41	77
TF001000	11/20/96	30	7	3	3		36	7.0	2	1	0.2	< 0.1	< 0.1	< 1	61	75
TF001000	2/19/97	23	6	2	2		29	6.7	2	1	0.1	< 0.1	< 0.1	50	55	62
TF001000	5/21/97	30	7	3	3		34	6.6	< 1	1	< 0.1	< 0.1	< 0.1		54	69
TF001000	8/20/97	32	8	3	3		36	7.6	2	1	0.1	< 0.1	< 0.1		54	74
TF001000	11/19/97	32	8	3	4		40	7.6	2	1	0.2	< 0.1	< 0.1	5	53	84
KG000000	1/17/96	46	7	7	16		41	7.2	12	10	16.0	0.1	0.1		109	181
KG000000	2/21/96	56	9	8	18		65	7.2	8	8	5.4	0.1	0.2		126	187
KG000000	3/20/96	56	9	8	22		63	7.2	12	15	0.6	< 0.1	0.2		134	210
KG000000	4/17/96	130	19	20	35		122	7.5	40	27	1.8	0.1	0.3		236	406
KG000000	5/15/96	152	23	23	36		141	8.0	45	28	1.8	0.2	0.4		258	445
KG000000	6/19/96	102	16	15	25		101	7.8	27	18	1.9	0.1	0.2	33	181	311
KG000000	7/17/96	95	15	14	22		93	7.3	21	17	1.7	0.1	0.2		167	280
KG000000	8/21/96	82	13	12	17		90	7.4	16	13	1.0	0.1	0.1	30	148	257
KG000000	9/18/96	91	15	13	20		98	7.7	19	16	0.8	0.1	0.1	29	150	285
KG000000	10/2/96						105	7.5						25		
KG000000	10/9/96						95	7.7						25		
KG000000	10/16/96	94	16	13	23		111	8.3	20	18	0.9	0.1	0.2	30	172	307
KG000000	10/23/96						102	7.9						25		
KG000000	10/30/96						106	7.9						22		
KG000000	11/5/96						108	7.5						22		
KG000000	11/13/96						100	7.4						27		
KG000000	11/20/96	109	17	16	30		114	7.7	24	28	1.0	< 0.1	0.2	19	191	356
KG000000	11/25/96						110	7.4						21		
KG000000	12/4/96						121	7.5						26		
KG000000	12/9/96						119	7.6						21		
KG000000	12/18/96	119	18	18	41		110	7.4	40	39	2.2	0.1	0.3	35	250	424
KG000000	12/23/96						37	6.3						160		
KG000000	12/30/96						51	7.0						218		
KG000000	1/7/97						48	6.8						102		
KG000000	1/15/97	52	9	7	18		68	7.2	9	10	0.7	0.1	0.2	68	116	186
KG000000	1/22/97						78	7.0						56		
KG000000	1/29/97						49	6.8						165		126
KG000000	2/5/97						58	6.8						88		
KG000000	2/10/97						72	6.9						54		
KG000000	2/19/97	78	13	11	29		88	7.1	21	26	0.5	< 0.1	0.2	52	175	294
KG000000	2/26/97						88	7.2						58		
KG000000	3/5/97						87	7.1						68		
KG000000	3/12/97						90	7.0						64		
KG000000	3/19/97	95	15	14	32		102	7.4	30	26	1.7	0.1	0.2	56	205	345
KG000000	3/26/97						114	7.4						32		
KG000000	4/2/97							4.5						42		
KG000000	4/8/97						139	7.7						22		
KG000000	4/16/97	151	24	22	44		152	7.8	53	37	1.6	0.2	0.4	29	277	495
KG000000	4/23/97						149	7.9						27		
KG000000	4/28/97						152	7.8						29		
KG000000	5/7/97						138	7.6						37		
KG000000	5/14/97						129	7.6						44		
KG000000	5/21/97	120	20	17	28		120	7.4	30	23	2.1	0.1	0.2	46	211	358
KG000000	5/27/97						138	7.3						56		
KG000000	6/4/97						127	7.0						54		
KG000000	6/11/97						115	7.3						68		
KG000000	6/18/97	94	16	13	24		101	7.2	24	19	3.0	0.1	0.2	68	178	306

Table C-1 (Con't)
Conventional Parameter, Major Mineral, Fluoride, and Boron Concentrations in the SWP

CONCENTRATION (mg/L unless otherwise noted)

STATION	DATE	HARDNESS (as CaCO3)	CALCIUM	MAGNESIUM	SODIUM	POTASSIUM	TOTAL ALKALINITY (as CaCO3)	LAB pH (pH units)	SULFATE	CHLORIDE	NITRATE (as NO3)	FLUORIDE	BORON	TURBIDITY (NTU)	DISSOLVED SOLIDS	CONDUCTIVITY (µS/cm)
KG000000	6/25/97						109	7.0						56		
KG000000	7/2/97						96	7.1						76		
KG000000	7/16/97	87	15	12	21		87	8.1	16	16	1.4	0.1	0.2	68	154	249
KG000000	8/20/97	90	16	12	18		89	7.8	12	12	0.6	0.1	0.1	52	142	242
KG000000	9/17/97	118	19	17	21		121	8.1	18	14	0.8	0.1	0.2	44	180	313
KG000000	10/15/97	96	17	13	24		101	8.1	17	18	1.2	0.1	0.2	45	167	291
KG000000	11/19/97	126	19	19	24		114	8.0	28	21	2.8	0.1	0.2	51	207	350
KG000000	12/17/97	99	15	15	34		104	7.8	27	33	1.3	0.1	0.2	114	214	372
KG002111	2/21/96	84	14	12	28		91	7.4	19	19	1.7	0.1	0.2		185	286
KG002111	5/15/96	152	23	23	38		144	8.0	46	29	1.9	0.2	0.4		259	456
KG002111	8/21/96	84	14	12	16		93	7.3	15	11	1.1	0.1	0.1	29	153	257
KG002111	11/20/96	107	18	15	26		111	7.6	24	23	1.4	< 0.1	0.2	72	184	336
KG002111	2/19/97	78	13	11	28		88	7.1	24	19	1.0	0.1	0.2	54	179	282
KG002111	5/21/97	120	20	17	29		120	7.4	25	24	2.2	0.1	0.2	58	214	365
KG002111	8/20/97	90	16	12	17		87	8.0	12	11	0.9	0.1	0.1	48	142	237
KG002111	11/19/97	109	17	16	27		109	8.0	26	24	1.6	0.1	0.2	32	192	343
DV000000	10/16/96	152	31	18	15		153	8.5	35	10	0.3	0.1	0.1	2	220	385
DV000000	2/19/97	128	28	14	10		118	7.8	24	6	1.8	< 0.1	0.1	28	169	285
DV000000	6/18/97	143	29	17	14		144	7.8	32	9	0.6	0.1	0.1	3	202	358
DV000000	9/17/97	162	32	20	18		142	8.4	36	12	< 0.1	0.1	0.2	1	211	373
DV000000	10/15/97	149	30	18	18		140	8.3	33	12	0.3	0.1	0.1	2	206	370
DV001000	9/18/96	177	36	21	14		153	8.1	35	9	< 0.1	0.1	0.1	< 1	215	394
DV001000	11/20/96	172	34	21	16		157	8.1	38	11	0.2	0.1	0.2	3	233	404
DV001000	12/18/96	170	35	20	16		152	8.0	38	10	1.3	0.1	0.2	27	227	386
DV001000	1/15/97	139	29	16	13		127	8.0	29	8	2.2	0.1	0.1	38	182	323
KB001638	4/16/97	82	18	9	30		68	7.3	36	34	3.2	< 0.1	0.2	6	174	323
KB001638	5/21/97	98	21	11	45		72	7.1	55	53	2.5	< 0.1	0.2	8	289	500
KB001638	6/18/97	84	17	10	35		66	6.9	37	39	3.6	< 0.1	0.2	9	197	350
KB001638	7/16/97	68	14	8	28		57	8.0	17	33	0.9	< 0.1	0.1	10	145	254
KB001638	8/20/97	66	13	8	28		58	8.0	16	33	0.4	< 0.1	0.1	7	149	265
KB001638	9/17/97	77	16	9	27		74	8.6	18	30	0.3	< 0.1	0.1	5	148	278
KB001638	10/15/97	96	17	13	61		71	8.0	25	86	1.2	< 0.1	0.1	2	259	489
KB001638	11/19/97	84	16	12	66		65	8.1	32	95	3.0	< 0.1	0.1	4	285	513
KB001638	12/17/97	120	20	17	85		69	7.9	37	131	3.8	< 0.1	0.1	10	349	657
KB004207	2/21/96	149	30	18	16		128	8.0	33	13	1.4	0.1	0.2		212	352
KB004207	3/20/96	136	28	16	12		117	8.2	26	8	0.8	< 0.1	0.1		185	310
KB004207	5/15/96	84	17	10	39		58	8.2	50	46	2.5	< 0.1	0.2		201	370
KB004207	8/21/96	56	11	7	22		55	7.6	14	28	0.8	< 0.1	< 0.1	8	130	241
KB004207	9/18/96	136	28	16	18		122	8.3	28	15	0.3	< 0.1	0.1	1	177	341
KB004207	10/16/96	134	27	16	21		130	8.5	31	18	0.7	< 0.1	< 0.1	2	202	359
KB004207	11/20/96	178	35	22	16		161	8.2	38	11	0.1	0.1	0.2	2	224	405
KB004207	12/18/96	102	21	12	29		89	7.6	29	38	3.9	< 0.1	0.1	15	198	353
KB004207	1/15/97	80	17	9	21		71	7.5	24	21	4.1	< 0.1	0.2	15	150	265
KB004207	2/19/97	78	18	8	20		74	7.6	25	19	2.7	< 0.1	0.2	19	162	257
KB004207	5/21/97	102	21	12	45		72	7.1	57	53	3.1	< 0.1	0.2	2	252	432
KB004207	8/20/97	68	14	8	27		58	8.0	16	33	0.6	< 0.1	0.1	6	149	267
KB004207	9/17/97	118	24	14	23		108	8.3	27	21	0.6	0.1	0.1	6	187	330
KB004207	10/15/97	134	27	16	34		113	8.3	30	42	0.6	0.1	0.1	2	226	412
KB004207	11/19/97	90	16	12	66		64	8.0	31	96	3.0	< 0.1	0.1	4	278	521
KA000000	2/21/96	70	15	8	31	1.6	42	7.0	45	31	3.9		0.2		180	299
KA000000	5/15/96	100	20	12	46	2.0	60	7.2	59	56	3.6		0.3		234	432
KA000000	8/21/96	56	11	7	21		53	6.9	13	27	1.1		< 0.1	5	131	233
KA000000	11/20/96	92	19	11	46	2.7	71	7.5	35	65	4.1		0.2	6	241	439
KA000000	1/7/97	39	9	4	10	2.4	48	6.8	10	9	2.1	< 0.1	< 0.1		87	135
KA000000	2/19/97	50	12	5	17	1.9	42	6.9	22	18	1.8	< 0.1	0.1	19	128	194
KA000000	5/21/97	119	26	13	53	3.0	79	7.0	67	63	5.3	< 0.1	0.3	10	254	500
KA000000	8/20/97	74	15	9	29	2.2	60	7.9	17	34	1.1		0.1	9	159	277
KA000000	11/19/97	84	14	12	59	3.3	60	7.9	24	90	2.2		< 0.1	7	261	477
KA000331	1/17/96	86	18	10	21		65	7.6	26	26	3.5	< 0.1	0.1		165	280
KA000331	2/21/96	95	20	11	38		55	7.3	52	43	5.3	< 0.1	0.2		229	372
KA000331	3/20/96	68	14	8	26		48	7.2	36	30	2.3	< 0.1	0.2		174	285
KA000331	4/17/96	86	18	10	40		59	7.0	50	48	2.4	< 0.1	0.3		219	387
KA000331	5/15/96	84	17	10	39		50	7.1	51	47	3.5	< 0.1	0.2		206	370
KA000331	6/19/96	64	14	7	22		50	7.1	25	24	2.3	< 0.1	0.1	15	141	245
KA000331	7/17/96	56	11	7	14		51	7.1	12	15	1.1	< 0.1	< 0.1		109	182
KA000331	8/21/96	56	11	7	21		53	7.1	14	28	1.0	< 0.1	< 0.1	7	135	240
KA000331	9/18/96	66	13	8	21		67	7.7	16	25	1.2	< 0.1	< 0.1	6	132	253
KA000331	10/16/96	78	15	10	35		79	7.7	22	41	2.1	< 0.1	< 0.1	4	179	324
KA000331	11/20/96	85	16	11	46		66	7.4	27	67	2.7	< 0.1	0.1	4	216	414
KA000331	12/18/96	68	14	8	33		56	7.2	24	45	2.7	< 0.1	0.1	8	182	319
KA000331	1/15/97	48	11	5	17		41	7.0	17	18	3.4	< 0.1	0.1	18	106	190
KA000331	2/19/97	60	14	6	20		45	7.0	25	20	2.4	< 0.1	0.2	8	129	216
KA000331	3/19/97	84	19	9	34		58	7.0	44	39	3.4	< 0.1	0.2	5	204	347
KA000331	4/16/97	82	18	9	30		68	7.2	35	34	3.3	< 0.1	0.2	7	161	318
KA000331	5/21/97	102	21	12	46		70	7.1	55	54	3.0	< 0.1	0.3	3	279	433
KA000331	6/18/97	77	16	9	30		64	6.9	33	33	3.0	< 0.1	0.1	23	179	341
KA000331	7/16/97	68	14	8	27		56	8.0	17	33	1.3	< 0.1	0.1	15	150	253
KA000331	8/20/97	70	13	9	28		57	8.0	16	33	0.4	< 0.1	0.1	6	150	264
KA000331	9/17/97	81	16	10	28		73	8.1	18	30	1.2	< 0.1	0.1	5	144	283
KA000331	10/15/97	96	17	13	64		68	8.0	26	95	1.8	< 0.1	0.1	5	276	516
KA000331	11/19/97	87	15	12	64		62	7.9	27	96	2.4	< 0.1	0.1	11	276	513
KA000331	12/17/97	116	20	16	81		70	7.8	37	127	3.8	< 0.1	0.1	11	338	643
KA006633	2/21/96	95	20	11	39	2.5	56	7.2	52	44	5.5	0.0	0.3		231	384

Table C-1 (Con't)
Conventional Parameter, Major Mineral, Fluoride, and Boron Concentrations in the SWP

CONCENTRATION (mg/L unless otherwise noted)

STATION	DATE	HARDNESS (as CaCO3)	CALCIUM	MAGNESIUM	SODIUM	POTASSIUM	TOTAL ALKALINITY (as CaCO3)	LAB pH (pH units)	SULFATE	CHLORIDE	NITRATE (as NO3)	FLUORIDE	BORON	TURBIDITY (NTU)	DISSOLVED SOLIDS	CONDUCTIVITY (µS/cm)
KA006633	5/14/96	90	18	11	42	2.0	59	7.4	54	49	1.8	0.0	0.3		216	395
KA006633	8/20/96	56	11	7	21	1.6	54	7.3	14	29	0.7	0.0	< 0.1		133	239
KA006633	11/20/96	78	15	10	43	2.6	65	7.5	24	65	2.7	0.0	0.1		214	398
KA006633	2/19/97	53	13	5	18	2.8	45	7.0	25	20	4.5	0.0	0.2		138	222
KA006633	5/21/97	107	23	12	46	2.6	78	7.4	57	54	3.6	0.0	0.2		252	444
KA006633	8/20/97	66	13	8	28	2.3	56	8.0	15	31	0.2	0.0	0.1		140	254
KA006633	11/19/97	98	18	13	62	3.6	63	8.0	30	95	2.5	0.0	0.1		288	514
KA007089	1/17/96	110	24	12	44		78	7.8	51	53	5.3	< 0.1	0.2		259	449
KA007089	2/21/96	95	20	11	38		56	7.1	51	43	5.3	< 0.1	0.3		225	376
KA007089	3/20/96	84	17	10	35		54	7.4	44	38	3.1	< 0.1	0.3		200	342
KA007089	4/17/96	100	20	12	45		68	7.4	51	57	3.2	< 0.1	0.2		244	434
KA007089	5/14/96	106	21	13	50		74	7.5	47	66	3.3	< 0.1	0.2		256	464
KA007089	6/19/96	77	16	9	32		57	7.1	29	38	2.8	< 0.1	0.1		187	313
KA007089	7/17/96	97	19	12	41		71	7.5	34	54	2.7	< 0.1	0.2		223	401
KA007089	8/20/96	81	16	10	35		67	7.7	28	49	1.9	< 0.1	0.1	4	210	358
KA007089	9/18/96	77	16	9	25		70	7.8	22	31	1.4	< 0.1	< 0.1	4	156	287
KA007089	10/16/96	74	15	9	30		74	7.8	22	37	2.1	< 0.1	< 0.1	6	174	321
KA007089	11/20/96	81	16	10	42		67	7.6	27	56	3.0	< 0.1	0.1	4	209	389
KA007089	12/18/96	68	14	8	34		58	7.2	26	47	3.8	< 0.1	0.1	10	198	330
KA007089	1/15/97	54	12	6	22		44	7.0	21	25	3.7	< 0.1	0.1	17	126	228
KA007089	2/19/97	60	14	6	21		49	7.0	25	22	3.7	< 0.1	0.2	11	148	233
KA007089	3/19/97	80	19	8	33		58	7.1	44	37	3.4	< 0.1	0.2	6	198	340
KA007089	4/16/97	91	20	10	40		74	7.3	44	47	3.7	< 0.1	0.2	7	203	390
KA007089	5/21/97	92	19	11	42		75	7.2	33	56	2.8	< 0.1	0.1	2	230	405
KA007089	6/18/97	86	18	10	38		71	7.1	36	47	3.3	< 0.1	0.2	12	211	375
KA007089	7/16/97	88	19	10	43		69	8.3	30	53	2.1	< 0.1	0.1	5	218	366
KA007089	8/19/97	92	19	11	41		67	8.2	25	45	0.8	< 0.1	0.1	5	197	343
KA007089	9/17/97	84	17	10	29		74	8.1	20	29	1.7	< 0.1	0.1	5	158	287
KA007089	10/15/97	97	19	12	55		73	8.1	31	74	3.0	< 0.1	0.2	10	251	466
KA007089	11/19/97	110	21	14	65		70	8.0	38	93	3.5	< 0.1	0.1	9	295	534
KA007089	12/17/97	125	22	17	86		76	7.9	46	128	4.5	< 0.1	0.2	16	293	682
KA014323	1/6/97	62	13	7	25	2.4	50	7.2	24	30	3.8	< 0.1	0.1		160	256
KA017226	1/17/96	116	25	13	47		76	7.7	56	57	6.2	< 0.1	0.2		272	474
KA017226	2/21/96	102	21	12	37		65	7.2	46	44	6.3	< 0.1	0.3		233	386
KA017226	3/20/96	86	18	10	34		56	7.4	43	39	3.8	< 0.1	0.2		204	347
KA017226	4/17/96	86	18	10	39		59	7.2	52	45	2.9	< 0.1	0.3		219	380
KA017226	5/14/96	110	21	14	52		77	7.5	46	70	3.5	< 0.1	0.2		265	478
KA017226	6/19/96	86	18	10	37		61	7.3	32	46	3.0	< 0.1	0.1		218	351
KA017226	7/17/96	74	15	9	29		63	7.5	24	37	1.9	< 0.1	0.1		179	305
KA017226	8/21/96	81	16	10	37		66	7.6	30	50	1.9	< 0.1	0.1	6	206	368
KA017226	9/18/96	92	19	11	38		75	7.8	32	51	2.1	< 0.1	0.1	8	199	390
KA017226	10/16/96	72	14	9	27		76	7.8	19	32	1.5	< 0.1	0.1	7	162	290
KA017226	11/20/96	81	16	10	38		66	7.7	24	52	2.8	< 0.1	0.1	3	190	358
KA017226	12/17/96	97	19	12	58		76	7.7	36	76	4.2	< 0.1	0.2	3	279	522
KA017226	1/14/97	81	16	10	30		61	7.3	44	28	3.8	< 0.1	0.1	22	175	315
KA017226	2/19/97	71	15	8	27		56	7.1	43	24	3.7	< 0.1	0.2	9	180	287
KA017226	3/19/97	69	16	7	26		48	6.9	34	29	2.5	< 0.1	0.1	19	169	276
KA017226	4/16/97	105	22	12	45		75	7.4	52	53	4.7	< 0.1	0.2	10	236	430
KA017226	5/21/97	92	19	11	42		76	7.3	34	56	2.6	< 0.1	0.2	13	239	403
KA017226	6/18/97	90	18	11	42		76	7.1	34	55	2.9	< 0.1	0.2	16	226	400
KA017226	7/15/97	84	17	10	37		64	8.2	26	46	2.0	< 0.1	0.1	11	194	327
KA017226	8/20/97	102	21	12	45		72	8.4	31	55	0.9	< 0.1	0.2	8	221	394
KA017226	9/17/97	77	16	9	26		71	8.2	20	27	1.5	< 0.1	0.1	13	148	273
KA017226	10/15/97	92	19	11	42		78	8.2	26	54	2.2	< 0.1	0.1	9	215	389
KA017226	11/19/97	108	20	14	74		68	8.1	37	117	3.1	< 0.1	0.1	5	313	602
KA017226	12/17/97	112	20	15	76		73	8.0	36	112	3.7	< 0.1	0.2	9	322	606
KA020794	1/9/97	62	13	7	28	3.2	52	7.2	23	35	4.3	< 0.1	0.1		169	291
KA021031	1/13/97	64	14	7	28		56	7.0	22	34	4.3	< 0.1	0.1	8	157	275
KA021031	1/28/97	64	14	7	28		54	7.2	23	33	3.5	< 0.1	0.1	5	160	303
KA021031	2/11/97	64	14	7	27		51	7.1	25	33	3.5	< 0.1	0.1	6	153	276
KA024454	1/16/96	119	26	13	54		81	7.8	58	63	6.3	< 0.1	0.3		284	504
KA024454	2/20/96	105	22	12	40		70	7.4	49	45	6.7	< 0.1	0.3		251	406
KA024454	3/19/96	95	20	11	40		58	7.6	52	47	5.0	< 0.1	0.3		236	397
KA024454	4/16/96	80	17	9	38		58	7.2	50	42	3.2	< 0.1	0.2		211	361
KA024454	5/14/96	110	21	14	51		79	7.7	45	70	3.5	< 0.1	0.2		265	479
KA024454	6/18/96	106	21	13	50		74	7.4	41	66	3.9	< 0.1	0.2		260	464
KA024454	7/16/96	90	18	11	38		68	7.5	32	50	2.7	< 0.1	0.2		214	377
KA024454	8/20/96	72	14	9	37		69	7.6	30	51	2.1	< 0.1	0.1	14	197	377
KA024454	9/17/96	70	15	8	25		67	7.9	20	32	1.3	< 0.1	< 0.1	39	146	283
KA024454	10/15/96	72	14	9	24		74	7.8	18	27	1.5	< 0.1	0.1	28	152	269
KA024454	11/19/96	77	16	9	35		70	7.7	24	48	1.5	< 0.1	0.1	22	195	344
KA024454	12/17/96	100	20	12	54		78	7.6	39	69	3.4	< 0.1	0.2	26	266	490
KA024454	1/14/97	28	8	2	7		32	6.8	5	4	1.2	< 0.1	< 0.1	19	66	89
KA024454	2/18/97	38	12	2	8		46	7.0	6	3	1.0	0.1	< 0.1	10	88	118
KA024454	3/18/97	60	14	6	23		47	7.0	29	26	2.1	< 0.1	0.1	18	147	247
KA024454	4/15/97	100	22	11	41		72	7.3	50	49	4.8	< 0.1	0.2	18	225	409
KA024454	5/20/97	92	19	11	42		76	7.2	31	56	3.0	< 0.1	0.2	14	227	401
KA024454	6/17/97	90	18	11	43		74	7.1	34	55	3.0	< 0.1	0.2	35	219	407
KA024454	7/15/97	86	18	10	40		66	8.1	28	49	2.6	< 0.1	0.1	21	210	345
KA024454	8/19/97	100	20	12	45		73	8.6	32	56	0.6	< 0.1	0.2	7	224	403
KA024454	9/16/97	77	16	9	28		68	8.2	21	30	1.7	< 0.1	0.1	10	154	283
KA024454	10/14/97	86	18	10	34		76	8.3	22	40	1.2	< 0.1	0.1	6	180	332
KA024454	11/18/97	108	20	14	78		71	8.1	39	116	3.4	< 0.1	0.2	5	331	618

Table C-1 (Con't)
Conventional Parameter, Major Mineral, Fluoride, and Boron Concentrations in the SWP

CONCENTRATION (mg/L unless otherwise noted)

STATION	DATE	HARDNESS (as CaCO3)	CALCIUM	MAGNESIUM	SODIUM	POTASSIUM	TOTAL ALKALINITY (as CaCO3)	LAB pH (pH units)	SULFATE	CHLORIDE	NITRATE (as NO3)	FLUORIDE	BORON	TURBIDITY (NTU)	DISSOLVED SOLIDS	CONDUCTIVITY (µS/cm)
KA024454	12/16/97	108	20	14	66		72	8.0	38	98	3.7	< 0.1	0.2	6	293	544
KA030341	2/21/96	114	24	13	46	3.7	75	7.8	56	52	7.0	< 0.1	0.3		258	454
KA030341	3/20/96	95	21	10	40	2.8	58	8.0	56	46	4.8	< 0.1	0.3		225	392
KA030341	4/17/96	79	17	9	36	2.0	52	7.9	47	41	2.9	< 0.1	0.2		209	347
KA030341	5/15/96	107	21	13	49	3.7	75	8.1	44	70	1.8	0.1	0.2		292	470
KA030341	6/19/96	95	19	11	42	3.2	67	8.1	38	57	3.4	< 0.1	0.2		228	403
KA030341	7/17/96	90	18	11	37		69	7.5	32	49	2.7	< 0.1	0.2		211	374
KA030341	8/21/96	90	18	11	38	3.0	68	8.1	31	52	2.4	< 0.1	0.1	28	221	371
KA030341	9/18/96	73	16	8	27		67	7.9	22	35	1.5	< 0.1	< 0.1	28	154	299
KA030341	10/16/96	68	14	8	24		75	8.0	19	26	1.4	< 0.1	< 0.1	9	149	270
KA030341	11/20/96	81	16	10	34		76	8.1	25	45	1.7	< 0.1	0.1	7	192	341
KA030341	12/18/96	84	17	10	40		72	7.5	29	58	2.7	< 0.1	0.1	6	215	392
KA030341	1/13/97	81	16	10	44	2.8	60	7.2	29	62	4.3	< 0.1	0.1		217	408
KA030341	2/19/97	33	10	2	8		43	7.0	5	3	1.3	0.1	< 0.1	6	80	107
KA030341	3/19/97	64	14	7	25		51	6.9	28	30	2.1	< 0.1	0.1	31	152	263
KA030341	4/16/97	100	22	11	42		74	7.2	53	52	5.0	< 0.1	0.2	48	240	430
KA030341	5/21/97	92	19	11	43		75	7.3	35	56	2.9	< 0.1	0.2	21	244	404
KA030341	6/18/97	90	18	11	43		76	7.3	37	54	3.0	< 0.1	0.2	30	227	404
KA030341	7/16/97	80	17	9	35		64	8.1	24	41	2.4	< 0.1	0.1	28	179	310
KA030341	8/20/97	100	20	12	46		74	8.6	32	55	0.6	< 0.1	0.2	24	218	400
KA030341	9/17/97	80	17	9	30		69	8.1	23	33	2.1	< 0.1	0.1	30	159	300
KA030341	10/15/97	90	18	11	34		76	8.3	22	39	1.2	< 0.1	0.1	21	184	328
KA030341	11/19/97	108	20	14	74		71	8.1	40	107	3.3	< 0.1	0.2	10	332	588
KA030341	12/17/97	101	19	13	66		88	8.0	33	96	3.3	< 0.1	0.1	17	277	532
KA040341	2/21/96	106	23	12	40	2.8	75	8.4	46	47	3.9	< 0.1	0.2		236	404
KA040341	5/15/96	107	21	13	49	3.7	76	8.2	43	69	1.6	0.1	0.2		285	470
KA040341	8/21/96	84	17	10	33	2.7	65	8.3	28	45	2.0	< 0.1	0.1	24	200	335
KA040341	11/20/96	86	18	10	28		83	8.0	23	32	1.3	< 0.1	0.1		177	309
KA040341	2/19/97						85	8.5	27	56	0.8	< 0.1	0.1		207	384
KA040341	5/21/97	92	19	11	43		77	7.4	35	56	2.8	< 0.1	0.2	30	248	404
KA040341	8/20/97	84	17	10	35		65	8.1	22	42	1.0	< 0.1	0.1		170	320
KA040341	11/19/97	94	18	12	61		71	8.3	32	86	1.9	< 0.1	0.1	3	274	503
KA041288	2/21/96	64	15	6	23	2.4	50	7.7	23	26	4.0	< 0.1	0.1		137	245
KA041288	3/20/96	93	21	10	36	2.7	71	8.0	39	43	3.1	< 0.1	0.2		216	362
KA041288	4/17/96	85	18	10	34	2.7	62	8.0	38	41	2.9	< 0.1	0.2		203	345
KA041288	5/15/96	94	19	11	44	2.9	66	8.4	46	56	1.1	0.1	0.2		238	416
KA041288	6/19/96	90	19	11	40	3.0	62	7.9	42	51	2.9	< 0.1	0.2		225	385
KA041288	7/17/96	90	18	11	39		68	7.8	36	50	2.9	< 0.1	0.2		213	388
KA041288	8/21/96	89	18	10	35	2.9	67	8.0	31	48	2.4	< 0.1	0.1	8	222	0
KA041288	9/18/96	77	16	9	33		84	8.6	25	43	1.7	< 0.1	0.1	5	174	338
KA041288	10/16/96	112	17	9	32		73	7.9	25	38	1.8	< 0.1	< 0.1		224	315
KA041288	11/20/96	80	17	9	30		74	7.6	26	37	1.9	< 0.1	0.1	4	183	319
KA041288	12/18/96	82	18	9	28		79	7.5	24	36	2.1	< 0.1	0.1	9	178	321
KA041288	1/13/97	83	20	8	25	2.4	78	7.3	22	28	3.1	< 0.1	< 0.1		167	300
KA041288	2/19/97	76	24	4	13		98	7.8	9	4	0.9	0.3	< 0.1		127	210
KA041288	3/19/97	74	18	7	24		74	7.7	20	28	1.5	0.1	< 0.1	4	158	271
KA041288	4/16/97	84	19	9	35		75	7.1	41	40	3.1	< 0.1	0.2	9	199	353
KA041288	5/21/97	91	20	10	42		77	7.1	38	52	2.5	< 0.1	0.2	7	240	399
KA041288	6/18/97	95	20	11	45		79	7.2	39	54	2.4	< 0.1	0.2	5	232	428
KA041288	7/16/97	95	20	11	44		70	8.2	33	51	2.7	< 0.1	0.2		215	375
KA041288	8/20/97	88	19	10	38		68	8.1	27	45	1.6	< 0.1	0.1	5	193	351
KA041288	9/17/97	88	19	10	38		71	8.1	28	48	1.1	< 0.1	0.2	3	195	362
KA041288	10/15/97	86	18	10	33		71	8.1	24	39	1.9	< 0.1	0.1	2	174	328
KA041288	11/19/97	84	17	10	37		74	8.1	16	45	1.9	< 0.1	0.1	2	200	354
KA041288	12/17/97	90	18	11	42		74	8.0	27	54	1.9	< 0.1	0.1	1	209	387
KC000934	2/20/96	95	20	11	36		66	7.5	45	42	5.7	< 0.1	0.2		228	377
KC000934	5/14/96	110	21	14	52		82	8.0	46	70	3.3	< 0.1	0.2		260	477
KC000934	6/18/96	90	18	11	39		69	7.9	34	51	2.7	< 0.1	0.2		208	376
KC000934	7/16/96	90	18	11	37		70	7.9	31	48	2.1	< 0.1	0.2		202	369
KC000934	8/20/96	84	17	10	38		71	8.3	31	52	1.8	< 0.1	0.1	30	210	382
KC000934	9/17/96	70	15	8	25		69	7.9	20	32	1.1	< 0.1	< 0.1	8	151	281
KC000934	10/15/96	74	15	9	27		76	7.8	20	31	1.4	< 0.1	0.1	12	163	291
KC000934	11/19/96	81	16	10	36		80	9.3	26	49	0.2	< 0.1	0.1	6	191	349
KC000934	12/17/96	86	18	10	44		78	8.2	32	64	1.9	< 0.1	0.2	10	234	418
KC000934	1/14/97	97	19	12	59		82	9.1	43	78	0.7	< 0.1	0.2	< 1	272	495
KC000934	2/18/97	92	19	11	58		84	9.0	42	77	< 0.1	< 0.1	0.2	10	138	486
KC000934	3/18/97	66	15	7	26		50	7.1	33	29	2.4	< 0.1	0.1	36	163	271
KC000934	4/15/97	95	20	11	43		78	7.7	42	55	3.2	< 0.1	0.2	12	229	438
KC000934	5/20/97	92	19	11	42		75	7.3	34	55	2.6	< 0.1	0.2	13	224	404
KC000934	6/17/97	92	19	11	42		84	8.3	40	53	2.7	< 0.1	0.2	30	219	402
KC000934	7/15/97	88	19	10	43		68	8.6	30	53	1.7	< 0.1	0.1	18	217	372
KC000934	8/19/97	98	21	11	45		72	8.9	32	54	0.4	< 0.1	0.2	6	227	399
KC000934	9/16/97	77	16	9	26		70	8.4	21	29	1.0	< 0.1	0.1	4	152	278
KC000934	10/14/97	90	18	11	39		77	8.4	25	49	1.1	< 0.1	0.1	8	200	367
KC000934	11/18/97	108	20	14	78		72	8.8	41	116	2.0	< 0.1	0.2	3	342	614
KC000934	12/15/97	108	20	14	67		72	8.3	38	95	3.3	< 0.1	0.2	3	287	547
SL005000	1/16/96	106	21	13	56		76	7.7	42	78	3.8	< 0.1	0.2		278	501
SL005000	2/20/96	110	21	14	53		76	7.5	42	72	4.0	< 0.1	0.2		276	482
SL005000	3/18/96	113	22	14	53		79	8.5	43	73	2.6	< 0.1	0.2		278	486
SL005000	4/16/96	110	21	14	52		82	7.8	45	70	3.9	< 0.1	0.2		272	481
SL005000	5/14/96	110	21	14	53		81	7.9	45	72	3.6	< 0.1	0.2		270	489
SL005000	6/18/96	113	22	14	53		76	7.3	42	69	3.7	< 0.1	0.2		281	482

Table C-1 (Con't)
Conventional Parameter, Major Mineral, Fluoride, and Boron Concentrations in the SWP

CONCENTRATION (mg/L unless otherwise noted)

STATION	DATE	HARDNESS (as CaCO3)	CALCIUM	MAGNESIUM	SODIUM	POTASSIUM	TOTAL ALKALINITY (as CaCO3)	LAB pH (pH units)	SULFATE	CHLORIDE	NITRATE (as NO3)	FLUORIDE	BORON	TURBIDITY (NTU)	DISSOLVED SOLIDS	CONDUCTIVITY (µS/cm)
SL005000	7/16/96	113	22	14	52		78	7.7	43	70	3.5	0.1	0.2		272	492
SL005000	8/19/96	106	21	13	52		80	7.9	43	71	2.9	< 0.1	0.2	4	269	498
SL005000	9/17/96	111	23	13	49		84	8.2	42	68	2.2	< 0.1	0.2	2	266	480
SL005000	10/15/96	92	19	11	44		78	8.0	37	55	2.2	< 0.1	0.1	1	239	427
SL005000	11/19/96	92	19	11	42		76	7.8	33	57	2.7	< 0.1	0.2	1	216	409
SL005000	12/17/96	92	19	11	43		77	7.6	33	58	2.1	< 0.1	0.2	< 1	237	415
SL005000	1/14/97	92	19	11	45		73	7.4	33	59	3.4	< 0.1	0.2	< 1	226	415
SL005000	2/18/97	95	20	11	41		73	7.4	33	57	3.9	< 0.1	0.2	< 1	243	408
SL005000	3/18/97	90	18	11	42		74	7.6	33	56	3.5	< 0.1	0.1	< 1	229	400
SL005000	4/14/97	90	18	11	43		75	7.4	33	57	2.9	< 0.1	0.1	< 1	208	404
SL005000	5/20/97	92	19	11	43		80	7.5	33	56	2.2	< 0.1	0.2	2	228	401
SL005000	6/17/97	90	18	11	44		78	7.4	33	56	2.3	< 0.1	0.2	3	232	404
SL005000	7/14/97	95	20	11	46		74	8.3	32	58	2.1	< 0.1	0.1	12	232	398
SL005000	8/19/97	123	26	14	52		89	8.5	35	59	0.9	< 0.1	0.2	5	257	456
SL005000	9/16/97	92	19	11	39		74	9.0	30	48	0.2	< 0.1	0.2	4	194	363
SL005000	10/14/97	92	19	11	39		74	8.2	27	49	1.6	< 0.1	0.2	3	208	371
SL005000	11/18/97	97	19	12	44		74	8.0	29	61	1.7	< 0.1	0.1	3	220	412
SL005000	12/17/97	97	19	12	52		73	7.9	30	70	2.7	< 0.1	0.1		244	456
CA002000	2/20/96	192	45	19	54	3.4	104	8.3	129	52	1.3	0.3	0.4		406	627
CA002000	5/13/96	180	41	19	51	3.6	97	9.1	123	53	< 0.1	0.3	0.4		386	596
CA002000	8/19/96	189	44	19	52	3.7	101	9.0	128	54	< 0.1	0.3	0.4	2	390	611
CA002000	11/19/96	161	38	16	49		99	8.0	102	50	1.2	0.3	0.4	< 1	331	560
CA002000	2/18/97	158	37	16	48		99	7.8	98	48	1.8	0.2	0.4	< 1	316	540
CA002000	5/19/97	142	32	15	45		107	9.1	88	43	< 0.1	0.2	0.3	2	325	519
CA002000	8/18/97	161	38	16	50		90	8.6	90	46	< 0.1	0.2	0.4	3	313	523
CA002000	11/17/97	138	32	14	45		85	8.1	78	45	1.0	0.2	0.3	< 1	279	480
PE002000	2/20/96	148	28	19	88	4.9	108	8.3	63	117	0.1	0.1	0.3		405	708
PE002000	5/13/96	144	27	18	80	4.9	107	8.9	40	114	< 0.1	0.2	0.2		397	689
PE002000	8/20/96	146	26	20	85	5.0	104	8.9	64	121	< 0.1	0.2	0.3	< 1	396	712
PE002000	11/18/96	135	26	17	78		108	8.1	56	102	0.1	0.2	0.2	< 1	360	663
PE002000	2/18/97	138	27	17	80		108	7.7	60	109	0.6	0.1	0.3	0	355	660
PE002000	5/20/97	134	27	16	74		120	8.4	56	101	< 0.1	0.1	0.2	< 1	370	632
PE002000	8/18/97	147	29	18	80		104	8.4	55	96	< 0.1	0.1	0.3	4	340	630
PE002000	11/17/97	131	26	16	70		101	8.1	53	91	0.2	0.1	0.2	< 1	342	609
PY001000	2/20/96	160	37	16	47	3.1	93	8.1	107	43	2.5	0.2	0.4		339	539
PY001000	5/14/96	118	26	13	40	2.9	75	8.2	71	47	1.4	0.2	0.3		278	446
PY001000	8/19/96	119	26	13	42	3.1	79	9.2	63	49	0.2	0.2	0.3	10	257	430
PY001000	11/18/96	112	25	12	38		84	7.9	55	43	1.7	0.2	0.3	2	233	414
PY001000	2/18/97	115	26	12	39		86	7.7	57	42	2.4	0.2	0.3	2	232	427
PY001000	5/21/97	100	22	11	39		81	7.4	48	46	2.5	0.1	0.2	2	234	401
PY001000	8/19/97	115	26	12	42		77	8.2	52	45	1.8	0.2	0.3	< 1	240	417
PY001000	11/18/97	105	22	12	43		78	8.1	45	52	1.9	0.1	0.2	2	237	419
SI002000	2/21/96	92	20	11	38	2.6	69	8.2	38	45	2.3	< 0.1	0.2		222	374
SI002000	5/14/96	94	19	11	43	2.8	66	8.4	48	55	1.1	0.1	0.2		246	408
SI002000	8/21/96	88	18	10	35	2.8	66	8.0	31	48	2.3	< 0.1	0.1		204	353
SI002000	11/19/96	84	17	10	31		74	7.7	25	38	2.3	< 0.1	0.1	4	187	322
SI002000	2/19/97	90	26	6	12		97	7.4	11	10	3.5	0.1	< 0.1		152	242
SI002000	5/19/97	91	20	10	42		77	7.3	40	52	2.5	< 0.1	0.2	7	234	399
SI002000	8/19/97	88	19	10	38		68	8.0	28	45	1.6	< 0.1	0.2	5	199	352
SI002000	11/18/97	84	17	10	36		74	8.1	24	46	1.6	< 0.1	0.1	1	207	355
DMC06716	1/17/96	175	37	20	86		104	7.9	94	102	7.5	< 0.1	0.4		435	761
DMC06716	2/21/96	102	21	12	50		57	7.2	66	53	5.0	< 0.1	0.4		264	442
DMC06716	3/20/96	70	15	8	30		48	7.3	38	31	2.6	< 0.1	0.2		176	297
DMC06716	4/17/96	105	22	12	50		66	7.3	66	59	3.7	< 0.1	0.3		274	465
DMC06716	5/14/96	100	20	12	45		70	8.8	55	54	2.3	< 0.1	0.2		234	422
DMC06716	6/19/96	62	13	7	20		48	7.0	22	21	2.1	< 0.1	0.1		135	223
DMC06716	7/17/96	95	20	11	34		64	7.2	39	40	3.9	< 0.1	0.2		213	359
DMC06716	8/20/96	128	28	14	55		83	7.5	65	64	6.8	< 0.1	0.3	17	322	539
DMC06716	9/18/96	91	20	10	32		76	7.7	34	37	3.5	< 0.1	0.1	9	185	352
DMC06716	10/16/96	72	14	9	32		73	7.8	21	40	2.2	< 0.1	< 0.1	18	180	321
DMC06716	11/20/96	85	16	11	48		66	7.5	26	71	3.0	< 0.1	0.1	6	234	429
DMC06716	12/18/96	48	11	5	18		45	7.1	18	17	4.0	< 0.1	0.1	18	127	196
DMC06716	1/9/97	46	10	5	15	2.7	40	6.9	16	14	2.8	< 0.1	< 0.1	68	103	186
DMC06716	1/15/97	48	11	5	18		40	7.0	21	18	3.0	< 0.1	0.1	44	115	196
DMC06716	2/19/97	69	16	7	24		50	7.1	38	24	3.0	< 0.1	0.2	11	165	268
DMC06716	3/19/97	108	25	11	47		77	7.4	61	52	5.9	< 0.1	0.2	16	269	458
DMC06716	4/16/97	82	18	9	30		70	7.2	36	35	3.5	< 0.1	0.1	12	169	338
DMC06716	5/21/97	119	26	13	51		83	7.4	65	62	4.8	< 0.1	0.3	6	309	488
DMC06716	6/18/97	88	19	10	34		67	7.0	35	38	3.4	< 0.1	0.2	21	187	337
DMC06716	7/16/97	68	14	8	27		55	8.0	17	34	1.7	< 0.1	< 0.1	22	149	253
DMC06716	8/20/97	105	22	12	44		74	8.0	38	47	3.4	< 0.1	0.2	14	228	392
DMC06716	9/17/97	116	25	13	47		90	8.1	46	52	4.8	< 0.1	0.2	13	247	447
DMC06716	10/15/97	96	22	10	44		68	8.0	48	47	6.2	< 0.1	0.2	18	223	405
DMC06716	11/19/97	90	16	12	60		60	7.8	25	97	2.4	< 0.1	< 0.1	9	276	503
DMC06716	12/17/97	116	20	16	78		69	7.8	35	120	4.1	< 0.1	0.1	10	321	620

Table C-2
Minor Element Concentrations in the SWP

STATION	DATE	ARSENIC	BARIUM	CADMIUM	CHROMIUM	COPPER	IRON	LEAD	MANGANESE	MERCURY	SELENIUM	SILVER	ZINC	ALUMINUM
		CONCENTRATION, mg/L												
AN001000	5/22/96	< 0.001			< 0.005	< 0.005	0.120	< 0.005	0.006		< 0.001		< 0.005	
AN001000	5/22/97	< 0.001			< 0.005	< 0.005	0.183	< 0.005	0.013		< 0.001		< 0.050	
FR001000	5/22/96	< 0.001			< 0.005	< 0.005	0.026	< 0.005	< 0.005		< 0.001		< 0.005	
FR001000	5/22/97	< 0.001			< 0.005	< 0.005	0.067	< 0.005	< 0.005		< 0.001		< 0.050	
LD001000	5/23/96	< 0.001			< 0.005	< 0.005	0.029	< 0.005	0.016		< 0.001		< 0.005	
LD001000	5/27/97	< 0.001			< 0.005	< 0.005	0.006	< 0.005	0.027		< 0.001		< 0.050	
LD001000	6/26/97						0.028		< 0.005					
LD001000	7/29/97						0.066		0.042					
LD001000	8/29/97						0.055		0.189					
LD001000	9/24/97						0.059		0.178					
TA001000	1/17/96	< 0.001			< 0.005	< 0.005	0.015	< 0.005	0.006		< 0.001		< 0.005	
TA001000	3/20/96	< 0.001			< 0.005	< 0.005	0.021	< 0.005	< 0.005		< 0.001		< 0.005	
TA001000	4/17/96	< 0.001			< 0.005	< 0.005	0.009	< 0.005	< 0.005		< 0.001		< 0.005	
TA001000	5/15/96	< 0.001			< 0.005	< 0.005	0.012	< 0.005	0.006		< 0.001		< 0.005	
TA001000	6/19/96	< 0.001			< 0.005	< 0.005	0.010	< 0.005	< 0.005		< 0.001		< 0.005	
TA001000	7/17/96	< 0.001			< 0.005	< 0.005	0.005	< 0.005	0.005		< 0.001		< 0.005	
TA001000	8/20/96	< 0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
TA001000	9/18/96	< 0.001		0.000	< 0.005	< 0.005	0.010	< 0.005	< 0.005		< 0.001		< 0.005	
TA001000	10/16/96	< 0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005		< 0.001	< 0.005	< 0.005	
TA001000	11/20/96	< 0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.010	< 0.005	< 0.005		< 0.001		< 0.005	
TA001000	12/18/96	< 0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.013	< 0.005	< 0.005		< 0.001		< 0.005	
TA001000	1/15/97	< 0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.024	< 0.005	< 0.005		< 0.001		< 0.005	
TA001000	2/19/97	< 0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	< 0.0010	< 0.001	<	< 0.005	< 0.010
TA001000	3/19/97	< 0.001		0.000	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005		< 0.001		< 0.005	
TA001000	4/16/97	< 0.001		0.000	< 0.005	< 0.005	0.017	< 0.005	< 0.005		< 0.001		< 0.005	
TA001000	5/21/97	< 0.001		0.000	< 0.005	< 0.005	0.026	< 0.005	< 0.005		< 0.001		< 0.050	
TA001000	6/18/97	< 0.001		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005		< 0.001		< 0.050	
TA001000	7/16/97	< 0.001		0.000	< 0.005	0.001	< 0.005	< 0.001	< 0.005		< 0.001		< 0.050	
TA001000	8/20/97	< 0.001	< 0.050	< 0.001	< 0.005	0.001	0.006	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
TA001000	9/17/97	< 0.001	0.000	0.000	< 0.005	0.001	0.010	< 0.001	< 0.005		< 0.001		< 0.050	
TA001000	10/15/97	< 0.001	< 0.050	< 0.001	< 0.005	< 0.001	0.005	< 0.001	< 0.005		< 0.001	< 0.001	< 0.005	
TA001000	11/19/97	< 0.001	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
TA001000	12/17/97	< 0.001	0.000	0.000	< 0.005	0.001	0.009	< 0.001	0.015		< 0.001		< 0.005	
TF001000	5/15/96	< 0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.013	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
TF001000	8/20/96	< 0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
TF001000	11/20/96	< 0.001	0.050	< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
TF001000	2/19/97	< 0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.016	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.014
TF001000	5/21/97	< 0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
TF001000	8/20/97	< 0.001	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
TF001000	11/19/97	< 0.001	< 0.050	< 0.001	< 0.005	< 0.001	0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KG000000	1/17/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.101	< 0.005	0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.068
KG000000	2/21/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.111	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.022
KG000000	3/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.086	< 0.005	0.063	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KG000000	4/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.014	< 0.005	0.027	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KG000000	5/15/96	0.003	0.053	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.016	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KG000000	6/19/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.030	< 0.0010	< 0.001	< 0.005	0.012	< 0.010
KG000000	7/17/96	0.003	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.011	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KG000000	8/21/96	0.003	< 0.050	< 0.005	< 0.005	< 0.005	0.006	< 0.005	0.010	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KG000000	9/18/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.010	< 0.005	0.015	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KG000000	10/2/96						0.012		0.014					< 0.010
KG000000	10/9/96						0.005		0.014					< 0.010
KG000000	10/16/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.006	< 0.005	0.022	< 0.0010	< 0.001	< 0.005	0.006	< 0.010
KG000000	10/23/96						< 0.005		0.012					< 0.010
KG000000	10/30/96						0.010		0.024					< 0.010
KG000000	11/5/96						0.009		0.023					< 0.010
KG000000	11/13/96						< 0.005		0.015					< 0.010
KG000000	11/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.021	< 0.005	0.022	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KG000000	11/25/96						0.026		0.032					< 0.010
KG000000	12/4/96						0.015		0.024					< 0.010
KG000000	12/9/96						0.021		0.025					< 0.010
KG000000	12/18/96	0.002	0.057	< 0.005	< 0.005	< 0.005	0.066	< 0.005	0.023	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KG000000	12/23/96						0.517		0.358					0.438
KG000000	12/30/96						0.088		< 0.005					< 0.010
KG000000	1/7/97						0.095		0.034					0.011
KG000000	1/15/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.155	< 0.005	0.025	< 0.0010	< 0.001	< 0.005	< 0.005	0.015
KG000000	1/22/97						0.126		0.024					0.011
KG000000	1/29/97						0.108		0.008					0.022
KG000000	2/5/97						0.107		0.035					0.010
KG000000	2/10/97						0.105		0.060					< 0.010
KG000000	2/19/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.087	< 0.005	0.075	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KG000000	2/26/97						0.064		0.042					< 0.010
KG000000	3/5/97						0.062		0.044					< 0.010
KG000000	3/12/97						0.042		0.039					< 0.010
KG000000	3/19/97	0.002	0.051	< 0.005	< 0.005	< 0.005	0.012	< 0.005	0.033	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KG000000	3/26/97						0.016		0.031					< 0.010
KG000000	4/2/97						0.008		0.043					< 0.010
KG000000	4/8/97						0.008		0.019					0.010
KG000000	4/16/97	0.002	0.064	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.015	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KG000000	4/23/97						< 0.005		0.017					< 0.010
KG000000	4/28/97						< 0.005		0.114					< 0.010
KG000000	5/7/97						< 0.005		0.008					< 0.010
KG000000	5/14/97						< 0.005		0.016					< 0.010
KG000000	5/21/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KG000000	5/27/97						0.006		0.020					< 0.010

Table C-2 (Con't)
Minor Element Concentrations in the SWP

		CONCENTRATION, mg/L												
STATION	DATE	ARSENIC	BARIUM	CADMIUM	CHROMIUM	COPPER	IRON	LEAD	MANGANESE	MERCURY	SELENIUM	SILVER	ZINC	ALUMINUM
KG000000	6/4/97						0.027		0.008					< 0.010
KG000000	6/11/97						0.026		0.008					< 0.010
KG000000	6/18/97	0.002	0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.013	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KG000000	6/25/97						< 0.005		0.010					< 0.010
KG000000	7/2/97						< 0.005		0.022					< 0.010
KG000000	7/16/97	0.003	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.017	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KG000000	8/20/97	0.003	< 0.050	< 0.001	< 0.005	0.002	0.013	< 0.001	0.023	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KG000000	9/17/97	0.003	0.066	< 0.001	< 0.005	0.002	0.005	< 0.001	0.014	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KG000000	10/15/97	0.003	< 0.050	< 0.001	0.006	0.002	< 0.005	< 0.001	0.015	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KG000000	11/19/97	0.002	0.065	< 0.001	< 0.005	0.003	0.015	< 0.001	0.012	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KG000000	12/17/97	0.002	0.054	< 0.001	0.007	0.004	0.060	< 0.001	0.018	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KG002111	2/21/96	0.002	< 0.050	< 0.005	< 0.005	0.005	0.070	< 0.005	0.038	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KG002111	5/15/96	0.003	0.059	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KG002111	8/21/96	0.003	< 0.050	< 0.005	< 0.005	< 0.005	0.011	< 0.005	0.006	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KG002111	11/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.015	< 0.005	0.007	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.005
KG002111	2/19/97	0.003	< 0.050	< 0.005	< 0.005	0.005	0.075	< 0.005	0.016	< 0.0010	< 0.001	< 0.005	0.016	< 0.010
KG002111	5/21/97	0.003	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KG002111	8/20/97	0.003	< 0.050	< 0.001	< 0.005	0.002	0.007	< 0.001	0.006	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KG002111	11/19/97	0.002	0.059	< 0.001	0.005	0.002	0.014	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
DV000000	10/16/96	0.002	0.070	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	0.437	< 0.010
DV000000	2/19/97	0.001	0.052	< 0.005	< 0.005	< 0.005	0.009	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	0.232	< 0.010
DV000000	6/18/97	< 0.001	0.064	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
DV000000	9/17/97	0.002	0.076	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.137	< 0.010
DV000000	10/15/97	0.003	0.073	< 0.001	0.008	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.126	< 0.010
DV001000	9/18/96	0.002	0.073	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.028	< 0.0010	< 0.001	< 0.005	0.025	< 0.010
DV001000	11/20/96	0.002	0.078	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.0010	< 0.001	< 0.005	0.240	< 0.010
DV001000	12/18/96	0.002	0.082	< 0.005	< 0.005	< 0.005	0.008	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	0.282	< 0.010
DV001000	1/15/97	0.001	0.062	< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	0.129	< 0.010
KB001638	4/16/97	0.001	< 0.050	< 0.005	< 0.005	0.015	0.009	< 0.005	0.012	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KB001638	5/21/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.008	< 0.005	0.010	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KB001638	6/18/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.012	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KB001638	7/16/97	0.002	< 0.050	< 0.001	< 0.005	0.008	0.006	< 0.001	0.008	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KB001638	8/20/97	0.003	< 0.050	< 0.001	< 0.005	0.003	0.006	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KB001638	9/17/97	0.002	< 0.050	< 0.001	< 0.005	0.003	0.009	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KB001638	10/15/97	0.002	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	0.008	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KB001638	11/19/97	0.002	< 0.050	< 0.001	< 0.005	0.002	0.009	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KB001638	12/17/97	0.002	< 0.050	< 0.001	< 0.005	0.004	0.029	< 0.001	0.007	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KB004207	2/21/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.013	< 0.005	0.012	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KB004207	3/20/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.008	< 0.005	0.007	< 0.0010	< 0.001	< 0.005	0.005	< 0.010
KB004207	5/15/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.014	< 0.0010	0.001	< 0.005	< 0.005	< 0.010
KB004207	8/21/96	0.002	< 0.050	< 0.005	< 0.005	0.039	< 0.005	< 0.005	0.009	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KB004207	9/18/96	0.002	0.055	< 0.005	< 0.005	< 0.005	0.010	< 0.005	0.011	< 0.0010	< 0.001	< 0.005	0.012	< 0.010
KB004207	10/16/96	0.002	0.058	< 0.005	< 0.005	< 0.005	0.006	< 0.005	0.005	< 0.0010	< 0.001	< 0.005	0.013	< 0.010
KB004207	11/20/96	0.003	0.080	< 0.005	< 0.005	< 0.005	0.006	< 0.005	0.009	< 0.0010	< 0.001	< 0.005	0.011	< 0.005
KB004207	12/18/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.022	< 0.005	0.010	< 0.0010	< 0.001	< 0.005	0.017	< 0.010
KB004207	1/15/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.033	< 0.005	0.025	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KB004207	2/19/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.019	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	0.016	< 0.010
KB004207	5/21/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.007	< 0.005	0.007	< 0.0010	0.001	< 0.005	< 0.050	< 0.010
KB004207	8/20/97	0.002	< 0.050	< 0.001	< 0.005	0.003	0.015	< 0.001	0.020	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KB004207	9/17/97	0.002	0.059	< 0.001	< 0.005	0.003	0.010	< 0.001	0.008	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KB004207	10/15/97	0.002	0.058	< 0.001	0.006	0.002	0.027	< 0.001	0.008	< 0.0002	< 0.001	< 0.001	0.007	< 0.010
KB004207	11/19/97	0.002	< 0.050	< 0.001	< 0.005	0.003	0.027	< 0.001	0.015	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KA000000	1/7/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.057	< 0.005	0.127	< 0.0010	< 0.001	< 0.005	< 0.005	0.021
KA000000	2/19/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.002	0.022	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA000331	1/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.083	< 0.005	0.012	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA000331	2/21/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.045	< 0.005	0.033	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA000331	3/20/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.018	< 0.005	0.017	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA000331	4/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.015	< 0.005	0.034	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA000331	5/15/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.006	< 0.005	0.029	< 0.0010	0.001	< 0.005	< 0.005	< 0.010
KA000331	6/19/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.014	< 0.005	0.024	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA000331	7/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.009	< 0.005	0.010	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA000331	8/21/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.021	< 0.005	0.015	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA000331	9/18/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.016	< 0.005	0.016	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA000331	10/16/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.010	< 0.005	0.016	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA000331	11/20/96	0.002	< 0.050	< 0.005	< 0.005	0.095	0.029	< 0.005	0.021	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA000331	12/18/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.048	< 0.005	0.022	< 0.0010	< 0.001	< 0.005	0.006	0.010
KA000331	1/15/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.028	< 0.005	0.021	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA000331	2/19/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.021	< 0.005	0.025	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA000331	3/19/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.008	< 0.005	0.034	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA000331	4/16/97	0.002	< 0.050	< 0.005	< 0.005	0.025	0.010	< 0.005	0.028	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA000331	5/21/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.008	< 0.0010	0.001	< 0.005	< 0.050	< 0.010
KA000331	6/18/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.005	< 0.005	0.021	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KA000331	7/16/97	0.002	< 0.050	< 0.001	< 0.005	0.020	< 0.005	< 0.001	0.021	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA000331	8/20/97	0.003	< 0.050	< 0.001	< 0.005	0.002	0.008	< 0.001	0.014	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA000331	9/17/97	0.003	< 0.050	< 0.001	< 0.005	0.013	0.009	< 0.001	0.020	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA000331	10/15/97	0.002	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.017	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KA000331	11/19/97	0.002	< 0.050	< 0.001	< 0.005	< 0.002	0.017	< 0.001	0.007	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KA000331	12/17/97	0.002	< 0.050	< 0.001	< 0.005	0.003	0.034	< 0.001	0.025	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KA007089	1/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.094	< 0.005	0.019	< 0.0010	< 0.001	< 0.005	< 0.005	0.010
KA007089	2/21/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.062	< 0.005	0.024	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA007089	3/20/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.079	< 0.005	0.006	< 0.0010	< 0.001	< 0.005	< 0.005	0.046
KA007089	4/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.008	< 0.005	0.009	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA007089	5/14/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.006	< 0.005	0.012	< 0.0010	< 0.001	< 0.005	0.006	< 0.010

Table C-2 (Con't)
Minor Element Concentrations in the SWP

STATION	DATE	CONCENTRATION, mg/L ARSENIC	BARIUM	CADMIUM	CHROMIUM	COPPER	IRON	LEAD	MANGANESE	MERCURY	SELENIUM	SILVER	ZINC	ALUMINUM
KA007089	6/19/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.016	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA007089	7/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.006	< 0.005	0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA007089	8/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.018	< 0.005	0.008	< 0.0010	< 0.001	< 0.005	< 0.005	0.013
KA007089	9/18/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.015	< 0.005	0.009	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA007089	10/16/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.050	< 0.005	0.008	< 0.0010	< 0.001	< 0.005	< 0.005	0.049
KA007089	11/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.032	< 0.005	0.009	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA007089	12/18/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.045	< 0.005	0.011	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA007089	1/15/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.036	< 0.005	0.012	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA007089	2/19/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.034	< 0.005	0.018	< 0.0010	< 0.001	< 0.005	< 0.005	0.013
KA007089	3/19/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.012	< 0.005	0.014	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA007089	4/16/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.010	< 0.005	0.010	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA007089	5/21/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KA007089	6/18/97	0.003	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KA007089	7/16/97	0.002	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA007089	8/19/97	0.002	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA007089	9/17/97	0.002	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA007089	10/15/97	0.003	< 0.050	< 0.001	< 0.005	0.002	0.005	< 0.001	0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KA007089	11/19/97	0.002	< 0.050	< 0.001	< 0.005	0.002	0.007	< 0.001	0.008	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KA007089	12/17/97	0.003	< 0.050	< 0.001	< 0.005	0.003	0.036	< 0.001	0.012	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KA014323	1/6/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	< 0.025	< 0.005	0.034	< 0.0010	< 0.001	< 0.005	0.008	< 0.010
KA017226	1/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.180	< 0.005	0.016	< 0.0010	< 0.001	< 0.005	< 0.005	0.080
KA017226	2/21/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.178	< 0.005	0.010	< 0.0010	< 0.001	< 0.005	< 0.005	0.070
KA017226	3/20/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.029	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA017226	4/17/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.034	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.030
KA017226	5/14/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.010	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA017226	6/19/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.028
KA017226	7/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.038	< 0.005	0.007	< 0.0010	< 0.001	< 0.005	< 0.005	0.033
KA017226	8/21/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.035	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.023
KA017226	9/18/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA017226	10/16/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA017226	11/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.011	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA017226	12/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.028	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA017226	1/14/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.018	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA017226	2/19/97	0.001	< 0.050	< 0.005	< 0.005	0.006	0.016	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA017226	3/19/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.009	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA017226	4/16/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA017226	5/21/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KA017226	6/18/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KA017226	7/15/97	0.002	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA017226	8/20/97	0.002	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA017226	9/17/97	0.002	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA017226	10/15/97	0.003	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KA017226	11/19/97	0.002	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KA017226	12/17/97	0.002	< 0.050	< 0.001	< 0.005	0.003	0.027	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KA021031	1/9/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.015	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA021031	1/13/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.017	< 0.005	0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA021031	1/28/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.019	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA021031	2/11/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.018	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA024454	1/16/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.014	< 0.005	0.006	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA024454	2/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.036	< 0.005	0.006	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA024454	3/19/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.018	< 0.005	0.090	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA024454	4/16/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA024454	5/14/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA024454	6/18/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA024454	7/16/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA024454	8/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA024454	9/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA024454	10/15/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA024454	11/19/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA024454	12/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.012	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA024454	1/15/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.039	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.026
KA024454	2/18/97	0.003	< 0.050	< 0.005	< 0.005	0.005	0.034	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.014
KA024454	3/18/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA024454	4/15/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA024454	5/20/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KA024454	6/17/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KA024454	7/15/97	0.002	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA024454	8/19/97	0.002	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA024454	9/16/97	0.002	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA024454	10/14/97	0.003	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KA024454	11/18/97	0.002	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KA024454	12/16/97	0.002	< 0.050	< 0.001	< 0.005	0.002	0.011	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KA030341	1/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA030341	2/21/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.050	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA030341	3/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.029	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA030341	4/17/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	0.001	< 0.005	< 0.005	< 0.010
KA030341	5/15/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA030341	6/19/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA030341	7/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA030341	8/21/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA030341	9/18/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA030341	10/16/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA030341	11/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	0.006	< 0.010
KA030341	12/18/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA030341	1/13/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.019	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010

Table C-2 (Con't)
Minor Element Concentrations in the SWP

		CONCENTRATION, mg/L												
STATION	DATE	ARSENIC	BARIUM	CADMIUM	CHROMIUM	COPPER	IRON	LEAD	MANGANESE	MERCURY	SELENIUM	SILVER	ZINC	ALUMINUM
KA030341	2/19/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.021	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	0.021	< 0.010
KA030341	3/19/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA030341	4/16/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.0010	0.001	< 0.005	< 0.005	< 0.010
KA030341	5/21/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KA030341	6/18/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KA030341	7/16/97	0.002	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA030341	8/20/97	0.003	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA030341	9/17/97	0.003	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA030341	10/15/97	0.004	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	0.0010	< 0.001	< 0.001	< 0.005	< 0.010
KA030341	11/19/97	0.003	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KA030341	12/17/97	0.002	< 0.050	< 0.001	< 0.005	0.002	0.007	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.008	< 0.010
KA040341	5/21/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KA040341	8/20/97	0.003	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA040341	11/19/97	0.003	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KA041288	1/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.006	< 0.005	0.014	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA041288	2/21/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.776	< 0.005	0.134	< 0.0010	< 0.001	< 0.005	0.007	0.539
KA041288	3/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.014	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA041288	4/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.022	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.022
KA041288	5/15/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.013	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.015
KA041288	6/19/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA041288	7/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA041288	8/21/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.044	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.040
KA041288	9/18/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.039	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.028
KA041288	10/16/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.058	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.029
KA041288	11/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.011	< 0.005	0.023	< 0.0010	< 0.001	< 0.005	< 0.005	0.024
KA041288	12/18/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.055	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA041288	1/13/97	< 0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.008	< 0.005	0.210	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA041288	2/19/97	< 0.001	< 0.050	< 0.005	< 0.005	0.005	0.008	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA041288	3/19/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.050
KA041288	4/16/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KA041288	5/21/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KA041288	6/18/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KA041288	7/16/97	0.002	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA041288	8/20/97	0.003	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA041288	9/17/97	0.003	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KA041288	10/15/97	0.003	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KA041288	11/19/97	0.003	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KA041288	12/17/97	0.003	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KC000934	2/20/96	0.002			< 0.005	< 0.005	0.036	< 0.005	0.010		< 0.001	0.000	0.019	
KC000934	5/14/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.015
KC000934	6/18/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KC000934	7/16/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KC000934	8/20/96	0.002	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KC000934	9/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.009	< 0.005	0.026	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KC000934	10/15/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KC000934	11/19/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.008	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KC000934	12/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KC000934	1/14/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.014
KC000934	2/18/97	0.002	< 0.050	< 0.005	< 0.005	0.016	0.011	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KC000934	3/18/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KC000934	4/15/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
KC000934	5/20/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KC000934	6/17/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
KC000934	7/15/97	0.002	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KC000934	8/19/97	0.003	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KC000934	9/16/97	0.003	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
KC000934	10/14/97	0.003	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
KC000934	11/16/97	0.002	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	0.000	< 0.005	< 0.010
KC000934	12/16/97	0.002	< 0.050	< 0.001	< 0.005	0.002	0.020	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
SL005000	1/16/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
SL005000	2/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
SL005000	3/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
SL005000	4/16/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
SL005000	5/14/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
SL005000	6/18/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.008	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.014
SL005000	7/16/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
SL005000	8/19/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.009	< 0.005	0.016	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
SL005000	9/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.012	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
SL005000	10/15/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
SL005000	11/19/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
SL005000	12/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
SL005000	1/14/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	0.006	< 0.010
SL005000	2/18/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	0.012	< 0.010
SL005000	3/18/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	0.006	< 0.010
SL005000	4/14/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.011
SL005000	5/20/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
SL005000	6/17/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
SL005000	7/14/97	0.002	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.012	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
SL005000	8/19/97	0.003	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.312	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
SL005000	9/16/97	0.003	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
SL005000	10/14/97	0.004	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
SL005000	11/18/97	0.004	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
SL005000	12/17/97	0.003	< 0.050	< 0.001	< 0.005	0.002	0.021	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.012	< 0.010
CA002000	2/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010

Table C-2 (Con't)
Minor Element Concentrations in the SWP

STATION	DATE	ARSENIC	BARIUM	CADMIUM	CHROMIUM	COPPER	IRON	LEAD	MANGANESE	MERCURY	SELENIUM	SILVER	ZINC	ALUMINUM
		CONCENTRATION, mg/L												
CA002000	5/13/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
CA002000	8/19/96	0.002	< 0.050	< 0.005	< 0.005	0.011	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
CA002000	11/19/96	0.002	0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
CA002000	2/18/97	0.002	< 0.050	< 0.005	< 0.005	0.008	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
CA002000	5/19/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
CA002000	8/18/97	0.002	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
CA002000	11/17/97	0.002	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
PE002000	2/20/96	0.002	0.059	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
PE002000	5/13/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
PE002000	8/20/96	0.002	0.057	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
PE002000	11/18/96	0.002	0.052	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
PE002000	2/18/97	0.002	0.054	< 0.005	< 0.005	0.017	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
PE002000	5/20/97	0.002	< 0.050	< 0.005	< 0.005	0.007	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
PE002000	8/18/97	0.002	0.057	< 0.001	< 0.005	0.010	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
PE002000	11/17/97	0.002	0.057	< 0.001	< 0.005	0.010	< 0.005	< 0.001	0.006	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
PY001000	2/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	0.001	< 0.005	< 0.005	< 0.010
PY001000	5/14/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.018	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.017
PY001000	8/19/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.020	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
PY001000	11/18/96	0.002	0.050	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.016
PY001000	2/18/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
PY001000	8/19/97	0.002	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
PY001000	11/18/97	0.003	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
SI002000	2/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.007	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
SI002000	5/14/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.015	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.017
SI002000	8/21/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
SI002000	11/19/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.017	< 0.005	0.022	< 0.0010	< 0.001	< 0.005	< 0.005	0.026
SI002000	2/19/97	< 0.001	< 0.050	< 0.005	< 0.005	0.006	0.045	< 0.005	0.403	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
SI002000	5/19/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
SI002000	8/19/97	0.003	< 0.050	< 0.001	< 0.005	0.004	< 0.005	< 0.001	< 0.005	0.0002	< 0.001	< 0.001	< 0.050	< 0.010
SI002000	11/18/97	0.003	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.006	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
DMC06716	1/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.030	< 0.005	0.062	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
DMC06716	2/21/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.017	< 0.005	0.009	< 0.0010	0.001	< 0.005	< 0.005	< 0.010
DMC06716	3/20/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.076	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.037
DMC06716	4/17/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	0.001	< 0.005	< 0.005	< 0.010
DMC06716	5/14/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
DMC06716	6/19/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.009	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
DMC06716	7/17/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
DMC06716	8/20/96	0.002	0.057	< 0.005	< 0.005	< 0.005	0.019	< 0.005	< 0.005	< 0.0010	0.001	< 0.005	< 0.005	0.013
DMC06716	9/18/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.017	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
DMC06716	10/16/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.010	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
DMC06716	11/20/96	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.032	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
DMC06716	12/18/96	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.051	< 0.005	0.005	< 0.0010	< 0.001	< 0.005	< 0.005	0.014
DMC06716	1/9/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.036	< 0.005	0.036	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
DMC06716	1/15/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.033	< 0.005	0.027	< 0.0010	< 0.001	< 0.005	< 0.005	0.014
DMC06716	2/19/97	0.001	< 0.050	< 0.005	< 0.005	< 0.005	0.024	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
DMC06716	3/19/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	0.005	< 0.005	0.009	< 0.0010	0.001	< 0.005	< 0.005	< 0.010
DMC06716	4/16/97	0.003	< 0.050	< 0.005	< 0.005	< 0.005	0.013	< 0.005	0.007	< 0.0010	< 0.001	< 0.005	< 0.005	< 0.010
DMC06716	5/21/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	0.001	< 0.005	< 0.050	< 0.010
DMC06716	6/18/97	0.002	< 0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0010	< 0.001	< 0.005	< 0.050	< 0.010
DMC06716	7/16/97	0.002	< 0.050	< 0.001	< 0.005	0.002	0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
DMC06716	8/20/97	0.002	< 0.050	< 0.001	< 0.005	< 0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
DMC06716	9/17/97	0.003	0.051	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050	< 0.010
DMC06716	10/15/97	0.002	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
DMC06716	11/19/97	0.002	< 0.050	< 0.001	< 0.005	0.002	0.017	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010
DMC06716	12/17/97	0.003	< 0.050	< 0.001	< 0.005	0.003	0.030	< 0.001	0.009	< 0.0002	< 0.001	< 0.001	< 0.005	< 0.010

Table C-3
TOC, DOC, UV 254, Bromide, TSS, and SVS Concentrations in the SWP

STATION	DATE	TOTAL ORGANIC CARBON (mg/L)	DISS. ORGANIC CARBON (mg/L)	UV 254 (1/cm)	BROMIDE (mg/L)	SUSPENDED SOLIDS (mg/L)	SUSPENDED VOLATILE SOLIDS (mg/L)
TA001000	5/15/96				< 0.01	6	2
TA001000	8/20/96				< 0.01	7	2
TA001000	11/20/96				< 0.01	4	< 1
TA001000	2/19/97				< 0.01	28	3
TA001000	5/21/97				< 0.01	8	2
TA001000	8/20/97				< 0.01		
TA001000	11/19/97				< 0.01	8	2
TF001000	8/20/96				< 0.01	2	< 1
KG000000	1/17/96	12.5			0.02		
KG000000	2/21/96	14.5			0.02	105	10
KG000000	3/20/96	13.1			0.03	42	10
KG000000	4/17/96	7.4			0.06		
KG000000	5/15/96	4.5			0.08	28	4
KG000000	6/19/96	4.7			0.05	20	2
KG000000	7/17/96	4.3			0.04	27	4
KG000000	8/21/96	4.9			0.04	28	4
KG000000	9/18/96	4.9			0.04	22	3
KG000000	10/2/96	5.4	4.5	0.137			
KG000000	10/9/96	4.0	3.5	0.106			
KG000000	10/16/96	4.4			0.04	32	2
KG000000	10/23/96	4.2	3.8	0.115			
KG000000	10/30/96	4.8	4.0	0.120			
KG000000	11/5/96	5.0	4.7	0.128			
KG000000	11/13/96	4.0	3.4	0.093			
KG000000	11/20/96	6.6	5.9	0.156	0.05	14	3
KG000000	11/25/96	6.6	5.6	0.157			
KG000000	12/4/96	5.6	4.6	0.134			
KG000000	12/9/96	6.0	5.5	0.159			
KG000000	12/18/96	11.0	10.0	0.309	0.05	25	4
KG000000	12/23/96	18.4	12.2	0.414			
KG000000	12/30/96	19.9	13.1	0.448			
KG000000	1/7/97	14.3	11.7	0.426			
KG000000	1/15/97	14.8	11.9	0.454	0.01	26	5
KG000000	1/22/97	14.1	12.2	0.440			
KG000000	1/29/97	11.8	8.1	0.284			
KG000000	2/5/97	12.0	8.8	0.321			
KG000000	2/10/97	12.1	9.4	0.355			
KG000000	2/19/97	12.1	9.8	0.358	0.05	24	7
KG000000	2/26/97	12.0	10.1	0.335			
KG000000	3/5/97	10.8	9.3	0.302			
KG000000	3/12/97	8.9	7.3	0.254			
KG000000	3/19/97	7.9	6.3	0.220	0.05	35	7
KG000000	3/26/97	7.2	6.7	0.205			
KG000000	4/2/97	7.2	5.8				
KG000000	4/8/97	6.2	5.8	0.179			
KG000000	4/16/97	6.1	5.6	0.164	0.08	48	5
KG000000	4/23/97	5.6	5.6	0.150			
KG000000	4/28/97	4.4	4.0	0.117			
KG000000	5/7/97	4.1	3.6	0.106			
KG000000	5/14/97	5.9	4.2	0.120			
KG000000	5/21/97	4.7	3.9	0.000	0.06	47	6
KG000000	5/27/97	5.9	5.1	0.156			
KG000000	6/4/97	5.6	4.8	0.144			
KG000000	6/11/97	5.3	4.3	0.094			
KG000000	6/18/97	4.0	3.7	0.105	0.05	59	6
KG000000	6/25/97	4.4	3.7	0.117			
KG000000	7/2/97	4.5	3.4	0.106			
KG000000	7/16/97	4.7	3.6		0.04	54	9
KG000000	8/20/97	6.0	4.9		0.03	31	4
KG000000	9/17/97	5.8	5.0	0.154	0.04	34	4
KG000000	10/15/97	5.5	3.4	0.095	0.20	39	4
KG000000	11/19/97	7.0	6.0	0.069	0.09	39	7
KG000000	12/17/97	11.9	9.5	0.318	0.05	58	10
KG002111	2/21/96				0.05		
KG002111	5/15/96				0.10		
KG002111	8/21/96				0.04		
KG002111	11/20/96				0.04		
KG002111	2/19/97				0.05		
KG002111	5/21/97				0.06		
KG002111	8/20/97				0.03		
KG002111	11/19/97				0.11		
DV000000	10/16/96				0.02	2	< 1
DV000000	2/19/97				0.01	8	1
DV000000	6/18/97				0.02	3	< 1
DV000000	9/17/97					2	< 1
DV000000	10/15/97					2	1
DV001000	9/18/96					2	< 1
DV001000	11/20/96					3	1
DV001000	12/18/96					8	< 1
DV001000	1/15/97				0.02	24	4
KB001638	4/16/97	3.6			0.09	4	< 1
KB001638	5/21/97	3.9			0.16	21	4
KB001638	6/18/97	4.0			0.11	6	1
KB001638	7/16/97	3.2			0.09	8	< 1
KB001638	8/20/97	3.2			0.09	9	2
KB001638	9/17/97	3.0			0.09	10	3
KB001638	10/15/97	3.0			0.38	< 1	< 1
KB001638	11/19/97	3.0			0.35	6	< 1
KB001638	12/17/97	4.4			0.46	12	4
KB004207	2/21/96				0.03		
KB004207	3/20/96				0.02		

Table C-3 (Con't)
TOC, DOC, UV 254, Bromide, TSS, and SVS Concentrations in the SWP

STATION	DATE	TOTAL ORGANIC CARBON (mg/L)	DISS. ORGANIC CARBON (mg/L)	UV 254 (1/cm)	BROMIDE (mg/L)	SUSPENDED SOLIDS (mg/L)	SUSPENDED VOLATILE SOLIDS (mg/L)
KB004207	5/15/96				0.13		
KB004207	8/21/96				0.11		
KB004207	9/18/96				0.05		
KB004207	10/16/96				0.05		
KB004207	11/20/96				0.03		
KB004207	12/18/96				0.11		
KB004207	1/15/97				0.05		
KB004207	2/19/97				0.05		
KB004207	5/21/97				0.15		
KB004207	8/20/97				0.09		
KB004207	9/17/97				0.06		
KB004207	10/15/97				0.27		
KB004207	11/19/97				0.35		
KA000000	2/21/96				0.08		
KA000000	5/15/96				0.15		
KA000000	8/21/96				0.11		
KA000000	11/20/96				0.20		
KA000000	1/7/97	5.9			0.02		
KA000000	2/19/97				0.04		
KA000000	5/21/97				0.19		
KA000000	8/20/97				0.10		
KA000000	11/19/97				0.34		
KA000331	1/17/96	5.5			0.07	50	7
KA000331	2/21/96	5.2			0.11	5	< 1
KA000331	3/20/96	3.7			0.08	7	2
KA000331	4/17/96	3.8			0.13	2	< 1
KA000331	5/15/96	3.0			0.13	2	< 1
KA000331	6/19/96	2.9			0.07	17	3
KA000331	7/17/96	2.7			0.04	11	2
KA000331	8/21/96	2.7			0.11	8	2
KA000331	9/18/96	2.8			0.08	7	< 1
KA000331	10/16/96	2.7			0.13	4	< 1
KA000331	11/20/96	3.1			0.21	4	< 1
KA000331	12/18/96	6.7			0.14	8	1
KA000331	1/15/97	4.6			0.04	14	3
KA000331	2/19/97	3.6			0.05	4	2
KA000331	3/19/97	3.5			0.11	4	2
KA000331	4/16/97	3.5			0.09	6	1
KA000331	5/21/97	3.6			0.16	3	< 1
KA000331	6/18/97	3.3			0.10	26	3
KA000331	7/16/97	3.2			0.09	16	3
KA000331	8/20/97	3.1			0.10	2	< 1
KA000331	9/17/97	2.7			0.09	5	< 1
KA000331	10/15/97	2.8			0.39	3	< 1
KA000331	11/19/97	3.0			0.36	15	2
KA000331	12/17/97	4.4			0.44	8	2
KA006633	2/20/96	5.5					
KA006633	5/14/96	3.9					
KA006633	8/20/96	2.8					
KA006633	11/20/96	3.2					
KA006633	2/19/97	4.1					
KA006633	5/21/97	3.9					
KA006633	8/20/97	2.9					
KA006633	11/19/97	2.7					
KA007089	1/17/96	5.2			0.15		
KA007089	2/21/96	5.0			0.11		
KA007089	3/20/96	3.9			0.10		
KA007089	4/17/96	3.7			0.16		
KA007089	5/14/96	3.6			0.19		
KA007089	6/19/96	3.2			0.10		
KA007089	7/17/96	3.2			0.16		
KA007089	8/20/96	2.9			0.15		
KA007089	9/18/96	2.9			0.09		
KA007089	10/16/96	3.0			0.11		
KA007089	11/20/96	3.0			0.16		
KA007089	12/18/96	5.8			0.14		
KA007089	1/15/97	4.7			0.06		
KA007089	2/19/97	4.4			0.05		
KA007089	3/19/97	3.4			0.10		
KA007089	4/16/97	3.5			0.12		
KA007089	5/21/97	2.9			0.17		
KA007089	6/18/97	3.2			0.14		
KA007089	7/16/97	3.0			0.16		
KA007089	8/19/97	3.1			0.12		
KA007089	9/17/97	2.9			0.09		
KA007089	10/15/97	2.7			0.29		
KA007089	11/19/97	2.8			0.34		
KA007089	12/17/97	4.3			0.43		
KA014323	1/6/97	4.1				16	2
KA017226	1/17/96					10	1
KA017226	2/21/96	6.2			0.12	18	2
KA017226	3/20/96					12	3
KA017226	4/17/96					22	2
KA017226	5/14/96	3.6			0.21	23	4
KA017226	6/19/96					33	3
KA017226	7/17/96					21	3
KA017226	8/21/96	2.9			0.16	16	2
KA017226	9/18/96					18	2
KA017226	10/16/96					12	< 1
KA017226	11/20/96	3.1			0.14	2	1
KA017226	12/17/96					9	< 1

Table C-3 (Con't)
TOC, DOC, UV 254, Bromide, TSS, and SVS Concentrations in the SWP

STATION	DATE	TOTAL ORGANIC CARBON (mg/L)	DISS. ORGANIC CARBON (mg/L)	UV 254 (1/cm)	BROMIDE (mg/L)	SUSPENDED SOLIDS (mg/L)	SUSPENDED VOLATILE SOLIDS (mg/L)
KA017226	1/14/97					21	4
KA017226	2/19/97	4.4			0.06	3	< 1
KA017226	3/19/97					36	5
KA017226	4/16/97					16	2
KA017226	5/21/97	2.9			0.17	31	4
KA017226	6/18/97					27	4
KA017226	7/15/97					16	2
KA017226	8/20/97	3.3			0.15	11	2
KA017226	9/17/97					21	2
KA017226	10/15/97					17	1
KA017226	11/19/97	2.7			0.39	8	1
KA017226	12/17/97					10	2
KA020794	1/9/97					10	< 1
KA021031	1/13/97					6	2
KA021031	1/28/97					4	< 1
KA021031	2/11/97					5	3
KA024454	1/16/96					12	1
KA024454	2/20/96					127	8
KA024454	3/19/96					10	2
KA024454	4/16/96					261	16
KA024454	5/14/96					1030	85
KA024454	6/18/96					83	7
KA024454	7/16/96					234	13
KA024454	8/20/96					38	4
KA024454	9/17/96					155	11
KA024454	10/15/96					70	2
KA024454	11/19/96					58	6
KA024454	12/17/96					67	6
KA024454	1/14/97					29	4
KA024454	2/18/97					13	2
KA024454	3/18/97					29	4
KA024454	4/15/97					44	4
KA024454	5/20/97					35	4
KA024454	6/17/97					137	7
KA024454	7/15/97					35	4
KA024454	8/19/97					15	3
KA024454	9/16/97					22	2
KA024454	10/14/97					6	< 1
KA024454	11/18/97					8	< 1
KA024454	12/16/97					8	2
KA030341	1/17/96	3.1			0.18		
KA030341	1/17/96					13	4
KA030341	2/21/96	5.9			0.15		
KA030341	2/21/96					15	2
KA030341	3/20/96	4.8			0.12		
KA030341	3/20/96					10	3
KA030341	4/17/96	3.9					
KA030341	4/17/96					71	8
KA030341	5/15/96	4.0			0.20		
KA030341	5/15/96					74	9
KA030341	6/19/96					61	6
KA030341	6/19/96	3.4			0.16		
KA030341	7/17/96	8.1			0.14	33	4
KA030341	8/20/96					56	6
KA030341	8/21/96	3.2			0.16		
KA030341	9/18/96	3.3			0.11	73	6
KA030341	10/15/96	2.7			0.08	11	< 1
KA030341	11/20/96	2.8			0.13	9	1
KA030341	12/18/96	2.7			0.17	7	< 1
KA030341	1/13/97	3.5			0.19	6	< 1
KA030341	2/19/97	4.1			< 0.01	3	1
KA030341	3/19/97	3.6			0.08	66	10
KA030341	4/16/97	4.8			0.14	9	9
KA030341	5/21/97	3.3			0.17	39	5
KA030341	6/18/97	3.0			0.16	73	6
KA030341	7/16/97	3.2			0.12	46	5
KA030341	8/20/97	3.5			0.16	52	6
KA030341	9/17/97	2.8			0.10	66	6
KA030341	10/15/97	2.5		0.069	0.18	40	5
KA030341	11/19/97	2.5		0.072	0.38	16	2
KA030341	12/17/97	2.7			0.33	32	3
KA036890	3/13/97	4.0					
KA037394	3/13/97	4.5					
KA040341	2/21/96	5.0					
KA040341	5/15/96	4.0					
KA040341	8/21/96	3.3					
KA040341	11/20/96	4.0					
KA040341	2/19/97	3.6					
KA040341	3/13/97	5.1					
KA040341	5/21/97	3.6			0.16	100	6
KA040341	8/20/97	3.5					
KA040341	11/19/97	2.7		0.070			
KA041288	1/17/96	3.0			0.13		
KA041288	2/21/96	6.4			0.08		
KA041288	3/20/96	3.8			0.12		
KA041288	4/17/96	4.5			0.10		
KA041288	5/15/96	4.0			0.16	8	3
KA041288	6/19/96	3.4					
KA041288	7/17/96	3.7			0.15		
KA041288	8/21/96	0.0				7	2
KA041288	8/21/96	3.1			0.14		

Table C-3 (Con't)
TOC, DOC, UV 254, Bromide, TSS, and SVS Concentrations in the SWP

STATION	DATE	TOTAL ORGANIC CARBON (mg/L)	DISS. ORGANIC CARBON (mg/L)	UV 254 (1/cm)	BROMIDE (mg/L)	SUSPENDED SOLIDS (mg/L)	SUSPENDED VOLATILE SOLIDS (mg/L)
KA041288	9/18/96	2.7			0.13		
KA041288	10/16/96	2.7			0.11	2	< 1
KA041288	11/20/96	2.9			0.11	5	2
KA041288	12/18/96	3.0			0.13		
KA041288	1/13/97	4.2			0.10		
KA041288	2/19/97	1.8			< 0.01	3	< 1
KA041288	3/19/97	4.4			0.09		
KA041288	4/16/97	3.6			0.10		
KA041288	5/21/97	3.2			0.15	6	2
KA041288	6/18/97				0.16	4	2
KA041288	7/16/97	3.0			0.15		
KA041288	8/20/97	2.8			0.13		
KA041288	9/17/97	2.7			0.14	2	< 1
KA041288	10/15/97	2.5		0.068	0.19		
KA041288	11/19/97	2.5		0.067	0.20	2	< 1
KA041288	12/17/97	2.4		0.066	0.17		
KC000934	6/18/96					57	4
KC000934	7/16/96					49	5
KC000934	8/20/96					180	16
KC000934	9/17/96					32	3
KC000934	10/15/96					55	3
KC000934	11/14/96					20	3
KC000934	12/17/96					47	6
KC000934	1/14/97					3	2
KC000934	2/18/97					23	4
KC000934	3/18/97					107	14
KC000934	4/15/97					25	4
KC000934	5/20/97					41	4
KC000934	6/17/97					142	11
KC000934	7/15/97					60	5
KC000934	8/19/97					10	3
KC000934	9/16/97					4	1
KC000934	10/14/97					14	2
KC000934	11/18/97					7	2
KC000934	12/15/97					4	2
CA002000	2/20/96	3.4					
CA002000	5/10/96	5.7					
CA002000	8/19/96	4.9					
CA002000	11/19/96	4.3					
CA002000	2/18/97	2.9					
CA002000	5/19/97	5.8				6	4
CA002000	8/18/97	4.3				5	1
CA002000	11/17/97	2.8		0.175			
PY001000	5/21/97	0.0				2	< 1
DMC06716	1/17/96	4.0			0.29		
DMC06716	2/21/96	4.0			0.15		
DMC06716	3/20/96	3.6			0.08		
DMC06716	4/17/96	3.5			0.16		
DMC06716	5/14/96	3.4			0.16		
DMC06716	6/19/96	3.5			0.06		
DMC06716	8/20/96	3.0			0.22		
DMC06716	9/18/96	3.0			0.12		
DMC06716	10/16/96	3.0			0.12		
DMC06716	11/20/96	3.2			0.21		
DMC06716	12/18/96	5.2			0.05		
DMC06716	1/9/97	5.8			0.04	98	11
DMC06716	1/15/97	5.4			0.04		
DMC06716	2/19/97	4.3			0.06		
DMC06716	3/19/97	3.9			0.15		
DMC06716	4/16/97	4.0			0.10		
DMC06716	5/21/97	3.2			0.18		
DMC06716	6/18/97	3.2			0.11		
DMC06716	7/16/97	2.8			0.10		
DMC06716	8/20/97	3.1			0.14		
DMC06716	9/17/97	2.9			0.15		
DMC06716	10/15/97	3.0			0.20		
DMC06716	11/19/97	4.4			0.37		
DMC06716	12/17/97	4.2			0.42		
DMC06803	7/17/96	3.2			0.12		

Table C-4
Nutrient Concentrations in the SWP

STATION	DATE	ORGANIC NITROGEN (mg/L)	NITRATE+ NITRITE (mg/L as N)	DISSOLVED AMMONIA (mg/L as N)	ORTHO-PHOSPHATE (mg/L as P)	TOTAL PHOSPHORUS (mg/L)
AN001000	5/22/96	0.3	< 0.01	< 0.01	< 0.01	0.02
AN001000	5/22/97	0.3	< 0.01	< 0.01	< 0.01	0.03
FR001000	5/22/96	0.2	< 0.01	< 0.01	< 0.01	< 0.01
FR001000	5/22/97	0.2	< 0.01	< 0.01	< 0.01	0.01
LD001000	5/23/96	0.3	< 0.01	< 0.01	< 0.01	0.02
LD001000	5/27/97	0.3	< 0.01	< 0.01	< 0.01	0.01
OR001000	4/17/96	0.2	< 0.01	< 0.01	< 0.01	0.12
OR001000	5/15/96	< 0.1	< 0.01	< 0.01	< 0.01	< 0.01
OR001000	6/19/96	0.2	< 0.01	< 0.01	< 0.01	< 0.01
OR001000	7/17/96	< 0.1	0.04	< 0.01	< 0.01	< 0.01
OR001000	8/20/96	< 0.1	< 0.01	< 0.01	< 0.01	< 0.01
OR001000	9/18/96	0.2	< 0.01	< 0.01	< 0.01	< 0.01
OR001000	10/16/96	< 0.1	0.02	< 0.01	< 0.01	0.06
OR001000	11/20/96	0.3	0.03	< 0.01	< 0.01	0.04
OR001000	4/16/97	0.2	< 0.01	< 0.01	< 0.01	0.02
OR001000	5/21/97	0.1	0.02	< 0.01	< 0.01	0.01
OR001000	6/18/97	0.1	< 0.01	< 0.01	< 0.01	< 0.01
OR001000	7/16/97	0.2	< 0.01	< 0.01	< 0.01	< 0.01
OR001000	8/20/97	0.2	< 0.01	< 0.01	< 0.01	0.01
OR001000	9/17/97	0.2	< 0.01	< 0.01	< 0.01	< 0.01
OR001000	10/15/97	0.1	< 0.01	0.01	< 0.01	0.01
OR001000	11/19/97	0.1	< 0.01	0.02	< 0.01	0.01
TA001000	1/17/96	< 0.1	< 0.01	< 0.01	< 0.01	< 0.01
TA001000	4/17/96	< 0.1	< 0.01	< 0.01	< 0.01	0.01
TA001000	4/20/96	< 0.1	0.02	< 0.01	< 0.01	0.02
TA001000	5/15/96	0.1	< 0.01	< 0.01	< 0.01	0.01
TA001000	6/19/96	0.1	< 0.01	< 0.01	< 0.01	0.01
TA001000	7/17/96	0.1	< 0.01	< 0.01	< 0.01	< 0.01
TA001000	8/20/96	0.1	< 0.01	< 0.01	< 0.01	< 0.01
TA001000	9/18/96	< 0.1	< 0.01	< 0.01	< 0.01	< 0.01
TA001000	10/16/96	< 0.1	0.02	< 0.01	< 0.01	0.06
TA001000	11/20/96	0.2	0.03	< 0.01	0.01	0.01
TA001000	12/18/96	0.1	0.07	< 0.01	< 0.01	< 0.01
TA001000	1/15/97	0.3	0.04	< 0.01	< 0.01	0.18
TA001000	2/19/97	0.2	0.03	< 0.01	< 0.01	0.09
TA001000	3/19/97	0.2	< 0.01	0.01	< 0.01	0.06
TA001000	4/16/97	0.2	< 0.01	< 0.01	< 0.01	0.04
TA001000	5/21/97	0.2	< 0.01	< 0.01	< 0.01	0.02
TA001000	6/18/97	0.2	< 0.01	< 0.01	< 0.01	0.02
TA001000	7/16/97	0.2	< 0.01	< 0.01	< 0.01	0.02
TA001000	8/20/97	0.2	0.01	< 0.01	< 0.01	0.02
TA001000	9/17/97	0.2	< 0.01	< 0.01	0.01	0.01
TA001000	10/15/97	0.1	< 0.01	0.01	< 0.01	0.02
TA001000	11/17/97	0.1	0.02	< 0.01	< 0.01	0.02
TA001000	12/17/97	0.2	< 0.01	< 0.01	< 0.01	0.02
KG000000	1/17/96	2.0	3.50	0.05	0.10	0.43
KG000000	2/21/96	2.0	1.30	0.08	0.08	0.32
KG000000	3/20/96	1.1	0.13	0.04	0.11	0.29
KG000000	4/17/96	0.7	0.36	0.03	0.07	0.15
KG000000	5/15/96	0.5	0.40	0.03	0.09	0.16
KG000000	6/19/96	0.5	0.40	0.02	0.10	0.18
KG000000	7/17/96	0.6	0.36	0.02	0.10	0.18
KG000000	8/21/96	0.6	0.23	0.01	0.10	0.19
KG000000	9/18/96	0.6	0.22	0.02	0.12	0.20
KG000000	10/16/96	0.4	0.15	0.02	0.08	0.17
KG000000	11/20/96	0.6	0.23	0.03	0.05	0.14
KG000000	12/18/96	1.0	0.52	0.05	0.10	0.20
KG000000	1/15/97	1.3	0.15	0.05	0.12	0.30
KG000000	2/19/97	1.1	0.11	0.07	0.15	0.35
KG000000	3/19/97	0.8	0.37	0.04	0.08	0.21
KG000000	4/16/97	0.7	0.34	0.03	0.09	0.17
KG000000	5/21/97	0.6	0.53	0.03	0.12	0.20
KG000000	6/18/97	0.6	0.61	0.02	0.11	0.21
KG000000	7/16/97	0.6	0.30	0.03	0.11	0.21
KG000000	8/20/97	0.6	0.15	< 0.01	0.10	0.21
KG000000	9/17/97	0.7	0.18	0.04	0.10	0.18
KG000000	10/15/97	0.4	0.26	0.02	0.11	0.15
KG000000	11/19/97	0.8	0.58	0.05	0.01	0.18
KG000000	12/17/97	1.0	0.30	0.04	0.10	0.28
DV000000	10/16/96	0.2	0.05	< 0.01	< 0.01	0.07
DV000000	2/19/97	0.3	0.38	< 0.01	0.02	0.06
DV000000	6/18/97	0.3	0.13	< 0.01	< 0.01	0.02
DV000000	9/17/97	0.3	< 0.01	< 0.01	< 0.01	< 0.01
DV000000	10/15/97	0.3	0.01	< 0.01	0.01	0.02
DV001000	7/24/96	0.3	< 0.01	< 0.01	< 0.01	0.01
DV001000	9/3/96	0.3	< 0.01	< 0.01	< 0.01	< 0.01
DV001000	9/18/96	0.3	0.01	< 0.01	< 0.01	0.01
DV001000	10/22/96	0.3	0.02	0.01	< 0.01	0.01
DV001000	11/12/96	0.4	0.02	0.03	< 0.01	< 0.01
DV001000	11/20/96	0.3	0.06	< 0.01	< 0.01	0.02
DV001000	12/18/96	0.4	0.39	< 0.01	< 0.01	0.04
DV001000	1/15/97	0.4	0.47	< 0.01	0.01	0.06
DV001000	*3/18/97*	*0.6*	*< 0.01*	*0.01*	*< 0.01*	*0.04*
DV001000	4/22/97	0.6	< 0.01	0.01	< 0.01	0.02
DV001000	5/13/97	0.5	< 0.01	0.02	< 0.01	0.02
DV001000	6/17/97	0.4	< 0.01	< 0.01	< 0.01	0.02
DV001000	8/29/97	0.4	< 0.01	< 0.01	< 0.01	< 0.01
DV001000	9/16/97	0.3	< 0.01	< 0.01	< 0.01	< 0.01
DV001000	11/24/97	0.4	0.01	0.03	< 0.01	< 0.01

Table C-4 (Con't)
Nutrient Concentrations in the SWP

STATION	DATE	ORGANIC NITROGEN (mg/L)	NITRATE+ NITRITE (mg/L as N)	DISSOLVED AMMONIA (mg/L as N)	ORTHO-PHOSPHATE (mg/L as P)	TOTAL PHOSPHORUS (mg/L)
DV001000	12/11/97	0.4	0.08	0.02	0.01	0.03
KB001638	4/16/97	0.4	0.71	0.01	0.06	0.10
KB001638	5/21/97	0.8	0.61	0.02	0.05	0.14
KB001638	6/18/97	0.5	0.60	0.05	0.12	0.17
KB001638	7/16/97	0.4	0.20	0.01	0.06	0.11
KB001638	8/20/97	0.4	0.09	< 0.01	0.07	0.12
KB001638	9/17/97	0.5	0.06	< 0.01	0.05	0.10
KB001638	10/15/97	0.3	0.26	0.01	0.04	0.05
KB001638	11/19/97	0.4	0.60	0.01	0.04	0.10
KB001638	12/17/97	0.5	0.89	0.04	0.06	0.11
KA000331	1/17/96	0.9	0.81	0.08	0.04	0.20
KA000331	2/21/96	0.5	1.20	0.04	0.10	0.14
KA000331	3/20/96	0.2	0.50	0.03	0.06	0.07
KA000331	4/17/96	0.3	0.48	0.04	0.06	0.08
KA000331	5/15/96	0.3	0.76	0.04	0.10	0.12
KA000331	6/19/96	0.4	0.46	0.02	0.06	0.12
KA000331	7/17/96	0.3	0.21	0.02	0.06	0.10
KA000331	8/21/96	0.5	0.19	0.03	0.06	0.09
KA000331	9/18/96	0.3	0.31	0.02	0.05	0.08
KA000331	10/16/96	0.2	0.43	0.04	0.07	0.11
KA000331	11/20/96	0.5	0.56	0.11	0.02	0.09
KA000331	12/18/96	0.6	0.67	0.14	0.12	0.17
KA000331	1/15/97	0.6	0.72	0.11	0.09	0.14
KA000331	2/19/97	0.3	0.52	0.04	0.08	0.10
KA000331	3/19/97	0.4	0.76	0.13	0.07	0.10
KA000331	4/16/97	0.3	0.75	0.07	0.06	0.09
KA000331	5/21/97	0.8	0.73	0.25	0.10	0.13
KA000331	6/18/97	0.5	0.82	0.04	0.08	0.15
KA000331	7/16/97	0.4	0.28	0.04	0.08	0.12
KA000331	8/20/97	0.4	0.09	0.03	0.07	0.11
KA000331	9/17/97	0.0	0.28	0.02	0.07	0.10
KA000331	10/15/97	0.3	0.38	0.04	0.06	0.09
KA000331	11/19/97	0.4	0.50	0.08	0.04	0.10
KA000331	12/17/97	0.5	0.88	0.14	0.06	0.12
KA030341	1/17/96	0.7	1.03	< 0.01	0.07	0.12
KA030341	2/21/96	0.8	1.58	0.03	0.15	0.19
KA030341	3/20/96	0.5	1.06	< 0.01	0.09	0.13
KA030341	4/17/96	0.6	0.64	< 0.01	0.08	0.10
KA030341	5/15/96	0.9	0.39	< 0.01	0.10	0.18
KA030341	6/19/96	0.4	0.76	< 0.01	0.10	0.17
KA030341	7/17/96	0.7	0.58	< 0.01	0.23	0.31
KA030341	8/21/96	0.4	0.53	0.01	0.08	0.14
KA030341	9/18/96	0.4	0.37	< 0.01	0.07	0.16
KA030341	10/16/96	0.2	0.20	< 0.01	0.06	0.10
KA030341	11/20/96	0.3	0.42	< 0.01	0.05	0.07
KA030341	12/18/96	0.2	0.62	0.01	0.06	0.08
KA030341	1/13/97	0.3	0.92	0.02	0.08	0.08
KA030341	2/19/97	0.3	0.28	0.01	0.03	0.05
KA030341	3/19/97	0.4	0.43	0.02	0.05	0.14
KA030341	4/16/97	0.5	1.00	0.01	0.06	0.20
KA030341	5/21/97	0.5	0.66	0.01	0.09	0.15
KA030341	6/18/97	0.4	0.89	0.01	0.10	0.17
KA030341	7/16/97	0.4	0.45	0.01	0.09	0.15
KA030341	8/20/97	0.6	0.14	< 0.01	0.05	0.14
KA030341	9/17/97	0.4	0.44	0.02	0.09	0.14
KA030341	10/15/97	0.4	0.24	0.02	0.09	0.11
KA030341	11/19/97	0.3	0.70	0.01	0.06	0.11
KA030341	12/17/97	0.4	0.75	< 0.01	0.06	0.13
KA040341	1/17/96	0.7	0.18	< 0.01	< 0.01	0.04
KA040341	2/21/96	0.6	0.88	0.02	0.05	0.07
KA040341	3/20/96	0.9	0.69	0.04	0.04	0.04
KA040341	4/17/96	0.6	0.63	0.03	0.09	0.09
KA040341	6/19/96	0.5	0.75	0.02	0.10	0.17
KA040341	7/17/96	0.6	0.60	< 0.01	0.09	0.14
KA040341	8/21/96	0.4	0.44	< 0.01	0.08	0.12
KA040341	9/18/96	0.4	0.34	< 0.01	0.08	0.14
KA040341	10/16/96	0.5	0.18	0.02	0.06	0.10
KA040341	11/20/96	0.4	0.30	< 0.01	0.03	0.08
KA040341	12/18/96	0.5	0.07	0.04	0.03	0.08
KA040341	1/13/97	0.4	0.08	0.03	0.02	0.04
KA040341	2/19/97	0.6	0.19	0.10	0.01	0.05
KA040341	3/19/97	0.5	0.65	0.02	0.07	0.15
KA040341	4/16/97	0.7	1.00	0.02	0.10	0.19
KA040341	5/21/97	0.5	0.65	< 0.01	0.09	0.17
KA040341	6/18/97	0.4	0.64	0.01	0.09	0.14
KA040341	7/16/97	0.3	0.56	0.02	0.09	0.10
KA040341	8/20/97	0.4	0.25	< 0.01	0.07	0.13
KA040341	9/17/97	0.5	0.44	0.02	0.09	0.15
KA040341	10/15/97	0.3	0.22	< 0.01	0.07	0.09
KA040341	11/19/97	0.3	0.44	< 0.01	0.05	0.09
KA040341	12/16/97	0.3	0.68	< 0.01	0.06	0.09
KA041288	1/17/96	0.4	0.63	0.01	0.06	0.08
KA041288	2/21/96	1.2	0.90	0.25	0.02	0.27
KA041288	3/20/96	0.3	0.69	0.04	0.04	0.06
KA041288	4/17/96	0.8	0.65	0.04	0.06	0.11
KA041288	5/15/96	1.3	0.24	0.03	0.04	0.09
KA041288	6/19/96	0.4	0.64	0.03	0.09	0.12
KA041288	7/17/96	0.3	0.61	0.03	0.09	0.11
KA041288	8/21/96	0.4	0.54	0.02	0.09	0.10

Table C-4 (Con't)
Nutrient Concentrations in the SWP

STATION	DATE	ORGANIC NITROGEN (mg/L)	NITRATE+ NITRITE (mg/L as N)	DISSOLVED AMMONIA (mg/L as N)	ORTHO-PHOSPHATE (mg/L as P)	TOTAL PHOSPHORUS (mg/L)
KA041288	9/15/96	0.2	0.43	0.01	0.08	0.11
KA041288	10/16/96	0.3	0.26	0.02	0.09	0.10
KA041288	11/20/96	0.2	0.45	0.01	0.05	0.08
KA041288	12/18/96	0.4	0.49	0.07	0.04	0.08
KA041288	1/13/97	0.5	0.64	0.20	< 0.01	0.06
KA041288	2/19/97	0.1	0.20	< 0.01	< 0.01	0.02
KA041288	3/19/97	0.6	0.32	0.02	< 0.01	0.05
KA041288	4/16/97	0.4	0.72	0.02	0.05	0.10
KA041288	5/21/97	0.5	0.58	0.09	0.08	0.11
KA041288	6/18/97	0.4	0.56	0.02	0.07	0.11
KA041288	7/16/97	0.4	0.56	0.02	0.09	0.11
KA041288	8/20/97	0.4	0.36	< 0.01	0.08	0.11
KA041288	9/17/97	0.3	0.25	0.02	0.08	0.10
KA041288	9/17/97	0.3	0.24	0.02	0.08	0.09
KA041288	10/15/97	0.3	0.37	< 0.01	0.10	0.11
KA041288	11/19/97	0.3	0.38	< 0.01	0.08	0.11
KA041288	12/17/97	0.3	0.43	< 0.01	0.07	0.09
SL001000	1/16/96	0.4	1.20	< 0.01	0.10	0.14
SL001000	2/20/96	0.6	0.69	0.04	0.08	0.13
SL001000	3/20/96	0.9	0.56	< 0.01	0.07	0.15
SL001000	4/16/96	0.4	0.84	< 0.01	0.08	0.12
SL001000	4/16/96	0.4	0.84	< 0.01	0.08	0.12
SL001000	5/14/96	0.7	0.84	< 0.01	0.08	0.12
SL001000	6/18/96	0.5	0.82	0.03	0.08	0.10
SL001000	7/16/96	0.5	0.58	0.02	0.07	0.10
SL001000	8/19/96	0.3	0.70	< 0.01	0.08	0.12
SL001000	9/17/96	0.3	0.58	0.02	0.07	0.10
SL001000	10/15/96	0.3	0.50	0.02	0.08	0.12
SL001000	11/19/96	0.4	0.77	< 0.01	0.06	0.10
SL001000	12/17/96	0.3	0.56	< 0.01	0.09	0.11
SL001000	1/14/97	0.3	0.76	< 0.01	0.09	0.11
SL001000	2/18/97	0.3	0.93	< 0.01	0.08	0.10
SL001000	3/18/97	0.5	0.48	< 0.01	0.06	0.11
SL001000	4/14/97	0.4	0.64	0.07	0.08	0.11
SL001000	5/20/97	0.5	0.50	0.06	0.07	0.11
SL001000	6/17/97	0.4	0.52	< 0.01	0.07	0.09
SL001000	7/14/97	0.6	0.33	< 0.01	0.05	0.12
SL001000	8/19/97	0.6	0.23	< 0.01	0.06	0.11
SL001000	9/16/97	0.4	0.20	0.02	0.08	0.11
SL001000	10/14/97	0.3	0.35	< 0.01	0.13	0.14
SL001000	11/18/97	0.3	1.39	0.04	0.12	0.16
SL001000	12/16/97	0.2	0.69	< 0.01	0.10	0.11
SL005000	1/16/96	0.2	0.85	0.01	0.10	0.12
SL005000	2/20/96	0.3	0.90	< 0.01	0.11	0.12
SL005000	3/18/96	0.8	0.60	< 0.01	0.08	0.16
SL005000	4/16/96	0.3	0.84	< 0.01	0.09	0.11
SL005000	5/14/96	0.4	0.78	< 0.01	0.09	0.11
SL005000	6/18/96	0.4	0.80	0.01	0.08	0.10
SL005000	7/16/96	0.4	0.72	0.02	0.09	0.11
SL005000	8/19/96	0.4	0.66	< 0.01	0.08	0.11
SL005000	9/17/96	0.4	0.55	0.02	0.06	0.11
SL005000	10/15/96	0.3	0.46	0.01	0.08	0.12
SL005000	11/19/96	0.3	0.51	< 0.01	0.05	0.12
SL005000	12/17/96	0.2	0.49	< 0.01	0.09	0.10
SL005000	1/14/97	0.3	0.77	< 0.01	0.08	0.11
SL005000	2/18/97	0.3	1.20	0.02	0.09	0.10
SL005000	3/18/97	0.4	0.80	0.01	0.07	0.10
SL005000	4/14/97	0.4	0.65	0.07	0.08	0.11
SL005000	5/20/97	0.4	0.51	0.06	0.08	0.10
SL005000	6/17/97	0.3	0.52	0.02	0.07	0.09
SL005000	7/14/97	0.4	0.40	0.03	0.07	0.11
SL005000	8/19/97	0.6	0.23	0.04	0.08	0.11
SL005000	9/16/97	0.6	0.05	< 0.01	0.07	0.13
SL005000	10/14/97	0.4	0.30	< 0.01	0.13	0.14
SL005000	11/18/97	0.8	0.40	< 0.01	0.11	0.18
SL005000	12/17/97	0.3	0.62	< 0.01	0.09	0.13
CA002000	1/16/96	0.4	0.29	< 0.01	0.03	0.04
CA002000	2/20/96	0.3	0.28	< 0.01	0.01	0.05
CA002000	3/18/96	0.4	0.10	< 0.01	0.02	0.05
CA002000	4/15/96	0.6	0.10	0.01	< 0.01	0.03
CA002000	5/13/96	0.5	< 0.01	< 0.01	< 0.01	0.04
CA002000	6/17/96	0.5	0.02	0.03	< 0.01	0.02
CA002000	7/15/96	0.4	< 0.01	< 0.01	< 0.01	0.02
CA002000	9/16/96	0.4	0.02	< 0.01	< 0.01	0.02
CA002000	10/15/96	0.4	0.07	< 0.01	< 0.01	0.07
CA002000	11/19/96	0.4	0.30	< 0.01	0.02	0.02
CA002000	12/16/96	0.2	0.38	< 0.01	0.03	0.04
CA002000	1/13/97	0.3	0.41	< 0.01	0.04	0.04
CA002000	2/18/97	0.3	0.42	< 0.01	0.04	0.06
CA002000	3/17/97	0.3	0.21	< 0.01	0.01	0.03
CA002000	4/14/97	0.5	0.07	< 0.01	< 0.01	0.04
CA002000	5/19/97	0.6	< 0.01	< 0.01	< 0.01	0.04
CA002000	6/16/97	0.4	0.02	0.02	< 0.01	0.02
CA002000	7/14/97	0.8	< 0.01	< 0.01	< 0.01	0.02
CA002000	8/18/97	0.4	< 0.01	< 0.01	< 0.01	0.02
CA002000	9/15/97	0.5	< 0.01	< 0.01	< 0.01	0.03
CA002000	10/14/97	0.5	0.07	0.03	< 0.01	0.02
CA002000	11/17/97	0.2	0.24	0.01	0.02	0.03
CA002000	12/15/97	0.2	0.34	< 0.01	0.03	0.05

Table C-4 (Con't)
Nutrient Concentrations in the SWP

STATION	DATE	ORGANIC NITROGEN (mg/L)	NITRATE+ NITRITE (mg/L as N)	DISSOLVED AMMONIA (mg/L as N)	ORTHO- PHOSPHATE (mg/L as P)	TOTAL PHOSPHORUS (mg/L)
PE002000	1/16/96	0.5	< 0.01	0.02	0.03	0.06
PE002000	2/20/96	0.3	< 0.01	0.02	0.02	0.04
PE002000	3/19/96	0.8	< 0.01	< 0.01	< 0.01	0.08
PE002000	4/16/96	0.5	< 0.01	< 0.01	< 0.01	0.02
PE002000	5/13/96	0.5	< 0.01	< 0.01	< 0.01	0.02
PE002000	6/17/96	0.4	< 0.01	< 0.01	< 0.01	0.02
PE002000	7/18/96	0.5	< 0.01	< 0.01	< 0.01	0.03
PE002000	8/21/96	0.5	< 0.01	< 0.01	< 0.01	< 0.01
PE002000	9/16/96	1.2	< 0.01	< 0.01	< 0.01	0.03
PE002000	10/15/96	0.6	0.02	< 0.01	< 0.01	0.08
PE002000	11/18/96	0.6	0.03	0.04	0.01	0.07
PE002000	12/16/96	0.4	0.03	0.06	0.04	0.06
PE002000	1/14/97	0.6	0.03	0.04	0.03	0.06
PE002000	2/18/97	0.4	0.12	0.02	0.05	0.07
PE002000	3/18/97	0.5	0.02	0.01	0.01	0.03
PE002000	4/15/97	0.4	0.04	0.02	0.02	0.04
PE002000	5/20/97	0.4	< 0.01	< 0.01	< 0.01	0.02
PE002000	6/16/97	0.4	0.07	< 0.01	< 0.01	0.02
PE002000	7/14/97	0.5	0.02	0.02	< 0.01	< 0.01
PE002000	8/18/97	0.4	0.01	< 0.01	< 0.01	0.01
PE002000	9/15/97	0.5	< 0.01	0.02	< 0.01	0.02
PE002000	10/14/97	0.4	0.02	0.01	0.03	0.05
PE002000	11/17/97	0.4	0.11	0.03	0.05	0.08
PE002000	12/15/97	0.3	0.20	< 0.01	0.05	0.07
PY001000	1/16/96	0.3	0.49	< 0.01	0.05	0.06
PY001000	2/20/96	0.2	0.56	< 0.01	0.05	0.05
PY001000	3/19/96	0.6	0.71	< 0.01	0.05	0.11
PY001000	4/15/96	0.7	0.66	0.06	0.07	0.09
PY001000	5/14/96	2.1	0.30	0.03	0.06	0.07
PY001000	6/18/96	0.5	0.68	< 0.01	0.05	0.08
PY001000	7/16/96	0.5	0.53	0.03	0.05	0.07
PY001000	9/17/96	0.3	0.35	0.02	0.06	0.27
PY001000	10/15/96	0.2	0.29	0.02	0.05	0.08
PY001000	11/18/96	0.2	0.40	< 0.01	0.05	0.05
PY001000	12/16/96	0.2	0.46	< 0.01	0.06	0.07
PY001000	1/13/97	0.2	0.51	< 0.01	0.06	0.07
PY001000	2/18/97	< 0.1	0.54	< 0.01	0.06	< 0.01
PY001000	3/18/97	0.6	0.32	< 0.01	0.03	0.08
PY001000	4/15/97	0.4	0.55	< 0.01	0.04	0.08
PY001000	5/19/97	0.4	0.58	0.02	0.06	0.09
PY001000	6/16/97	0.3	0.54	0.03	0.06	0.08
PY001000	7/15/97	0.4	0.46	0.02	0.05	0.06
PY001000	8/19/97	0.3	0.43	< 0.01	0.04	0.06
PY001000	9/16/97	0.3	0.40	0.01	0.04	0.05
PY001000	10/15/97	0.3	0.41	< 0.01	0.06	0.06
PY001000	11/18/97	0.4	0.44	< 0.01	0.06	0.08
PY001000	12/16/97	0.2	0.52	< 0.01	0.06	0.08
SI002000	1/16/96	0.3	0.64	< 0.01	0.06	0.08
SI002000	2/20/96	0.8	0.51	0.06	0.04	0.06
SI002000	3/18/96	0.6	0.58	0.02	0.02	0.06
SI002000	4/15/96	0.8	0.60	< 0.01	0.05	0.08
SI002000	5/14/96	0.3	0.25	0.02	0.04	0.07
SI002000	6/19/96	0.6	0.70	0.03	0.09	0.11
SI002000	7/16/96	0.4	0.58	0.02	0.09	0.10
SI002000	8/21/96	0.9	0.52	< 0.01	0.09	0.10
SI002000	9/17/96	0.3	0.42	< 0.01	0.08	0.10
SI002000	10/16/96	0.2	0.39	0.01	0.07	0.10
SI002000	11/19/96	0.2	0.42	0.01	0.05	0.08
SI002000	12/16/96	0.4	0.47	0.08	0.04	0.08
SI002000	1/14/97	0.8	0.72	0.23	< 0.01	0.09
SI002000	2/19/97	0.6	0.77	0.24	< 0.01	0.07
SI002000	2/20/97	0.6	0.77	0.23	< 0.01	0.07
SI002000	3/19/97	0.4	0.57	0.14	< 0.01	0.02
SI002000	4/14/97	0.4	0.66	< 0.01	0.04	0.09
SI002000	5/19/97	0.4	0.57	0.08	0.08	0.11
SI002000	6/16/97	0.5	0.41	0.02	0.06	0.10
SI002000	7/14/97	0.6	0.62	0.01	0.11	0.15
SI002000	8/19/97	0.4	0.38	< 0.01	0.08	0.11
SI002000	9/16/97	0.4	0.23	0.04	0.08	0.08
SI002000	10/14/97	0.3	0.39	< 0.01	0.08	0.11
SI002000	11/18/97	0.3	0.38	0.01	0.08	0.12
SI002000	12/15/97	0.2	0.43	< 0.01	0.08	0.10

Table C-5
Total Trihalomethane Formation Potential Concentrations in the SWP

STATION	DATE	CHLOROFORM (CONCENTRATION, ug/L)	DIBROMO-CHLOROFORM	BROMODI-CHLOROFORM	BROMOFORM	TOTAL TRIHALOMETHANE FORMATION POTENTIAL
KG000000	1/17/96	1300	< 10	30	< 10	1350
KG000000	2/21/96	1700	< 10	32	< 10	1752
KG000000	3/20/96	1600	< 10	40	< 10	1660
KG000000	4/17/96	880	< 10	51	< 10	951
KG000000	5/15/96	440	< 10	38	< 10	498
KG000000	6/19/96	440	< 10	40	< 10	500
KG000000	7/17/96	500	< 10	39	< 10	559
KG000000	8/21/96	440	< 10	27	< 10	487
KG000000	9/18/96	450	< 10	28	10	498
KG000000	10/16/96	410	< 10	38	< 10	468
KG000000	11/20/96	490	< 10	39	< 10	549
KG000000	12/18/96	820	< 10	45	< 10	885
KG000000	1/15/97	1400	< 10	28	< 10	1448
KG000000	2/19/97	1100	< 10	59	< 10	1179
KG000000	3/19/97	800	< 10	55	< 10	875
KG000000	4/16/97	640	< 10	68	< 10	728
KG000000	5/21/97	480	< 10	47	< 10	547
KG000000	6/18/97	500	< 10	54	< 10	574
KG000000	7/16/97	820	< 10	46	< 10	886
KG000000	8/20/97	610	< 10	32	< 10	662
KG000000	9/17/97	600	< 10	32	< 10	652
KG000000	10/15/97	560	< 10	38	< 10	618
KG000000	11/19/97	750	< 10	40	< 10	810
KG000000	12/17/97	950	< 10	48	< 10	1018
KB001638	4/16/97	380	< 10	78	< 10	478
KB001638	5/21/97	440	18	100	< 10	568
KB001638	6/18/97	520	12	100	< 10	642
KB001638	7/16/97	320	< 10	74	< 10	414
KB001638	8/20/97	320	< 10	73	< 10	413
KB001638	9/17/97	290	< 10	61	< 10	371
KB001638	10/15/97	210	45	110	< 10	375
KB001638	11/19/97	240	75	140	< 10	465
KB001638	12/17/97	320	88	170	< 10	588
KA000331	1/17/96	700	< 10	55	< 10	775
KA000331	2/21/96	440	< 10	70	< 10	530
KA000331	3/20/96	380	< 10	52	< 10	452
KA000331	4/17/96	410	< 10	56	< 10	486
KA000331	5/15/96	240	13	60	< 10	323
KA000331	6/19/96	320	< 10	45	< 10	385
KA000331	7/17/96	300	< 10	35	< 10	355
KA000331	8/21/96	270	13	57	< 10	350
KA000331	9/18/96	240	11	47	< 10	308
KA000331	10/16/96	230	23	73	< 10	336
KA000331	11/20/96	200	40	100	< 10	350
KA000331	12/18/96	410	< 10	78	< 10	508
KA000331	1/15/97	500	< 10	38	< 10	558
KA000331	2/19/97	490	< 10	44	< 10	554
KA000331	3/19/97	520	< 10	88	< 10	628
KA000331	4/16/97	410	< 10	78	< 10	508
KA000331	5/21/97	360	18	98	< 10	486
KA000331	6/18/97	380	< 10	82	< 10	482
KA000331	7/16/97	310	< 10	82	< 10	412
KA000331	8/20/97	300	< 10	72	< 10	392
KA000331	9/17/97	290	< 10	54	< 10	364
KA000331	10/15/97	210	56	120	< 10	396
KA000331	11/19/97	250	76	150	< 10	486
KA000331	12/17/97	300	88	160	< 10	558
KA006633	2/21/96	560	< 10	78	< 10	658
KA006633	5/14/96	310	11	66	< 10	397
KA006633	8/20/96	260	11	54	< 10	335
KA006633	11/20/96	190	32	86	< 10	318
KA006633	2/19/97	440	< 10	40	< 10	500
KA006633	5/21/97	330	17	92	< 10	449
KA006633	8/20/97	290	< 10	68	< 10	378
KA006633	11/19/97	210	69	130	< 10	419
KA007089	1/17/96	560	13	95	< 10	678
KA007089	2/21/96	490	< 10	75	< 10	585
KA007089	3/20/96	420	< 10	62	< 10	502
KA007089	4/17/96	370	12	76	< 10	468
KA007089	5/14/96	290	22	83	< 10	405
KA007089	6/19/96	320	14	66	< 10	410
KA007089	7/17/96	320	30	91	< 10	451
KA007089	8/20/96	260	24	77	< 10	371
KA007089	9/18/96	250	12	54	< 10	326
KA007089	10/16/96	220	20	65	< 10	315
KA007089	11/20/96	180	29	80	< 10	299
KA007089	12/18/96	330	< 10	73	< 10	423
KA007089	1/15/97	500	< 10	49	< 10	569
KA007089	2/19/97	470	< 10	48	< 10	538
KA007089	3/19/97	470	< 10	78	< 10	568
KA007089	4/16/97	400	17	92	< 10	519
KA007089	5/21/97	270	30	96	< 10	406
KA007089	6/18/97	340	25	100	< 10	475
KA007089	7/16/97	340	31	110	< 10	491
KA007089	8/19/97	360	16	96	< 10	482
KA007089	9/17/97	410	< 10	83	< 10	513
KA007089	10/15/97	230	42	110	< 10	392

Table C-5 (Con't)
Total Trihalomethane Formation Potential Concentrations in the SWP

STATION	DATE	CHLOROFORM	DIBROMO-CHLOROFORM	BROMODI-CHLOROFORM	BROMOFORM	TOTAL TRIHALOMETHANE FORMATION POTENTIAL
		CONCENTRATION, ug/L				
KA007089	11/19/97	240	85	130	< 10	445
KA007089	12/17/97	290	85	160	< 10	545
KA017226	2/21/96	620	< 10	78	< 10	718
KA017226	5/14/96	290	27	89	< 10	416
KA017226	8/21/96	270	26	79	< 10	385
KA017226	11/20/96	180	21	69	< 10	280
KA017226	2/19/97	490	< 10	52	< 10	562
KA017226	5/21/97	290	27	99	< 10	426
KA017226	8/20/97	270	28	96	< 10	404
KA017226	11/19/97	220	97	170	< 10	497
KA020794	1/9/97	440	< 10	70	< 10	530
KA021031	1/13/97	440	< 10	66	< 10	526
KA021031	1/28/97	380	< 10	66	< 10	466
KA021031	2/11/97	430	< 10	71	< 10	521
KA024454	9/17/96	230	14	56	< 10	310
KA024454	10/15/96	220	12	51	< 10	293
KA024454	11/19/96	180	20	73	< 10	283
KA024454	12/17/96	180	37	89	< 10	316
KA024454	1/14/97	510	< 10	< 10	< 10	540
KA024454	2/18/97	480	< 10	< 10	< 10	510
KA024454	3/18/97	360	< 10	54	< 10	434
KA024454	4/15/97	360	16	86	< 10	472
KA024454	5/20/97	270	26	94	< 10	400
KA024454	6/17/97	310	31	110	< 10	461
KA024454	7/15/97	270	26	93	< 10	399
KA024454	8/19/97	260	30	98	< 10	398
KA024454	9/16/97	250	< 10	60	< 10	330
KA024454	10/14/97	240	< 10	64	< 10	324
KA024454	11/18/97	190	70	130	< 10	400
KA024454	12/16/97	200	57	110	< 10	377
KA030341	1/17/96	290	32	96	< 10	428
KA030341	2/20/96	600	11	97	< 10	718
KA030341	3/20/96	470	< 10	68	< 10	558
KA030341	4/17/96	370	10	70	< 10	460
KA030341	5/15/96	330	24	89	< 10	453
KA030341	6/19/96	350	30	94	< 10	484
KA030341	7/17/96	420	24	92	< 10	546
KA030341	8/21/96	290	27	86	< 10	413
KA030341	9/18/96	220	17	58	< 10	305
KA030341	10/16/96	210	12	50	< 10	282
KA030341	11/20/96	170	20	67	< 10	267
KA030341	12/18/96	170	24	72	< 10	276
KA030341	1/13/97	280	28	96	< 10	414
KA030341	2/19/97	470	< 10	< 10	< 10	500
KA030341	3/19/97	340	< 10	61	< 10	421
KA030341	4/16/97	340	20	91	< 10	461
KA030341	5/21/97	320	26	98	< 10	454
KA030341	6/18/97	360	27	110	< 10	507
KA030341	7/16/97	250	16	78	< 10	354
KA030341	8/19/97	270	27	96	< 10	403
KA030341	9/17/97	270	< 10	63	< 10	353
KA030341	10/15/97	230	< 10	63	< 10	313
KA030341	11/19/97	190	76	140	< 10	416
KA030341	12/17/97	180	61	110	< 10	361
KA040341	2/21/96	480	< 10	84	< 10	584
KA040341	5/15/96	330	28	95	< 10	463
KA040341	11/20/96	200	10	57	< 10	277
KA040341	2/19/97	250	20	85	< 10	365
KA040341	5/21/97	430	26	120	< 10	586
KA040341	8/20/97	270	14	79	< 10	373
KA040341	11/19/97	210	55	120	< 10	395
KA041288	1/17/96	270	19	74	< 10	373
KA041288	2/21/96	870	< 10	59	< 10	949
KA041288	3/20/96	360	11	73	< 10	454
KA041288	4/17/96	460	11	78	< 10	559
KA041288	5/15/96	330	18	82	< 10	440
KA041288	6/19/96	300	22	78	< 10	410
KA041288	7/17/96	300	27	85	< 10	422
KA041288	8/21/96	240	23	72	< 10	345
KA041288	9/18/96	220	19	61	< 10	310
KA041288	10/16/96	230	19	68	< 10	327
KA041288	11/20/96	210	14	63	< 10	287
KA041288	12/18/96	190	< 10	54	< 10	264
KA041288	1/13/97	270	< 10	58	< 10	348
KA041288	2/19/97	190	< 10	< 10	< 10	220
KA041288	3/19/97	380	< 10	55	< 10	455
KA041288	4/16/97	350	11	78	< 10	449
KA041288	5/21/97	310	22	95	< 10	437
KA041288	6/18/97	310	30	110	< 10	460
KA041288	7/16/97	260	27	94	< 10	391
KA041288	8/20/97	250	17	78	< 10	355
KA041288	9/17/97	240	17	77	< 10	344
KA041288	10/15/97	240	< 10	66	< 10	326
KA041288	11/19/97	240	10	77	< 10	337
KA041288	12/17/97	190	27	74	< 10	301
KC000934	8/20/96	280	28	85	< 10	403
KC000934	9/17/96	240	13	55	< 10	318

Table C-5 (Con't)
Total Trihalomethane Formation Potential Concentrations in the SWP

CONCENTRATION, ug/L

STATION	DATE	CHLOROFORM	DIBROMO-CHLOROFORM	BROMODI-CHLOROFORM	BROMOFORM	TOTAL TRIHALOMETHANE FORMATION POTENTIAL
KC000934	10/15/96	220	15	58	< 10	303
KC000934	11/19/96	210	23	76	< 10	319
KC000934	12/17/96	170	30	80	< 10	290
KC000934	1/13/97	260	46	110	< 10	426
KC000934	2/18/97	330	44	120	< 10	504
KC000934	3/18/97	360	< 10	61	< 10	441
KC000934	4/15/97	340	25	100	< 10	475
KC000934	5/20/97	330	26	110	< 10	476
KC000934	6/17/97	320	32	110	< 10	472
KC000934	7/15/97	260	32	100	< 10	402
KC000934	9/16/97	280	< 10	67	< 10	367
KC000934	10/14/97	240	15	79	< 10	344
KC000934	12/15/97	210	63	120	< 10	403
CA002000	2/20/96	270	22	80	< 10	382
CA002000	5/13/96	330	14	72	< 10	426
CA002000	8/19/96	340	26	88	< 10	464
CA002000	11/19/96	220	18	73	< 10	321
CA002000	2/18/97	270	18	79	< 10	377
CA002000	5/19/97	340	17	87	< 10	454
CA002000	8/18/97	320	17	83	< 10	430
CA002000	11/17/97	260	11	79	< 10	360
DMC06716	1/17/96	390	55	140	< 10	595
DMC06716	2/21/96	430	12	82	< 10	534
DMC06716	3/20/96	380	< 10	54	< 10	454
DMC06716	4/17/96	330	15	77	< 10	432
DMC06716	5/14/96	280	16	70	< 10	376
DMC06716	6/19/96	400	< 10	42	< 10	462
DMC06716	7/17/96	320	21	76	< 10	427
DMC06716	8/20/96	270	14	58	< 10	352
DMC06716	9/18/96	240	18	64	< 10	332
DMC06716	10/16/96	210	20	64	< 10	304
DMC06716	11/20/96	180	37	90	< 10	317
DMC06716	12/18/96	390	< 10	29	< 10	439
DMC06716	1/15/97	630	< 10	36	< 10	686
DMC06716	2/19/97	430	< 10	46	< 10	496
DMC06716	3/19/97	360	17	92	< 10	479
DMC06716	4/16/97	350	< 10	72	< 10	442
DMC06716	5/21/97	350	25	100	< 10	485
DMC06716	6/18/97	360	13	91	< 10	474
DMC06716	7/16/97	260	10	73	< 10	353
DMC06716	8/20/97	290	14	84	< 10	398
DMC06716	9/17/97	260	25	96	< 10	391
DMC06716	10/15/97	280	< 10	71	< 10	371
DMC06716	11/19/97	220	64	130	< 10	424
DMC06716	12/17/97	300	67	140	< 10	517

Appendix D

Explanation of a Trilinear Plot

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Explanation of a Trilinear Plot

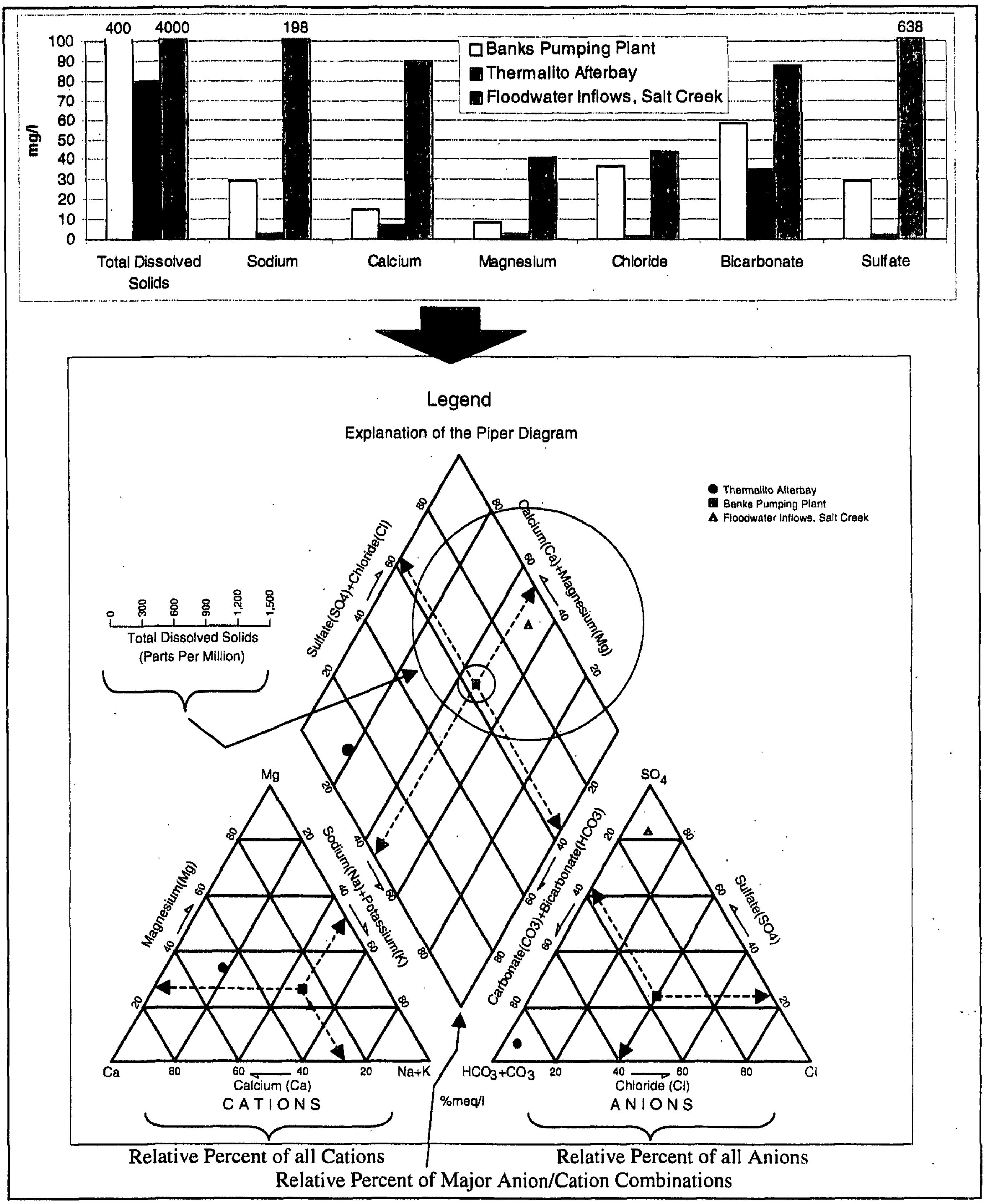
Trilinear graphs are useful for comparing the characteristics of different water bodies. Streams and groundwater usually exhibit a unique composition of major minerals such as sulfate, chloride, and bicarbonate. A histogram of six major minerals and TDS is converted to three points on a trilinear graph (Figure D-1). The central diamond plot accounts for all cation/anion combinations together. The circle surrounding each icon is TDS (calculated) on a scale provided in the mid-upper left. The larger the circle surrounding each icon, the greater the TDS. The two equilateral triangles present anions and cations separately and show them each as percentages of the total ionic equivalent concentration.

Figure D-1 shows the average mineralogical characteristics of three different water bodies—Salt Creek from the San Luis Canal, Delta water at Banks Pumping Plant, and Feather River water at Thermalito Afterbay. The arrows show which direction the scales should be read. In the central diamond, for example, the anionic composition at Banks Pumping Plant is 36 percent bicarbonate (very little carbonate exists at pH levels observed in the Project) and 64 percent sulfate+chloride. Conversely the anionic composition of water at Thermalito Afterbay is 90 percent bicarbonate and only 10 percent sulfate+chloride. The exact reverse is true for Salt Creek.

The individual anionic components are shown in the lower right triangle. This diagram separates out chloride and sulfate and compares them with bicarbonate. At Banks Pumping Plant, chloride composes 40 percent of the anionic composition, followed by bicarbonate at 36 percent and sulfate at 24 percent. This compares with Thermalito Afterbay, where bicarbonate composes almost 90 percent of the anionic composition and Salt Creek, in which sulfate is the dominant anion with over 80 percent. The cationic composition as shown in the lower left triangle was not as dramatic, with the exception of Thermalito Afterbay. The Afterbay is dominated by calcium as opposed to the other two water bodies, which had similar proportions of sodium+potassium and calcium.

A trilinear plot (also known as a Piper graph) can be used to determine the influence of one water body on another. If two icons, A and B, represent two water bodies, then the icon of the mixture will be positioned between A and B. This assumes that there was no chemical interactions upon mixing that might result in the precipitation of any salts. If equal amounts of water from two different water bodies are mixed, the icon of the resulting mixture would be positioned in a straight line between the two source icons in all three diagrams.

Figure D-1
Explanation of a Trilinear Graph



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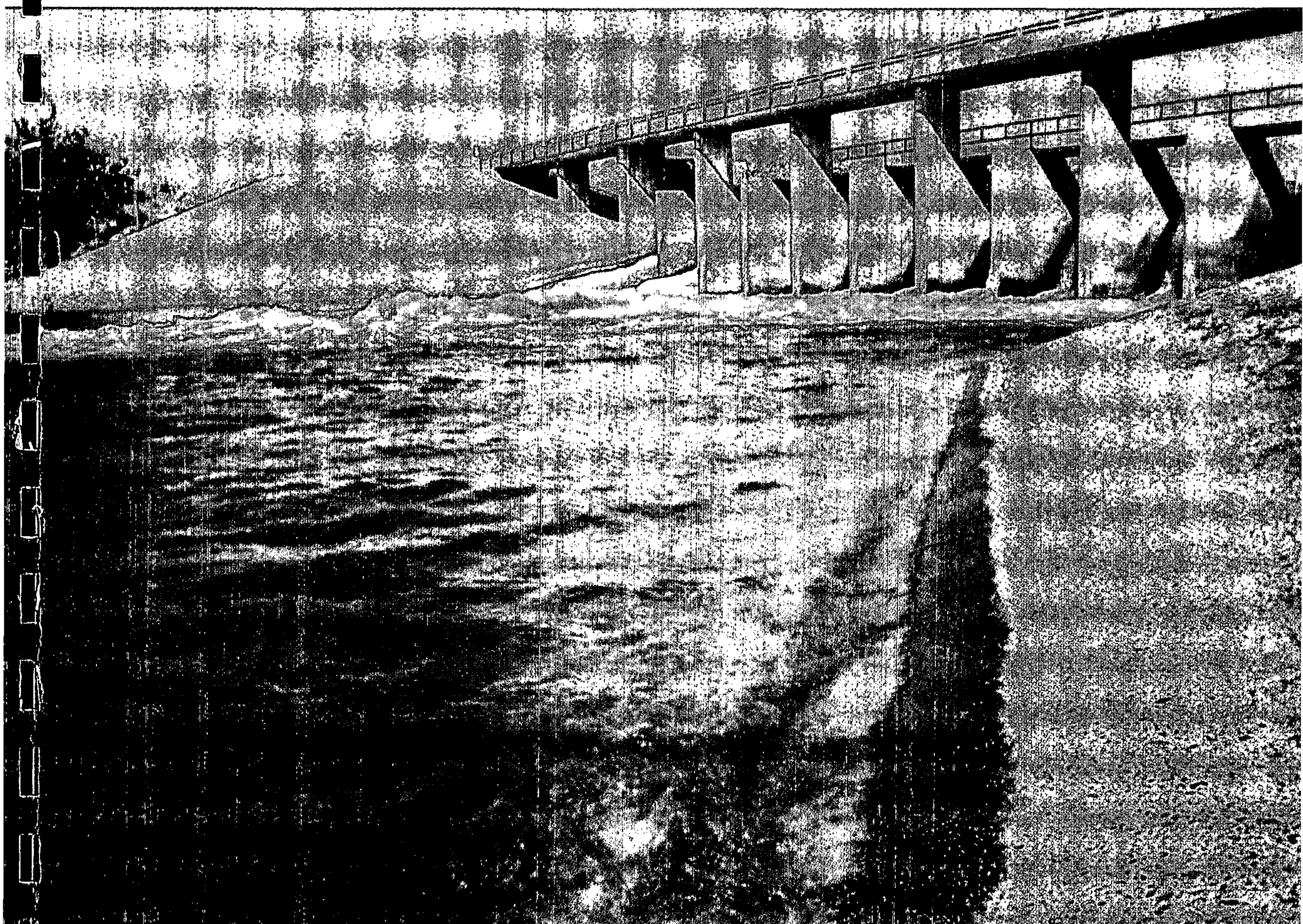
California Department of Water Resources
Division of Operations and Maintenance
Water Quality Section

R2-C

Water Quality Assessment of the State Water Project, 1998-99



July 2000

Gray Davis
Governor
State of California

Mary D. Nichols
Secretary for Resources
The Resources Agency

Thomas M. Hannigan
Director
Department of Water Resources

Photo Cover: Thermalito Afterbay outlet to the Feather River.

California Department of Water Resources
Division of Operations and Maintenance
Water Quality Section

Water Quality Assessment of the State Water Project, 1998-99

July 2000

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Governor	Secretary for Resources	Director
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Acronyms and Abbreviations

af	acre-feet
Ag	silver
Al	aluminum
As	arsenic
B	boron
Ba	barium
Br	bromide
Ca	calcium
Cd	cadmium
cfs	cubic feet per second
Cl	chloride
CO_3	carbonate
Cr	chromium
Cu	copper
CVP	Central Valley Project
DHS	Department of Health Services
DMC	Delta-Mendota Canal
DOC	dissolved organic carbon
DWR	Department of Water Resources
EC	electrical conductivity
EPA	Environmental Protection Agency
F	fluoride
Fe	iron
Hg	mercury
K	potassium
MCL	maximum contaminant level
MFL	million fibers per liter
mg/L	milligrams per liter
Mg	magnesium
Mn	manganese
mp	milepost
MTBE	methyl-tertiary-butyl ether
n	number
N	nitogren
Na	sodium
NH_4	ammonia
NO_2	nitrite
NO_3	nitrate
NTU	nephelometric turbidity unit
P	phosphorus
Pb	lead
pH	negative log of the hydrogen ion activity
PO_4	phosphate
Se	selenium
SLC	San Luis Canal
SO_4	sulfate
SRI	Sacramento River Index
SWP	State Water Project
TDS	total dissolved solids
TOC	total organic carbon
TSS	total suspended solids
THM	trihalomethane
TTHMFP	total trihalomethane formation potential
USBR	United States Bureau of Reclamation
µg/L	micrograms per liter
µmole/L	micromoles per liter
µS/cm	microseimens per centimeter
WQT	water quality threshold
Zn	Zinc

I. Executive Summary

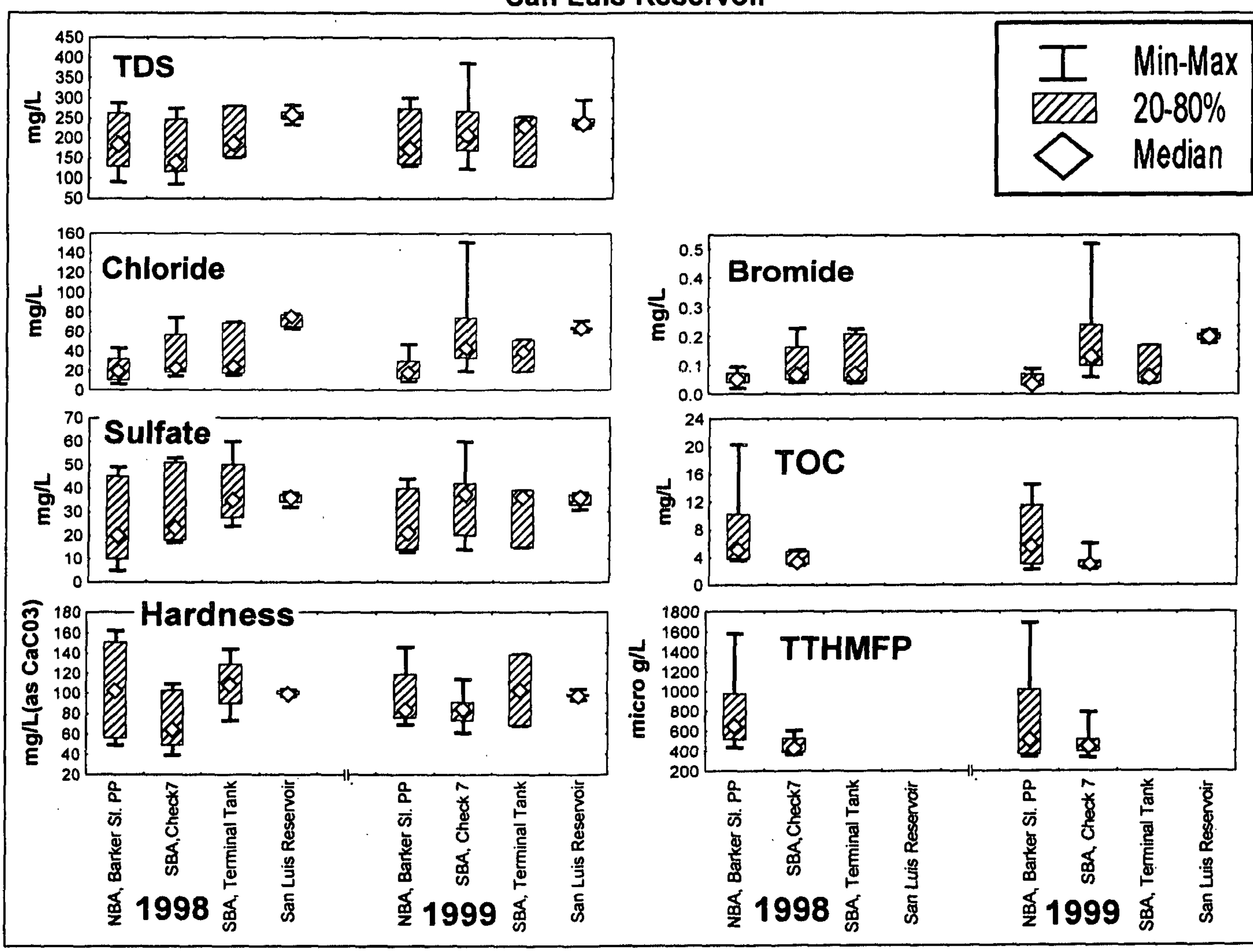
This report describes water quality in the State Water Project during 1998 and 1999. The Executive Summary covers important drinking water parameters such as salinity and trihalomethane precursors. The rest of the report assesses all parameters including metals and pesticides.

Annual and Seasonal Trends

North Bay Aqueduct

In the North Bay Aqueduct at Barker Slough Pumping Plant, the median and range of water quality parameters were similar between 1998 and 1999 (Figure 1-1). TDS ranged from 90 to 300 mg/L and was highest in late spring and early summer of both years. Similar trends were observed for sulfate, chloride, hardness, and bromide. Bromide was highest each April but never exceeded 0.1 mg/L.

Figure 1-1
Annual Water Quality Summary in the North and South Bay Aqueducts and San Luis Reservoir



TOC at Barker Slough Pumping Plant was highest during the winter months with a maximum of 20 mg/L in January 1998 and 14.4 mg/L in February 1999. The same samples contained peak TTHMFP levels of 1,583 and 1,689 µg/L, respectively. Rainfall runoff from the upstream watershed was responsible for these increases.

South Bay Aqueduct

Median TDS at Check 7 on the South Bay Aqueduct was 139 mg/L in 1998 and 208 mg/L in 1999, with a combined range of 85 to 386 mg/L (Figure 1-1). A maximum of 386 mg/L was measured in December 1999 along with peak chloride and bromide levels (151 mg/L and 0.52 mg/L, respectively). Nearly identical levels were detected at Banks Pumping Plant in that same month. The increases in December were related to salinity intrusion in the south Delta. Salinity trends at Check 7 on the South Bay Aqueduct were similar to those at Banks Pumping Plant on the California Aqueduct. Monthly salt concentrations at these two stations covaried with r-squared values ranging from 0.96 for sulfate to 0.99 for chloride.

TOC at Check 7 ranged between 3 and 6 mg/L. Monthly levels were somewhat correlated with those at Banks Pumping Plant (r-squared = 0.76) but were sometimes off by +-1.5 mg/L. Organic carbon levels may be affected as water is pumped through Bethany Reservoir prior to reaching Check 7.

San Luis Reservoir

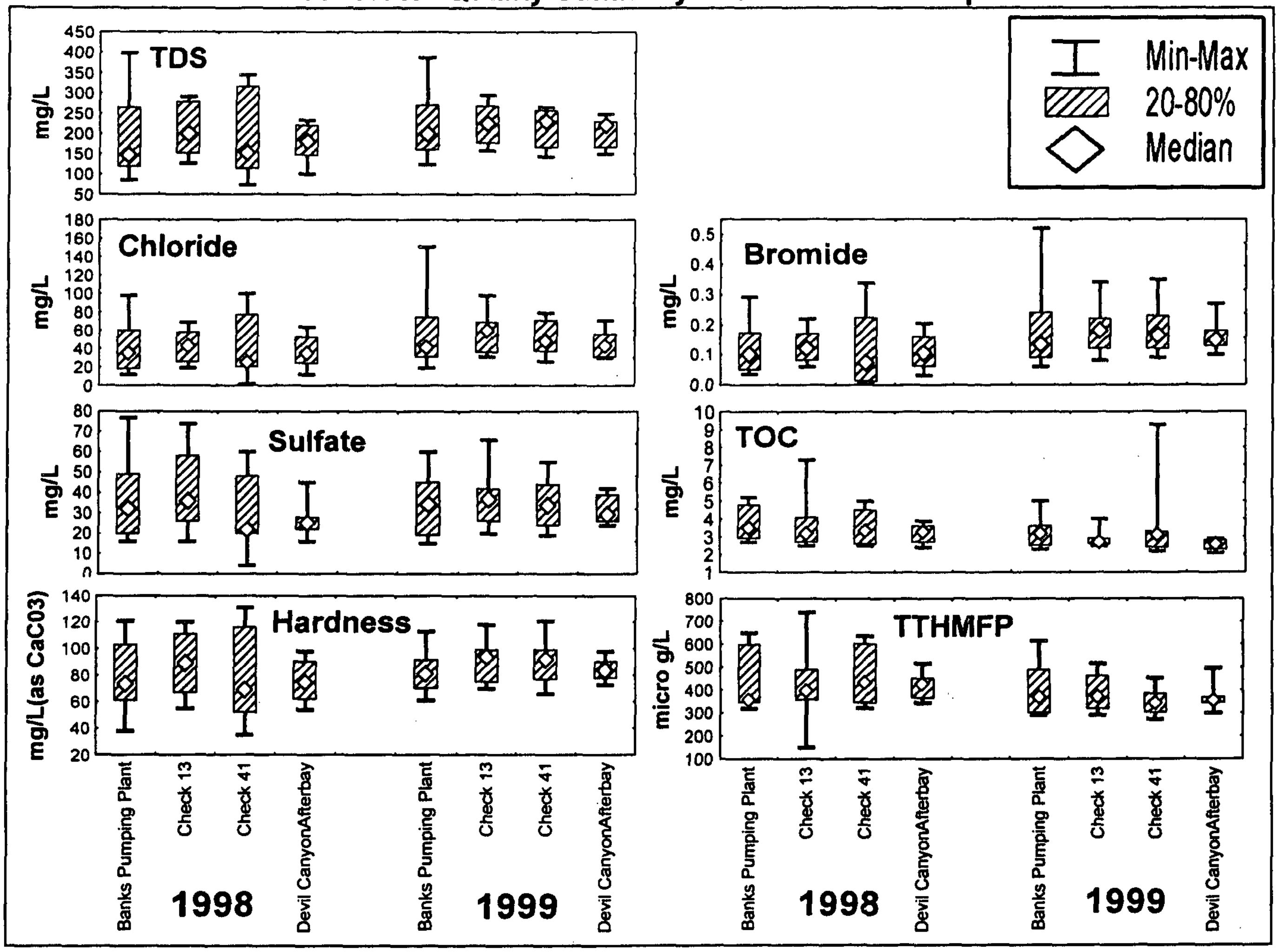
In San Luis Reservoir, turbidity remained below 5 NTU and TDS ranged between 226 and 295 mg/L during the 2-year period (Figure 1-1). In 1998, chloride declined from 76 mg/L in August to 65 mg/L in October. The decline was a result of reservoir filling with low-salinity water from the south Delta. Chloride (and salinity in general) has been steadily declining in the reservoir since 1991, when it peaked at 149 mg/L (TDS = 420 mg/L). The higher levels were due to past lake filling during the 1989-92 drought. Bromide sampling was initiated in 1999 and all values were around 0.2 mg/L.

California Aqueduct

Salinity was highly variable in the California Aqueduct during 1998-99. TDS at Banks Pumping Plant ranged from 85 to 400 mg/L during the 2-year period (Figure 1-2). It remained low (85-146 mg/L) throughout the summer of 1998 due to a wet season and high runoff in the Central Valley. These effects were observed throughout the Aqueduct. The following year, TDS at Banks Pumping Plant increased to 388 mg/L in December along with chloride (151 mg/L) and bromide (0.52 mg/L). That month, the south Delta experienced salinity intrusion due, in part, to closure of the Cross Channel Gates. Further down the Aqueduct, salinity in the San Luis Canal increased because of floodwaters during February 1998. Federal deliveries removed 48 percent of the total inflow to the canal that month and likely reduced the loads contributed by floodwaters. In April 1998, east-side inflows from the Kern, Kaweah, and Tulare rivers lowered Aqueduct TDS—and other salt-related parameters like bromide—by more than 50 percent. These inflows accounted for most Aqueduct flow south of Check 29 for three consecutive months. There were no river or floodwater inflows in 1999.

TOC in the California Aqueduct ranged from 2.1 to 9.3 mg/L over the 2-year period. TOC was unusually elevated at Check 13 in January 1998 (7.2 mg/L). Based on inflows to O'Neill Forebay, the high level originated from the Delta Mendota Canal and San Luis Reservoir. A maximum value of 9.3 mg/L was measured at Check 41 in January 1998. The high level may have resulted from a short-duration slug that made its way down the Aqueduct and passed Check 41 at the time of sampling. An on-line organic carbon monitor has been installed at Clifton Court Forebay to track such short-duration trends.

Figure 1-2
Annual Water Quality Summary in the California Aqueduct

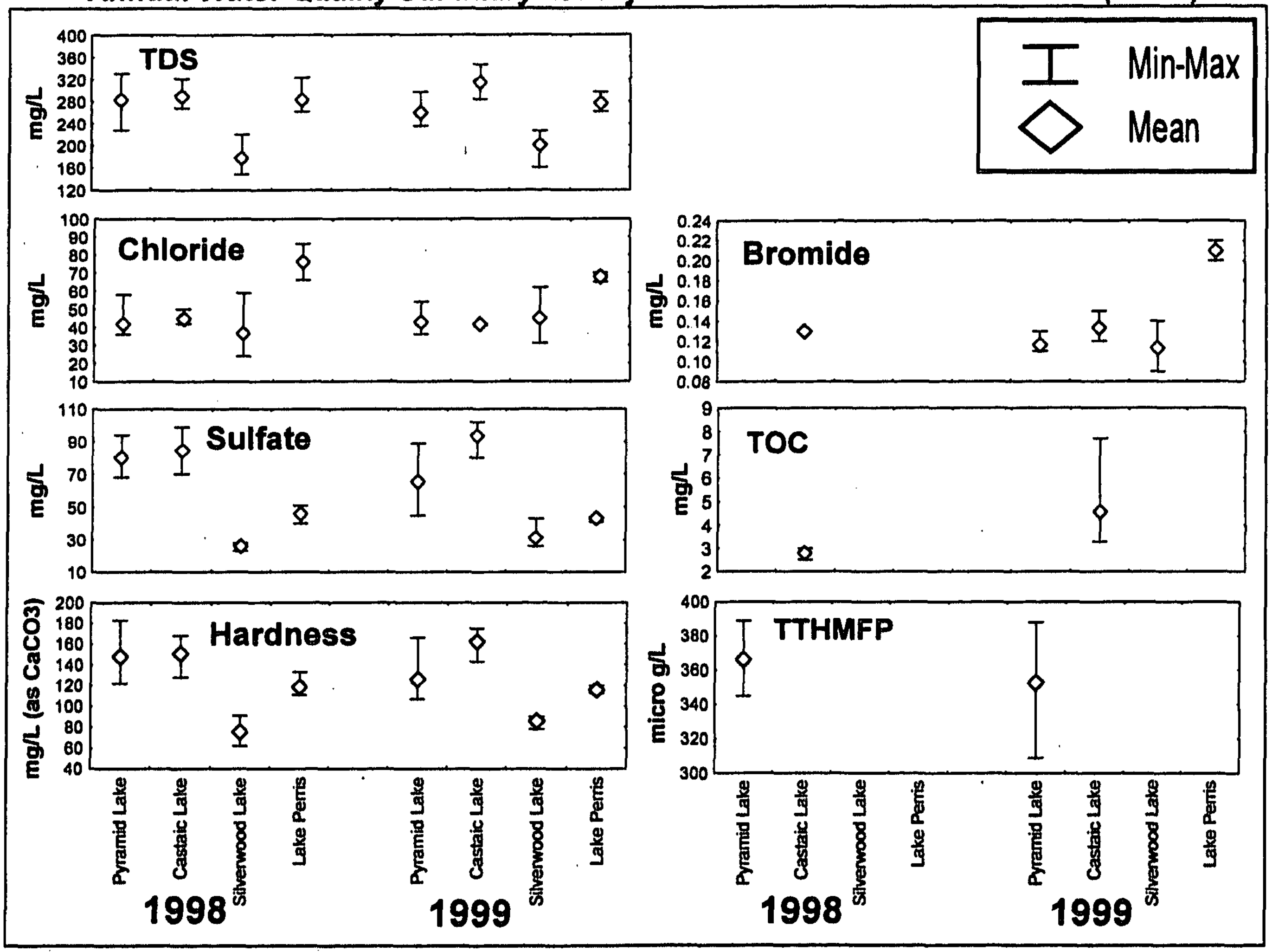


Project Lakes in Southern California

Water quality samples are collected quarterly at Project Lakes in Southern California (Figure 1-3). In Pyramid Lake, mean TDS, sulfate, and hardness levels were slightly higher in 1998 than in 1999 due, in part, to above-normal inflow from Piru Creek. The creek has a high TDS (average = 554 mg/L) with high sulfate and hardness relative to chloride. These mineralogical traits were reflected in Pyramid Lake from May 1998 to February 1999 and in Castaic Lake for most of the 2-year period. TDS was lowest in Silverwood Lake due, in part, to low-salinity inflow from the surrounding watershed.

TOC in Castaic Lake ranged between 2.5 and 3.7 mg/L in all but one sample. The February 1999 sample contained 7.7 mg/L but did not correspond with any major inflow event—Project inflow was zero for the month and natural inflow was below normal. Routine bromide monitoring was initiated at all lakes in 1999 and values ranged from 0.09 to 0.15 mg/L, except at Lake Perris where bromide averaged 0.21 mg/L.

Figure 1-3
Annual Water Quality Summary at Project Lakes in Southern California (n=1-4)



Non-Project Inflows

Floodwater Inflow to the San Luis Canal

Floodwater inflow to the San Luis Canal totaled 20,578 af in 1998—the fifth highest volume behind 1973, 1978, 1983, and 1985. Eighty-six percent of the inflow was in February and 31 percent of that was from Cantua Creek, followed by Little Panoche Creek (25 percent) and Arroyo Pasajero (12 percent). In the same month, federal contractors diverted about half of all inflows (Project and floodwater) to the canal for pre-irrigation purposes. Although these diversions tended to minimize water quality impacts to the Aqueduct, floodwaters raised conductivity by 50 to 400 µS/cm (30-230 mg/L calculated TDS) for more than a month. There were no floodwaters in 1999.

Inflow from the Kern River Intertie and Cross Valley Canal

In the first half of 1998, 198,446 af from the Kern, Tulare, and Kaweah rivers was admitted to the California Aqueduct just prior to Check 29. Releases from southern Sierra Nevada reservoirs were diverted into the Kern River Intertie and Cross Valley Canal (and eventually the Aqueduct) to alleviate flooding in the San Joaquin Valley. The flood event lasted 96 days from April 3 to July 8, 1998. With few exceptions, both inflows exhibited low TDS ranging from 102 to 124 mg/L. Suspended solids were moderate, ranging from 28 to 88 mg/L. The inflows composed almost all water pumped south during the event and Aqueduct water quality reflected that. There were no inflows in 1999.

Natural Inflow to Project Lakes in Southern California

Pyramid Lake. Natural inflow to Pyramid Lake totaled 133,135 af in 1998 and 16,493 af in 1999, amounting to 52 and 5 percent, respectively, of all Project/non-Project inflows. Piru Creek drains a 372 square-mile watershed and is the largest natural source to the lake. The creek has elevated salt levels and a sulfate concentration that is eight times greater than Project water and a chloride concentration that is nine times less. Nineteen ninety-eight was a high inflow year and lake mineralogy shifted to reflect these concentration differences. The bulk of the 1998 inflow occurred in February. Soon after, sulfate and hardness in the lake increased relative to chloride and stayed elevated through February 1999. These mineral shifts indicate that Piru Creek can have a major influence on the lake's water quality. In 1995, Piru Creek accounted for 35 percent of all inflows and 58 percent of the TDS load, making it the single largest source of salt to the lake in wet years.

Castaic Lake. Natural inflow to Castaic Lake totaled 126,224 af in 1998 and 10,220 af in 1999, amounting to 41 and 3 percent, respectively, of all Project/non-Project inflows. Six watersheds drain to the 323,702 af lake, ranging in size from 2.7 to 41.7 square miles. Assessing the effects of natural inflow is problematic due to pump-back from Elderberry Forebay. Water in the forebay can be pumped back into Pyramid Lake for energy management purposes, and about half of all natural inflow drains to this forebay. Similar to Pyramid Lake, sulfate and hardness increased relative to chloride in early 1998 but the increase continued through 1999. The mineral shift was likely due to Pyramid Lake releases.

Silverwood Lake. Natural inflow to Silverwood Lake totaled 41,730 af in 1998 and 2,291 af in 1999, amounting to 11 and 0.5 percent, respectively, of all Project/non-Project inflows. Miller and Cleghorn creeks are the two largest streams that, combined, drain about 60 square miles of watershed surrounding the lake. The salinity of these streams is usually lower than Project water. High inflows during the first few months of 1998 coincided with a 97 to 136 mg/L decrease in TDS in the lake and at Devil Canyon Afterbay. TDS remained low into spring and summer because of East Branch contributions from low-salinity Delta and Kern River waters.

II. Introduction

Objectives

Within the Division of Operations and Maintenance, five field divisions and the Water Quality Section are responsible for monitoring and assessing water quality in the State Water Project. The objectives are to:

1. assess the influence of hydrological conditions and water operations on Project water quality;
2. document long-term changes in Project water quality;
3. provide Project contractors with water quality data to assess water treatment plant operational needs;
4. identify, monitor, and respond to water quality emergencies and determine impacts to the Project;
5. assess the relative quality of Project water by comparing concentration data to Article 19 objectives or Department of Health Services Drinking Water Standards; and
6. assess water quality issues of particular concern through special investigations.

Monitoring Strategy

Water quality samples are routinely collected at 29 stations throughout the State Water Project (Table A-1, Appendix A). Stations are distributed over a distance of more than 500 miles, from the upper Feather River watershed in Plumas County to Lake Perris in Riverside County (Figure A-1 and Plates 1 to 5). Monitoring is conducted in the Feather River watershed, North Bay Aqueduct, South Bay Aqueduct, Coastal Branch, California Aqueduct—including its four terminus lakes—and the Central Valley Project's Delta-Mendota Canal.

Grab samples are collected by staff from the Oroville, Delta, San Luis, San Joaquin, and Southern field divisions on a monthly, quarterly, or as needed basis. Subsurface samples are collected from a depth of between 1 to 9 feet at both channel and lake stations. Samples are transported to the Department's Bryte Chemical Laboratory within 24 hours of collection. Laboratory analyses have included inorganic and organic parameters such as major minerals, metals, and pesticides (Table A-1). Details of field and lab methods are presented in Appendix A, Methods.

Automated water quality monitoring stations measure conventional parameters such as conductivity, temperature, or turbidity at 20 locations throughout the Project (Table A-2, Figure A-1 and Plates 1 to 5). Data are logged on an hourly basis and daily averages are uploaded to O&M's Water Quality Homepage at http://wwwomwq.water.ca.gov. Data are used to define hourly or daily water quality trends.

Water Quality Standards and Objectives

Primary Drinking Water Standards or Maximum Contaminant Levels are the maximum permissible levels in a public drinking water supply. These standards must be met in finished drinking water (potable water) to protect human health. Since raw water in the Project is not required to meet MCL standards, comparisons are made with Project data to provide a relative indication of raw water quality.

Secondary Drinking Water Standards are consumer acceptance standards designed to protect taste, odor, color, and other aesthetic aspects of drinking water that are not considered health risks. Similar to Primary

MCLs, they are used for comparison purposes only. Primary and Secondary MCLs are presented in Appendix B, Water Quality Standards and Objectives.

Article 19 objectives are included as standard provisions in the Department's water supply contracts. They require the collection and analysis of water quality samples in the Project and the compilation of records. Article 19(a) states:

> "It shall be the objective of the State and the State shall take all reasonable measures to make available, at all delivery structures for the delivery of Project water to the District, Project water of such quality that the following constituents do not exceed the concentrations stated."

These objectives are listed along with MCLs in Appendix B.

III. Annual and Seasonal Trends

This chapter describes general water quality trends in the State Water Project during 1998-99. Annual summaries for each station were presented in box and whisker plots or tables. Box and whisker plots show the median, 20-80th percentile range, non-extreme minimums/maximums, and values that were 1.5 times outside of the 20-80th percentile range. The latter values usually highlighted specific events that were detailed in Chapter IV.

Water quality parameters are presented in the following order: conventional parameters (e.g., pH, hardness) and major minerals, minor elements, trihalomethane precursors and formation potential, and organic chemicals.

Conventional Parameters and Major Minerals

Conventional parameters include conductivity, hardness, lab pH, suspended solids, suspended volatile solids, field temperature, total dissolved solids, and turbidity. Major minerals include the cations calcium, magnesium, and sodium, and the anions bicarbonate (alkalinity), chloride, nitrate, and sulfate.

Feather River Watershed

All data from Project stations in the Feather River watershed were below the Article 19 objectives or MCLs for finished drinking (Tables 3-1). The cations calcium, magnesium, and sodium were less than 10 mg/L at all stations. Bicarbonate dominated the anionic composition while chloride, nitrate, and sulfate were near or below their respective reporting limits.

North and South Bay Aqueducts and San Luis Reservoir

On the North Bay Aqueduct, all data were below the MCLs for finished drinking water or Article 19 objectives. At Barker Slough Pumping Plant, the median and range of most water quality constituents were similar between years (Figures 3-1 and 3-2). TDS ranged from 90 to 300 mg/L and was highest from late spring to early summer of both years (Figure 3-3). Similar trends were observed for sulfate, chloride, and hardness (Figure 3-4). Turbidity at Barker Slough Pumping Plant ranged between 27 and 256 NTU in 1998 and between 18 and 222 NTU in 1999. During both years, levels were highest during the winter months when rainfall runoff transports sediment from the upstream watershed.

On the South Bay Aqueduct, stations include Check 7, Santa Clara Terminal Tank, and Lake Del Valle (usually reservoir releases). With the exception of three samples from Lake Del Valle and one from Check 7, all data were below the Article 19 objectives or MCLs for finished drinking water (Figures 3-1 and 3-2). Hardness was above the Article 19 Objective of 180 mg/L in five of eight samples collected from Lake Del Valle during the 2-year period (Figure 3-4). Turbidity in the reservoir reached 65 NTU in March 1998 and coincided with natural inflows from Arroyo Del Valle totaling 65,000 af. One sample collected at Check 7 on the South Bay Aqueduct contained 151 mg/L of chloride, above the Article 19 Objective of 110 mg/L (Figure 3-4). The same sample contained sodium over the Article 19 Objective. The high chloride and sodium levels were detected in December 1999 when salinity intrusion affected all south Delta exports.

Salinity trends on the South Bay Aqueduct at Check 7 were similar to those at Banks Pumping Plant on the California Aqueduct. Median TDS at Check 7 was 185 mg/L (range 85 to 386 mg/L) compared to 179 mg/L at Banks Pumping Plant (range 85 to 388 mg/L) (Figure 3-3). Similarities were also observed for chloride, sulfate, and hardness. Regression correlations for these parameters between stations ranged from 0.96 for sulfate to 0.99 for chloride during 1998-99.

Table 3-1
Conventional Parameters and Major Minerals in the Feather River Watershed, 1998-99

			1998				1999			
Parameter	Station Name	I.D. #	Median	Low	High	# of Samples	Median	Low	High	# of Samples
Conductivity	Antelope Lake	AN001000					72			1
(Specific Conductance)	Frenchman Lake	FR001000					92			1
µS/cm	Lake Davis	LD001000					58			1
	Thermalito Forebay	TF001000	72	68	81	4	78	78	80	4
	Thermalito Afterbay	TA001000	73	67	89	12	77	76	81	10
Hardness	Antelope Lake	AN001000					26			1
mg/L as CaCO3	Frenchman Lake	FR001000					39			1
	Lake Davis	LD001000					23			1
	Thermalito Forebay	TF001000	30	29	32	4		32	32	4
	Thermalito Afterbay	TA001000	30	27	36	12	32	30	33	10
pH, Lab	Antelope Lake	AN001000					7.2			1
	Frenchman Lake	FR001000					7.0			1
	Lake Davis	LD001000					6.7			1
	Thermalito Forebay	TF001000	7.2	6.8	7.2	4	6.6	6.3	7.4	4
	Thermalito Afterbay	TA001000	7.2	6.9	7.4	12	6.8	6.6	7.1	10
Suspended Solids, mg/L	Thermalito Afterbay	TA001000	4	3	6	3	1	<1	1	3
Suspended Volatile Solids mg/L	Thermalito Afterbay	TA001000	4	1	6	6	1	1	2	6
Temperature	Antelope Lake	AN001000					18.9			1
Degrees C	Frenchman Lake	FR001000					15.5			1
	Lake Davis	LD001000	17.8	13	24	6	17.3	11.4	20.6	8
	Lake Oroville	OR001000	17.8	14.4	27.2	6	22.2	15.6	23.9	7
	Thermalito Forebay	TF001000	15.6	7.8	20.6	11	15.6	7.8	20.6	12
	Thermalito Afterbay	TA001000	10.0	8.9	12.2	4	11.7	8.9	13.9	4
Total Dissolved Solids	Antelope Lake	AN001000					65			1
mg/L	Frenchman Lake	FR001000					64			1
	Lake Davis	LD001000					41			1
	Thermalito Forebay	TF001000	44	43	54	4	55	50	63	4
	Thermalito Afterbay	TA001000	54	44	63	10	49	38	69	10
Turbidity, NTU	Antelope Lake	AN001000					3			1
	Frenchman Lake	FR001000					3			1
	Lake Davis	LD001000					2			1
	Thermalito Forebay	TF001000		4	5	2	1	1	9	4
	Thermalito Afterbay	TA001000	5	2	9	11	3	2	4	10
Calcium	Antelope Lake	AN001000					7.0			1
mg/L	Frenchman Lake	FR001000					9.0			1
	Lake Davis	LD001000					6.0			1
	Thermalito Forebay	TF001000	7.0	7.0	8.0	4	8.0	7.7	8.0	4
	Thermalito Afterbay	TA001000	7.0	6.6	8.0	12	8.0	6.8	8.0	10
Magnesium	Antelope Lake	AN001000					2.0			1
mg/L	Frenchman Lake	FR001000					4.0			1
	Lake Davis	LD001000					2.0			1
	Thermalito Forebay	TF001000	3.0	2.8	3.0	4	3.0	3.0	3.1	4
	Thermalito Afterbay	TA001000	2.9	2.7	4.0	12	3.0	3.0	3.3	10
Sodium	Antelope Lake	AN001000					3			1
mg/L	Frenchman Lake	FR001000					5			1
	Lake Davis	LD001000					3			1
	Thermalito Forebay	TF001000	3	2.8	3	4 3	3	3	3.3	4
	Thermalito Afterbay	TA001000	3	2.6	4	12	3	3	4	10
Bicarbonate	Antelope Lake	AN001000					41			1
(Alkalinity)	Frenchman Lake	FR001000					50			1
mg/L as CaCO3	Lake Davis	LD001000					31			1
	Thermalito Forebay	TF001000	32	32	39	4	38	36	43	4
	Thermalito Afterbay	TA001000	33	32	39	12	38	36	40	10
Chloride	Antelope Lake	AN001000					<1.0			1
mg/L	Frenchman Lake	FR001000					<1.0			1
	Lake Davis	LD001000					<1.0			1
	Thermalito Forebay	TF001000	<1.0	<1.0	1.0	4	<1.0	<1.0	1.0	4
	Thermalito Afterbay	TA001000	<1.0	<1.0	1.0	12	1.0	<1.0	1.0	10
Nitrate	Antelope Lake	AN001000					<0.1			1
mg/L as NO3	Frenchman Lake	FR001000					<0.1			1
	Lake Davis	LD001000					<0.1			1
	Thermalito Forebay	TF001000	<0.1	<0.1	0.2	4	<0.1	<0.1	0.2	4
	Thermalito Afterbay	TA001000	<0.1	<0.1	0.2	12	<0.1	<0.1	0.1	10
Sulfate	Antelope Lake	AN001000					<1.0			1
mg/L	Frenchman Lake	FR001000					1			1
	Lake Davis	LD001000					<1.0			1
	Thermalito Forebay	TF001000	2	<1	2	4	2	2	3	4
	Thermalito Afterbay	TA001000	2	<1	2	12	2	<1	3	10

Figure 3-1
Conventional Parameters in the North and South Bay Aqueducts and San Luis Reservoir, 1998-99

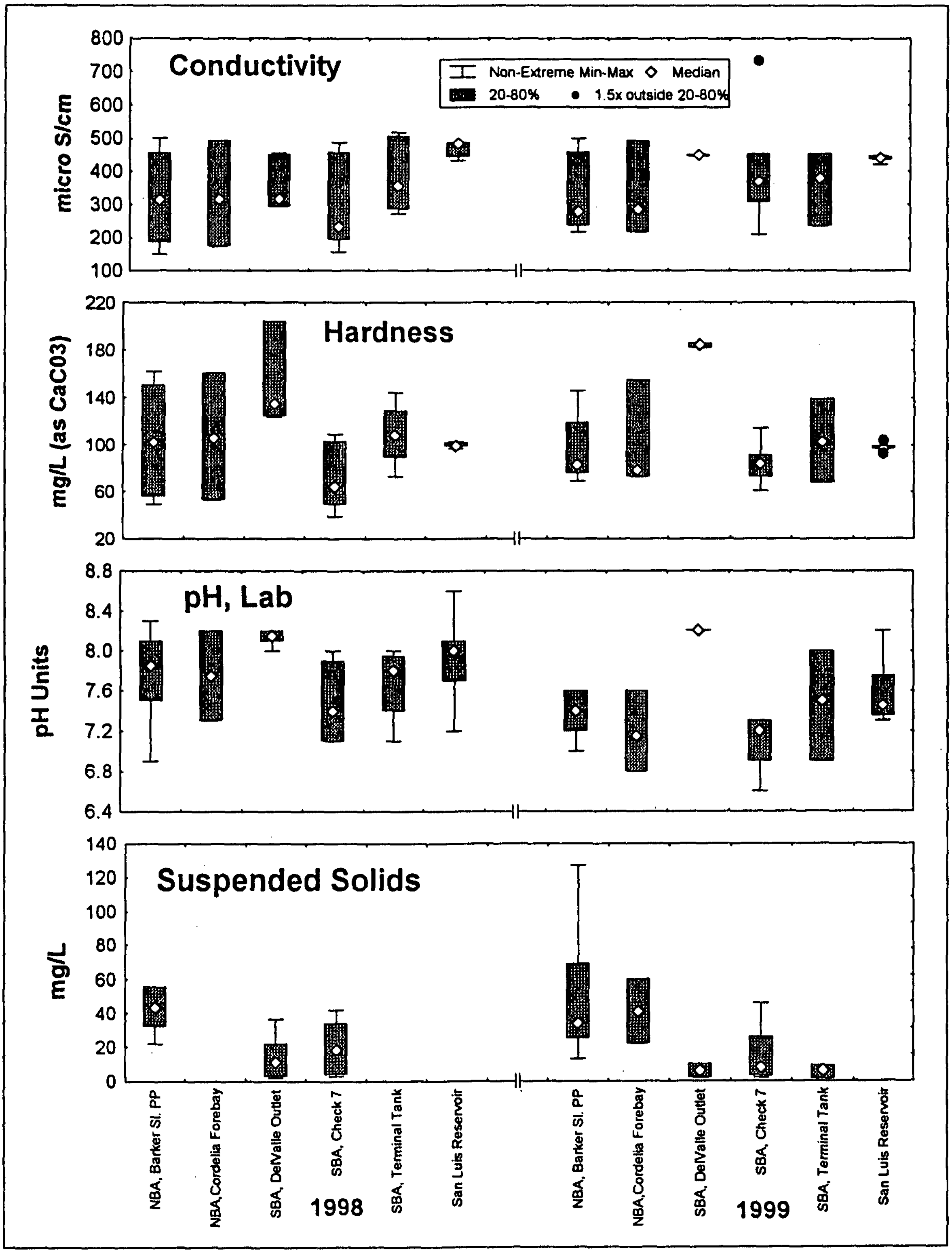


Figure 3-1 (Con't)
Conventional Parameters in the North and South Bay Aqueducts and San Luis Reservoir, 1998-99

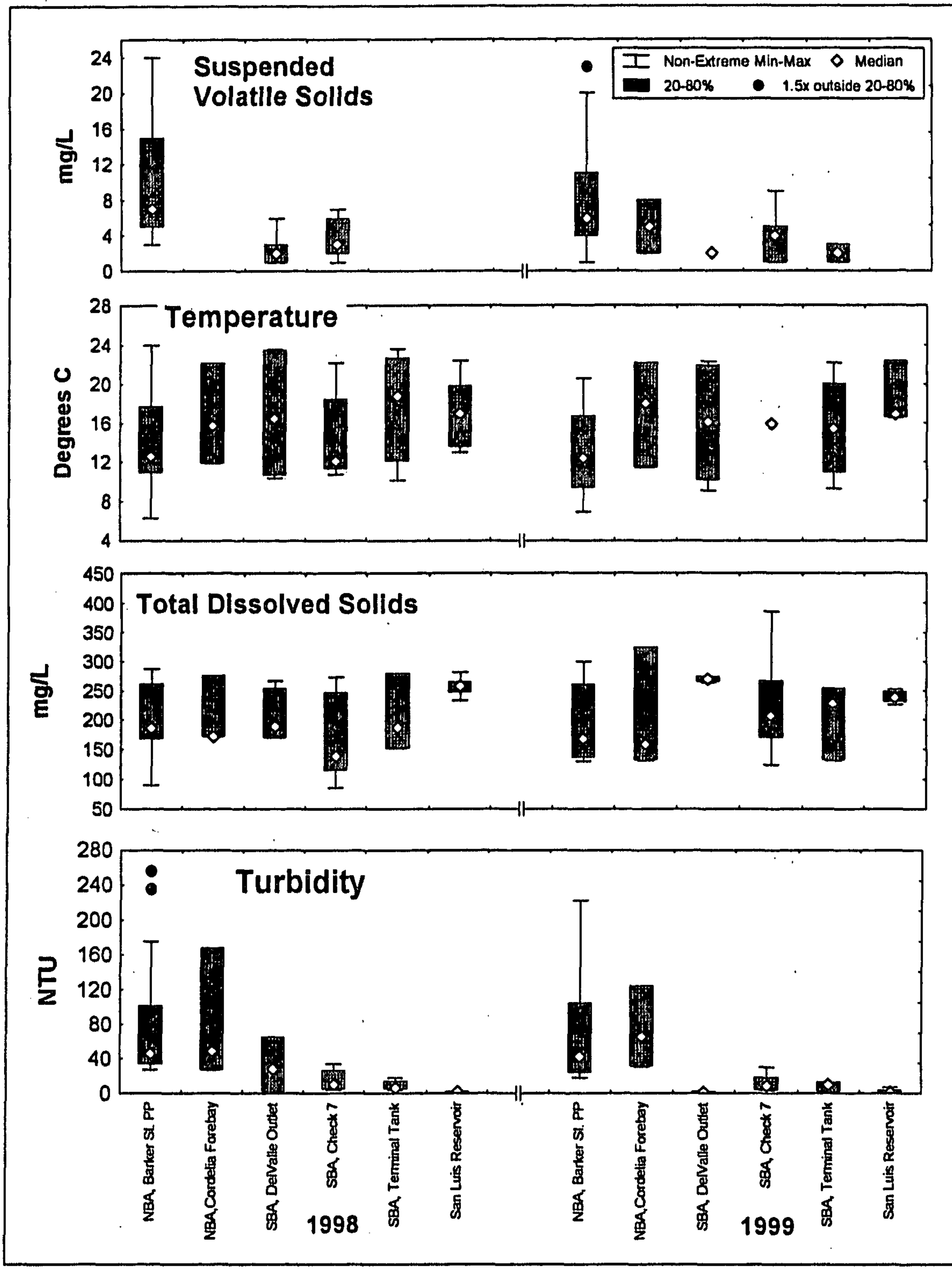


Figure 3-2
Major Minerals in the North and South Bay Aqueducts and San Luis Reservoir, 1998-99

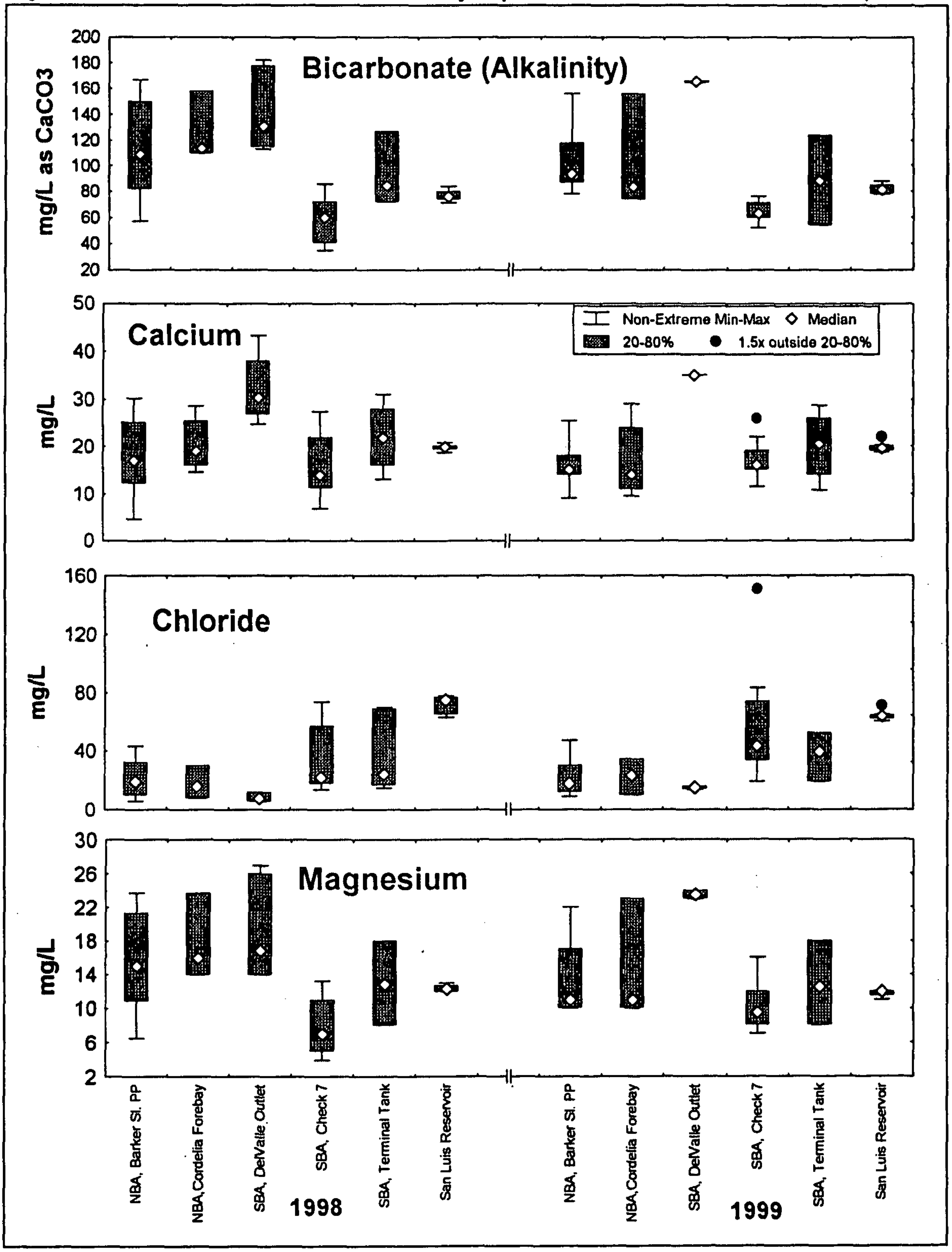
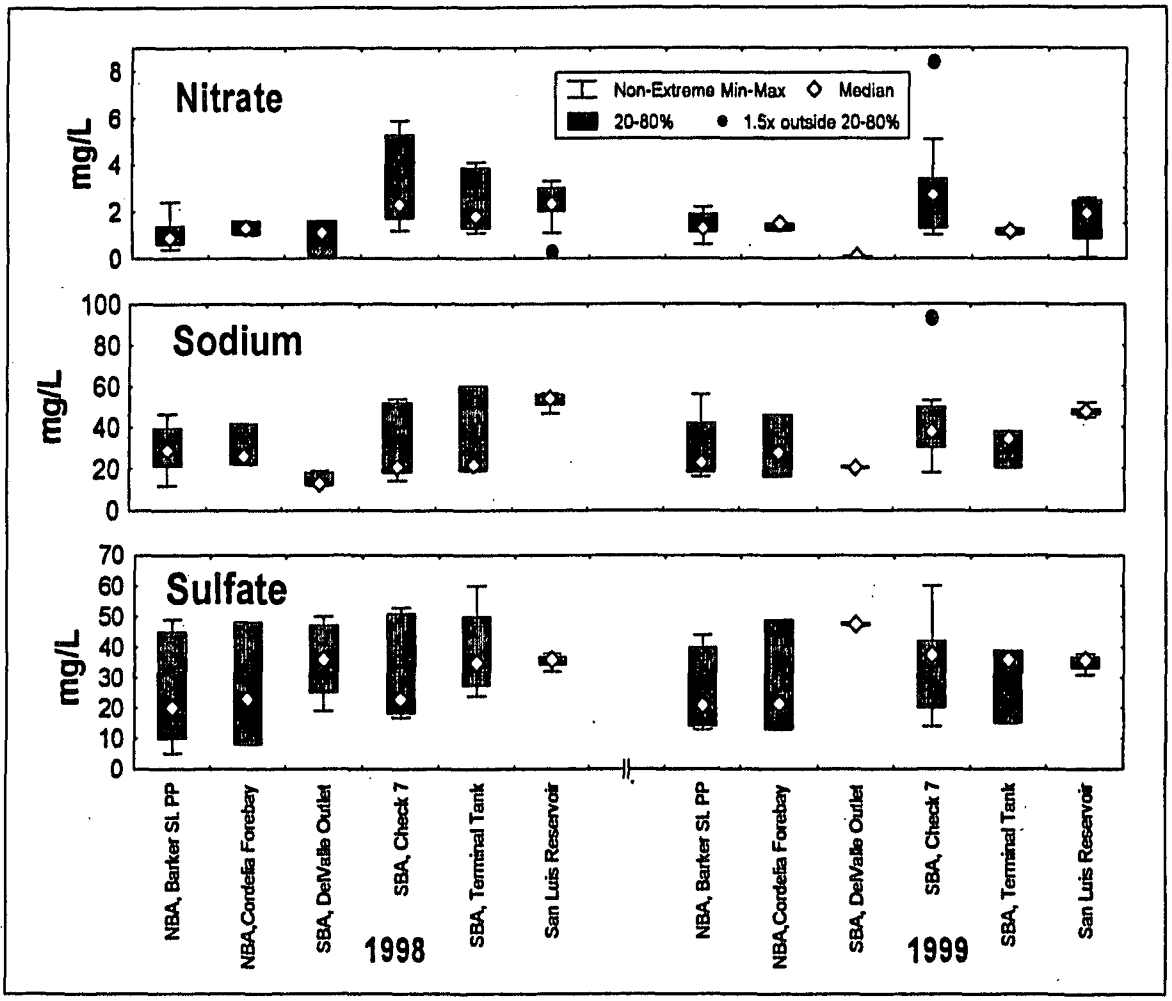


Figure 3-2 (Con't)
Major Minerals in the North and South Bay Aqueducts and San Luis Reservoir, 1998-99



All data from San Luis Reservoir were below the Article 19 objectives or MCLs for finished drinking water (Figures 3-1 and 3-2). Turbidity in the reservoir remained largely below 5 NTU and TDS ranged between 226 and 295 mg/L (Figure 3-3). Chloride declined from 76 mg/L in August 1998 to 65 mg/L in October (Figure 3-4). Reservoir filling was initiated in September and dilution from low-salinity Delta water coincided with the decline. Chloride (and salinity in general) has been steadily declining in San Luis Reservoir since 1991 when the concentration peaked at 149 mg/L (TDS = 420 mg/L). The higher levels earlier in the decade were due to lake filling during the 1989-92 drought. Reservoir filling is greatest during fall and winter when salinity intrusion in the Delta is most probable.

Figure 3-3
Monthly TDS and Turbidity in the North and South Bay Aqueducts and San Luis Reservoir

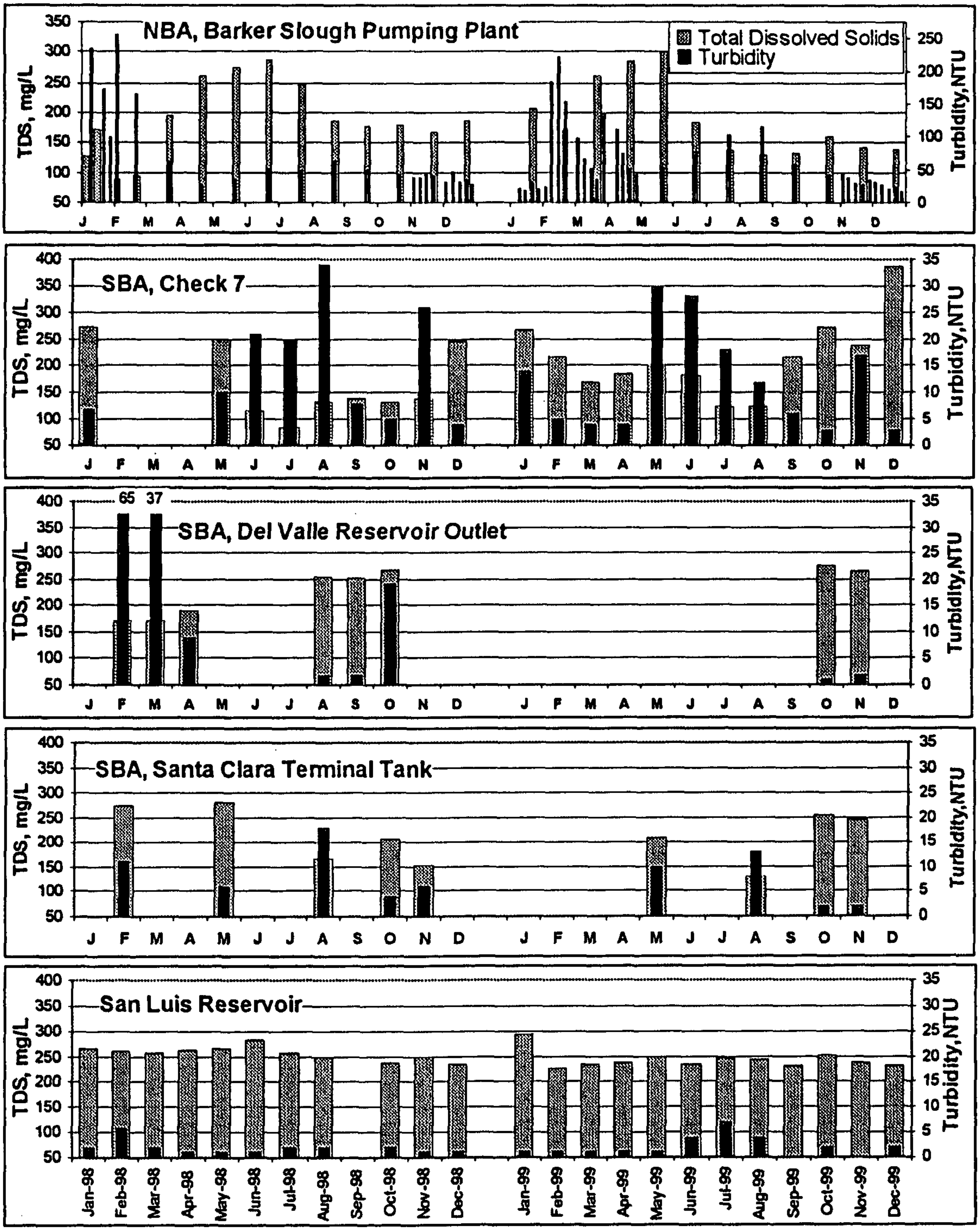
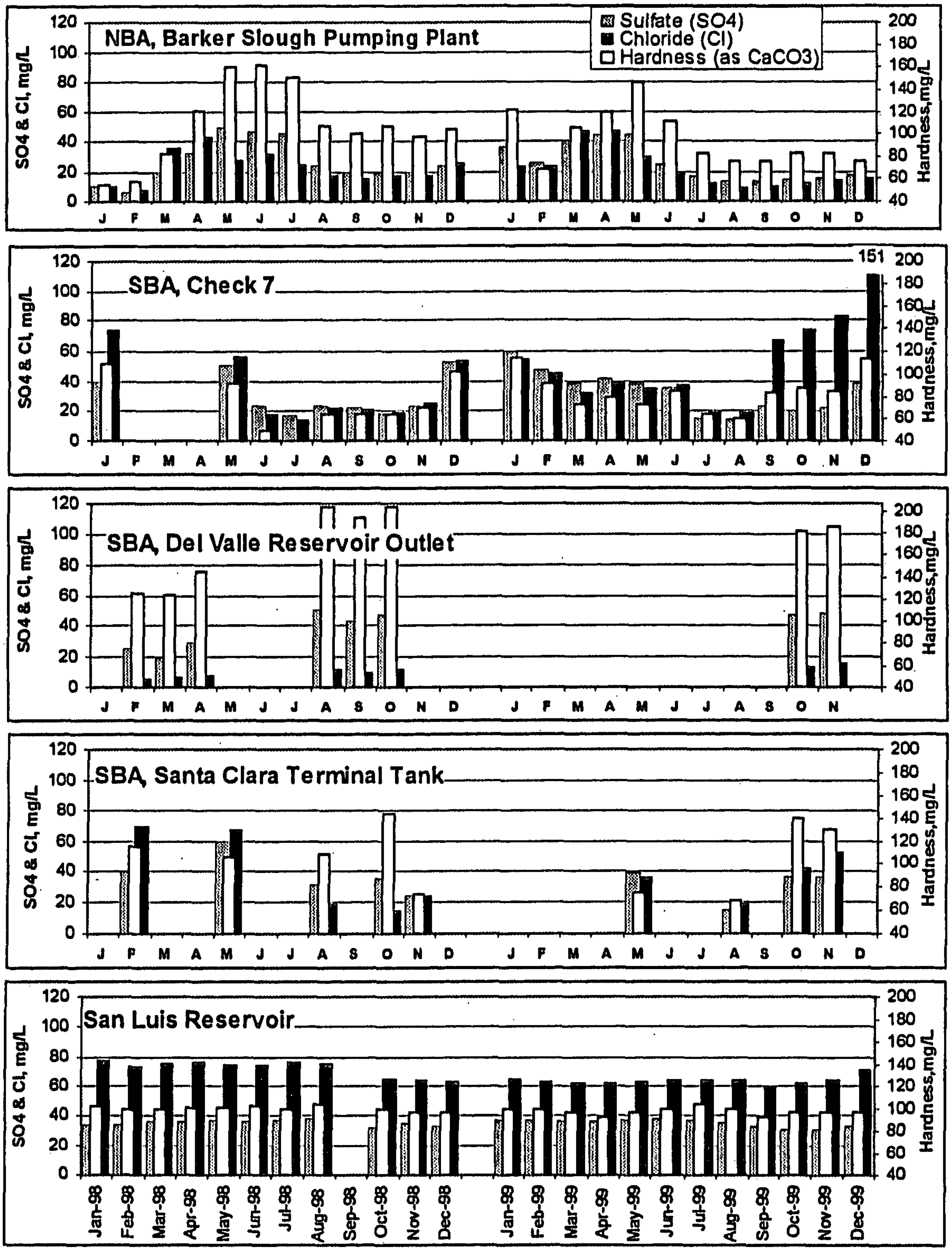


Figure 3-4
Monthly Sulfate, Chloride, and Hardness in the North and South Bay Aqueducts and San Luis Reservoir



California Aqueduct and Coastal Branch

Most water quality parameters in the California Aqueduct and Coastal Branch were below MCLs for finished drinking water or Article 19 objectives (Figures 3-5 and 3-6). The exceptions were TDS, chloride, sulfate, and hardness. In February 1998, TDS at Check 21 was 593 mg/L, above the Recommended Secondary MCL for finished drinking of 500 mg/L (Figure 3-7). In the same sample, sulfate was above the Secondary MCL of 250 mg/L and hardness was above the Article 19 Objective of 180 mg/L (Figure 3-8). These high levels were caused by floodwater inflow to the San Luis Canal (see Non-Project Inflows). Chloride was detected above the Article 19 Objective of 110 mg/L in December 1999 at Clifton Court Forebay (120-126 mg/L) and Banks Pumping Plant (151 mg/L). Sodium was above the Article 19 Objective in the same samples. The high chloride and sodium levels were the result of salinity intrusion in the south Delta that affected all exports.

TDS, chloride, sulfate, and hardness declined at Banks Pumping Plant starting in May 1998 and remained relatively low for the next six months (Figures 3-7 and 3-8). A wet season in the Central Valley and correspondingly high runoff from the San Joaquin River reduced salt levels throughout the south Delta. Farther down the Aqueduct, good quality Kings River water was admitted to the San Luis Canal (Checks 13 to 21), but water quality effects were overshadowed by floodwater inflows from the Diablo Range. Diablo range floodwaters increased Aqueduct salinity for the entire month of February 1998. Inflow from the Kern River Intertie and Cross Valley Canal (just upstream of Check 29) lowered salinity in the Aqueduct from April to early June 1999. These inflows originated from the Kern, Kaweah, and Tulare rivers and their combined TDS averaged around 115 mg/L. Almost all flow south of Check 29 was composed of this river water and Aqueduct water quality reflected that. The effects of all these inflows on the Aqueduct are detailed in Chapter IV, Non-Project Inflows. There were no river or floodwater inflows in 1999.

Figure 3-5
Conventional Parameters in the California Aqueduct and Coastal Branch, 1998-99

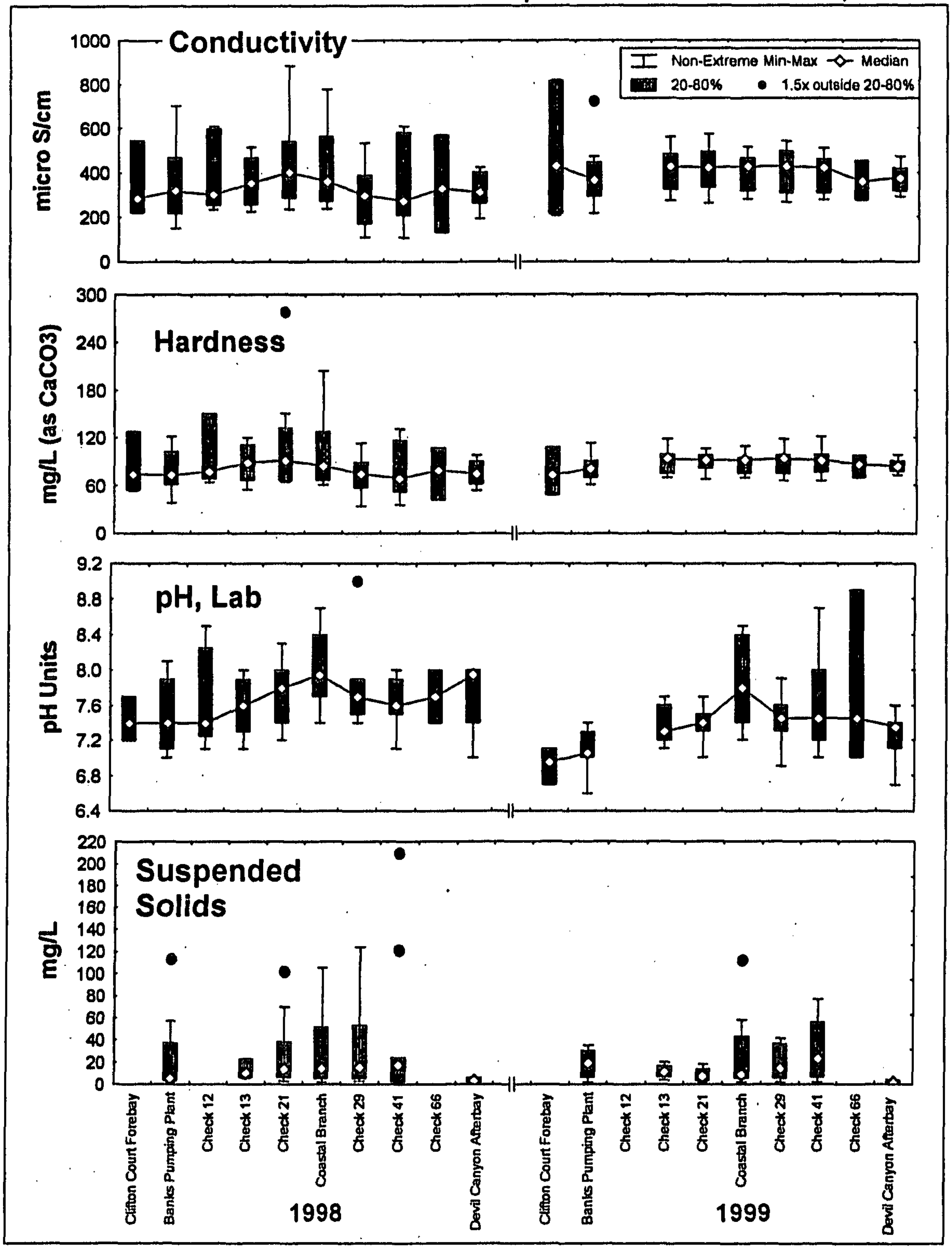


Figure 3-5 (Con't)
Conventional Parameters in the California Aqueduct and Coastal Branch, 1998-99

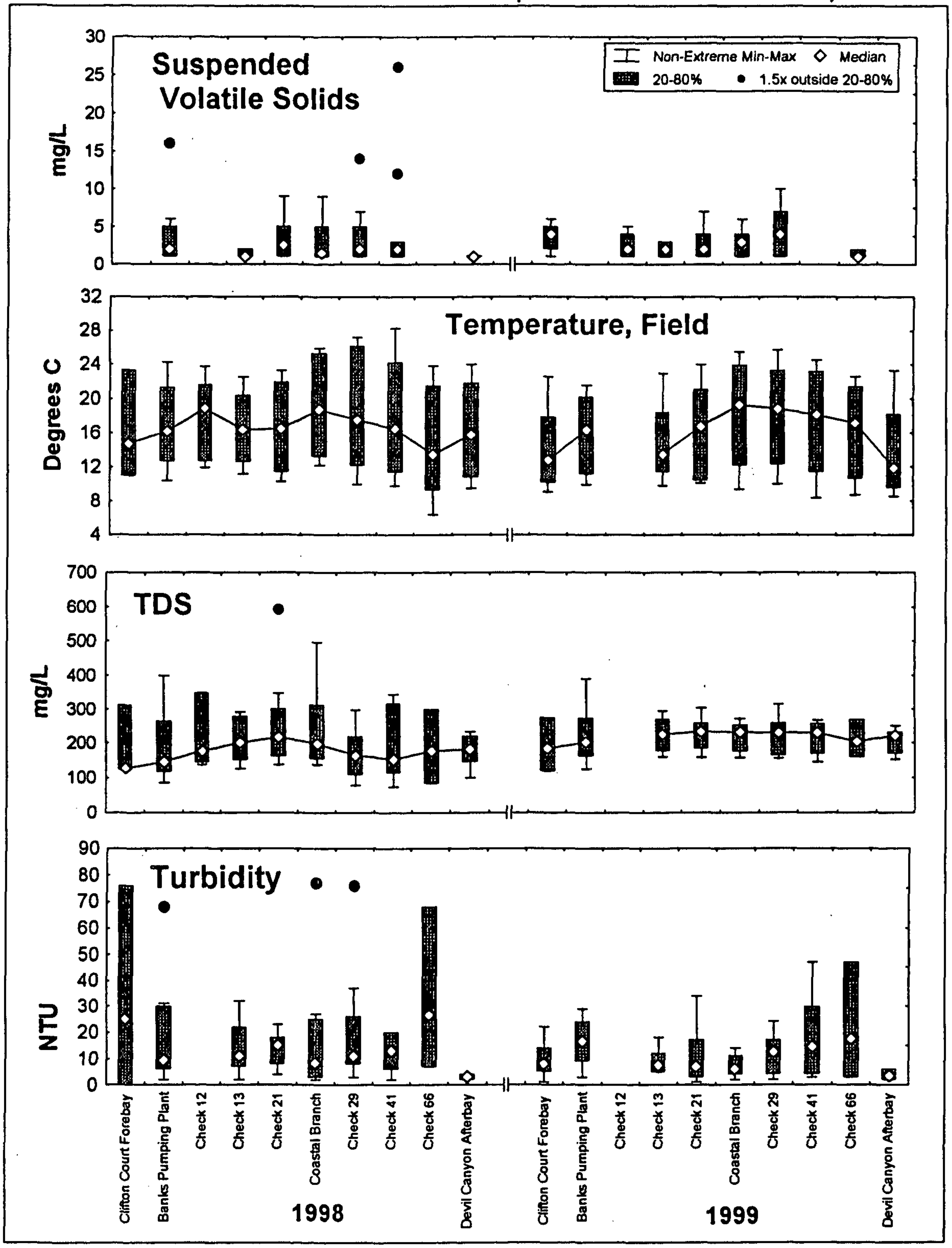


Figure 3-6
Major Minerals in the California Aqueduct and Coastal Branch, 1998-99

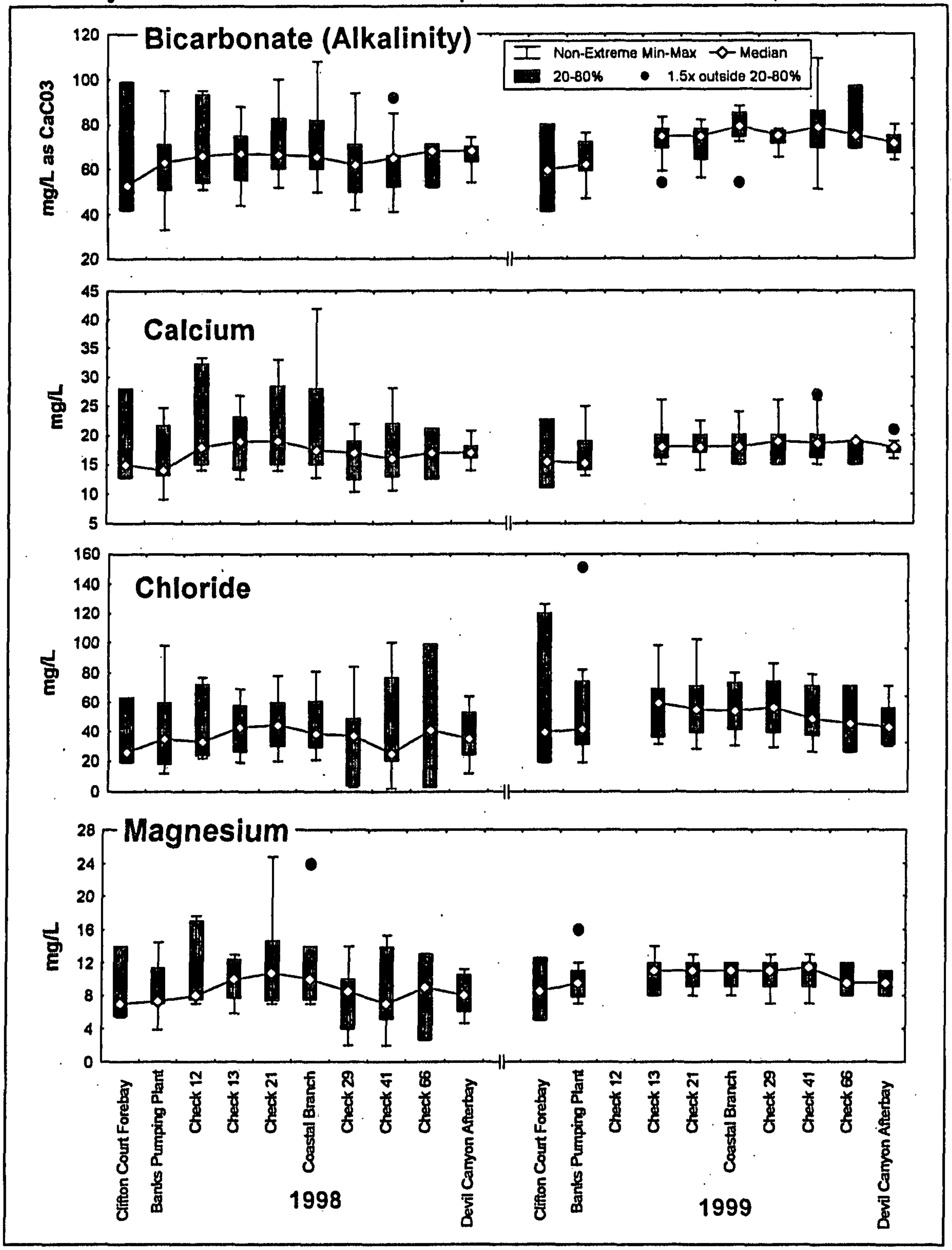


Figure 3-6 (Con't)
Major Minerals in the California Aqueduct and Coastal Branch, 1998-99

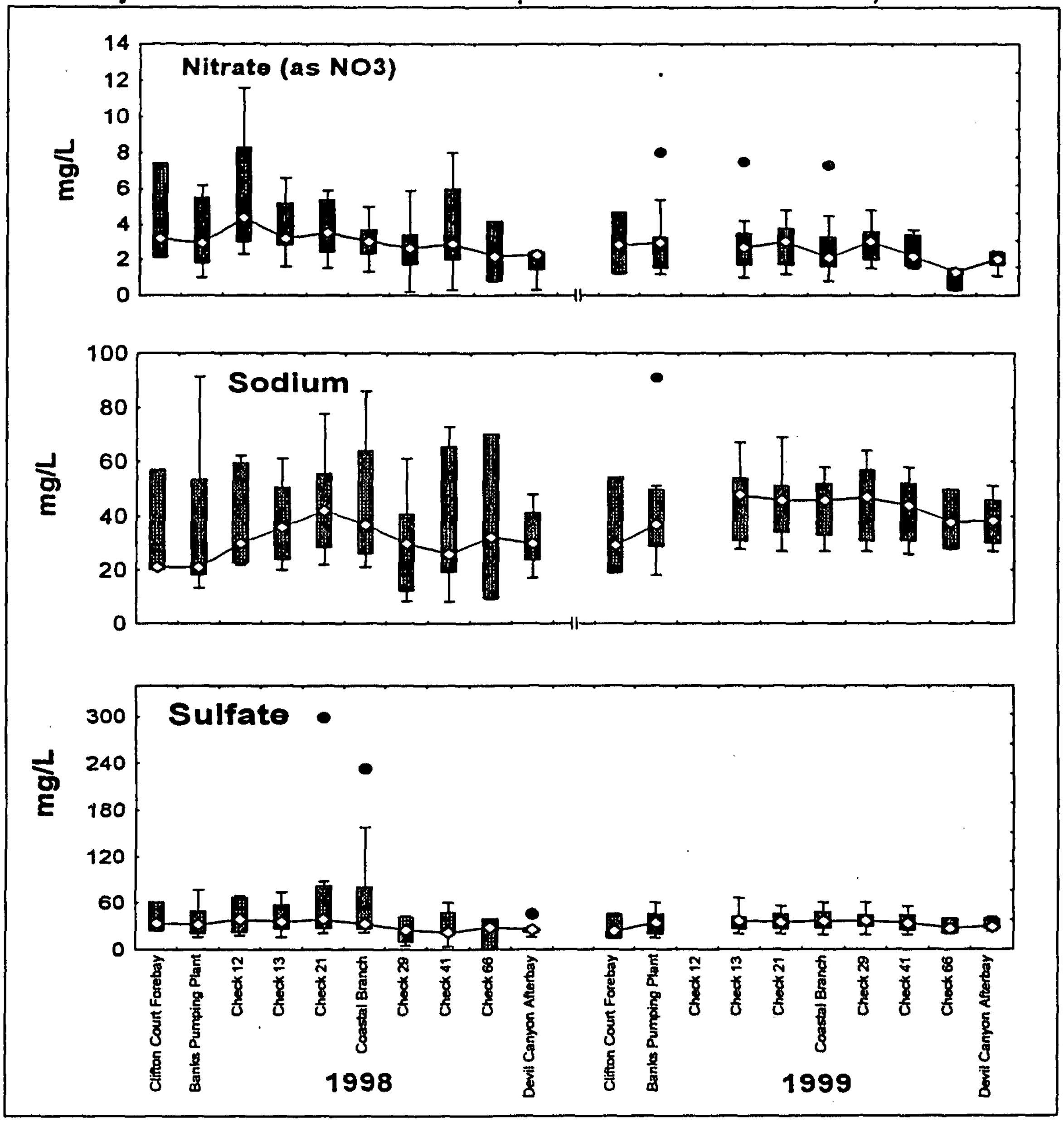


Figure 3-7
Monthly TDS and Turbidity in the California Aqueduct

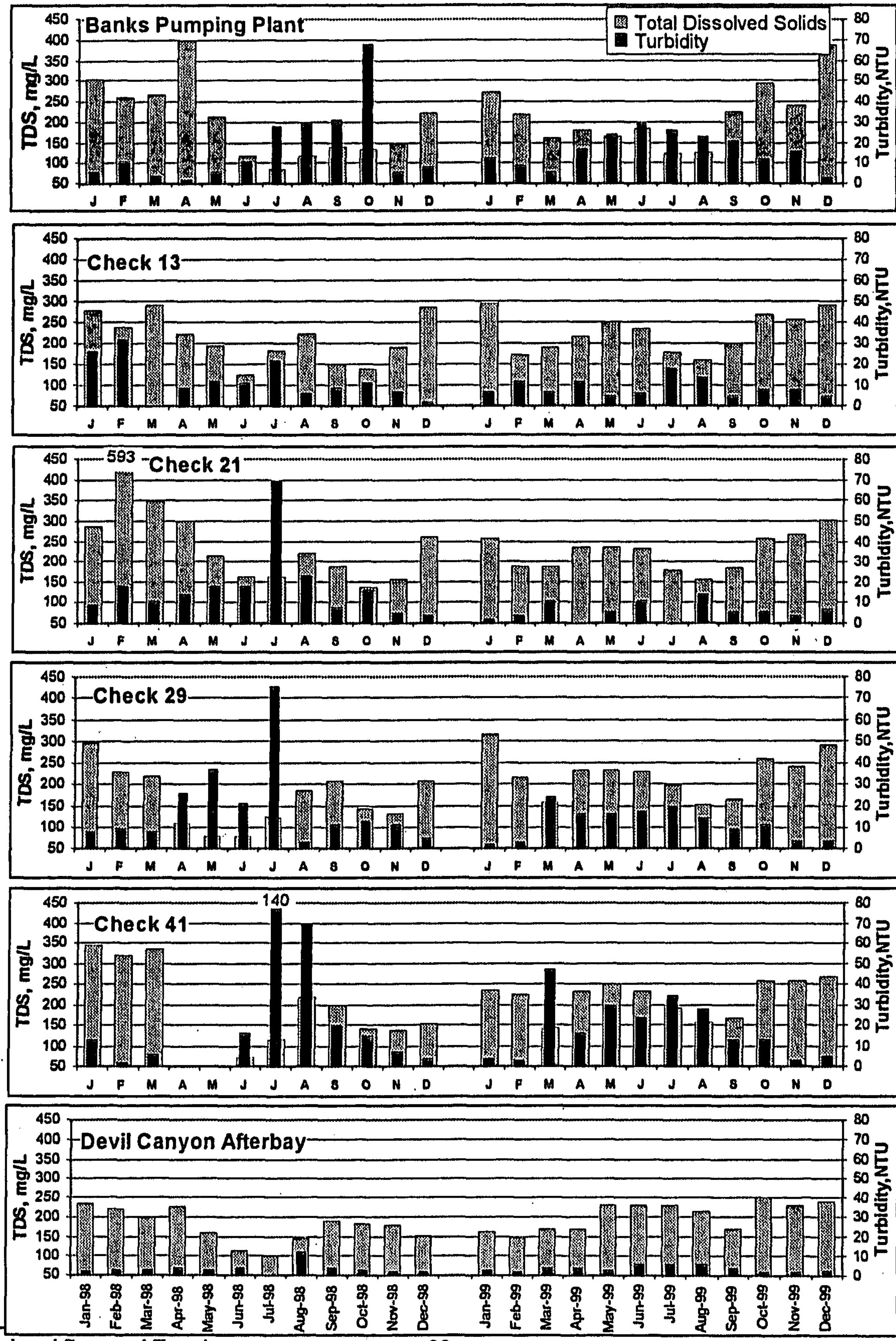
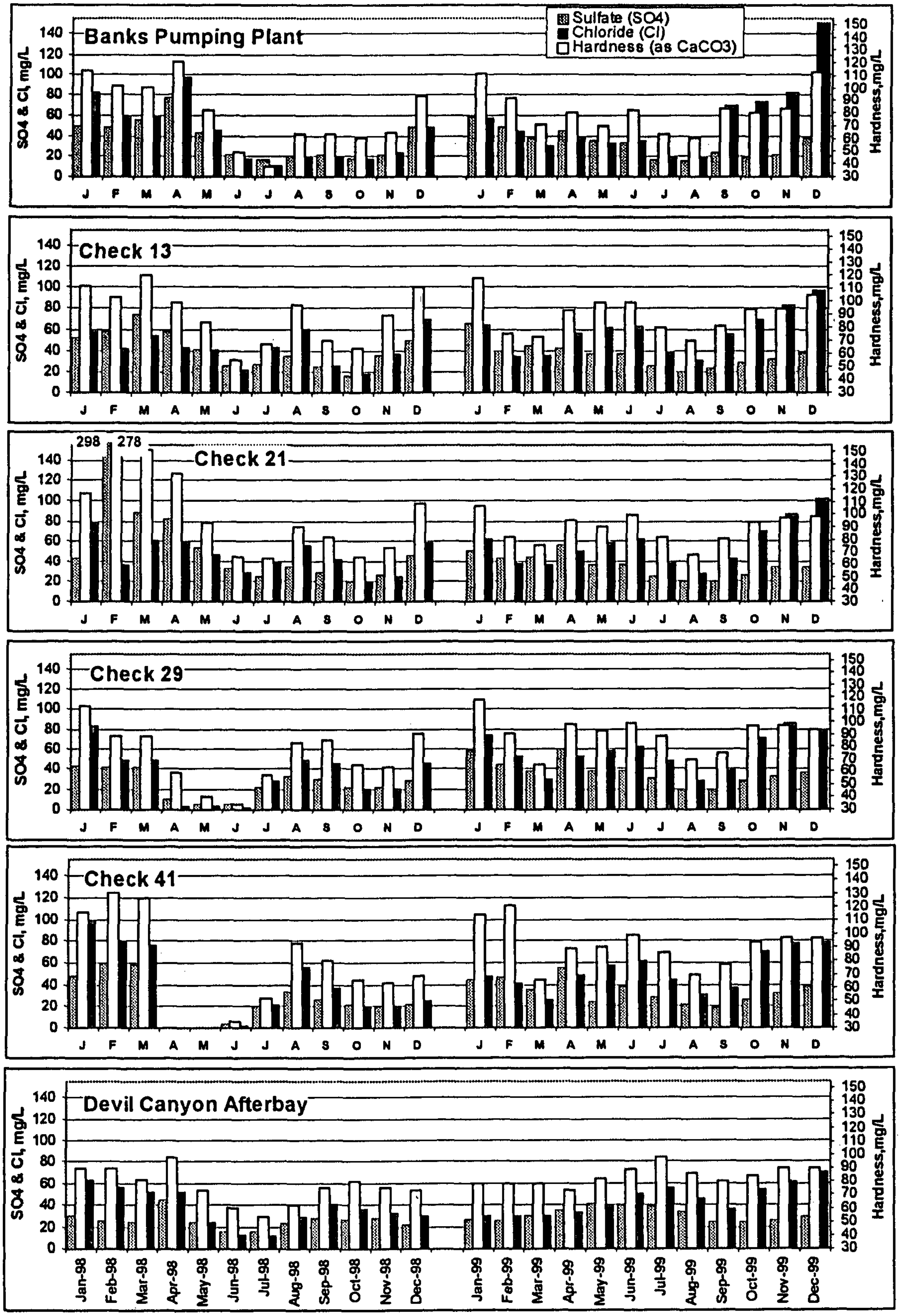


Figure 3-8
Monthly Sulfate, Chloride, and Hardness in the California Aqueduct



Project Lakes in Southern California

Mineral monitoring is conducted quarterly at Lake Perris and Pyramid, Castaic, and Silverwood lakes. Except for hardness, all data were below the MCLs for finished drinking water or Article 19 objectives (Figures 3-9 to 3-10). Hardness was above the Article 19 Objective of 180 mg/L in Pyramid Lake during May 1998 (Figure 3-11). The high level was due to above-normal inflow from Piru Creek in early 1998 (see Non-Project Inflows). Creek inflow was greatest in February and raised lake turbidity to 21 NTU (Figure 3-12). The creek's influence also resulted in an increase in sulfate and hardness with respect to chloride from May 1998 to February 1999. These trends were also observed in Castaic Lake. TDS was lowest in Silverwood Lake due, in part, to low-salinity runoff from the surrounding watershed.

Figure 3-9
Conventional Parameters at Project Lakes in Southern California, 1998-99 (n=1-4)

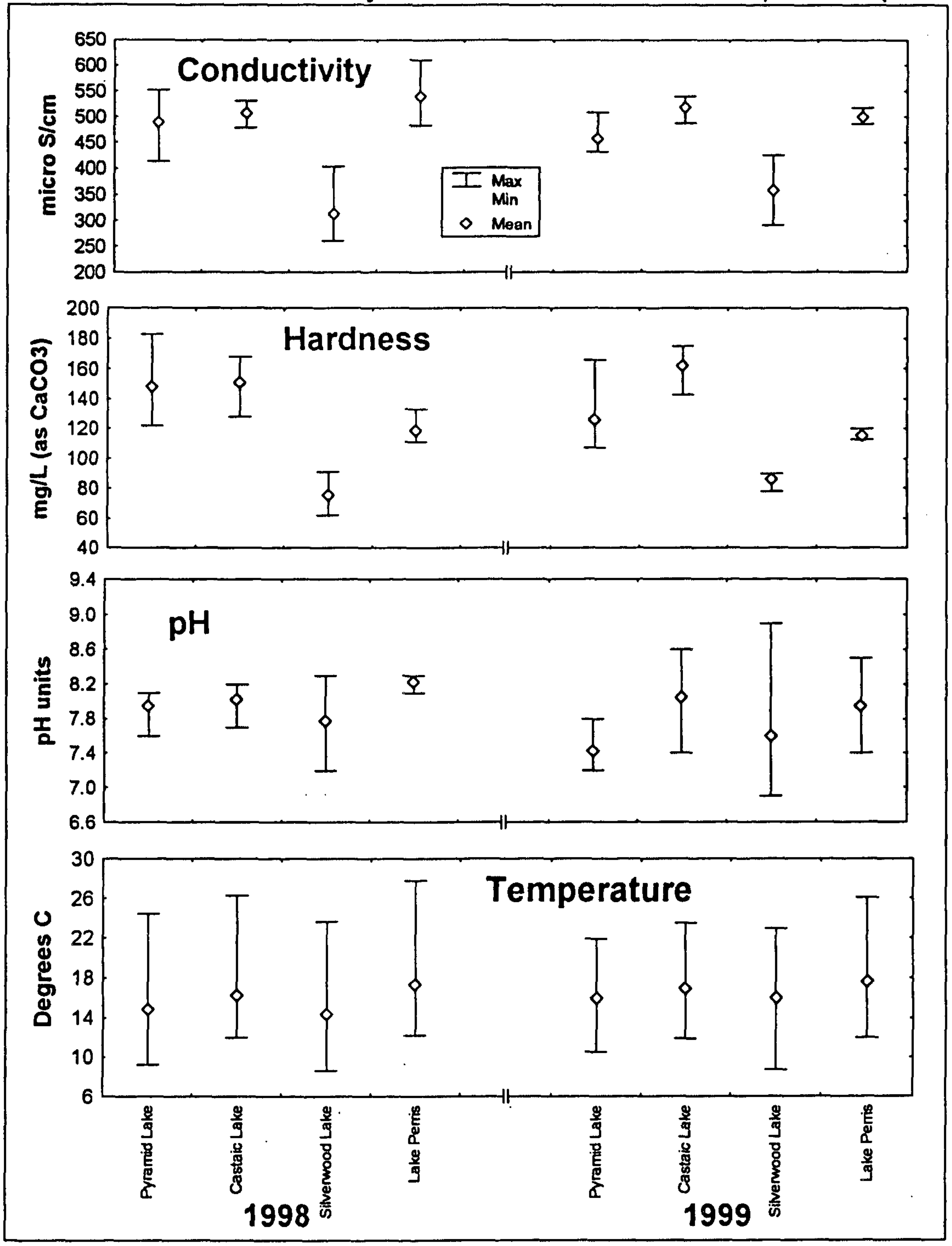


Figure 3-9 (Con't)
Conventional Parameters at Project Lakes in Southern California, 1998-99 (n=1-4)

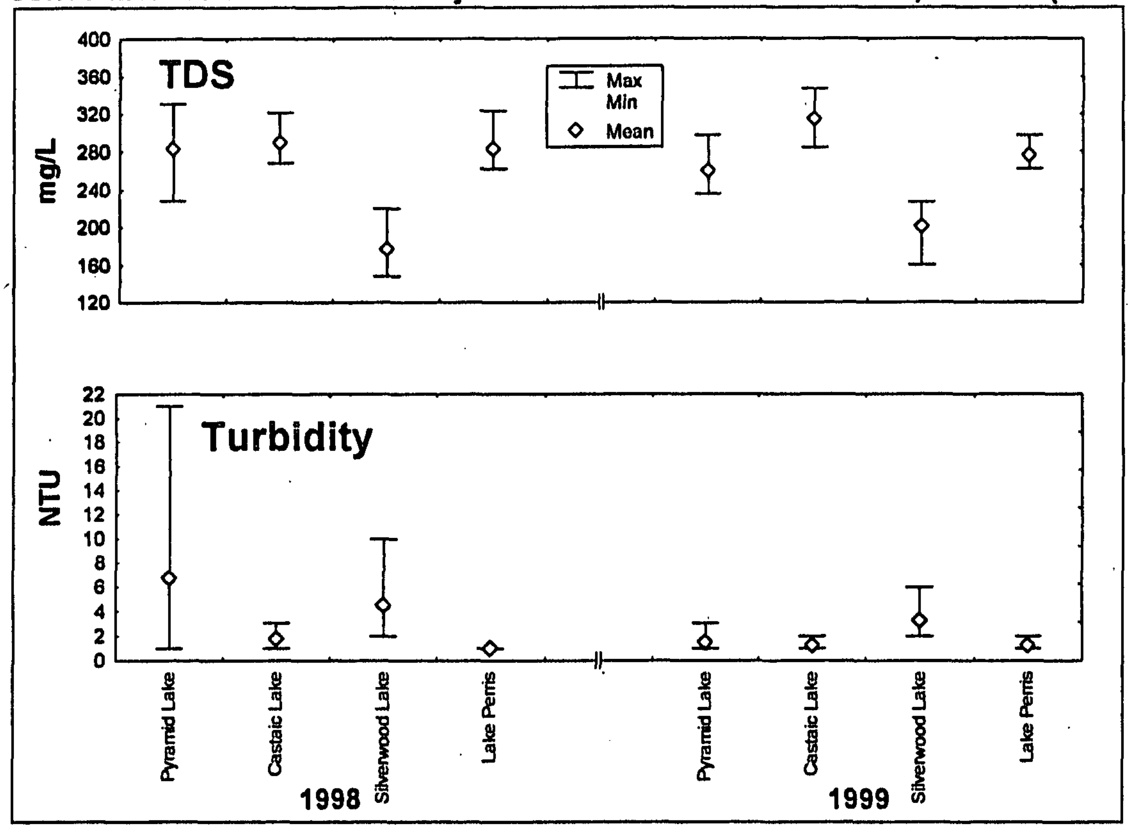


Figure 3-10
Major Minerals at Project Lakes in Southern California, 1998-99 (n=1-4)

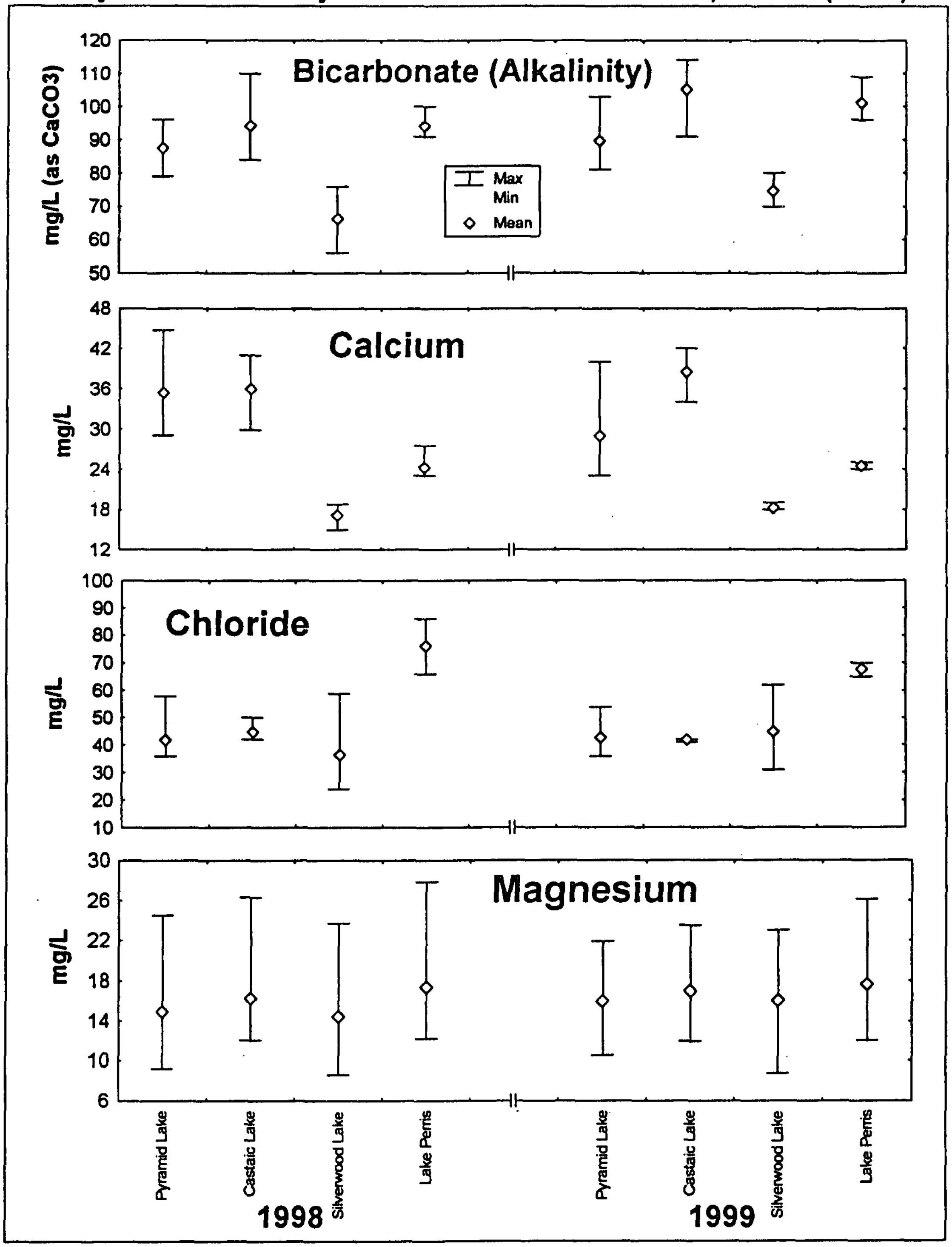


Figure 3-10 (Con't)
Major Minerals at Project Lakes in Southern California, 1998-99 (n=1-4)

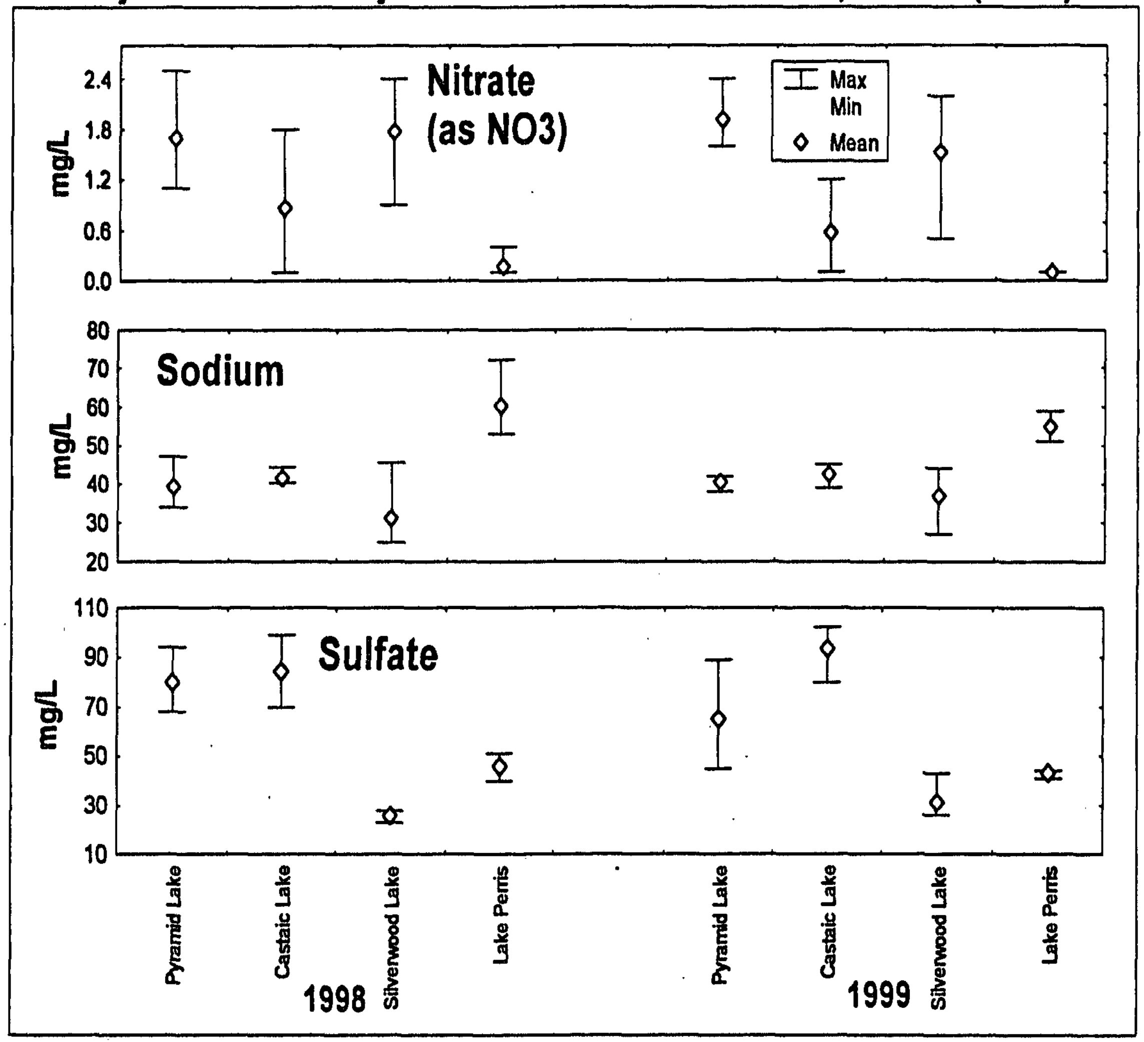


Figure 3-11
Quarterly Sulfate, Chloride, and Hardness at Project Lakes in Southern California

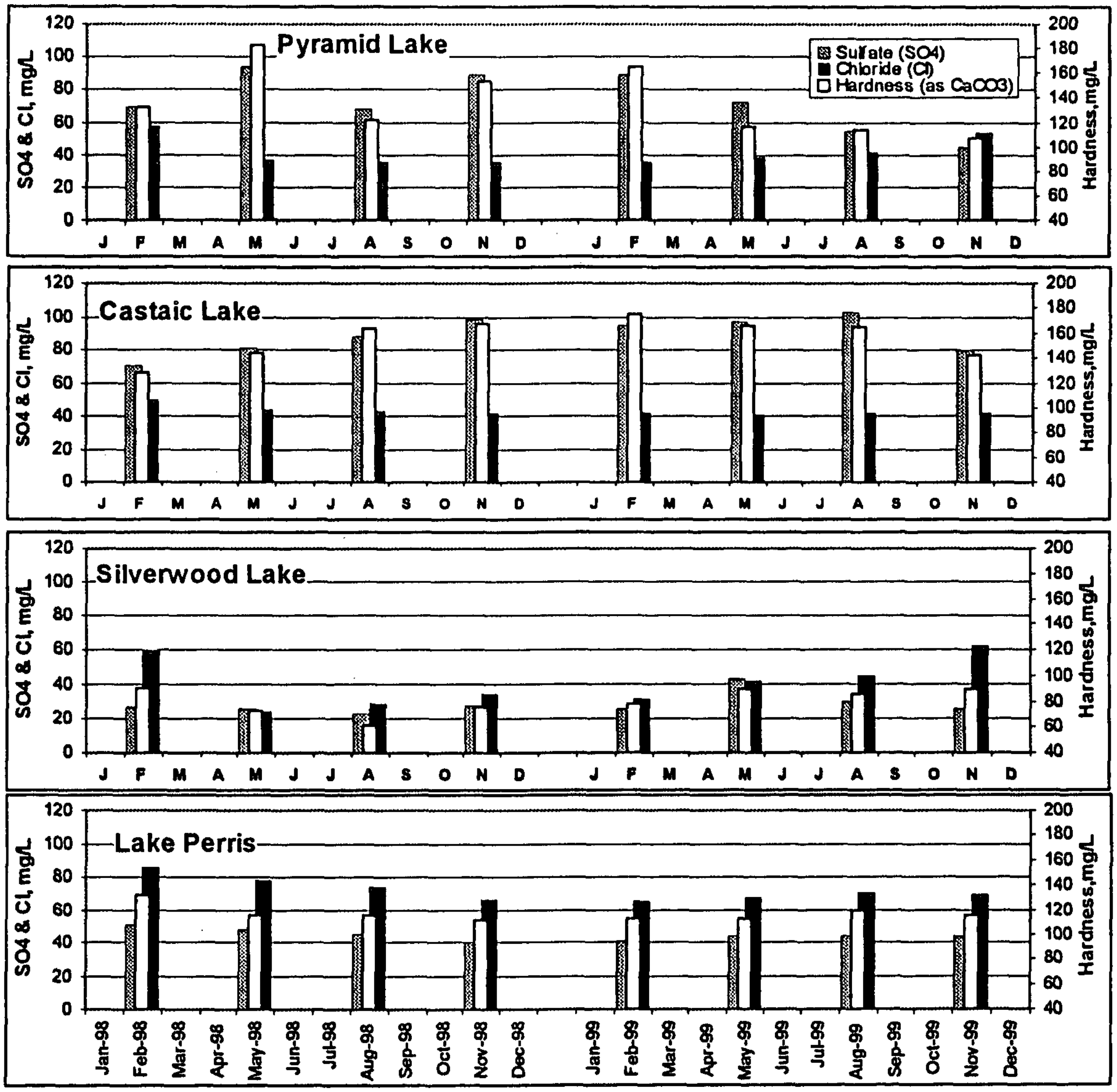
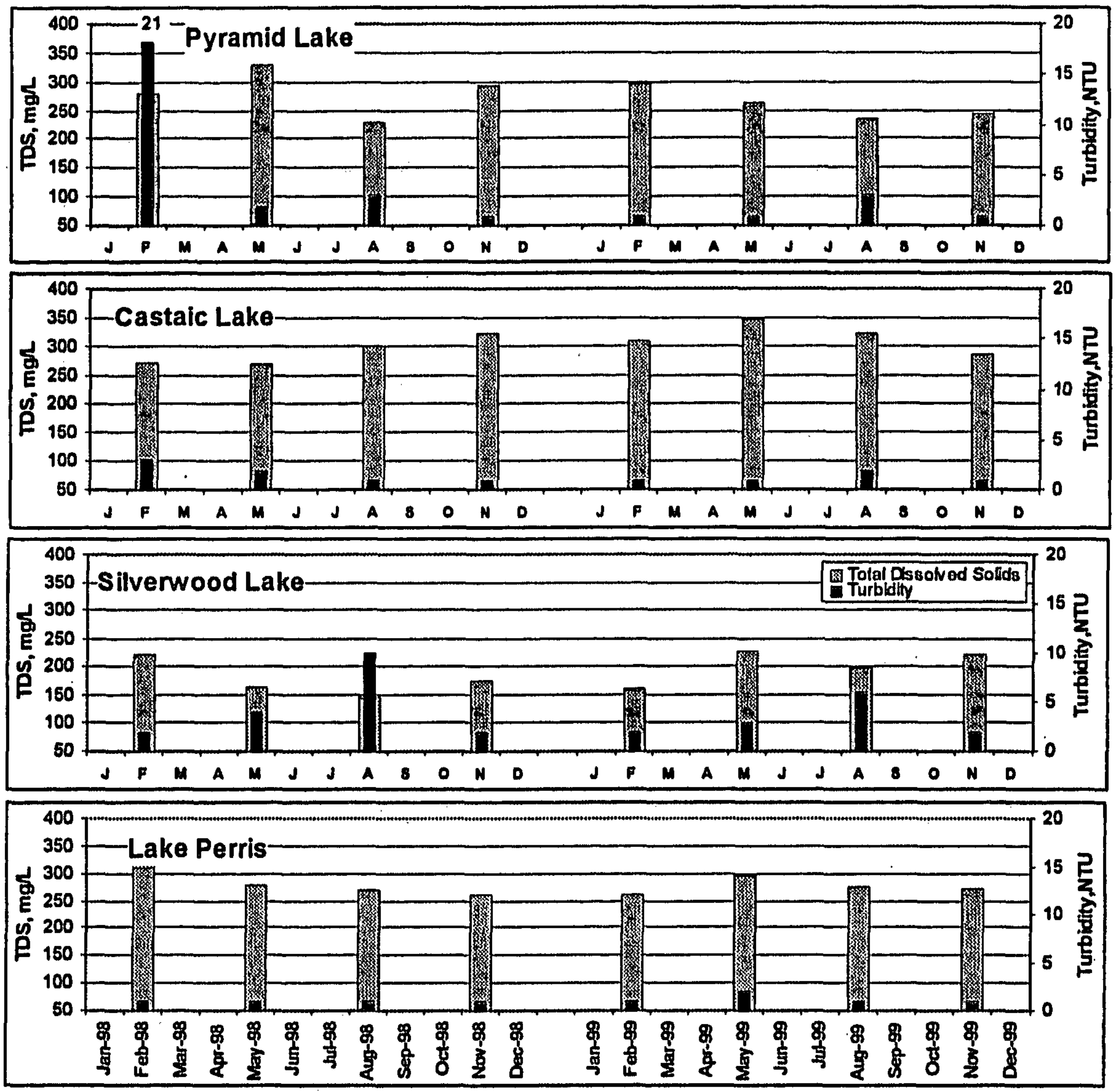


Figure 3-12
Quarterly TDS and Turbidity at Project Lakes in Southern California



Minor Elements

Minor elements include metals such as copper, zinc, and iron, and non-metals such as arsenic and selenium.

Feather River Watershed

Minor elements at Project stations in the Feather River Watershed were below detection except for iron, manganese, copper, and zinc (Table 3-2). Of those detected, none were over the Primary or Secondary MCLs. Two samples from Lake Davis were above the Article 19 Objective for iron+manganese of 0.3 mg/L. The first was collected in August 1998 and contained 0.022 mg/L iron and 0.278 mg/L manganese. The other sample was collected in July 1999 and contained 0.039 mg/L iron and 0.273 mg/L manganese. Both metals are naturally present in Lake Davis.

North and South Bay Aqueducts and San Luis Reservoir

In the North Bay Aqueduct, cadmium, lead, mercury, and silver were below their respective reporting limits during 1998-99 (Tables 3-3 and 3-4). All positive detections were below the MCLs for finished drinking water or Article 19 objectives.

In the South Bay Aqueduct, aluminum, lead, mercury, selenium, and silver were below their respective reporting limits at all stations monitored during 1998-99 (Tables 3-3 and 3-4). Most of the other elements were infrequently detected and all were below the MCLs for finished drinking water. Boron was detected at 1.00 mg/L, above the Article 19 Objective of 0.6 mg/L. The sample was collected in May 1998 when San Joaquin River flow remained elevated from a wet season. Copper was routinely detected at low levels but never exceeded 0.02 mg/L. As in the past, samples from Lake Del Valle contained the highest levels of zinc in the Project. Zinc at the outlet ranged from 0.025 to 0.118 mg/L during the 2-year period. A maximum of 0.437 mg/L was reported in 1996. Barium levels in Lake Del Valle were also higher than at other Project stations.

In San Luis Reservoir, aluminum, barium, cadmium, iron, lead, mercury, selenium, and silver were below their respective reporting limits during 1998-99 (Tables 3-3 and 3-4). None of the positive detections were above the MCLs for finished drinking water or Article 19 objectives.

California Aqueduct and Coastal Branch

With the exception of boron, minor elements in the California Aqueduct and Coastal Branch were below the MCLs for finished drinking water or Article 19 objectives (Tables 3-5 and 3-6). One sample from Banks Pumping Plant contained 1.23 mg/L of boron during 1998 and was above the Article 19 Objective of 0.6 mg/L. The sample was collected in April, when high flows from the San Joaquin River dominated the south Delta. Mercury was also detected at the same station in 1999 and was probably due to field or laboratory contamination. A lead value of 0.002 mg/L was detected at Check 13, well below the Article 19 Objective of 0.1 mg/L. A manganese concentration of 0.750 mg/L was reported for Devil Canyon Afterbay and was above the iron+manganese Article 19 Objective of 0.3 mg/L. Other stations exhibited maximum manganese concentrations of between <0.005 and 0.032 mg/L during the same year, indicating possible sample contamination.

Table 3-2
Minor Elements in the Feather River Watershed, 1998-99 (mg/L)

			1998				1999			
Parameter	Station Name	I.D. #	Median	Low	High	# of Samples	Median	Low	High	# of Samples
Aluminum	Thermalito Forebay	TF001000		< 0.010	< 0.010	3		< 0.010	< 0.010	4
	Thermalito Afterbay	TA001000		< 0.010	< 0.010	2		< 0.010	< 0.010	6
Cadmium	Thermalito Forebay	TF001000		< 0.001	< 0.001	3		< 0.001	< 0.001	4
	Thermalito Afterbay	TA001000		< 0.001	< 0.001	6		< 0.001	< 0.001	6
Chromium	Antelope Lake	AN001000					< 0.005			1
	Frenchman Lake	FR001000					< 0.005			1
	Lake Davis	LD001000					< 0.005			1
	Thermalito Forebay	TF001000		< 0.005	< 0.005	3		< 0.005	< 0.005	4
	Thermalito Afterbay	TA001000		< 0.005	< 0.005	11		< 0.005	< 0.005	12
Copper	Antelope Lake	AN001000					< 0.001			1
	Frenchman Lake	FR001000					< 0.001			1
	Lake Davis	LD001000					< 0.001			1
	Thermalito Forebay	TF001000	< 0.001	< 0.001	< 0.001	3		< 0.001	< 0.001	4
	Thermalito Afterbay	TA001000	< 0.001	< 0.001	0.001	11	< 0.001	< 0.001	0.001	12
Iron	Antelope Lake	AN001000					0.033			1
	Frenchman Lake	FR001000					0.016			1
	Lake Davis	LD001000	0.027	0.009	0.058	6	0.027	0.007	0.057	10
	Thermalito Forebay	TF001000	< 0.005	< 0.005	0.007	3		< 0.005	< 0.005	4
	Thermalito Afterbay	TA001000	0.005	< 0.005	0.011	11	< 0.005	< 0.005	0.005	12
Lead	Antelope Lake	AN001000					< 0.001			1
	Frenchman Lake	FR001000					< 0.001			1
	Lake Davis	LD001000					< 0.001			1
	Thermalito Forebay	TF001000		< 0.001	< 0.001	3		< 0.001	< 0.001	4
	Thermalito Afterbay	TA001000		< 0.001	< 0.001	11		< 0.001	< 0.001	12
Manganese	Antelope Lake	AN001000					< 0.005			1
	Frenchman Lake	FR001000					< 0.005			1
	Lake Davis	LD001000	0.009	< 0.005	0.278	6	< 0.005	< 0.005	0.273	10
	Thermalito Forebay	TF001000		< 0.005	< 0.005	3		< 0.005	< 0.005	4
	Thermalito Afterbay	TA001000	< 0.005	< 0.005	0.006	11		< 0.005	0.016	12
Mercury	Thermalito Forebay	TF001000		< 0.0002	< 0.0002	3		< 0.0002	< 0.0002	4
	Thermalito Afterbay	TA001000		< 0.0002	< 0.0002	2		< 0.0002	< 0.0002	6
Silver	Thermalito Forebay	TF001000		< 0.001	< 0.001	3		< 0.001	< 0.001	4
	Thermalito Afterbay	TA001000		< 0.001	< 0.001	6		< 0.001	< 0.001	12
Zinc	Antelope Lake	AN001000					< 0.005			1
	Frenchman Lake	FR001000					< 0.005			1
	Lake Davis	LD001000					< 0.005			1
	Thermalito Forebay	TF001000		< 0.005	< 0.005	3		< 0.005	< 0.005	4
	Thermalito Afterbay	TA001000		< 0.005	< 0.005	11	< 0.005	< 0.005	0.010	12
Arsenic	Antelope Lake	AN001000				1	< 0.001			1
	Frenchman Lake	FR001000				1	< 0.001			1
	Lake Davis	LD001000				1	< 0.001			1
	Thermalito Forebay	TF001000		< 0.001	< 0.001	3		< 0.001	< 0.001	4
	Thermalito Afterbay	TA001000		< 0.001	< 0.001	11		< 0.001	< 0.001	12
Barium	Thermalito Forebay	TA001000		< 0.05	< 0.05	3		< 0.05	< 0.05	4
	Thermalito Afterbay	TF001000		< 0.05	< 0.05	6		< 0.05	< 0.05	6
Boron	Antelope Lake	AN001000					< 0.1			1
	Frenchman Lake	FR001000					< 0.1			1
	Lake Davis	LD001000					< 0.1			1
	Thermalito Forebay	TF001000		< 0.1	< 0.1	4		< 0.01	< 0.1	4
	Thermalito Afterbay	TA001000		< 0.1	< 0.1	12		< 0.1	< 0.1	9
Fluoride	Antelope Lake	AN001000					< 0.1			1
	Frenchman Lake	FR001000					< 0.1			1
	Lake Davis	LD001000					< 0.1			1
	Thermalito Forebay	TF001000		< 0.1	< 0.1	4		< 0.01	< 0.1	4
	Thermalito Afterbay	TA001000		< 0.1	< 0.1	12		< 0.1	< 0.1	9
Selenium	Antelope Lake	AN001000					< 0.001			1
	Frenchman Lake	FR001000					< 0.001			1
	Lake Davis	LD001000					< 0.001			1
	Thermalito Forebay	TF001000		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	Thermalito Afterbay	TA001000		< 0.001	< 0.001	11		< 0.001	< 0.001	12

Table 3-3
Metallic Elements in the North and South Bay Aqueducts and San Luis Reservoir, 1998-99 (mg/L)

			1998				1999			
Parameter	Station Name	I.D#	Median	Low	High	# of Samples	Median	Low	High	# of Samples
Aluminum	NBA, Barker Sl. Pumping Plant	KG000000	< 0.010	< 0.010	0.018	13	< 0.010	< 0.010	0.033	12
	NBA, Cordelia Forebay	KG002123	< 0.010	< 0.010	0.028	4		< 0.010	< 0.010	4
	SBA, Check 7	KB001638		< 0.010	< 0.010	9		< 0.010	< 0.010	12
	SBA, Del Valle Outlet	DV000000		< 0.010	< 0.010	4		< 0.010	< 0.010	2
	SBA, Santa Clara Terminal Tank	KB004207		< 0.010	< 0.010	5		< 0.010	< 0.010	4
	San Luis Reservoir	SL005000		< 0.010	< 0.010	11		< 0.010	< 0.010	12
Cadmium	NBA, Barker Sl. Pumping Plant	KG000000		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	NBA, Cordelia Forebay	KG002123		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	SBA, Check 7	KB001638		< 0.001	< 0.001	9		< 0.001	< 0.001	12
	SBA, Del Valle Outlet	DV000000		< 0.001	< 0.001	4		< 0.001	< 0.001	2
	SBA, Santa Clara Terminal Tank	KB004207		< 0.001	< 0.001	5		< 0.001	< 0.001	4
	San Luis Reservoir	SL005000		< 0.001	< 0.001	11		< 0.001	< 0.001	12
Chromium	NBA, Barker Sl. Pumping Plant	KG000000	0.005	< 0.005	0.008	12	0.007	< 0.005	0.011	12
	NBA, Cordelia Forebay	KG002123	< 0.005	< 0.005	0.007	4	0.005	< 0.005	0.011	4
	SBA, Check 7	KB001638		< 0.005	< 0.005	9	< 0.005	< 0.005	0.006	12
	SBA, Del Valle Outlet	DV000000	0.005	< 0.005	0.010	4		0.011	0.013	2
	SBA, Santa Clara Terminal Tank	KB004207	< 0.005	< 0.005	0.006	5	0.005	< 0.005	0.009	4
	San Luis Reservoir	SL005000		< 0.005	< 0.005	11	< 0.005	< 0.005	0.007	12
Copper	NBA, Barker Sl. Pumping Plant	KG000000	0.003	0.002	0.005	12	0.002	0.002	0.005	12
	NBA, Cordelia Forebay	KG002123	0.003	0.002	0.003	4	0.002	0.002	0.004	4
	SBA, Check 7	KB001638	0.002	0.001	0.020	9	0.002	0.002	0.009	9
	SBA, Del Valle Outlet	DV000000	0.002	0.001	0.002	4		0.001	0.002	2
	SBA, Santa Clara Terminal Tank	KB004207	0.003	0.002	0.007	5	0.002	0.002	0.003	4
	San Luis Reservoir	SL005000	0.002	< 0.001	0.006	11	0.004	0.001	0.014	12
Iron	NBA, Barker Sl. Pumping Plant	KG000000	0.006	< 0.005	0.126	13	< 0.005	< 0.005	0.061	12
	NBA, Cordelia Forebay	KG002123	< 0.005	< 0.005	0.052	4	< 0.005	< 0.005	0.045	4
	SBA, Check 7	KB001638	0.007	< 0.005	0.039	9	< 0.005	< 0.005	0.037	12
	SBA, Del Valle Outlet	DV000000		< 0.005	< 0.005	4		< 0.005	< 0.005	2
	SBA, Santa Clara Terminal Tank	KB004207	0.007	< 0.005	0.039	5		< 0.005	< 0.005	4
	San Luis Reservoir	SL005000		< 0.005	< 0.005	11		< 0.005	< 0.005	12
Lead	NBA, Barker Sl. Pumping Plant	KG000000		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	NBA, Cordelia Forebay	KG002123		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	SBA, Check 7	KB001638		< 0.001	< 0.001	9		< 0.001	< 0.001	12
	SBA, Del Valle Outlet	DV000000		< 0.001	< 0.001	4		< 0.001	< 0.001	2
	SBA, Santa Clara Terminal Tank	KB004207		< 0.001	< 0.001	5		< 0.001	< 0.001	4
	San Luis Reservoir	SL005000		< 0.001	< 0.001	11		< 0.001	< 0.001	12
Manganese	NBA, Barker Sl. Pumping Plant	KG000000	0.015	0.008	0.061	13	0.010	0.006	0.044	12
	NBA, Cordelia Forebay	KG002123	< 0.005	< 0.005	0.005	4	0.005	< 0.005	0.01	4
	SBA, Check 7	KB001638	< 0.005	< 0.005	0.011	9	< 0.005	< 0.005	0.012	12
	SBA, Del Valle Outlet	DV000000		< 0.005	< 0.005	4		< 0.005	< 0.005	2
	SBA, Santa Clara Terminal Tank	KB004207	0.006	< 0.005	0.032	5		< 0.005	< 0.005	4
	San Luis Reservoir	SL005000	< 0.005	< 0.005	0.005	10	< 0.005	< 0.005	0.017	12
Mercury	NBA, Barker Sl. Pumping Plant	KG000000		< 0.0002	< 0.0002	12		< 0.0002	< 0.0002	12
	NBA, Cordelia Forebay	KG002123		< 0.0002	< 0.0002	4		< 0.0002	< 0.0002	4
	SBA, Check 7	KB001638		< 0.0002	< 0.0002	9		< 0.0002	< 0.0002	12
	SBA, Del Valle Outlet	DV000000		< 0.0002	< 0.0002	4		< 0.0002	< 0.0002	2
	SBA, Santa Clara Terminal Tank	KB004207		< 0.0002	< 0.0002	5		< 0.0002	< 0.0002	4
	San Luis Reservoir	SL005000		< 0.0002	< 0.0002	11		< 0.0002	< 0.0002	12
Silver	NBA, Barker Sl. Pumping Plant	KG000000		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	NBA, Cordelia Forebay	KG002123		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	SBA, Check 7	KB001638		< 0.001	< 0.001	9		< 0.001	< 0.001	12
	SBA, Del Valle Outlet	DV000000		< 0.001	< 0.001	4		< 0.001	< 0.001	2
	SBA, Santa Clara Terminal Tank	KB004207		< 0.001	< 0.001	5		< 0.001	< 0.001	4
	San Luis Reservoir	SL005000	<	< 0.001	< 0.001	11		< 0.001	< 0.001	12
Zinc	NBA, Barker Sl. Pumping Plant	KG000000	< 0.005	< 0.005	0.016	13		< 0.005	< 0.005	12
	NBA, Cordelia Forebay	KG002123	< 0.005	< 0.005	0.009	4		< 0.005	< 0.005	4
	SBA, Check 7	KB001638	< 0.005	< 0.005	0.015	9	< 0.005	< 0.005	0.012	12
	SBA, Del Valle Outlet	DV000000	0.025	0.025	0.118	4		0.027	0.034	2
	SBA, Santa Clara Terminal Tank	KB004207	< 0.005	< 0.005	0.016	5	0.007	< 0.005	0.017	4
	San Luis Reservoir	SL005000	< 0.005	< 0.005	0.042	11		< 0.005	< 0.005	12

Table 3-4
Nonmetallic Elements in the North and South Bay Aqueducts and San Luis Reservoir, 1998-99 (mg/L)

Parameter	Station Name	I.D#	1998 Median	1998 Low	1998 High	1998 # of Samples	1999 Median	1999 Low	1999 High	1999 # of Samples
Arsenic	NBA, Barker Sl. Pumping Plant	KG000000	0.002	0.001	0.004	12	0.002	0.002	0.003	12
	NBA, Cordelia Forebay	KG002123	0.002	0.002	0.003	4	0.002	0.002	0.003	4
	SBA, Check 7	KB001638	0.002	0.001	0.003	9	0.002	0.001	0.002	12
	SBA, Del Valle Outlet	DV000000	0.001	< 0.001	0.002	8		0.002	0.002	2
	SBA, Santa Clara Terminal Tank	KB004207	0.002	0.002	0.003	6	0.002	0.001	0.002	4
	San Luis Reservoir	SL005000	0.002	< 0.001	0.002	11	0.002	< 0.001	0.003	12
Barium	NBA, Barker Sl. Pumping Plant	KG000000	< 0.050	< 0.050	0.076	12	< 0.050	< 0.050	0.063	12
	NBA, Cordelia Forebay	KG002123	< 0.050	< 0.050	0.067	4	< 0.050	< 0.050	0.063	4
	SBA, Check 7	KB001638	< 0.050	< 0.050	< 0.050	9		< 0.050	< 0.050	12
	SBA, Del Valle Outlet	DV000000	0.054	0.050	0.080	8		0.082	0.085	2
	SBA, Santa Clara Terminal Tank	KB004207	< 0.050	< 0.050	0.053	6	< 0.050	< 0.050	0.057	4
	San Luis Reservoir	SL005000		< 0.050	< 0.050	11		< 0.050	< 0.050	12
Boron	NBA, Barker Sl. Pumping Plant	KG000000	0.20	< 0.10	0.40	14	0.2	0.1	0.4	12
	NBA, Cordelia Forebay	KG002123	0.20	< 0.10	0.39	4	0.1	0.1	0.4	4
	SBA, Check 7	KB001638	0.11	0.10	0.47	9	0.1	0.1	0.2	12
	SBA, Del Valle Outlet	DV000000	0.11	< 0.10	0.20	6		< 0.1	0.2	2
	SBA, Santa Clara Terminal Tank	KB004207	0.10	< 0.10	1.00	5	< 0.1	0.1	0.2	4
	San Luis Reservoir	SL005000	0.16	0.16	0.20	11	0.2	< 0.1	0.2	12
Fluoride	NBA, Barker Sl. Pumping Plant	KG000000	0.1	< 0.1	0.2	12	0.1	< 0.1	0.2	12
	NBA, Cordelia Forebay	KG002123	0.1	< 0.1	0.2	4	0.1	0.1	0.4	4
	SBA, Check 7	KB001638	< 0.1	< 0.1	0.1	9	0.2	< 0.1	0.2	12
	SBA, Del Valle Outlet	DV000000	0.1	< 0.1	0.1	6		< 0.1	0.2	2
	SBA, Santa Clara Terminal Tank	KB004207	< 0.1	< 0.1	0.1	5	0.1	< 0.1	0.2	4
	San Luis Reservoir	SL005000		0.1	0.1	4		0.1	0.1	4
Selenium	NBA, Barker Sl. Pumping Plant	KG000000	< 0.001	< 0.001	0.001	12		< 0.001	< 0.001	12
	NBA, Cordelia Forebay	KG002123		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	SBA, Check 7	KB001638		< 0.001	< 0.001	9		< 0.001	< 0.001	12
	SBA, Del Valle Outlet	DV000000		< 0.001	< 0.001	8		< 0.001	< 0.001	2
	SBA, Santa Clara Terminal Tank	KB004207		< 0.001	< 0.001	6		< 0.001	< 0.001	4
	San Luis Reservoir	SL005000		< 0.001	< 0.001	4		< 0.001	< 0.001	4

Table 3-5
Metallic Elements in the California Aqueduct and Coastal Branch, 1998-99 (mg/L)

			1998				1999			
Parameter	Station Name	I.D#	Median	Low	High	# of Samples	Median	Low	High	# of Samples
Aluminum	Clifton Court Forebay	KA000000						< 0.010		1
	Harvey O. Banks Pumping Plant	KA000331		< 0.010	< 0.010	12		< 0.010	< 0.010	12
	Check 13	KA007089		< 0.010	< 0.010	12		< 0.010	< 0.010	10
	Check 21	KA017226		< 0.010	< 0.010	12	< 0.010	< 0.010	0.057	12
	Coastal Branch	KC000934		< 0.010	< 0.010	12		< 0.010	< 0.010	12
	Check 29	KA024454		< 0.010	< 0.010	12		< 0.010	< 0.010	12
	Check 41	KA030341		< 0.010	< 0.010	12		< 0.010	< 0.010	12
	Check 66	KA040341		< 0.010	< 0.010	4		< 0.010	< 0.010	2
	Devil Canyon Afterbay	KA041288	< 0.010	< 0.010	0.048	12		< 0.010	< 0.010	12
Cadmium	Clifton Court Forebay	KA000000					< 0.001			1
	Harvey O. Banks Pumping Plant	KA000331		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Check 13	KA007089		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Check 21	KA017226		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Coastal Branch	KC000934		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Check 29	KA024454		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Check 41	KA030341		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Check 66	KA040341		< 0.001	< 0.001	4		< 0.001	< 0.001	5
	Devil Canyon Afterbay	KA041288		< 0.005	< 0.001	12		< 0.001	< 0.001	12
Chromium	Clifton Court Forebay	KA000000					< 0.005		< 0.005	1
	Harvey O. Banks Pumping Plant	KA000331		< 0.005	< 0.005	12	< 0.005	< 0.005	0.006	12
	Check 13	KA007089		< 0.005	< 0.005	12	< 0.005	< 0.005	0.007	12
	Check 21	KA017226		< 0.005	< 0.005	12	< 0.005	< 0.005	0.007	12
	Coastal Branch	KC000934		< 0.005	< 0.005	12	< 0.005	< 0.005	0.006	12
	Check 29	KA024454		< 0.005	< 0.005	12	< 0.005	< 0.005	0.006	12
	Check 41	KA030341		< 0.005	< 0.005	12	< 0.005	< 0.005	0.007	12
	Check 66	KA040341		< 0.005	< 0.005	4	< 0.005	< 0.005	0.005	5
	Devil Canyon Afterbay	KA041288		< 0.005	< 0.005	12	< 0.005	< 0.005	0.006	12
Copper	Clifton Court Forebay	KA000000					< 0.001			1
	Harvey O. Banks Pumping Plant	KA000331	0.003	0.001	0.011	12	0.002	0.002	0.007	12
	Check 13	KA007089	0.002	< 0.001	0.006	12	0.002	0.002	0.003	12
	Check 21	KA017226	0.002	< 0.001	0.003	12	0.002	< 0.001	0.002	12
	Coastal Branch	KC000934	0.002	0.002	0.039	12	0.002	0.002	0.003	12
	Check 29	KA024454	0.002	0.001	0.003	12		0.002	0.002	12
	Check 41	KA030341	0.002	0.001	0.004	12		0.002	0.002	12
	Check 66	KA040341	0.003	0.002	0.004	4	0.002	< 0.001	0.004	5
	Devil Canyon Afterbay	KA041288	0.002	< 0.001	0.005	12	0.002	0.002	0.003	12
Iron	Clifton Court Forebay	KA000000					< 0.005			1
	Harvey O. Banks Pumping Plant	KA000331	0.007	< 0.005	0.036	12	0.006	< 0.005	0.034	12
	Check 13	KA007089	0.006	< 0.005	0.025	12	< 0.005	< 0.005	0.024	12
	Check 21	KA017226	< 0.005	< 0.005	0.040	12	< 0.005	< 0.005	0.084	12
	Coastal Branch	KC000934	< 0.005	< 0.005	0.030	12	< 0.005	< 0.005	0.019	12
	Check 29	KA024454	0.006	< 0.005	0.032	12	< 0.005	< 0.005	0.016	12
	Check 41	KA030341	< 0.005	< 0.005	0.027	12	< 0.005	< 0.005	0.017	12
	Check 66	KA040341	< 0.005	< 0.005	0.014	4	< 0.005	< 0.005	0.009	5
	Devil Canyon Afterbay	KA041288	< 0.005	< 0.005	0.035	12	< 0.005	< 0.005	0.007	12
Lead	Clifton Court Forebay	KA000000						< 0.001	< 0.001	1
	Harvey O. Banks Pumping Plant	KA000331		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Check 13	KA007089	< 0.001	< 0.001	0.002	12		< 0.001	< 0.001	12
	Check 21	KA017226		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Coastal Branch	KC000934		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Check 29	KA024454		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Check 41	KA030341		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Check 66	KA040341		< 0.001	< 0.001	4		< 0.001	< 0.001	5
	Devil Canyon Afterbay	KA041288		< 0.001	< 0.001	12		< 0.001	< 0.001	12

Table 3-5 (Con't)
Metallic Elements in the California Aqueduct and Coastal Branch, 1998-99 (mg/L)

			1998				1999			
Parameter	Station Name	I.D#	Median	Low	High	# of Samples	Median	Low	High	# of Samples
Manganese	Clifton Court Forebay	KA000000					< 0.005			1
	Harvey O. Banks Pumping Plant	KA000331	0.011	< 0.005	0.034	12	0.008	< 0.005	0.032	12
	Check 13	KA007089	< 0.005	< 0.005	0.015	12	0.005	< 0.005	0.015	12
	Check 21	KA017226	< 0.005	< 0.005	0.007	12	< 0.005	< 0.005	0.006	12
	Coastal Branch	KC000934	< 0.005	< 0.005	0.009	12	< 0.005	< 0.005	0.009	12
	Check 29	KA024454	< 0.005	< 0.005	< 0.005	12		< 0.005	< 0.005	12
	Check 41	KA030341		< 0.005	< 0.005	12		< 0.005	< 0.005	12
	Check 66	KA040341	< 0.005	< 0.005	0.005	4	< 0.005	< 0.005	0.026	5
	Devil Canyon Afterbay	KA041288	< 0.005	< 0.005	0.017	12	< 0.005	< 0.005	0.750	12
Mercury	Clifton Court Forebay	KA000000					< 0.0002			1
	Harvey O. Banks Pumping Plant	KA000331		< 0.0002	< 0.0002	12	< 0.0002	< 0.0002	0.0002	12
	Check 13	KA007089		< 0.0002	< 0.0002	12		< 0.0002	< 0.0002	12
	Check 21	KA017226		< 0.0002	< 0.0002	12		< 0.0002	< 0.0002	12
	Coastal Branch	KC000934		< 0.0002	< 0.0002	12		< 0.0002	< 0.0002	12
	Check 29	KA024454		< 0.0002	< 0.0002	12		< 0.0002	< 0.0002	12
	Check 41	KA030341		< 0.0002	< 0.0002	12		< 0.0002	< 0.0002	12
	Check 66	KA040341		< 0.0002	< 0.0002	4		< 0.0002	< 0.0002	5
	Devil Canyon Afterbay	KA041288		< 0.0002	< 0.0002	12		< 0.0002	< 0.0002	12
Silver	Clifton Court Forebay	KA000000					< 0.001			1
	Harvey O. Banks Pumping Plant	KA000331		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Check 13	KA007089		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Check 21	KA017226		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Coastal Branch	KC000934		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Check 29	KA024454		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Check 41	KA030341		< 0.001	< 0.001	12		< 0.001	< 0.001	12
	Check 66	KA040341		< 0.001	< 0.001	4		< 0.001	< 0.001	5
	Devil Canyon Afterbay	KA041288		< 0.001	< 0.001	12		< 0.001	< 0.001	12
Zinc	Clifton Court Forebay	KA000000					< 0.005			1
	Harvey O. Banks Pumping Plant	KA000331	< 0.005	< 0.005	0.016	12		< 0.005	< 0.005	12
	Check 13	KA007089	< 0.005	< 0.005	0.006	12		< 0.005	< 0.005	12
	Check 21	KA017226	< 0.005	< 0.005	0.007	12		< 0.005	< 0.005	12
	Coastal Branch	KC000934	< 0.005	< 0.005	0.026	12		< 0.005	< 0.005	12
	Check 29	KA024454		< 0.005	< 0.005	12		< 0.005	< 0.005	12
	Check 41	KA030341	< 0.005	< 0.005	0.016	12	< 0.005	< 0.005	0.010	12
	Check 66	KA040341		< 0.005	< 0.005	4	< 0.005	< 0.005	0.009	5
	Devil Canyon Afterbay	KA041288	< 0.005	< 0.005	0.012	12	< 0.005	< 0.005	0.007	12

Table 3-6
Nonmetallic Elements in the California Aqueduct and Coastal Branch, 1998-99 (mg/L)

			1998				1999			
Parameter	Station Name	I.D#	Median	Low	High	# of Samples	Median	Low	High	# of Samples
Arsenic	Clifton Court Forebay	KA000000					< 0.001			1
	Harvey O. Banks Pumping Plant	KA000331	0.002	0.001	0.003	12	0.002	0.001	0.002	12
	Check 13	KA007089	0.002	< 0.001	0.003	12	0.002	0.001	0.002	12
	Check 21	KA017226	0.002	< 0.001	0.002	12	0.002	< 0.001	0.002	12
	Coastal Branch	KC000934	0.002	0.002	0.002	12	0.002	0.001	0.003	12
	Check 29	KA024454	0.002	0.002	0.003	12	0.002	0.001	0.002	12
	Check 41	KA030341	0.002	< 0.001	0.003	12	0.002	0.001	0.003	12
	Check 66	KA040341	0.002	0.002	0.003	4	0.002	< 0.001	0.002	5
	Devil Canyon Afterbay	KA041288	0.002	< 0.001	0.003	12	0.002	< 0.001	0.003	12
Barium	Clifton Court Forebay	KA000000					< 0.05			1
	Harvey O. Banks Pumping Plant	KA000331		< 0.05	< 0.05	12		< 0.05	< 0.05	12
	Check 13	KA007089		< 0.05	< 0.05	12		< 0.05	< 0.05	12
	Check 21	KA017226	< 0.05	< 0.05	0.07	12		< 0.05	< 0.05	12
	Coastal Branch	KC000934		< 0.05	< 0.05	12		< 0.05	< 0.05	12
	Check 29	KA024454		< 0.05	< 0.05	12		< 0.05	< 0.05	12
	Check 41	KA030341		< 0.05	< 0.05	12		< 0.05	< 0.05	12
	Check 66	KA040341		< 0.05	< 0.05	4		< 0.05	< 0.05	5
	Devil Canyon Afterbay	KA041288		< 0.05	< 0.05	12		< 0.05	< 0.05	12
Boron	Clifton Court Forebay	KA000000	0.11	0.1	0.3	4	0.1	< 0.1	0.21	4
	Harvey O. Banks Pumping Plant	KA000331	0.12	< 0.1	1.23	12	0.1	0.1	0.3	12
	Check 12	KA006633	0.1	0.1	0.35	4	0.2	< 0.1	0.2	3
	Check 13	KA007089	0.2	0.1	0.32	12	0.2	< 0.1	0.3	12
	Check 21	KA017226	0.2	0.1	0.58	12	0.2	< 0.1	0.26	12
	Coastal Branch	KC000934	0.2	0.1	0.6	12	0.2	< 0.1	0.2	12
	Check 29	KA024454	0.1	< 0.1	0.2	12	0.2	< 0.1	0.3	12
	Check 41	KA030341	0.1	< 0.1	0.24	10	0.1	< 0.1	0.2	12
	Check 66	KA040341	0.1	< 0.1	0.2	4	0.1	0.1	0.2	4
	Devil Canyon Afterbay	KA041288	0.11	0.1	0.19	11	0.1	< 0.1	0.2	12
Fluoride	Harvey O. Banks Pumping Plant	KA000331	< 0.1	< 0.1	0.2	12		< 0.1	< 0.1	12
	Check 13	KA007089	< 0.1	< 0.1	0.1	12		< 0.1	< 0.1	12
	Check 21	KA017226	< 0.1	< 0.1	0.2	12		< 0.1	< 0.1	12
	Coastal Branch	KC000934	< 0.1	< 0.1	0.2	12		< 0.1	< 0.1	12
	Check 29	KA024454	< 0.1	< 0.1	0.2	12		< 0.1	< 0.1	12
	Check 41	KA030341	< 0.1	< 0.1	0.2	10	< 0.1	< 0.1	0.2	12
	Check 66	KA040341	< 0.1	< 0.1	0.1	4		< 0.1	< 0.1	4
	Devil Canyon Afterbay	KA041288	< 0.1	< 0.1	0.2	12		< 0.1	< 0.1	12
Selenium	Clifton Court Forebay	KA000000					< 0.001			1
	Harvey O. Banks Pumping Plant	KA000331		< 0.001	< 0.001	12	< 0.001	< 0.001	0.002	12
	Check 13	KA007089	< 0.001	< 0.001	0.001	12	< 0.001	< 0.001	0.001	12
	Check 21	KA017226	< 0.001	< 0.001	0.005	12	< 0.001	< 0.001	0.005	12
	Coastal Branch	KC000934	< 0.001	< 0.001	0.003	12		< 0.001	< 0.001	12
	Check 29	KA024454		< 0.001	< 0.001	12	< 0.001	< 0.001	0.001	12
	Check 41	KA030341	< 0.001	< 0.001	0.001	12	< 0.001	< 0.001	0.001	12
	Check 66	KA040341		< 0.001	< 0.001	4		< 0.001	< 0.001	5
	Devil Canyon Afterbay	KA041288		< 0.001	< 0.001	12		< 0.001	< 0.001	12

Project Lakes in Southern California

Arsenic, copper, boron, and fluoride were the only minor elements routinely detected at Project lakes in Southern California (Table 3-7). Of these elements, all values were below the MCLs for finished drinking water or Article 19 objectives.

Table 3-7
Minor Elements in Project Lakes in Southern California, 1998-99

Parameter	Station Name	I.D#	1998 Median	1998 Low	1998 High	1998 # of Samples	1999 Median	1999 Low	1999 High	1999 # of Samples
Aluminum	Pyramid Lake	PY001000	< 0.010	< 0.010	0.015	4	< 0.010	< 0.010	0.024	4
	Castaic Lake	CA002000		< 0.010	< 0.010	4		< 0.010	< 0.010	4
	Silverwood Lake	SI002000		< 0.010	< 0.010	4		< 0.010	< 0.010	4
	Lake Perris	PE002000		< 0.010	< 0.010	4		< 0.010	< 0.010	4
Cadmium	Pyramid Lake	PY001000		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	Castaic Lake	CA002000		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	Silverwood Lake	SI002000		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	Lake Perris	PE002000		< 0.001	< 0.001	4		< 0.001	< 0.001	4
Chromium	Pyramid Lake	PY001000		< 0.005	< 0.005	4	0.006	0.005	0.007	4
	Castaic Lake	CA002000		< 0.005	< 0.005	4	0.006	0.006	0.007	4
	Silverwood Lake	SI002000		< 0.005	< 0.005	4	< 0.005	< 0.005	0.005	4
	Lake Perris	PE002000		< 0.005	< 0.005	4	< 0.005	< 0.005	0.007	4
Copper	Pyramid Lake	PY001000		0.002	0.003	4		0.002	0.002	4
	Castaic Lake	CA002000		0.002	0.014	4	0.002	0.002	0.005	4
	Silverwood Lake	SI002000		0.002	0.004	4	0.002	0.002	0.003	4
	Lake Perris	PE002000		0.003	0.021	4	0.003	0.003	0.023	4
Iron	Pyramid Lake	PY001000		< 0.005	< 0.005	4		< 0.005	< 0.005	4
	Castaic Lake	CA002000		< 0.005	< 0.005	4		< 0.005	< 0.005	4
	Silverwood Lake	SI002000		< 0.005	< 0.005	4		< 0.005	< 0.005	4
	Lake Perris	PE002000		< 0.005	< 0.005	4		< 0.005	< 0.005	4
Lead	Pyramid Lake	PY001000		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	Castaic Lake	CA002000		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	Silverwood Lake	SI002000		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	Lake Perris	PE002000	< 0.001	< 0.001	0.001	4		< 0.001	< 0.001	4
Manganese	Pyramid Lake	PY001000	< 0.005	< 0.005	0.007	4		< 0.005	< 0.005	4
	Castaic Lake	CA002000		< 0.005	< 0.005	4		< 0.005	< 0.005	4
	Silverwood Lake	SI002000		< 0.005	< 0.005	4	< 0.005	< 0.005	0.007	4
	Lake Perris	PE002000		< 0.005	< 0.005	4	< 0.005	< 0.005	0.027	4
Mercury	Pyramid Lake	PY001000		< 0.0002	< 0.0002	4		< 0.0002	< 0.0002	4
	Castaic Lake	CA002000		< 0.0002	< 0.0002	4		< 0.0002	< 0.0002	4
	Silverwood Lake	SI002000		< 0.0002	< 0.0002	4		< 0.0002	< 0.0002	4
	Lake Perris	PE002000		< 0.0002	< 0.0002	4		< 0.0002	< 0.0002	4
Silver	Pyramid Lake	PY001000		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	Castaic Lake	CA002000		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	Silverwood Lake	SI002000		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	Lake Perris	PE002000		< 0.001	< 0.001	4		< 0.001	< 0.001	4
Zinc	Pyramid Lake	PY001000	< 0.005	< 0.005	0.008	4		< 0.005	< 0.005	4
	Castaic Lake	CA002000	< 0.005	< 0.005	0.010	4		< 0.005	< 0.005	4
	Silverwood Lake	SI002000	< 0.005	< 0.005	0.005	4		< 0.005	< 0.005	4
	Lake Perris	PE002000	< 0.005	< 0.005	0.009	4		< 0.005	< 0.005	4
Arsenic	Pyramid Lake	PY001000		0.002	0.002	4		0.002	0.002	4
	Castaic Lake	CA002000		0.002	0.002	4		0.002	0.002	4
	Silverwood Lake	SI002000	0.002	0.002	0.003	4		0.002	0.002	4
	Lake Perris	PE002000		0.002	0.002	4		0.002	0.002	4
Barium	Pyramid Lake	PY001000		< 0.050	< 0.050	4		< 0.050	< 0.050	4
	Castaic Lake	CA002000		< 0.050	< 0.050	4		< 0.050	< 0.050	4
	Silverwood Lake	SI002000		< 0.050	< 0.050	4		< 0.050	< 0.050	4
	Lake Perris	PE002000	< 0.050	< 0.050	0.059	4	< 0.05	< 0.050	0.520	4
Boron	Pyramid Lake	PY001000	0.30	0.29	0.40	4		0.20	0.20	4
	Castaic Lake	CA002000	0.28	0.28	0.30	4	0.30	0.30	0.40	4
	Silverwood Lake	SI002000	0.10	0.10	0.15	4	0.10	0.10	0.20	4
	Lake Perris	PE002000	0.20	0.20	0.24	4		0.20	0.20	4
Fluoride	Pyramid Lake	PY001000	0.2	0.2	0.4	4	0.2	0.1	0.3	4
	Castaic Lake	CA002000	0.2	0.2	0.4	4	0.3	0.2	0.3	4
	Silverwood Lake	SI002000	< 0.1	< 0.1	0.1	4		< 0.1	< 0.1	4
	Lake Perris	PE002000		0.1	0.1	4		0.1	0.1	4
Selenium	Pyramid Lake	PY001000		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	Castaic Lake	CA002000		< 0.001	< 0.001	4		< 0.001	< 0.001	4
	Silverwood Lake	SI002000	< 0.001	< 0.001	0.001	4		< 0.001	< 0.001	4
	Lake Perris	PE002000		< 0.001	< 0.001	4		< 0.001	< 0.001	4

Trihalomethane Precursors and Formation Potential

Trihalomethane precursors include bromide and organic carbon. Trihalomethane formation potential is a measure of the capacity for trihalomethanes to form when disinfectants are added in the water treatment process. No standard exists for this measurement. Total trihalomethane formation potential (TTHMFP) is the sum of chloroform, bromodichloromethane, dibromochloromethane, and bromoform.

North and South Bay Aqueducts and San Luis Reservoir
In the North Bay Aqueduct at Barker Slough Pumping Plant, total organic carbon peaked at 20.3 mg/L in 1998 and 14.4 mg/L in 1999 (Figure 3-13). The peaks occurred during winter (Figure 3-14) when rainfall runoff frequently flushes organic carbon and other parameters from the upstream watershed. In the same samples, TTHMFP peaked at 1,583 µg/L and 1,689 µg/L, respectively. Conversely, bromide was lowest during the winter months and increased during spring and early summer. Despite the increases, bromide never exceeded 0.1 mg/L during the 2-year period.

Figure 3-13
Bromide, TOC, and TTHMFP in the North and South Bay Aqueducts and San Luis Reservoir, 1998-99

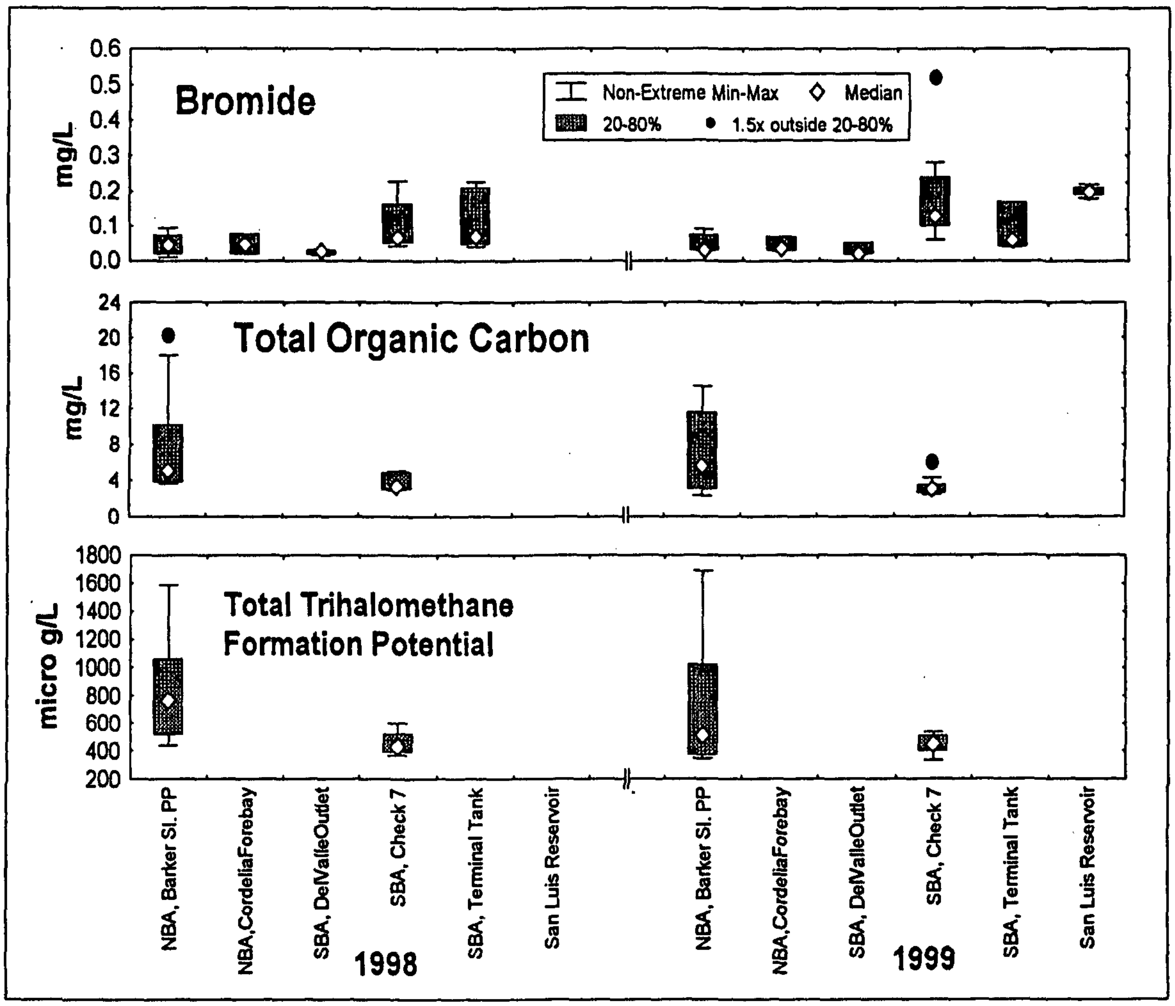
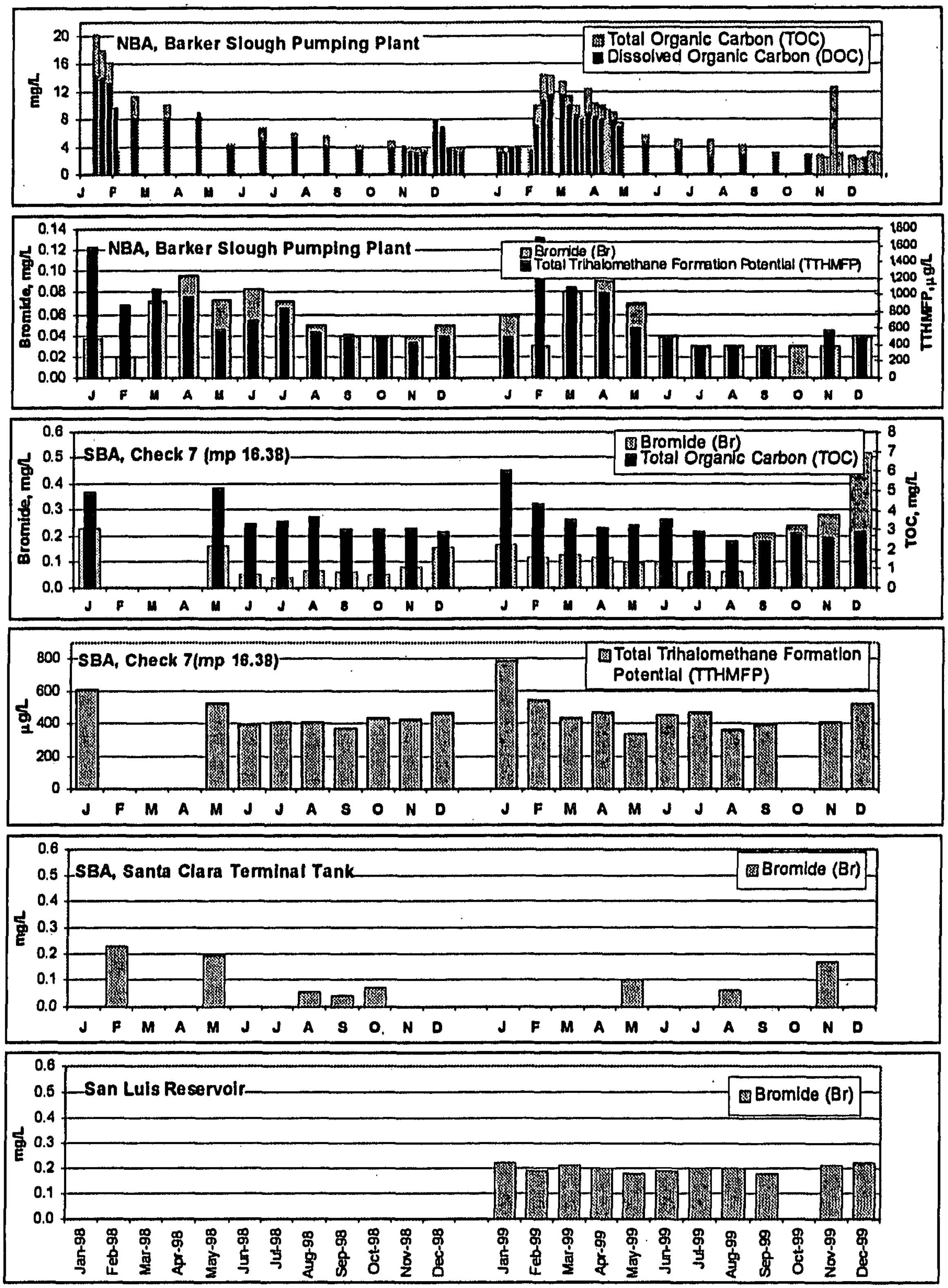


Figure 3-14
Monthly TOC and TTHMFP in the North and South Bay Aqueducts and San Luis Reservoir



On the South Bay Aqueduct at Check 7, TOC ranged between 3 and 6 mg/L during the 2-year period (Figure 3-13). Monthly levels were similar to those at Banks Pumping Plant but were sometimes off by +-1.5 mg/L. TOC did not covary between these stations as well as minerals with an r-squared of 0.78. One factor that may affect TOC between these two stations is Bethany Reservoir. Delta exports pass through a short stretch of the 4,804 af reservoir and TOC may be altered by local runoff and reservoir dynamics before reaching Check 7.

Bromide at Check 7 remained below 0.3 mg/L except in December 1999 when it reached 0.52 mg/L (Figure 3-14). The high December value was related to salinity intrusion in the south Delta. Bromide ranged from 0.04 to 0.05 mg/L in eight samples collected from Lake Del Valle (not shown).

Bromide sampling in San Luis Reservoir was initiated in 1999 and all values ranged around 0.2 mg/L (Figure 3-14).

California Aqueduct and Coastal Branch
TOC in the California Aqueduct ranged from 2.1 to 9.3 mg/L during 1998-99 (Figure 3-15). Levels were highest during the winter months at Banks Pumping Plant and Check 13 (Figure 3-16).

TOC was particularly high at Check 13 (7.2 mg/L) on January 21, 1998, while at Banks Pumping Plant it was 5.2 mg/L. On that day, 65 percent of the water entering O'Neill Forebay was from the Delta Mendota Canal and the rest was from San Luis Reservoir (no inflow from Banks Pumping Plant). On the same day, TOC in the DMC was 6.5 mg/L suggesting reservoir releases, in part, contributed to the Check 13 value. In fact, reservoir releases were also influenced by the DMC from off-peak pumping. From the 15th to the 27th of that month, the reservoir was being filled during off-peak hours and almost all inflow to the forebay (other than reservoir releases during peak energy use hours) was from the DMC. Therefore, water released from the reservoir was a mixture of existing storage with DMC inflow.

TOC at Check 13 was also higher than at Banks Pumping Plant in February 1998. On the day the sample was taken, almost all inflow to O'Neill Forebay was from the DMC and TOC in the DMC and at Check 13 was 5.8 mg/L. The same day, TOC at Banks Pumping Plant was 4.8 mg/L. TOC at Banks Pumping Plant was about 1 mg/L lower than DMC levels during both January and February 1998. This is unusual since south Delta outflow during the same period was positive, indicating both state and federal exports were influenced by the San Joaquin River. However, state exports were reduced (mostly no flow) from January 14 to February 27, 1998, due to a "low flow" Delta fish test, while federal exports continued. The January sample at Banks Pumping Plant essentially reflected water admitted to Clifton Court Forebay eight days earlier. The February sample reflected water admitted 16-19 days earlier. Therefore, the samples collected at Banks Pumping Plant and in the DMC in January and February were not likely to be similar in composition.

One potential source of TOC to the DMC is floodwater inflows. Unlike the California Aqueduct, the DMC was built with overchutes or culverts only on the largest streams. Smaller streams and runoff from adjacent farmland is admitted to the DMC all along the 69 miles from Tracy Pumping Plant to O'Neill Forebay. Most of the land adjacent to the DMC is irrigated agriculture such as row crops and orchards and January 1998 was a heavy rainfall month.

An unusually high TOC of 9.3 mg/L was detected at Check 41 in January 1999. Upstream floodwaters or other non-Project inflows were absent that month. It is possible that a short-duration slug of TOC made its way down the Aqueduct from the Delta and was passing Check 41 at the time of sampling. TTHMFP was not unusually high in the same sample (Figure 3-17). An on-line organic carbon monitor has been installed at Clifton Court Forebay to track such short duration changes.

Bromide ranged from 0.01 to 0.52 mg/L in the California Aqueduct during the 2-year period (Figure 3-15). A maximum of 0.52 mg/L was detected at Banks Pumping Plant in December 1999 (Figure 3-16). Water exported that month was influenced by salinity intrusion due, in part, to closure of the Delta Cross Channel gates. At Check 41, bromide dropped to between 0.01 and 0.012 mg/L during April through June 1998, due to inflows from the Kern River (see Non-Project Inflows). A decline in bromide was also observed downstream at Devil Canyon Afterbay from May to July 1998.

Total trihalomethane formation potential in the California Aqueduct and Coastal Branch ranged from 150 to 776 µg/L (Figure 3-17). Monthly trends generally followed those of TOC with a few exceptions. An unusually low TTHMFP concentration at Check 13 in February 1998 (Figure 3-17) coincided with a seasonally-elevated TOC concentration of 5.8 mg/L. Another exception occurred when TTHMFP began increasing the last three months of 1999 at Banks Pumping Plant and coincided with increasing bromide but not TOC. Another exception was presented above regarding Check 41.

Figure 3-15
Bromide, TOC, and TTHMFP in the California Aqueduct and Coastal Branch, 1998-99

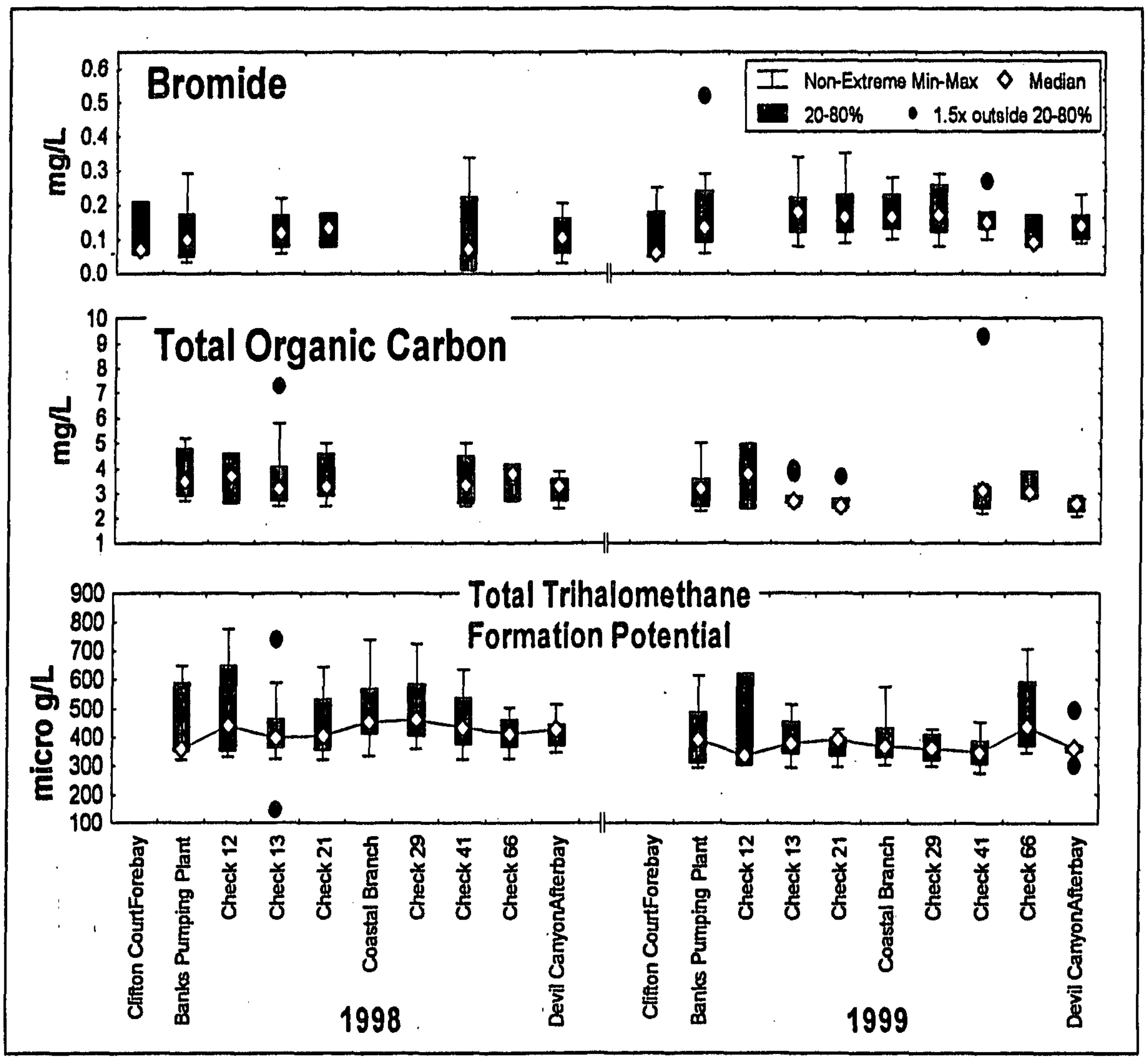


Figure 3-16
Monthly TOC and Bromide in the California Aqueduct

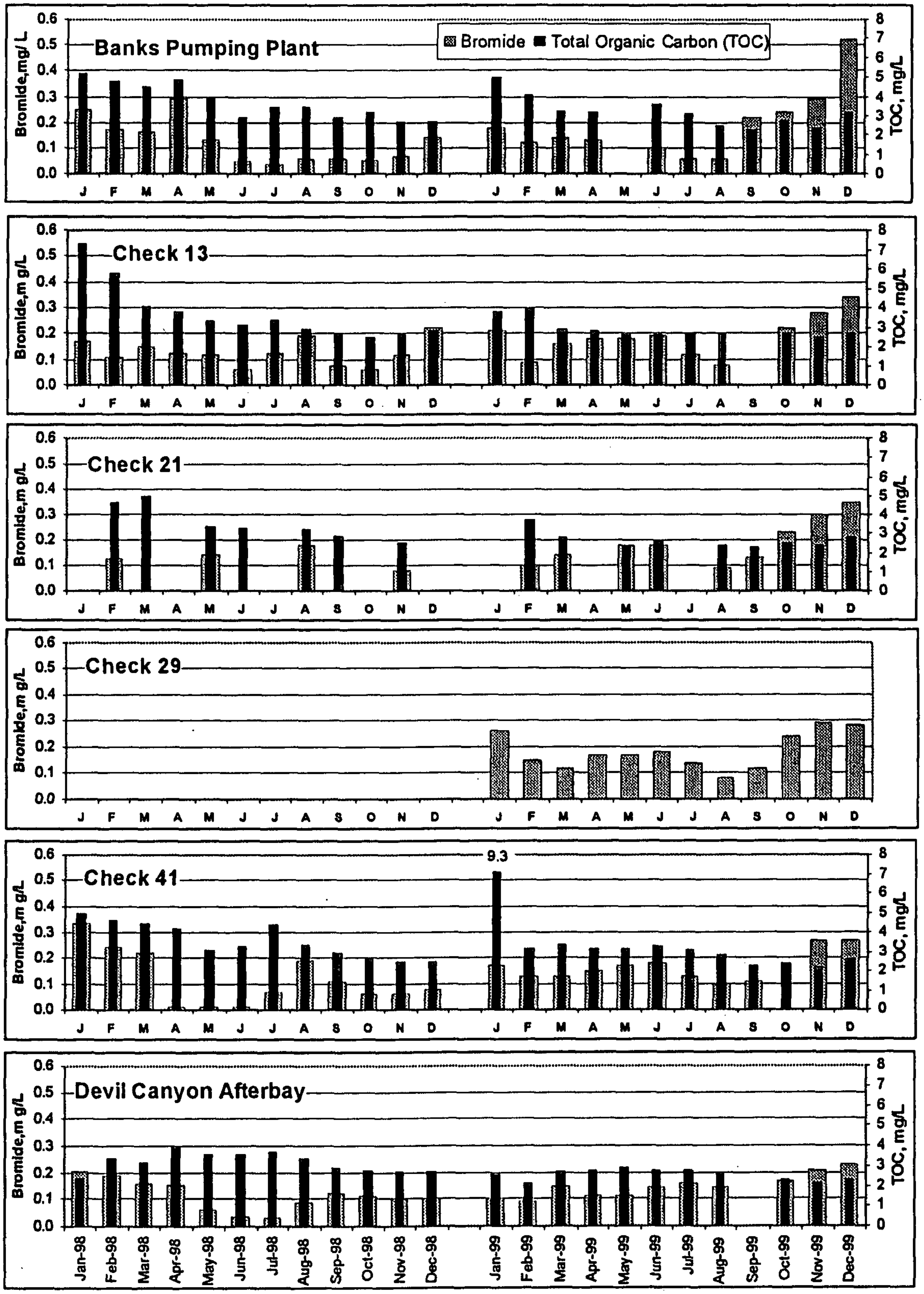
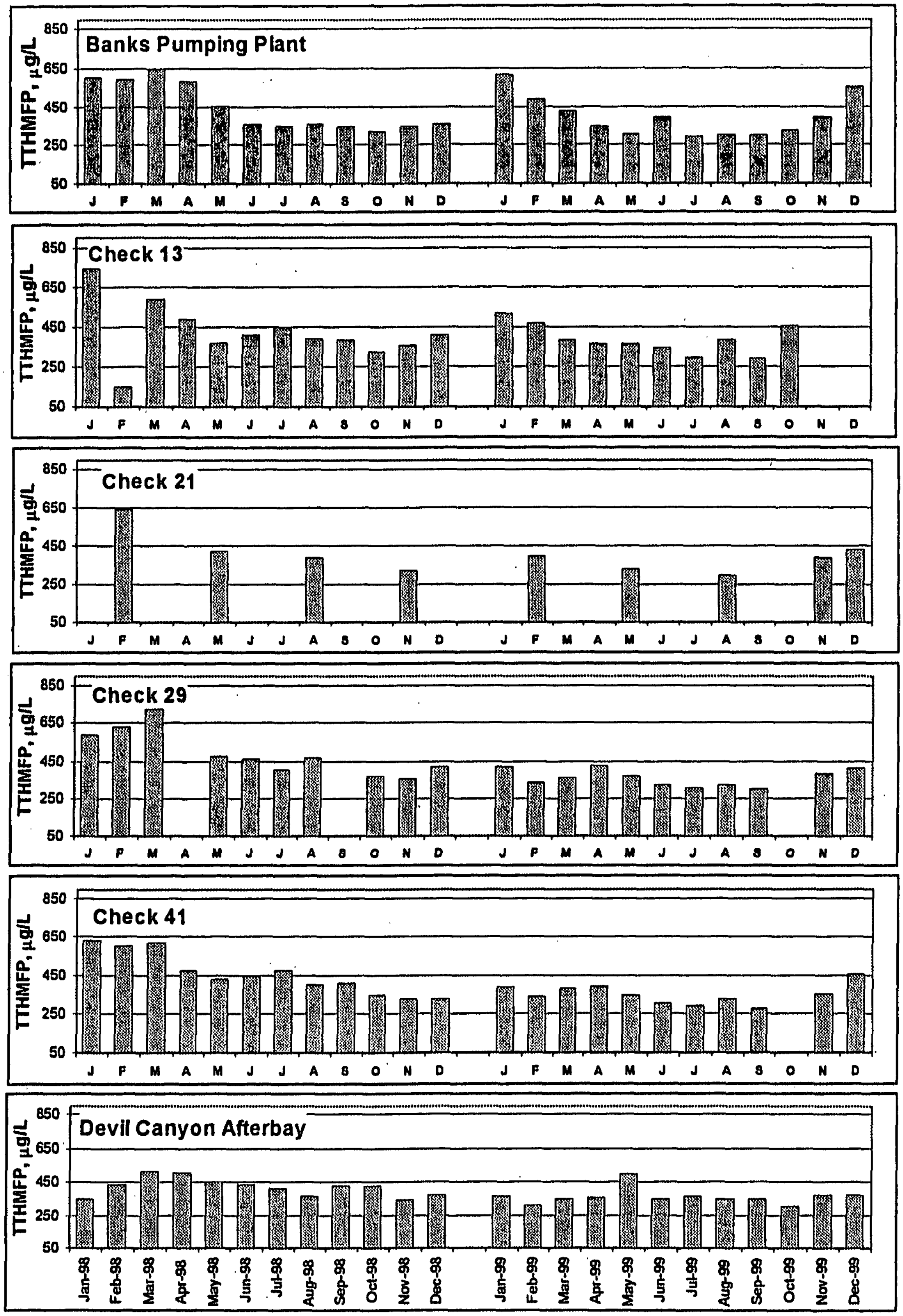


Figure 3-17
Monthly TTHMFP in the California Aqueduct



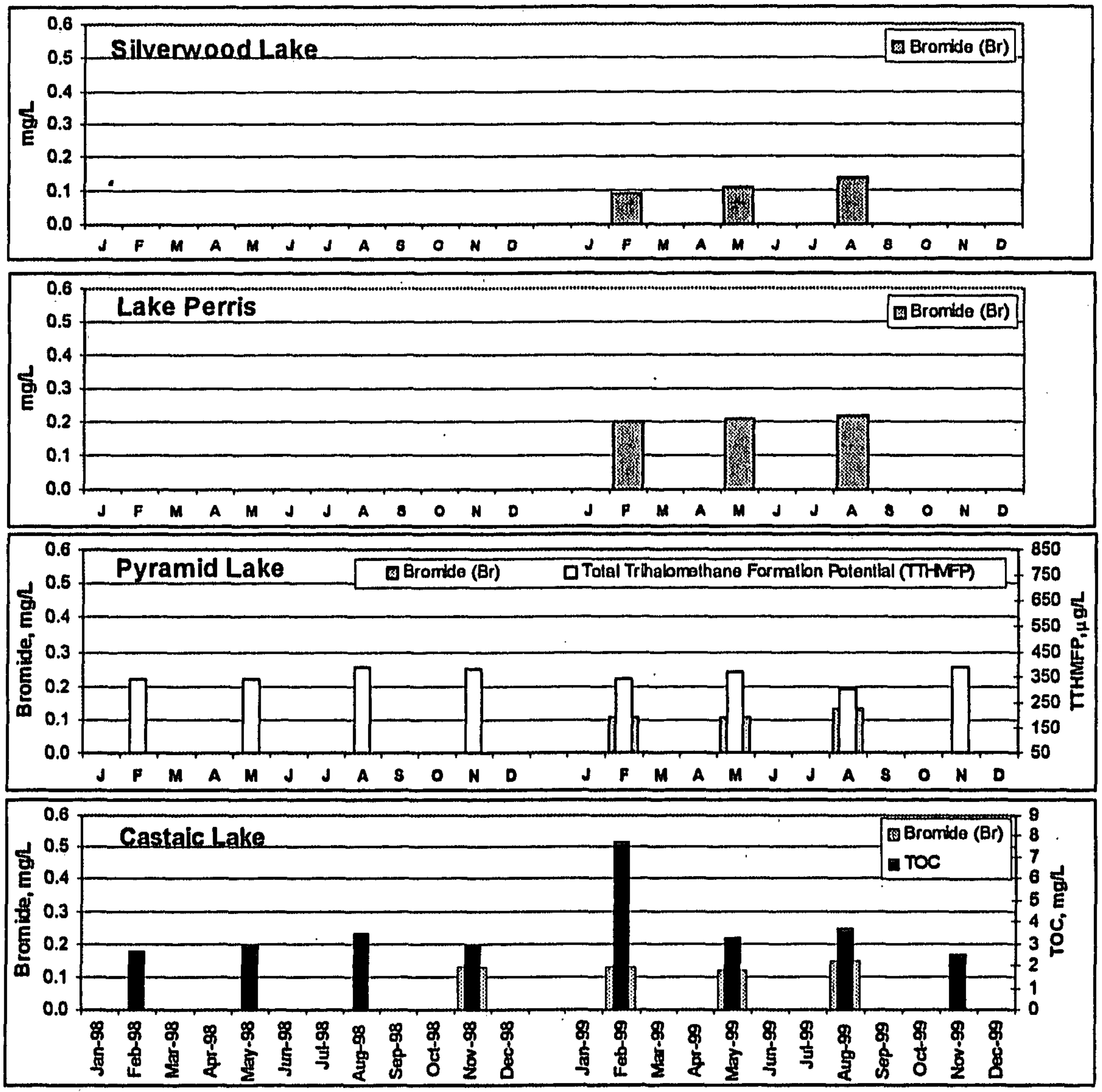
Project Lakes in Southern California

TOC is monitored quarterly at Castaic Lake. During both years, TOC ranged from 2.5 to 3.7 mg/L in all samples but one—the February 1999 sample contained 7.7 mg/L TOC (Figure 3-18). It is unclear what caused this increase since Project inflow was zero for the month and natural inflow was minimal (see Non-Project Inflows). If natural inflow was a source of high TOC, Castaic Lake TOC would have increased in 1998 when natural inflow accounted for 41 percent of all inflows (they only accounted for 1/2 percent in 1999).

Quarterly monitoring for bromide was initiated in 1999 at Lake Perris and Pyramid and Silverwood lakes. In Silverwood Lake, bromide ranged from 0.09 to 0.14 mg/L in three samples collected in 1999. Pyramid Lake exhibited similar levels. Bromide in Castaic Lake ranged between 0.12 and 0.15 mg/L in four samples collected during the 2-year period. Lake Perris levels remained around 0.2 mg/L from three samples collected in 1999.

TTHMFP ranged from 309 to 389 μg/L in Pyramid Lake (Figure 3-18). This compares with values ranging up to 776 μg/L in the California Aqueduct. Some of the disparity in the maximums at these two sites was due to limited Project inflows. Project inflows were limited or non-existent during the first few months of 1998 when TTHMFP levels in the Aqueduct were highest.

Figure 3-18
Quarterly TOC, Bromide, and TTHMFP in Project Lakes in Southern California



Organic Chemicals

Organic chemical samples are collected three times a year and analyzed for chlorinated organics, chlorinated phenoxy acid herbicides, glyphostate, propargite, volatile organics (including MtBE), and carbamates. Individual chemicals are listed in Appendix A, Methods.

All chemicals were below their respective reporting limits except those in Table 3-14, and all of those were below any applicable MCLs for finished drinking water.

Table 3-8
Organic Chemicals in the State Water Project, 1998-99 (Reported in µg/L)

- = Below the Reporting Limit						California Aqueduct													
				Barker Sl. P.P.		Banks P.P.		Check 13		Check 21		Check 29		Check 41		Devil Canyon A.B.		DMC(CVP)	
Chemical	R.L. 1/	MCL	Month	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999
2,4-D	0.1	70	March	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			June	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			September	-	-	0.71	-	0.16	-	0.11	-	-	-	-	-	-	-	0.1	-
Dacthal (DCPA)	0.01		March	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			June	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			September	-	-	-	-	-	-	0.16	-	-	-	-	-	-	-	-	-
MtBE	0.1		March	-	-	-	-	-	-	-	-	-	-	-	-	-	2.4	-	-
			June	-	-	-	-	-	-	-	-	-	-	-	-	-	2.7	-	2.8
			September	-	-	1.6	-	-	-	-	-	-	-	-	-	-	-	-	1.1

1/ Reporting Limit

Only three compounds were detected in Project waters during 1998-99 – 2,4-D, Dacthal, and methyl *tertiary*-butyl ether (MtBE). The herbicide 2,4-D was detected once at three locations in the Aqueduct and once in the DMC during 1998. Another herbicide, Dacthal, was detected once at Check 21 in 1998. The gasoline additive MtBE was detected once at Banks Pumping Plant in September 1998 and twice each at Devil Canyon Afterbay and the DMC during 1999.

IV. Non-Project Inflows

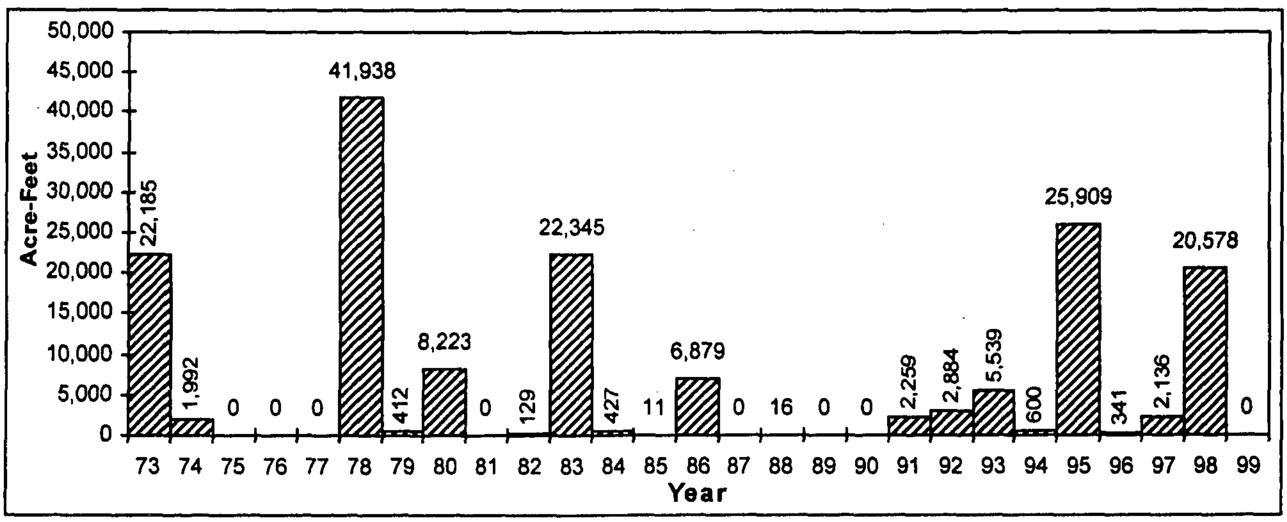
Non-Project inflows include San Luis Canal floodwaters, inflow from the Kings and Kern rivers, and natural runoff to Project lakes in Southern California

Floodwater Inflow to the San Luis Canal

Inflow Volumes

Floodwater inflow to the San Luis Canal totaled 20,578 af in 1998—the fifth highest volume behind 1973, 1978, 1983, and 1985 (Figure 4-1). Inflow to the San Luis Canal from the Kings River (via Lateral 7) totaled 7,236 af. River inflow was not from the Diablo range and is not included in Figure 4-1. There were no river or floodwater inflows to the San Luis Canal in 1999.

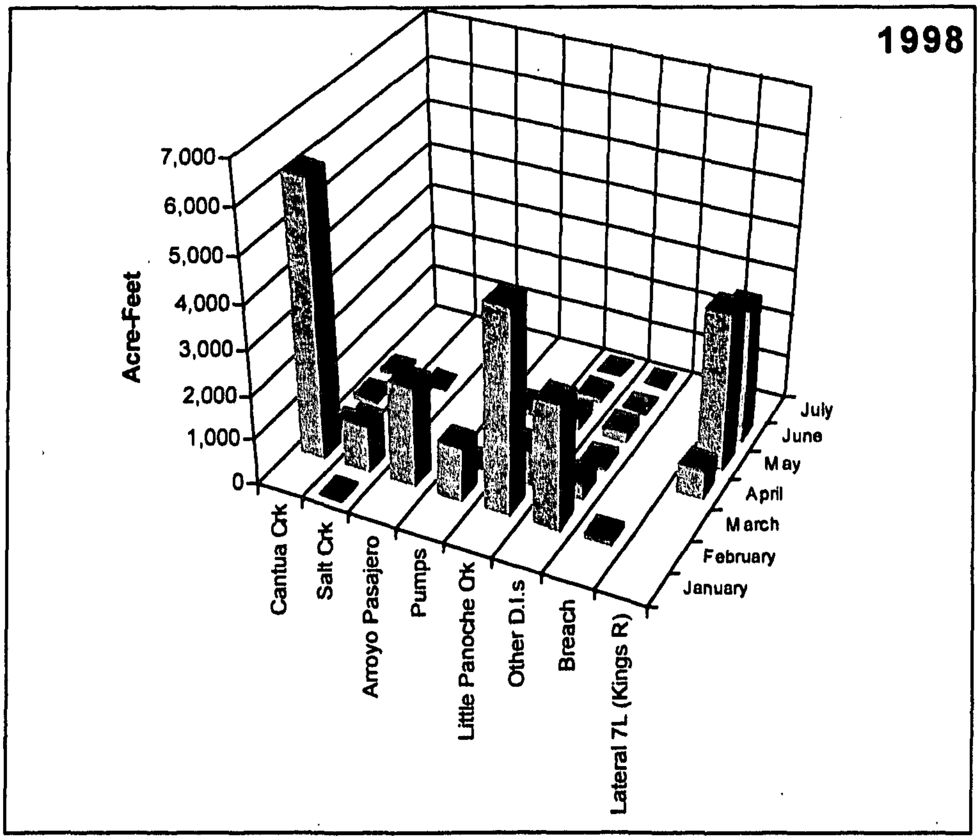
Figure 4-1
Annual Floodwater Inflow Volumes to the San Luis Canal, 1973-99



In 1998, 86 percent of the Diablo Range inflow occurred in February and 31 percent of that was from Cantua Creek followed by Little Panoche Creek (25 percent) and Arroyo Pasajero (12 percent) (Figure 4-2). Inflow from Little Panoche Creek is uncommon because of an upstream detention dam as well as an evacuation culvert that shunts water across the Aqueduct. High runoff that year exceeded the capacity of both structures and had to be admitted to the Aqueduct to prevent flooding. Inflow from Salt Creek was unusually small and accounted for only 6 percent of the 1998 total. A small amount of inflow continued into early July.

A total of 7,236 af from the Kings River was admitted to the Aqueduct via Lateral 7 during April through June 1998. Lateral 7 is 45 miles downstream of Check 13. The water originated from Mendota Pool and was composed of floodwaters from the Kings River and likely other southern Sierra Nevada reservoir releases. The inflow was used as credit for direct delivery downstream in the Westlands Water District service area.

Figure 4-2
Monthly Floodwater Inflow per Drain Inlet



Floodwater Quality
Suspended solids were highest in Ortigalita and Little Panoche creeks during 1998 with values of 8,680 and 12,500 mg/L, respectively (Table 4-1). The value for Little Panoche Creek was one of the highest ever-measured in floodwaters (Figure 4-3). One sample from Arroyo Pasajero contained very little suspended solids (14 mg/L). Historical data shows this is typical for Arroyo Pasajero, with concentrations ranging from 14 to 77 mg/L in four samples compared to levels as high as 13,000 mg/L in other drain inlets (Figure 4-3). The low suspended solids in Arroyo Pasajero are attributable to ponding against the Aqueduct and a decantation weir. The weir, installed in 1986, was specifically designed to reduce sediment loads in the Aqueduct.

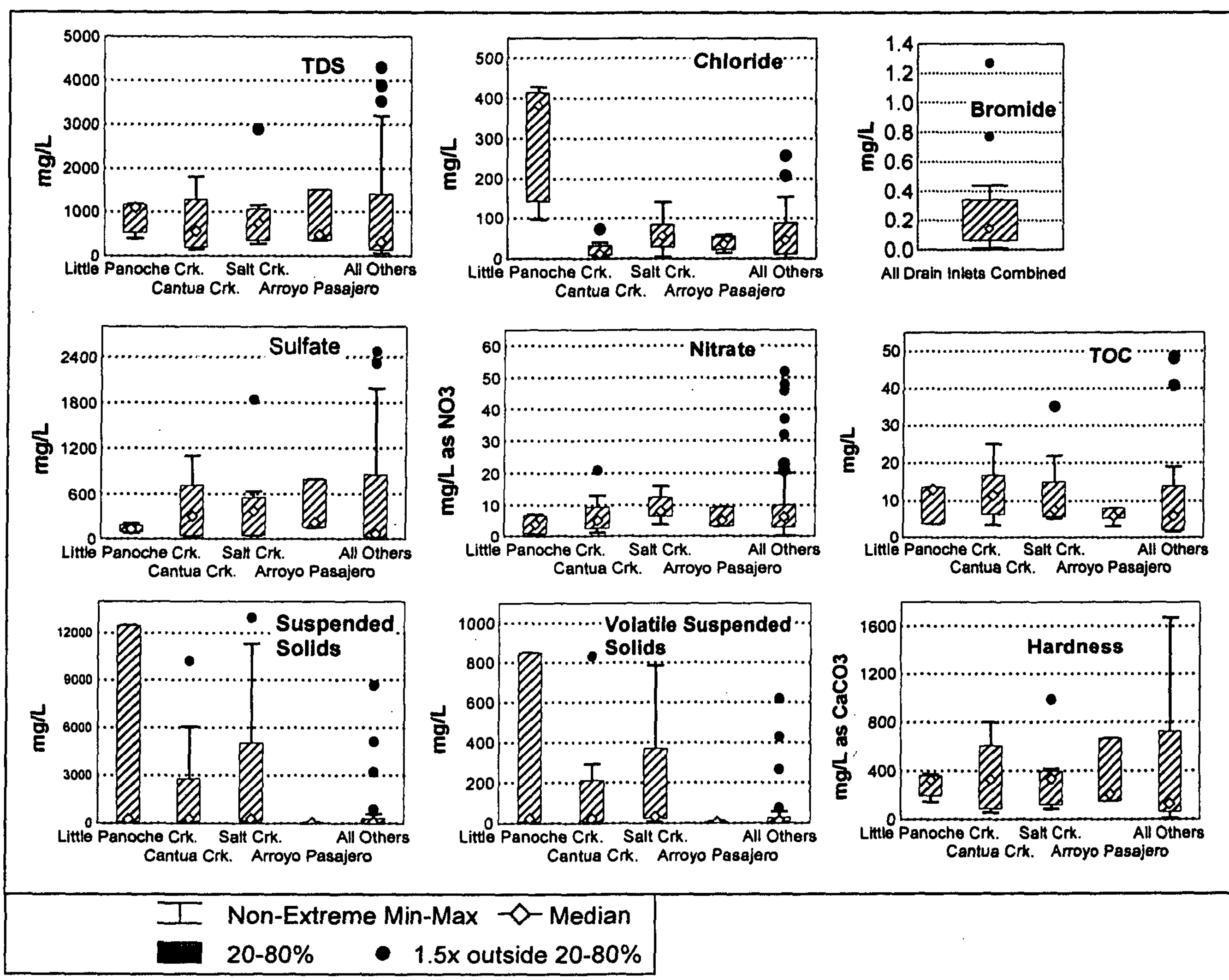
TDS ranged from 89 to 585 mg/L in 1998 and was highest in Arroyo Pasajero and lowest in Skunk Hollow (Table 4-1). These values were below the historical medians of 705 to 897 mg/L (Figure 4-3). Levels as high as 4,310 mg/L have been measured in the past, but extreme concentrations are infrequent.

Inflow from the Jorden Group and Salt Creek exhibited nearly identical mineralogies in January 1998. Although a distance of 2 miles separates these drain inlets, runoff from both watersheds can apparently commingle prior to reaching the Aqueduct. Historical data supports this. Conversely, mixing of Cantua and Salt creeks appears to be uncommon. Samples collected on the same day at Salt and Cantua creeks rarely exhibited similar mineralogies. A little over 1 mile separates these two inlets. In Late 1999, a new drain inlet was installed that will combine both Salt and Cantua creek floodwaters.

Table 4-1
General Water Quality Parameters in Floodwater Inflow
(mg/L unless otherwise specified)

Watershed	Milepost	Date	pH	Organic Carbon (Tot.)	Turbidity, NTU	Susp. Solids (Tot.)	Susp. Solids (Vol.)	TDS	Conductivity, µS/cm	Hardness (CaCO3)	Bicarbonate (CaCO3)	Calcium	Magnesium	Sodium	Sulfate	Chloride	Nitrate (NO3)	Fluoride	Boron
			Conventional Parameters									Cations			Anions				
Ortigalita Creek	82.67	2/3/98	8.1	48.6	6,120	8,680	620	313	523	115	97	23.0	14.0	62.0	95	38	5.2	0.3	0.50
Little Panoche Crk.	96.59	2/3/98	8.1	13.0	9,920	12,500	850	391	681	144	100	38.8	11.4	79.8	76	96	3.9	0.3	1.99
Lateral 7L (Kings R.)	115.43	4/27/98	7.4	NA	32	NA	NA	106	169	43	40	10.5	4.1	13.8	19	13	1.0	< 0.1	< 0.10
	115.43	5/19/98	7.9	NA	16	NA	NA	146	266	64	58	13.7	7.2	28.4	25	32	0.5	< 0.1	0.12
Salt Creek	135.96	4/7/98	NA	5.3	152	NA	NA	391	NA	130	NA	27.3	14.9	54.6	83	57	5.6	0.1	0.37
	136.00	1/13/98	8.0	5.7	NA	169	24	310	539	116	80	27.5	11.6	62.4	46	84	8.0	< 0.1	0.18
Jorden Group	138.14	1/20/98	8.0	7.5	101	132	10	323	576	128	81	26.7	15.0	62.0	56	84	6.7	< 0.1	0.22
Skunk Hollow	146.44	2/17/98	7.6	4.3	267	163	14	89	161	45	35	11.8	3.7	10.1	9	5	22.7	0.2	< 0.10
Arroyo Pasajero	158.38	2/8/98	8.0	5.8	12	14	2	585	886	244	122	49.2	29.3	94.3	283	22	3.7	0.3	0.51

Figure 4-3
Historical Water Quality of Drain Inlets (all historical data)



Unlike other drain inlets, Little Panoche Creek contained high levels of both chloride and sodium (Table 4-1and Figure 4-3). This is an indication of upstream springs composed of connate water. Connate water is ancient seawater trapped between sedimentary deposits. Figure 4-4 provides some evidence of its existence within the watershed. As salinity increases in Little Panoche Creek, the mineralogical characteristics become more like seawater—the anionic dominance of chloride and the cationic dominance of sodium. Although most floodwaters have elevated salinities, they do not usually follow the same trend. Averaged data from all other drain inlets show that sulfate becomes the dominant anion as salinity increases with no dominant cation (Figure 4-5). Water reflecting the mineralogy of seawater is also likely to contain other ocean-related parameters such as bromide. This was supported with a limited bromide database.

Bromide concentrations ranged from 0.01 to 1.27 mg/L in 15 floodwater samples (Figure 4-3). The high value of 1.27 mg/L was from Little Panoche Creek. One sample collected each from Arroyo Pasajero and Cantua and Salt creeks revealed concentrations of 0.03, 0.16, and 0.06 mg/L, respectively. The other high value of 0.77 mg/L originated from the Monocline Ridge Group (mileposts 113 to 119). No major inlets exist in that watershed group—farmers use portable pumps to remove floodwaters from adjacent farmland in preparation for planting. As a result, inflows from these sources tend to be minor.

A very high TOC concentration of 49 mg/L was reported for Ortigalita Creek in 1998 (Table 4-1), the highest value ever recorded (Figure 4-3). Historical medians range from 7 to 12 mg/L. The high TOC sample was collected on the first day of inflow and likely captured the peak of a first flush effect. Concentrations can peak in the early stages of a runoff event and then taper off as less TOC is available to be flushed from a watershed. TOC was lowest in Arroyo Pasajero and ranged from 3 to 8 mg/L in seven samples. TOC ranged from 3.5 to 25 mg/L in Cantua Creek and from 5.2 to 35 mg/L in Salt Creek. Two samples from Little Panoche Creek were 13 and 13.9 mg/L.

Copper, iron, barium, zinc, and manganese levels in 1998 floodwaters were similar to those in the Aqueduct (Table 4-2). Arsenic was routinely present at low levels and chromium and selenium were detected once near their reporting limits. All other minor elements were undetected.

Unlike previous years, very few organic chemicals were present in floodwaters during 1998. Simazine and Cyanazine were detected in Salt Creek at 0.14 and 22.1 µg/L, respectively (Table 4-3). The same chemicals were detected once each in two other drain inlets.

Figure 4-4
Mineralogy of Little Panoche Creek and Seawater with TDS (See Appendix D for Explanation)

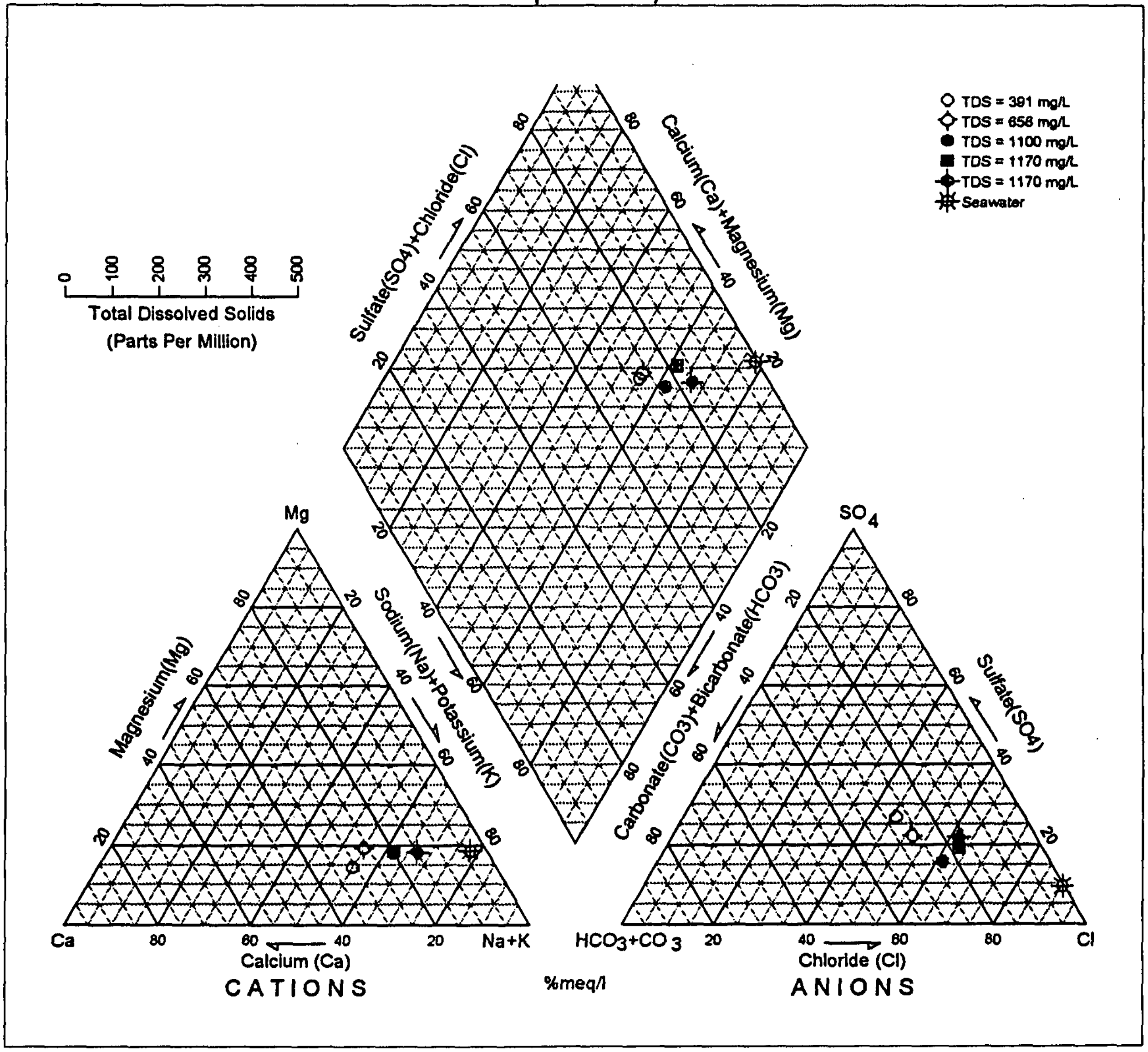


Figure 4-5
Mineralogy of all Drain Inlets Combined with TDS

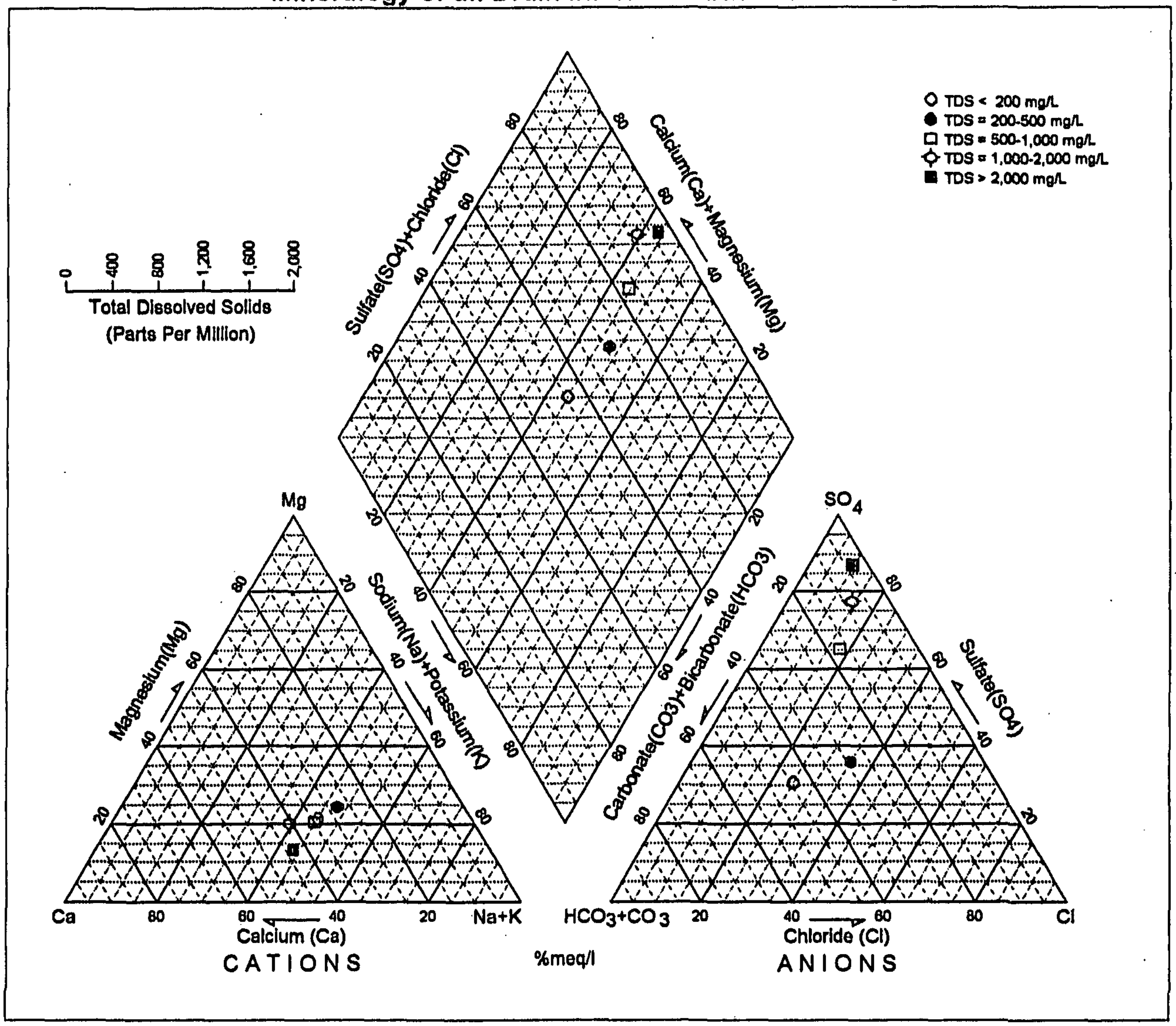


Table 4-2
Minor Element Concentrations in Floodwater Inflow

Watershed	Milepost	Date	Aluminum	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc
			Concentration in mg/L												
Ortigalita Creek	82.67	2/3/98	< 0.010	0.002	< 0.050	< 0.001	< 0.005	0.003	0.009	< 0.001	0.024	< 0.0002	< 0.001	< 0.001	< 0.005
Little Panoche Creek	96.59	2/3/98	< 0.010	0.003	0.070	< 0.001	0.006	0.003	0.012	< 0.001	0.008	< 0.0002	< 0.001	< 0.001	< 0.005
Lateral 7L (Kings R.)	115.43	4/27/98	< 0.010	0.001	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.006
	115.43	5/19/98	< 0.010	0.001	< 0.050	< 0.001	< 0.005	0.002	0.009	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
Salt Creek	136.00	1/13/98	< 0.010	0.002	0.093	< 0.001	< 0.005	0.005	0.020	< 0.001	0.010	< 0.0002	< 0.001	< 0.001	< 0.005
Jorden Group	138.14	1/20/98	< 0.010	0.002	0.052	< 0.001	< 0.005	0.003	0.030	< 0.001	0.051	< 0.0002	< 0.001	< 0.001	< 0.050
Skunk Hollow	146.44	2/17/98	< 0.010	0.004	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.018	< 0.0002	< 0.001	< 0.001	< 0.005
Arroyo Pasajero	158.38	2/8/98	< 0.010	0.001	< 0.050	< 0.001	< 0.005	0.004	< 0.005	< 0.001	0.007	< 0.0002	0.003	< 0.001	< 0.005

Table 4-3
Pesticides and Herbicides in Floodwater Inflow

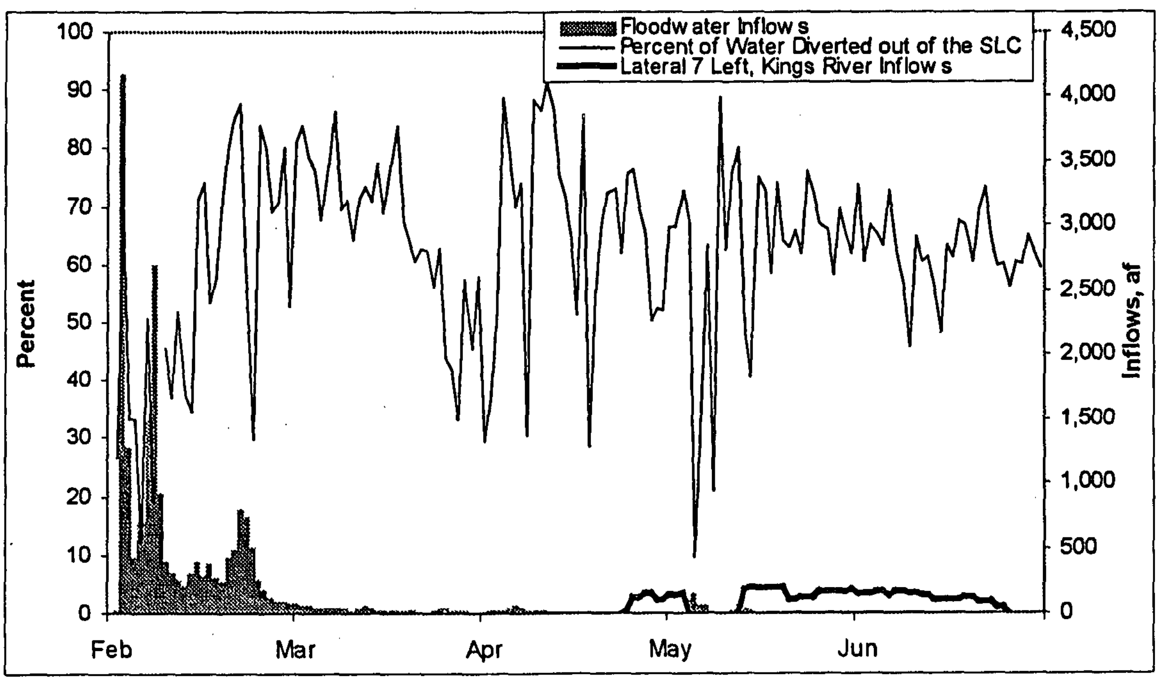
			Concentration in µg/L 1/									
Watershed	Milepost	Date	EPA 608 Scan	Simazine	EPA 614 Scan	Cyanazine	EPA 615 Scan	EPA 608 Scan	EPA 602 Scan	EPA 547 Scan	EPA 531.1 Scan	EPA 502.2 Scan
Ortigalita Creek	82.67	2/3/98	N.D.		N.D.		N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Little Panoche Creek	96.59	2/3/98	N.D.		N.D.		N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Salt Creek	136.00	1/13/98		0.14		22.10	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Jorden Group	138.96	1/20/98		0.11	N.D.		N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Skunk Hollow	146.44	2/17/98	N.D.			0.39	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Jorden Group	158.38	2/8/98	N.D.		N.D.		N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

1/ N.D.=None Detected

Aqueduct Water Quality

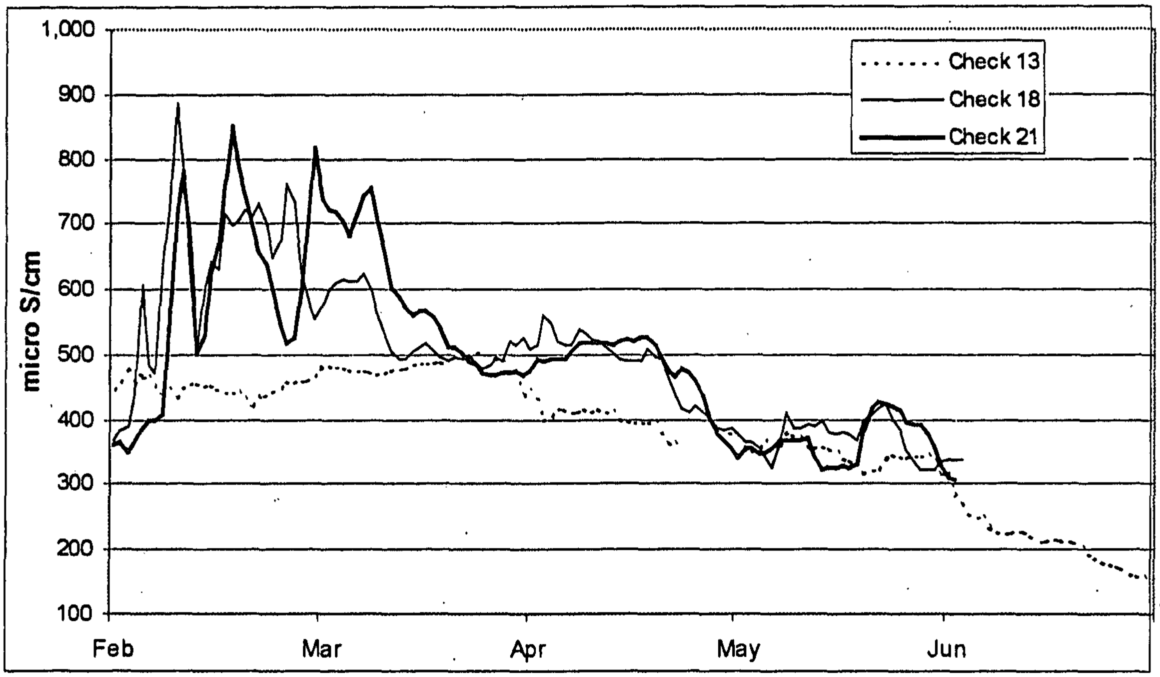
From February to June 1998, federal contractors diverted 62 percent of the water entering San Luis Canal from either Dos Amigos pumping or floodwater inflow (Figure 4-6). Since federal turnouts are located throughout the canal, floodwaters were removed along with Project water. In February—when floodwaters were greatest—almost half (48 percent) of the total Project/non-Project inflows were diverted for pre-irrigation purposes. These winter diversions would tend to lesson floodwater impacts to the Aqueduct.

Figure 4-6
Percent of Water Diverted out of the SLC by Federal Contractors, February-June, 1998
(Inflows include Dos Amigos Pumping and Floodwaters)



Floodwater inflow in February coincided with an increase in conductivity in the Aqueduct. At the downstream stations—checks 18 and 21—conductivity was routinely over 600 μS/cm and approached a maximum of 900 μS/cm (Figure 4-7). Upstream at Check 13, it remained below 500 μS/cm throughout the inflow event. Check 18 is downstream of Cantua, Salt, and Little Panoche creeks and Check 21 is downstream all drain inlets including Arroyo Pasajero. Checks 18 and 21 are 72 miles apart. Downstream levels increased again in April but the rise may have been due more to delayed Aqueduct flow from upstream rather than floodwaters.

Figure 4-7
Daily Conductivity at Checks 13, 18, and 21, February-June 1998



Turbidity trends were not as straightforward. Spikes occurred at all upstream/downstream stations in February (Figure 4-8). Turbidity increases were also seen at Check 21 in late March and at checks 18 and 21 around the first of May. All three events coincided with periods of increased flow that likely influenced turbidity as much, or more, than floodwaters (Figure 4-9). Past studies have shown that Aqueduct turbidity varies directly with flow (DWR 1999). As flow increases in the Aqueduct, sediment is suspended higher in the water column where measurements are made by the auto station (usually 9 feet from the surface).

During February, water at Check 21 was more similar to floodwaters than upstream Aqueduct water at Check 13. Check 21 had a higher TDS than Check 13 (593 mg/L versus 237 mg/L) and an anionic composition dominated by sulfate (Figure 4-10)[1]. In the lower right-hand graph, sulfate made up 73 percent of the anionic composition at Check 21 compared to 34 percent at Check 13. These characteristics—high TDS and dominant sulfate composition—were similar to most floodwater inflows (see previous Figure 4-5). The Piper graph indicates that the Aqueduct was heavily influenced by floodwaters. Although floodwaters continued through July, no other month showed such a large shift in mineralogy.

[1] TDS in the graph is calculated and may be different than the laboratory value.

Figure 4-8
Daily Turbidity at Checks 13, 18, and 21, February-June 1998

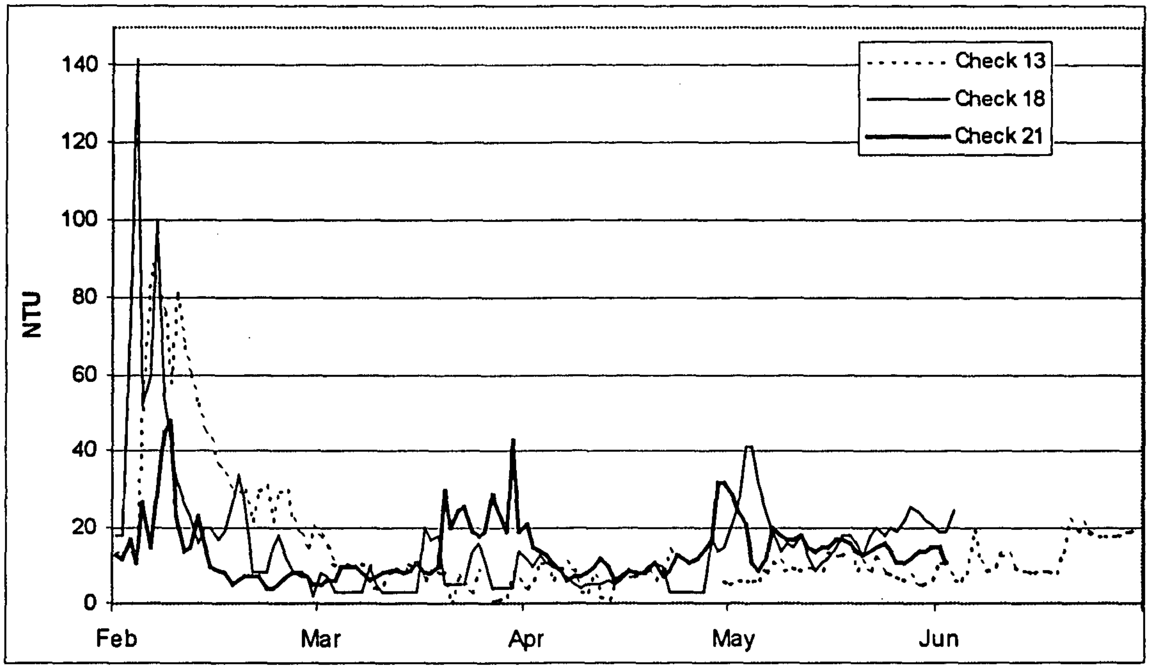


Figure 4-9
Daily Flow Past Check 21, February-June 1998

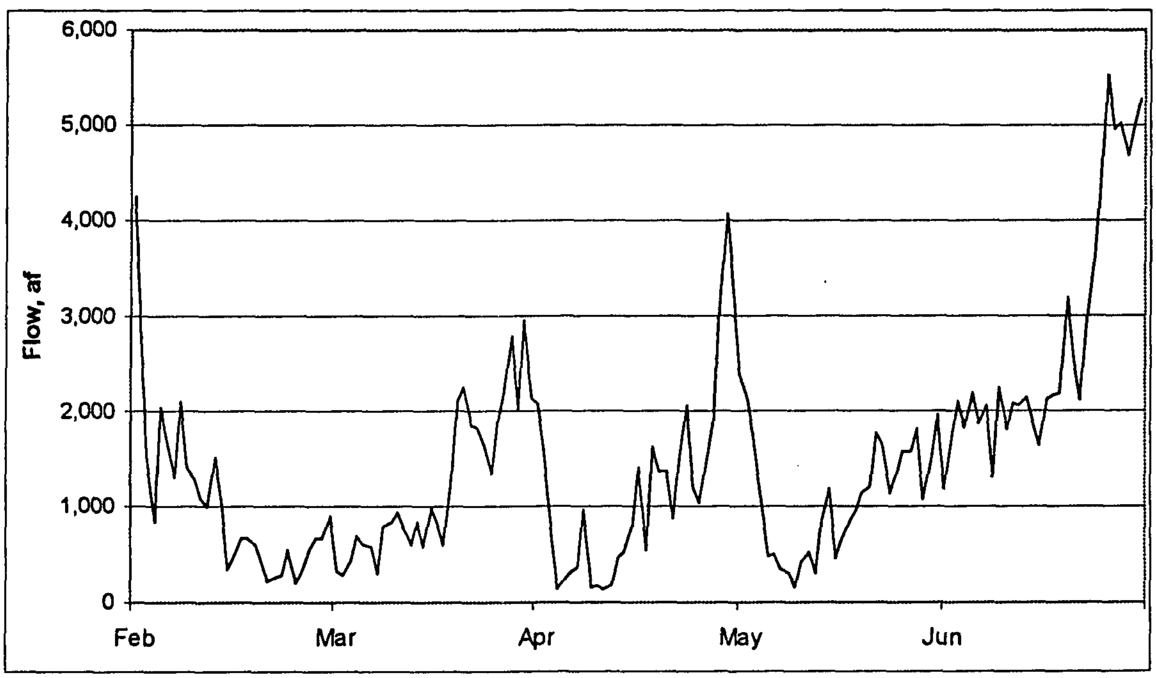


Figure 4-10
Mineralogical Makeup of Water at Checks 13 and 21, February 18, 1998 (See Appendix D for Explanation)

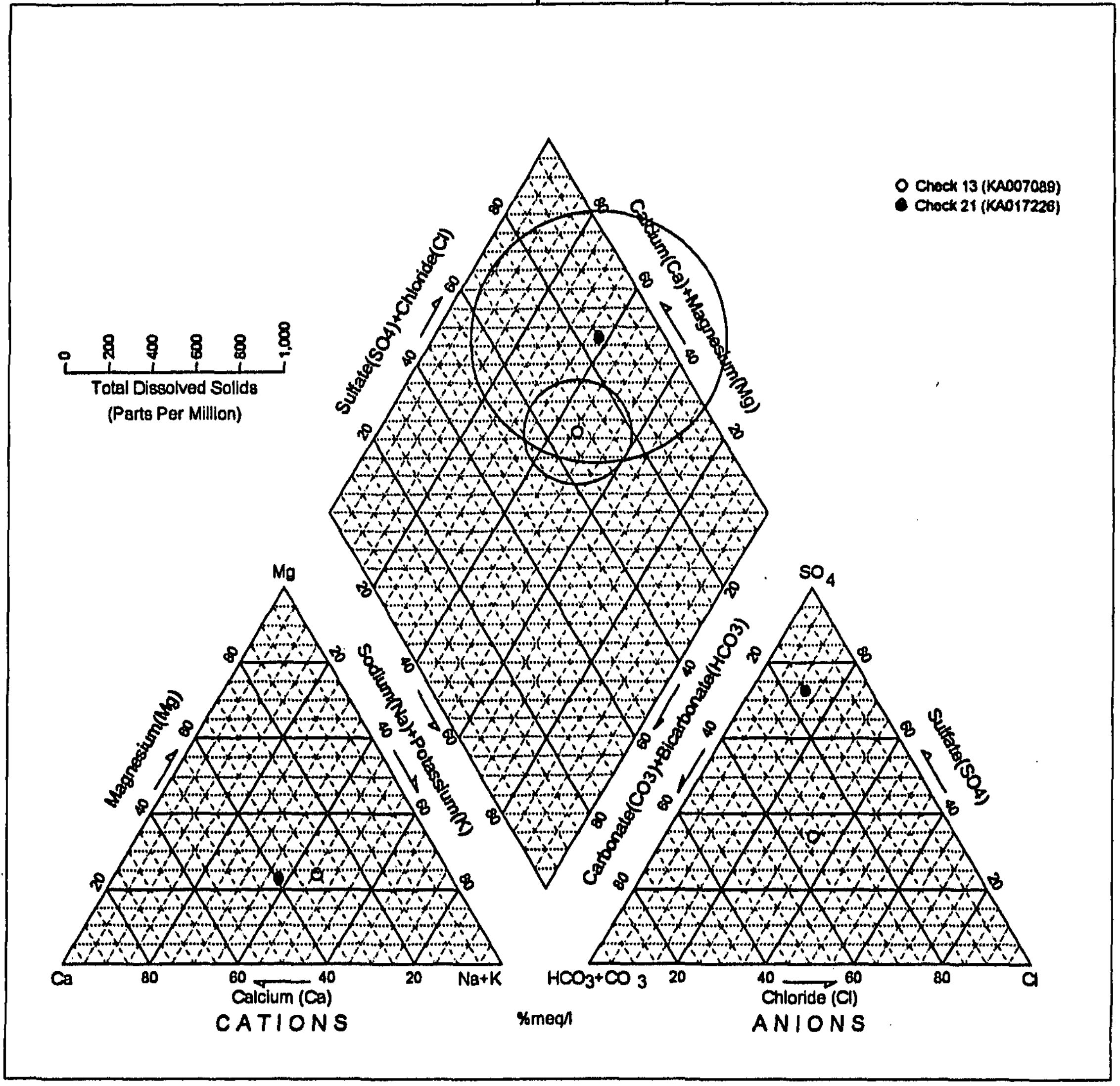
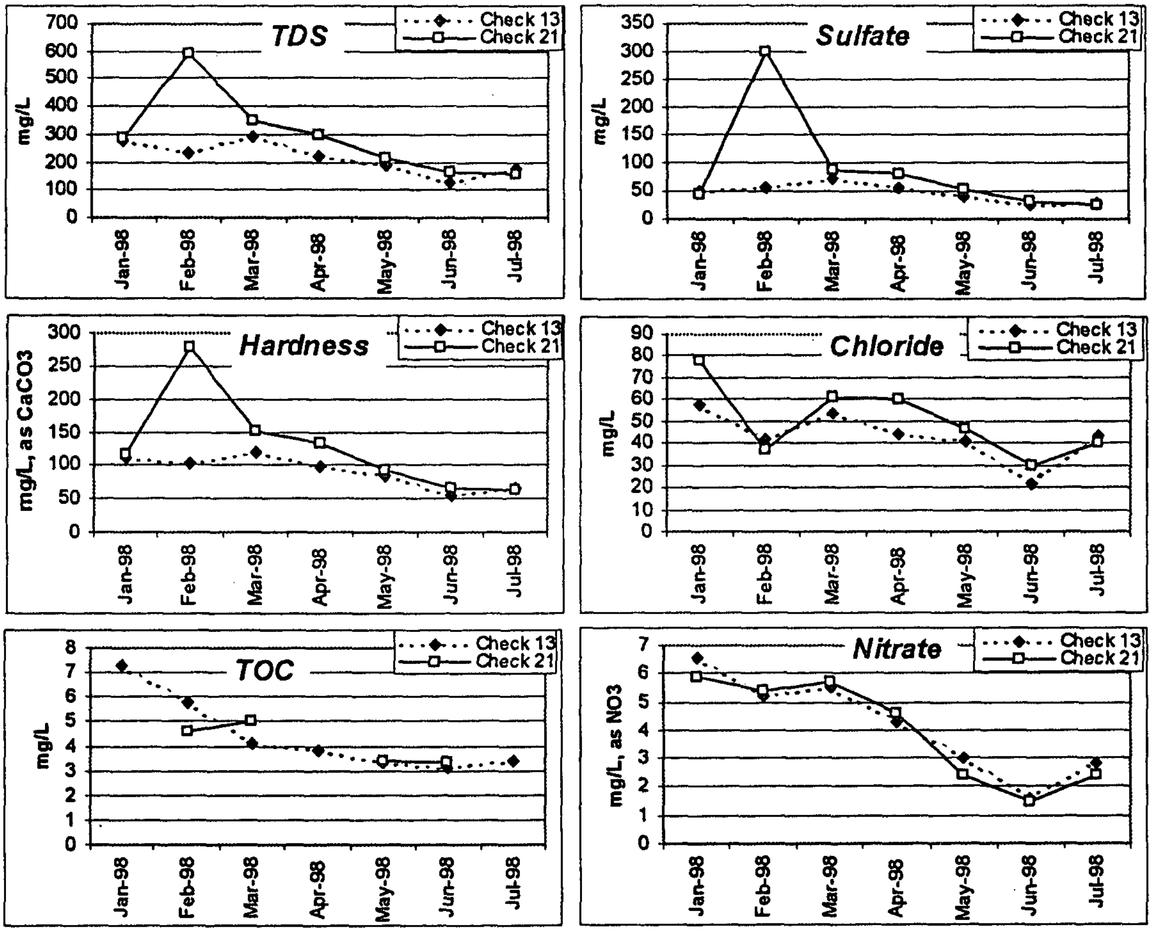


Figure 4-11 shows upstream/downstream concentrations of several parameters. TDS, hardness, and sulfate were all higher at Check 21 than at Check 13 in February 1998. No change in chloride was observed that month but several months later, downstream levels were slightly higher. Floodwaters did not appear to affect nitrate concentrations. Limited sampling shows downstream TOC was lower in February. The next month, downstream TOC was higher than upstream.

Figure 4-11
Water Quality in the San Luis Canal at Checks 13 and 21, January-July, 1998



Inflow from the Kern River Intertie and Cross Valley Canal

In the first half of 1998, 188,048 af of Kern River water was admitted to the California Aqueduct through the Kern River Intertie (milepost 241, just prior to Check 29). The Intertie is a controlled conveyance structure used to relieve flooding east of the Aqueduct. Inflow began on April 3 and ended 96 days later on July 8 and comprised most of the water pumped south at Buena Vista Pumping Plant (Figures 4-12 and 4-13). No inflows occurred in 1999.

River flow was also admitted to the Aqueduct via the Cross Valley Canal (10,398 af, milepost 238) (Figure 4-12). The water was a mixture of runoff from the Kern, Tulare, and Kaweah rivers. The Cross Valley Canal usually conveys water out of the Aqueduct to the Kern County Water Agency, but flow was reversed due to flooding. Controlled dam releases from Sierra Nevada reservoirs were pumped into the Friant-Kern Canal (and eventually the Cross Valley Canal) to prevent flooding on cropland in the Tulare Lakebed. No inflow occurred in 1999.

Both inflows had similar water quality characteristics (Tables 4-4 and 4-5). Suspended solids were moderate ranging from 28 to 88 mg/L. Intertie conductivity ranged between 50 and 165 µS/cm during the entire event (Figure 4-14). Cross Valley Canal conductivity was similar with the exception of two values exceeding 500 µS/cm in April. It is unclear what caused these spikes.

Figure 4-12
Kern River Intertie and Cross Valley Canal Inflows to the California Aqueduct, April-July 1998

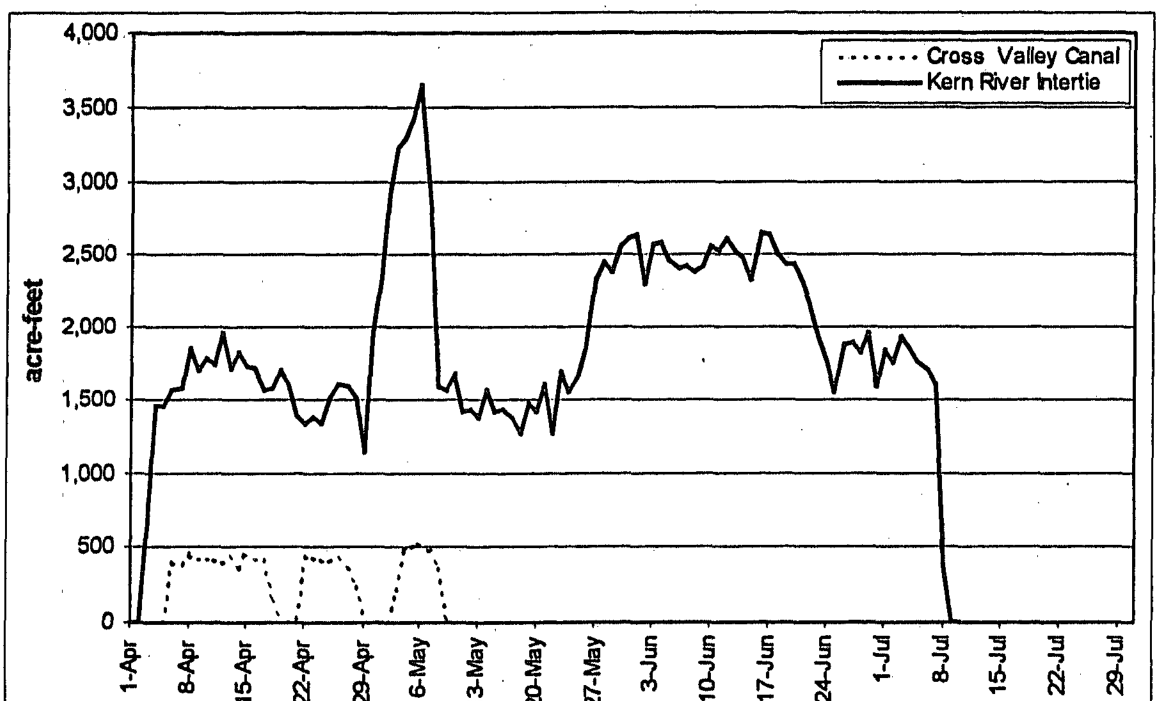


Figure 4-13
Pumping at Buena Vista Pumping Plant and Check 28 Flow in the Aqueduct, April-July, 1998

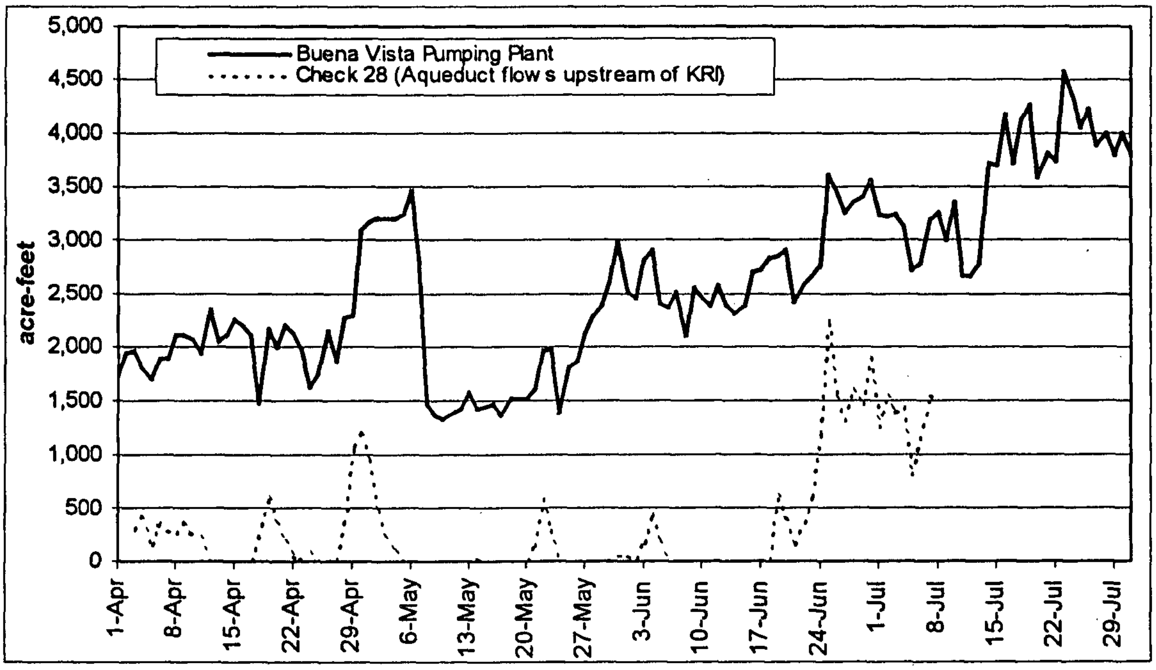


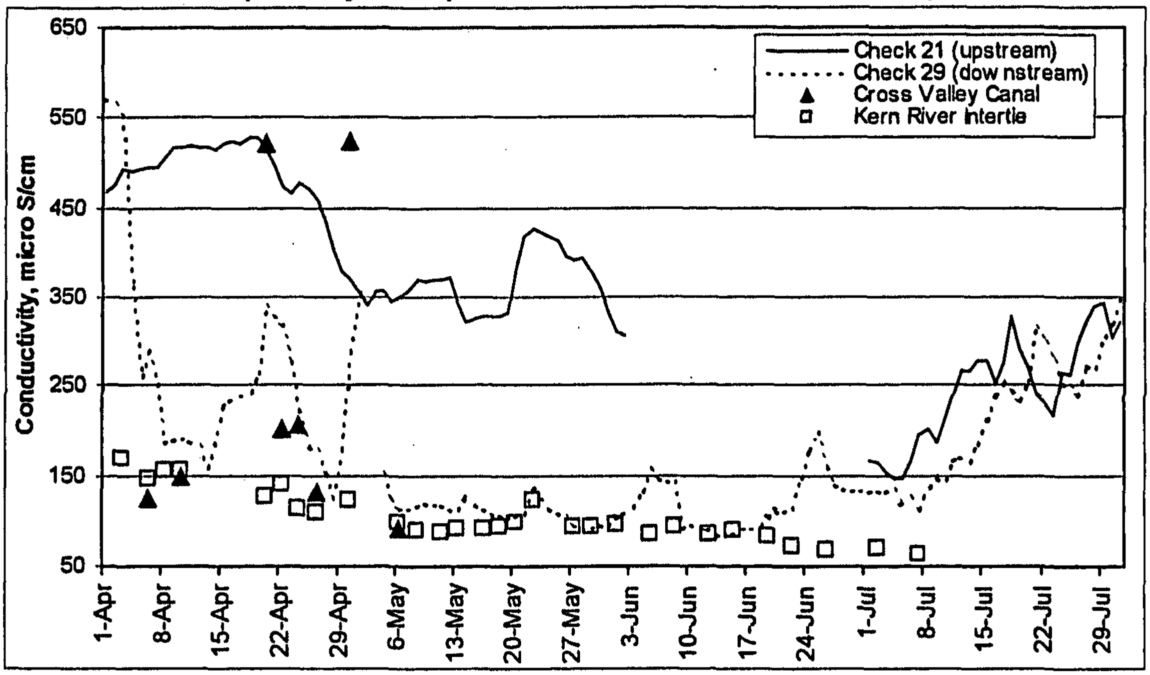
Table 4-4
Water Quality in the Kern River Intertie and Cross Valley Canal, 1998
(mg/L unless specified otherwise)

			Conventional Parameters								Cations			Anions					
Watershed	Milepost	Date	pH	Turbidity, NTU	Susp. Solids (Tot.)	Susp. Solids (Vol.)	TDS	Conductivity, µS/cm	Hardness (CaCO3)	Bicarbonate (CaCO3)	Calcium	Magnesium	Sodium	Sulfate	Chloride	Nitrate (NO3)	Fluoride	Boron
Cross Valley Canal	238.04	4/6/98	7.6	85	88	11	102	155	54	57	15	4	8	9	4	3.7	< 0.1	< 0.10
	238.04	4/14/98	7.9	24	28	4	124	176	59	66	17	4	11	9	6	2.5	0.1	< 0.10
Kern River Intertie	241.02	4/6/98	7.9	58	29	6	110	161	57	63	16	4	11	9	4	2.2	0.1	< 0.10
	241.02	4/14/98	7.9	38	56	6	102	166	59	64	17	4	11	9	4	1.8	0.2	< 0.10

Table 4-5
Minor Elements in the Kern River Intertie and Cross Valley Canal, 1998

			Concentration in mg/L												
Watershed	Milepost	Date	Aluminum	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc
Cross Valley Canal	238.04	4/6/98	< 0.010	0.002	< 0.050	< 0.001	< 0.005	0.008	0.010	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
	238.04	4/14/98	< 0.010	0.002	< 0.050	< 0.001	< 0.005	0.002	0.008	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
Kern River Intertie	241.02	4/6/98	< 0.010	0.004	< 0.050	< 0.001	< 0.005	0.003	0.018	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.006
	241.02	4/14/98	< 0.010	0.004	< 0.050	< 0.001	< 0.005	0.002	0.016	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005

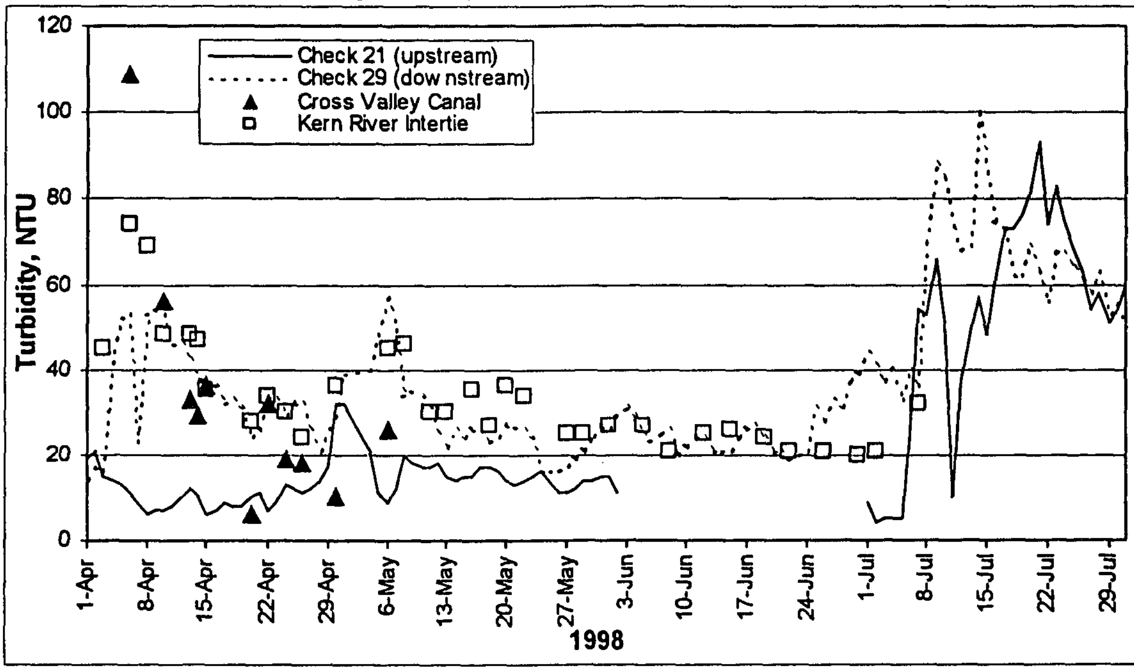
Figure 4-14
Daily Conductivity in the Aqueduct, Kern River Intertie, and Cross Valley Canal, April-July 1998 (Field and Automated Station Data)



Downstream in the Aqueduct, conductivity decreased from 570 µS/cm to around 200 µS/cm 5 days after Intertie inflow began. Spikes were observed from mid- to late April, coinciding with those in the Cross Valley Canal. Near the end of June, conductivity at Check 29 started to rise with increasing Aqueduct flow from upstream (see previous graph 4-13). Similar same trends were observed 62 miles downstream at Check 41. June data for Check 21 was corrupted.

Turbidity in the Intertie was highest during the first week of inflow (Figure 4-15). After that, levels tapered off to between 20 and 40 NTU. Similar trends were observed in the Cross Valley Canal. With the exception of the first week, downstream turbidity at Check 29 averaged 20 NTU higher than upstream. Although flow in the Aqueduct can affect turbidity, Check 29 levels tended to mimic those in the Intertie.

Figure 4-15
Daily Turbidity in the Aqueduct, Kern River Intertie, and Cross Valley Canal, April to July, 1998 (Field and Automated Station Data)



Natural Inflow to Project Lakes in Southern California

Pyramid Lake
Natural inflow to Pyramid Lake totaled 133,135 af in 1998 and 16,493 af in 1999, amounting to 52 and 5 percent, respectively, of the Project/non-Project inflows. Piru Creek drains a 372 square-mile watershed (Figure 4-16) and is the largest non-Project source to the lake. The creek is a clear perennial brook in summer and a muddy torrent during the rainy season. It was the sole inflow to the lake for three consecutive months in 1998 and 2 consecutive months in 1999 (Figure 4-17).

Piru Creek has an average TDS of 554 mg/L and a unique mineralogy that affects Pyramid Lake during high flow years (DWR 1999). The creek's average sulfate concentration is eight times greater than Project water and its average chloride concentration is nine times less. 1998 was a high flow year and the lake's mineralogy shifted to reflect these differences. Sulfate and hardness increased relative to chloride starting in May and stayed elevated until February 1999 (see previous Figure 3-11). In most Aqueduct samples, sulfate is lower than chloride and hardness is just slightly higher (Figure 3-8). The same mineralogical characteristics were observed in Castaic Lake but lasted through the end of 1999. Piru Creek appears to be the single largest source of salts to Pyramid Lake in years of high watershed runoff. In 1995, for instance, the creek accounted for 35 percent of the total inflow but 58 percent of the total TDS load (DWR 1999).

Castaic Lake
Natural inflow to Castaic Lake totaled 126,224 af in 1998 and 10,220 af in 1999, amounting to 41 and 3 percent, respectively, of all Project/non-Project inflows. Six watersheds drain into the 323,702 af lake, ranging in size from 2.7 to 41.7 square miles (Figure 4-18). Natural inflow during 1998 was highest in February and continued through summer (Figure 4-19). TDS trends in Castaic Lake were not as

Figure 4-16
Water Quality Sampling Stations on Pyramid Lake
(PY001000 is the Routine Monitoring Station)

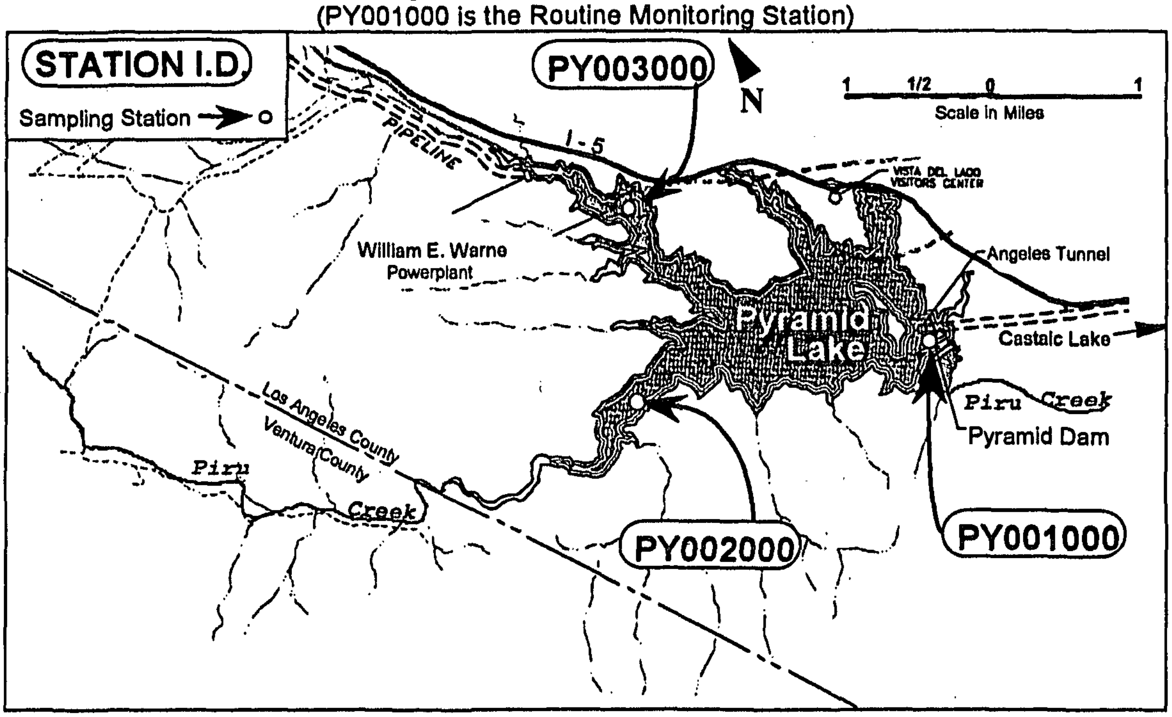


Figure 4-17
Monthly Inflows to Pyramid Lake, 1998-99

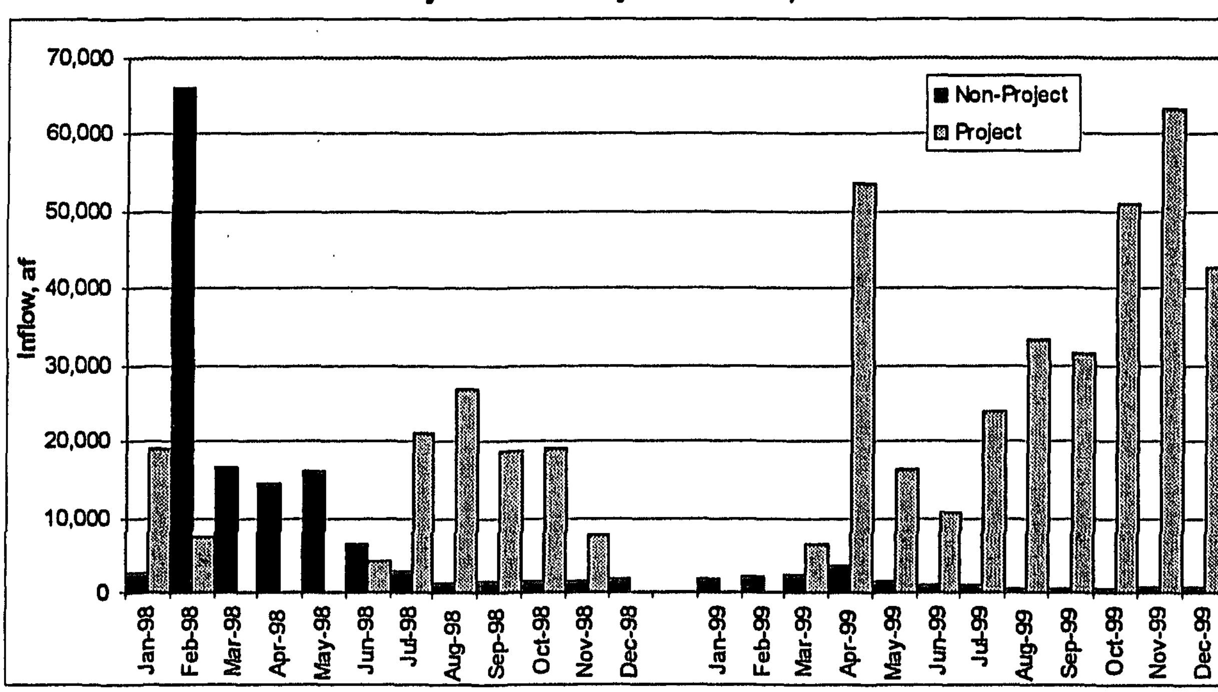


Figure 4-18
Water Quality Sampling Stations on Castaic Lake

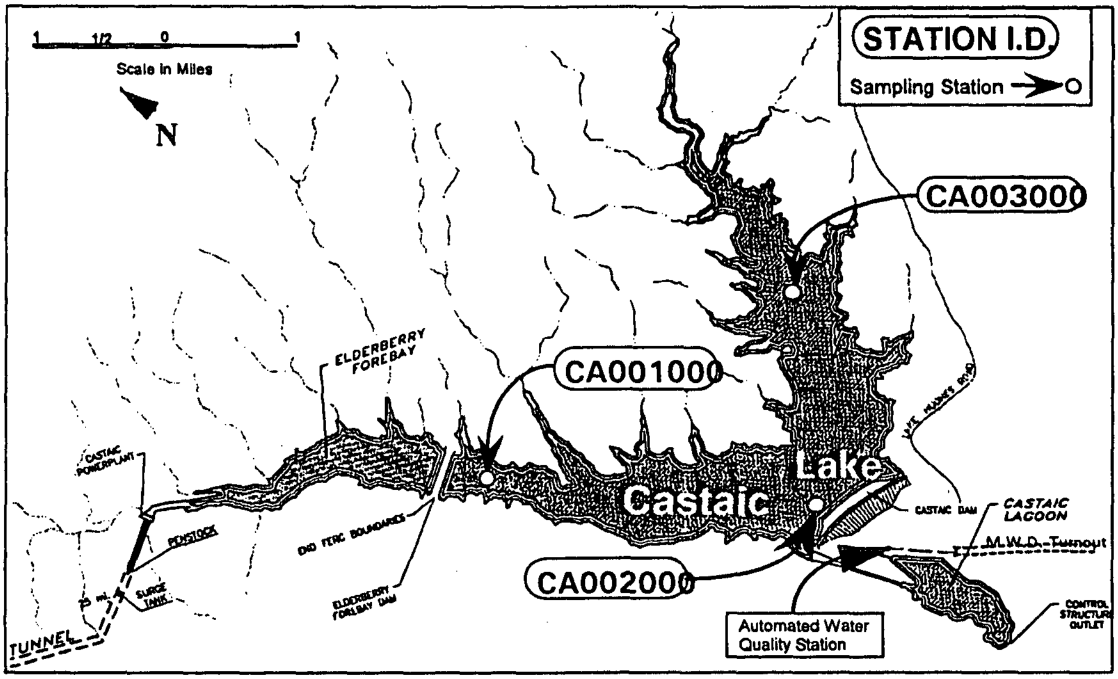
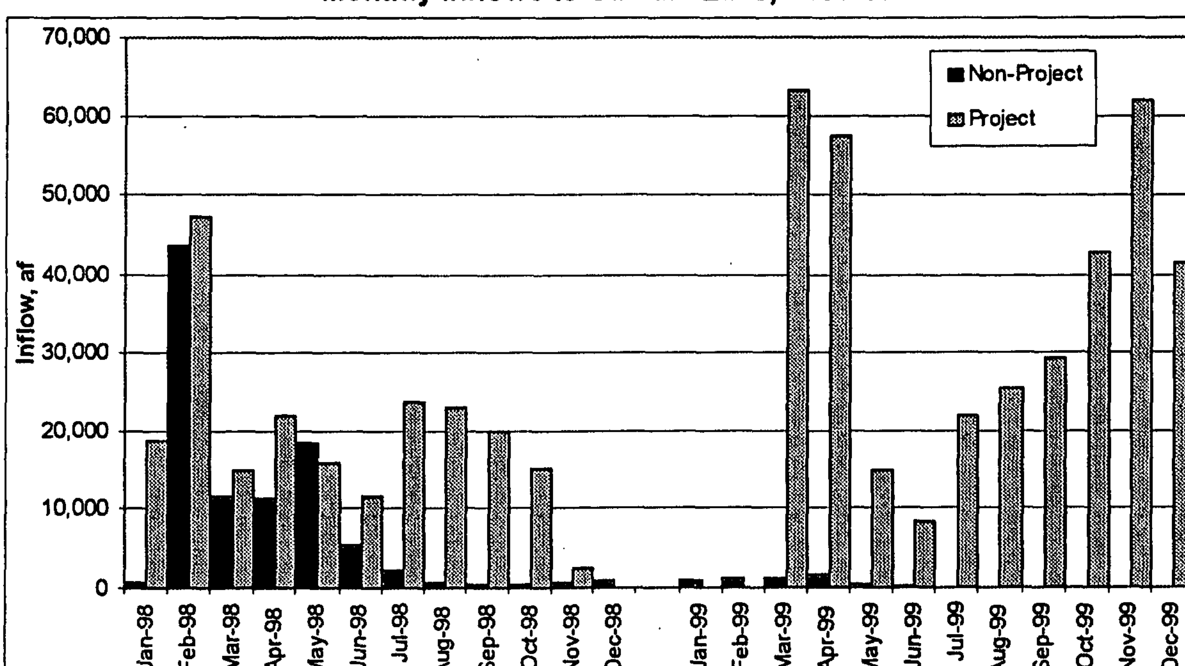
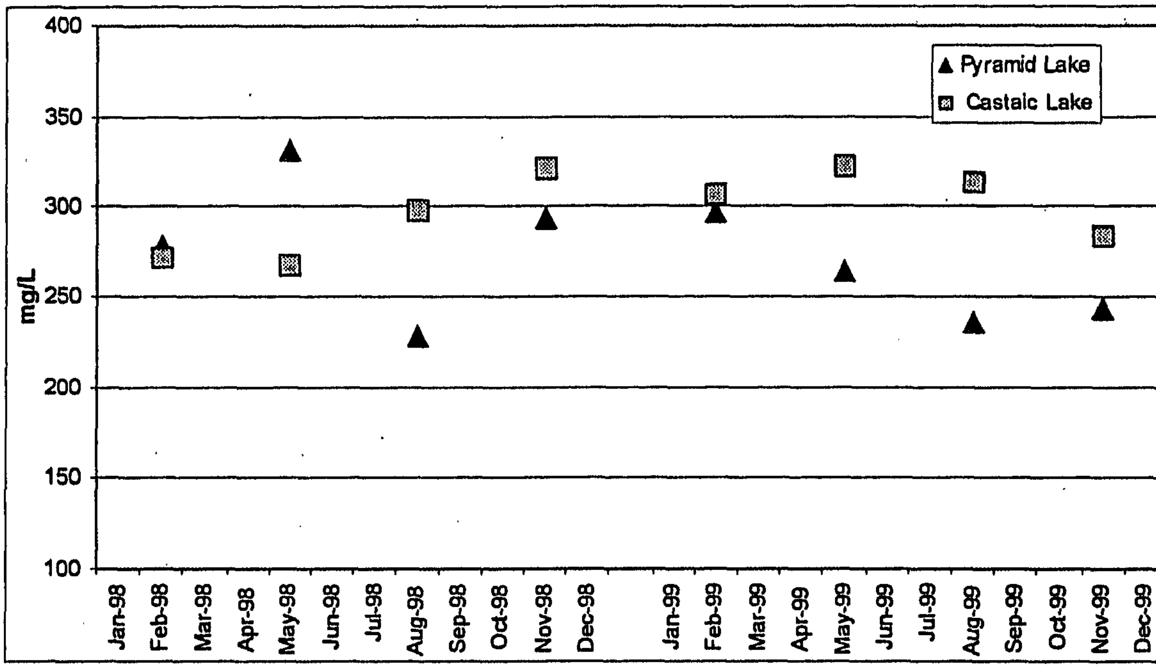


Figure 4-19
Monthly Inflows to Castaic Lake, 1998-99



erratic as in Pyramid Lake (Figure 4-20), but assessing the effects of natural inflow is problematic due to pump-back from Elderberry Forebay. Water in the forebay can be pumped back into Pyramid Lake for energy management purposes. About half of all natural inflow enters this Forebay.

Figure 4-20
TDS in Castaic and Pyramid Lakes, 1998-99



Silverwood Lake
Natural inflow to Silverwood Lake totaled 41,730 af in 1998 and 2,291 af in 1999, amounting to 11 and 0.5 percent, respectively, of the Project/non-Project inflows. Miller Creek drains a 41.5-square-mile watershed (Figure 4-21) and accounts for about 60 percent of all natural inflow to the lake. Cleghorn Creek drains 18.4 square miles and contributes about 30 percent; Sawpit Creek drains 3.63 square miles and contributes less than 10 percent. Miller and Cleghorn creeks are ephemeral and sometimes go dry in the lower stretches during the end of summer.

Project flow to the lake via the East Branch of the California Aqueduct usually dominates all inflows during spring and summer. The lake essentially becomes a conveyance during this period, with water entering the lake from the Mojave Siphon and leaving via the San Bernardino Intake Tower (Figure 4-21) and eventually the Devil Canyon Power Plant. The lake's residence time with high Aqueduct flow is 10 to 20 days. During the rainy season, Project flow from the East Branch is curtailed, and natural runoff can become dominant.

Natural inflow was highest during the first few months of 1998 (Figures 4-22). Unlike Pyramid Lake, creeks draining to Silverwood Lake are usually lower in TDS than Project water. TDS averages around 200 mg/L in Cleghorn Creek and 142 mg/L in Miller Creek (DWR 1999). During the first 3 months of 1998, TDS at Devil Canyon Afterbay was lower than East Branch water (at Check 41) by 97 to 136 mg/L (Figure 4-23). Devil Canyon Afterbay levels essentially mimicked grab samples taken from the lake's surface.

4-21
Water Quality Sampling Stations on Silverwood Lake
(S1002000 is the Routine Monitoring Station)

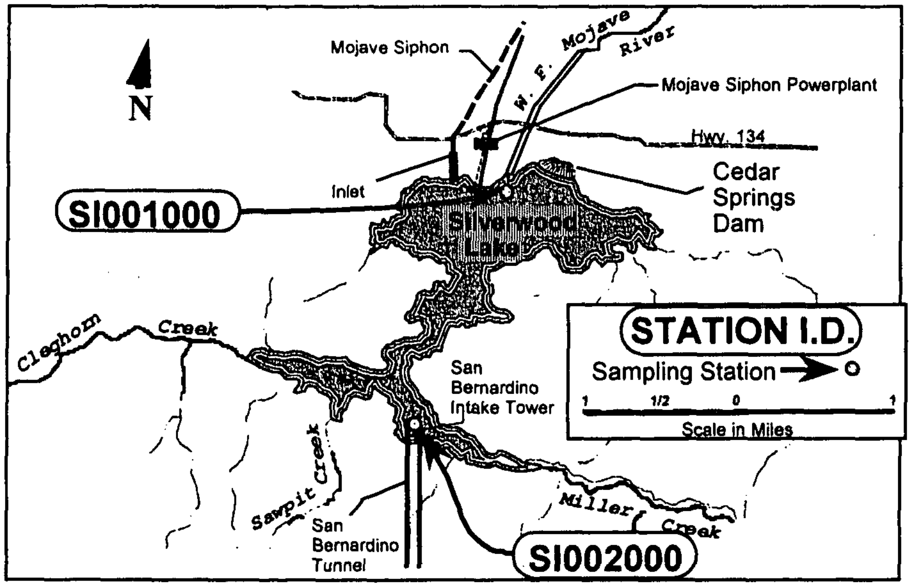


Figure 4-22
Monthly Inflows to Silverwood Lake, 1998-99

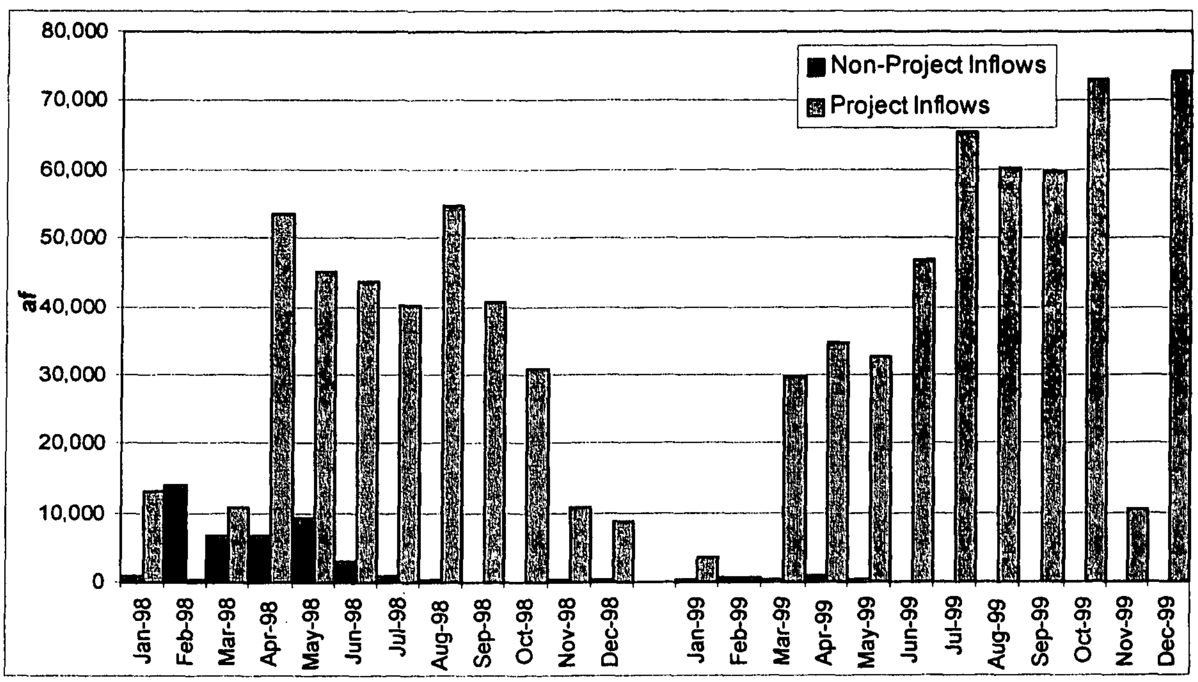
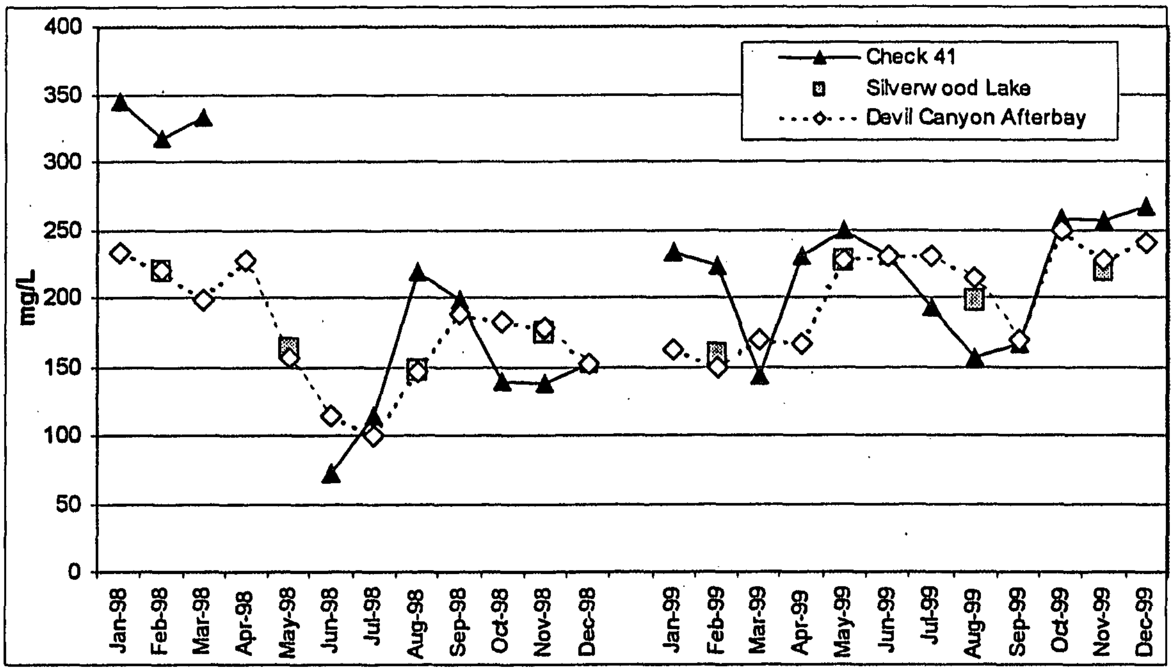


Figure 4-23
TDS in Silverwood Lake and its Inflows/Outflows, 1998-99



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Appendix A

Methods

Contents

Methods

Monitoring Stations

Water quality samples are routinely collected at 29 stations throughout the State Water Project (Table A-1, Figure A-1, and Plates 1 to 5). Automated water quality monitoring stations measure conventional parameters such as conductivity, temperature, or turbidity at 20 locations throughout the Project (Table A-2, Figure A-1, and Plates 1 to 5).

Water Collection

Water quality sampling, preservation, and transportation protocols were followed as per EPA 1983, USGS 1985, and *Standard Methods for the Examination of Water and Wastewater* (APHA et al. 1995). Monitoring protocol for the Project is documented in O&M's "*Water Quality Field Manual for the State Water Project*", DWR, Environmental Assessment Branch, January 1998. The specifics are briefly described here.

Water was taken just below the surface at all lake stations, on the Delta-Mendota Canal, and at Thermalito Afterbay and Forebay stations. The collection device is either an acrylic Van Dorn Beta sampler with polypropylene stoppers, hand-dipped bottle, stainless steel bucket for organics, or plastic bucket for metals suspended by a rope.

At sites with automated stations, samples are collected directly from the circulation system. A spigot is opened and runs for 2 to 3 minutes before the bottle is filled. The circulation piping is PVC and the submerged pump forces around 3 to 5 GPM through the system. After the environmental samples and field blanks have been collected, the tubing is removed, rinsed with deionized water, and stored in a ziploc bag.

Filtration of samples is either performed in the field or at the field lab within an hour. At automated station sampling sites, water is filtered directly from the circulation system. A segment of Masterflex platinum-cured polypropylene tubing is connected to the system that is, in turn, connected to a Gelman 0.45 micron filter capsule. One capsule is used for all filtered samples, including the filtered field blanks.

Field blanks for dissolved metals are filtered with a peristaltic pump with the same tubing used for the environmental samples after it has been rinsed with deionized water. To collect field blanks for total metals, the device used to collected the environmental sample (e.g., bucket) is rinsed with deionized water, then filled with deionized water before the field blank bottle is filled. At stations where a sampler is not used, total field blanks are filled with the peristaltic pump setup without a filter. After sampling, the tubing is placed in a ziploc bag for transport and storage. A travel blank is included along with the purgeable organics vials.

All water samples are collected in accordance with the protocol prescribed for the specific method. Further precautions are taken to eliminate sample contamination in the field. These include use of a "clean" sampling box for storage and transport of items used in the filtration process. Clean items include unused filter cartridges, unused sample bottles, filter tubing, and unused baggies. Containers used include coolers with hinged tops or polyethylene security containers with flip lids. Once the samples are collected and filtered, they are placed immediately in a cooler with ice and transported to the lab within 24 hours.

Filtration and processing of samples is conducted on a clean surface. A clean piece of plastic wrapping is often used, as are unused garbage bags that are disposed of after use. The plastic is spread out on the sampling bench prior to sampling. Items set on this surface include sample bottles, filter tubing, preservatives, and unused filter cartridges. The plastic is removed after sample processing and thrown out.

Laboratory Methods

Water quality samples are transported to the Bryte Chemical Laboratory within 24 to 48 hours of collection. Analytical work was performed by Bryte Laboratory using the analytical methods shown in Table A-3. As required for environmental laboratory accreditation in California, Bryte Laboratory filed a Quality Assurance Plan with the

California Department of Health Services. The plan covers items required by EPA, such as organization and responsibility, laboratory sample procedures and identification, analytical methods, internal quality control, and corrective action. Internal quality control checks include duplicates, spikes, check standards, reference standards, and control charts.

Table A-1
Water Quality Monitoring Schedule

			Sampling Frequency 1/ — Inorganics							Organics									
Waterbody or Facility	Station Name or Description	Station I.D.	Project Standard 2/	Project Additional 3/	Nutrients	Bromide	Major Minerals	Iron and Manganese	Suspended Solids	Chlorinated Organics	Organo-Phosphorus Pesticides	Herbicides	Carbamates	Purgeable Organics	Trihalomethane Form. Pot.	Total Organic Carbon	Dissolved Organic Carbon	UV 254	Automated Monitoring Station
Feather River Watershed	Antelope Lake	AN001000	A		A														
	Frenchman Lake	FR001000	A		A														
	Lake Davis	LD001000	A		A			M3											
	Oroville Lake	OR001000			M2														
	Thermalito Forebay	TF001000	Q	Q															
	Thermalito Afterbay	TA001000	M		M2	Q			Q										
North and South Bay Aqueducts	NBA, Barker Sl. Pumping Plant	KG000000	M	M	M			W1	Q	T	T	T	T	T	M4	M4	M4	M4	X
	NBA, Cordelia Forebay	KG002111	Q	Q															X
	SBA, Check 7	KB001632	M	M	M	M									M	M			X
	SBA, Del Valle Reservoir	DV001000			M														
	SBA, Del Valle Res. Outlet	DV000000	M1	M1	M1				M1										X
	SBA, Santa Clara Terminal Tank	KB004207	Q1	Q1		Q1													X
California Aqueduct and Coastal Branch	Clifton Court Forebay	KA000000				Q	Q												X
	Banks Pumping Plant	KA000331	M	M	M	M			M	T	T	T	T	T	M	M			X
	Check 12	KA006633					Q								Q				X
	Check 13	KA007089	M	M		M				T	T	T	T	T	M	M			X
	Check 21	KA017226	M	M		M			M	T	T	T	T	T	Q	M			X
	Coastal Branch	KC000934	M	M					M						M				X
	Check 29	KA024454	M	M		M			M	T	T	T	T	T	M				X
	Check 41	KA030341	M	M	M	M			M	T	T	T	T	T	M	M			X
	Check 66	KA040341	Q		M										Q				X
	Devil Canyon Afterbay	KA041288	M	M	M	M			Q	T	T	T	T	T	M	M			X
San Luis Reservoir and Project Lakes in Southern California	San Luis Res., Trashracks	SL001000	M	M	M														
	San Luis Res., Tunnel Island	SL005000	M	M	M														X
	Pyramid Lake	PY001000	Q	Q	M	Q									Q				
		PY002000					(Special Monitoring Studies)												
		PY003000					(Special Monitoring Studies)												
	Castaic Lake	CA001000					(Special Monitoring Studies)												
		CA002000	Q	Q	M	Q										Q			
		CA003000					(Special Monitoring Studies)												
	Silverwood Lake	SI001000																	
		SI002000	Q	Q	M	Q													
	Lake Perris	PE001000																	
		PE002000	Q	Q	M	Q													
		PE003000					(Special Monitoring Studies)												
Central Valley Project	Delta Mendota Canal	DMC06716	M	M						T	T	T	T	T	M	M			

1/ Sampling Frequency: A=Annual Q=Quarterly Q1=Feb, May, Aug-Dec M=Monthly M1=Monthly When Flowing M2=Apr-Nov M3=May-Sep M4=Weekly in Winter else Monthly, T=Mar, Jun, Sep, W1=Weekly in Winter

2/ Project Standard: Arsenic, Chromium, Copper, Iron, Lead, Manganese, Selenium, Zinc, Calcium, Magnesium, Sodium, Alkalinity, Sulfate, Chloride, Fluoride, Boron, Nitrate, Dissolved Solids, Turbidity, and Conductivity

3/ Project Additional: Barium, Cadmium, Aluminum, Mercury, and Silver.

Figure A-1
Water Quality Monitoring Stations in the State Water Project

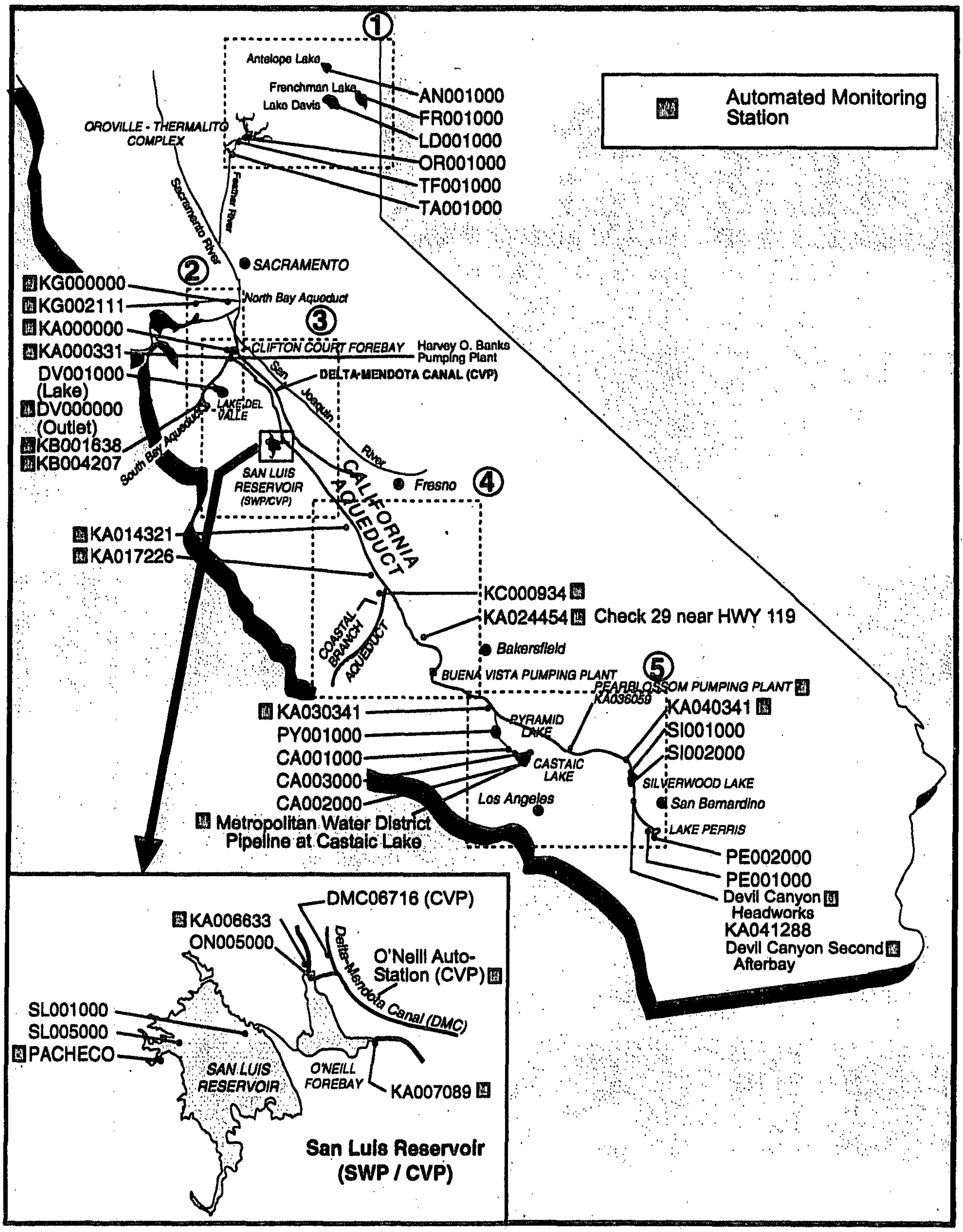


Plate 1

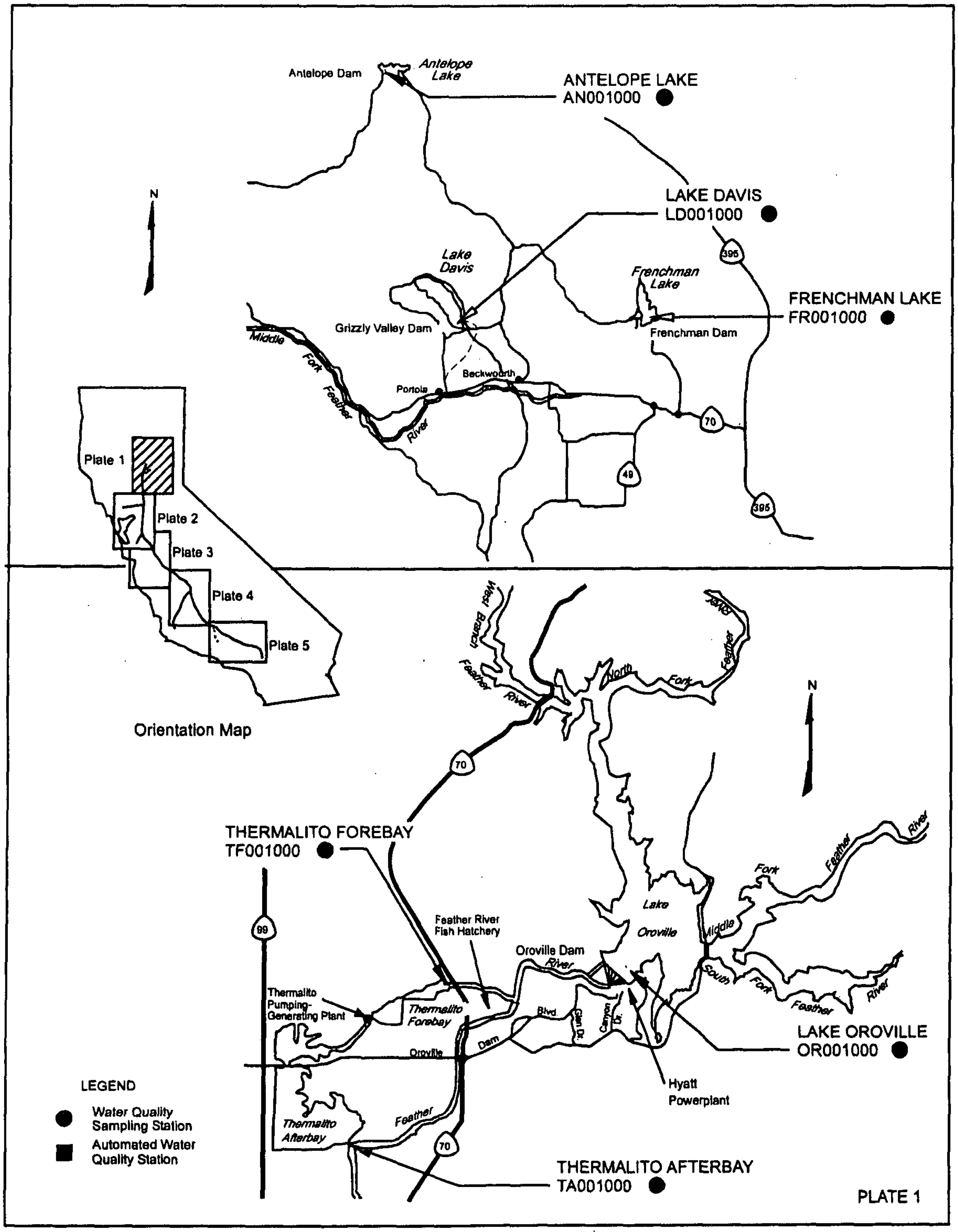
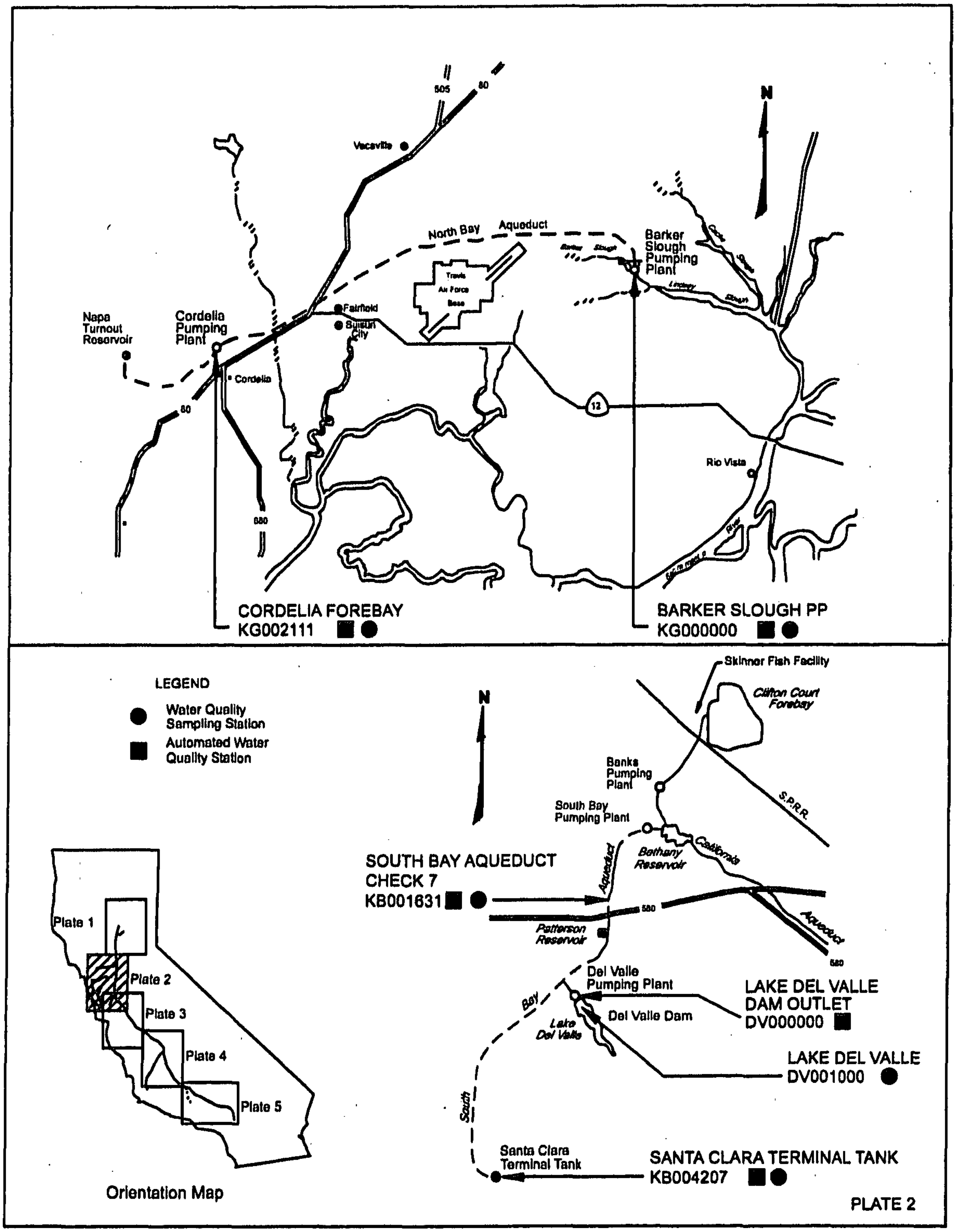
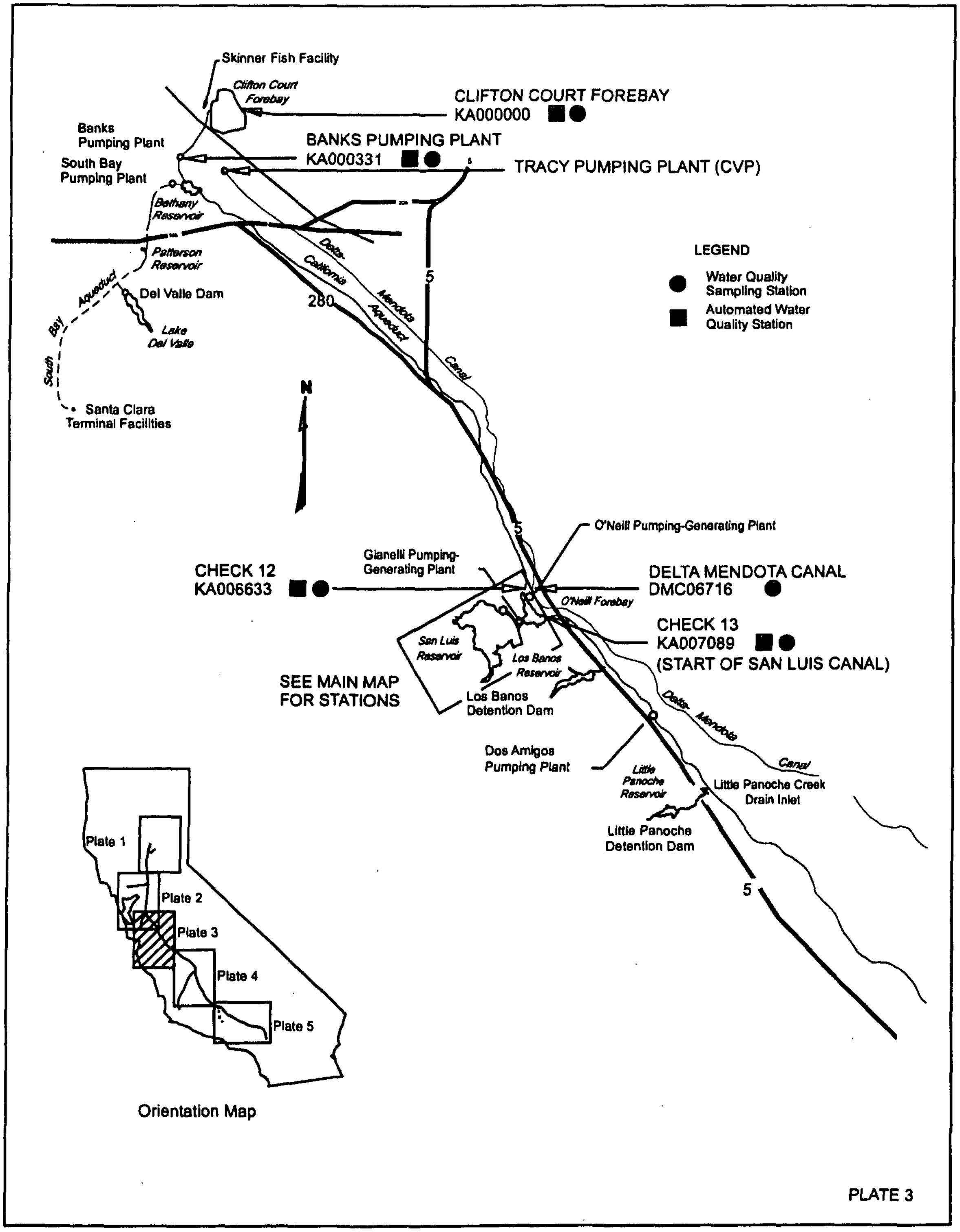

Antelope Dam
Antelope Lake
ANTELOPE LAKE
AN001000
LAKE DAVIS
LD001000
Lake Davis
Frenchman Lake
FRENCHMAN LAKE
FR001000
Grizzly Valley Dam
Frenchman Dam
Middle Fork Feather River
Portola
Beckwourth
395
70
49
Plate 1
Plate 2
Plate 3
Plate 4
Plate 5
Orientation Map
N
West Branch Feather River
North Fork Feather River
THERMALITO FOREBAY
TF001000
Feather River Fish Hatchery
Oroville Dam
Lake Oroville
Middle Fork Feather River
South Fork Feather River
Thermalito Pumping-Generating Plant
Thermalito Forebay
Oroville Dam Blvd
Glen Dr
Canyon Dr
LAKE OROVILLE
OR001000
Hyatt Powerplant
99
LEGEND
Water Quality Sampling Station
Automated Water Quality Station
Thermalito Afterbay
Feather
THERMALITO AFTERBAY
TA001000
PLATE 1

Plate 2



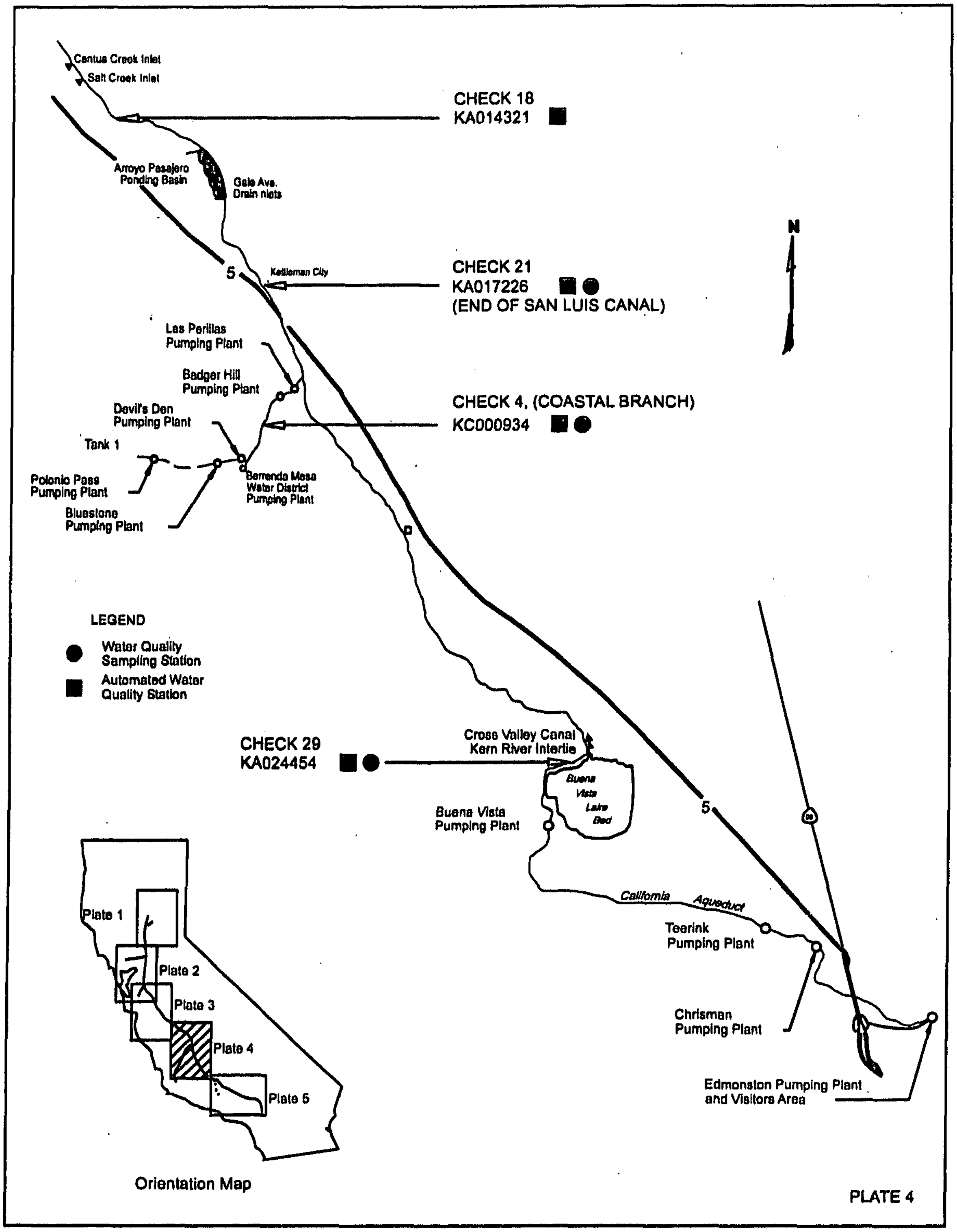
505
80
Vacaville
North Bay Aqueduct
Travis Air Force Base
Barker Slough Pumping Plant
N
Napa Turnout Reservoir
Cordelia Pumping Plant
Fairfield
Suisun City
Cordelia
80
12
Rio Vista
680
CORDELIA FOREBAY
KG002111
BARKER SLOUGH PP
KG000000
LEGEND
Water Quality Sampling Station
Automated Water Quality Station
N
Skinner Fish Facility
Clifton Court Forebay
Banks Pumping Plant
South Bay Pumping Plant
S.P.R.R.
Bethany Reservoir
California
Aqueduct
SOUTH BAY AQUEDUCT CHECK 7
KB001631
580
Patterson Reservoir
Del Valle Pumping Plant
Del Valle Dam
Lake Del Valle
Bay
South
LAKE DEL VALLE DAM OUTLET
DV000000
LAKE DEL VALLE
DV001000
Santa Clara Terminal Tank
SANTA CLARA TERMINAL TANK
KB004207
Plate 1
Plate 2
Plate 3
Plate 4
Plate 5
Orientation Map
PLATE 2

Plate 3



Skinner Fish Facility
Clifton Court Forebay
CLIFTON COURT FOREBAY
KA000000
Banks Pumping Plant
BANKS PUMPING PLANT
KA000331
South Bay Pumping Plant
TRACY PUMPING PLANT (CVP)
Bethany Reservoir
Patterson Reservoir
Del Valle Dam
Lake Del Valle
South Bay Aqueduct
Santa Clara Terminal Facilities
Delta-Mendota Canal
California Aqueduct
280
5
LEGEND
Water Quality Sampling Station
Automated Water Quality Station
N
O'Neill Pumping-Generating Plant
Gianelli Pumping-Generating Plant
CHECK 12
KA006633
DELTA MENDOTA CANAL
DMC06716
O'Neill Forebay
CHECK 13
KA007089
(START OF SAN LUIS CANAL)
San Luis Reservoir
Los Banos Reservoir
SEE MAIN MAP FOR STATIONS
Los Banos Detention Dam
Dos Amigos Pumping Plant
Little Panoche Reservoir
Little Panoche Creek Drain Inlet
Little Panoche Detention Dam
Plate 1
Plate 2
Plate 3
Plate 4
Plate 5
Orientation Map
PLATE 3

Plate 4



Cantua Creek Inlet
Salt Creek Inlet
CHECK 18
KA014321
Arroyo Pasajero Ponding Basin
Gale Ave. Drain Inlets
N
5
Kettleman City
CHECK 21
KA017226
(END OF SAN LUIS CANAL)
Las Perillas Pumping Plant
Badger Hill Pumping Plant
Devil's Den Pumping Plant
CHECK 4, (COASTAL BRANCH)
KC000934
Tank 1
Polonio Pass Pumping Plant
Bluestone Pumping Plant
Berrenda Mesa Water District Pumping Plant
LEGEND
Water Quality Sampling Station
Automated Water Quality Station
CHECK 29
KA024454
Cross Valley Canal Kern River Intertie
Buena Vista Lake Bed
Buena Vista Pumping Plant
5
California Aqueduct
Teerink Pumping Plant
Chrisman Pumping Plant
Edmonston Pumping Plant and Visitors Area
Plate 1
Plate 2
Plate 3
Plate 4
Plate 5
Orientation Map
PLATE 4

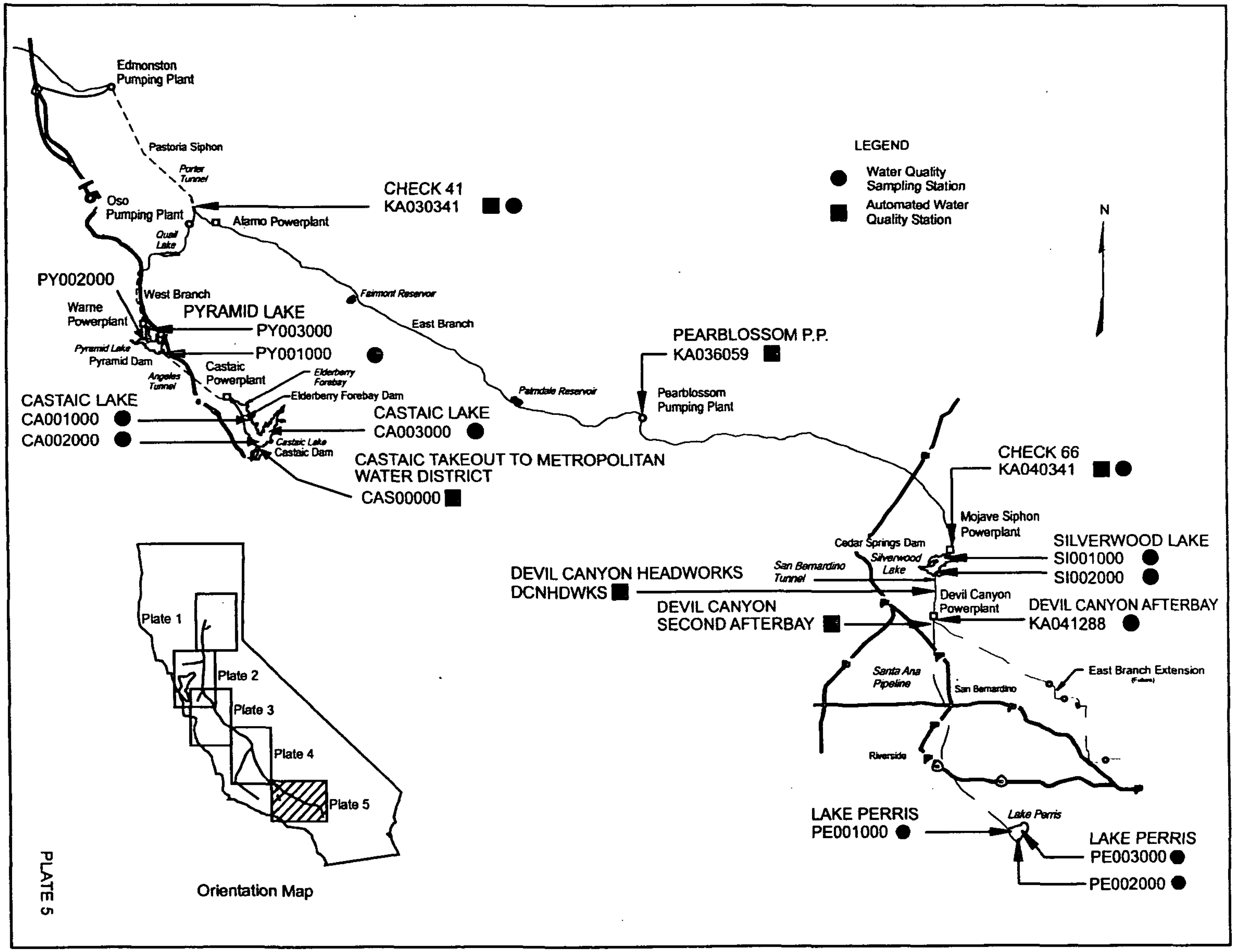

Edmonston Pumping Plant
Pastoria Siphon
Porter Tunnel
Oso Pumping Plant
Quail Lake
Alamo Powerplant
CHECK 41
KA030341
LEGEND
Water Quality Sampling Station
Automated Water Quality Station
N
PY002000
West Branch
Warne Powerplant
PYRAMID LAKE
PY003000
PY001000
Pyramid Lake
Pyramid Dam
Fairmont Reservoir
East Branch
Angeles Tunnel
Castaic Powerplant
Elderberry Forebay
Elderberry Forebay Dam
CASTAIC LAKE
CA001000
CA002000
CASTAIC LAKE
CA003000
Castaic Lake
Castaic Dam
CASTAIC TAKEOUT TO METROPOLITAN WATER DISTRICT
CAS00000
Palmdale Reservoir
PEARBLOSSOM P.P.
KA036059
Pearblossom Pumping Plant
CHECK 66
KA040341
Mojave Siphon Powerplant
Cedar Springs Dam
Silverwood Lake
SILVERWOOD LAKE
SI001000
SI002000
San Bernardino Tunnel
DEVIL CANYON HEADWORKS
DCNHDWKS
Devil Canyon Powerplant
DEVIL CANYON SECOND AFTERBAY
DEVIL CANYON AFTERBAY
KA041288
East Branch Extension
Santa Ana Pipeline
San Bernardino
Riverside
Plate 1
Plate 2
Plate 3
Plate 4
Plate 5
Orientation Map
PLATE 5
LAKE PERRIS
PE001000
Lake Perris
LAKE PERRIS
PE003000
PE002000

Plate 5

Table A-2
Automated Water Quality Monitoring Stations

Project Area or Facility	Station Name or Description	Parameters Monitored: Water Quality: Conductivity	Temperature	Turbidity	pH	Fluorometry	Petroleum Hydrocarbons	Parameters Monitored: Other: Water Depth	Tank Depth	Rainfall	Flow	Tide Elevation
North and South Bay Aqueducts	NBA, Barker Sl. Pumping Plant	X	X	X	X	X				X	X	X
	NBA, Cordelia Forebay	X	X	X				X		X		
	SBA, Check 7	X	X	X	X	X						
	SBA, Del Valle Res. Outlet	X	X	X	X	X					X	
	SBA, Santa Clara Terminal Tank	X	X	X		X			X			
California Aqueduct and Coastal Branch	Clifton Court Forebay	X	X	X	X							X
	Banks Pumping Plant	X	X	X	X		X					
	Check 12	X	X									
	Check 13	X	X	X	X							
	Check 18	X	X	X								
	Check 21	X	X	X							X	
	Coastal Branch	X	X	X								
	Check 29	X	X	X								
	Check 41	X	X	X								
	Pearblossom Pumping Plant			X								
	Check 66			X								
	Devil Canyon Headworks	X	X	X	X							
	Devil Canyon Second Afterbay	X	X	X								
San Luis Reservoir	San Luis Res., Pacheco Pumping Plant	X	X	X	X	X						
Project Lakes in Southern California	Metropolitan Water District Pipeline at Castaic Lake	X	X	X	X							
Central Valley Project 1/	Delta-Mendota Canal near O'Neill PGP	X	X									

1/ Operated and Maintained by the U.S.BR.

Table A-3
Methods for Water Quality Analysis

Constituent	Method [a]	Reference	
MINERAL			
Calcium	AA, flame	EPA	215.1
Magnesium	AA, flame	EPA	242.1
Hardness	Calculated from calcium and magnesium	Std. Met.	
Sodium	AA, flame	EPA	273.1
Potassium	AA, flame	EPA	258.1
Alkalinity	Titrimetric	EPA	310.1
pH	Electrometric	EPA	150.1
Sulfate	Colorimetric, Automated MTB	EPA	375.2
Chloride	Colorimetric, Automated	EPA	325.2
Nitrate	Colorimetric, Automated Cd reduction	EPA	353.2
Fluoride	Potentiometric ISE	EPA	340.2
Boron	Colorimetric, Automated, Azomethine	USGS	I-2115-85
Turbidity	Nephelometric	EPA	180.1
Dissolved Solids	Gravimetric, 180°C	EPA	160.1
Specific Conductance	Wheatstone Bridge	EPA	120.1
Silica	Colorimetric, Molybdate Blue	USGS	I-1700-85
METALS			
Aluminum	AA, direct & furnace, Zeeman	EPA	202.1, 202.2
Arsenic	AA, hydride	EPA	206.3
Barium	AA, direct	EPA	208.1
Cadmium	AA, furnace, Zeeman	EPA	213.2
Chromium	AA, furnace, Zeeman	EPA	218.2
Chromium (+6)	AA, furnace, Zeeman	EPA	218.5
Colbalt	AA, furnace, Zeeman	EPA	219.2
Copper	AA, direct & furnace, Zeeman	EPA	220.1, 220.2
Iron	AA, direct & furnace, Zeeman	EPA	236.1, 236.2
Lead	AA, furnace, Zeeman	EPA	239.2
Lithium	AA, direct	USGS	I-1425-85
Manganese	AA, furnace, Zeeman	EPA	243.1, 243.2
Mercury	AA, cold vapor	EPA	245.1
Molybdenum	AA, furnace, Zeeman	EPA	246.2
Nickel	AA, direct & furnace, Zeeman	EPA	249.1, 249.2
Selenium	AA, hydride	EPA	270.3
Silver	AA, Zeeman	EPA	272.2
Strontium	AA, direct	USGS	I-1800-85
Zinc	AA, direct & furnace, Zeeman	EPA	289.1, 289.2
Barium	AA, furnace, Zeeman	EPA	208.2
Vanadium	AA, furnace, Zeeman	EPA	286.2

[a] Abbreviations:
AA — Atomic Absorption
GC — Gas Chromatography
HPLC — High Performance Liquid Chromotography

Table A-3 (Con't)
Methods for Water Quality Analysis

Constituent	Method [a]	Reference	
NUTRIENTS			
Ammonia	Colorimetric, Automated Phenate	EPA	350.1
Ammonia + Organic N	Colorimetric, Semi-Automated	EPA	351.2
Nitrate	Colorimetric, Auto Cd Reduction	EPA	353.2
Nitrite	Colorimetric, Auto Cd Reduction	EPA	353.2
Nitrate + Nitrite	Colorimetric, Auto Cd Reduction	EPA	353.2
Phosphate	Colorimetric, Ascorbic acid	EPA	365.1
Phosphorus	Colorimetric, Semi-Automated	EPA	365.4
MISCELLANEOUS			
Settleable Solids	Volumetric, Imhoff	EPA	160.5
Suspended Solids	Gravimetric, 105°C	EPA	160.2
Color, True	Colorimetric, Pt-Co	EPA	110.2
Methylene Blue Act Sub.	Colorimetric	EPA	425.1
COD	Titrimetric, low level	EPA	410.2
Tannin & Lignin	Colorimetric	Std. Met.	5550B
Oil & Grease	Gravimetric, extraction	EPA	413.1
Cyanide	Titrimetric, Spectrophotometric	EPA	335.1
Phenols	Spectrophotometric, Distillation	EPA	420.1
BOD	Incubation 20°C	EPA	405.1
Organic Carbon	Wet Oxidation, IR, Auto	EPA	415.1
Volatile Suspended Solids	550°C	EPA	160.4
Bromide	Ion Chromatography	Std. Met	4110B
ORGANICS			
THM Formation Potential	GC	EPA	502.2
Chloroform			
Bromodichloromethane			
Dibromochloromethane			
Bromoform			
Chlorinated Organics	GC	EPA	608
Pesticides			
Diuron	Reporting Limits in µg/l: 0.05		
BHC, alpha	0.01		
Chlopropham	0.02		
Dichloran	0.01		
Simazine	0.02		
BHC, gamma	0.01		

[a] ***Abbreviations:***
AA — Atomic Absorption
GC — Gas Chromatography
HPLC — High Performance Liquid Chromotography

Table A-3 (Con't)
Methods for Water Quality Analysis

Constituent	Method [a]		Reference	
ORGANICS (Continued)				
Chlorinated Organic Pesticides (Cont'd)	GC		EPA	608
BHC, beta	Reporting Limits in µg/l:	0.01		
Atrazine		0.02		
PCNB		0.01		
BHC, delta		0.01		
Chlorothalonil		0.01		
Alachlor		0.05		
Heptachlor		0.01		
Thiobencarb		0.02		
Chlorpyrifos		0.01		
Aldrin		0.01		
DCPA		0.01		
Captan		0.02		
Heptachlor Epoxide		0.01		
Chlordane		0.05		
Endosulfan I		0.01		
Dieldrin		0.01		
DDE		0.01		
Endrin		0.01		
Endosulfan II		0.01		
Endrin Aldehyde		0.01		
DDD		0.01		
Endosulfan Sulfate		0.01		
DDT		0.01		
Methoxychlor		0.01		
Dicofol		0.01		
Toxaphene		0.20		
PCB-1016		0.10		
PCB-1221		0.10		
PCB-1232		0.10		
PCB-1248		0.10		
PCB-1254		0.10		
PCB-1260		0.10		
Metolachlor		0.20		
Oxyfluorfen		0.20		

a Abbreviations:
AA — Atomic Absorption
GC — Gas Chromatography
HPLC — High Performance Liquid Chromotography

Table A-3 (Con't)
Methods for Water Quality Analysis

Constituent	Method [a]		Reference	
ORGANICS (Continued)				
Organic Phosphorus Pesticides	GC		EPA	614
Mevinphos	Reporting Limits in µg/l:	0.01		
Demeton		0.02		
Naled		0.02		
Phorate		0.01		
Dimethoate		0.01		
Diazinon		0.01		
Disulfoton		0.01		
Methyl Parathion		0.01		
Malathion		0.01		
Chlorpyrifos		0.01		
Parathion		0.01		
Methidathion		0.02		
Profenofos		0.01		
s,s,s-Tributyl Phosphorotrithioate (DEF)		0.01		
Ethion		0.01		
Carbophenothion (Trithion)		0.02		
Phosmet		0.02		
Phosalone		0.02		
Azinphosmethyl		0.05		
Bromacil		1.0		
Cyanazine		0.01		
Naproazmide		5.0		
Norflurazon		5.0		
Pendimethalin		5.0		
Prometryn		0.1		
Propetamphos		0.05		
Trifluralin		0.05		
Benfluralin		0.05		
Chlorinated Phenoxy Acid Herbicides	GC		EPA	615
Dicamba	Reporting Limits in µg/l:	0.1		
MCPP		0.1		
Pentachlorophenol (PCP)		0.1		
Dichlororop		0.1		
2,4, -D		0.1		
MCPA		0.1		
2,4,5 -TP		0.1		
2,4,5 -T		0.1		
2,4, -DB		0.1		
Picloram		0.1		
Triclophr		0.1		

[a] Abbreviations:
AA — Atomic Absorption
GC — Gas Chromatography
HPLC — High Performance Liquid Chromotography

Table A-3 (Con't)
Methods for Water Quality Analysis

Constituent	Method [a]	Reference	
ORGANICS (Continued)			
Purgeable Organics	GC	EPA	602
	Reporting Limits in µg/l:		
Dichlorodifluoromethane	0.5		
Chloromethane	0.5		
Vinyl chloride	0.5		
Bromomethane	0.5		
Chloroethane	0.5		
Trichlorofluoromethane	0.5		
1,1-Dichloroethene	0.5		
Methylene chloride	0.5		
trans- 1,2-Dichloroethene	0.5		
1,1-Dichloroethane	0.5		
2,2-Dichloropropane	0.5		
cis- 1,2-Dichloroethene	0.5		
Chloroform	0.5		
Bromochloromethane	0.5		
1,1,1- Trichloroethane	0.5		
1,1-Dichloropropene	0.5		
Carbon tetrachloride	0.5		
Benzene	0.5		
1,2-Dichloroethane	0.5		
Trichloroethene	0.5		
1,2-Dichloropropane	0.5		
Bromodichloromethane	0.5		
Dibromomethane	0.5		
cis-1,3-Dichloropropene	0.5		
Tolune	0.5		
trans-1, 3-Dichloropropene	0.5		
1,1,2-Trichloroethane	0.5		
1,3-Dichloropropane	0.5		
Tetrachloroethene	0.5		
Dibromochloromethane	0.5		
1,2-Dibromoethane	0.5		
Chlorobenzene	0.5		
Ethyl benzene	0.5		
1,1,1,2-Tetrachloroethane	0.5		
m-Xylene	0.5		
p-Xylene	0.5		
o-Xylene	0.5		
Styrene	0.5		
Isopropyl benzene	0.5		
Bromoform	0.5		

[a] Abbreviations:
AA — Atomic Absorption
GC — Gas Chromatography
HPLC — High Performance Liquid Chromotography

Table A-3 (Con't)
Methods for Water Quality Analysis

Constituent	Method [a]		Reference	
ORGANICS (Continued)				
Purgeable Organics (cont'd)	GC		EPA	602
1,1,2,2-Tetrachloroethane	Reporting Limits in µg/l:	0.5		
1,2,3-Trichloropropane		0.5		
n-Propyl benzene		0.5		
Bromobenzene		0.5		
1,3,5-Trimethylbenzene		0.5		
2-Chlorotoluene		0.5		
4-Chlorotoluene		0.5		
tert-Butylbenzene		0.5		
1,2,4-Trimethylbenzene		0.5		
sec-Butylbenzene		0.5		
4-Isopropyltoluene		0.5		
1,3-Dichlorobenzene		0.5		
1,4-Dichlorobenzene		0.5		
n-Butylbenzene		0.5		
1,2-Dichlorobenzene		0.5		
1,2-Dibromo-3-chloropropane		0.5		
1,2,4-Trichlorobenzene		0.5		
Hexachlorobutadiene		0.5		
Napthalene		0.5		
1,2,3- Trichlorobenzene		0.5		
Carbamates	HPLC		EPA	531.1
Aldicarb Sulfoxide	Reporting Limits in µg/l:	2		
Aldicarb Sulfone		2		
Oxamyl		2		
Methomyl		2		
3-Hydroxycarbofuran		2		
Aldicarb		2		
Carbofuran		2		
Carbaryl		2		
1-Naphthol		4		
Methiocarb		4		
Formetanate Hydrochloride		100		
Miscellaneous Pesticides	HPLC		EPA	531.1
Glyphosate	Reporting Limits in µg/l:	100		
Aminomethylphosphonic Acid		100		
Propargite		1		

[a] Abbreviations:
AA — Atomic Absorption
GC — Gas Chromatography
HPLC — High Performance Liquid Chromotography

Appendix B

Water Quality Standards and Objectives

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Table B-1
MCLs and Article 19 Objectives for Inorganic Parameters

Parameter	Units	Primary MCL	Secondary MCLs Recommended	Secondary MCLs Upper	Secondary MCLs Short Term	Article 19 Objectives Monthly Average	Article 19 Objectives 10 year Average
Asbestos	MFL a/	7					
Conductivity (Specific Conductance)	µS/cm		900	1600	2200		
Chloride	mg/L		250	500	600	110	55
Nitrate as NO3	mg/L	45					
Nitrate + Nitrite sum as N	mg/L	10					
Nitrite as N	mg/L	0.4					
Sodium	% b/					50	40
Sulfate	mg/L		250	500	600		
Total Dissolved Solids	mg/L		500	1000	1500	440	220
Total Hardness as CaCO3	mg/L					180	110

a/ Million Fibers per Liter: MCL for fibers exceeding 10 um in length.
b/ Percentage of cationic composition

Table B-2
MCLs and Article 19 Objectives for Minor Elements

Minor Element	mg/L Article 19 Objectives Maximum	mg/L Primary MCL	mg/L Secondary MCL
Aluminum		1	0.2
Antimony		0.006	
Arsenic	0.05	0.05	
Barium		1	
Beryllium		0.004	
Boron	0.6 b/		
Cadmium		0.005	
Chromium		0.05	
Hexavalent Chromium	0.05		
Copper	3.0		1.0
Cyanide		0.2	
Fluoride	1.5	1.4-2.4 a/	
Iron			0.3
Iron+Manganese	0.3		
Lead	0.1		
Mercury		0.002	
Nickel		0.1	
Selenium	0.05	0.05	
Silver			0.1
Thallium		0.002	
Zinc	15		5.0

a/ Temperature Dependent

Degrees C	MCL (mg/L)
12.0 and below	2.4
12.1 to 14.6	2.2
14.7 to 17.6	2.0
17.7 to 21.4	1.8
21.5 to 26.2	1.6
26.3 to 32.5	1.4

b/ Monthly Average

Table B-3
Primary Maximum Contaminant Levels for Organic Chemicals

Volatile Organic Chemicals (VOCs)	MCL mg/L	Non-Volatile Synthetic Organic Chemicals	MCL mg/L
Benzene	0.001	Alachlor	0.002
Carbon Tetrachloride	0.0005	Atrazine	0.003
1,2-Dichlorobenzene	0.6	Bentazon	0.018
1,4-Dichlorobenzene	0.005	Benzo(a)pyrene	0.0002
1,1 -Dichloroethane	0.005	Carbofuran	0.018
1,2-Dichloroethane	0.0005	Chlordane	0.0001
1,1 -Dichloroethylene	0.006	2,4-D	0.07
cis- 1,2-Dichloroethylene	0.006	Dalapon	0.2
trans- 1,2-Dichloroethylene	0.01	Dacthal (DBCP)	0.0002
Dichloromethane	0.005	Di(2-ethylhexyl)adipate	0.4
1,2-Dichloropropane	0.005	Di(2-ethylhexyl)phthalate	0.004
1,3-Dichloropropene	0.0005	Dinoseb	0.007
Ethylbenzene	0.7	Diquat	0.02
Monochlorobenzene	0.07	Endothall	0.1
Styrene	0.1	Endrin	0.002
1,1,2,2-Tetrachloroethane	0.001	Ethylene Dibromide (EDP)	0.00005
Tetrachloroethylene	0.005	Glyphosate	0.7
Toluene	0.15	Heptachlor	0.00001
1,2,4-Trichlorobenzene	0.07	Heptachlor Epoxide	0.00001
1,1,1 -Trichloroethane	0.2	Hexachlorobenzene	0.001
1,1,2-Trichloroethane	0.005	Hexachlorocyclopentadiene	0.05
Trichloroethylene	0.005	Lindane	0.0002
Trichlorofluoromethane	0.15	Methoxychlor	0.04
1,1,2-Trichloro- 1,2,2-Trifluoroethane	1.2	Methyl tertiary-butyl ether (MtBE)	0.005 b/
Vinyl Chloride	0.0005	Molinate	0.02
Xylenes	1.750 a/	Oxamyl	0.2
		Pentachlorophenol	0.001
		Picloram	0.5
		Polychlorinated Biphenyls	0.0005
		simazine	0.004
		Thiobencarb c/	0.07
		Toxaphene	0.003
		2,3,7,8-TCDD (Dioxin)	3 x 10-8
		2,4,5-TP (Silvex)	0.05

a/ MCL is for either a single isomer or the sum of the isomers.
b/ Secondary MCL
c/ Secondary MCL=0.001 mg/L

Appendix C

Data Tables

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Table C-1

Conventional Parameter, Major Mineral, Fluoride, and Boron Concentrations in the SWP

CONCENTRATION (mg/L unless otherwise noted)

STATION	DATE	HARDNESS (as CaCO3)	CALCIUM	MAGNESIUM	SODIUM	TOTAL ALKALINITY (as CaCO3)	LAB pH (pH units)	SULFATE	CHLORIDE	NITRATE (as NO3)	FLUORIDE	BORON	TURBIDITY (NTU)	DISSOLVED SOLIDS	CONDUCTIVITY (µS/cm)
AN001000	5/27/99	26	7.0	2.0	3.0	41	7.2	< 1	< 1	< 0.1	< 0.1	< 0.10	3	65	72
CA002000	2/17/98	128	29.8	13.0	44.3	84	8.0	70	50	1.8	0.2	0.28	3	272	479
CA002000	5/18/98	144	33.9	14.4	40.3	91	8.2	81	44	0.6	0.2	0.28	2	268	492
CA002000	8/17/98	163	39.0	16.0	41.0	110	8.2	88	43	< 0.1	0.4	0.30	< 1	298	531
CA002000	11/16/98	168	41.0	16.0	41.0	92	7.7	99	42	1.0	0.3	0.30	< 1	321	528
CA002000	2/16/99	175	42.0	17.0	44.0	104	7.6	95	42	1.2	0.3	0.30	< 1	307	539
CA002000	5/17/99	166	40.0	16.0	42.0	114	8.6	97	41	< 0.1	0.3	0.40	1	347	525
CA002000	8/16/99	165	38.0	17.0	45.0	111	8.6	102	42	< 0.1	0.3	0.40	2	322	523
CA002000	11/15/99	143	34.0	14.0	39.0	91	7.4	80	42	0.9	0.2	0.30	< 1	284	488
DMC06716	1/21/98	60	14.0	6.0	23.0	47	7.7	28	22	4.6	< 0.1	0.10	36	151	248
DMC06716	1/21/98	61	13.7	6.4	23.3	47	7.7	28	22	4.6	< 0.1	0.14	36	151	248
DMC06716	2/18/98	101	22.8	10.7	38.8	67	7.8	59	39	5.1	< 0.1	0.26	55	233	404
DMC06716	3/18/98	133	29.7	14.3	61.1	80	7.9	87	63	5.7	0.1	0.41		324	562
DMC06716	4/14/98	81	18.2	8.7	31.8	61	7.9	49	32	3.5	< 0.1	0.20	11	188	343
DMC06716	5/19/98	79	17.8	8.3	30.2	54	7.8	42	35	3.2	< 0.1	0.17	28	175	319
DMC06716	6/16/98	46	10.9	4.7	16.6	40	7.5	20	15	2.0	< 0.1	0.10	26	114	186
DMC06716	7/14/98	36	8.5	3.5	12.5	32	7.2	15	13	2.1	< 0.1	< 0.10	52	77	145
DMC06716	8/19/98	82	18.0	9.0	32.0	59	7.5	39	34	4.9	< 0.1	0.20	21	180	325
DMC06716	10/20/98	70	16.2	7.2	27.9	55	7.2	32	30	4.3	< 0.1	0.18	18	166	286
DMC06716	11/18/98	139	31.0	15.0	60.0	100	7.3	68	70	7.8	< 0.1	0.30	6	329	573
DMC06716	12/16/98	118	25.7	13.2	59.0	111	8.8	54	66	5.5	< 0.1	0.26	3	282	519
DMC06716	1/20/99	155	34.0	17.0	79.0	103	7.8	78	95	8.3	< 0.1	0.40	15	412	729
DMC06716	2/17/99	55	12.0	6.0	17.0	46	7.0	24	19	2.5	< 0.0	0.10	22	112	210
DMC06716	3/17/99	70	15.0	8.0	32.0	51	7.3	43	33	2.9	< 0.1	0.20	16	175	314
DMC06716	4/21/99	80	17.0	9.0	38.0	62	6.9	44	41	3.4	< 0.1	0.20	8	189	358
DMC06716	5/19/99	64	14.0	7.0	29.0	48	6.9	36	32	3.4	< 0.1	0.20	14	154	281
DMC06716	6/16/99	73	16.0	8.0	28.0	59	7.0	28	31	2.7	< 0.1	0.10	45	154	288
DMC06716	7/21/99	61	13.0	7.0	18.0	60	7.2	15	19	1.7	< 0.1	< 0.10	28	120	208
DMC06716	8/18/99	91	20.0	10.0	36.0	73	6.9	36	39	4.2	< 0.1	0.20	18	205	360
DMC06716	9/15/99	85	16.0	11.0	47.0	74	7.2	23	66	1.7	< 0.1	0.10	12	222	409
DMC06716	10/20/99	83	15.0	11.0	49.0	68	7.0	14	72				12	303	432
DMC06716	11/17/99	104	22.0	12.0	52.0	84	7.4	44	68	4.9	< 0.1	0.20		270	487
DMC06716	12/15/99	109	19.0	15.0	78.0	73	7.3	22	122	3.0	< 0.1	0.10	3	332	641
DV0000.00	2/18/98	125					8.1	25	6	1.6	< 0.1		65		294
DV0000.00	3/18/98	124	26.6	14.0	11.9	115	8.2	19	7	1.3	0.1	< 0.10	37	170	294
DV0000.00	4/15/98	145	30.4	16.8	13.0	131	8.1	29	8	0.9	0.1	0.11	9	189	339
DV0000.00	8/19/98	204	37.0	27.0	19.0	173	8.2	50	12	< 0.1	0.1	0.20	2	254	452
DV0000.00	9/16/98	194	38.0	24.0	17.0	182	8.4	43	10	0.2	0.1	0.10	2	251	425
DV0000.00	10/21/98	204	39.0	26.0	18.0	178	8.0	47	12	0.1	0.1	0.20	19	267	456
DV0000.00	10/20/99	182	35.0	23.0	20.0	166	8.2	47	14				1	275	447
DV0000.00	11/17/99	186	35.0	24.0	21.0	165	8.2	48	16	< 0.1	0.1	0.20	2	265	452
DV000000	2/18/98	125	27.0	14.0	12.0	113	8.1	25	6	1.6	< 0.1	0.10	65	172	294
DV000000	3/18/98	125	27.0	14.0	12.0	115	8.2	19	7	1.3	0.1	< 0.10	37	170	294
FR001000	5/26/99	39	9.0	4.0	5.0	50	7.0	1	< 1	< 0.1	< 0.1	< 0.10	3	64	92
KA000000	2/18/98	83					7.7	43	30	4.2			39		329
KA000000	5/20/98	54	12.7	5.4	20.0	42	7.6	25	19	2.1		0.11		122	220
KA000000	8/19/98	66	15.0	7.0	21.0	53	7.2	24	22	2.2		0.10	76	127	238
KA000000	11/18/98	128	28.0	14.0	57.0	99	7.2	61	63	7.4		0.30	11	311	543
KA000000	2/17/99	48	11.0	5.0	19.0	41	7.0	26	19	2.5		0.10	15	119	208
KA000000	5/19/99	86	18.0	10.0	40.0	59	6.9	46	43	3.2		0.20	21	241	360
KA000000	8/18/99	61	13.0	7.0	19.0	60	6.7	14	19	1.2		< 0.10	9	125	213
KA000000	11/17/99	108	22.7	12.6	54.2	80	7.1	22	36	4.7		0.21	7	274	499
KA000331	1/21/98	114	22.8	13.9	61.3	76	7.9	49	82	5.4	< 0.1	0.32	6	303	537
KA000331	2/18/98	103					7.9	48	60	5.5	< 0.1		11		462
KA000331	3/18/98	101	21.7	11.4	53.3	71	8.0	56	58	6.0	0.1	0.36	4	265	467
KA000331	4/15/98	121	24.7	14.5	91.3	95	8.1	77	98	6.2	0.2	1.23	2	399	702
KA000331	5/20/98	82	17.5	9.4	41.8	63	7.9	43	46	1.0	< 0.1	0.34	6	212	380
KA000331	6/17/98	49	11.2	5.1	17.9	39	7.4	22	18	1.8	< 0.1	0.12	11	117	193
KA000331	7/15/98	38	9.0	3.9	13.1	33	7.3	16	12	1.8	< 0.1	< 0.10	28	85	148
KA000331	8/19/98	64	14.0	7.0	19.0	51	7.1	20	19	1.8	< 0.1	0.10	30	118	220
KA000331	9/16/98	64	14.0	7.0	20.0	60	7.2	21	20	2.2	< 0.1	0.10	31	139	233
KA000331	10/21/98	61	13.0	7.0	18.0	57	7.1	18	18	2.5	< 0.1	< 0.10	68	133	216
KA000331	11/18/98	65	14.0	7.3	21.0	66	7.0	22	24	3.4	< 0.1	0.10	6	146	255
KA000331	12/16/98	94	21.0	10.0	47.0	71	7.4	48	48	5.5	< 0.1	0.30	8	220	421
KA000331	1/20/99	112	25.0	12.0	48.0	72	7.0	60	57	8.0	< 0.0	0.30	13	271	472
KA000331	2/17/99	91	20.0	10.0	38.0	62	7.3	48	44	5.4	< 0.0	0.20	9	218	384
KA000331	3/17/99	71	15.5	7.8	28.6	53	7.3	38	31	3.2	< 0.1	0.17	6	160	303
KA000331	4/21/99	80	17.0	9.0	36.0	62	7.0	45	39	3.1	< 0.1	0.20	17	179	350
KA000331	5/19/99	70	16.0	8.0	30.0	47	6.8	36	33	3.3	< 0.1	0.20	24	164	291
KA000331	6/16/99	82	18.0	9.0	32.0	62	7.2	33	36	3.2	< 0.1	0.20	29	182	310
KA000331	7/21/99	64	14.0	7.0	18.0	59	7.0	16	19	1.5	< 0.1	< 0.10	26	123	215
KA000331	8/18/99	61	13.0	7.0	20.0	64	6.6	15	19	1.2	< 0.1	< 0.10	23	127	223
KA000331	9/15/99	83	15.0	11.0	50.0	74	7.2	24	70	1.4	< 0.1	0.10	21	226	424
KA000331	10/20/99	80	14.0	11.0	49.0	68	7.1	18	74				12	293	437
KA000331	11/17/99	83	15.0	11.0	51.0	62	7.0	22	82	1.7	< 0.1	< 0.10	16	242	447
KA000331	12/15/99	113	19.0	16.0	91.0	76	7.4	38	151	2.8	< 0.1	0.20	3	388	725
KA0066.11	9/16/98	78	18.0	8.0	30.0	57	7.4	39	33	5.0	< 0.1	0.20	32	177	300
KA006633	2/18/98	150	31.2	17.6	62.1	95	8.0	65	77	11.6		0.35		351	609
KA006633	5/19/98	151	33.3	16.5	56.6	92	8.5	69	67	4.4		0.30		344	591
KA006633	8/19/98	64	14.0	7.0	22.0	51	7.4	18	22	2.3		0.10		137	235
KA006633	11/18/98	73	16.0	8.0	23.0	66	7.1	26	25	3.7		0.10		150	272
KA006633	2/17/99	103	23.0	11.0	38.0							0.20			
KA006633	5/19/99	73	16.0	8.0	30.0							0.20		245	

Table C-1 (Con't)
Conventional Parameter, Major Mineral, Fluoride, and Boron Concentrations in the SWP

CONCENTRATION (mg/L unless otherwise noted)

STATION	DATE	HARDNESS (as CaCO3)	CALCIUM	MAGNESIUM	SODIUM	TOTAL ALKALINITY (as CaCO3)	LAB pH (pH units)	SULFATE	CHLORIDE	NITRATE (as NO3)	FLUORIDE	BORON	TURBIDITY (NTU)	DISSOLVED SOLIDS	CONDUCTIVITY
KA006633	8/18/99	59	12.0	7.0	20.0	60	6.8	14	19	1.2		< 0.10		128	222
KA007082	7/15/98	68	14.3	7.9	33.6	55	7.6	27	45	3.0	< 0.1	0.13	15	200	318
KA007089	1/21/98	112	24.2	12.5	50.5	70	7.8	52	58	6.6	< 0.1	0.21	26	279	467
KA007089	2/18/98	103	23.2	11.0	40.1	70	7.8	58	42	5.2	< 0.1	0.27	32	237	414
KA007089	3/18/98	120	26.8	12.9	51.1	77	8.0	74	54	5.5	0.1	0.32		291	498
KA007089	4/15/98	99	22.0	10.8	41.2	67	7.9	58	44	4.3	0.1	0.27	9	222	412
KA007089	5/19/98	84	18.1	9.4	34.4	62	8.0	41	41	3.0	< 0.1	0.18	12	193	354
KA007089	6/17/98	55	12.4	5.8	21.0	44	7.6	26	22	1.6	< 0.1	0.13	11	126	225
KA007089	7/15/98	67	13.9	7.7	32.9	52	7.6	27	43	2.8	< 0.1	0.13	22	180	312
KA007089	8/19/98	97	19.0	12.0	46.0	69	7.6	35	61	3.2	< 0.1	0.20	6	223	421
KA007089	9/16/98	70	15.0	8.0	24.0	57	7.2	25	26	2.5	< 0.1	0.10	9	151	255
KA007089	10/21/98	64	14.0	7.0	20.0	56	7.3	16	19	2.9	< 0.1	0.10	11	137	225
KA007089	11/18/98	89	19.0	10.0	36.0	75	7.1	36	37	4.7	< 0.1	0.20	7	192	351
KA007089	12/16/98	111	23.0	13.0	61.0	88	7.8	49	69	4.3	< 0.1	0.20	2	284	516
KA007089	1/20/99	118	26.0	13.0	54.0	83	7.7	66	65	7.5	< 0.1	0.30	7	295	534
KA007089	2/17/99	75	17.0	8.0	29.0	59	7.2	40	35	4.2	< 0.0	0.20	12	171	323
KA007089	3/17/99	73	16.0	8.0	32.0	54	7.3	45	36	3.5	< 0.1	0.20	7	190	333
KA007089	4/21/99	93	19.0	11.0	46.0	74	7.3	42	57	2.7	< 0.1	0.20	12	216	425
KA007089	5/19/99	99	20.0	12.0	50.0	78	7.3	37	62	1.9	< 0.1	0.20	5	249	427
KA007089	6/16/99	99	20.0	12.0	52.0	79	7.6	37	63	1.9	< 0.1	0.20	6	233	442
KA007089	7/21/99	80	17.0	9.0	31.0	74	7.6	26	39	1.5	< 0.1	0.10	18	177	316
KA007089	8/18/99	70	15.0	8.0	28.0	69	7.1	20	31	1.0	< 0.1	0.10	14	158	272
KA007089	9/15/99	81	16.0	10.0	41.0	75	7.2	23	56	1.7	< 0.1	0.10	5	201	375
KA007089	10/20/99	94	18.0	12.0	52.0	77	7.5	29	69				8	269	456
KA007089	11/17/99	94	18.0	12.0	54.0	71	7.3	32	83	3.2	< 0.1	0.10	8	257	483
KA007089	12/15/99	105	19.0	14.0	67.0	75	7.2	38	98	2.7	< 0.1	0.20	5	290	560
KA017226	1/21/98	117	23.7	14.0	55.5	72	7.9	44	78	5.9	< 0.1	0.18	9	288	518
KA017226	2/18/98	278	70.4	24.8	77.6	78	8.0	298	37	5.4	0.2	0.37	18	593	883
KA017226	3/18/98	151	32.9	16.7	60.3	100	8.3	88	61	5.7	0.2	0.58	11	347	599
KA017226	4/15/98	132	28.5	14.7	55.6	83	8.3	82	60	4.6	0.1	0.39	14	300	541
KA017226	5/19/98	93	20.1	10.5	40.4	64	8.0	54	47	2.4	< 0.1	0.21	18	214	406
KA017226	6/17/98	66	14.7	7.2	28.3	52	7.8	33	30	1.5	< 0.1	0.23	18	163	283
KA017226	7/14/98	65	13.9	7.4	31.1	53	7.5	26	40	2.4	< 0.1	0.13	69	162	298
KA017226	8/19/98	90	18.0	11.0	44.0	66	7.6	34	57	2.8	< 0.1	0.20	23	220	398
KA017226	9/16/98	82	18.0	9.0	34.0	65	7.4	30	42	2.7	< 0.1	0.20	8	188	338
KA017226	10/21/98	66	15.0	7.0	22.0	60	7.4	21	20	3.0	< 0.1	0.10	16	137	234
KA017226	11/18/98	73	16.0	8.0	26.0	67	7.2	27	26	4.1	< 0.1	0.10	5	155	275
KA017226	12/16/98	109	24.0	12.0	50.0	85	7.8	46	59	4.9	< 0.1	0.20	4	260	472
KA017226	1/20/99	106	22.5	12.1	50.2	79	7.7	51	63	4.3	< 0.1	0.26	2	258	495
KA017226	2/17/99	82	18.0	9.0	34.0	62	7.4	44	39	4.8	< 0.1	0.20	4	189	346
KA017226	3/17/99	75	17.0	8.0	34.0	56	7.4	45	37	3.7	< 0.1	0.20	11	187	341
KA017226	4/20/99	95	20.0	11.0	45.0	70	7.4	56	51	3.8	< 0.1	0.20		235	424
KA017226	5/18/99	90	18.0	11.0	47.0	77	7.3	37	59	2.1	< 0.1	0.20	6	236	422
KA017226	6/15/99	99	20.0	12.0	49.0	82	7.7	37	63	1.7	< 0.1	0.20	11	233	440
KA017226	7/20/99	82	18.0	9.0	31.0	75	7.4	26	39	1.7	< 0.1	0.10		179	326
KA017226	8/17/99	68	14.0	8.0	27.0	64	7.0	20	28	1.2	< 0.1	0.10	14	156	261
KA017226	9/14/99	81	16.0	10.0	34.0	76	7.5	21	43	1.8	< 0.1	0.10	6	183	330
KA017226	10/19/99	94	18.0	12.0	51.0	78	7.5	27	71				6	258	460
KA017226	11/16/99	97	19.0	12.0	57.0	74	7.4	34	87	3.5	< 0.1	0.20	4	268	513
KA017226	12/14/99	98	18.0	13.0	69.0	74	7.2	34	102	3.2	< 0.1	0.10	7	304	573
KA021031	4/6/98	125	27.0	14.0	52.0	80	8.0	78	56	5.8	0.1	0.40	10	295	518
KA021031	4/14/98	128	28.0	14.0	52.0	79	8.2	76	52	5.0	0.1	0.30	5	291	515
KA024454	1/20/98	113	22.0	14.0	61.0	71	7.9	43	84	5.9	< 0.1	0.20	8	297	534
KA024454	2/17/98	89	19.0	10.0	41.0	62	7.8	42	49	5.2	< 0.1	0.20	9	227	394
KA024454	3/17/98	89	19.0	10.0	42.0	68	9.0	42	49	1.7	< 0.1	0.20	8	218	389
KA024454	4/14/98	59	17.0	4.0	12.0	65	7.9	10	4	2.0	0.2	< 0.10	26	108	170
KA024454	5/20/98	41	12.1	2.6	10.5	50	7.8	5	4	0.4	0.2	< 0.10	37	78	135
KA024454	6/16/98	34	10.3	2.0	8.3	42	7.6	5	3	0.2	0.2	< 0.10	21	78	109
KA024454	7/15/98	57	12.4	6.3	25.1	48	7.6	22	29	2.6	< 0.1	0.12	76	124	244
KA024454	8/18/98	84	17.0	10.0	38.0	62	7.5	32	50	2.7	< 0.1	0.20	3	186	363
KA024454	9/15/98	86	18.0	10.0	35.0	69	7.5	30	46	2.2	< 0.1	0.10	11	206	349
KA024454	10/20/98	66	15.0	7.0	21.0	60	7.4	22	21	3.0	< 0.1	0.10	13	142	237
KA024454	11/17/98	64	14.0	7.0	20.0	58	7.4	22	21	3.2	< 0.1	0.10	11	130	239
KA024454	12/15/98	91	20.0	10.0	38.0	74	7.8	29	45	3.4	< 0.1	0.20	5	207	371
KA024454	1/19/99	118	26.0	13.0	64.0	94	7.9	58	74	4.8	< 0.1	0.30	2	315	541
KA024454	2/16/99	91	20.0	10.0	46.0	74	7.6	44	53	3.3	< 0.1	0.20	3	216	418
KA024454	3/16/99	66	15.0	7.0	28.0	51	7.2	38	30	3.5	< 0.1	0.20	24	158	294
KA024454	4/20/99	98	21.0	11.0	48.0	71	7.4	60	54	3.7	< 0.1	0.30	16	231	447
KA024454	5/18/99	93	19.0	11.0	46.0	77	7.4	38	59	2.0	< 0.1	0.20	16	232	418
KA024454	6/15/99	99	20.0	12.0	48.0	78	7.6	38	62	2.0	< 0.1	0.20	17	228	435
KA024454	7/20/99	89	19.0	10.0	39.0	77	7.5	31	48	2.0	< 0.1	0.20	20	199	364
KA024454	8/17/99	70	15.0	8.0	27.0	65	6.9	19	29	1.5	< 0.1	0.10	14	153	265
KA024454	9/14/99	75	15.0	9.0	31.0	76	7.5	19	39	1.6	< 0.1	0.10	9	164	306
KA024454	10/19/99	97	19.0	12.0	53.0	78	7.6	29	72				11	258	470
KA024454	11/16/99	97	19.0	12.0	57.0	75	7.3	33	86	3.0	< 0.1	0.20	4	242	497
KA024454	12/14/99	94	18.0	12.0	58.0	75	7.3	36	80	3.6	< 0.1	0.20	4	291	500
KA030341	1/21/98	116	22.1	14.8	72.7	66	7.6	48	100	6.0	< 0.1	0.18	13	345	607
KA030341	2/18/98	131	27.2	15.3	67.0	85	8.0	60	81	7.5	0.1	0.24	2	317	584
KA030341	3/18/98	127	28.1	13.9	65.4	92	7.9	59	77	8.0	0.2	0.22	6	334	579
KA030341	5/20/98	43	12.8	2.7	10.4	52	7.8	6	4	0.8	0.2	< 0.10	11	89	137
KA030341	6/17/98	35	10.6	2.0	8.1	43	7.6	4	2	0.3	0.2	< 0.10	16	73	106
KA030341	7/15/98	52	12.3	5.1	19.2	41	8.0	20	22	2.0	< 0.1	0.10	140	114	205
KA030341	8/19/98	93	19.0	11.0	41.0	66	7.5	34	57	2.9	< 0.1	0.20	70	219	398

Table C-1 (Con't)
Conventional Parameter, Major Mineral, Fluoride, and Boron Concentrations in the SWP

CONCENTRATION (mg/L unless otherwise noted)

STATION	DATE	HARDNESS (as CaCO3)	CALCIUM	MAGNESIUM	SODIUM	TOTAL ALKALINITY (as CaCO3)	LAB pH (pH units)	SULFATE	CHLORIDE	NITRATE (as NO3)	FLUORIDE	BORON	TURBIDITY (NTU)	DISSOLVED SOLIDS	CONDUCTIVITY (µS/cm)
KA030341	9/16/98	80	17.0	9.0	30.0	65	7.6	27	37	2.4	< 0.1	0.10	20	198	313
KA030341	10/21/98	66	15.0	7.0	21.0	61	7.4	22	21	2.8	< 0.1	0.10	15	139	239
KA030341	11/18/98	64	14.0	7.0	20.0	63	7.1	21	20	2.9	< 0.1	0.10	7	137	235
KA030341	12/16/98	69	16.0	7.0	26.0	66	7.6	22	25	3.2	< 0.1	0.10	4	152	271
KA030341	1/20/99	114	26.0	12.0	43.0	102	8.7	44	48	2.3	0.1	0.20	4	234	426
KA030341	2/17/99	121	27.0	13.0	41.0	109	8.0	47	42	1.5	0.2	0.20	3	223	433
KA030341	3/17/99	66	15.0	7.0	26.0	51	7.4	36	26	3.4	< 0.1	0.20	47	143	277
KA030341	4/21/99	89	19.0	10.0	45.0	69	7.4	55	49	3.4	< 0.1	0.20	16	230	416
KA030341	5/19/99	90	18.2	10.8	45.0	79	7.6	24	58	1.9	< 0.1	0.17	30	249	414
KA030341	6/16/99	99	20.0	12.0	52.0	80	7.6	38	62	1.9	< 0.1	0.20	24	230	436
KA030341	7/21/99	86	18.0	10.0	36.0	73	7.2	29	44	2.1	< 0.1	0.10	34	193	350
KA030341	8/18/99	70	15.0	8.0	27.0	69	7.0	22	31	1.6	< 0.1	0.10	28	157	300
KA030341	9/15/99	77	16.0	9.0	31.0	78	7.5	19	37	1.5	< 0.1	0.10	13	168	305
KA030341	10/20/99	94	18.0	12.0	52.0	86	8.0	27	71				13	258	460
KA030341	11/17/99	97	19.0	12.0	54.0	82	7.4	32	78	3.1	< 0.1	0.20	3	257	490
KA030341	12/15/99	97	19.0	12.0	58.0	76	7.2	38	79	3.7	< 0.1	0.20	5	266	511
KA033180	6/10/99	99	20.0	12.0	52.0	91	6.9	37	64	1.7		0.20		243	444
KA033180	7/26/99	77	16.0	9.0	32.0	71	7.4	26	38	1.8	< 0.1	0.10		182	317
KA040341	2/18/98	107	21.2	13.1	70.3	68	7.9	39	99	4.2	< 0.1	0.17	68	299	570
KA040341	5/20/98	42	12.5	2.7	9.1	52	8.0	< 1	3	0.8	0.1	< 0.10	20	83	130
KA040341	8/19/98	93	19.0	11.0	44.0	68	7.5	35	61	3.1	< 0.1	0.20	33	218	419
KA040341	11/18/98	66	15.0	7.0	21.0	71	7.4	22	21	1.3	< 0.1	0.10	7	134	238
KA040341	2/17/99	80	19.0	8.0	28.0	75	7.5	27	28	1.2	< 0.1	0.10	5	162	289
KA040341	5/19/99	93	19.0	11.0	48.0	75	7.4	40	60	1.5	< 0.1	0.20	47	268	427
KA040341	8/18/99	70	15.0	8.0	28.0	69	7.0	20	31	1.4	< 0.1	0.10	30	157	274
KA040341	11/17/99	97	19.0	12.0	50.0	97	8.9	28	71	0.3	< 0.1	0.10	3	242	452
KA041288	1/21/98	90	18.2	10.9	47.9	74	8.0	30	64	2.3	< 0.1	0.14	2	233	423
KA041288	2/18/98	90	18.9	10.5	44.5	70	8.0	26	57	2.5	< 0.1	0.14	3	220	402
KA041288	3/18/98	81	17.5	9.1	39.3	68	8.0	24	52	2.4	< 0.1	0.12	3	198	364
KA041288	4/15/98	98	20.8	11.2	41.4	73	8.0	45	53	2.4	0.1	0.19	4	227	422
KA041288	5/20/98	73	17.9	6.9	23.6	69	8.0	25	24	1.4	0.1	0.13	3	157	272
KA041288	6/17/98	61	16.2	5.0	17.8	63	7.9	16	13	0.3	0.2	0.12	4	115	206
KA041288	7/15/98	54	13.9	4.6	17.1	59	7.7	16	12	0.5	0.2	0.11		100	192
KA041288	8/19/98	62	15.0	6.0	24.0	54	7.2	23	29	1.6	0.1	0.10	12	146	260
KA041288	9/16/98	75	17.0	8.0	32.0	65	8.0	28	41	2.2	0.1	0.10	4	189	324
KA041288	10/21/98	80	17.0	9.0	31.0	66	7.4	27	37	2.3	0.1	0.10	3	183	316
KA041288	11/18/98	75	17.0	8.0	29.0	70	7.0	28	33	2.3	< 0.1	0.10	2	178	304
KA041288	12/16/98	73	16.0	8.0	28.0	68	7.5	22	31	2.1	< 0.1	0.10	2	152	298
KA041288	1/20/99	78	18.0	8.0	30.0	66	7.4	27	31	2.4	< 0.1	0.10	3	163	381
KA041288	2/17/99	78	18.0	8.0	27.0	67	7.2	26	30	2.3	< 0.0	0.10	2	150	290
KA041288	3/17/99	78	18.0	8.0	28.0	70	7.6	30	30	2.2	< 0.1	0.20	4	169	318
KA041288	4/21/99	73	16.0	8.0	32.0	64	7.2	36	34	2.5	< 0.1	0.20	4	167	317
KA041288	5/19/99	82	18.0	9.0	39.0	69	7.4	42	40	1.7	< 0.1	0.20	3	228	356
KA041288	6/16/99	89	19.0	10.0	48.0	72	7.4	40	51	2.0	< 0.1	0.20	6	230	395
KA041288	7/21/99	98	21.0	11.0	46.0	80	7.3	39	56	2.1	< 0.1	0.20	6	230	417
KA041288	8/18/99	86	18.0	10.0	38.0	71	6.7	34	46	1.7	< 0.1	0.20	6	214	368
KA041288	9/15/99	80	17.0	9.0	31.0	73	7.4	24	37	1.1	< 0.1	0.10	4	169	310
KA041288	10/20/99	84	17.0	10.0	42.0	73	7.4	25	55				2	249	473
KA041288	11/17/99	90	18.0	11.0	44.0	75	7.1	26	62	1.8	< 0.1	0.10	2	228	418
KA041288	12/15/99	90	18.0	11.0	51.0	75	7.0	29	71	2.5	< 0.1	0.10	3	241	460
KAO24102	5/19/98	39	12.0	2.3	9.1	51	7.8	2	3	0.3	0.2	< 0.10	31	75	121
KAO24102	6/16/98	32	9.8	1.8	7.2	41	7.5	3	2	0.1	0.2	< 0.10	24	74	98
KB001638	1/21/98	109	21.9	13.2	51.8	72	7.9	40	74	5.3	< 0.1	0.17	7	274	487
KB001638	5/20/98	92	19.2	10.8	52.0	72	8.0	51	57	1.2	0.1	0.47	10	248	449
KB001638	6/17/98	49	11.3	5.0	17.9	41	7.5	23	18	2.0	< 0.1	0.12	21	116	195
KB001638	7/15/98	39	9.2	3.9	14.2	35	7.4	17	14	1.7	< 0.1	0.11	20	85	157
KB001638	8/19/98	64	14.0	7.0	21.0	56	7.1	23	22	2.3	< 0.1	0.10	34	132	233
KB001638	9/16/98	64	14.0	7.0	21.0	60	7.3	22	21	2.1	< 0.1	0.10	8	139	235
KB001638	10/21/98	64	14.0	7.0	19.0	58	7.1	18	19	2.3	< 0.1	0.10	5	132	218
KB001638	11/18/98	70	15.0	8.0	23.0	64	7.2	23	25	3.6	< 0.1	0.10	28	139	267
KB001638	12/16/98	103	23.0	11.0	54.0	86	7.6	53	54	5.9	< 0.1	0.30	4	247	458
KB001638	1/20/99	114	26.0	12.0	46.0	71	7.2	60	55	8.4	< 0.1	0.20	14	267	453
KB001638	2/17/99	91	20.0	10.0	39.0	62	6.6	48	46	5.1	< 0.1	0.20	5	217	386
KB001638	3/17/99	73	16.0	8.0	30.0	55	7.3	39	33	3.0	< 0.1	0.20	4	170	311
KB001638	4/21/99	80	17.0	9.0	37.0	65	7.2	42	40	2.5	< 0.1	0.20	4	185	356
KB001638	5/19/99	73	16.0	8.0	33.0	52	7.0	39	36	3.2	< 0.1	0.20	30	198	307
KB001638	6/16/99	85	19.0	9.0	34.0	63	7.3	36	38	3.4	< 0.1	0.20	28	182	330
KB001638	7/21/99	64	14.0	7.0	18.0	60	6.9	15	19	1.5	< 0.1	< 0.10	18	124	211
KB001638	8/18/99	61	13.0	7.0	20.0	60	6.8	14	19	1.2	< 0.1	< 0.10	12	123	225
KB001638	9/15/99	83	15.0	11.0	46.0	76	7.3	23	67	1.3	< 0.1	0.10	6	218	411
KB001638	10/20/99	87	15.0	12.0	50.0	70	7.2	20	74				3	272	440
KB001638	11/17/99	85	16.0	11.0	53.0	63	7.0	22	83	1.9	< 0.1	0.10	17	238	454
KB001638	12/15/99	113	19.0	16.0	93.0	76	7.3	39	151	2.9	< 0.1	0.20	3	388	734
KB004207	2/18/98	114					7.9	40	70	4.1	< 0.1		11		495
KB004207	5/20/98	106	21.7	12.6	60.2	80	8.0	60	68	1.5	0.1	1.00	6	260	518
KB004207	8/19/98	108	22.0	13.0	21.0	89	7.7	31	19	1.8	< 0.1	0.10	18	168	301
KB004207	10/21/98	144	28.0	18.0	19.0	127	7.8	35	15	1.1	0.1	0.10	4	208	356
KB004207	11/18/98	73	16.0	8.0	23.0	72	7.1	24	24	3.6	< 0.1	0.10	6	152	273
KB004207	5/19/99	75	17.0	8.0	35.0	54	7.1	39	36		< 0.1	0.20	10	210	315
KB004207	8/18/99	68	14.0	8.0	20.0	66	6.9	15	19	1.3	< 0.1	0.10	13	131	236
KB004207	10/20/99	139	26.0	18.0	34.0	124	8.0	36	42				2	254	445
KB004207	11/17/99	130	24.0	17.0	38.0	111	7.9	36	52	1.0	0.1	0.10	2	247	455
KC000934	1/20/98	115	23.0	14.0	64.0	74	8.2	53	81	5.0	< 0.1	0.20	2	311	565

Table C-1 (Con't)
Conventional Parameter, Major Mineral, Fluoride, and Boron Concentrations in the SWP

CONCENTRATION (mg/L unless otherwise noted)

STATION	DATE	HARDNESS (as CaCO3)	CALCIUM	MAGNESIUM	SODIUM	TOTAL ALKALINITY (as CaCO3)	LAB pH (pH units)	SULFATE	CHLORIDE	NITRATE (as NO3)	FLUORIDE	BORON	TURBIDITY (NTU)	DISSOLVED SOLIDS	CONDUCTIVITY (µS/cm)
KC000934	2/17/98	204	42.0	24.0	86.0	99	8.4	233	31	3.1	0.2	0.40	3	496	779
KC000934	3/17/98	191	37.0	24.0	80.0	108	8.7	158	64	3.7	0.2	0.60	3	450	748
KC000934	4/14/98	128	28.0	14.0	56.0	82	8.4	80	61	4.3	0.1	0.40	5	303	536
KC000934	5/20/98	87	18.5	10.0	39.0	66	8.0	43	46	2.3 <	0.1	0.21	18	205	378
KC000934	6/16/98	67	14.6	7.5	29.8	52	8.0	34	30	1.3 <	0.1	0.22	27	161	284
KC000934	7/15/98	61	12.7	7.0	29.2	50	7.7	24	34	2.5 <	0.1	0.12	77	140	269
KC000934	8/18/98	84	17.0	10.0	38.0	64	7.9	32	50	2.3 <	0.1	0.20	25	200	362
KC000934	9/15/98	73	16.0	8.0	26.0	63	7.7	26	29	1.8 <	0.1	0.10	9	154	275
KC000934	10/20/98	66	15.0	7.0	21.0	60	7.4	22	21	3.1 <	0.1	0.10	14	137	236
KC000934	11/17/98	73	16.0	8.0	25.0	65	7.7	26	26	3.0 <	0.1	0.10	8	156	269
KC000934	12/15/98	86	18.0	10.0	36.0	76	7.8	30	43	3.1 <	0.1	0.20	3	195	361
KC000934	1/19/99	94	21.0	10.0	46.0	78	7.2	48	53	4.5 <	0.1	0.20	2	246	425
KC000934	2/16/99	109	24.0	12.0	48.0	77	7.6	60	55	7.3 <	0.0	0.20	3	250	465
KC000934	3/16/99	70	15.0	8.0	30.0	54	7.5	41	32	3.2 <	0.1	0.20	6	175	308
KC000934	4/20/99	95	20.0	11.0	45.0	72	7.3	56	51	3.3 <	0.1	0.20	8	229	426
KC000934	5/18/99	90	18.0	11.0	46.0	76	7.4	37	60	2.0 <	0.1	0.20	17	234	418
KC000934	6/15/99	99	20.0	12.0	49.0	86	8.2	37	63	1.6 <	0.1	0.20	16	226	438
KC000934	7/20/99	89	19.0	10.0	39.0	81	8.0	31	48	1.6 <	0.1	0.20	22	204	366
KC000934	8/17/99	70	15.0	8.0	27.0	80	8.4	19	30	0.8 <	0.1	0.10	34	155	278
KC000934	9/14/99	75	15.0	9.0	33.0	81	8.4	20	41	1.0 <	0.1	0.10	5	168	315
KC000934	10/19/99	94	18.0	12.0	53.0	85	8.0	27	74				11	272	463
KC000934	11/8/99	90	18.0	11.0	52.0	74	7.4	30	73	2.2 <	0.1	0.10	3	251	472
KC000934	12/14/99	94	18.0	12.0	58.0	88	8.5	36	80	2.2 <	0.1	0.20	1	255	514
KG000000	1/21/98	55	9.8	7.4	16.6	80	8.0	10	10	0.8	0.1	0.11	175	128	187
KG000000	1/29/98	75	12.2	10.9	29.2	82	7.6	20	21	0.9	0.0	0.15	102	172	281
KG000000	2/2/98	49	8.7	6.5	11.8	57	6.9	5	6	0.6	0.0 <	0.10	256	90	150
KG000000	2/18/98	56					7.7	6	8	0.7 <	0.1		166		173
KG000000	3/18/98	83	13.5	12.0	37.2	89	8.3	20	36	0.6	0.1	0.15	63	196	338
KG000000	4/15/98	121	18.8	17.9	46.4	132	7.7	32	43	0.4	0.1	0.25	29	262	457
KG000000	5/20/98	160	25.1	23.7	39.4	158	8.2	49	28	1.0	0.2	0.39	36	274	487
KG000000	6/17/98	162	25.8	23.6	41.6	167	8.1	46	32	1.4	0.2	0.40	52	287	501
KG000000	7/15/98	151	25.2	21.3	37.9	150	8.0	45	25	2.4	0.2	0.38	49	249	457
KG000000	8/19/98	107	18.0	15.0	25.0	109	8.0	24	17	1.2	0.1	0.20	65	186	318
KG000000	9/16/98	100	17.0	14.0	21.0	104	7.6	19	15	0.9	0.1	0.20	49	176	291
KG000000	10/21/98	107	18.0	15.0	23.0	113	8.0	18	17	0.9	0.1	0.20	44	180	310
KG000000	11/18/98	98	16.0	14.0	22.0	100	7.2	20	17	1.3	0.1	0.20	43	168	292
KG000000	12/16/98	104	17.0	15.0	29.0	116	7.5	24	26	1.4	0.1	0.20	32	186	350
KG000000	1/6/99												21		
KG000000	1/13/99												19		
KG000000	1/20/99	122	21.0	17.0	31.0	118	7.6	36	24	1.9	0.1	0.20	30	206	372
KG000000	1/27/99												21		
KG000000	2/3/99												23		
KG000000	2/9/99												185		
KG000000	2/17/99	69	11.0	10.0	36.0	78	7.1	26	24	2.2	0.1	0.20	222	173	292
KG000000	2/24/99												154		
KG000000	3/2/99												98		
KG000000	3/9/99												67		
KG000000	3/17/99	106	16.0	16.0	50.0	114	7.6	40	47	1.2	0.1	0.30	52	261	460
KG000000	3/24/99												36		
KG000000	3/30/99												137		
KG000000	4/6/99												112		
KG000000	4/13/99												76		
KG000000	4/21/99	119	18.0	18.0	56.0	137	7.4	44	47	0.6	0.2	0.30	51	284	501
KG000000	4/27/99												43		
KG000000	5/19/99	146	22.0	22.0	42.0	156	7.6	44	30	1.1	0.2	0.40	54	300	483
KG000000	6/16/99	111	18.0	16.0	27.0	109	7.6	25	20	1.6	0.1	0.30	77	183	326
KG000000	7/21/99	83	15.0	11.0	18.0	87	7.2	16	12	1.8	0.1	0.10	104	136	237
KG000000	8/18/99	76	13.4	10.4	16.1	81	7.0	13	9	1.4	0.1	0.13	115	130	218
KG000000	9/15/99	76	14.0	10.0	17.0	95	7.4	13	10	1.1	0.1	0.10	58	133	234
KG000000	10/20/99	83	15.0	11.0	18.0	92	7.4	14	12				43	161	248
KG000000	11/3/99												44		
KG000000	11/10/99												39		
KG000000	11/17/99	83	15.0	11.0	18.0	88	7.3	15	14	1.1	0.1	0.10	30	142	255
KG000000	11/17/99												29		
KG000000	11/24/99												35		
KG000000	12/1/99												32		
KG000000	12/8/99												29		
KG000000	12/15/99	76	14.0	10.0	19.0	88	7.4	17	15	2.1 <	0.1	0.10	22	138	268
KG000000	12/22/99												24		
KG000000	12/29/99												18		
KG000000	1/5/00												21		
KG002121	2/18/98	53					7.6	8	8	1.2 <	0.1		168		174
KG002121	5/20/98	161	25.4	23.7	41.5	158	8.2	48	30	1.0	0.2	0.39	27	276	494
KG002121	8/19/98	113	19.0	16.0	26.0	114	7.9	25	18	1.4	0.1	0.20	61	172	331
KG002121	11/18/98	98	16.0	14.0	22.0	110	7.3	21	14	1.6	0.1	0.20	38	172	299
KG002121	2/17/99	73	11.0	11.0	39.0	74	7.1	29	34		0.1	0.20	124	180	326
KG002121	5/19/99	155	24.0	23.0	46.0	156	7.6	49	33	1.2	0.2	0.40	44	324	494
KG002121	8/18/99	74	13.0	10.0	16.0	80	6.8	13	10	1.5 <	0.1	0.10	88	131	218
KG002121	11/17/99	83	15.0	11.0	17.0	87	7.2	14	13	1.5	0.1	0.10	31	136	246
LD001000	5/26/99	23	6.0	2.0	3.0	32	6.6 <	1 <	1 <	0.1 <	0.1 <	0.10	2	48	58
LD001000	5/26/99	23	6.0	2.0	3.0	31	6.7 <	1 <	1 <	0.1 <	0.1 <	0.10	2	41	58
PE002000	2/17/98	133	27.5	15.6	72.2	100	8.2	51	86	0.4	0.1	0.24 <	1	323	610

Table C-1 (Con't)
Conventional Parameter, Major Mineral, Fluoride, and Boron Concentrations in the SWP

CONCENTRATION (mg/L unless otherwise noted)

STATION	DATE	HARDNESS (as CaCO3)	CALCIUM	MAGNESIUM	SODIUM	TOTAL ALKALINITY (as CaCO3)	LAB pH (pH units)	SULFATE	CHLORIDE	NITRATE (as NO3)	FLUORIDE	BORON	TURBIDITY (NTU)	DISSOLVED SOLIDS	CONDUCTIVITY (µS/cm)
PE002000	5/18/98	116	23.6	13.8	59.7	91	8.3	48	78	< 0.1	0.1	0.22	< 1	278	546
PE002000	8/17/98	115	23.0	14.0	57.0	92	8.1	45	74	< 0.1	0.1	0.20	< 1	269	518
PE002000	11/16/98	111	23.0	13.0	53.0	94	8.3	40	68	< 0.1	0.1	0.20	< 1	262	483
PE002000	2/18/99	113	24.0	13.0	51.0	98	7.9	41	65	< 0.1	0.1	0.20	1	262	486
PE002000	5/17/99	113	24.0	13.0	56.0	102	8.5	44	67	< 0.1	0.1	0.20	2	297	493
PE002000	8/16/99	120	25.0	14.0	59.0	109	8.0	44	70	< 0.1	0.1	0.20	1	275	504
PE002000	11/15/99	116	25.0	13.0	54.0	96	7.4	44	69	< 0.1	0.1	0.20	< 1	271	517
PY001000	2/17/98	133	30.8	13.5	47.2	80	8.0	69	58	2.5	0.2	0.29	21	279	502
PY001000	5/19/98	183	44.7	17.4	38.7	95	8.1	94	37	1.6	0.4	0.39	2	331	552
PY001000	8/18/98	122	29.0	12.0	34.0	79	8.1	68	36	1.1	0.2	0.30	3	228	413
PY001000	11/17/98	154	37.0	15.0	37.0	96	7.6	89	36	1.6	0.3	0.40	< 1	294	491
PY001000	2/18/99	166	40.0	16.0	38.0	103	7.8	89	36	1.6	0.3	0.40	< 1	297	509
PY001000	5/18/99	117	27.0	12.0	42.0	90	7.4	72	39	2.4	0.2	0.30	1	264	433
PY001000	8/17/99	114	26.0	12.0	40.0	85	7.2	55	42	1.7	0.2	0.30	3	236	453
PY001000	11/16/99	107	23.0	12.0	42.0	81	7.3	45	54	2.0	0.1	0.20	1	243	436
SI002000	2/17/98	91	18.8	10.6	45.6	76	8.0	27	59	2.4	< 0.1	0.14	2	220	404
SI002000	5/19/98	73	18.0	6.9	25.3	68	8.3	26	24	0.9	0.1	0.15	4	164	278
SI002000	8/18/98	62	15.0	6.0	25.0	56	7.6	23	29	1.6	0.1	0.10	10	148	261
SI002000	11/17/98	75	17.0	8.0	29.0	65	7.2	28	34	2.2	< 0.1	0.10	2	175	310
SI002000	2/16/99	78	18.0	8.0	27.0	70	7.4	26	31	2.2	< 0.0	0.10	2	160	292
SI002000	5/18/99	89	19.0	10.0	39.0	80	8.9	43	42	0.5	< 0.1	0.20	3	227	361
SI002000	8/17/99	86	18.0	10.0	38.0	74	6.9	30	45	1.6	< 0.1	0.20	6	198	353
SI002000	11/16/99	90	18.0	11.0	44.0	75	7.2	26	62	1.8	< 0.1	0.10	2	220	426
SL001000	8/19/98	103	20.0	13.0	56.0	84	7.9	38	76	0.3	< 0.1	0.20	6	250	488
SL005000	1/20/98	102	20.4	12.3	54.0	71	7.9	34	78	2.9	< 0.1	0.17	2	265	484
SL005000	2/17/98	99	19.5	12.2	53.3	73	8.0	34	73	3.0	< 0.1	0.16	6	261	475
SL005000	3/17/98	99	19.9	12.0	56.6	74	8.0	36	76	3.3	< 0.1	0.16	2	258	488
SL005000	4/14/98	101	19.9	12.4	54.5	76	8.0	36	77	3.1	0.1	0.16	< 1	264	489
SL005000	5/19/98	101	19.8	12.4	52.7	75	8.1	37	75	2.7	< 0.1	0.16	1	265	488
SL005000	6/16/98	102	19.7	12.7	54.6	76	8.1	36	75	2.6	< 0.1	0.16	1	282	485
SL005000	7/14/98	99	19.3	12.3	54.9	76	8.6	37	77	2.0	< 0.1	0.16	2	256	485
SL005000	8/19/98	103	20.0	13.0	56.0	83	8.6	38	76	1.1	< 0.1	0.20	2	249	486
SL005000	10/20/98	99	20.0	12.0	47.0	76	7.4	32	65	2.1	< 0.1	0.20	2	238	433
SL005000	11/18/98	97	19.0	12.0	47.0	80	7.2	35	64	2.0	< 0.1	0.20	1	250	446
SL005000	12/16/98	97	19.0	12.0	51.0	78	7.7	33	63	2.0	< 0.1	0.20	< 1	234	437
SL005000	1/20/99	99	20.0	12.0	48.0	85	7.6	37	65	2.5	< 0.1	0.20	1	295	450
SL005000	2/17/99	99	20.0	12.0	45.0	79	7.5	37	63	2.6	< 0.0	0.20	< 1	226	442
SL005000	3/17/99	97	19.0	12.0	47.0	78	7.4	36	62	2.5	< 0.1	0.20	1	236	444
SL005000	4/21/99	93	19.0	11.0	48.0	78	7.4	36	62	2.4	< 0.1	0.20	< 1	238	438
SL005000	5/19/99	97	19.0	12.0	49.0	81	7.3	37	63	2.0	< 0.1	0.20	1	250	438
SL005000	6/16/99	99	20.0	12.0	49.0	81	7.6	38	64	1.9	< 0.1	0.20	4	236	442
SL005000	7/21/99	104	22.0	12.0	49.0	85	7.9	37	64	1.1	< 0.1	0.20	7	246	449
SL005000	8/18/99	99	20.0	12.0	52.0	88	8.2	35	64	< 0.1	< 0.1	0.20	4	243	445
SL005000	9/15/99	93	19.0	11.0	47.0	82	7.4	33	60	0.6	< 0.1	0.20		232	423
SL005000	10/20/99	97	19.0	12.0	48.0	83	7.6	31	62				2	253	432
SL005000	11/17/99	97	19.0	12.0	45.0	83	7.3	31	64	1.5	< 0.1	0.20		239	442
SL005000	12/15/99	97	19.0	12.0	50.0	76	7.2	33	71	2.2	< 0.1	0.20	2	232	452
TA001000	1/21/98	36	8.0	4.0	4.0	37	7.4	2	< 1	0.2	< 0.1	< 0.10	6	58	89
TA001000	2/18/98	30	7.0	3.0	3.0	33	7.2	1	1	0.2	< 0.1	< 0.10	6	45	74
TA001000	3/18/98	30	7.0	3.0	3.0	34	7.3	2	1	0.2	< 0.1	< 0.10	6	54	76
TA001000	4/15/98	30	7.0	3.0	3.0	34	7.2	2	1	0.2	< 0.1	< 0.10	9	48	74
TA001000	5/20/98	29	7.0	2.9	2.8	32	7.2	< 1	1	< 0.1	< 0.1	< 0.10	5	49	73
TA001000	6/18/98	29	6.9	2.8	2.7	33	7.2	1	1	< 0.1	< 0.1	< 0.10	4	51	70
TA001000	7/15/98	27	6.6	2.7	2.7	33	7.2	1	< 1	< 0.1	< 0.1	< 0.10	6	38	69
TA001000	8/19/98	30	7.0	3.0	3.0	33	6.9	2	< 1	< 0.1	< 0.1	< 0.10		42	68
TA001000	9/16/98	32	8.0	3.0	3.0	36	7.0	2	1	0.2	< 0.1	< 0.10	3	50	76
TA001000	10/22/98	28	6.8	2.8	2.6	33	6.9	2	< 1	0.1	< 0.1	< 0.10	2	48	67
TA001000	11/18/98	28	6.8	2.7	2.7	34	6.9	2	< 1	< 0.1	< 0.1	< 0.10	3	39	67
TA001000	12/16/98	29	7.0	2.8	3.1	39	7.0	< 1	< 1	< 0.1	< 0.1	< 0.10	5	69	79
TA001000	1/20/99	33	7.9	3.3	3.2	38	6.8	2	1	< 0.1	< 0.1	< 0.10	4	55	77
TA001000	2/17/99	32	8.0	3.0	3.0	36	6.8	3	1	0.1	< 0.0	< 0.01	4	56	79
TA001000	3/17/99	30	6.8	3.2	3.4	40	7.1	2	1	< 0.1	< 0.1	< 0.10	3	52	81
TA001000	4/21/99	30	7.0	3.0	3.0	38	6.8	2	1	< 0.1	< 0.1	< 0.10	3	44	77
TA001000	5/20/99	32	8.0	3.0	3.0	37	6.7	2	1	< 0.1	< 0.1	< 0.10	4	63	78
TA001000	6/17/99	32	8.0	3.0	3.0	37	6.8	< 1	1	< 0.1	< 0.1	< 0.10	4	48	76
TA001000	7/21/99	32	8.0	3.0	3.0	38	6.6	2	1	< 0.1	< 0.1	< 0.10	4	56	77
TA001000	8/18/99	32	8.0	3.0	4.0	40	6.6	3	1	< 0.1	< 0.1	< 0.10	3	54	78
TA001000	9/15/99	31	7.4	3.1	3.2	36	6.6	2	< 1	< 0.1	< 0.1	< 0.10	2	52	76
TA001000	10/20/99	31	7.0	3.0	3.0	37	6.6	2	1				3	56	76
TA001000	11/17/99	32	8.0	3.0	3.0	38	6.7	2	1	< 0.1	< 0.1	< 0.10	2	54	79
TA001000	12/15/99	32	8.0	3.0	4.0	40	6.8	1	1	< 0.1	< 0.1	< 0.10	2	49	94
TF001000	2/18/98	32	8.0	3.0	3.0	39	7.2	2	1	0.2	< 0.1	< 0.10	5	54	81
TF001000	5/20/98	29	7.0	2.8	2.8	32	7.2	< 1	1	< 0.1	< 0.1	< 0.10	4	48	72
TF001000	8/19/98	30	7.0	3.0	3.0	32	6.8	2	< 1	< 0.1	< 0.1	< 0.10		44	68
TF001000	11/18/98	30	7.0	3.0	3.0	33	6.9	2	< 1	< 0.1	< 0.1	< 0.10		43	77
TF001000	2/17/99	32	8.0	3.0	3.0	36	6.8	2	1	0.2	< 0.1	< 0.01	9	55	79
TF001000	5/20/99	32	7.7	3.1	3.3	43	7.4	2	1	< 0.1	< 0.1	< 0.10	2	63	78
TF001000	8/18/99	32	8.0	3.0	3.0	38	6.3	3	1	< 0.1	< 0.1	< 0.10	1	50	78
TF001000	11/17/99	32	8.0	3.0	3.0	38	6.6	2	< 1	< 0.1	< 0.1	< 0.10	< 1	56	80

Table C-2
Minor Element Concentrations in the SWP

STATION	DATE	ARSENIC	ALUMINUM	BARIUM	CADMIUM	CHROMIUM	COPPER	IRON	LEAD	MANGANESE	MERCURY	SELENIUM	SILVER	ZINC
		CONCENTRATION, mg/L												
AN001000	5/27/99	< 0.001				< 0.005	< 0.001	0.033	< 0.001	< 0.005		< 0.001		< 0.005
CA002000	2/17/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
CA002000	5/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
CA002000	8/17/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.014	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.010
CA002000	11/16/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.005	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
CA002000	2/16/99	0.002	< 0.010	< 0.050	< 0.001	0.007	0.005	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
CA002000	5/17/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
CA002000	8/16/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
CA002000	11/15/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
DMC06716	1/21/98	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.029	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.016
DMC06716	2/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.014	< 0.001	0.016	< 0.0002	0.001	< 0.001	< 0.005
DMC06716	3/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.023	< 0.0002	0.001	< 0.001	< 0.005
DMC06716	4/14/98	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
DMC06716	5/19/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.008	< 0.001	0.012	< 0.0002	< 0.001	< 0.001	< 0.005
DMC06716	6/16/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.014	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
DMC06716	7/14/98	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.010	< 0.001	0.012	< 0.0002	0.000	< 0.001	< 0.005
DMC06716	8/19/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
DMC06716	9/16/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.006	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
DMC06716	10/20/98	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.001	0.007	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
DMC06716	11/18/98	0.002	< 0.010	0.054	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.008	< 0.0002	0.001	< 0.001	< 0.005
DMC06716	12/16/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.081	< 0.0002	< 0.001	< 0.001	< 0.005
DMC06716	1/20/99	0.002	< 0.010	0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.018	0.0005	< 0.001	< 0.001	< 0.005
DMC06716	2/17/99	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.007	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
DMC06716	3/17/99	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
DMC06716	4/21/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.006	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
DMC06716	5/19/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
DMC06716	6/16/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
DMC06716	7/21/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
DMC06716	8/18/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
DMC06716	9/15/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
DMC06716	10/20/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	0.008	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
DMC06716	11/17/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	0.001	< 0.001	< 0.005
DMC06716	12/15/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.003	0.046	< 0.001	< 0.005	< 0.0002	0.001	< 0.001	< 0.005
DV0000.00	2/18/98	0.001	< 0.010	0.054	< 0.001	0.006	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.118
DV0000.00	3/18/98	< 0.001	< 0.010	0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.076
DV0000.00	4/15/98	< 0.001	< 0.010	0.055	< 0.001	0.005	0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.068
DV0000.00	8/19/98	0.002	< 0.010	0.080	< 0.001	0.008	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.024
DV0000.00	9/16/98	0.001	< 0.010	0.077	< 0.001	0.005	0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.040
DV0000.00	10/21/98	0.002	< 0.010	0.076	< 0.001	0.010	0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.025
DV0000.00	10/20/99	0.002		0.082		0.013	0.001							0.034
DV0000.00	11/17/99	0.002	< 0.010	0.085	< 0.001	0.011	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.027
DV000000	2/18/98	0.001	< 0.010	0.054	< 0.001	0.006	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.118
DV000000	3/18/98	< 0.001	< 0.010	0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.076
FR001000	5/26/99	< 0.001				< 0.005	< 0.001	0.016	< 0.001	< 0.005		< 0.001		< 0.005
KA000000	12/15/99	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005		< 0.001	< 0.001	< 0.005
KA000331	1/21/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.036	< 0.001	0.020	< 0.0002	< 0.001	< 0.001	0.016
KA000331	2/18/98	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	3/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.004	0.007	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	4/15/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.005	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	5/20/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	0.034	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	6/17/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.011	< 0.001	0.009	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	7/15/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.011	0.014	< 0.001	0.014	< 0.0002		< 0.001	< 0.005
KA000331	8/19/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.007	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	9/16/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.007	< 0.001	0.012	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	10/21/98	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.001	0.010	< 0.001	0.011	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	11/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.013	< 0.001	0.015	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	12/16/98	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.005	< 0.001	0.012	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	1/20/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.034	< 0.001	0.032	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	2/17/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.013	< 0.001	0.008	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	3/17/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.021	< 0.001	0.018	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	4/21/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	5/19/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.006	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	6/16/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.007	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	7/21/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.005	< 0.001	0.006	0.0002	< 0.001	< 0.001	< 0.005
KA000331	8/18/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	0.006	< 0.001	0.008	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	9/15/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.002	< 0.005	< 0.001	0.010	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	10/20/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	< 0.005	< 0.001	0.012	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	11/17/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.014	< 0.001	0.013	< 0.0002	< 0.001	< 0.001	< 0.005
KA000331	12/15/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.003	0.021	< 0.001	0.016	< 0.0002	0.002	< 0.001	< 0.005
KA007082	7/15/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.006	< 0.001	0.007	< 0.0002		< 0.001	0.017
KA007089	1/21/98	0.002	< 0.010	< 0.050	< 0.001	0.008	0.004	0.025	< 0.001	0.006	< 0.0002	< 0.001	< 0.001	0.006
KA007089	2/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.006	0.019	0.002	0.006	< 0.0002	0.001	< 0.001	< 0.005
KA007089	3/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.006	< 0.001	0.015	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	4/15/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.006	< 0.001	0.006	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	5/19/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.007	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	6/17/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.009	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	7/15/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002		< 0.001	< 0.005
KA007089	8/19/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	9/16/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.007	< 0.001	0.008	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	10/21/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.009	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	11/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.006	< 0.001	0.007	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	12/16/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005

Table C-2 (Con't)
Minor Element Concentrations in the SWP

CONCENTRATION, mg/L

STATION	DATE	ARSENIC	ALUMINUM	BARIUM	CADMIUM	CHROMIUM	COPPER	IRON	LEAD	MANGANESE	MERCURY	SELENIUM	SILVER	ZINC
KA007089	1/20/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.016	< 0.001	0.015	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	2/17/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.013	< 0.001	0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	3/17/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.013	< 0.001	0.008	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	4/21/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	5/19/99	0.002	< 0.010	< 0.050	< 0.001	0.007	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	6/16/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	7/21/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	8/18/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	9/15/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.007	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	10/20/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	0.007	< 0.001	0.007	< 0.0002	< 0.001	< 0.001	< 0.005
KA007089	11/17/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.009	< 0.001	0.007	< 0.0002	0.001	< 0.001	< 0.005
KA007089	12/15/99	0.002	< 0.010	< 0.050	< 0.001	0.007	0.003	0.024	< 0.001	0.006	< 0.0002	0.001	< 0.001	< 0.005
KA017226	1/21/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.040	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.007
KA017226	2/18/98	0.002	< 0.010	0.074	< 0.001	< 0.005	0.003	< 0.005	< 0.001	0.007	< 0.0002	0.005	< 0.001	< 0.005
KA017226	3/18/98	0.002	< 0.010	0.051	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	0.002	< 0.001	< 0.005
KA017226	4/15/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	0.001	< 0.001	< 0.005
KA017226	5/19/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA017226	6/17/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA017226	7/14/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002		< 0.001	< 0.005
KA017226	8/19/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA017226	9/16/98	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	0.000	< 0.0002	< 0.001	< 0.001	< 0.005
KA017226	10/21/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.006	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA017226	11/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.006	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA017226	12/16/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA017226	1/20/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA017226	2/17/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.010	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA017226	3/17/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.009	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA017226	4/20/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.007	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA017226	5/18/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA017226	6/15/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA017226	7/20/99	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	0.000	< 0.0002	< 0.001	< 0.001	< 0.005
KA017226	8/17/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA017226	9/14/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA017226	10/19/99	0.000	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA017226	11/16/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	0.001	< 0.001	< 0.005
KA017226	12/14/99	0.002	0.057	< 0.050	< 0.001	0.007	0.002	0.084	< 0.001	< 0.005	< 0.0002	0.001	< 0.001	< 0.005
KA021031	4/6/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	0.001	< 0.001	< 0.005
KA021031	4/14/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	0.001	< 0.001	< 0.005
KA024454	1/20/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	< 0.003	0.032	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.050
KA024454	2/17/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.019	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	3/17/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.007	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	4/14/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.006	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	5/20/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.012	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	6/16/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.001	0.017	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	7/15/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002		< 0.001	< 0.005
KA024454	8/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	9/15/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	10/20/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	11/17/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.012	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	12/15/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	1/19/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	2/16/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	3/16/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.010	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	4/20/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.006	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	5/18/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	6/15/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	7/20/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	8/17/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	9/14/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	10/19/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA024454	11/16/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	0.001	< 0.001	< 0.005
KA024454	12/14/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.002	0.016	< 0.001	< 0.005	< 0.0002	0.001	< 0.001	< 0.005
KA030341	1/21/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.021	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.016
KA030341	2/18/98	0.002	< 0.010	< 0.050	< 0.001	0.005	0.004	0.009	< 0.001	< 0.005	< 0.0002	0.001	< 0.001	< 0.005
KA030341	3/18/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.004	0.006	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA030341	4/15/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA030341	5/20/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.016	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA030341	6/17/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.001	0.027	< 0.001	0.010	< 0.0002	< 0.001	< 0.001	0.013
KA030341	7/15/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	0.000	< 0.001	< 0.005
KA030341	8/19/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA030341	9/16/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA030341	10/21/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA030341	11/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA030341	12/16/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA030341	1/20/99	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA030341	2/17/99	0.003	< 0.010	< 0.050	< 0.001	0.007	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA030341	3/17/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA030341	4/21/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA030341	5/19/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA030341	6/16/99	0.002	< 0.010	< 0.050	< 0.001	0.007	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA030341	7/21/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005

Table C-2 (Con't)
Minor Element Concentrations in the SWP

		CONCENTRATION, mg/L												
STATION	DATE	ARSENIC	ALUMINUM	BARIUM	CADMIUM	CHROMIUM	COPPER	IRON	LEAD	MANGANESE	MERCURY	SELENIUM	SILVER	ZINC
KA030341	8/18/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.010
KA030341	9/15/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.006
KA030341	10/20/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.006
KA030341	11/17/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.008
KA030341	12/15/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.002	0.017	< 0.001	< 0.005	< 0.0002	0.001	< 0.001	0.008
KA040341	2/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA040341	5/20/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.004	0.014	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA040341	8/19/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA040341	11/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA040341	2/17/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.003	< 0.005	< 0.001	0.026	< 0.0002	< 0.001	< 0.001	0.009
KA040341	5/19/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA040341	8/18/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA040341	10/20/99	0.000	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA040341	11/17/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.004	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA041288	1/21/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.008
KA041288	2/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.005	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.012
KA041288	3/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA041288	4/15/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA041288	5/20/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.006
KA041288	6/17/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.007	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.007
KA041288	7/15/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.017	< 0.0002	0.000	< 0.001	< 0.005
KA041288	8/19/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA041288	9/16/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA041288	10/21/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA041288	11/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA041288	12/16/98	0.002	0.048	< 0.050	< 0.001	< 0.005	0.002	0.035	< 0.001	0.008	< 0.0002	< 0.001	< 0.001	< 0.005
KA041288	1/20/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA041288	2/17/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.006	< 0.0002	< 0.001	< 0.001	< 0.005
KA041288	3/17/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA041288	4/21/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KA041288	5/19/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.009	< 0.0002	< 0.001	< 0.001	< 0.005
KA041288	6/16/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.002	< 0.005	< 0.001	0.012	< 0.0002	< 0.001	< 0.001	< 0.005
KA041288	7/21/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.011	< 0.0002	< 0.001	< 0.001	< 0.005
KA041288	8/18/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.003	< 0.005	< 0.001	0.750	< 0.0002	< 0.001	< 0.001	0.005
KA041288	9/15/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.003	< 0.005	< 0.001	0.010	< 0.0002	< 0.001	< 0.001	< 0.005
KA041288	10/20/99	0.003	< 0.010	< 0.050	< 0.001	0.005	0.003	< 0.005	< 0.001	0.010	< 0.0002	< 0.001	< 0.001	< 0.005
KA041288	11/17/99	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.007
KA041288	12/15/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KAO24102	5/19/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.006	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KAO24102	6/16/98	0.003	0.011	< 0.050	< 0.001	< 0.005	< 0.001	0.033	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KB0009.57	2/4/99		< 0.010				0.008	< 0.005		0.705				
Kb000955	12/22/98		< 0.010				0.001	0.016		5.430				
KB000975	12/22/98		< 0.010				0.002	0.007		0.011				
KB000975	12/28/98		< 0.010				0.002	0.008		0.063				
KB001638	1/21/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.039	< 0.001	0.006	< 0.0002	< 0.001	< 0.001	0.015
KB001638	5/20/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.020	< 0.005	< 0.001	0.007	< 0.0002	< 0.001	< 0.001	< 0.005
KB001638	6/17/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.001	0.007	< 0.001	0.011	< 0.0002	< 0.001	< 0.001	< 0.005
KB001638	7/15/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.004	0.007	< 0.001	< 0.005	< 0.0002		< 0.001	< 0.005
KB001638	8/19/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.005
KB001638	9/16/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.009	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KB001638	10/21/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.006	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KB001638	11/18/98	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.014	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KB001638	12/16/98	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KB001638	1/20/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.037	< 0.001	0.012	< 0.0002	< 0.001	< 0.001	< 0.005
KB001638	2/17/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.011	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KB001638	3/17/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.021	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KB001638	4/21/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.008	< 0.001	0.008	< 0.0002	< 0.001	< 0.001	< 0.005
KB001638	5/19/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.011	< 0.0002	< 0.001	< 0.001	< 0.005
KB001638	6/16/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.009	< 0.005	< 0.001	0.011	< 0.0002	< 0.001	< 0.001	< 0.005
KB001638	7/21/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KB001638	8/18/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KB001638	9/15/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.002	< 0.005	< 0.001	0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KB001638	10/20/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	< 0.005	< 0.001	0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KB001638	11/17/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.008	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.012
KB001638	12/15/99	0.002	< 0.010	< 0.050	< 0.001	0.007	0.003	0.017	< 0.001	0.006	< 0.0002	0.002	< 0.001	0.006
KB004207	2/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.035	< 0.001	0.032	< 0.0002	< 0.001	< 0.001	0.011
KB004207	5/20/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.007	< 0.005	< 0.001	0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KB004207	8/19/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.007	< 0.001	0.009	< 0.0002	< 0.001	< 0.001	< 0.005
KB004207	10/21/98	0.002	< 0.010	0.053	< 0.001	0.006	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.006
KB004207	11/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.018	< 0.001	0.006	< 0.0002	< 0.001	< 0.001	< 0.005
KB004207	5/19/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KB004207	8/18/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.017
KB004207	10/20/99	0.002	< 0.010	0.057	< 0.001	0.009	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.010
KB004207	11/17/99	0.002	< 0.010	0.054	< 0.001	0.006	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.007
KC000934	1/20/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.030	< 0.001	0.005	< 0.0002	< 0.001	< 0.001	< 0.050
KC000934	2/17/98	0.002	< 0.010	< 0.050	< 0.001	0.005	0.003	< 0.005	< 0.001	0.009	< 0.0002	0.002	< 0.001	< 0.005
KC000934	3/17/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	0.003	< 0.001	0.026
KC000934	4/14/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	0.001	< 0.001	< 0.005
KC000934	5/20/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.039	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KC000934	6/16/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KC000934	7/15/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	0.000	< 0.001	< 0.005
KC000934	8/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KC000934	9/15/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KC000934	10/20/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KC000934	11/17/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.007	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005

Table C-2 (Con't)
Minor Element Concentrations in the SWP

STATION	DATE	ARSENIC	ALUMINUM	BARIUM	CADMIUM	CHROMIUM	COPPER	IRON	LEAD	MANGANESE	MERCURY	SELENIUM	SILVER	ZINC
		CONCENTRATION, mg/L												
KC000934	12/15/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KC000934	1/19/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.009	< 0.0002	< 0.001	< 0.001	< 0.005
KC000934	2/16/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.019	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KC000934	3/16/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.009	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KC000934	4/20/99	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.009	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KC000934	5/18/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KC000934	6/15/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KC000934	7/20/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KC000934	8/17/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KC000934	9/14/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KC000934	10/19/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KC000934	11/8/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KC000934	12/14/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.002	0.019	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	1/12/98		< 0.010					0.098		0.019				
KG000000	1/21/98	0.002	0.011	< 0.050	< 0.001	< 0.005	0.005	0.126	< 0.001	0.008	< 0.0002	< 0.001	< 0.001	0.007
KG000000	2/18/98	0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.058	< 0.001	0.011	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	3/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.041	< 0.001	0.061	< 0.0002	< 0.001	< 0.001	0.016
KG000000	4/15/98	0.002	< 0.010	0.060	< 0.001	0.006	0.003	0.016	< 0.001	0.045	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	5/20/98	0.002	< 0.010	0.068	< 0.001	0.006	0.002	< 0.005	< 0.001	0.019	< 0.0002	0.001	< 0.001	< 0.005
KG000000	6/17/98	0.003	< 0.010	0.076	< 0.001	0.008	0.005	0.006	< 0.001	0.010	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	7/15/98	0.004	< 0.010	0.074	< 0.001	0.008	0.005	< 0.005	< 0.001	0.011	< 0.0002		< 0.001	< 0.005
KG000000	8/19/98	0.003	0.018	< 0.050	< 0.001	0.005	0.003	0.014	< 0.001	0.024	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	9/16/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.014	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	10/21/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.011	< 0.0002	< 0.001	< 0.001	0.006
KG000000	11/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.024	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	12/16/98	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	0.006	< 0.001	0.015	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	1/20/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	0.006	< 0.001	0.019	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	2/17/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.005	0.061	< 0.001	0.011	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	3/17/99	0.002	< 0.010	0.056	< 0.001	0.007	0.004	0.033	< 0.001	0.044	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	4/21/99	0.002	< 0.010	0.061	< 0.001	0.010	0.004	0.012	< 0.001	0.025	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	5/19/99	0.003	< 0.010	0.063	< 0.001	0.011	0.003	< 0.005	< 0.001	0.020	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	6/16/99	0.003	< 0.010	< 0.050	< 0.001	0.010	0.003	< 0.005	< 0.001	0.009	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	7/21/99	0.003	< 0.010	< 0.050	< 0.001	0.006	0.002	< 0.005	< 0.001	0.010	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	8/18/99	0.003	< 0.010	< 0.050	< 0.001	0.007	0.002	< 0.005	< 0.001	0.008	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	9/15/99	0.002	< 0.010	< 0.050	< 0.001	0.007	0.002	< 0.005	< 0.001	0.006	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	10/20/99	0.002	0.033	< 0.050	< 0.001	0.007	0.002	0.021	< 0.001	0.006	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	11/17/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	< 0.005	< 0.001	0.022	< 0.0002	< 0.001	< 0.001	< 0.005
KG000000	12/15/99	0.002	< 0.010	< 0.050	< 0.001	0.008	0.002	< 0.005	< 0.001	0.008	< 0.0002	< 0.001	< 0.001	< 0.005
KG002121	2/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	0.052	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.009
KG002121	5/20/98	0.002	< 0.010	0.067	< 0.001	0.007	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KG002121	8/19/98	0.003	0.028	0.051	< 0.001	0.005	0.003	0.020	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KG002121	11/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KG002121	2/17/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.004	0.045	< 0.001	0.010	< 0.0002	< 0.001	< 0.001	< 0.005
KG002121	5/19/99	0.003	< 0.010	0.063	< 0.001	0.011	0.003	< 0.005	< 0.001	0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KG002121	8/18/99	0.003	< 0.010	< 0.050	< 0.001	0.007	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
KG002121	11/17/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	< 0.005	< 0.001	0.010	< 0.0002	< 0.001	< 0.001	< 0.005
LD001000	7/23/98							0.009		0.029				
LD001000	7/23/98							0.058		< 0.005				
LD001000	8/27/98							0.030		< 0.005				
LD001000	8/27/98							0.022		0.278				
LD001000	9/22/98							0.027		0.009				
LD001000	9/22/98							0.038		0.125				
LD001000	5/26/99	< 0.001				< 0.005	< 0.001	0.012	< 0.001	< 0.005		< 0.001		< 0.005
LD001000	5/26/99	< 0.001				< 0.005	< 0.001	0.027	< 0.001	0.012		< 0.001		< 0.005
LD001000	6/24/99							0.028		< 0.005				
LD001000	7/30/99							0.039		0.273				
LD001000	8/25/99							0.007		< 0.005				
LD001000	9/28/99							0.023		0.026				
PE002000	2/17/98	0.002	< 0.010	0.059	< 0.001	0.006	0.005	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
PE002000	5/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.021	< 0.005	0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.009
PE002000	8/17/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.007	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
PE002000	11/16/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
PE002000	2/18/99	0.002	< 0.010	0.051	< 0.001	< 0.005	0.004	< 0.005	< 0.001	0.027	< 0.0002	< 0.001	< 0.001	< 0.005
PE002000	5/17/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
PE002000	8/16/99	0.002	< 0.010	< 0.050	< 0.001	0.007	0.003	< 0.005	< 0.001	0.006	< 0.0002	< 0.001	< 0.001	< 0.005
PE002000	10/18/99	0.000	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	0.006	< 0.0002	< 0.001	< 0.001	< 0.005
PE002000	11/15/99	0.002	< 0.010	0.052	< 0.001	< 0.005	0.023	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
PY001000	2/17/98	0.002	0.015	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
PY001000	5/19/98	0.002	0.013	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.007	< 0.0002	< 0.001	< 0.001	< 0.005
PY001000	8/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.008
PY001000	11/17/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
PY001000	2/18/99	0.002	< 0.010	< 0.050	< 0.001	0.007	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
PY001000	5/18/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
PY001000	8/17/99	0.002	0.024	< 0.050	< 0.001	0.006	0.002	0.009	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
PY001000	10/19/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
PY001000	11/16/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SI002000	2/17/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	0.001	< 0.001	0.005
SI002000	5/19/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.004	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.005
SI002000	8/18/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SI002000	11/17/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SI002000	2/16/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.007	< 0.0002	< 0.001	< 0.001	< 0.005
SI002000	5/18/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SI002000	8/17/99	0.002	< 0.010	< 0.050	< 0.001	0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005

Table C-2 (Con't)
Minor Element Concentrations in the SWP

STATION	DATE	CONCENTRATION, mg/L ARSENIC	ALUMINUM	BARIUM	CADMIUM	CHROMIUM	COPPER	IRON	LEAD	MANGANESE	MERCURY	SELENIUM	SILVER	ZINC
SI002000	10/19/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SI002000	11/16/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SL001000	8/19/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	0.010	< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	1/20/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.014
SL005000	2/17/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.042
SL005000	3/17/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.005	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	4/14/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	0.001	< 0.001	< 0.005
SL005000	5/19/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	0.001	< 0.001	< 0.005
SL005000	6/16/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.003	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	7/14/98	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	0.000	< 0.001	< 0.005
SL005000	8/19/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	10/20/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.004	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	11/18/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	12/16/98	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.006	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	1/20/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.008	< 0.005	< 0.001	0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	1/20/99	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001		< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	2/17/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.009	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	3/17/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.007	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	4/21/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	5/19/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	6/16/99	0.002	< 0.010	< 0.050	< 0.001	0.007	0.002	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	7/21/99	0.002	< 0.010	< 0.050	< 0.001	< 0.005	0.002	< 0.005	< 0.001	0.017	< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	8/18/99	0.003	< 0.010	< 0.050	< 0.001	0.006	0.004	< 0.005	< 0.001	0.007	< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	9/15/99	0.003	< 0.010	< 0.050	< 0.001	0.005	0.007	< 0.005	< 0.001	0.011	< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	9/15/99	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001		< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	10/20/99	0.003	< 0.010	< 0.050	< 0.001	0.005	0.010	< 0.005	< 0.001		< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	11/17/99	0.003	< 0.010	< 0.050	< 0.001	< 0.005	0.014	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
SL005000	12/15/99	0.002	< 0.010	< 0.050	< 0.001	0.006	0.014	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
TA001000	1/21/98	< 0.001		< 0.050	< 0.001	< 0.005	0.001	0.005	< 0.001	< 0.005		< 0.001	< 0.001	< 0.050
TA001000	2/18/98	< 0.001		< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005		< 0.001	< 0.001	< 0.005
TA001000	3/17/98	< 0.001		< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005		< 0.001	< 0.001	< 0.005
TA001000	4/15/98	< 0.001	0.000	< 0.050	< 0.001	< 0.005	0.001	0.011	< 0.001	< 0.005		< 0.001	< 0.001	< 0.005
TA001000	5/20/98	< 0.001				< 0.005	< 0.001	0.008	< 0.001	< 0.005		< 0.001		< 0.005
TA001000	6/18/98	< 0.001				< 0.005	< 0.001	0.008	< 0.001	< 0.005		< 0.001		< 0.005
TA001000	7/15/98	< 0.001				< 0.005	0.001	< 0.005	< 0.001	< 0.005		< 0.001		< 0.005
TA001000	8/19/98	< 0.001				< 0.005	0.001	< 0.005	< 0.001	< 0.005		< 0.001		0.000
TA001000	9/16/98	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
TA001000	10/22/98	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
TA001000	11/18/98	< 0.001				< 0.005	< 0.001	< 0.005	< 0.001	< 0.005		< 0.001		< 0.005
TA001000	12/16/98	< 0.001				< 0.005	< 0.001	0.007	< 0.001	0.006		< 0.001		< 0.005
TA001000	1/20/99	< 0.001				< 0.005	< 0.001	< 0.005	< 0.001	0.016		< 0.001		< 0.005
TA001000	2/17/99	< 0.001				< 0.005	< 0.001	< 0.005	< 0.001	< 0.005		< 0.001		< 0.005
TA001000	3/17/99	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
TA001000	4/21/99	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	0.010
TA001000	5/20/99	< 0.001				< 0.005	< 0.001	< 0.005	< 0.001	< 0.005		< 0.001		< 0.005
TA001000	6/17/99	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
TA001000	7/21/99	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
TA001000	8/18/99	< 0.001				< 0.005	< 0.001	< 0.005	< 0.001	< 0.005		< 0.001		< 0.005
TA001000	9/15/99	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
TA001000	10/20/99	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
TA001000	11/17/99	< 0.001				< 0.005	< 0.001	< 0.005	< 0.001	< 0.005		< 0.001		< 0.005
TA001000	12/15/99	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
TF001000	2/18/98	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
TF001000	5/20/98	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	0.007	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
TF001000	8/19/98	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	0.007	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
TF001000	11/18/98	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
TF001000	2/17/99	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
TF001000	5/20/99	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
TF001000	8/18/99	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005
TF001000	11/17/99	< 0.001	< 0.010	< 0.050	< 0.001	< 0.005	< 0.001	< 0.005	< 0.001	< 0.005	< 0.0002	< 0.001	< 0.001	< 0.005

Table C-3
TOC, DOC, UV 254, Bromide, TSS, and SVS Concentrations in the SWP

STATION	DATE	TOTAL ORGANIC CARBON (mg/L)	DISS. ORGANIC CARBON (mg/L)	UV 254 (1/cm)	BROMIDE (mg/L)	SUSPENDED SOLIDS (mg/L)	SUSPENDED VOLATILE SOLIDS (mg/L)
CA002000	2/17/98	2.7		0.069			
CA002000	5/18/98	3.0		0.076			
CA002000	8/17/98	3.5		0.069			
CA002000	11/16/98	3.0		0.072	0.130		
CA002000	2/16/99	7.7		0.067	0.130		
CA002000	5/17/99	3.3		0.071	0.120		
CA002000	8/16/99	3.7		0.063	0.150		
CA002000	11/15/99	2.5		0.061			
DMC06716	1/21/98	6.5			0.060		
DMC06716	2/18/98	5.8			0.099		
DMC06716	3/18/98	3.8			0.164		
DMC06716	4/14/98	3.9			0.087		
DMC06716	5/19/98	3.6			0.102		
DMC06716	6/16/98	3.1			0.047		
DMC06716	7/14/98				0.035		
DMC06716	8/19/98	2.9			0.108		
DMC06716	9/16/98	2.5			0.090		
DMC06716	10/20/98	2.5			0.090		
DMC06716	11/18/98	3.0			0.230		
DMC06716	12/16/98	2.9			0.220		
DMC06716	1/20/99	3.0			0.280		
DMC06716	2/17/99	3.1			0.050		
DMC06716	3/17/99	2.4		0.081	0.140	22.0	2.0
DMC06716	4/21/99	2.9			0.130		
DMC06716	5/19/99	2.3			0.090		
DMC06716	6/16/99	3.6			0.180	61.0	9.0
DMC06716	7/21/99	2.5			0.060		
DMC06716	8/18/99	2.7			0.120		
DMC06716	9/15/99	2.3		0.072	0.200		
DMC06716	10/20/99	2.8					
DMC06716	11/17/99	2.7			0.240		
DMC06716	12/15/99	3.0			0.420		
DV0000.00	2/18/98				0.017	36.4	3.0
DV0000.00	3/18/98				0.015	18.8	2.0
DV0000.00	4/15/98				0.021	3.2	1.0
DV0000.00	8/19/98				0.031	3.0	2.0
DV0000.00	9/16/98				0.030	2.0	1.0
DV0000.00	10/21/98				0.030	22.0	6.0
DV0000.00	10/20/99	3.4			0.040	2.0	
DV0000.00	10/20/99	3.4			0.040	2.0	
DV0000.00	11/17/99	3.3			0.050	10.0	2.0
DV000000	2/18/98				0.020	36.0	3.0
DV000000	3/18/98				0.020	19.0	2.0
KA000000	2/18/98				0.076		
KA000000	5/20/98				0.056		
KA000000	8/19/98				0.067		
KA000000	11/18/98				0.210		
KA000000	2/17/99				0.050		
KA000000	2/17/99				0.050		
KA000000	5/19/99				0.110		
KA000000	8/18/99				0.060		
KA000000	11/17/99	2.7		0.082	0.250		
KA000000	11/24/99	2.4	2.5	0.078			
KA000000	12/1/99	2.6	2.7	0.077			
KA000000	12/1/99	2.6	2.6	0.083			
KA000000	12/8/99	2.8	2.8	0.087			
KA000000	12/15/99	2.9	2.7	0.076			
KA000000	12/22/99	3.8	3.5	0.125			
KA000000	12/29/99	2.9	2.6	0.080			
KA000000	1/5/00	3.7	3.6	0.130			
KA000000	1/5/00	4.0	4.3	0.136			
KA000331	1/21/98	5.2			0.250	4.0	< 1.0
KA000331	2/18/98	4.8			0.173	22.4	5.0
KA000331	3/18/98	4.5			0.160	2.0	< 1.0
KA000331	4/15/98	4.9			0.292	3.6	2.0
KA000331	5/20/98	3.9			0.130	4.4	1.0
KA000331	6/17/98	2.9			0.049	3.6	1.0
KA000331	7/15/98	3.5			0.035	27.0	2.0
KA000331	8/19/98	3.5			0.060	37.0	6.0
KA000331	9/16/98	2.9			0.060	57.0	5.0
KA000331	10/21/98	3.2			0.050	113.0	16.0
KA000331	11/18/98	2.7			0.070	4.0	1.0
KA000331	12/16/98	2.7			0.140	6.0	2.0
KA000331	1/20/99	5.0			0.180	15.0	2.0
KA000331	2/17/99	4.1			0.120	6.0	1.0
KA000331	3/17/99	3.3			0.140	5.0	2.0
KA000331	4/21/99	3.2			0.130	18.0	4.0
KA000331	5/19/99				0.090	28.0	4.0
KA000331	6/16/99	3.6			0.100	26.0	4.0
KA000331	7/21/99	3.1			0.060	30.0	5.0
KA000331	8/18/99	2.5			0.060	30.0	5.0
KA000331	9/15/99	2.3			0.220	35.0	6.0
KA000331	10/20/99	2.8			0.240	19.0	
KA000331	11/17/99	2.4			0.290	26.0	3.0
KA000331	12/15/99	3.2			0.520	2.0	1.0
KA006633	2/18/98	4.6					
KA006633	5/19/98	4.4					
KA006633	8/19/98	3.0					
KA006633	11/18/98	2.6					
KA006633	2/17/99	5.0					
KA006633	5/19/99	2.6					

Table C-3 (Con't)
TOC, DOC, UV 254, Bromide, TSS, and SVS Concentrations in the SWP

STATION	DATE	TOTAL ORGANIC CARBON (mg/L)	DISS. ORGANIC CARBON (mg/L)	UV 254 (1/cm)	BROMIDE (mg/L)	SUSPENDED SOLIDS (mg/L)	SUSPENDED VOLATILE SOLIDS (mg/L)
KA006633	8/18/99	2.4			0.060		
KA007082	7/15/98					10.0	1.0
KA007089	1/21/98	7.3			0.169		
KA007089	2/18/98	5.8			0.108		
KA007089	3/18/98	4.1			0.151		
KA007089	4/15/98	3.8			0.122		
KA007089	5/19/98	3.3			0.120		
KA007089	6/17/98	3.1			0.061		
KA007089	7/15/98	3.4			0.126	23.2	2.0
KA007089	8/19/98	2.9			0.192		
KA007089	9/16/98	2.7			0.080		
KA007089	10/21/98	2.5			0.060		
KA007089	11/18/98	2.6			0.120	6.0	1.0
KA007089	12/16/98	2.8			0.220		
KA007089	1/20/99	3.8			0.210	5.0	1.0
KA007089	2/17/99	4.0			0.090	10.0	3.0
KA007089	3/17/99	2.9		0.071	0.160	8.0	1.0
KA007089	4/21/99	2.8			0.180	20.0	4.0
KA007089	5/19/99	2.6			0.180	12.0	2.0
KA007089	6/16/99	2.6		0.068	0.190	15.0	3.0
KA007089	7/21/99	2.7			0.120	19.0	5.0
KA007089	8/18/99	2.7			0.080		
KA007089	9/15/99			0.071	0.170	4.0	2.0
KA007089	10/20/99	2.7			0.220	11.0	
KA007089	11/17/99	2.5			0.280	9.0	2.0
KA007089	12/15/99	2.7			0.340		
KA017226	1/21/98					12.0	2.0
KA017226	2/18/98	4.6			0.128	38.0	5.0
KA017226	3/18/98	5.0				9.6	3.0
KA017226	4/15/98					26.0	3.0
KA017226	5/19/98	3.4			0.142	13.2	2.0
KA017226	6/17/98	3.3				14.0	2.0
KA017226	7/14/98					102.0	9.0
KA017226	8/19/98	3.2			0.177	70.0	8.0
KA017226	9/16/98	2.9				6.0	1.0
KA017226	10/21/98					22.0	4.0
KA017226	11/18/98	2.5			0.080	3.0	1.0
KA017226	12/16/98					4.0	1.0
KA017226	1/20/99				0.210	2.0	1.0
KA017226	2/17/99	3.7			0.100	4.0	1.0
KA017226	3/17/99	2.8			0.140	14.0	2.0
KA017226	4/20/99				0.150		
KA017226	5/18/99	2.4			0.180	10.0	2.0
KA017226	6/15/99	2.6			0.180	18.0	3.0
KA017226	7/20/99				0.120		
KA017226	8/17/99	2.4			0.090	14.0	3.0
KA017226	9/14/99	2.3			0.130	6.0	2.0
KA017226	10/19/99	2.5			0.230	7.0	
KA017226	11/16/99	2.4			0.300	3.0	1.0
KA017226	12/14/99	2.8			0.350	7.0	1.0
KA021031	4/6/98					10.0	4.0
KA021031	4/14/98					5.0	1.0
KA024454	1/20/98					9.0	< 1.0
KA024454	2/17/98					5.0	< 1.0
KA024454	3/17/98					5.0	2.0
KA024454	4/14/98					31.0	4.0
KA024454	5/20/98					53.6	5.0
KA024454	6/16/98					26.0	2.0
KA024454	7/15/98					85.0	7.0
KA024454	8/18/98					124.0	14.0
KA024454	9/15/98					12.0	1.0
KA024454	10/20/98					17.0	3.0
KA024454	11/17/98					14.0	2.0
KA024454	12/15/98					3.0	1.0
KA024454	1/19/99				0.260	2.0	1.0
KA024454	2/16/99				0.150	6.0	2.0
KA024454	3/16/99				0.120	36.0	4.0
KA024454	4/20/99				0.170	41.0	4.0
KA024454	5/18/99				0.170	24.0	3.0
KA024454	6/15/99				0.180	22.0	3.0
KA024454	7/20/99				0.140	36.0	6.0
KA024454	8/17/99				0.080	10.0	2.0
KA024454	9/14/99				0.120	10.0	3.0
KA024454	10/19/99				0.240	19.0	
KA024454	11/16/99				0.290	5.0	1.0
KA024454	12/14/99				0.280	4.0	1.0
KA030341	1/21/98	5.0		0.141	0.338	19.2	2.0
KA030341	2/18/98	4.6		0.149	0.243	2.4	1.0
KA030341	3/18/98	4.5		0.136	0.223	1.2	1.0
KA030341	4/15/98	4.2		0.112	0.012	22.8	3.0
KA030341	5/20/98	3.1		0.088	0.010	8.4	1.0
KA030341	6/17/98	3.3		0.084	0.010	17.2	2.0
KA030341	7/15/98	4.4		0.070	0.065	210.0	26.0
KA030341	8/19/98	3.4		0.087	0.190	121.0	12.0
KA030341	9/16/98	3.0		0.080	0.110	24.0	3.0
KA030341	10/21/98	2.6		0.070	0.060	18.0	3.0
KA030341	11/18/98	2.5		0.064	0.060	3.0	1.0
KA030341	12/16/98	2.5		0.064	0.080	2.0	1.0
KA030341	1/20/99	9.3		0.063	0.170	8.0	2.0
KA030341	2/17/99	3.2		0.060	0.130	3.0	1.0
KA030341	3/17/99	3.4		0.078	0.130	77.0	7.0

Table C-3 (Con't)
TOC, DOC, UV 254, Bromide, TSS, and SVS Concentrations in the SWP

STATION	DATE	TOTAL ORGANIC CARBON (mg/L)	DISS. ORGANIC CARBON (mg/L)	UV 254 (1/cm)	BROMIDE (mg/L)	SUSPENDED SOLIDS (mg/L)	SUSPENDED VOLATILE SOLIDS (mg/L)
KA030341	4/21/99	3.2		0.084	0.150	24.0	4.0
KA030341	5/19/99	3.2		0.087	0.170	56.0	6.0
KA030341	6/16/99	3.3		0.069	0.180	35.0	5.0
KA030341	7/21/99	3.1		0.087	0.130	61.0	10.0
KA030341	8/18/99	2.8		0.071	0.100	39.0	7.0
KA030341	9/15/99	2.3		0.070	0.110	14.0	3.0
KA030341	10/20/99	2.4				22.0	
KA030341	11/17/99	2.2		0.070	0.270	2.0	1.0
KA030341	12/15/99	2.6		0.079	0.270	6.0	1.0
KA040341	2/18/98	4.2		0.104			
KA040341	5/20/98	4.0		0.095			
KA040341	8/19/98	3.6		0.088			
KA040341	11/18/98	2.7		0.068			
KA040341	2/17/99	3.2		0.066	0.080		
KA040341	5/19/99	3.9		0.071	0.170		
KA040341	8/18/99	2.8		0.071	0.090		
KA040341	11/17/99	2.9		0.069			
KA041288	1/21/98	2.4		0.069	0.205		
KA041288	2/18/98	3.4		0.087	0.186	2.4	1.0
KA041288	3/18/98	3.2		0.095	0.160		
KA041288	4/15/98	3.9		0.108	0.151		
KA041288	5/20/98	3.6		0.102	0.060	3.6	1.0
KA041288	6/17/98	3.6		0.092	0.035		
KA041288	7/15/98	3.7		0.084	0.031		
KA041288	8/19/98	3.4		0.077	0.087	6.0	1.0
KA041288	9/16/98	2.9		0.080	0.120		
KA041288	10/21/98	2.8		0.077	0.110		
KA041288	11/18/98	2.7		0.074	0.100	2.0	1.0
KA041288	12/16/98	2.7		0.077	0.100		
KA041288	1/20/99	2.6		0.064	0.100		
KA041288	2/17/99	2.1		0.066	0.090	1.0	1.0
KA041288	3/17/99	2.7		0.074	0.150		
KA041288	4/21/99	2.8		0.076	0.110		
KA041288	5/19/99	2.9		0.077	0.110	4.0	2.0
KA041288	6/16/99	2.8		0.070	0.140		
KA041288	7/21/99	2.8		0.068	0.160		
KA041288	8/18/99	2.6		0.076	0.140	2.0	1.0
KA041288	9/15/99			0.068	0.100		
KA041288	10/20/99	2.3			0.170		
KA041288	11/17/99	2.2		0.064	0.210	1.0	1.0
KA041288	12/15/99	2.3		0.066	0.230		
KAO24102	5/19/98					51.2	6.0
KAO24102	6/16/98					40.0	3.0
KB0009.57	2/4/99					8.0	
KB0009.57	2/5/99	5.1					
KB000975	12/22/98					6.0	
KB000975	12/28/98					3.2	
KB001638	1/21/98	4.9			0.229	8.8	2.0
KB001638	5/20/98	5.1			0.164	18.4	3.0
KB001638	6/17/98	3.3			0.050	28.4	4.0
KB001638	7/15/98	3.4			0.042	20.0	3.0
KB001638	8/19/98	3.6			0.066	34.0	6.0
KB001638	9/16/98	3.0			0.060	9.0	2.0
KB001638	10/21/98	3.0			0.050	4.0	2.0
KB001638	11/18/98	3.1			0.080	42.0	7.0
KB001638	12/16/98	2.9			0.160	3.0	1.0
KB001638	1/20/99	6.0			0.170	22.0	4.0
KB001638	2/17/99	4.3			0.120	2.0	1.0
KB001638	3/17/99	3.5			0.130	4.0	1.0
KB001638	4/21/99	3.1			0.120	6.0	2.0
KB001638	5/19/99	3.2			0.100	46.0	9.0
KB001638	6/16/99	3.5			0.100	26.0	4.0
KB001638	7/21/99	2.9			0.060	18.0	5.0
KB001638	8/18/99	2.4			0.060	10.0	4.0
KB001638	9/15/99	2.4			0.210	6.0	3.0
KB001638	10/20/99	2.8			0.240	3.0	
KB001638	11/17/99	2.6			0.280	27.0	6.0
KB001638	12/15/99	2.9			0.520	2.0	1.0
KB004207	2/18/98				0.227		
KB004207	5/20/98				0.192		
KB004207	8/19/98				0.054		
KB004207	10/21/98				0.040		
KB004207	11/18/98				0.070		
KB004207	5/19/99				0.100	9.0	2.0
KB004207	8/18/99				0.060	6.0	3.0
KB004207	11/17/99				0.170	1.0	1.0
KC000934	1/20/98					2.0	< 1.0
KC000934	2/17/98					8.0	1.0
KC000934	3/17/98					5.0	< 1.0
KC000934	4/14/98					15.0	2.0
KC000934	5/20/98					20.0	2.0
KC000934	6/16/98					51.6	5.0
KC000934	7/15/98					105.0	9.0
KC000934	8/18/98					82.0	7.0
KC000934	9/15/98					12.0	1.0
KC000934	10/20/98					18.0	3.0
KC000934	11/17/98					14.0	1.0
KC000934	12/15/98					2.0	1.0
KC000934	1/19/99				0.170	2.0	1.0
KC000934	2/16/99				0.150	7.0	2.0
KC000934	3/16/99				0.130	6.0	1.0

Table C-3 (Con't)
TOC, DOC, UV 254, Bromide, TSS, and SVS Concentrations in the SWP

STATION	DATE	TOTAL ORGANIC CARBON (mg/L)	DISS. ORGANIC CARBON (mg/L)	UV 254 (1/cm)	BROMIDE (mg/L)	SUSPENDED SOLIDS (mg/L)	SUSPENDED VOLATILE SOLIDS (mg/L)
KC000934	4/20/99				0.160	10.0	2.0
KC000934	5/18/99				0.170	43.0	4.0
KC000934	6/15/99				0.180	30.0	4.0
KC000934	7/20/99				0.140	58.0	7.0
KC000934	8/17/99				0.100	112.0	7.0
KC000934	9/14/99				0.120	5.0	2.0
KC000934	10/19/99				0.240	30.0	
KC000934	11/8/99				0.230	5.0	2.0
KC000934	12/14/99				0.280	2.0	1.0
KG000000	1/12/98	20.3	14.6	0.470			
KG000000	1/21/98	18.0	14.2	0.473	0.018	101.0	15.0
KG000000	1/29/98	16.3	13.3	0.464	0.037		
KG000000	2/2/98	3.7	9.7	0.304	0.011		
KG000000	2/18/98	11.5	8.2	0.260	0.020	106.0	16.0
KG000000	3/18/98	10.2	8.3	0.286	0.072	48.7	7.0
KG000000	4/15/98	8.3	9.0	0.252	0.095	32.0	5.0
KG000000	5/20/98	4.4	4.2	0.123	0.073	41.0	7.0
KG000000	6/17/98	6.7	5.4	0.168	0.083	56.0	8.0
KG000000	7/15/98	5.9	5.3	0.143	0.072	32.5	4.0
KG000000	8/19/98	5.5	4.2	0.135	0.050	47.0	6.0
KG000000	9/16/98	4.3	3.7	0.119	0.040	46.0	24.0
KG000000	10/21/98	4.7	4.0	0.121	0.040	40.0	8.0
KG000000	11/6/98	3.7	4.2				
KG000000	11/12/98	4.0	3.4				
KG000000	11/18/98	3.8	3.2	0.097	0.040	34.0	3.0
KG000000	11/24/98	3.6	3.2				
KG000000	12/1/98	6.2	7.8				
KG000000	12/8/98	6.1	6.9				
KG000000	12/16/98	3.9	3.9	0.112	0.050	22.0	3.0
KG000000	12/23/98	3.8	3.5				
KG000000	12/29/98	3.8	3.2				
KG000000	1/6/99	3.9	3.2				
KG000000	1/6/99	3.9	3.2				
KG000000	1/13/99	3.2	3.1				
KG000000	1/13/99	3.2	3.1				
KG000000	1/20/99	3.8	3.8	0.094	0.060	31.0	4.0
KG000000	1/27/99	4.1	4.0				
KG000000	2/3/99	3.7	3.4				
KG000000	2/9/99	10.0	7.0				
KG000000	2/17/99	14.5	10.9	0.379	0.030	127.0	23.0
KG000000	2/24/99	14.4	11.6				
KG000000	3/2/99	13.5	11.6				
KG000000	3/9/99	11.5	10.1				
KG000000	3/17/99	10.0	8.7	0.316	0.080	25.0	4.0
KG000000	3/18/99	11.5					
KG000000	3/24/99	8.4	8.1				
KG000000	3/24/99	8.4	8.1				
KG000000	3/30/99	12.4	8.9				
KG000000	4/6/99	10.4	8.4				
KG000000	4/13/99	10.0	8.0				
KG000000	4/16/99	9.2					
KG000000	4/19/99	9.3					
KG000000	4/21/99	8.9	7.9	0.273	0.090	34.0	6.0
KG000000	4/27/99	7.5	6.9				
KG000000	4/30/99	7.4					
KG000000	5/19/99	5.6	4.6	0.140	0.070	44.0	4.0
KG000000	6/16/99	4.9	3.6	0.624	0.040	42.0	9.0
KG000000	7/21/99	5.0	2.9	0.099	0.030	69.0	11.0
KG000000	8/18/99	4.3	2.8	0.094	0.030	92.0	20.0
KG000000	9/15/99	3.0	3.1	0.095	0.030	45.0	10.0
KG000000	10/20/99	2.9	2.9		0.030	30.0	
KG000000	11/3/99	2.8					
KG000000	11/10/99	2.5					
KG000000	11/17/99	12.9		0.077	0.030	25.0	4.0
KG000000	11/24/99	3.1					
KG000000	12/1/99	2.7					
KG000000	12/8/99	2.3					
KG000000	12/15/99	2.5	2.3	0.069	0.040	13.0	1.0
KG000000	12/22/99	3.3					
KG000000	12/29/99	3.0					
KG000000	1/5/00	2.4					
KG002111	2/18/98				0.020		
KG002121	5/20/98				0.077		
KG002121	8/19/98				0.053		
KG002121	11/18/98				0.040		
KG002121	2/17/99				0.040		
KG002121	5/19/99				0.070		
KG002121	8/18/99				0.030	60.0	8.0
KG002121	11/17/99				0.030	22.0	2.0
KRI24102	4/6/98					29.0	6.0
KRI24102	4/14/98	4.5	5.0			56.0	6.0
LD001000	5/26/99				0.010		
LD001000	5/26/99				0.010		
PE002000	2/18/99				0.200		
PE002000	5/17/99				0.210		
PE002000	8/16/99				0.220		
PY001000	2/18/99				0.110		
PY001000	5/18/99				0.110		
PY001000	8/17/99				0.130		
SI002000	2/16/99				0.090		
SI002000	5/18/99				0.110		
SI002000	8/17/99				0.140		

Table C-3 (Con't)
TOC, DOC, UV 254, Bromide, TSS, and SVS Concentrations in the SWP

STATION	DATE	TOTAL ORGANIC CARBON (mg/L)	DISS. ORGANIC CARBON (mg/L)	UV 254 (1/cm)	BROMIDE (mg/L)	SUSPENDED SOLIDS (mg/L)	SUSPENDED VOLATILE SOLIDS (mg/L)
SL005000	7/14/98					3.6	1.0
SL005000	12/16/98					1.0	1.0
SL005000	1/20/99				0.220		
SL005000	2/17/99				0.190		
SL005000	3/17/99			0.064	0.210		
SL005000	4/21/99				0.200		
SL005000	5/19/99				0.180		
SL005000	6/16/99				0.190		
SL005000	7/21/99				0.200		
SL005000	8/18/99				0.200		
SL005000	9/15/99				0.180		
SL005000	11/17/99				0.210		
SL005000	12/15/99				0.220		
TA001000	2/18/98				< 0.010	4.0	< 1.0
TA001000	5/20/98				0.080	6.0	1.0
TA001000	11/18/98				0.010	3.2	1.0
TA001000	1/20/99				0.010		
TA001000	2/17/99				0.010	4.0	1.0
TA001000	3/17/99				0.010		
TA001000	4/21/99				0.010		
TA001000	5/20/99				0.010	6.0	2.0
TA001000	6/17/99				0.010		
TA001000	7/21/99				0.010		
TA001000	8/18/99				0.010	4.0	1.0
TA001000	9/15/99				0.010		
TA001000	11/17/99				0.010	1.0	1.0
TA001000	12/15/99				0.010		
TF001000	2/17/99				0.010		
TF001000	5/20/99				0.010	4.0	2.0
TF001000	8/18/99				0.010	2.0	2.0
TF001000	11/17/99				0.010		

Table C-4
Total Trihalomethane Formation Potential Concentrations in the State Water Project

		CONCENTRATION, µg/L				
STATION	DATE	CHLOROFORM	DIBROMO-CHLOROFORM	BROMODI-CHLOROFORM	BROMOFORM	TOTAL TRIHALOMETHANE FORMATION POTENTIAL
CA002000	2/17/98	230	30	79	< 10	349
CA002000	2/17/98	230	30	79	10	349
CA002000	5/18/98	250	18	67	10	345
CA002000	8/17/98	280	18	81	10	389
CA002000	11/16/98	270	23	78	10	381
CA002000	2/16/99	230	29	74	< 10	343
CA002000	5/17/99	260	28	73	< 10	371
CA002000	8/16/99	220	20	59	< 10	309
CA002000	11/15/99	270	26	82	< 10	388
DMC06716	1/21/98	650	10	43	< 10	713
DMC06716	2/18/98	730	11	88	< 10	839
DMC06716	4/14/98	380	< 10	60	< 10	460
DMC06716	5/19/98	340	10	60	10	420
DMC06716	6/16/98	360	10	35	10	415
DMC06716	7/14/98	360	10	21	10	401
DMC06716	8/19/98	250	10	60	10	330
DMC06716	9/16/98	270	15	62	10	357
DMC06716	10/20/98	240	12	54	10	316
DMC06716	11/18/98	250	46	100	10	406
DMC06716	12/16/98	270	52	110	10	442
DMC06716	1/20/99	220	50	110	10	390
DMC06716	2/17/99	280	< 10	40	< 10	340
DMC06716	3/17/99	220	19	54	< 10	303
DMC06716	4/21/99	320	24	68	< 10	422
DMC06716	5/19/99	200	20	53	< 10	283
DMC06716	6/16/99	260	12	60	10	342
DMC06716	7/21/99	200	10	34	10	254
DMC06716	8/18/99	240	21	66	10	337
DMC06716	9/15/99	160	43	82	10	295
DMC06716	11/17/99	220	45	100	10	375
DMC06716	12/15/99	220	99	150	17	486
DV0000.00	11/17/99	330	< 10	44	< 10	394
KA000331	1/21/98	440	30	120	< 10	600
KA000331	2/18/98	450	27	110	< 10	597
KA000331	3/18/98	490	30	120	< 10	650
KA000331	3/26/98	490	30	120	< 10	650
KA000331	4/15/98	380	54	142	< 10	586
KA000331	5/20/98	360	13	71	10	454
KA000331	6/17/98	300	< 10	37	< 10	357
KA000331	7/15/98	300	10	28	10	348
KA000331	8/19/98	300	10	39	10	359
KA000331	9/16/98	280	< 10	45	< 10	345
KA000331	9/16/98	280	10	45	10	345
KA000331	10/21/98	260	10	40	10	320
KA000331	11/18/98	280	10	49	10	349
KA000331	12/16/98	240	30	77	10	357
KA000331	1/20/99	480	24	100	< 10	614
KA000331	2/17/99	380	22	78	< 10	490
KA000331	3/17/99	340	18	63	< 10	431
KA000331	4/21/99	250	23	63	< 10	346
KA000331	5/19/99	220	20	58	< 10	308
KA000331	6/16/99	290	17	74	10	391
KA000331	7/21/99	230	10	42	10	292
KA000331	8/18/99	240	< 10	41	< 10	301
KA000331	9/15/99	180	46	92	10	328
KA000331	11/17/99	200	60	120	12	392
KA000331	12/15/99	230	120	180	23	553
KA006633	2/18/98	570	46	150	< 10	776
KA006633	5/19/98	380	28	100	10	518
KA006633	8/19/98	300	10	46	10	366
KA006633	11/18/98	260	10	50	10	330
KA006633	2/17/99	500	23	90	< 10	623
KA006633	5/19/99	240	22	62	< 10	334
KA006633	8/18/99	240	10	42	10	302
KA007089	1/21/98	620	12	98	< 10	740
KA007089	2/18/98	120	10	10	< 10	150
KA007089	3/18/98	440	29	110	< 10	589
KA007089	4/15/98	390	11	78	< 10	489
KA007089	5/19/98	280	13	65	10	368
KA007089	6/17/98	340	10	47	10	407
KA007089	7/15/98	330	17	83	10	440
KA007089	8/19/98	250	33	96	10	389
KA007089	9/16/98	300	12	59	10	381
KA007089	10/21/98	260	10	43	10	323
KA007089	11/18/98	260	19	69	10	358
KA007089	12/16/98	240	56	100	10	406
KA007089	1/20/99	360	36	110	10	516
KA007089	2/17/99	380	16	62	< 10	468
KA007089	3/17/99	290	19	62	< 10	381
KA007089	4/21/99	230	37	82	16	365
KA007089	5/19/99	210	44	91	17	362
KA007089	6/16/99	200	40	90	10	340
KA007089	7/21/99	210	18	61	10	299
KA007089	8/18/99	290	16	63	10	379
KA007089	9/15/99	170	36	76	10	292
KA007089	11/17/99	260	56	130	11	457
KA007089	12/15/99	200	68	120	13	401

Table C-4 (Con't)
Total Trihalomethane Formation Potential Concentrations in the State Water Project

		CONCENTRATION, µg/L				
STATION	DATE	CHLOROFORM	DIBROMO-CHLOROFORM	BROMODI-CHLOROFORM	BROMOFORM	TOTAL TRIHALOMETHANE FORMATION POTENTIAL
KA017226	2/18/98	520	19	96	< 10	645
KA017226	5/19/98	320	17	77	10	424
KA017226	8/19/98	260	29	89	10	388
KA017226	11/18/98	250	10	50	10	320
KA017226	2/17/99	310	17	61	< 10	398
KA017226	5/18/99	190	41	83	16	330
KA017226	8/17/99	220	14	51	10	295
KA017226	11/16/99	200	60	120	12	392
KA017226	12/14/99	210	76	130	13	429
KA024454	1/20/98	400	45	130	< 10	585
KA024454	2/17/98	500	20	100	< 10	630
KA024454	3/17/98	580	24	110	< 10	724
KA024454	5/20/98	440	10	17	10	477
KA024454	6/16/98	430	10	10	10	460
KA024454	7/15/98	320	10	64	10	404
KA024454	8/18/98	340	22	95	10	467
KA024454	10/20/98	300	10	47	10	367
KA024454	11/17/98	290	10	47	10	357
KA024454	12/15/98	280	36	94	10	420
KA024454	1/19/99	250	48	110	10	418
KA024454	2/16/99	220	31	75	< 10	336
KA024454	3/16/99	280	16	54	< 10	360
KA024454	4/20/99	300	32	86	< 10	428
KA024454	5/18/99	230	37	87	16	370
KA024454	6/15/99	190	34	83	10	317
KA024454	7/20/99	200	26	71	10	307
KA024454	8/17/99	240	15	55	10	320
KA024454	9/14/99	200	23	65	10	298
KA024454	11/16/99	200	60	110	12	382
KA024454	12/14/99	220	60	120	12	412
KA030341	1/21/98	400	66	160	< 10	636
KA030341	2/18/98	420	42	130	< 10	602
KA030341	3/18/98	420	52	140	< 10	622
KA030341	4/15/98	440	10	15	10	475
KA030341	5/20/98	390	10	18	10	428
KA030341	6/17/98	410	10	10	10	440
KA030341	7/15/98	400	10	57	10	477
KA030341	8/19/98	270	28	93	10	401
KA030341	9/16/98	300	21	78	10	409
KA030341	10/21/98	280	10	46	10	346
KA030341	11/18/98	260	10	42	10	322
KA030341	12/16/98	240	17	57	10	324
KA030341	1/20/99	260	29	87	10	386
KA030341	2/17/99	230	26	69	< 10	335
KA030341	3/17/99	300	16	54	< 10	380
KA030341	4/21/99	280	28	76	< 10	394
KA030341	5/19/99	200	43	86	16	345
KA030341	6/16/99	180	35	78	10	303
KA030341	7/21/99	190	24	68	10	292
KA030341	8/18/99	240	16	58	10	324
KA030341	9/15/99	180	22	61	10	273
KA030341	11/17/99	190	51	100	11	352
KA030341	12/15/99	250	63	130	12	455
KA040341	2/18/98	280	75	140	< 10	505
KA040341	5/20/98	370	10	15	10	405
KA040341	8/19/98	280	32	98	10	420
KA040341	11/18/98	260	10	43	10	323
KA040341	2/17/99	260	17	55	< 10	342
KA040341	5/19/99	520	39	130	16	705
KA040341	8/18/99	390	15	67	10	482
KA040341	11/17/99	220	50	110	11	391
KA041288	1/21/98	210	40	91	< 10	351
KA041288	2/18/98	270	48	110	< 10	438
KA041288	3/18/98	360	36	110	< 10	516
KA041288	4/15/98	380	20	94	10	504
KA041288	5/20/98	380	10	51	10	451
KA041288	6/17/98	380	10	32	10	432
KA041288	7/15/98	360	10	30	10	410
KA041288	8/19/98	290	10	56	10	366
KA041288	9/16/98	310	25	82	10	427
KA041288	10/21/98	320	20	76	10	426
KA041288	11/18/98	260	14	60	10	344
KA041288	12/16/98	270	22	68	10	370
KA041288	1/20/99	280	15	62	10	367
KA041288	2/17/99	220	23	60	< 10	313
KA041288	3/17/99	260	21	62	< 10	353
KA041288	4/21/99	270	20	59	< 10	359
KA041288	5/19/99	380	25	82	< 10	497
KA041288	6/16/99	230	28	82	10	350
KA041288	7/21/99	240	30	84	10	364
KA041288	8/18/99	240	25	71	10	346
KA041288	8/18/99	240	25	71	10	346
KA041288	9/15/99	210	20	61	10	301
KA041288	11/17/99	220	43	100	10	373
KA041288	12/15/99	210	49	100	10	369
KAO24102	5/19/98	370	10	14	10	404
KAO24102	6/16/98	360	10	10	10	390

Table C-4 (Con't)
Total Trihalomethane Formation Potential Concentrations in the State Water Project

		CONCENTRATION, µg/L				
STATION	DATE	CHLOROFORM	DIBROMO-CHLOROFORM	BROMODI-CHLOROFORM	BROMOFORM	TOTAL TRIHALOMETHANE FORMATION POTENTIAL
KB001638	1/21/98	440	33	120	< 10	603
KB001638	5/20/98	400	21	94	10	525
KB001638	6/17/98	330	10	42	10	392
KB001638	7/15/98	360	10	32	10	412
KB001638	8/19/98	340	10	47	10	407
KB001638	9/16/98	300	10	48	10	368
KB001638	10/21/98	370	10	46	10	436
KB001638	11/18/98	350	10	57	10	427
KB001638	12/16/98	320	36	98	10	464
KB001638	1/20/99	630	25	120	< 10	785
KB001638	2/17/99	440	18	71	< 10	539
KB001638	3/17/99	340	17	63	< 10	430
KB001638	4/21/99	360	22	72	< 10	464
KB001638	5/19/99	240	22	61	< 10	333
KB001638	6/16/99	340	17	79	10	446
KB001638	7/21/99	400	10	49	10	469
KB001638	8/18/99	290	10	46	10	356
KB001638	9/15/99	230	45	110	10	395
KB001638	11/17/99	210	65	120	12	407
KB001638	12/15/99	200	120	170	24	514
KC000934	1/20/98	380	42	130	< 10	562
KC000934	2/17/98	480	10	71	< 10	571
KC000934	3/17/98	550	38	140	< 10	738
KC000934	5/20/98	480	13	87	10	590
KC000934	6/16/98	330	10	64	10	414
KC000934	7/15/98	350	10	76	10	446
KC000934	8/18/98	330	21	94	10	455
KC000934	11/17/98	260	10	53	10	333
KC000934	12/15/98	270	33	86	10	399
KC000934	1/19/99	280	30	90	10	410
KC000934	2/16/99	440	28	97	< 10	575
KC000934	3/16/99	280	18	58	< 10	366
KC000934	4/20/99	330	28	82	< 10	450
KC000934	5/18/99	210	42	88	16	356
KC000934	6/15/99	190	39	88	10	327
KC000934	7/20/99	220	26	75	10	331
KC000934	8/17/99	220	16	54	10	300
KC000934	9/14/99	200	24	67	10	301
KC000934	11/8/99	210	56	110	11	387
KC000934	12/14/99	240	62	120	11	433
KG000000	1/21/98	1500	10	29	< 10	1549
KG000000	1/29/98	1500	20	43	< 20	1583
KG000000	2/2/98	980	10	17	10	1017
KG000000	2/18/98	830	10	27	< 10	877
KG000000	3/18/98	960	10	82	< 10	1062
KG000000	4/15/98	870	< 10	81	< 10	971
KG000000	5/20/98	520	10	55	10	595
KG000000	6/17/98	610	< 10	68	< 10	698
KG000000	7/15/98	750	10	69	10	839
KG000000	8/19/98	490	10	40	10	550
KG000000	9/16/98	460	< 10	38	< 10	518
KG000000	10/21/98	460	10	37	10	517
KG000000	11/18/98	380	10	35	10	435
KG000000	12/16/98	440	10	50	10	510
KG000000	1/20/99	430	< 10	46	< 10	496
KG000000	2/17/99	1600	< 20	49	< 20	1689
KG000000	3/17/99	1000	13	65	< 13	1091
KG000000	4/21/99	900	24	76	< 20	1020
KG000000	5/19/99	510	21	62	< 20	613
KG000000	6/16/99	410	20	43	20	493
KG000000	7/21/99	320	10	28	10	368
KG000000	8/18/99	320	10	26	10	366
KG000000	9/15/99	300	10	26	10	346
KG000000	11/17/99	510	10	36	10	566
KG000000	12/15/99	200	120	170	24	514
SL005000	6/16/98	260	48	110	10	428

Appendix D

Explanation of a Trilinear Plot

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Explanation of a Trilinear Plot

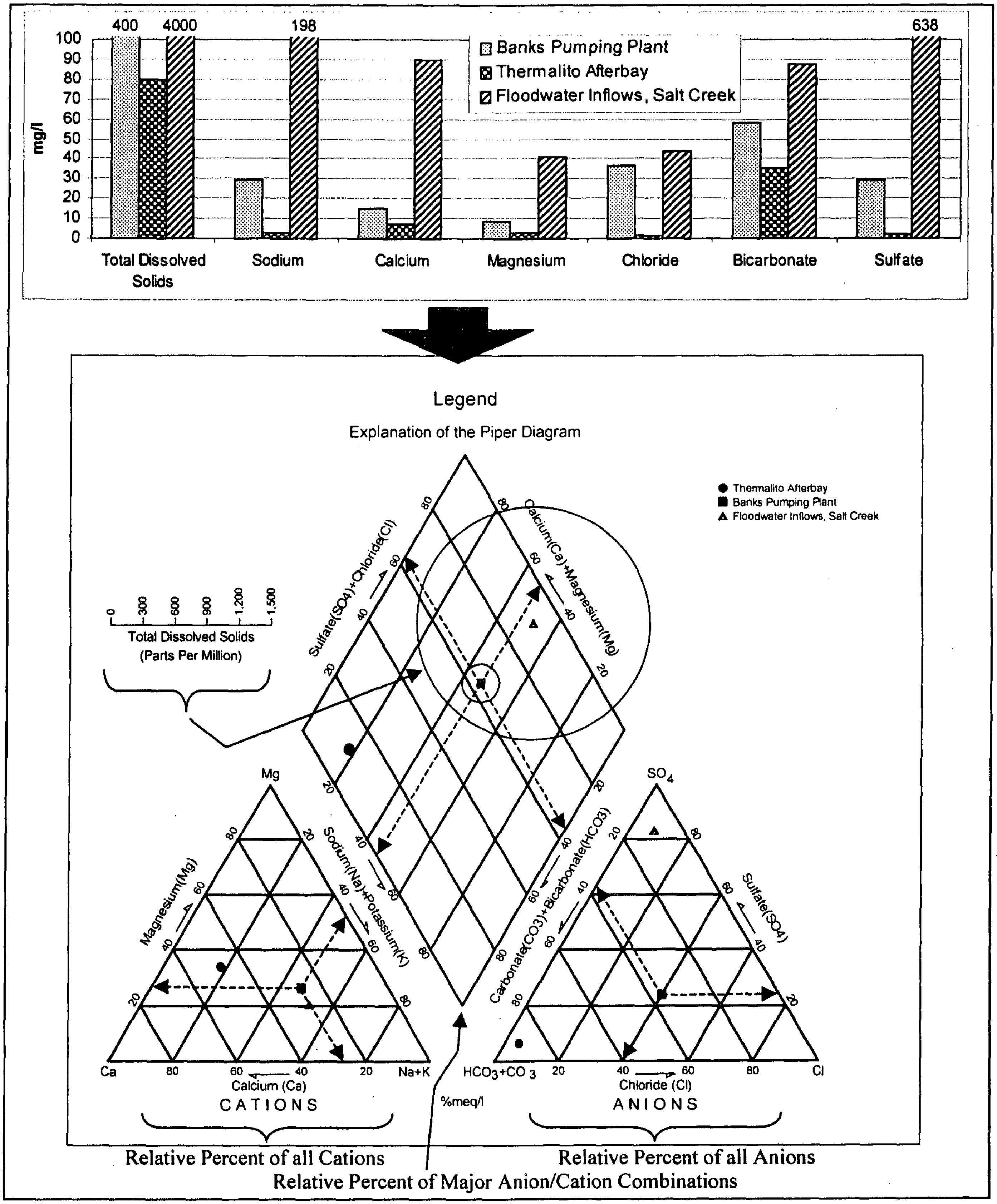
Trilinear graphs are useful for comparing the characteristics of different water bodies. Streams and groundwater usually exhibit a unique composition of major minerals such as sulfate, chloride, and bicarbonate. A histogram of six major minerals and TDS is converted to three points on a trilinear graph (Figure D-1). The central diamond plot accounts for all cation/anion combinations together. The circle surrounding each icon is TDS (calculated) on a scale provided in the mid-upper left. The larger the circle surrounding each icon, the greater the TDS. The two equilateral triangles present anions and cations separately and show them each as percentages of the total ionic equivalent concentration.

Figure D-1 shows the average mineralogical characteristics of three different water bodies—Salt Creek from the San Luis Canal, Delta water at Banks Pumping Plant, and Feather River water at Thermalito Afterbay. The arrows show which direction the scales should be read. In the central diamond, for example, the anionic composition at Banks Pumping Plant is 36 percent bicarbonate (very little carbonate exists at pH levels observed in the Project) and 64 percent sulfate+chloride. Conversely the anionic composition of water at Thermalito Afterbay is 90 percent bicarbonate and only 10 percent sulfate+chloride. The exact reverse is true for Salt Creek.

The individual anionic components are shown in the lower right triangle. This diagram separates out chloride and sulfate and compares them with bicarbonate. At Banks Pumping Plant, chloride composes 40 percent of the anionic composition, followed by bicarbonate at 36 percent and sulfate at 24 percent. This compares with Thermalito Afterbay, where bicarbonate composes almost 90 percent of the anionic composition and Salt Creek, in which sulfate is the dominant anion with over 80 percent. The cationic composition as shown in the lower left triangle was not as dramatic, with the exception of Thermalito Afterbay. The Afterbay is dominated by calcium as opposed to the other two water bodies, which had similar proportions of sodium+potassium and calcium.

A trilinear plot (also known as a Piper graph) can be used to determine the influence of one water body on another. If two icons, A and B, represent two water bodies, then the icon of the mixture will be positioned between A and B. This assumes that there was no chemical interactions upon mixing that might result in the precipitation of any salts. If equal amounts of water from two different water bodies are mixed, the icon of the resulting mixture would be positioned in a straight line between the two source icons in all three diagrams.

Figure D-1
Explanation of a Trilinear Graph



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