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

Gray Davis
Governor
State of California

Mary D. Nichols
Secretary for Resources
The Resources Agency

Thomas M. Hannigan
Director
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I. Executive Summary

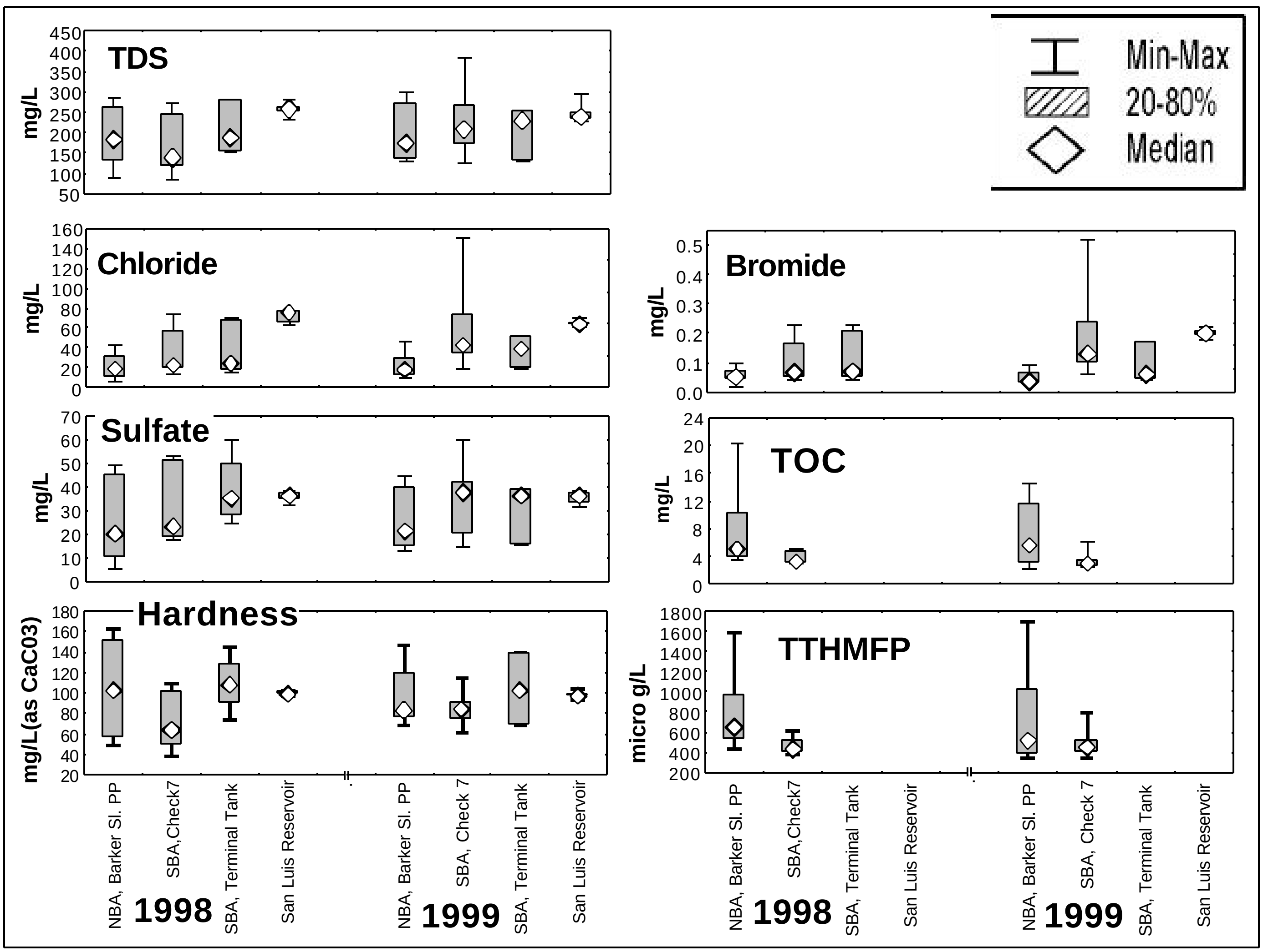
This report describes water quality in the State Water Project during 1998 and 1999. The Executive Summary covers important drinking water parameters such as salinity and trihalomethane precursors. The rest of the report assesses all parameters including metals and pesticides.

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

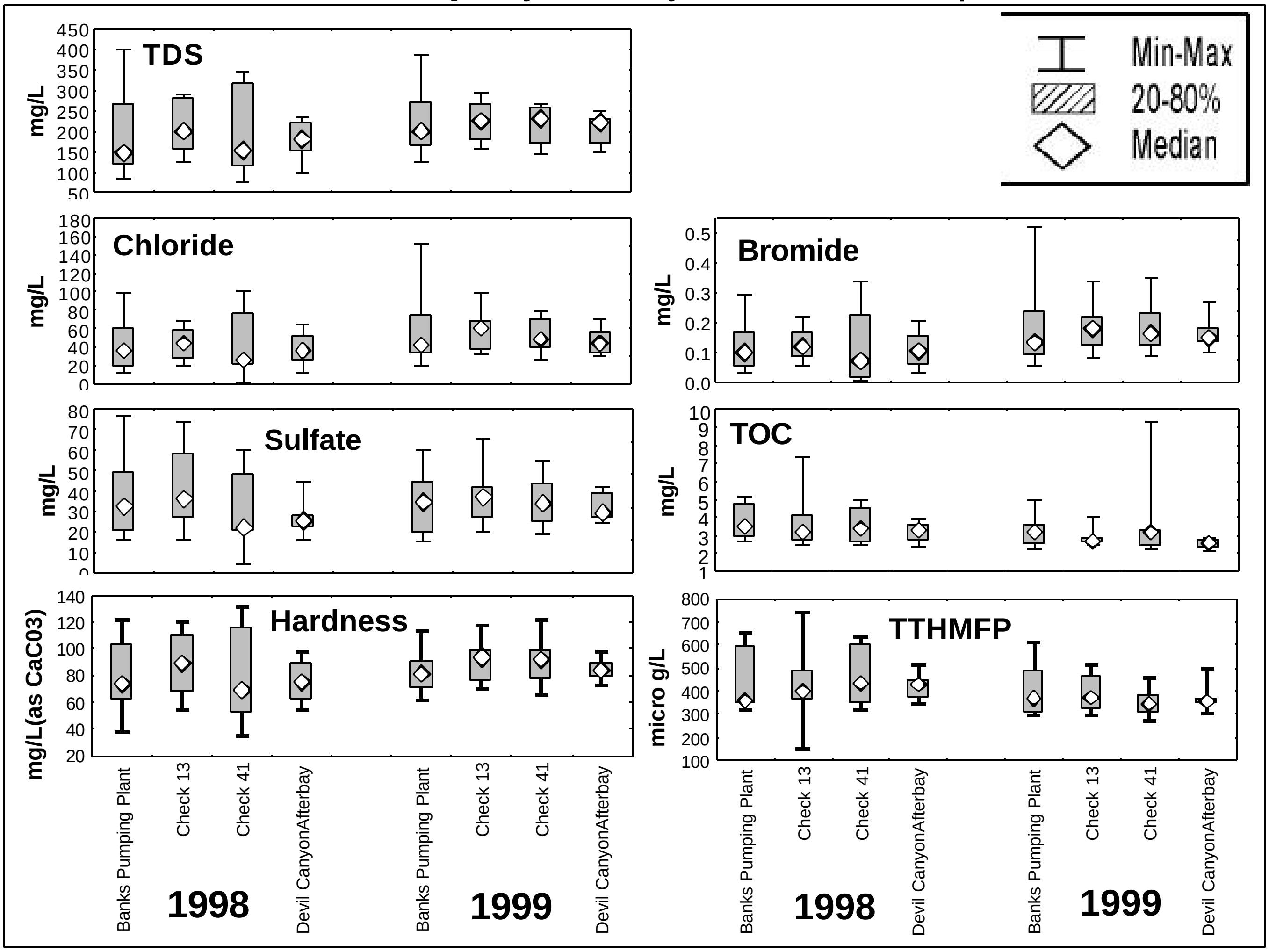
In San Luis Reservoir, turbidity remained below 5 NTU and TDS ranged between 226 and 295 mg/L during the 2-year period (Figure 1-1). In 1998, chloride declined from 76 mg/L in August to 65 mg/L in October. The decline was a result of reservoir filling with low-salinity water from the south Delta. Chloride (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

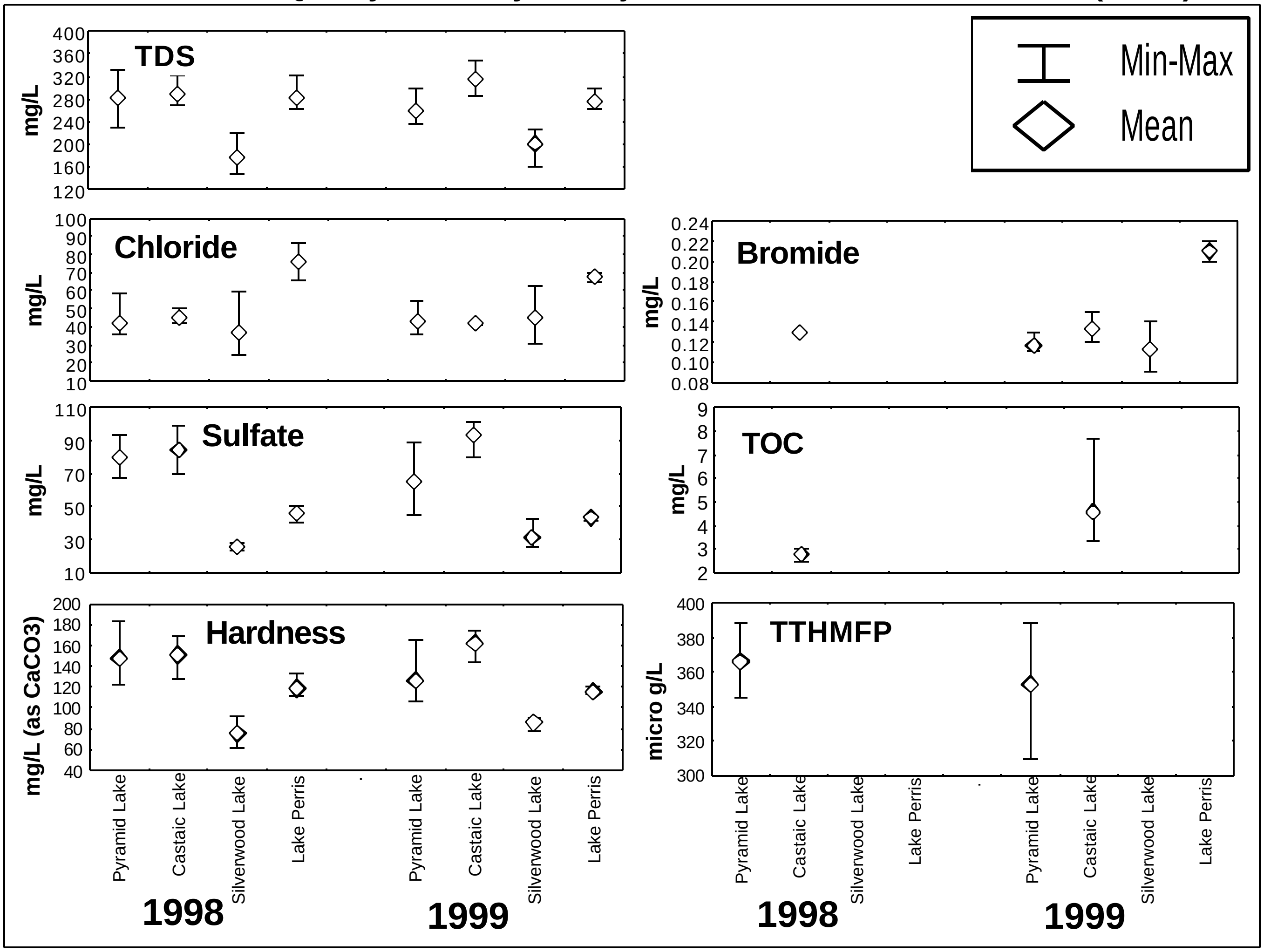


Project Lakes in Southern California

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
uS/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

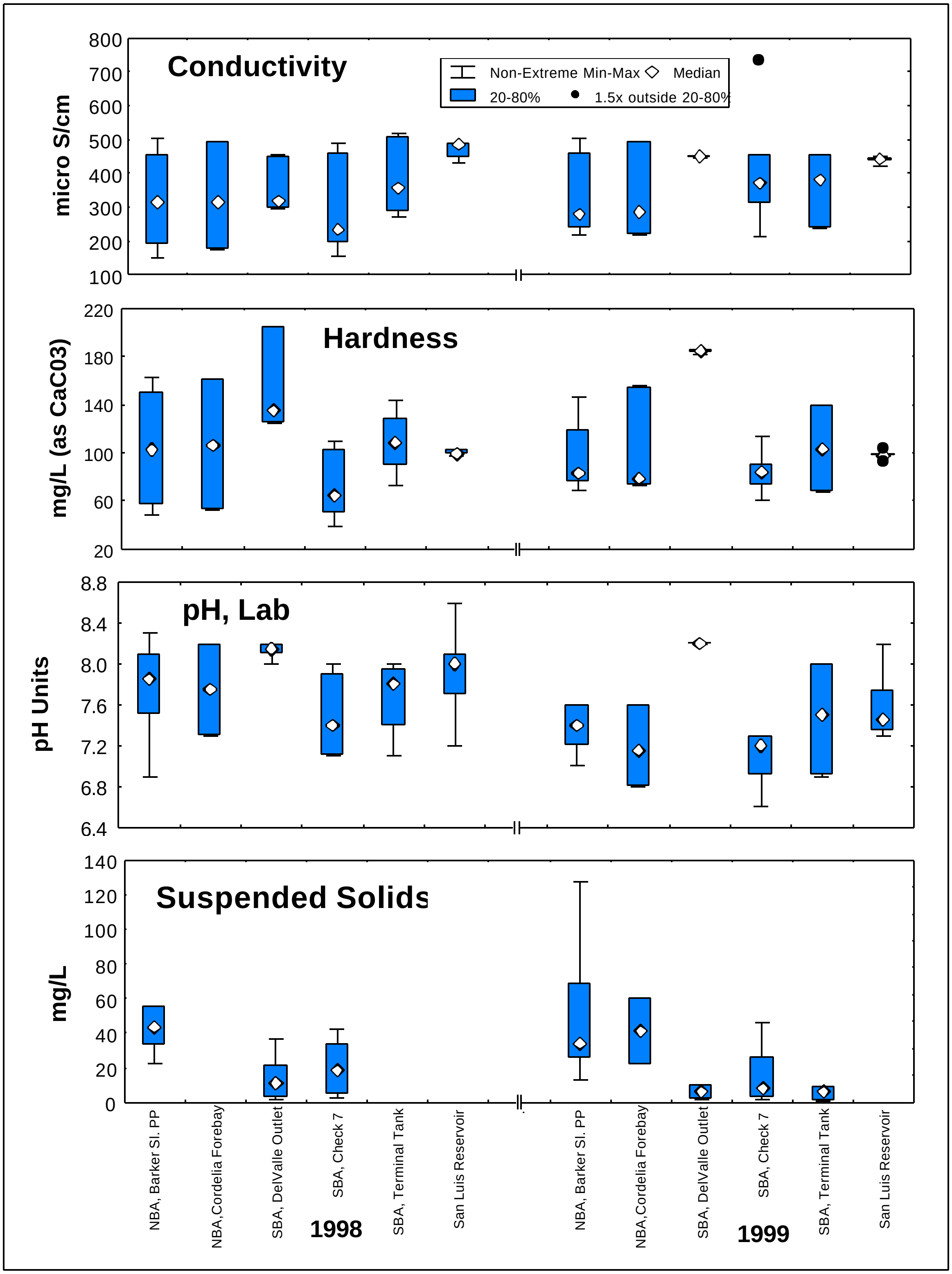


Figure 3-1 (Con't)
Conventional Parameters in the North and South Bay Aqueducts and San Luis Reservoir, 1998-99

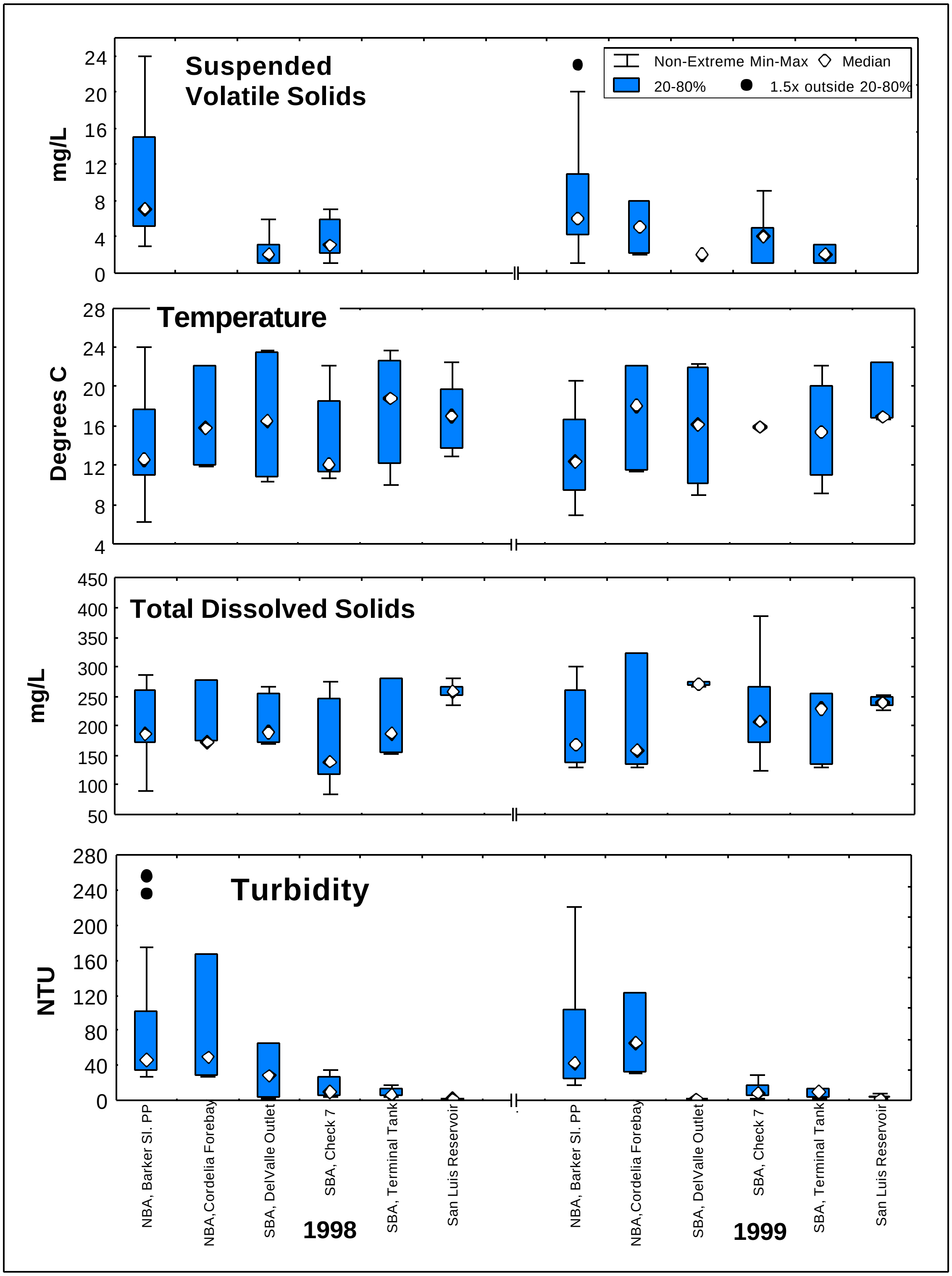


Figure 3-2
Major Minerals in the North and South Bay Aqueducts and San Luis Reservoir, 1998-99

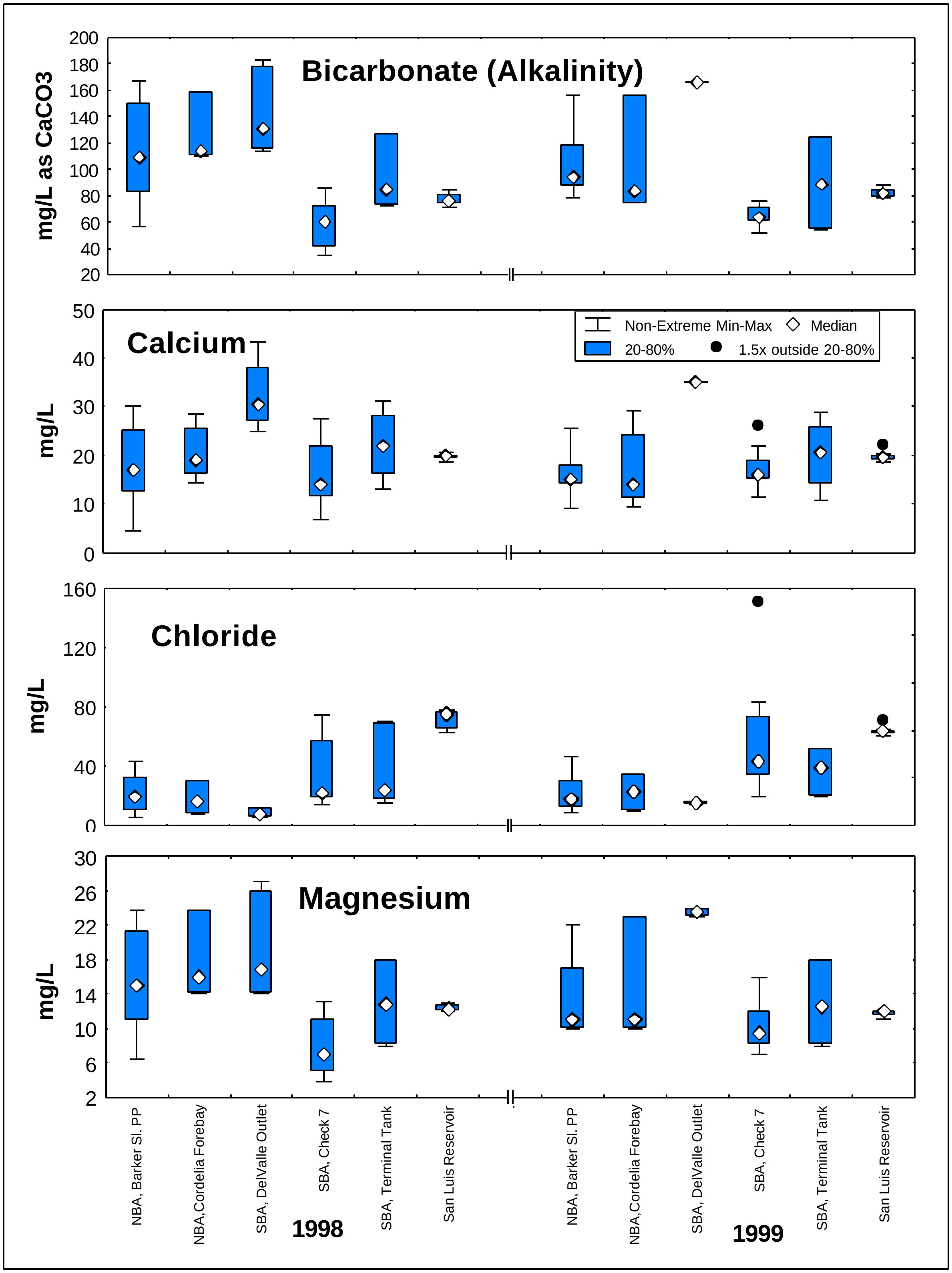
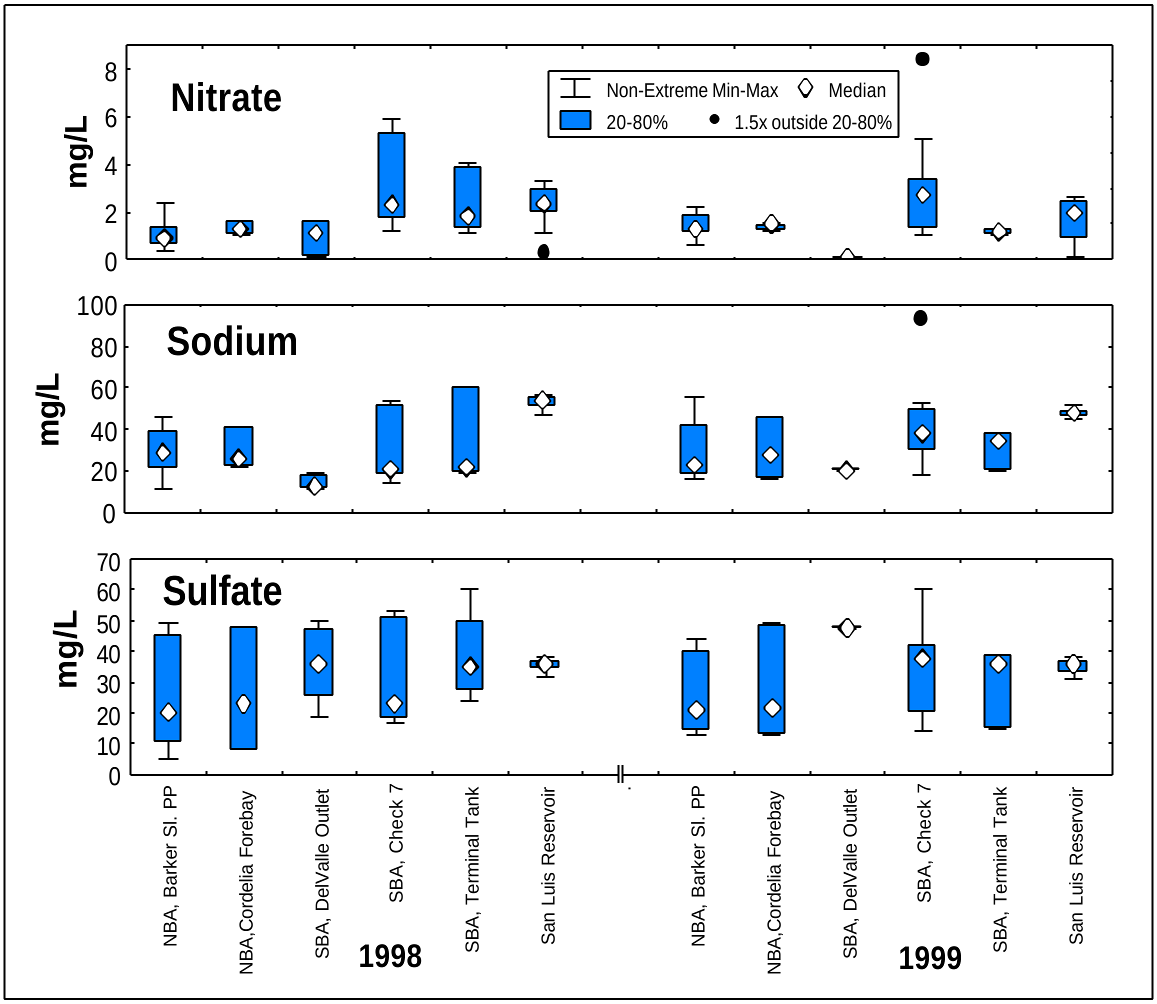


Figure 3-2 (Con't)
Major Minerals in the North and South Bay Aqueducts and San Luis Reservoir, 1998-99



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

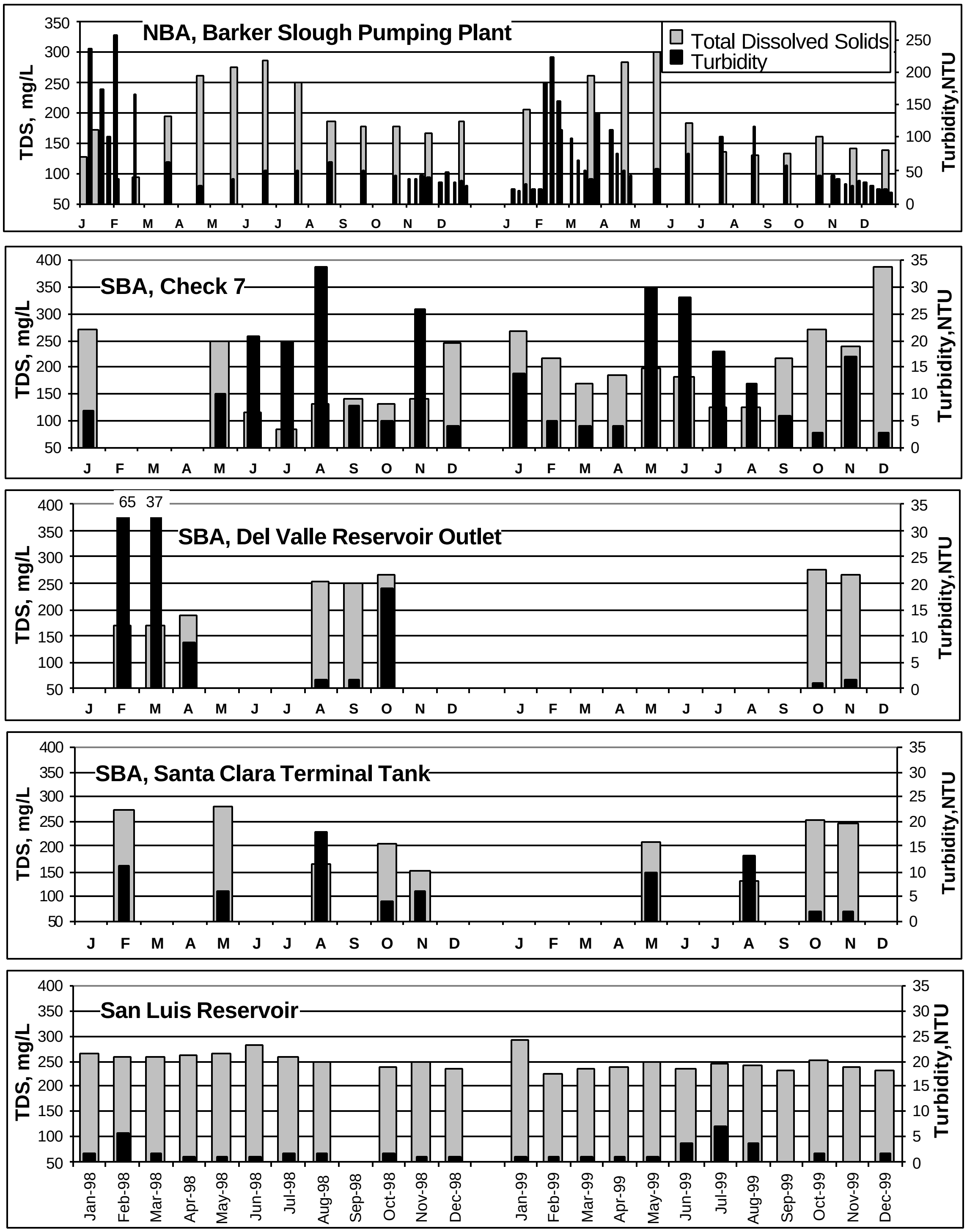
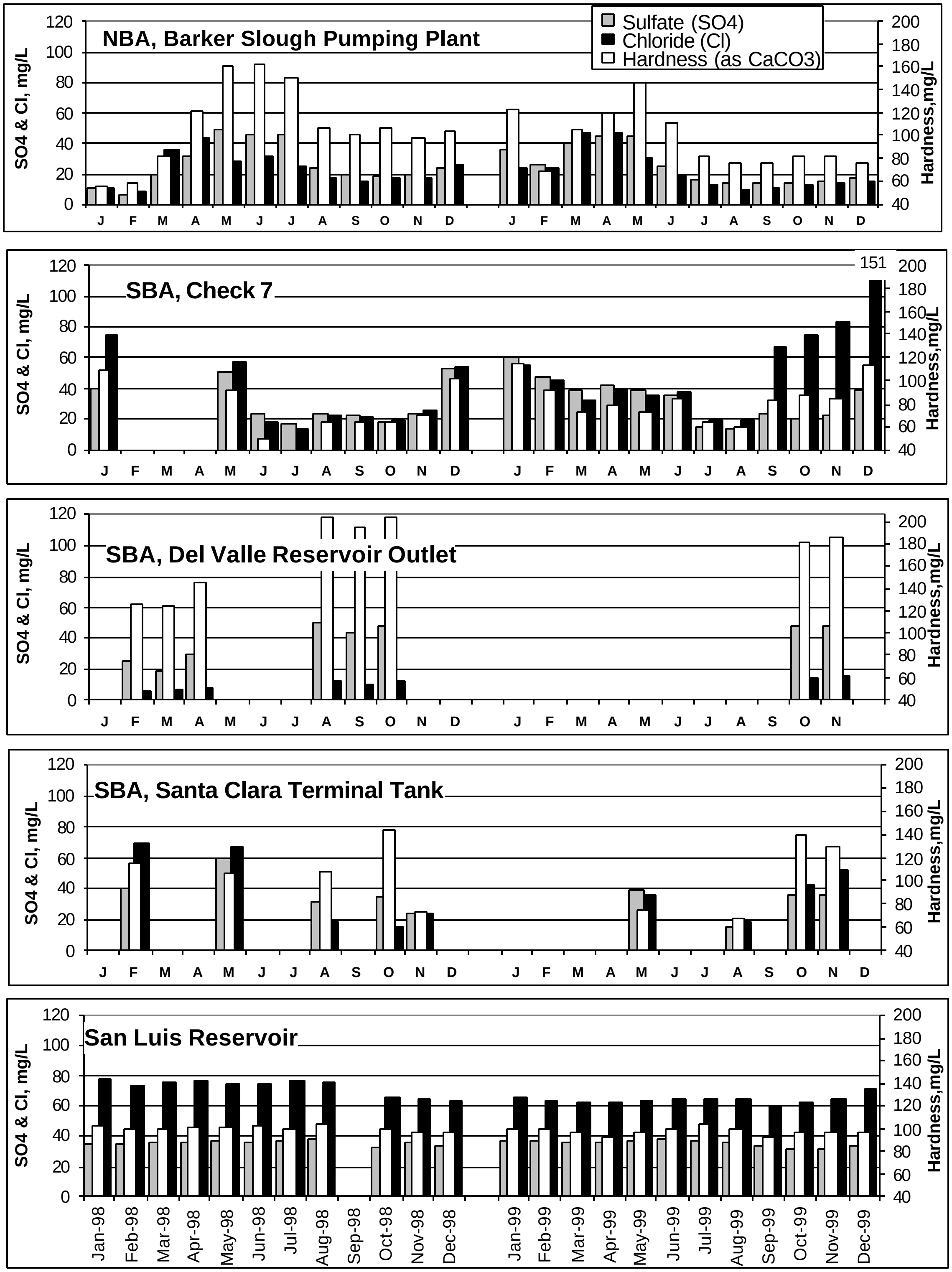


Figure 3-4
Monthly Sulfate, Chloride, and Hardness in the North and South Bay Aqueducts and San Luis Reservoir



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

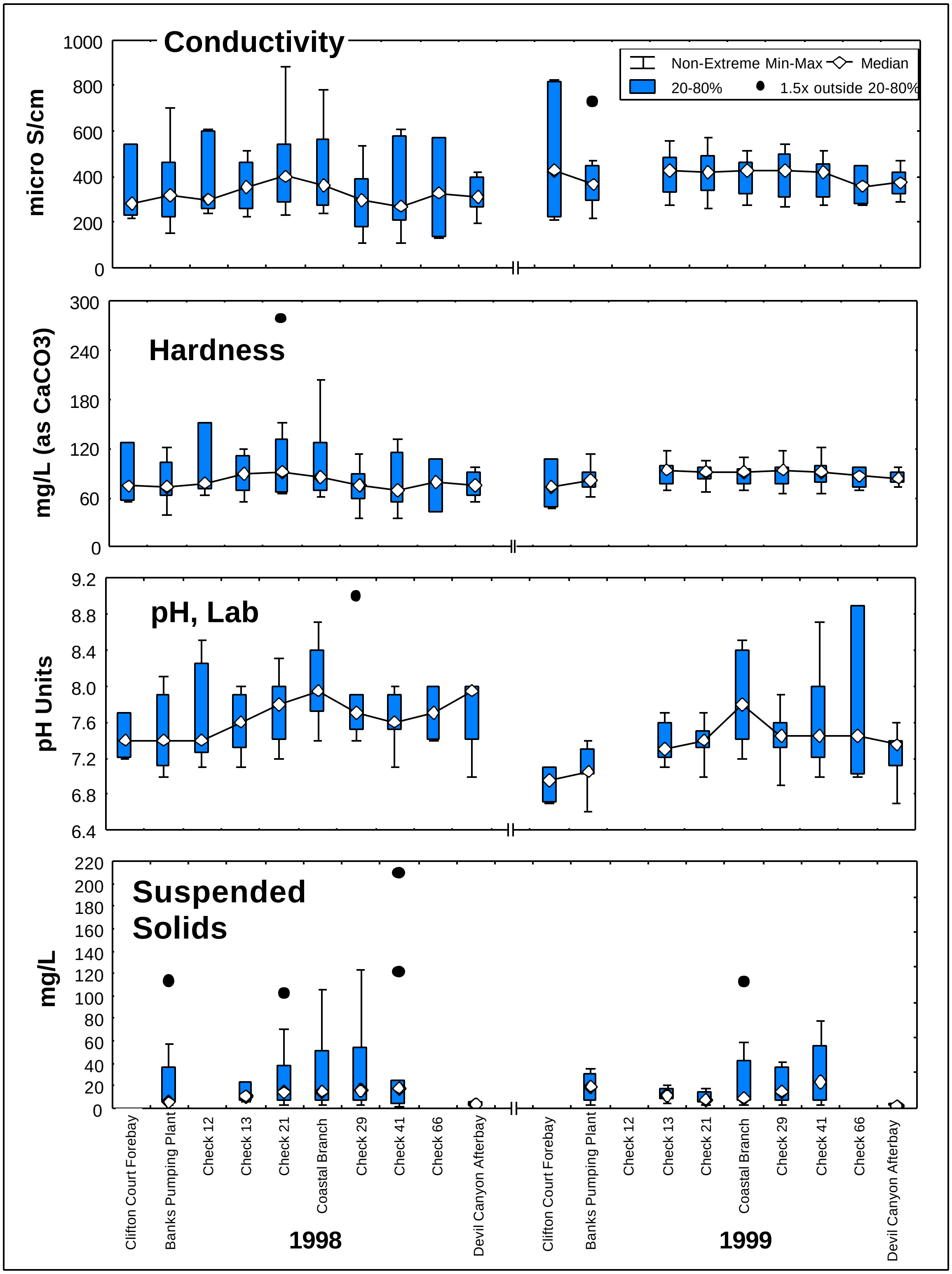


Figure 3-5 (Con't)
Conventional Parameters in the California Aqueduct and Coastal Branch, 1998-99

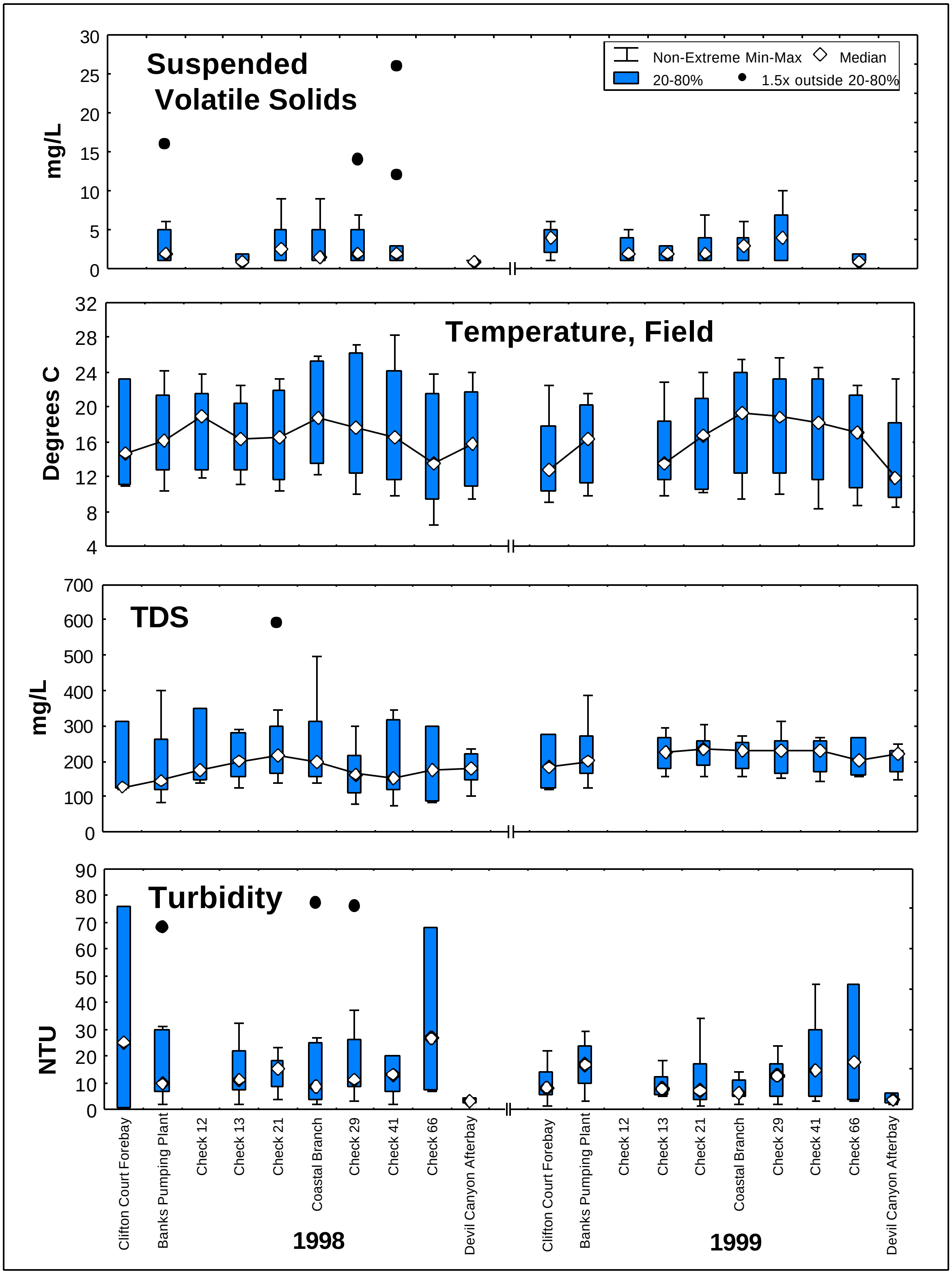


Figure 3-6
Major Minerals in the California Aqueduct and Coastal Branch, 1998-99

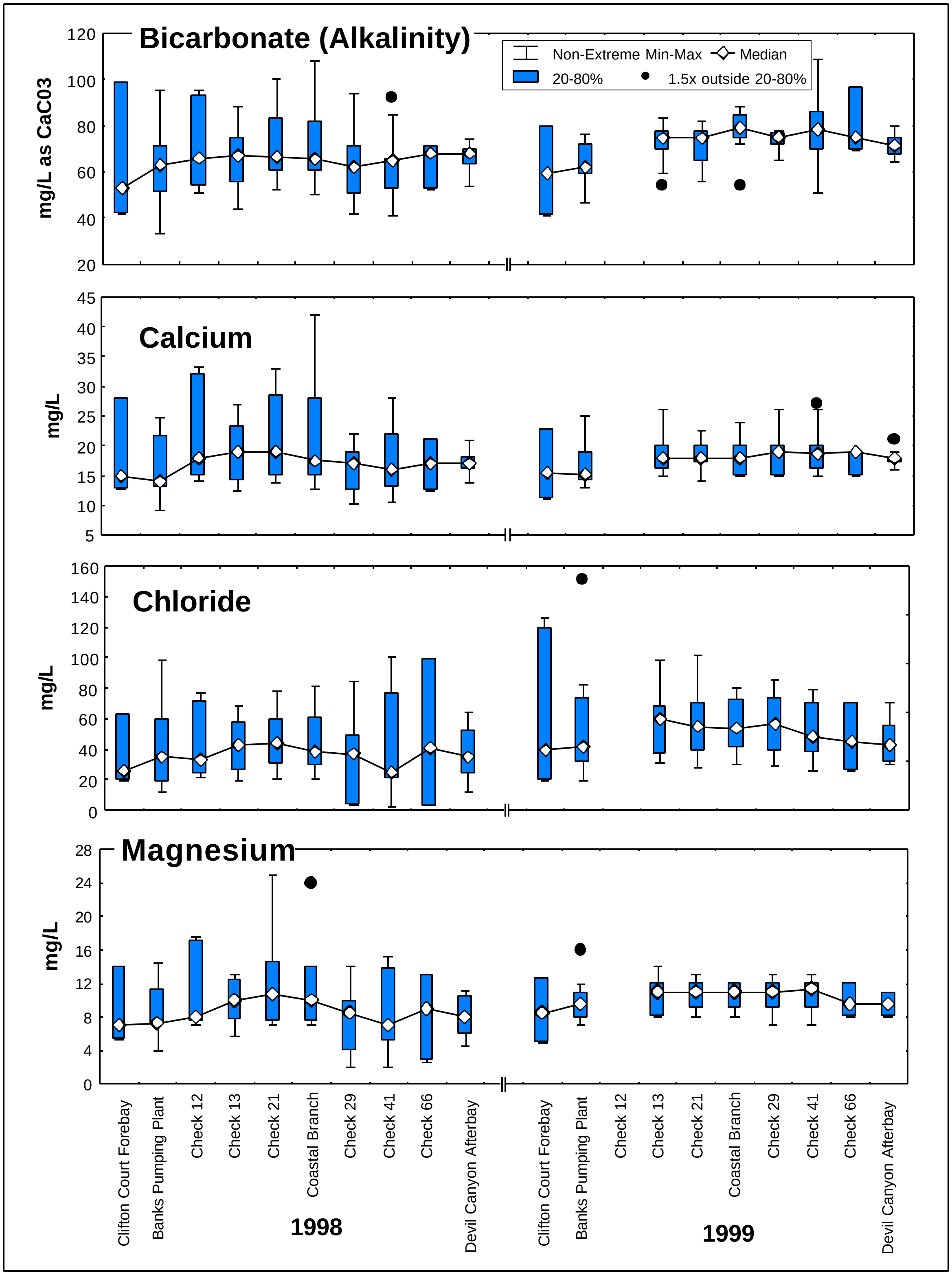


Figure 3-6 (Con't)
Major Minerals in the California Aqueduct and Coastal Branch, 1998-99

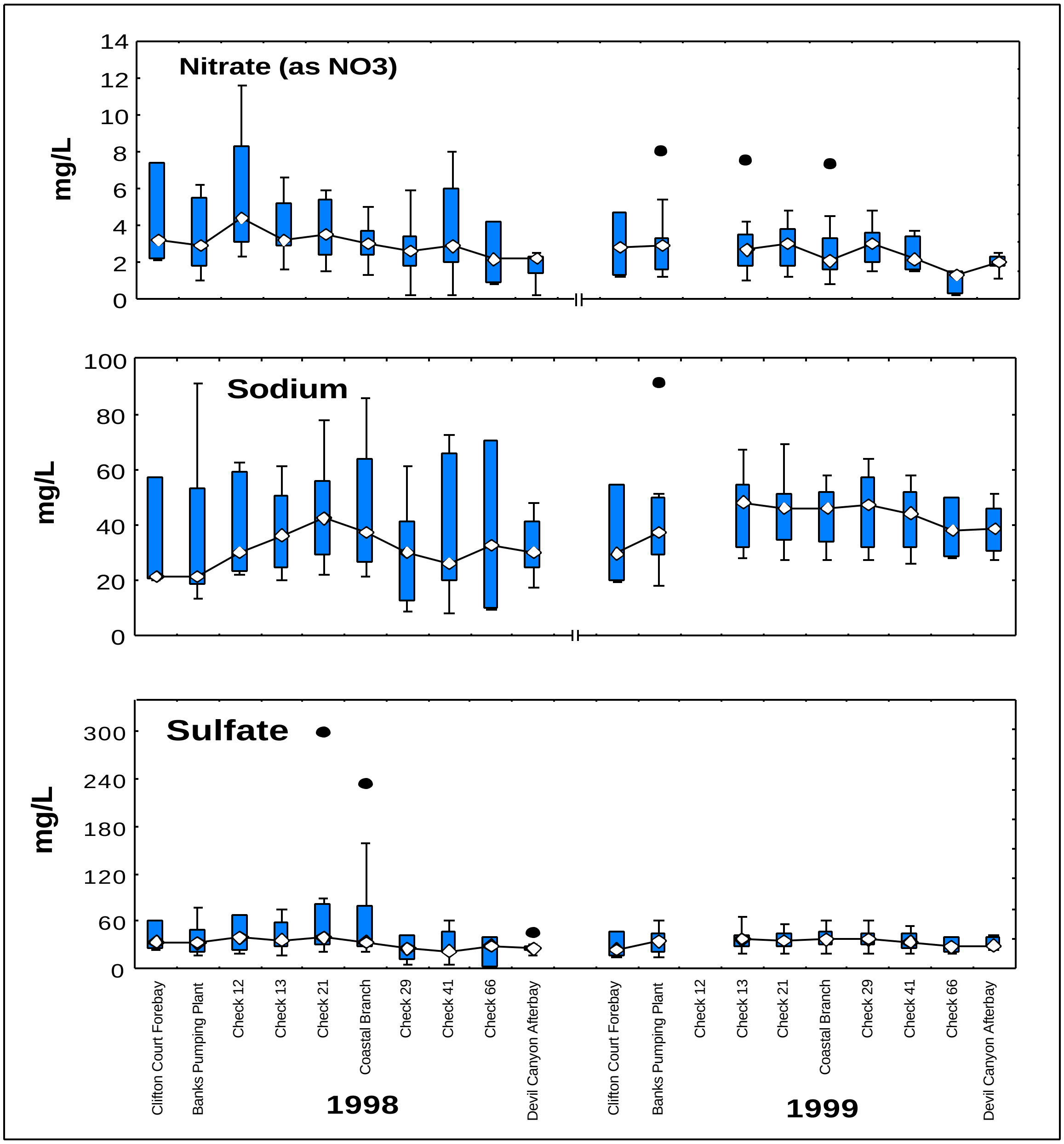


Figure 3-7
Monthly TDS and Turbidity in the California Aqueduct

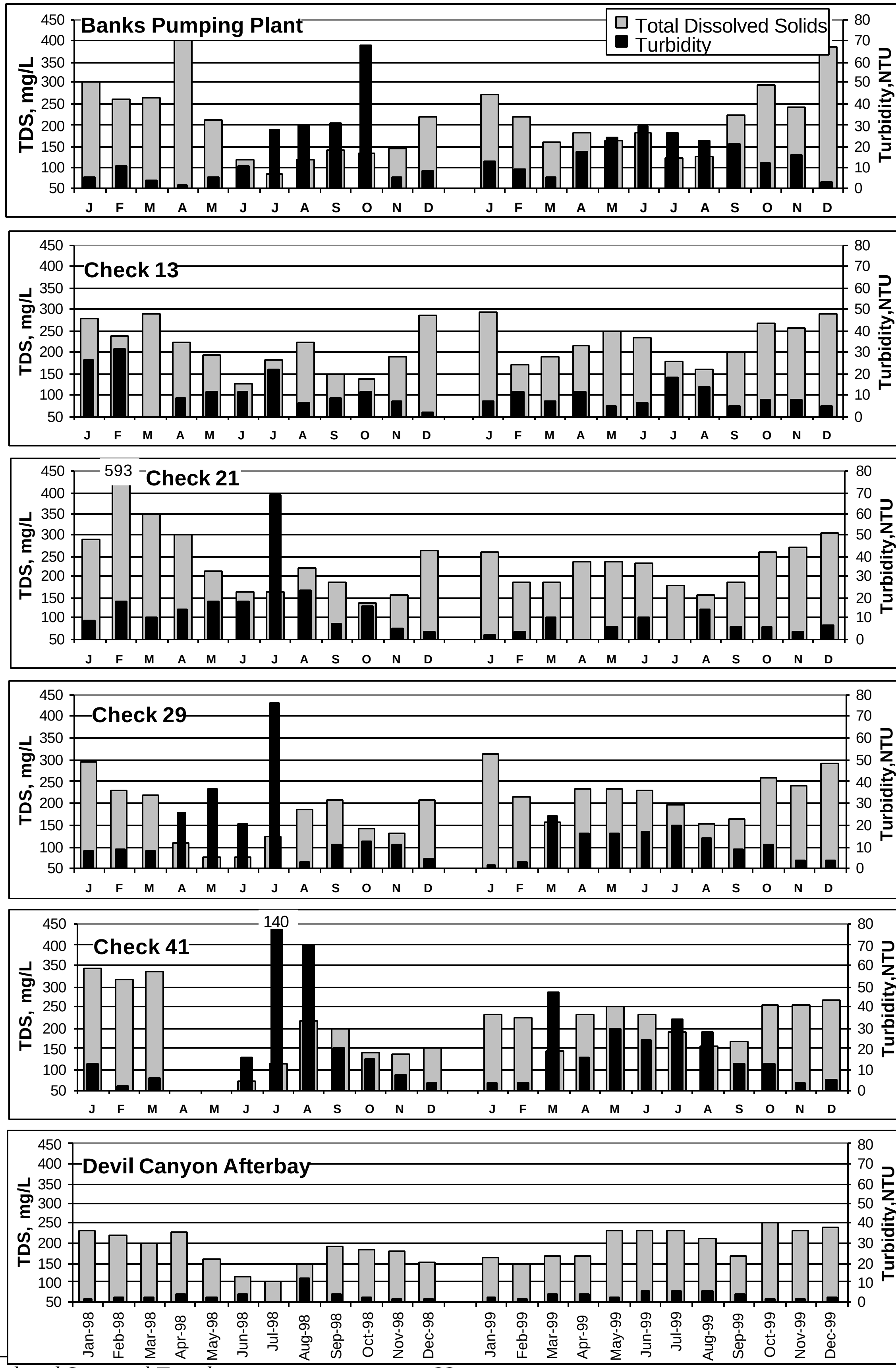
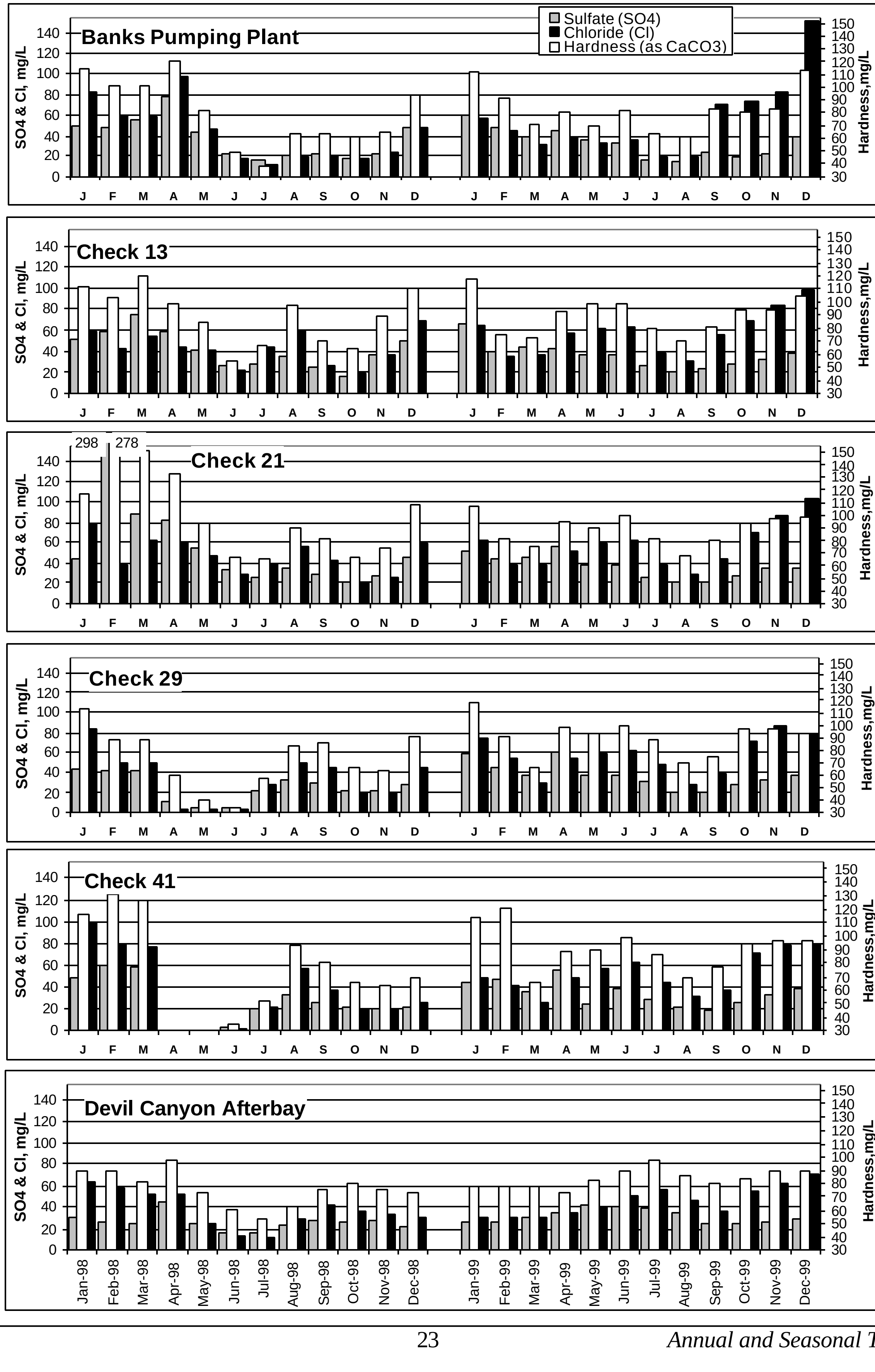


Figure 3-8
Monthly Sulfate, Chloride, and Hardness in the California Aqueduct



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)

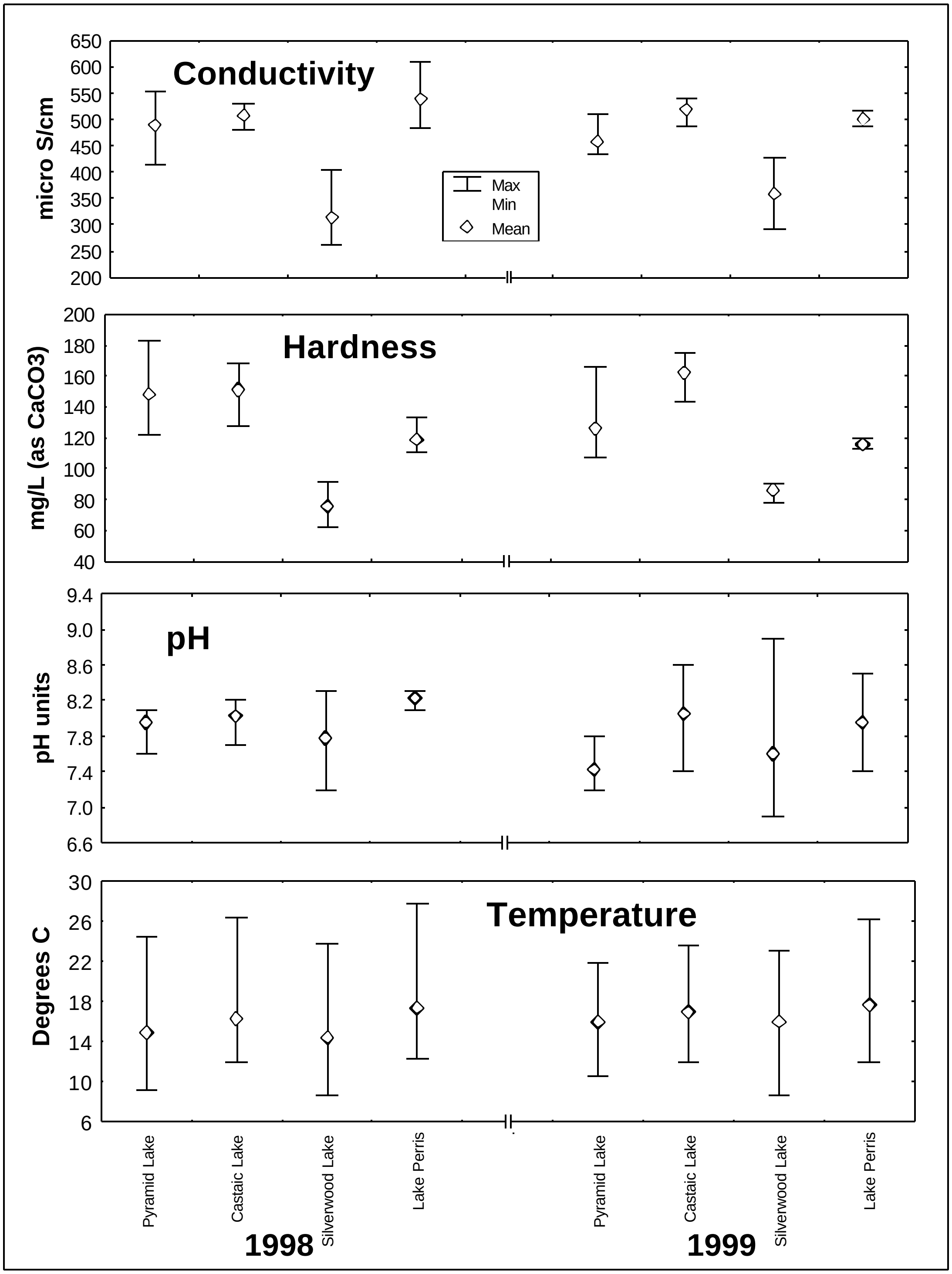


Figure 3-9 (Con't)
Conventional Parameters at Project Lakes in Southern California, 1998-99 (n=1-4)

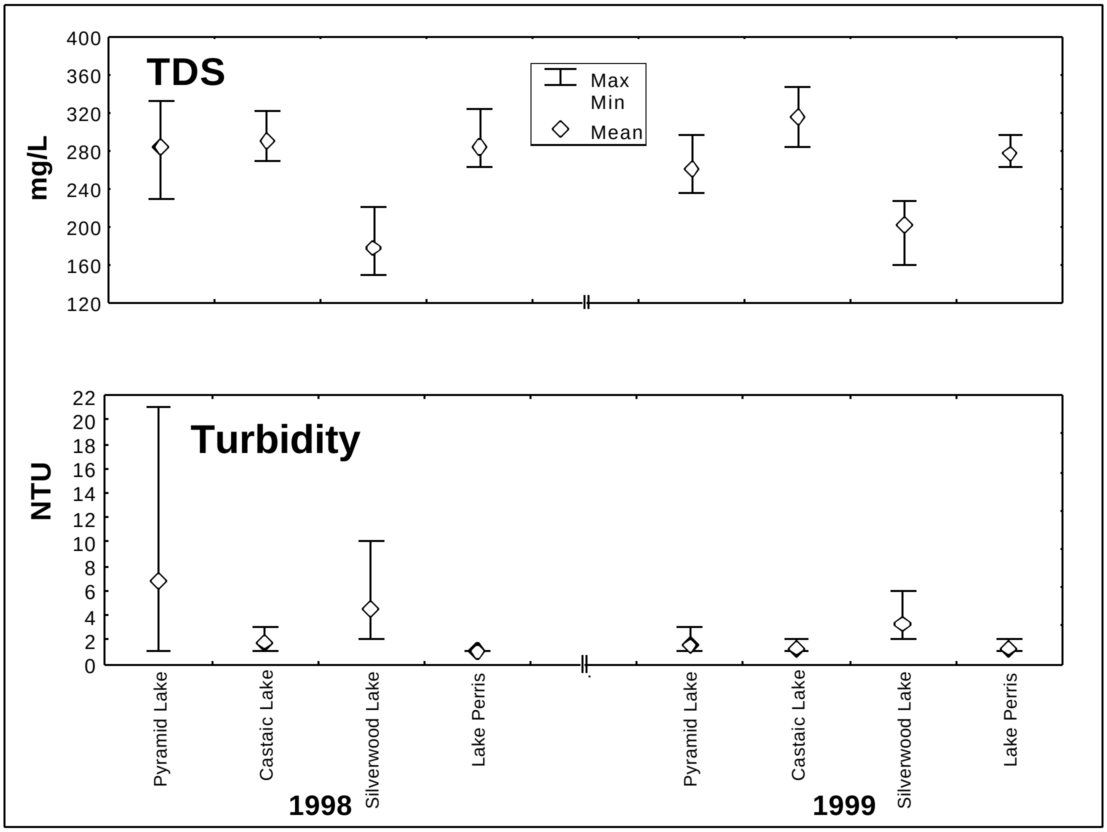


Figure 3-10
Major Minerals at Project Lakes in Southern California, 1998-99 (n=1-4)

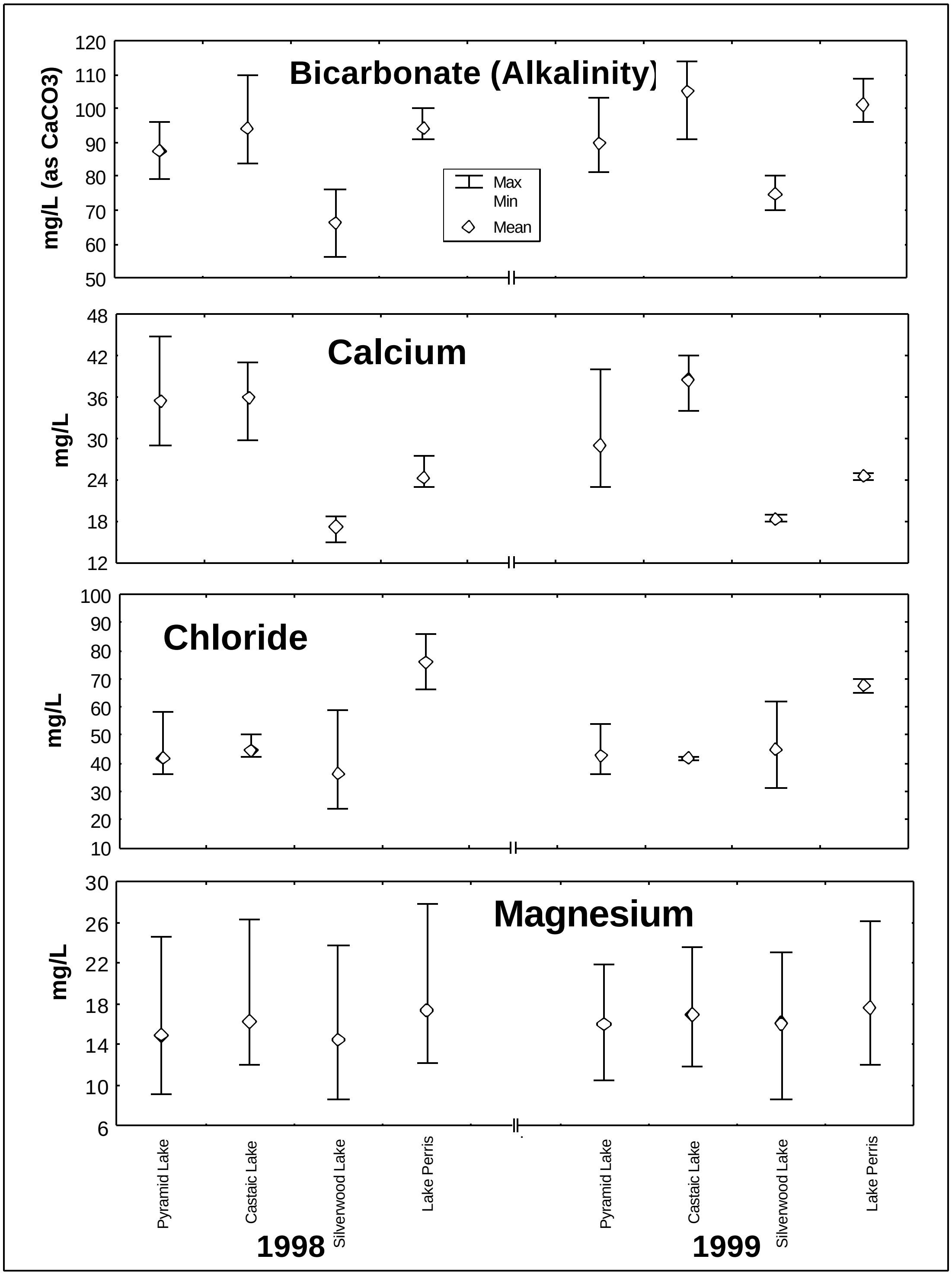


Figure 3-10 (Con't)
Major Minerals at Project Lakes in Southern California, 1998-99 (n=1-4)

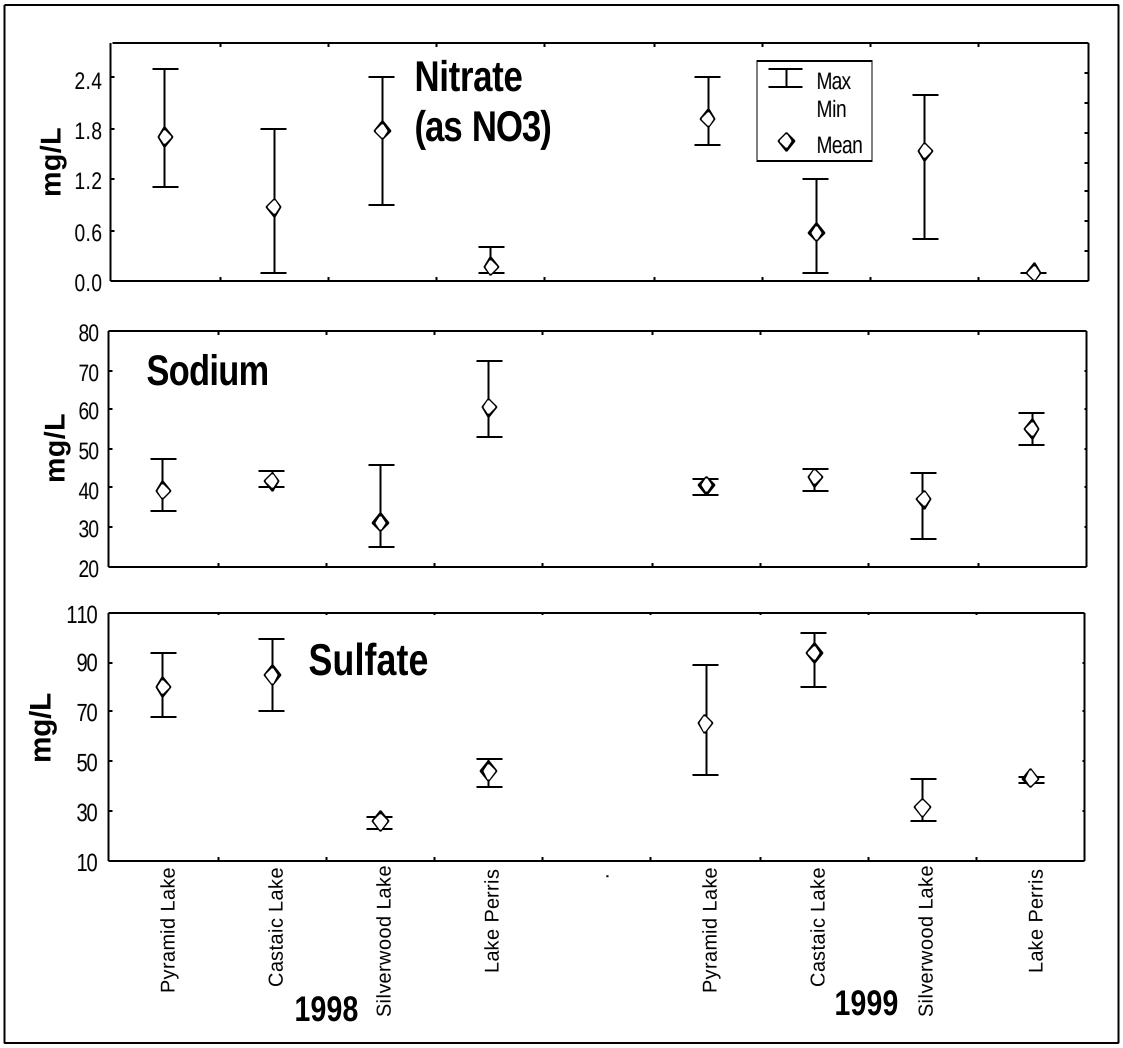


Figure 3-11
Quarterly Sulfate, Chloride, and Hardness at Project Lakes in Southern California

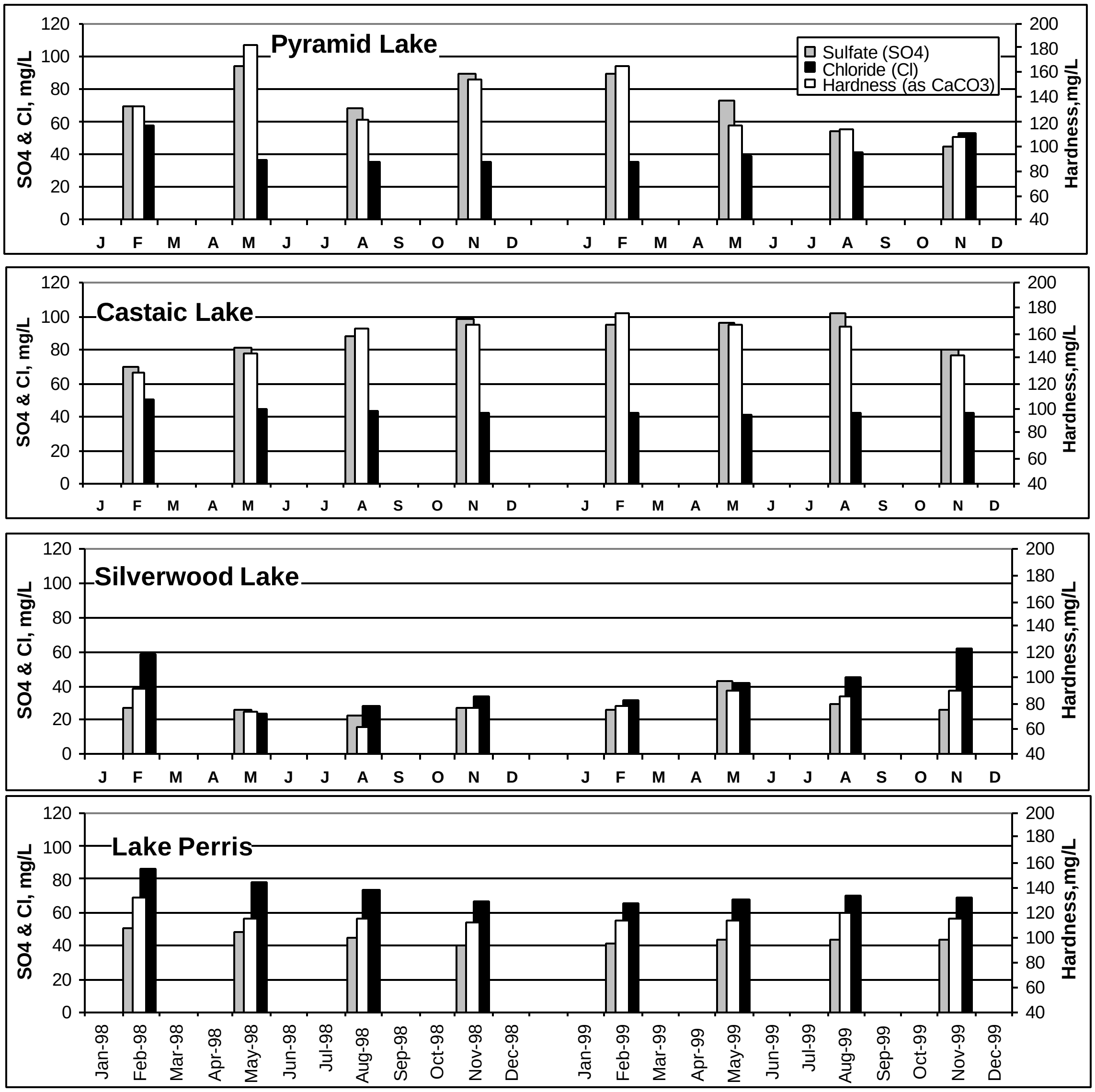
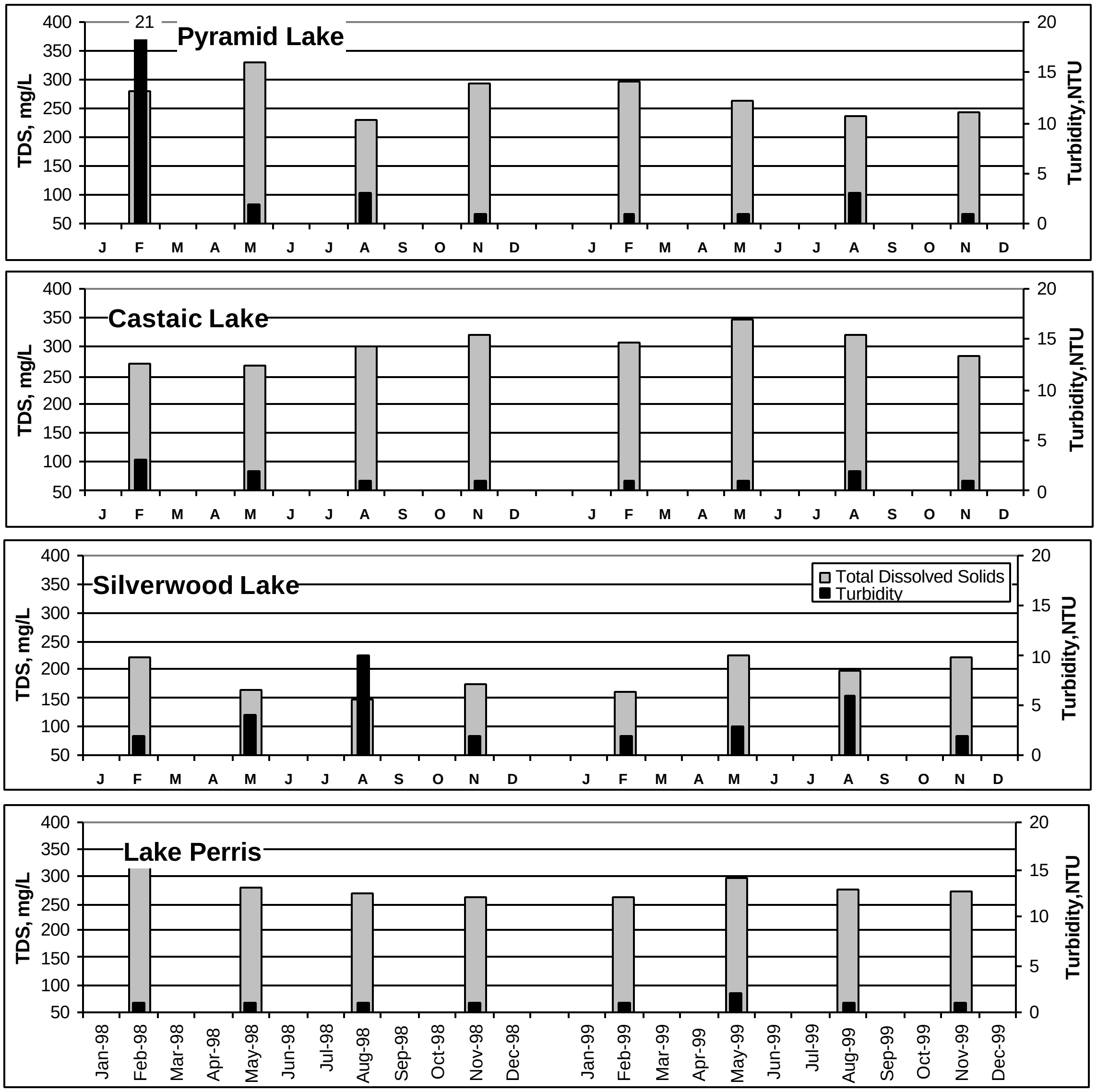


Figure 3-12
Quarterly TDS and Turbidity at Project Lakes in Southern California



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)

			1998				1999			
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	0.004	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

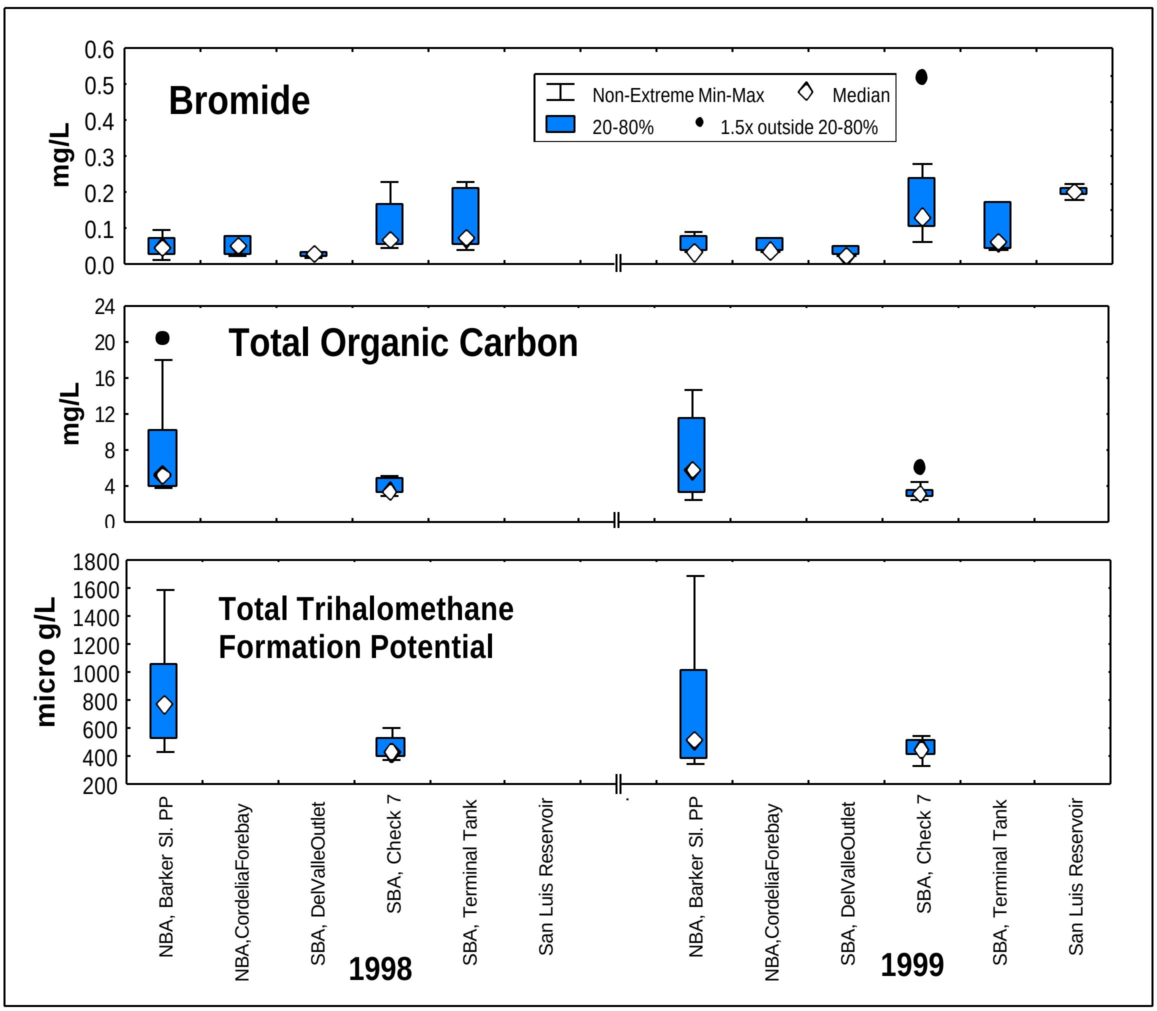
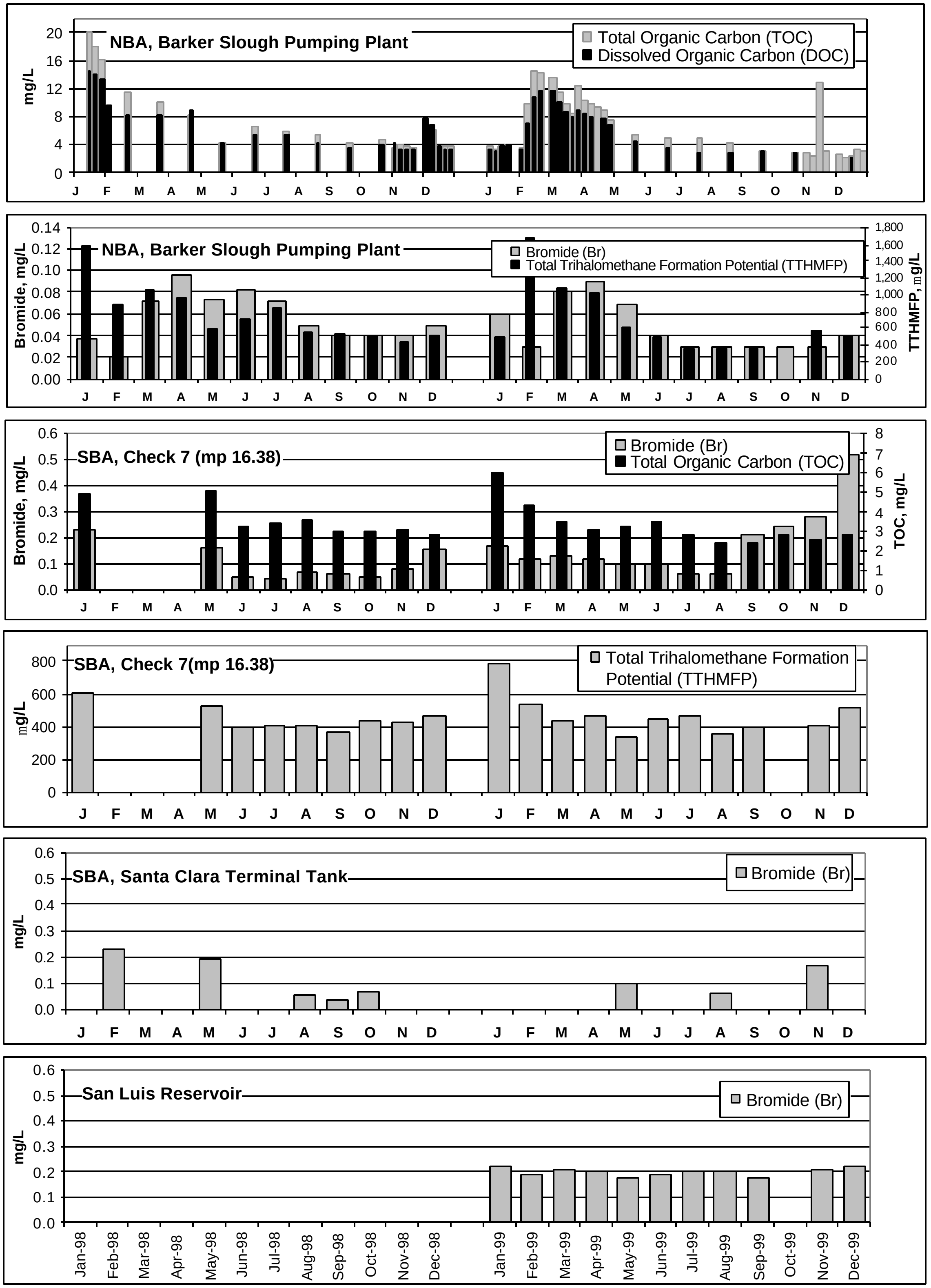


Figure 3-14
Monthly TOC and TTHMFP in the North and South Bay Aqueducts and San Luis Reservoir



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 15^{th} to the 27^{th} 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

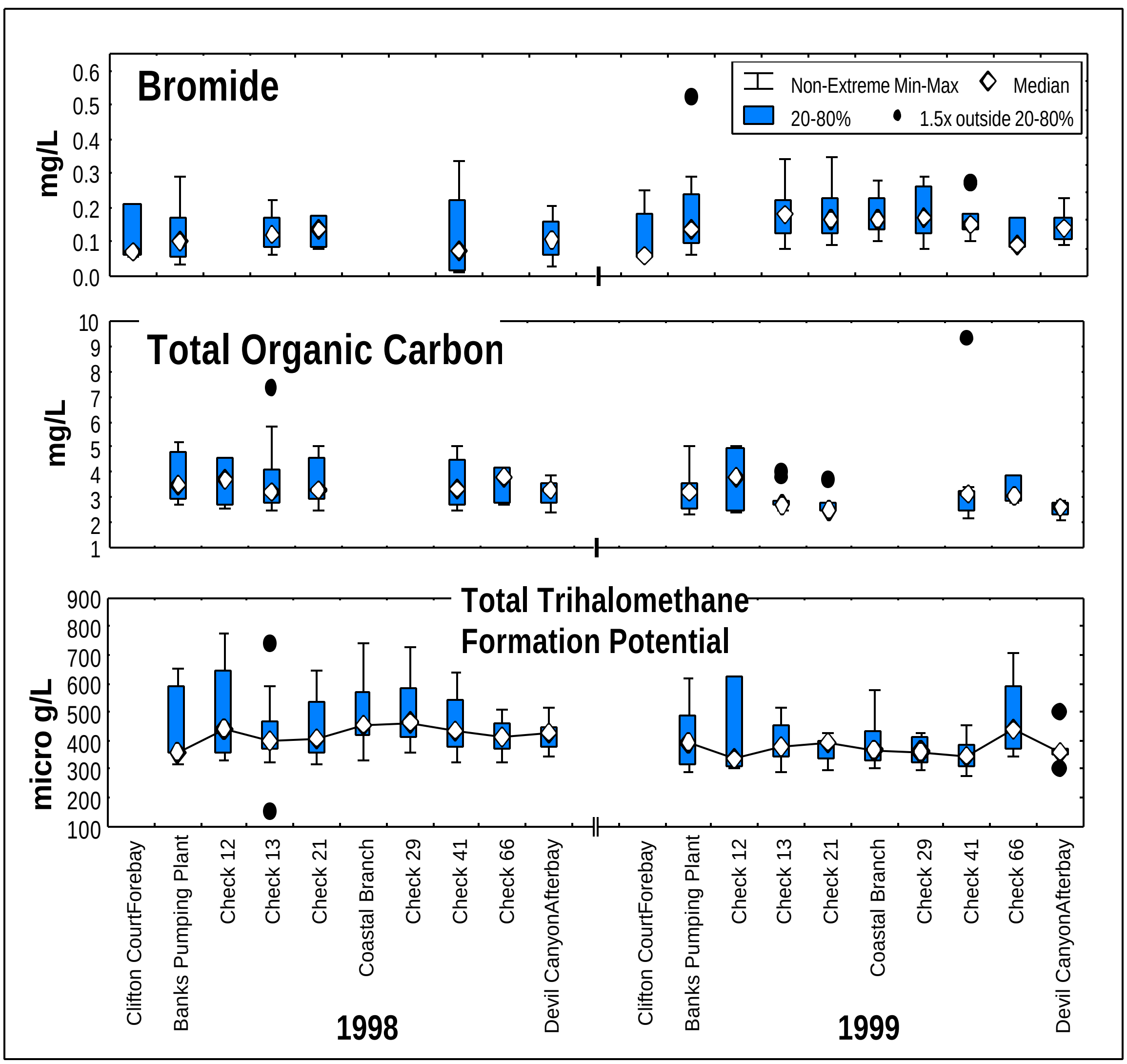


Figure 3-16
Monthly TOC and Bromide in the California Aqueduct

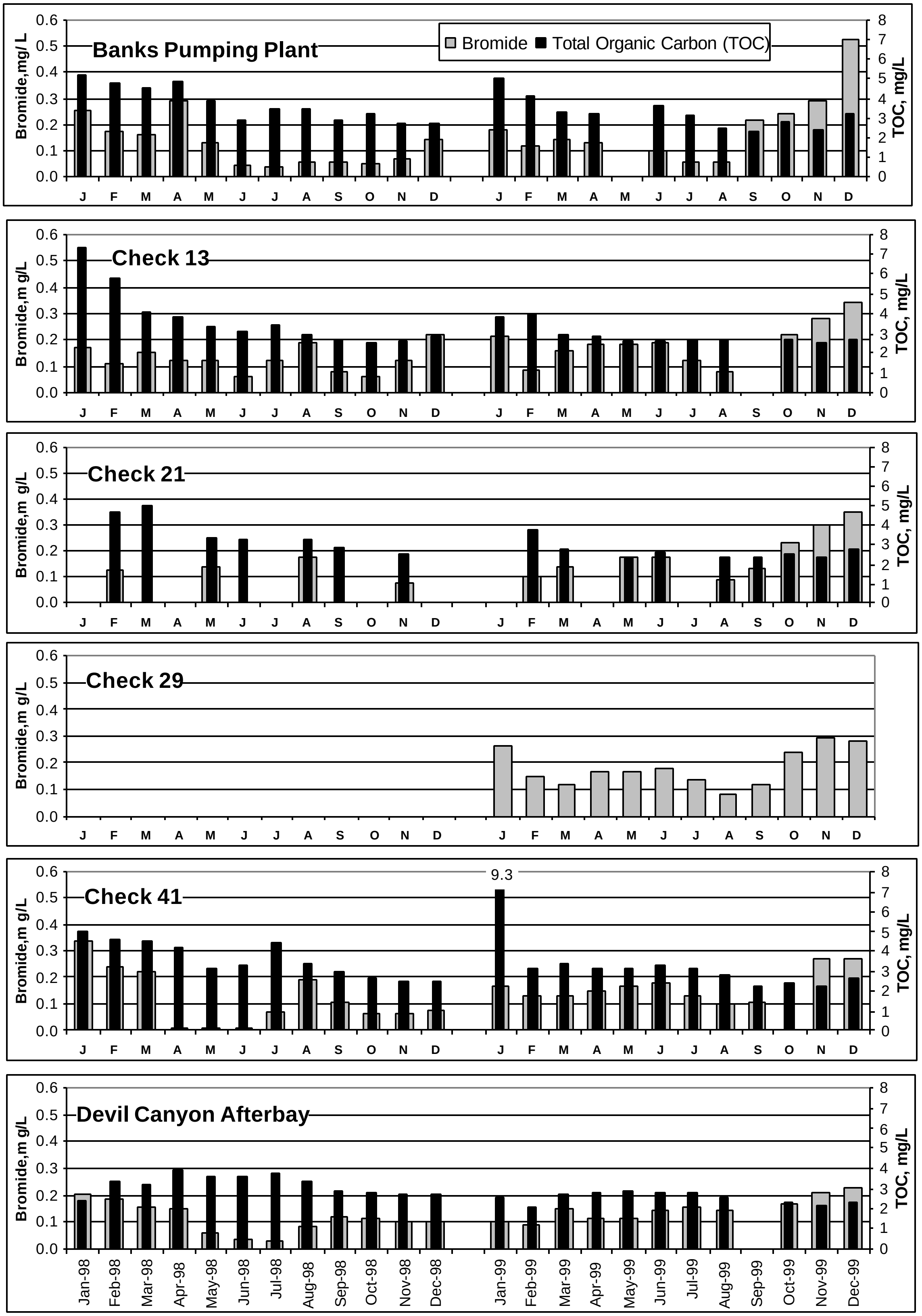
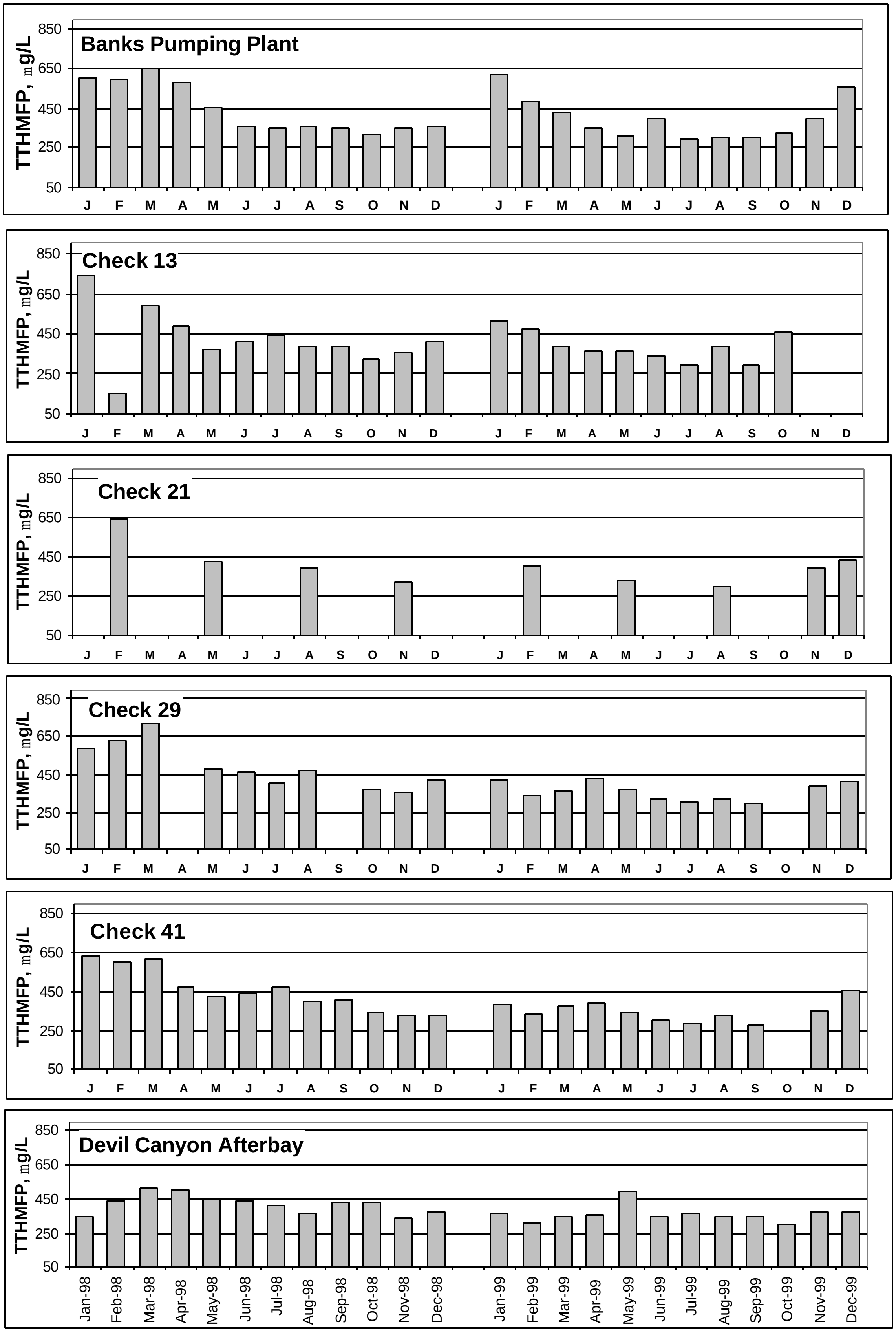


Figure 3-17
Monthly TTHMFP in the California Aqueduct



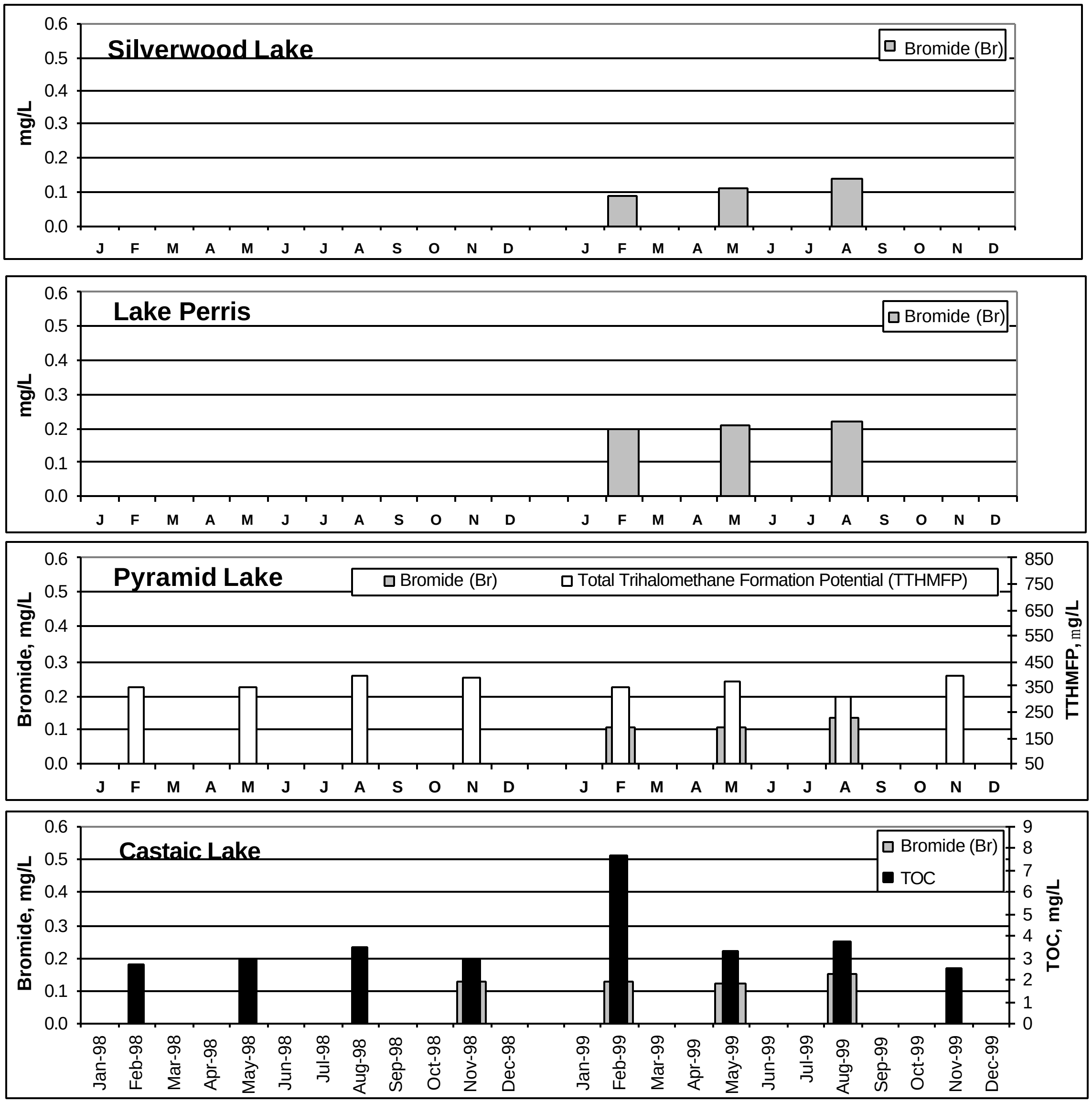
Project Lakes in Southern California

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

Chemical	R.L. 1/	MCL	Month	Barker Sl. P.P. 1998	Barker Sl. P.P. 1999	California Aqueduct: Banks P.P. 1998	Banks P.P. 1999	Check 13 1998	Check 13 1999	Check 21 1998	Check 21 1999	Check 29 1998	Check 29 1999	Check 41 1998	Check 41 1999	Devil Canyon A.B. 1998	Devil Canyon A.B. 1999	DMC(CVP) 1998	DMC(CVP) 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

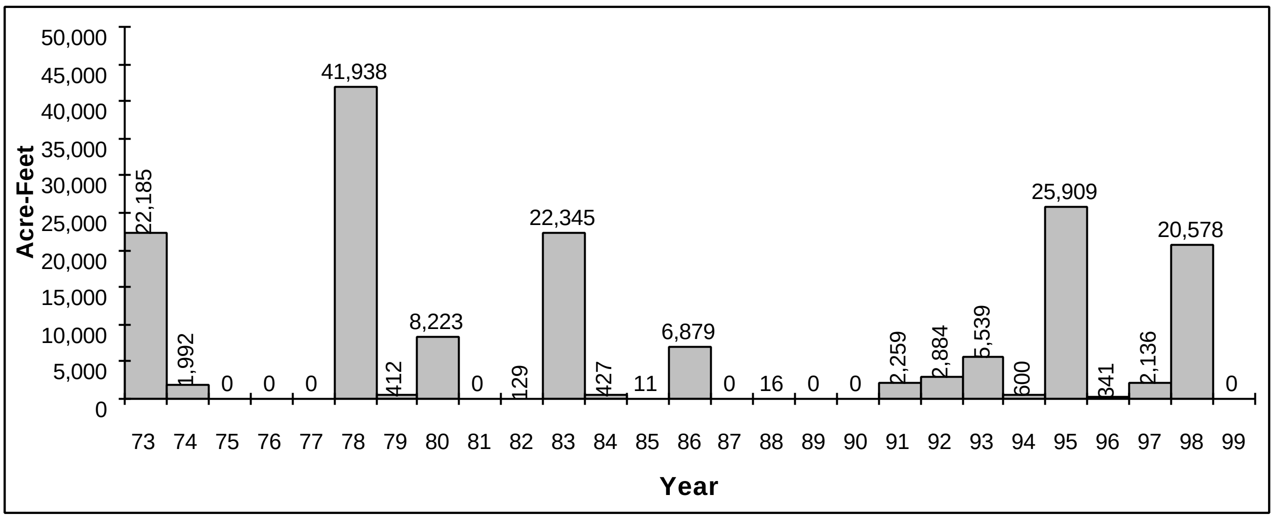
Non-Project inflows include San Luis Canal floodwaters, inflow from the Kings and Kern rivers, and natural runoff to Project lakes in Southern California

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.

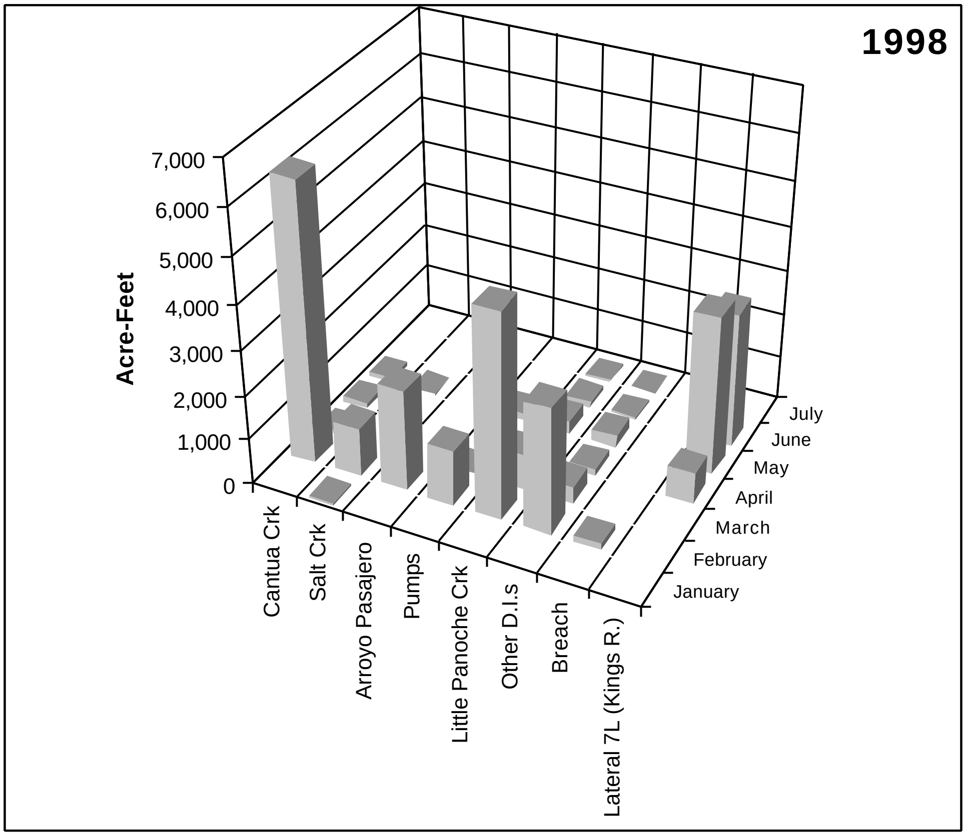
Figure 4-1
Annual Floodwater Inflow Volumes to the San Luis Canal, 1973-99



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.

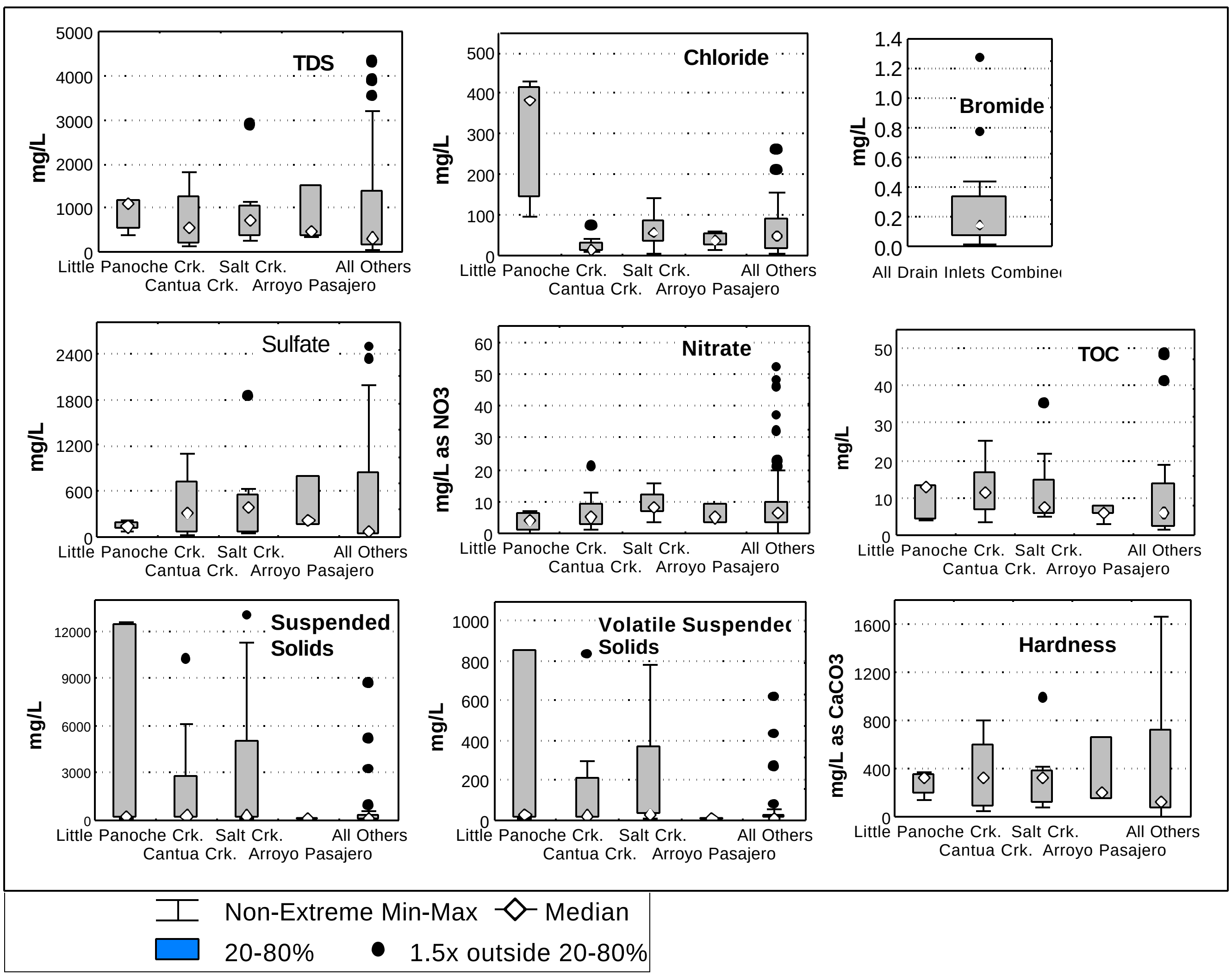
TDS ranged from 89 to 585 mg/L in 1998 and was highest in Arroyo Pasajero and lowest in Skunk Hollow (Table 4-1). These values were below the historical medians of 705 to 897 mg/L (Figure 4-3). Levels as high as 4,310 mg/L have been measured in the past, but extreme concentrations are infrequent.

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)

			Conventional Parameters									Cations			Anions				
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**
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)

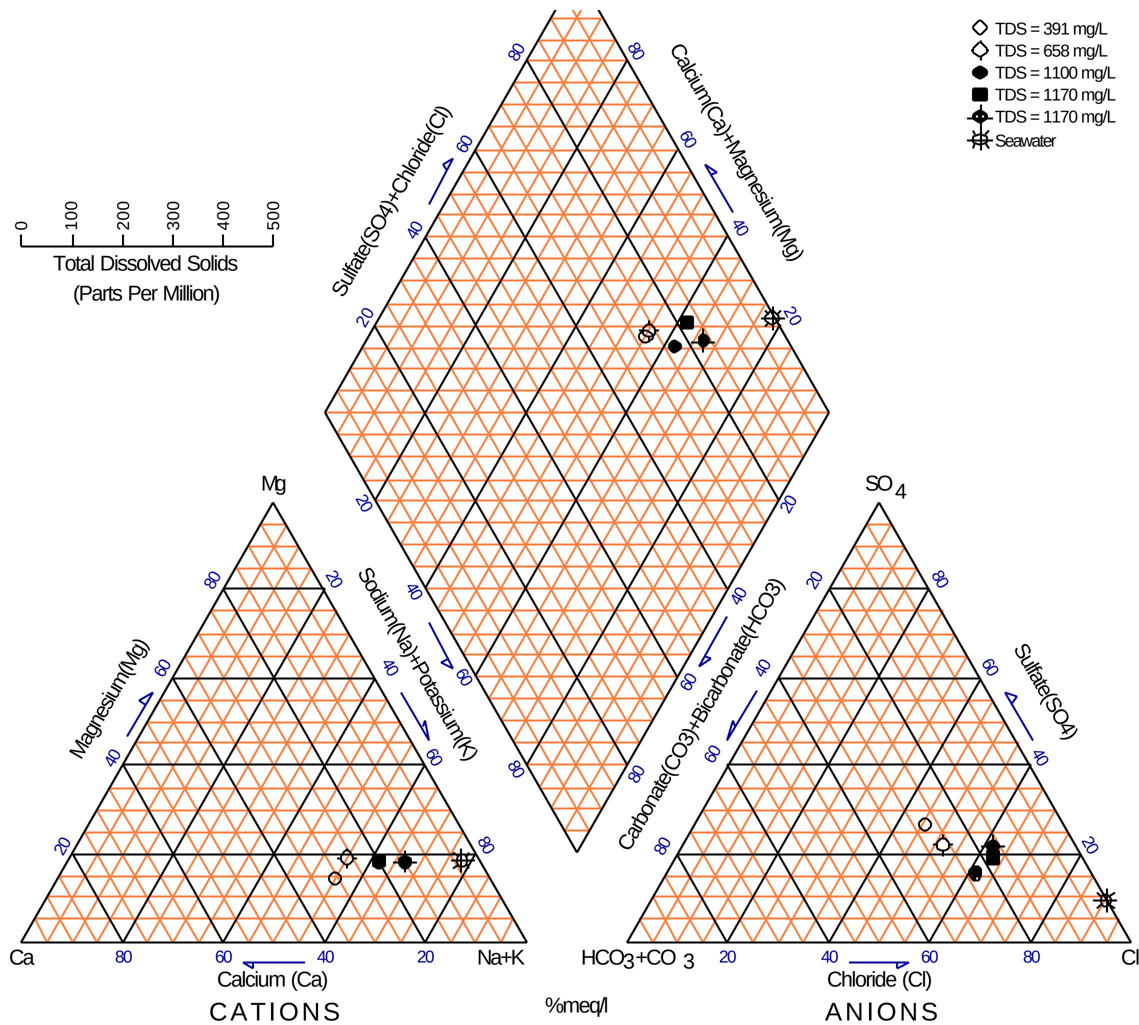


Figure 4-5
Mineralogy of all Drain Inlets Combined with TDS

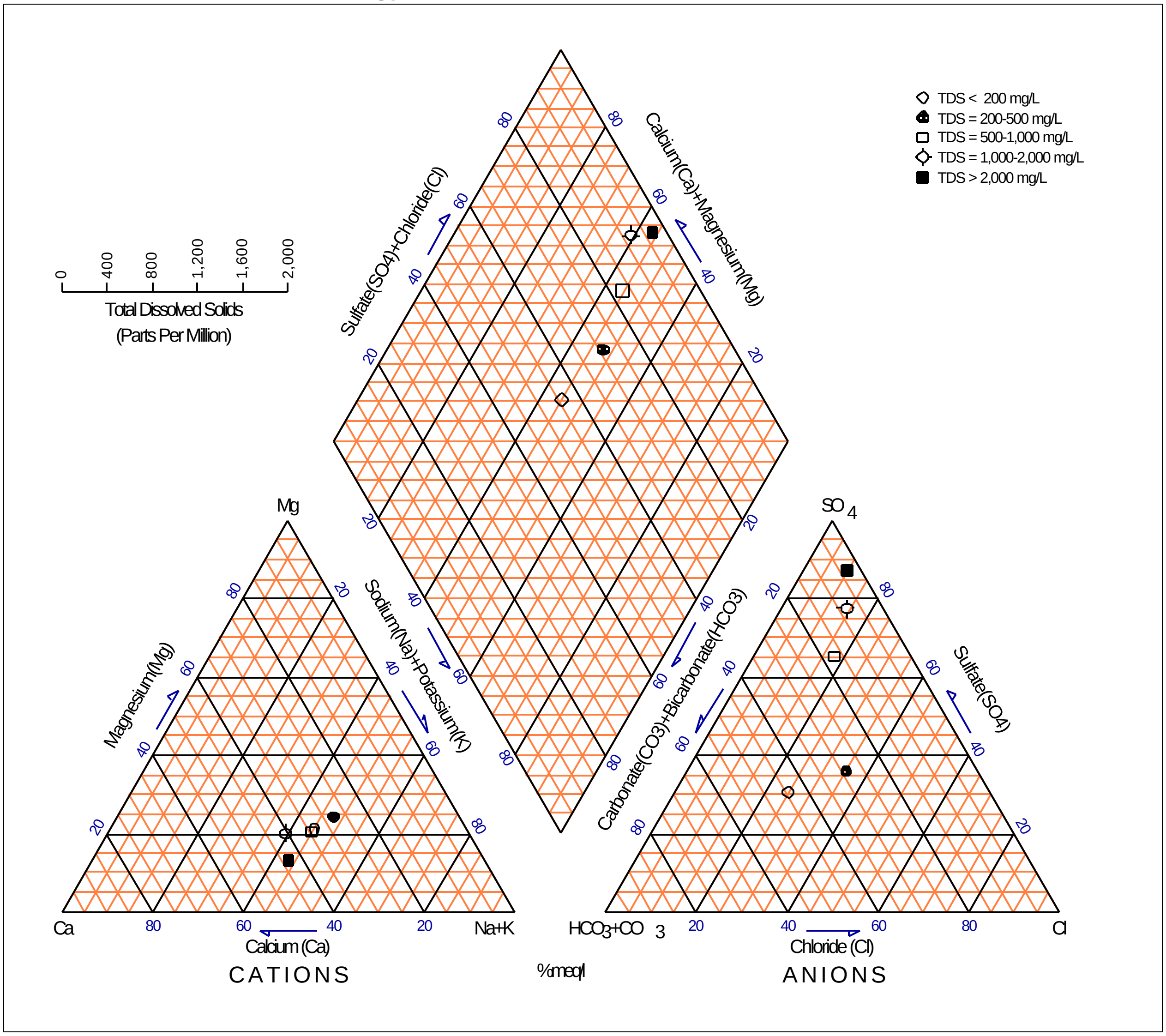


Table 4-2
Minor Element Concentrations in Floodwater Inflow

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

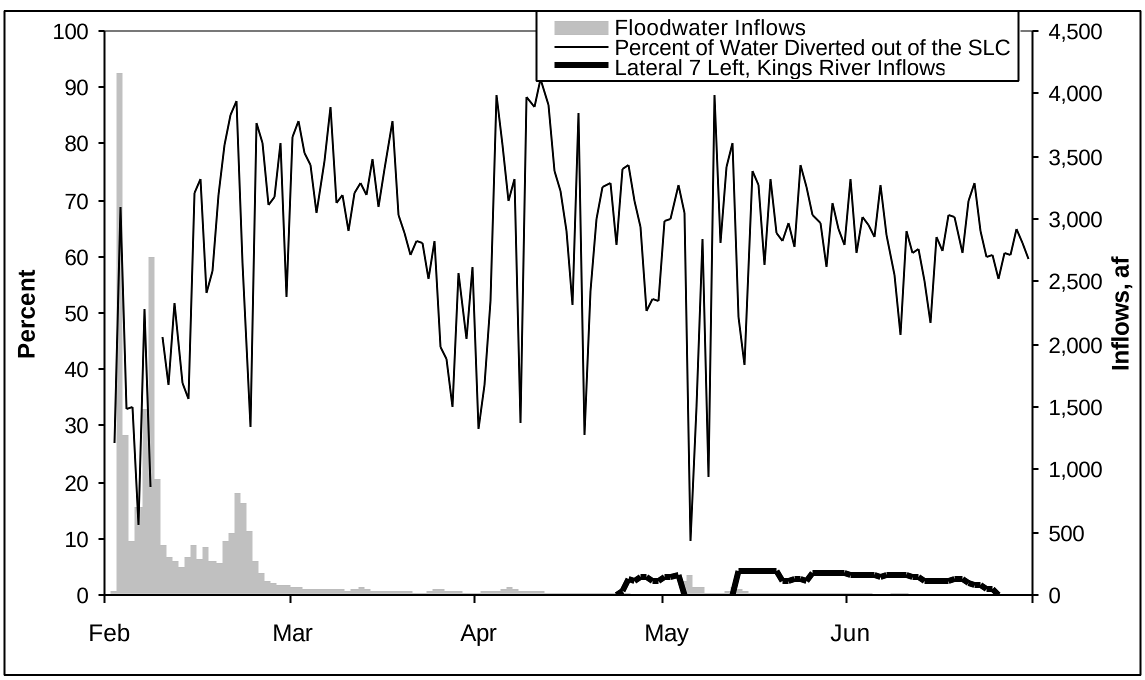
Watershed	Milepost	Date	Concentration in μg/L 1/									
			EPA 608 Scan	Simazine	EPA 614 Scan	Cyanazine	EPA 615 Scan	EPA 608 Scan	EPA 602 Scan	EPA 547 Scan	EPA 531.1 Scan	EPA 502.2 Scan
Ortigalita Creek	82.67	2/3/98	N.D.		N.D.		N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Little Panoche Creek	96.59	2/3/98	N.D.		N.D.		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

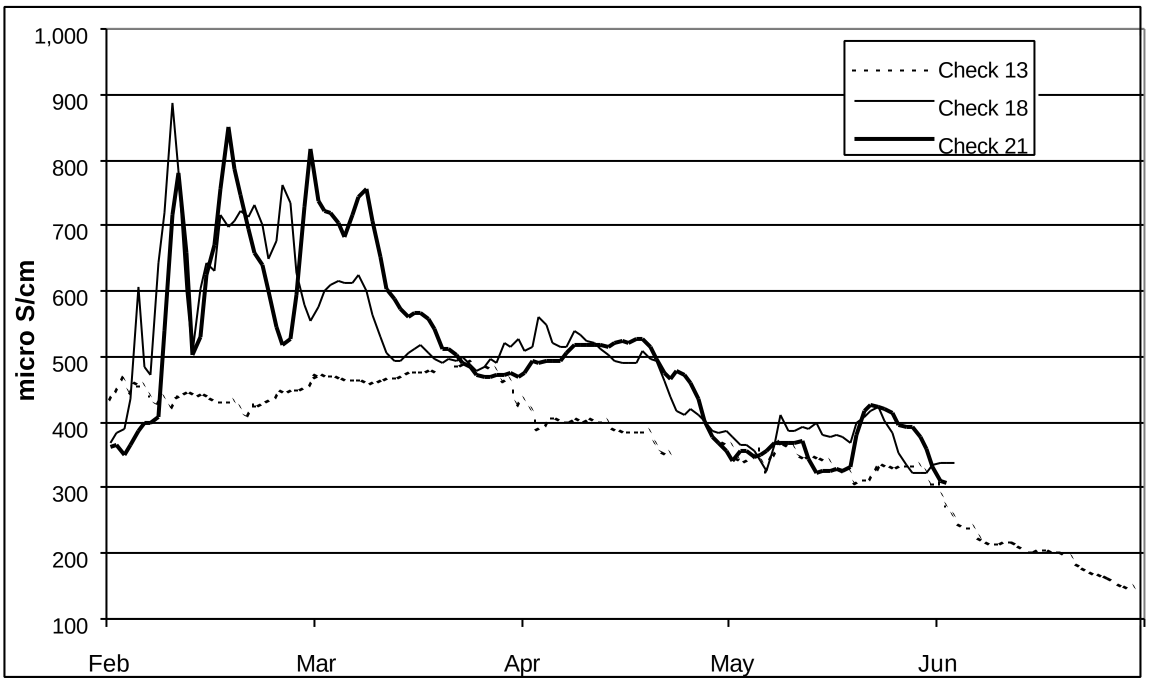
From February to June 1998, federal contractors diverted 62 percent of the water entering San Luis Canal from either Dos Amigos pumping or floodwater inflow (Figure 4-6). Since federal turnouts are located throughout the canal, floodwaters were removed along with Project water. In February—when floodwaters 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

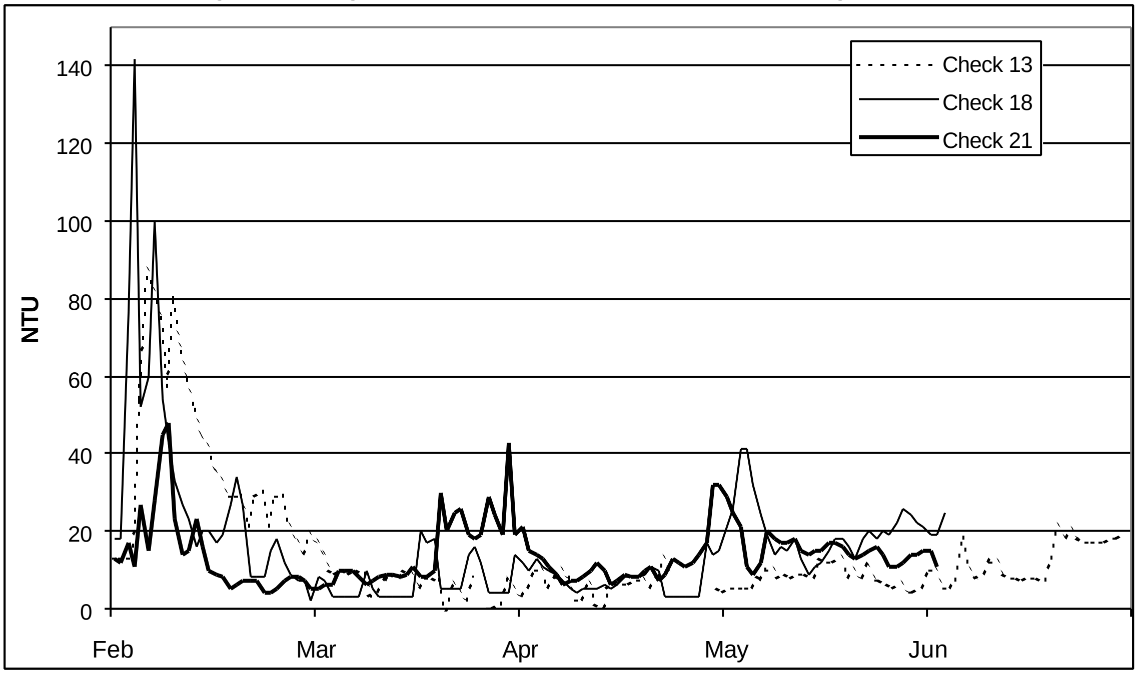


Figure 4-9
Daily Flow Past Check 21, February-June 1998

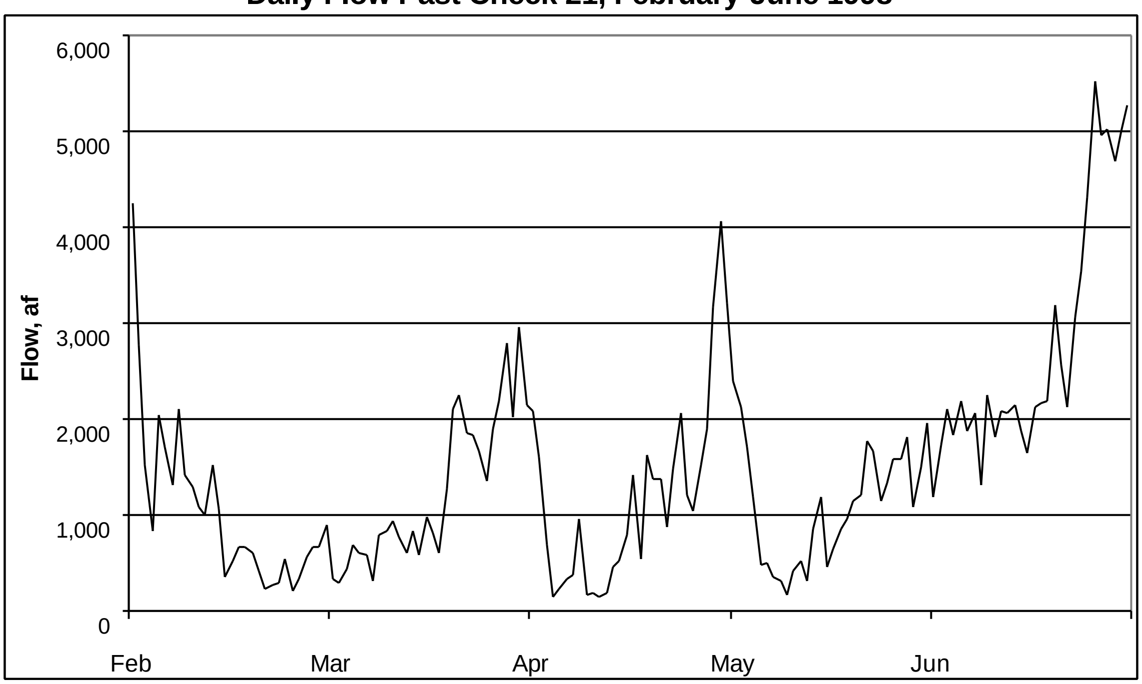


Figure 4-10
Mineralogical Makeup of Water at Checks 13 and 21, February 18, 1998 (See Appendix D for Explanation)

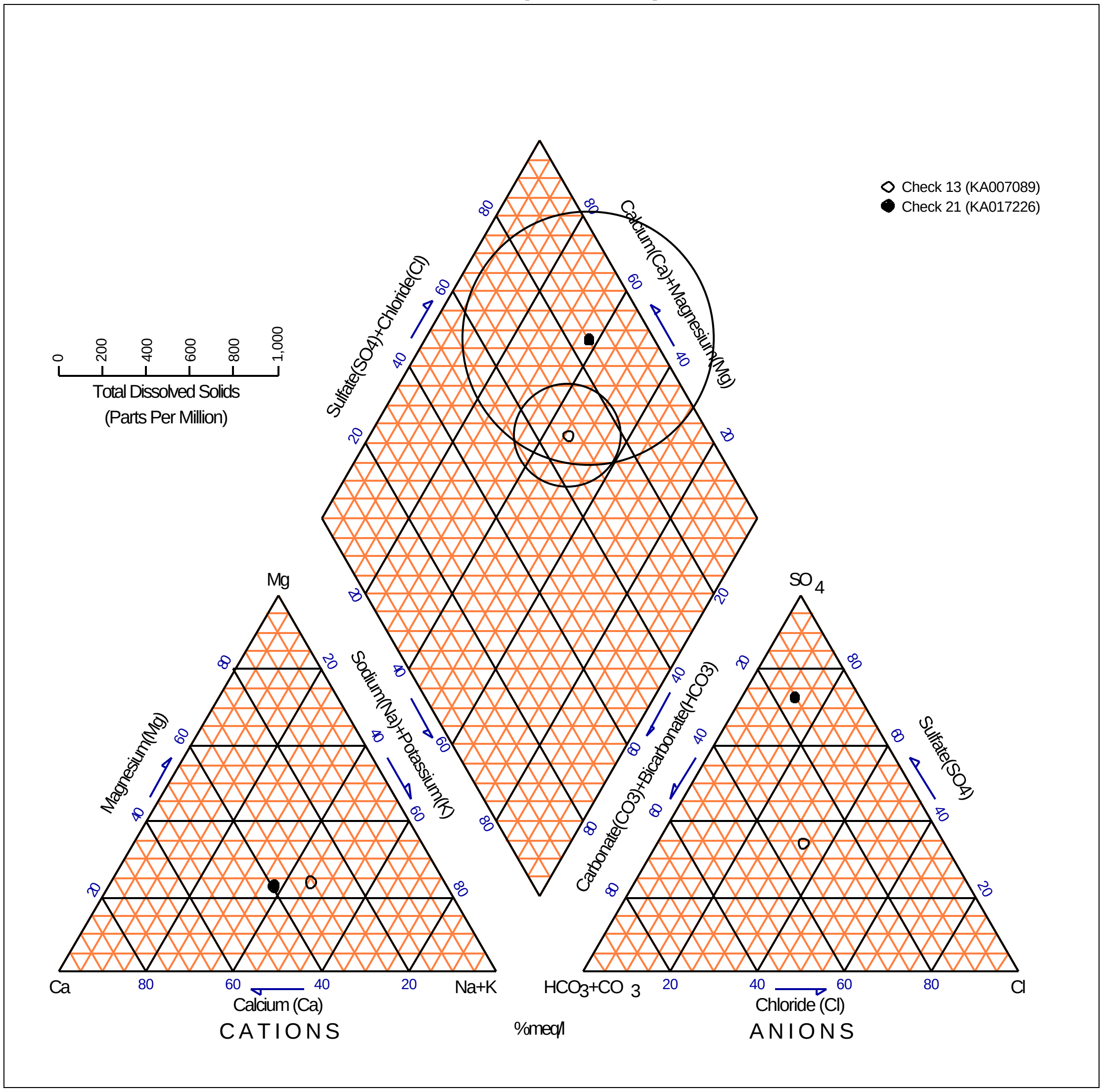
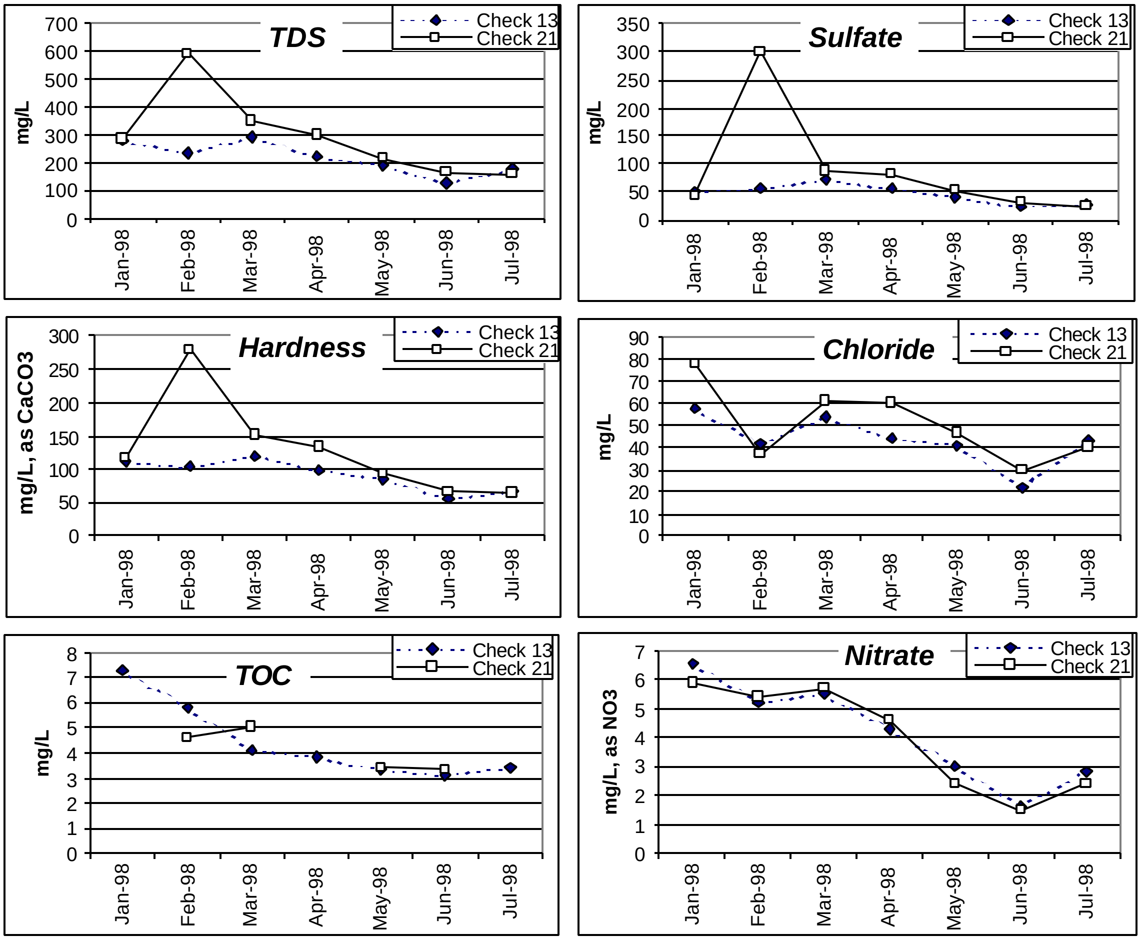


Figure 4-11 shows upstream/downstream concentrations of several parameters. TDS, hardness, and sulfate were all higher at Check 21 than at Check 13 in February 1998. No change in chloride was observed that month but several months later, downstream levels were slightly higher. Floodwaters did not appear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

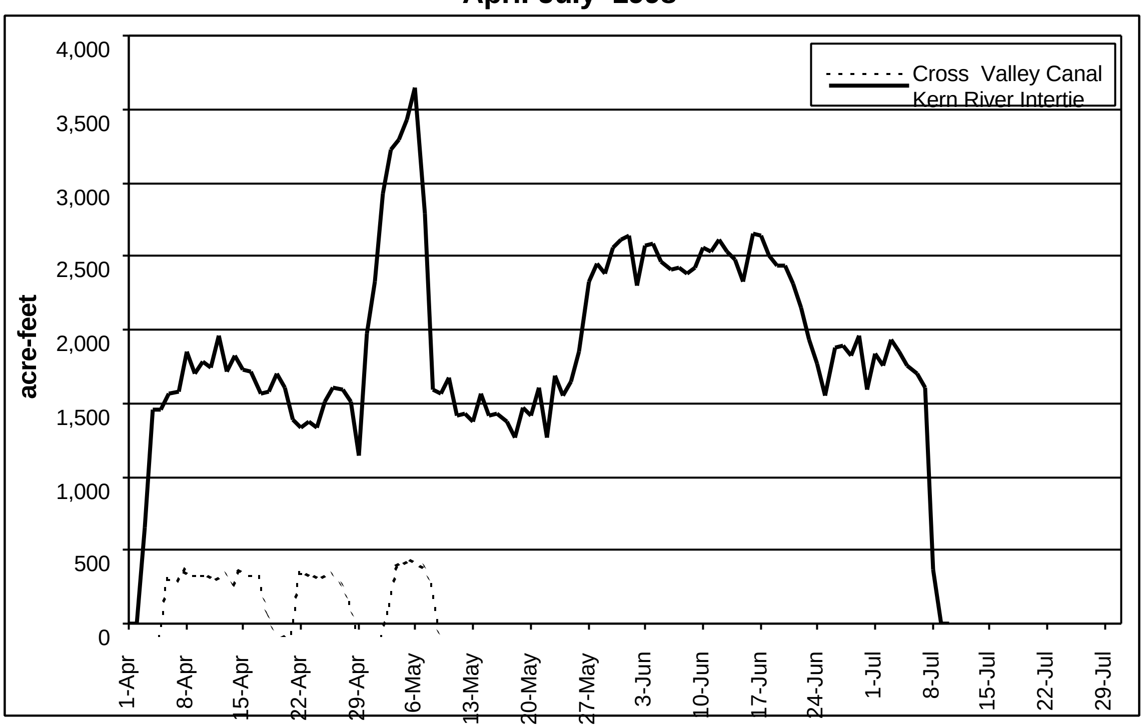


Figure 4-13
Pumping at Buena Vista Pumping Plant and Check 28 Flow in the Aqueduct, April-July, 1998

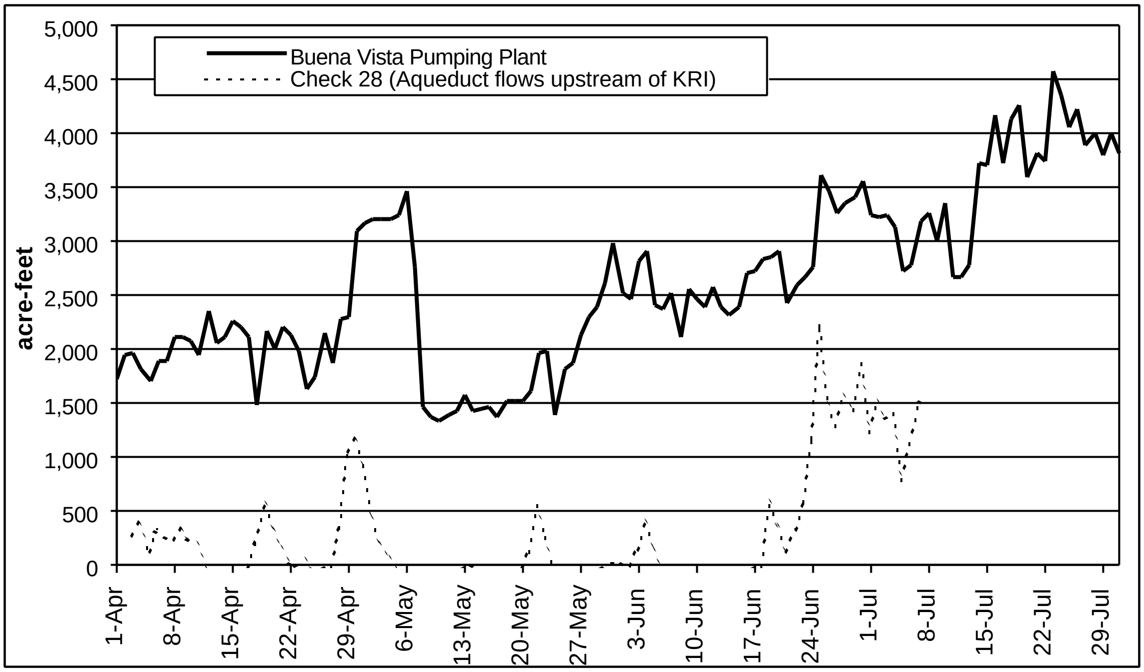


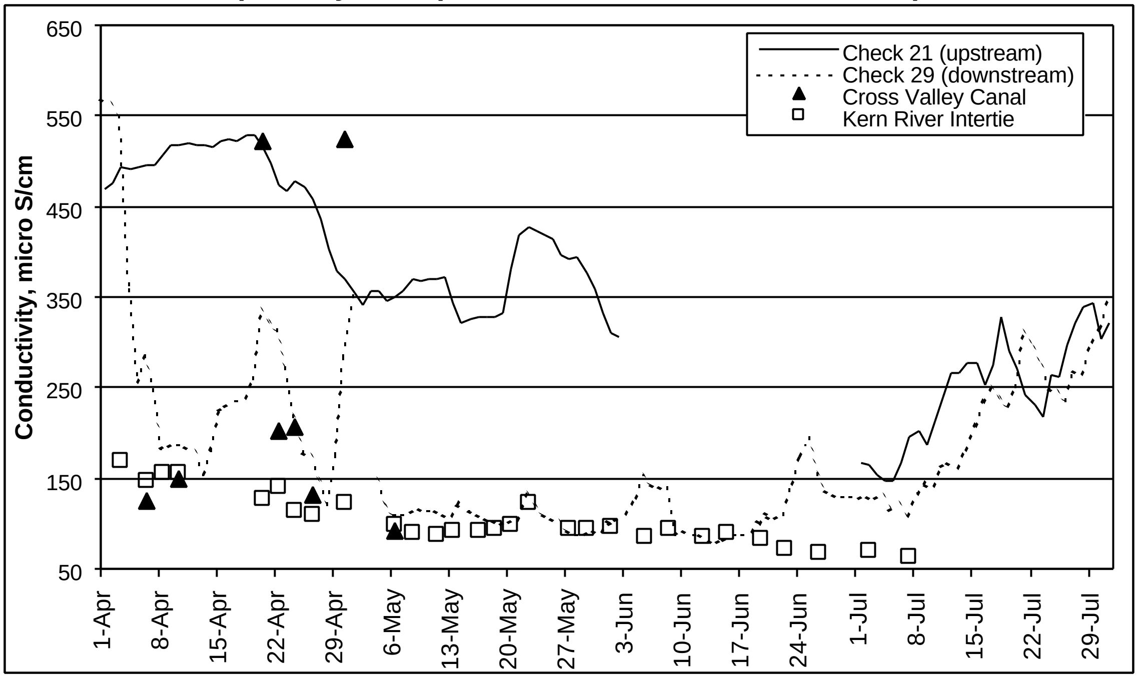
Table 4-4
Water Quality in the Kern River Intertie and Cross Valley Canal, 1998 (mg/L unless specified otherwise)

			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	0.006	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

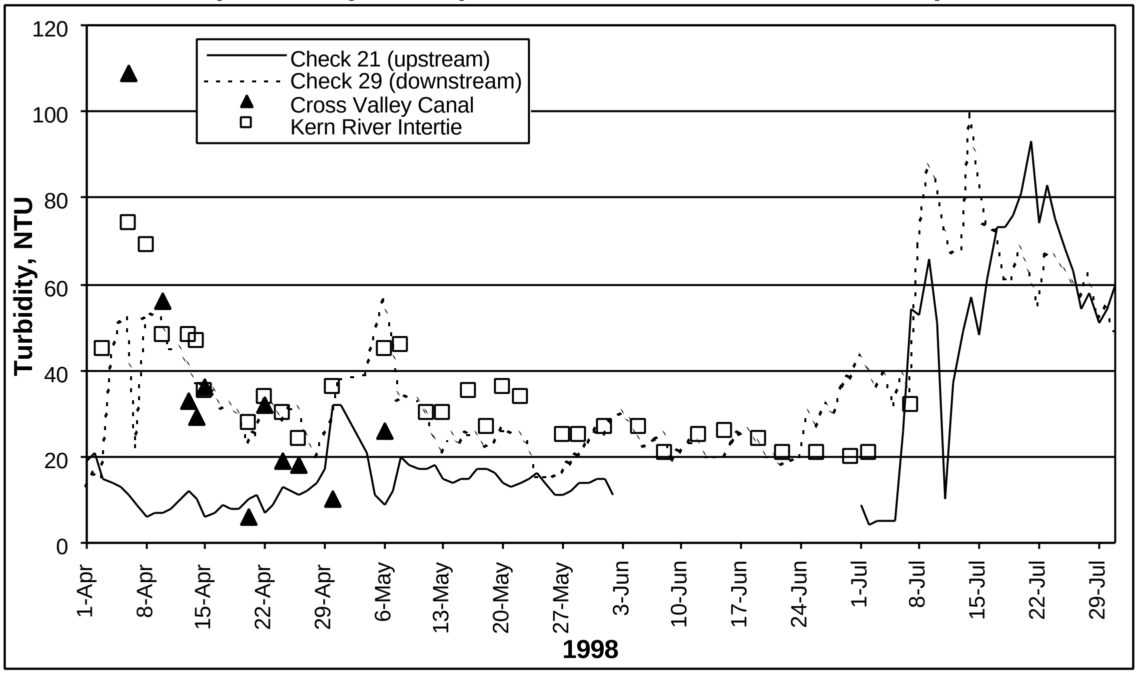
Figure 4-14
Daily Conductivity in the Aqueduct, Kern River Intertie, and Cross Valley Canal, April-July 1998 (Field and Automated Station Data)



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)

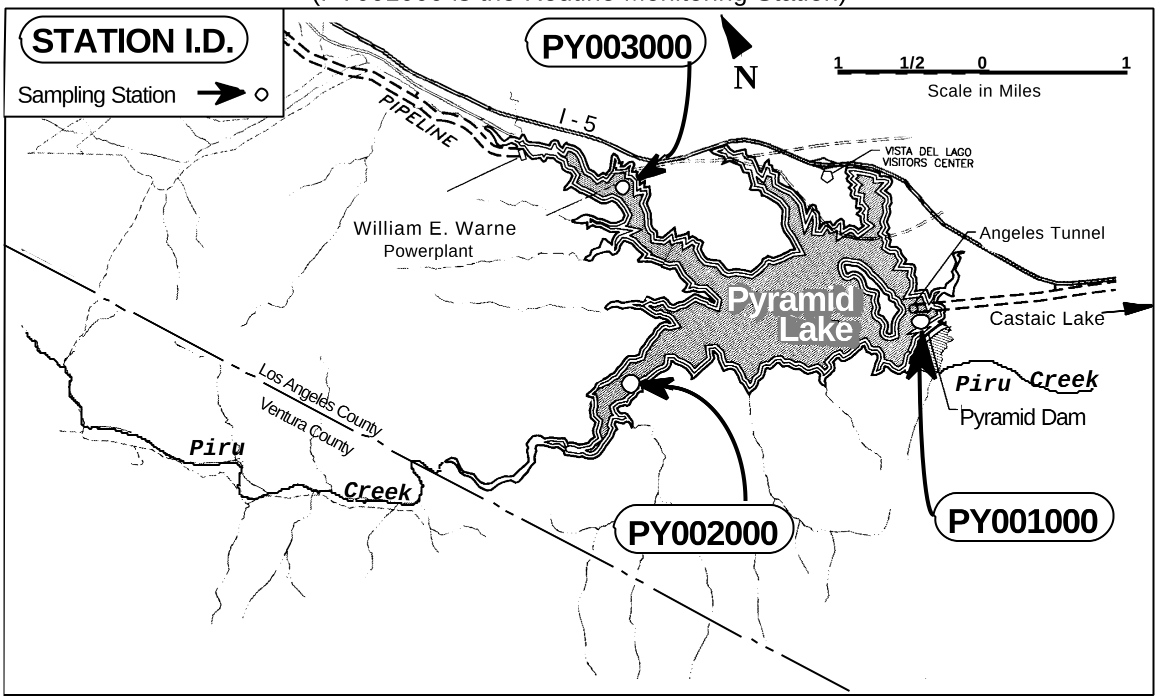


Figure 4-17
Monthly Inflows to Pyramid Lake, 1998-99

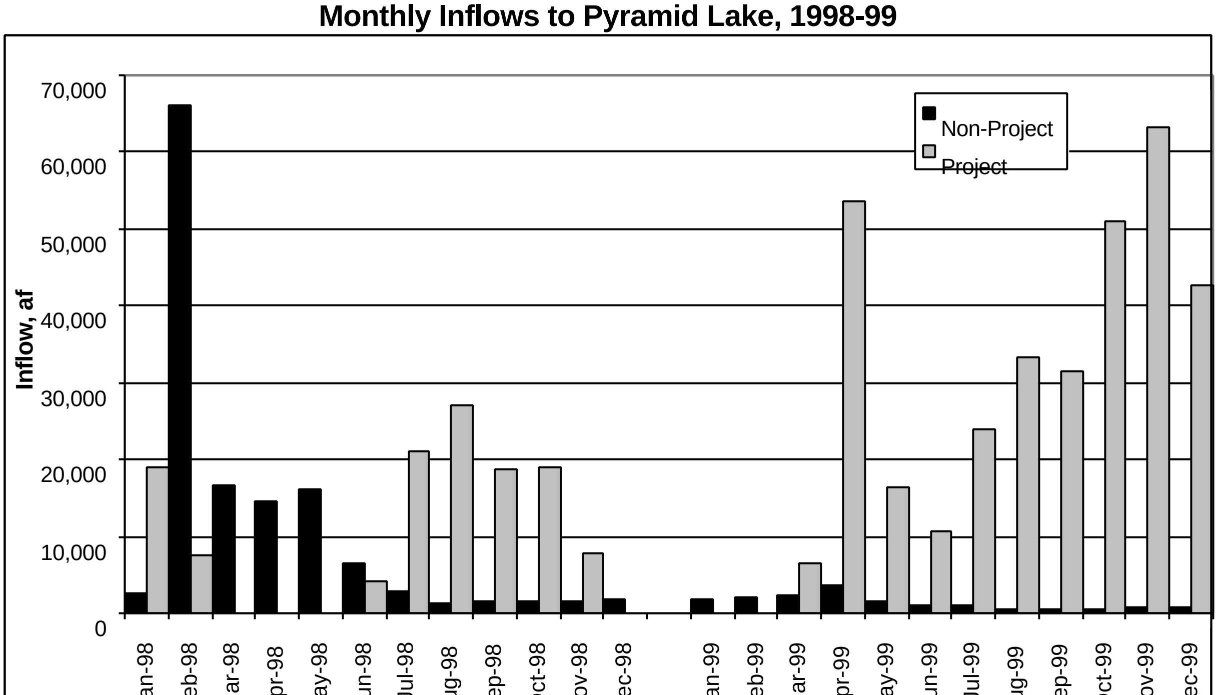


Figure 4-18
Water Quality Sampling Stations on Castaic Lake

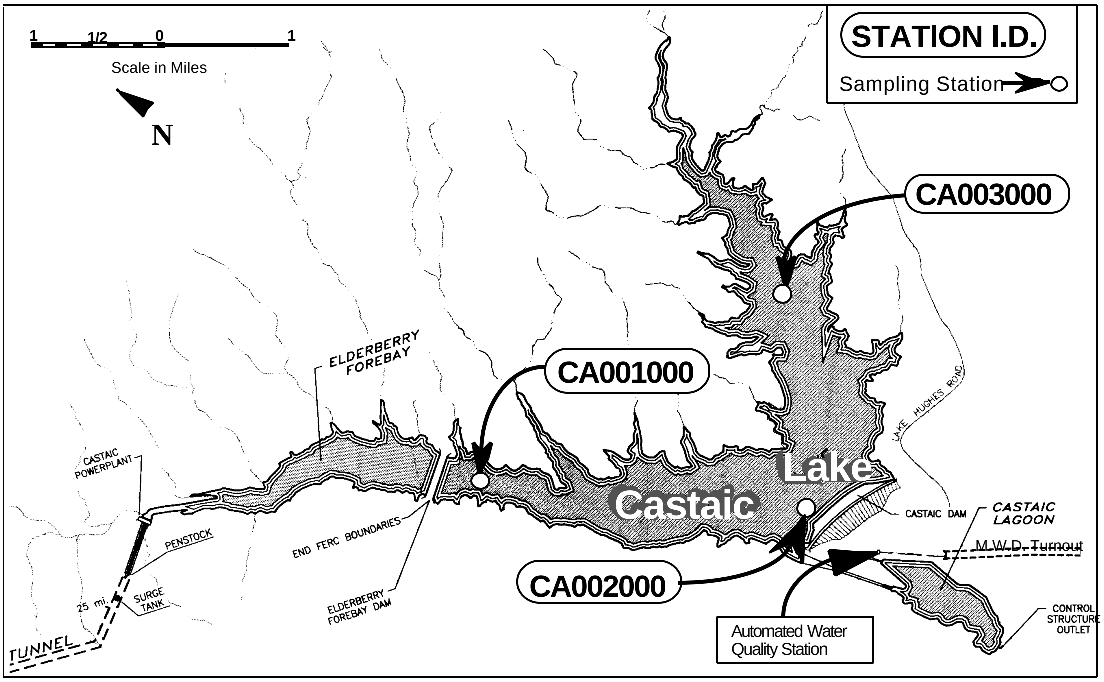
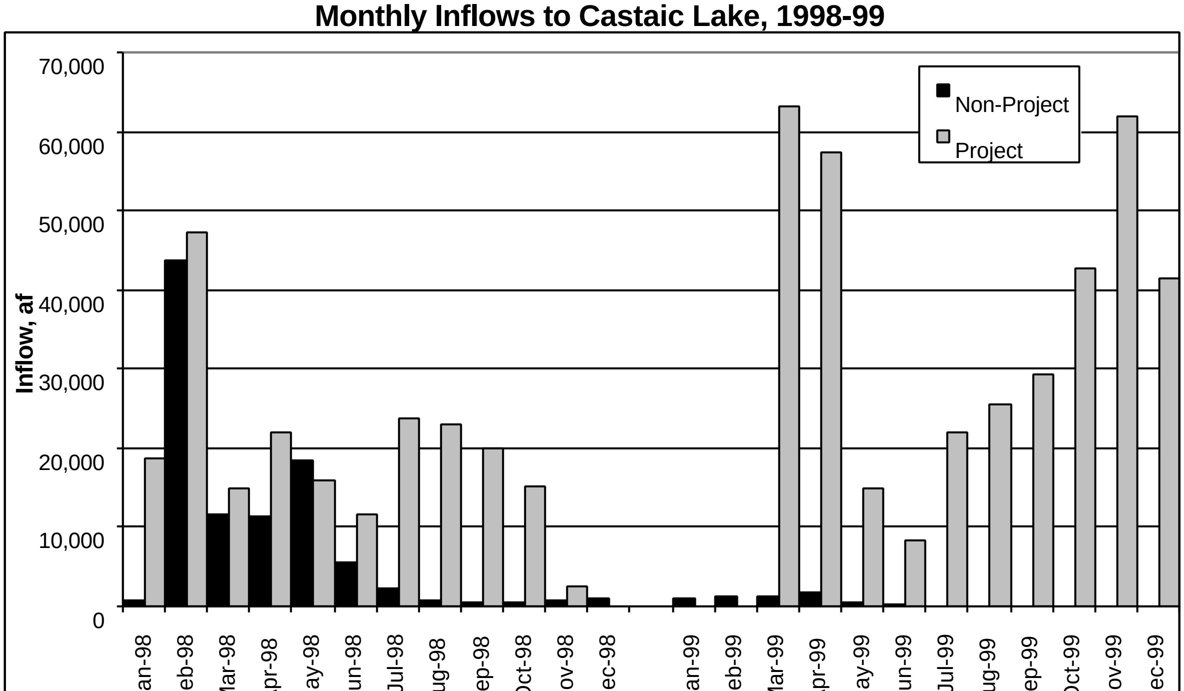
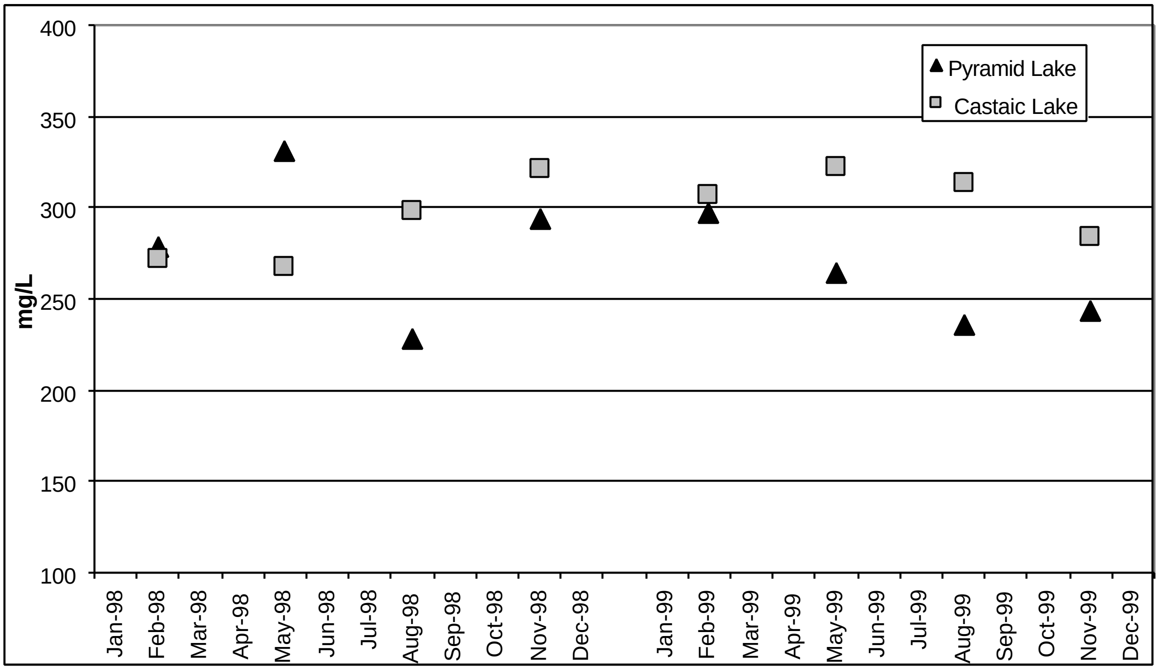


Figure 4-19
Monthly Inflows to Castaic Lake, 1998-99



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)

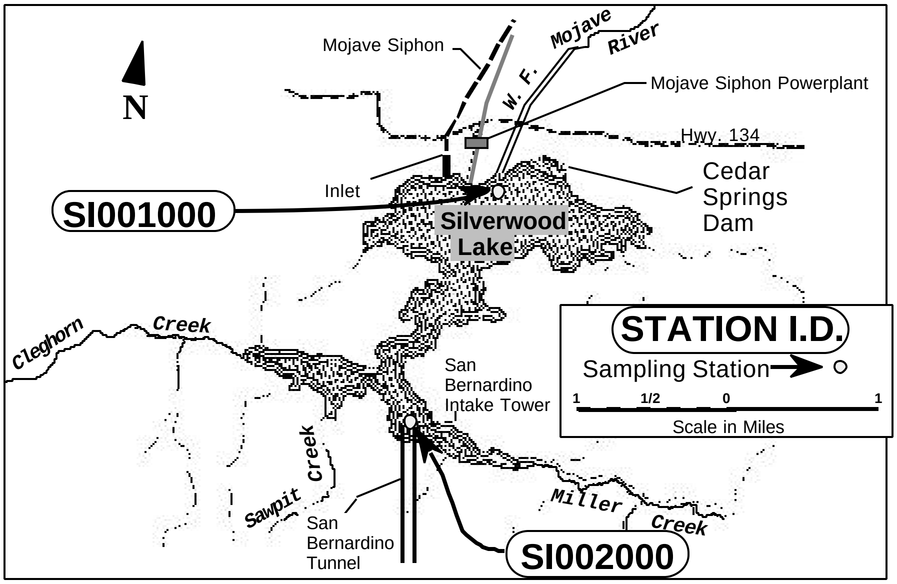


Figure 4-22
Monthly Inflows to Silverwood Lake, 1998-99

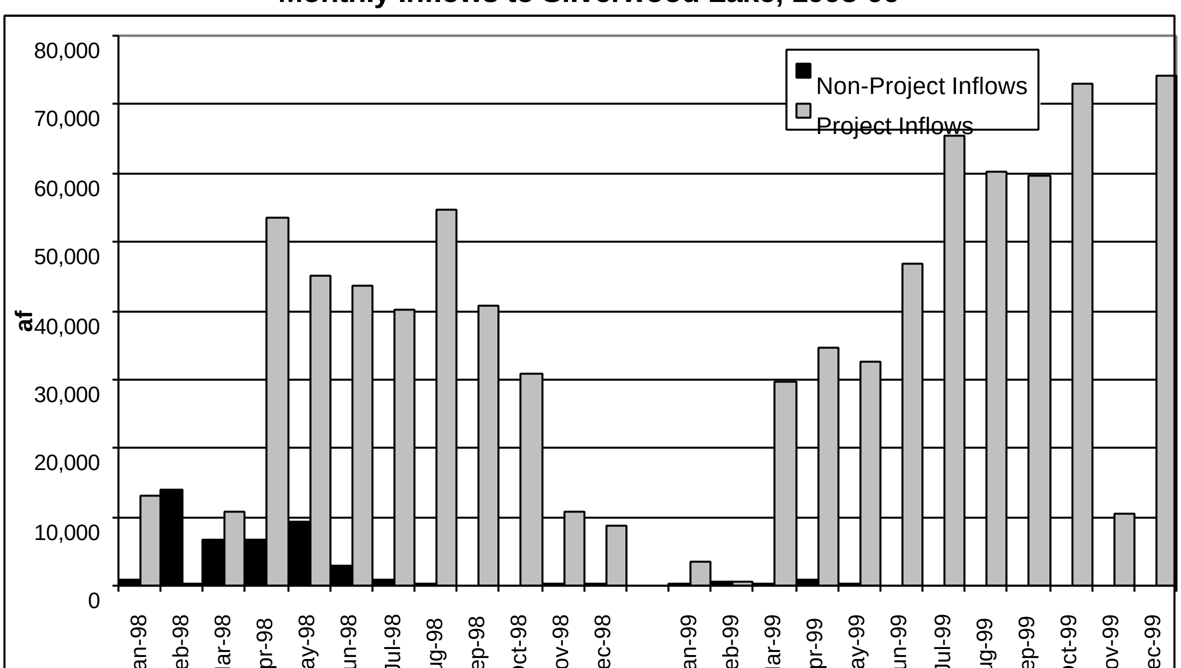
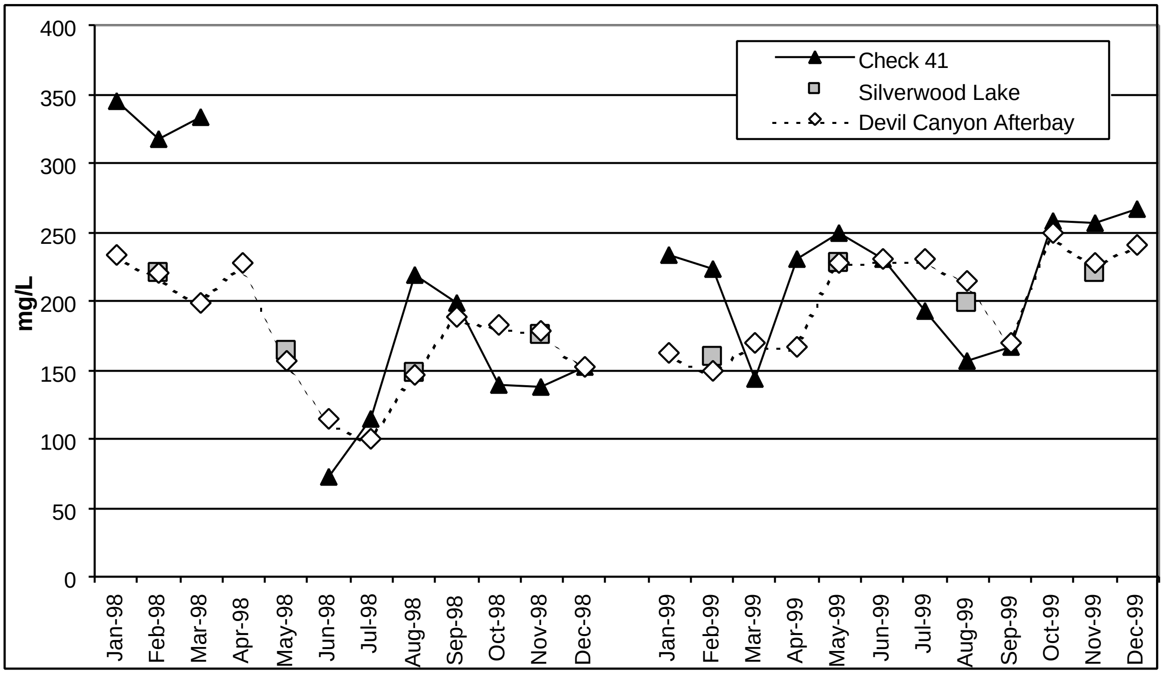


Figure 4-23
TDS in Silverwood Lake and Its Inflows/Outflows, 1998-99



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Appendix A

Methods

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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). 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	O	O															
	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	O	O															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				O	O												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	O	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	O	O	M	O									O				
		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	O	O	M	O													
		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

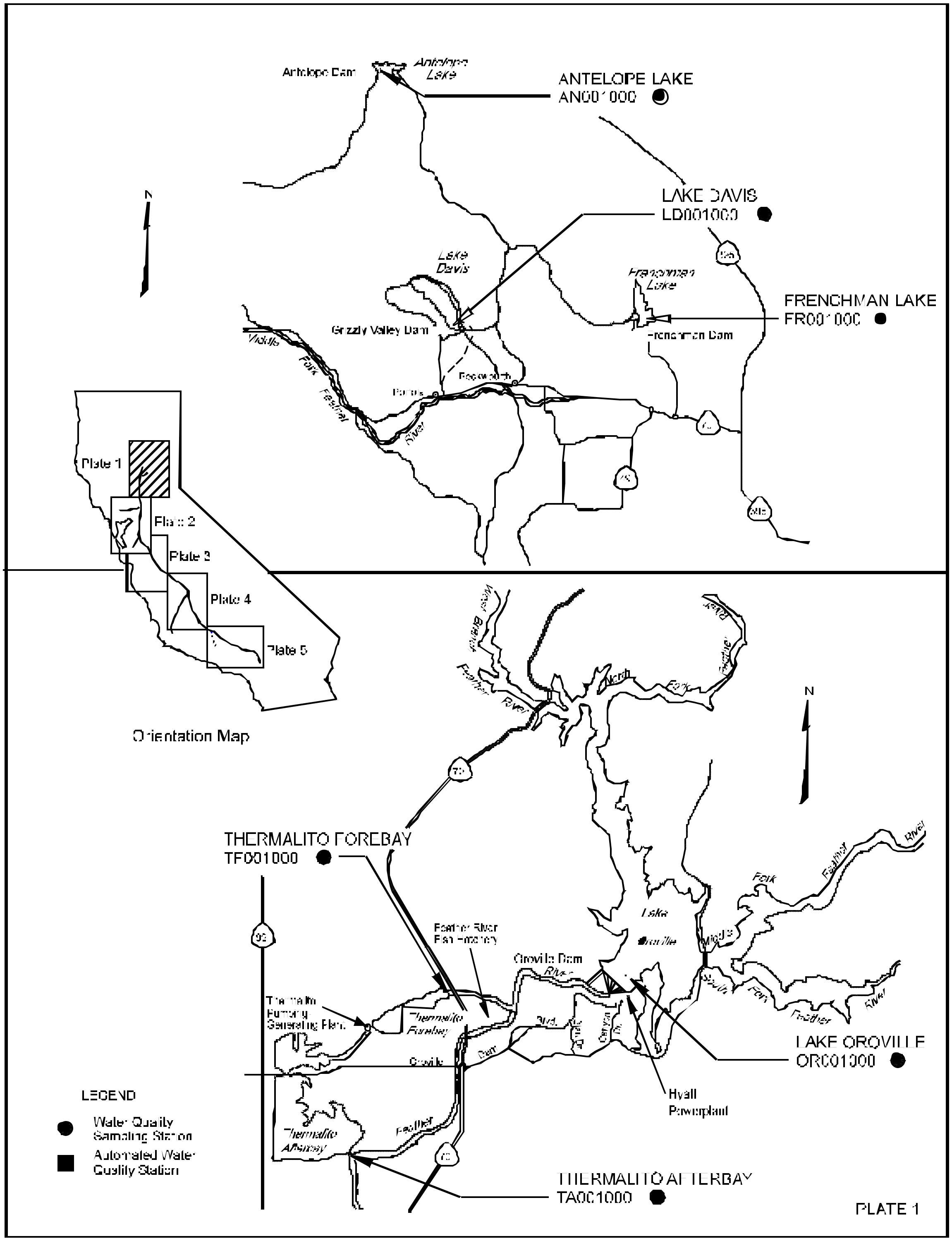
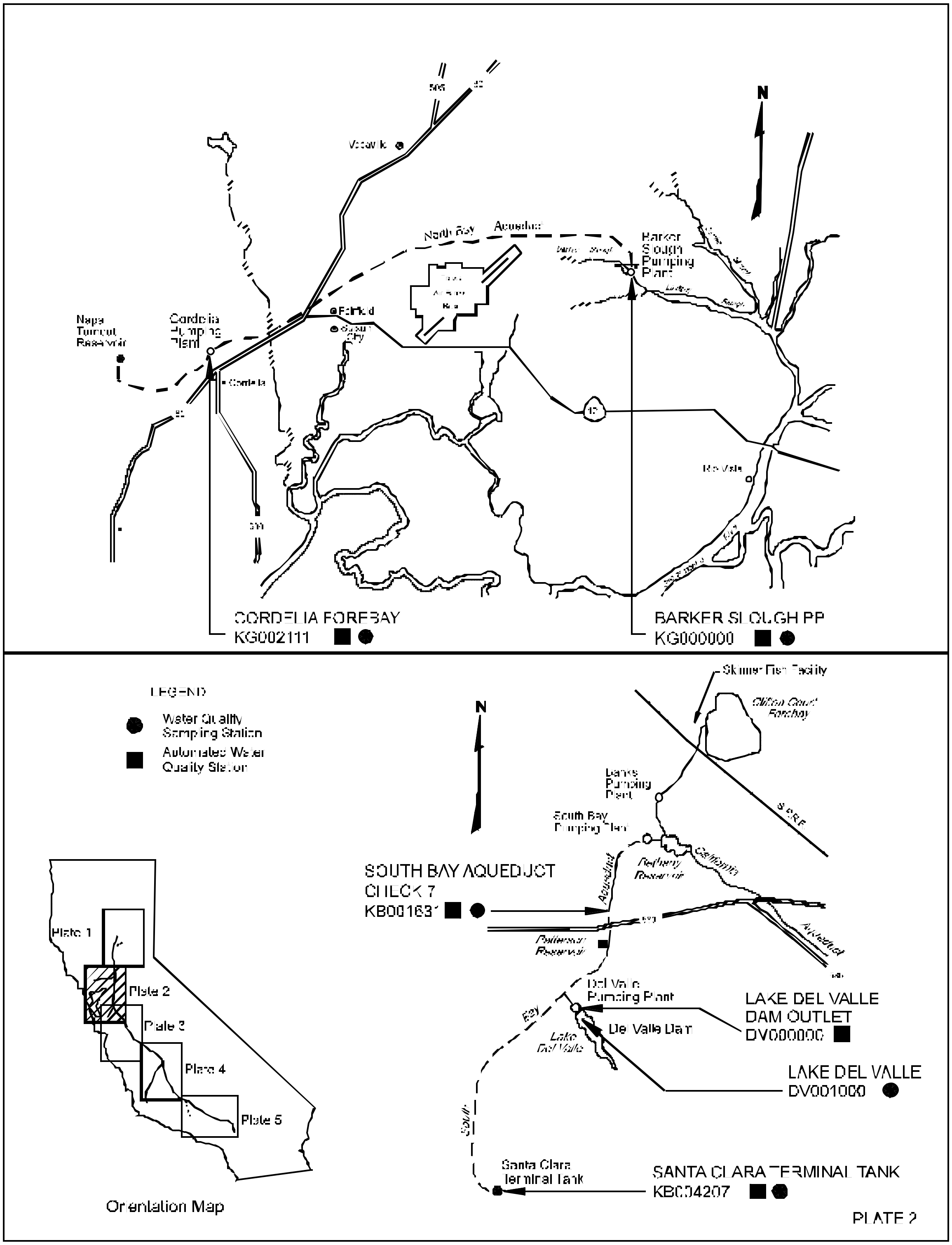

ANTELOPE LAKE
AN001000
Antelope Dam
LAKE DAVIS
LD001000
Lake Davis
Grizzly Valley Dam
FRENCHMAN LAKE
FR001000
Frenchman Dam
Plate 1
Plate 2
Plate 3
Plate 4
Plate 5
Orientation Map
N
THERMALITO FOREBAY
TF001000
Feather River Fish Hatchery
Oroville Dam
Thermalito Forebay
Thermalito Afterbay
Oroville
Lake Oroville
LAKE OROVILLE
OR001000
Hyatt Powerplant
LEGEND
Water Quality Sampling Station
Automated Water Quality Station
THERMALITO AFTERBAY
TA001000
PLATE 1

Plate 2



North Bay Aqueduct
Vacaville
Barker Slough Pumping Plant
Napa Turnout Reservoir
Cordelia Pumping Plant
Fairfield
Suisun City
Cordelia
Rio Vista
CORDELIA FOREBAY
KG002111
BARKER SLOUGH PP
KG000000
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
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
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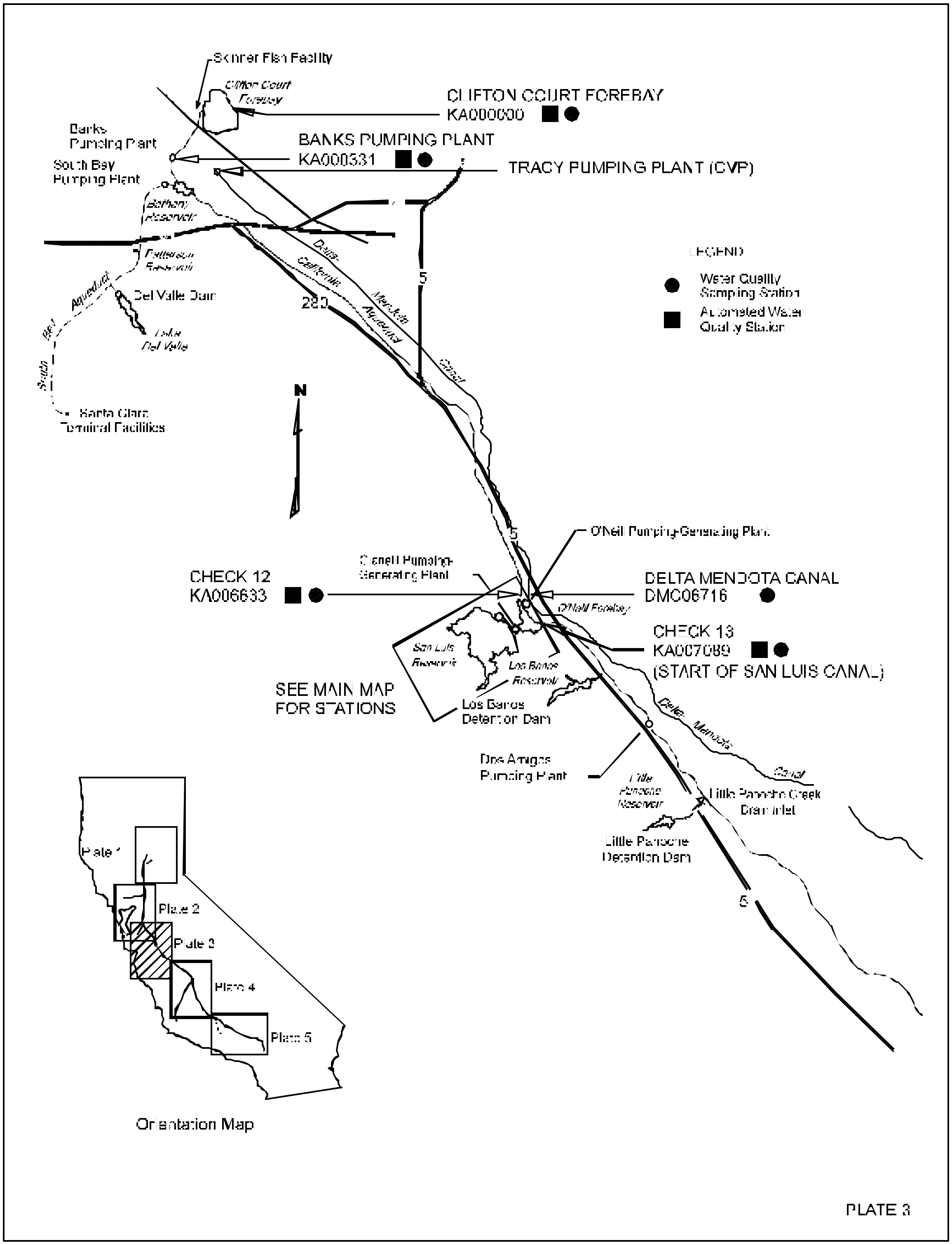
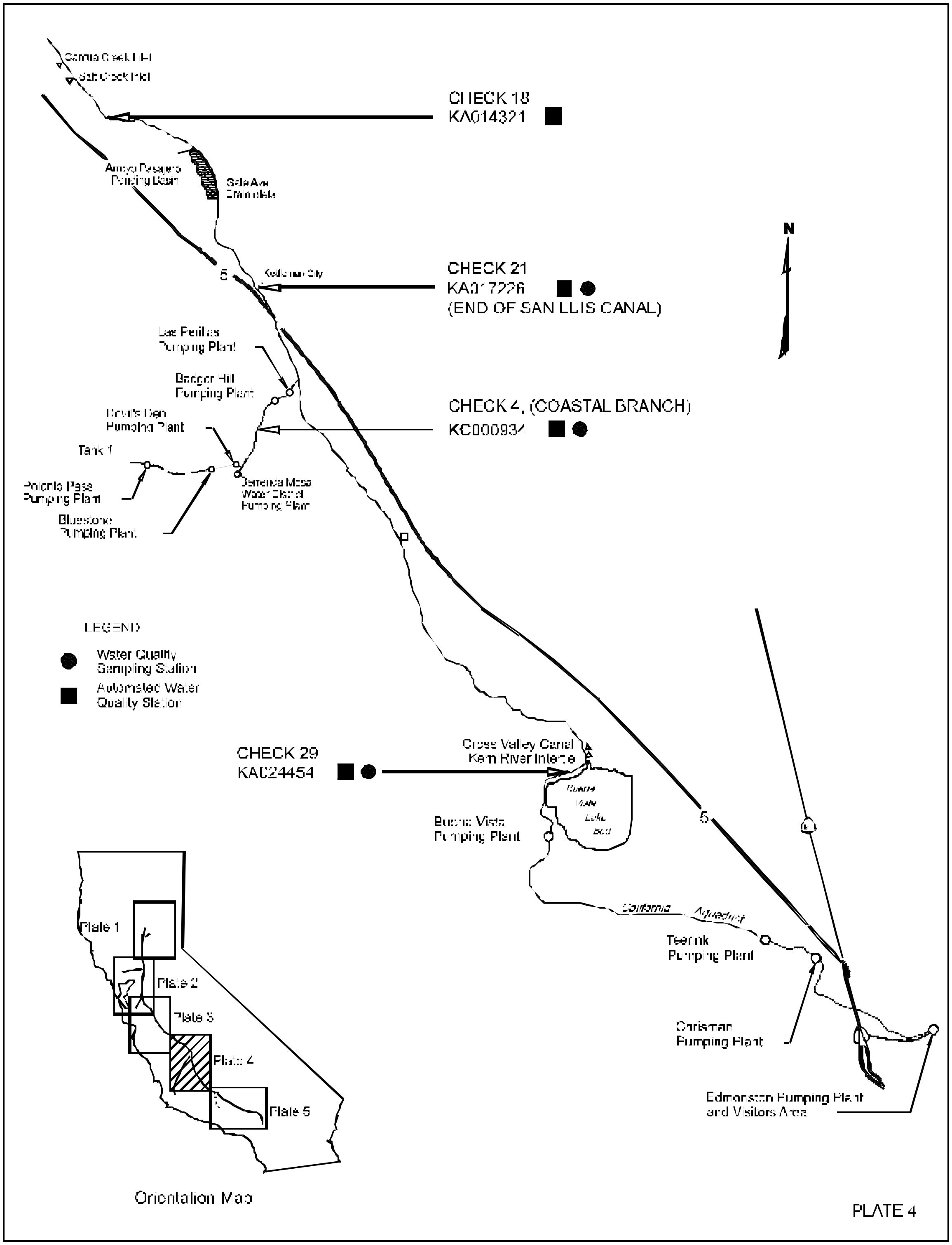
Orientation Map
PLATE 2

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
580
5
LEGEND
Water Quality Sampling Station
Automated Water Quality Station
N
O'Neil Pumping-Generating Plant
CHECK 12
KA006633
O'neill Pumping-Generating Plant
DELTA MENDOTA CANAL
DMC06716
O'Neil 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



CHECK 18
KA014321
Arroyo Pasajero Ponding Basin
N
CHECK 21
KA017226
(END OF SAN LUIS CANAL)
5
Las Perillas Pumping Plant
Badger Hill Pumping Plant
CHECK 4, (COASTAL BRANCH)
KC000934
Devil's Den Pumping Plant
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 Pumping Plant
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

Plate 5

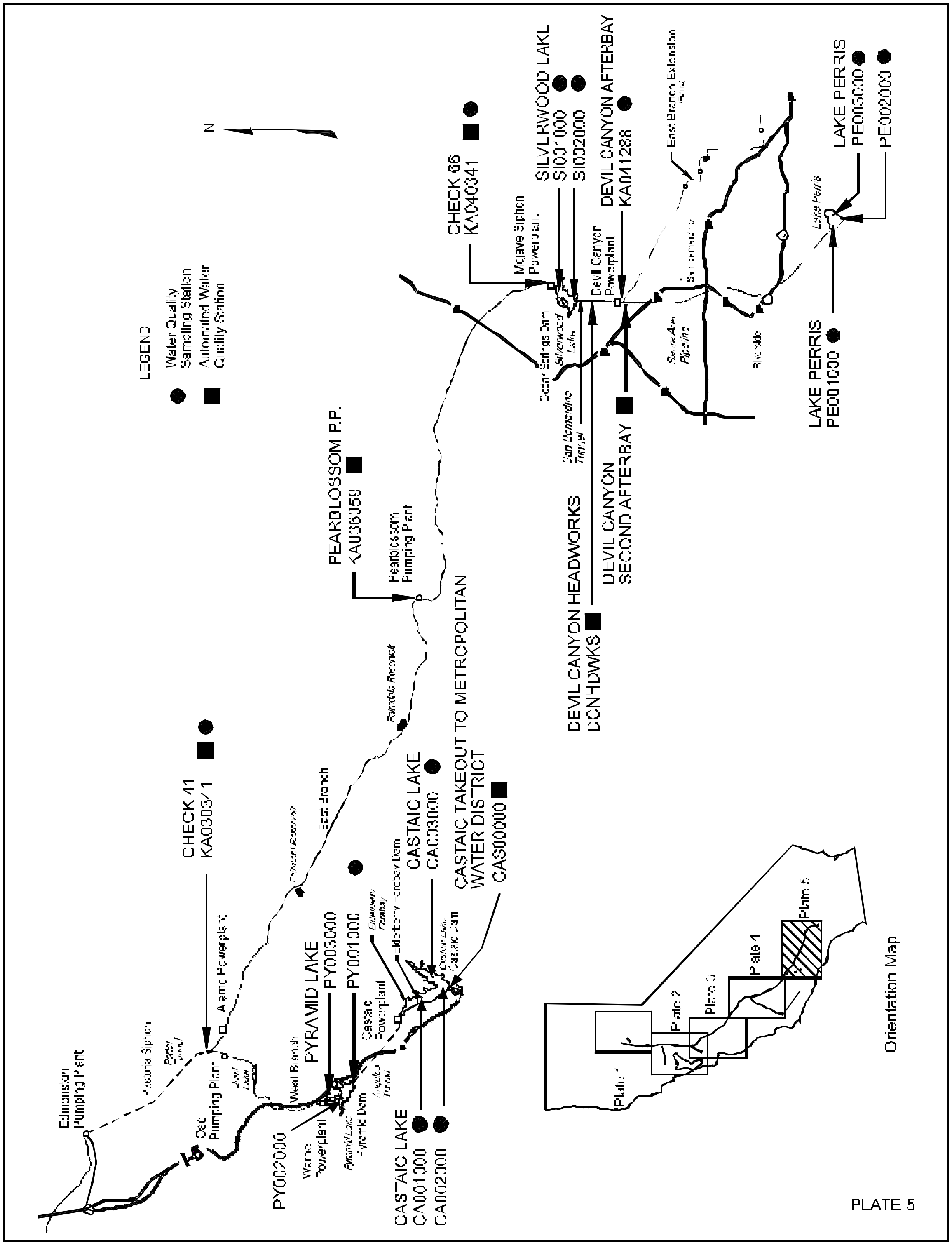

LEGEND
Water Quality Sampling Station
Automated Water Quality Station
CHECK 66
KA040341
SILVERWOOD LAKE
DEVIL CANYON AFTERBAY
PEARBLOSSOM P.P.
Pearblossom Pumping Plant
CHECK 41
PYRAMID LAKE
PY003000
PY001000
PY002000
CASTAIC LAKE
CA001000
CA002000
CASTAIC TAKEOUT TO METROPOLITAN WATER DISTRICT
DEVIL CANYON HEADWORKS
DCNHDWKS
DEVIL CANYON SECOND AFTERBAY
LAKE PERRIS
PE001000
Orientation Map
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	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

Contents

List of Tables

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

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)
		CONCENTRATION (mg/L unless otherwise noted)													
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	26	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	206
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	215
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	15.0	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	69	7.1	19	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	36.0							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	78	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	166	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	26	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	266	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	23.8	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	26	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	48.0	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	386	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	280	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	206	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	66	< 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	486
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	436
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	48	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

STATION	DATE	ARSENIC	ALUMINUM	BARIUM	CADMIUM	CHROMIUM	COPPER	IRON	LEAD	MANGANESE	MERCURY	SELENIUM	SILVER	ZINC
		CONCENTRATION, mg/L												
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	0.006	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

		CONCENTRATION, mg/L												
STATION	DATE	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	0.006	< 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			0.184		
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			0.290		
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		0.067	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		0.067	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