

**H EXAMPLE OF CALIFORNIA WATER CODE SECTION 13267 ORDER FOR EFFLUENT  
METHYLMERCURY MONITORING (4 PAGES)  
& DISCHARGERS TO WHICH A LETTER WAS SENT**



# California Regional Water Quality Control Board

## Central Valley Region



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16 June 2004

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### **ORDER FOR UNFILTERED METHYLMERCURY WASTE DISCHARGE DATA PURSUANT TO CALIFORNIA WATER CODE SECTION 13267 (MONTHLY SAMPLING) NPDES NO. «NPDES\_NO»**

Section 303(d) of the federal Clean Water Act requires States to list water bodies that do not meet water quality objectives to protect their beneficial uses and to develop and implement Total Maximum Daily Load (TMDL) control programs to eliminate the impairment of beneficial uses.

The Sacramento and San Joaquin Rivers and associated Delta Estuary were placed on the 303(d) list because of elevated methylmercury concentrations in fish. Recent data demonstrate a statistically significant correlation between methylmercury concentrations in water and fish, i.e., as concentrations of methylmercury increase in the water column, concentrations of methylmercury also increase in fish resident in that water column. The data thus suggest that the annual median methylmercury concentration of a water body is a major factor determining resident fish tissue methylmercury levels. The proposed TMDL goal to protect Delta beneficial uses is 0.05 nanograms per liter (ng/l) methylmercury in water.

Limited methylmercury effluent data are available for local NPDES facilities. A recent survey by the Regional Board found considerable variability between facilities and demonstrated that some plants were discharging methylmercury above the proposed TMDL goal. Table 1 summarizes data collected by the Regional Board in February and March of 2004 as well as data collected by the Sacramento Regional County Sanitation District from a year-long study in 2001.

Section 13267 of the California Water Code states in part that a regional board may investigate the quality of waters within its region, and in doing so may require dischargers to furnish technical or monitoring reports which the regional board requires. The burden, including costs, of these reports must bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports.

The monitoring reports required by this letter are necessary to determine the extent to which NPDES facilities are contributing methylmercury in concentrations that impair beneficial uses of receiving waters. Preliminary load calculations using the information shown in Table 1 estimate that POTWs discharge significant portions of the total methylmercury loading to the Delta. Accurate discharge information will be required from treatment facilities to complete the TMDL.

***California Environmental Protection Agency***

**Table 1. Summary of unfiltered methylmercury concentrations in effluent from POTW's located in the Central Valley of California.**

<b>Facility</b>	<b># of Sampling Events</b>	<b>Mean Concentration (ng/l)</b>	<b>Range (ng/l)</b>
Sacramento Regional County Sanitation District	45	0.73	0.14-2.93
Stockton STP	2	0.34	0.13-0.59
Vacaville Easterly STP	2	0.10	0.09-0.11
West Sacramento STP	2	0.04	0.03-0.05
City of Roseville	2	0.01	0.01-0.01

Therefore pursuant to Section 13267 of the California Water Code, you are required to submit effluent methylmercury monitoring data for your facility. In most cases, this monitoring will be in addition to monitoring required in your NPDES Permit.

Instantaneous grab samples shall be collected monthly for one year (August 2004-July 2005) from the facility's effluent. Intermittent or seasonal dischargers shall collect monthly samples during those months for which a discharge occurs. The samples must be collected downstream from the last connection through which wastes can be admitted into the outfall, and shall be representative of the quality of the discharge from the treatment plant. Unfiltered methylmercury samples shall be taken using clean hands/dirty hands procedures<sup>1</sup> and shall be analyzed by U.S. EPA method 1630/1631 (Revision E) with a method detection limit of 0.02 ng/l. A matrix spike/matrix spike duplicate shall also be analyzed with either the first or second set of samples to insure an acceptable methylmercury recovery rate in your effluent. A travel-blank must also be collected and analyzed with every other set of samples. Any other methylmercury monitoring data collected by your plant during the above period shall also be reported to the Regional Board. If your facility is currently collecting total mercury data, methylmercury samples should be collected concurrently. A partial list of laboratories performing U.S. EPA method 1630/1631 is attached as Table 2.

While not required by this letter, we are also recommending that instantaneous grab samples be collected from the facility's upstream receiving water and the main influent to determine the methylmercury treatment efficiency of your facility.

Please submit quarterly reports summarizing the monitoring results to the Regional Board. The reports are due by 31 October 2004, 31 January 2005, 30 April 2005, and 31 July 2005. Your cooperation with this special discharge monitoring requirement is sincerely appreciated. However, we must advise that failure or refusal to comply with this request as required by Section 13267 of the California Water Code or falsifying any information provided may be subject to an administrative civil liability of up to \$1,000 per day of violation in accordance with Section 13268.

<sup>1</sup> Described in U.S. EPA method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels for collection of equipment blanks (section 9.4.4.2)

Please contact your regular Regional Board staff representative if you have any questions regarding this order.

THOMAS R. PINKOS  
Executive Officer

Attachment

**Table 2. List of Analytical Laboratories Measuring Methylmercury  
by U.S. EPA Method 1630/1631**

Presence on the list does not constitute endorsement by the Regional Board.

<b>Facility</b>	<b>Contact</b>	<b>Phone</b>
Battelle Marine Science Laboratory 1529 West Sequim Bay Road Sequim, WA 98382	Brenda Lasorsa	360-681-3650
Frontier GeoSciences 414 Pontius Ave N Seattle WA 98109 <a href="http://www.frontiergeosciences.com">http://www.frontiergeosciences.com</a>	Michelle Gauthier	206-622-6960
Brook-Rand Trace Metal Analysis and Products 3958 6 <sup>th</sup> Ave N.W. Seattle WA 98107 <a href="http://www.brooksrand.com">http://www.brooksrand.com</a>	Colin Davis	206-632-6206

Table H.1: NPDES-Permitted Facilities Required to Conduct Effluent Methylmercury Monitoring under Section 13267.

AGENCY NAME	FACILITY NAME	NPDES NO	MONITORING FREQUENCY (a)
AEROJET GENERAL CORPORATION	INTERIM GROUND WTP	CA0083861	B
AEROJET GENERAL CORPORATION	SACRAMENTO FACILITY	CA0004111	B
AFB CONVERSION AGENCY	A C & W - GW TREATMENT	CA0083992	Q
ANDERSON, CITY OF	ANDERSON WPCP	CA0077704	M
ATWATER, CITY OF	WWTF	CA0079197	M
AUBURN, CITY OF	AUBURN WWTP	CA0077712	M
BELL CARTER OLIVE COMPANY INC	BELL CARTER INDUSTRIAL WWTP	CA0083721	Q
BELL CARTER OLIVE COMPANY INC	PLANT 1	CA0081639	B
BELLA VISTA WD	BELLA VISTA WTP	CA0080799	B
BIGGS, CITY OF	BIGGS WWTP	CA0078930	Q
BRENTWOOD, CITY OF	BRENTWOOD WWTP	CA0082660	M
BROWN SAND, INC.	MANTECA AGGREGATE SAND PLANT	CA0082783	Q
CA DEPT OF FISH & GAME	DARRAH SPRINGS HATCHERY	CA0004561	Q
CA DEPT OF FISH & GAME	FEATHER RIVER HATCHERY	CA0004570	Q
CA DEPT OF FISH & GAME	MERCED RIVER FISH HATCHERY	CA0080055	Q
CA DEPT OF FISH & GAME	MOCCASIN FISH HATCHERY	CA0004804	Q
CA DEPT OF FISH & GAME	MOKELUMNE RIVER FISH HATCHERY	CA0004791	Q
CA DEPT OF FISH & GAME	NIMBUS HATCHERY	CA0004774	Q
CA DEPT OF FISH & GAME	SAN JOAQUIN FISH HATCHERY	CA0004812	Q
CA DEPT OF FISH & GAME	THERMALITO ANNEX HATCHERY	CA0082350	Q
CA DEPT OF GENERAL SERVICES	STATE PRINTING & WAREHOUSES	CA0078875	Q
CA STATE OF, CENTRAL PLANT	CENTRAL HEATING/COOLING FAC	CA0078581	Q
CALAVERAS TROUT FARM, INC	TROUT REARING FACILITY	CA0081752	Q
CALIF AMMONIA COMPANY	CALAMCO - STOCKTON TERMINAL	CA0083968	Q
CALIFORNIA DAIRIES, INC	LOS BANOS FOODS, INC	CA0082082	Q
CALPINE CORPORATION	GREENLEAF UNIT ONE COGEN PLANT	CA0081566	Q
CANADA COVE L.P.	FRENCH CAMP GOLF & RV PARK	CA0083682	Q
CHICO, CITY OF	CHICO REGIONAL WWTP	CA0079081	M
CLEAR CREEK CSD	CLEAR CREEK WTP	CA0083828	B
COLFAX, CITY OF	COLFAX WWTP	CA0079529	Q
COLUSA, CITY OF	COLUSA WWTP	CA0078999	Q
CORNING, CITY OF	CORNING INDUST/DOMESTIC WWTP	CA0004995	Q
CRYSTAL CREEK AGGREGATE INC	CRYSTAL CREEK AGGREGATE	CA0082767	B
DAVIS, CITY OF	CITY OF DAVIS WWTP	CA0079049	M
DEFENSE LOGISTICS AGENCY, ASCW	DDJC, SHARPE - GW CLEANUP	CA0081931	Q
DEUEL VOCATIONAL INSTITUTE	DEUEL VOCATNL INST. WWTP	CA0078093	Q
DISCOVERY BAY CSD	DISCOVERY BAY WWTP	CA0078590	M

Table H.1: NPDES-Permitted Facilities Required to Conduct Effluent Methylmercury Monitoring under Section 13267.

AGENCY NAME	FACILITY NAME	NPDES NO	MONITORING FREQUENCY (a)
DONNER SUMMIT PUBLIC UTILITY	DONNER SUMMIT WWTP	CA0081621	Q
EAST BAY MUD	CAMANCHE DAM POWER HOUSE	CA0082040	Q
EL DORADO ID	DEER CREEK WWTP	CA0078662	M
EL DORADO ID	EL DORADO HILLS WWTP	CA0078671	M
FORMICA CORPORATION	SIERRA PLANT	CA0004057	Q
GALT, CITY OF	GALT SD	CA0081434	M
GAYLORD CONTAINER CORPORATION	ANTIOCH PULP & PAPER MILL	CA0004847	M
GENERAL ELECTRIC CO	GAC GROUND WATER CLEANUP SYSTM	CA0083739	Q
GENERAL ELECTRIC CO	GWCS	CA0081833	Q
GRASS VALLEY, CITY OF	GRASS VALLEY WWTP	CA0079898	M
GWF POWER SYSTEMS, INC.	GWF POWER SYSTEMS, SITE IV	CA0082309	Q
HERSHEY FOODS CORP	HERSHEY CHOCOLATE USA, OAKDALE	CA0004146	Q
JACKSON, CITY OF	CITY OF JACKSON WWTP	CA0079391	Q
LEHIGH SOUTHWEST CEMENT CO	LEHIGH SOUTHWEST CEMENT CO	CA0081191	B
LINCOLN, CITY OF	CITY OF LINCOLN WWTP	CA0084476	M
LINDA CO WATER DISTRICT	LINDA CO WTR DIST WPCP	CA0079651	Q
LIVE OAK, CITY OF	CITY OF LIVE OAK WWTP	CA0079022	Q
LODI, CITY OF	WHITE SLOUGH WWTP	CA0079243	M
MANTECA, CITY OF	MANTECA WWTP	CA0081558	M
MARIPOSA PUD	WWTP	CA0079430	Q
MAXWELL P.U.D.	MAXWELL PUD WWTP	CA0079987	Q
MERCED, CITY OF	WWTP	CA0079219	M
MIRANT DELTA LLC	CONTRA COSTA POWER PLT ANTIOCH	CA0004863	M
MODESTO ID	MODESTO ID REGIONAL WTP	CA0083801	Q
MODESTO, CITY OF	GRAYSON PARK WELL NO.295	CA0083054	Q
MODESTO, CITY OF	MODESTO WATER QUALITY CTRL FAC	CA0079103	M
MOUNTAIN HOUSE CSD	MOUNTAIN HOUSE WWTP	CA0084271	M
MT LASSEN TROUT FARMS INC	MEADOWBROOK FACILITY	CA0080373	Q
NEVADA CITY, CITY OF	NEVADA CITY WWTP	CA0079901	Q
NEVADA CO SD #1	CASCADE SHORES WWTP	CA0083241	Q
NEVADA CO SD #1	LAKE OF THE PINES WWTP	CA0081612	Q
NEVADA CO SD #1	LAKE WILDWOOD WWTP	CA0077828	M
OLIVEHURST PUD	OLIVEHURST WWTP	CA0077836	M
ORIGINAL SIXTEEN TO ONE MINE	SIXTEEN TO ONE MINE	CA0081809	Q
OROVILLE WYANDOTTE ID	MINERS RANCH WTP	CA0083143	B
PACIFIC COAST SPROUT FARMS	SACRAMENTO FACILITY	CA0082961	Q
PACTIV CORP	PACTIV MOLDED PULP MILL	CA0004821	M
PARADISE ID	PARADISE WTP	CA0083488	B

Table H.1: NPDES-Permitted Facilities Required to Conduct Effluent Methylmercury Monitoring under Section 13267.

AGENCY NAME	FACILITY NAME	NPDES NO	MONITORING FREQUENCY (a)
PLACER CO FACILITY SERVICES 1	PLACER CO SMD NO 1	CA0079316	M
PLACER CO FACILITY SERVICES 1	PLACER CO SMD NO 3	CA0079367	Q
PLACER CO FACILITY SERVICES 1	SA NO 28, ZONE NO.6	CA0079341	Q
PLACERVILLE, CITY OF	HANGTOWN CREEK WWTP	CA0078956	M
PLANADA CSD	WWTP	CA0078950	Q
PROCTER AND GAMBLE COMPANY	PROCTER & GAMBLE CO WWTP	CA0004316	Q
RED BLUFF, CITY OF	RED BLUFF WW RECLAMATION PLANT	CA0078891	M
REDDING, CITY OF	CLEAR CREEK WWTP	CA0079731	M
REDDING, CITY OF	STILLWATER WWTP	CA0082589	M
RIO ALTO WD	LAKE CALIFORNIA WWTP	CA0077852	B
RIO VISTA, CITY OF	RIO VISTA WWTP	CA0079588	Q
RIO VISTA, CITY OF	TRILOGY WWTP	CA0083771	Q
RIVER HIGHLANDS CSD	HAMMONTON GOLD VILLAGE WWTP	CA0081574	Q
RIVIERA WEST MUTUAL WATER CO	RIVIERA WEST WATER SUPPLY TP	CA0083925	Q
ROSEVILLE, CITY OF	DRY CREEK WWTP	CA0079502	M
ROSEVILLE, CITY OF	PLEASANT GROVE WWTP	CA0084573	M
S.M.U.D.	RANCHO SECO NUCLEAR GEN STA 1	CA0004758	M
SACRAMENTO CO AIRPORT SYSTEM	SACRAMENTO INTERNATIONAL AIRPT	CA0034841	Q
SACRAMENTO COGENERATION AUTH.	PROCTOR & GAMBLE COGEN. PLANT	CA0083569	Q
SACRAMENTO MUNICIPAL UTILITY D	SMUD COGENERATION PLANT	CA0083658	Q
SACRAMENTO REGIONAL CSD-ELK GV	WALNUT GROVE WWTP	CA0078794	Q
SACRAMENTO, CITY OF	COMBINED WW COLLECTION/TRT SYS	CA0079111	M
SAN ANDREAS SANITARY DIST.	SAN ANDREAS WWTP	CA0079464	Q
SEWER COMM - OROVILLE REGION	OROVILLE WWTP	CA0079235	M
SHASTA CSA #17	COTTONWOOD WWTP	CA0081507	Q
SHASTA LAKE, CITY OF	SHASTA LAKE WTP	CA0004693	B
SHASTA LAKE, CITY OF	SHASTA LAKE WWTP	CA0079511	Q
SHEA, J F COMPANY INC	FAWNGDALE ROCK & ASPHALT	CA0083097	B
SIERRA PACIFIC INDUSTRIES	CAMINO SAWMILL	CA0078841	Q
SIERRA PACIFIC INDUSTRIES	MARTELL COMPLEX/SIERRA PINE	CA0004219	Q
SIERRA PACIFIC INDUSTRIES	SIERRA PACIFIC, ANDERSON DIV	CA0082066	Q
SIERRA PACIFIC INDUSTRIES	SIERRA PACIFIC, SHASTA LAKE DV	CA0081400	Q
STIMPEL-WIEBELHAUS ASSOCIATES	SWA AT MOUNTAIN GATE	CA0084140	B
STOCKTON COGENERATION COMPANY	STOCKTON COGENERATION FACILITY	CA0081965	Q
STOCKTON, CITY OF	STOCKTON WWTP	CA0079138	M
THE BOEING COMPANY	INTERIM TREATMENT SYSTEM	CA0084891	B
TRACY, CITY OF	TRACY WWTP	CA0079154	M
TUOLUMNE UD/JAMESTOWN SD	SONORA RWTP/JAMESTOWN WWTP	CA0084727	M



Table H.1: NPDES-Permitted Facilities Required to Conduct Effluent Methylmercury Monitoring under Section 13267.

AGENCY NAME	FACILITY NAME	NPDES NO	MONITORING FREQUENCY (a)
TURLOCK, CITY OF	TURLOCK WWTP	CA0078948	M
U.A. LOCAL 38 TRUST FUND	KONOCTI HARBOR INN	CA0083551	Q
U.S. BUREAU OF RECLAMATION	SLIGER MINE	CA00084905	Q
UC DAVIS	AQUATIC CENTER/ANIMAL SCIENCE	CA0083348	Q
UC DAVIS	HYDRAULICS LABORATORY	CA0084182	Q
UC DAVIS	UC DAVIS WWTP	CA0077895	M
UNITED AUBURN INDIAN COMMUNITY	AUBURN RANCHERIA CASINO WWTP	CA0084697	Q
US AIR FORCE - BEALE AFB	BEALE AFB WWTP	CA0110299	B
US AIR FORCE - MCCLELLAN AFB	GRND WTR EXTR & TRMT SYSTEM	CA0081850	B
US DEPT OF AGRICULTURE	UCD AQUATIC WEED LABORATORY	CA0083364	Q
USDI BUREAU OF RECLAMATION	WINTER RUN REARING FACILITY	CA0084298	Q
USDI FISH & WILDLIFE SERVICE	COLEMAN FISH HATCHERY	CA0004201	Q
VACAVILLE, CITY OF	EASTERLY WWTP	CA0077691	M
WASTE MANAGEMENT OF ALAMEDA CO	ALTAMONT LANDFILL & RESOURCE	CA0083763	Q
WEST SACRAMENTO, CITY OF	WEST SACRAMENTO WWTP	CA0079171	M
WHEELABRATOR SHASTA ENERGY CO	WHEELABRATOR SHASTA ENERGY CO	CA0081957	Q
WILLIAMS, CITY OF	WILLIAMS WWTP	CA0077933	Q
WILLOWS, CITY OF	WILLOWS WWTP	CA0078034	M
WOODLAND, CITY OF - DOMESTIC	WOODLAND WWTP	CA0077950	M
YUBA CITY	YUBA CITY WWTP	CA0079260	M
YUBA CWD	FORBESTOWN WTP	CA0084824	B

(a) Key: Biannual (B); Monthly (M); and Quarterly (Q).

## I URBAN RUNOFF CONSTITUENT CONCENTRATION DATA

**Figure I.1 Site Codes:**

1. Arcade Creek
2. City of Sac'to Strong Ranch Slough
3. City of Sac'to Sump 104
4. City of Sac'to Sump 111
5. Stockton Calaveras River Pump Station
6. Stockton Duck Creek Pump Station
7. Stockton Mosher Slough Pump Station
8. Stockton Smith Canal Pump Station
9. Tracy Drainage Basin 10 Outflow
10. Tracy Drainage Basin 5 Outflow
11. Tracy Lateral to Sugar Cut Slough

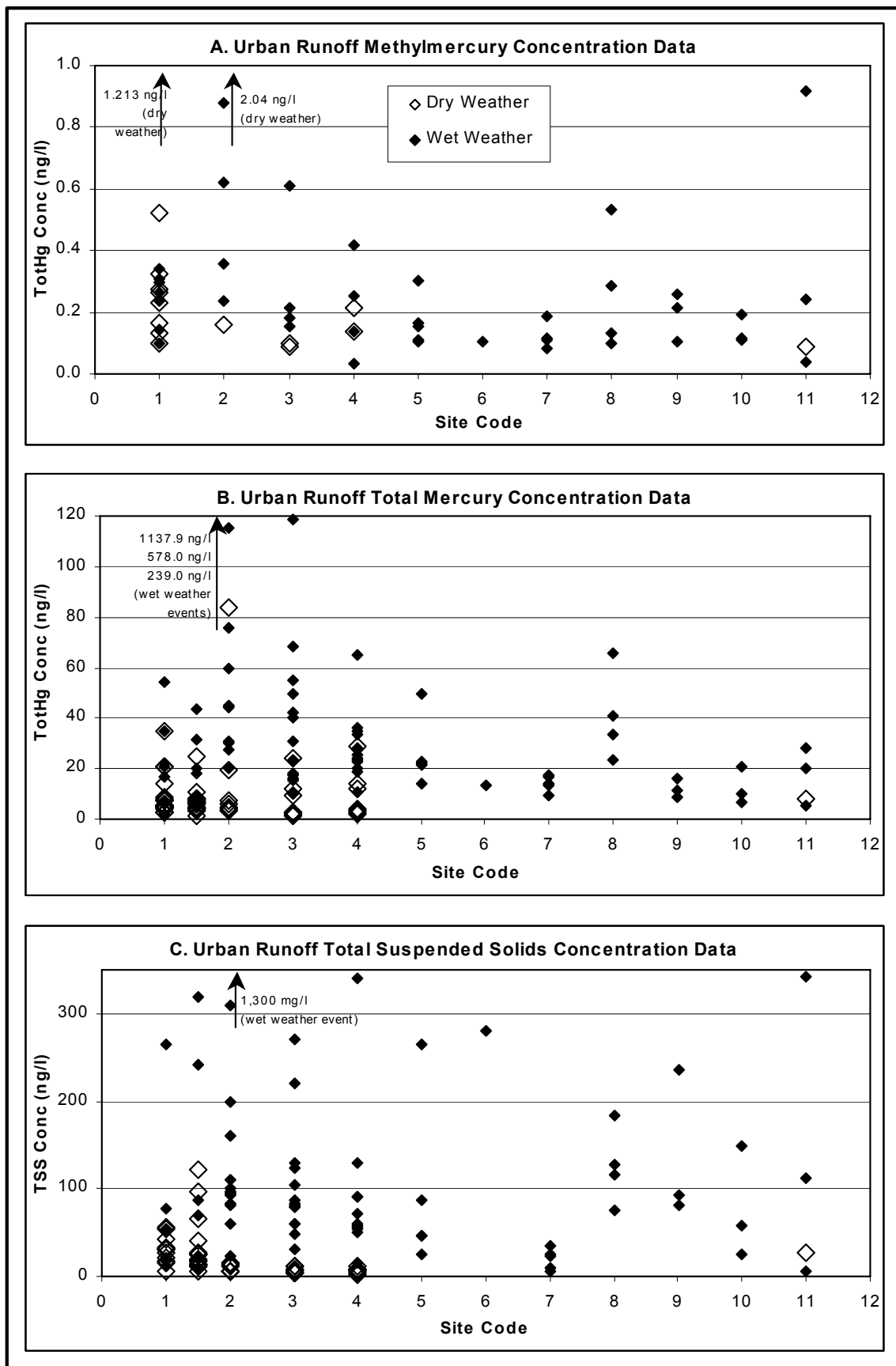


Figure I.1: Urban Runoff Constituent Concentrations.  
 (Site codes are defined on the next page. Appendix T provides the raw data and data sources.)

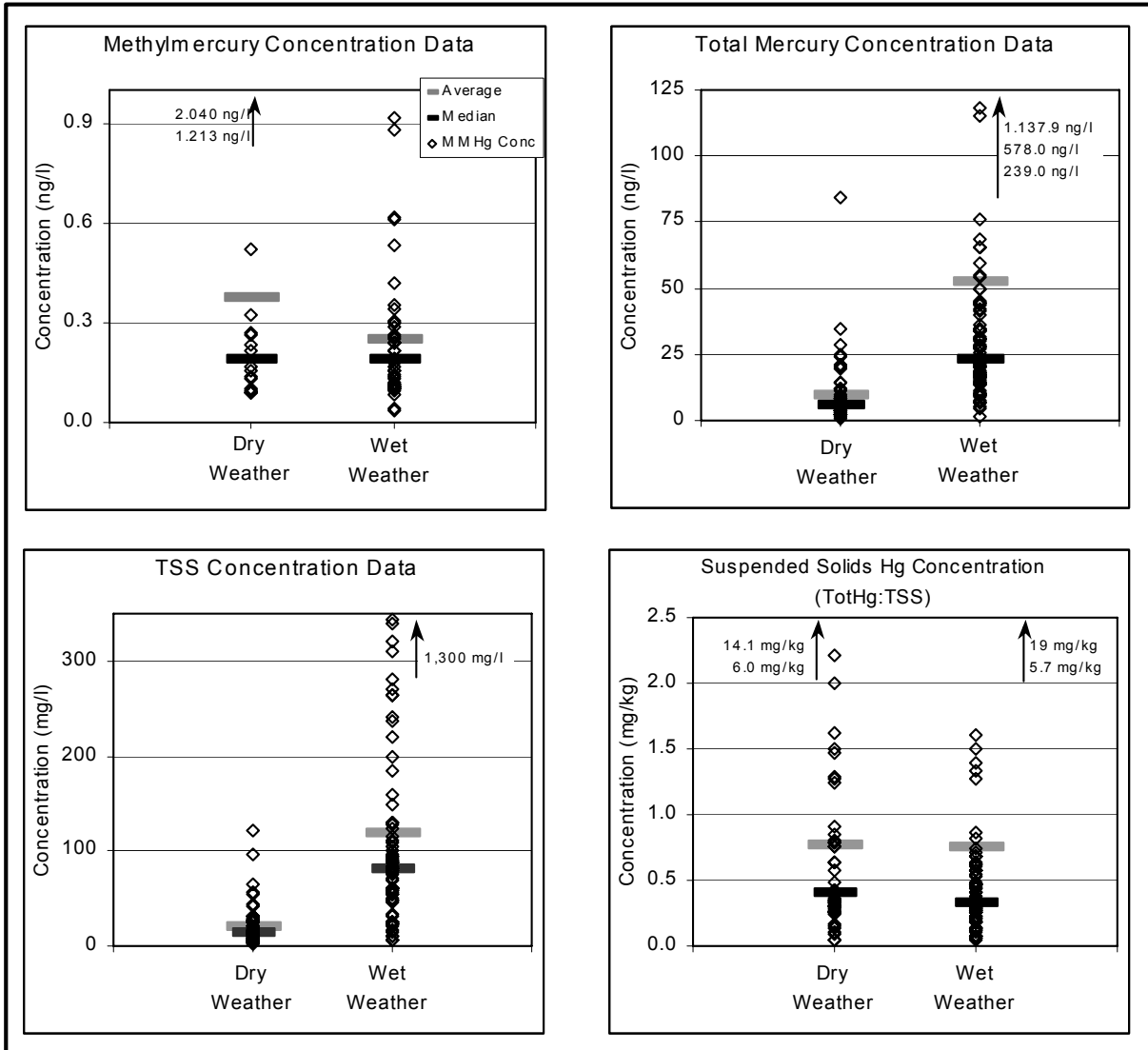


Figure I.2: Pooled Urban Runoff Constituent Concentrations.

## J SUMMARY OF TOTAL MERCURY AND TSS CONCENTRATION DATA FOR MAJOR DELTA TRIBUTARY INPUT AND EXPORT LOADS

*<IN PROGRESS.>*

Figures J.1 through J.5 present times series plots of available total mercury and TSS concentration data for the tributary monitoring stations. Figures J.# through J.# present the regression plots of mercury and TSS concentrations versus daily flow for each tributary monitoring station with daily flow data available. Figures J.# through J.# present the plots of total mercury versus TSS concentrations for each monitoring station.

Uncertainty of the regressions was estimated by calculating the 95% confidence intervals for the mean response (Helsel & Hirsch, 2002):<sup>8</sup>

$$\text{Confidence Intervals of Mean} = \left( \hat{y} - ts \sqrt{\frac{1}{n} + \frac{(x_0 - \bar{x})^2}{SS_x}}, \hat{y} + ts \sqrt{\frac{1}{n} + \frac{(x_0 - \bar{x})^2}{SS_x}} \right)$$

Where:

$x_0$  = specified value of x

$\hat{y}$  = predicted value from regression equation at  $x_0$

t = critical t value from two-sided t test

s = standard error of the regression

n = number of observations

$\bar{x}$  = mean of x [[GM: I can't seem to find the 'x bar' character]]

$SS_x$  = sum of squares x

Upper and lower concentration limits were calculated for each day of the flow record and were then multiplied by flow to determine the upper and lower loads. The statistical values were calculated using Microsoft Excel's Data Analysis ToolPak.

<sup>8</sup> Helsel D.R. and R.M. Hirsch. 2002. Statistical Methods in Water Resources. Techniques of Water-Resources Investigations of the United States Geological Survey Book 4, Hydrologic Analysis and Interpretation. September 2002.

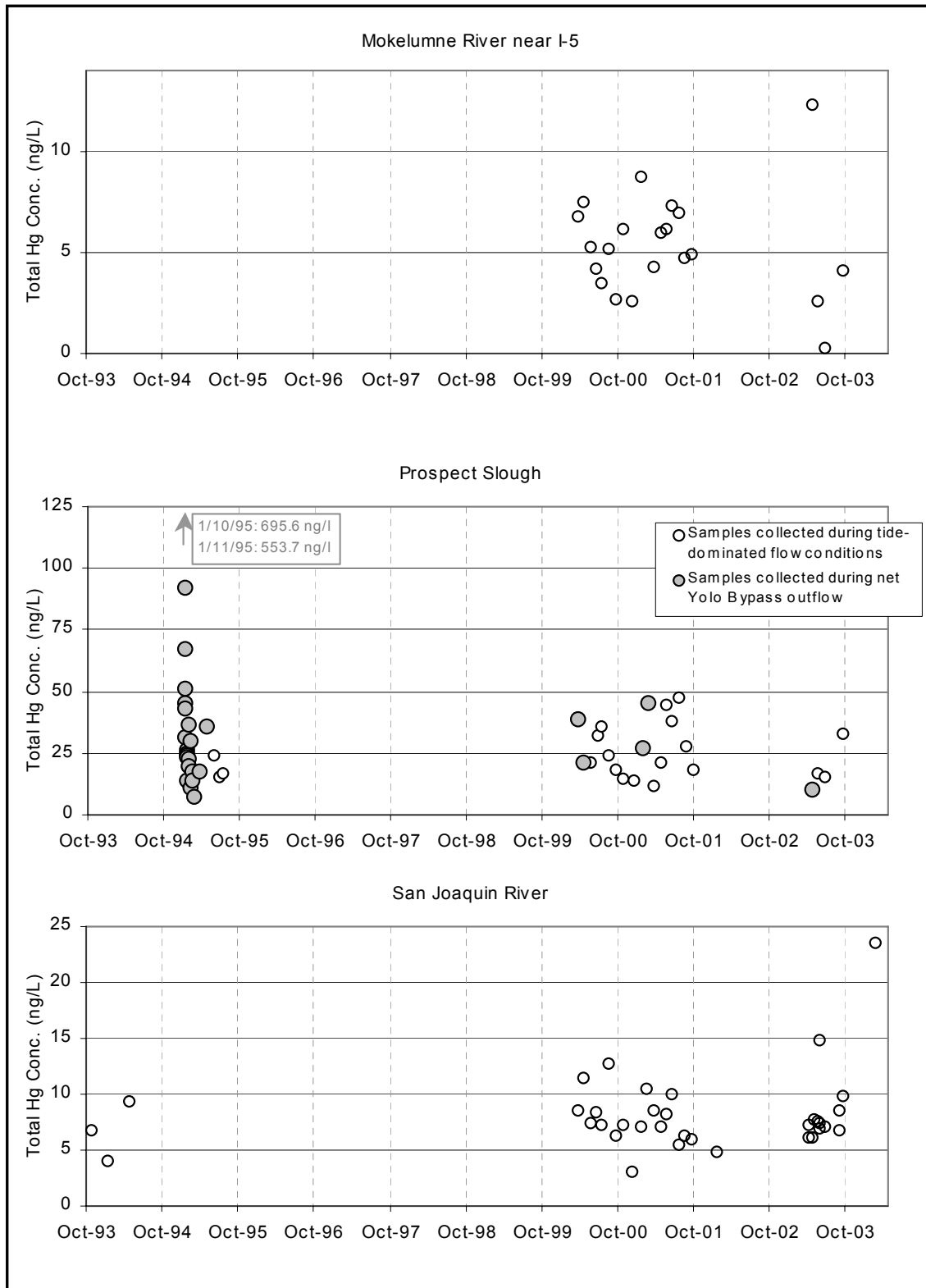


Figure J.1a: Available Total Mercury Concentration Data for the Mokelumne River, Prospect Slough and San Joaquin River.

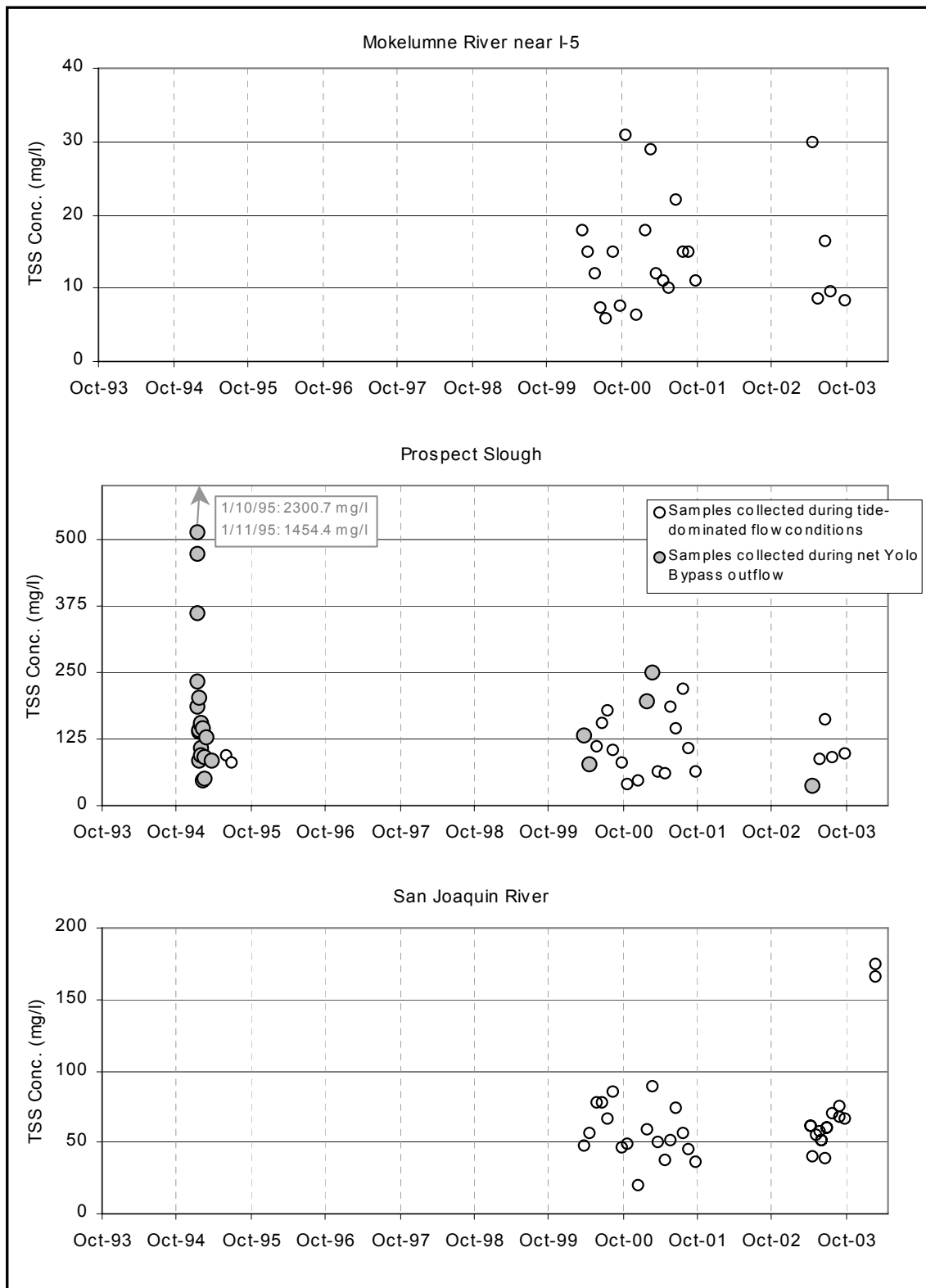


Figure J.1b: Available TSS Concentration Data for the Mokelumne River, Prospect Slough and San Joaquin River.

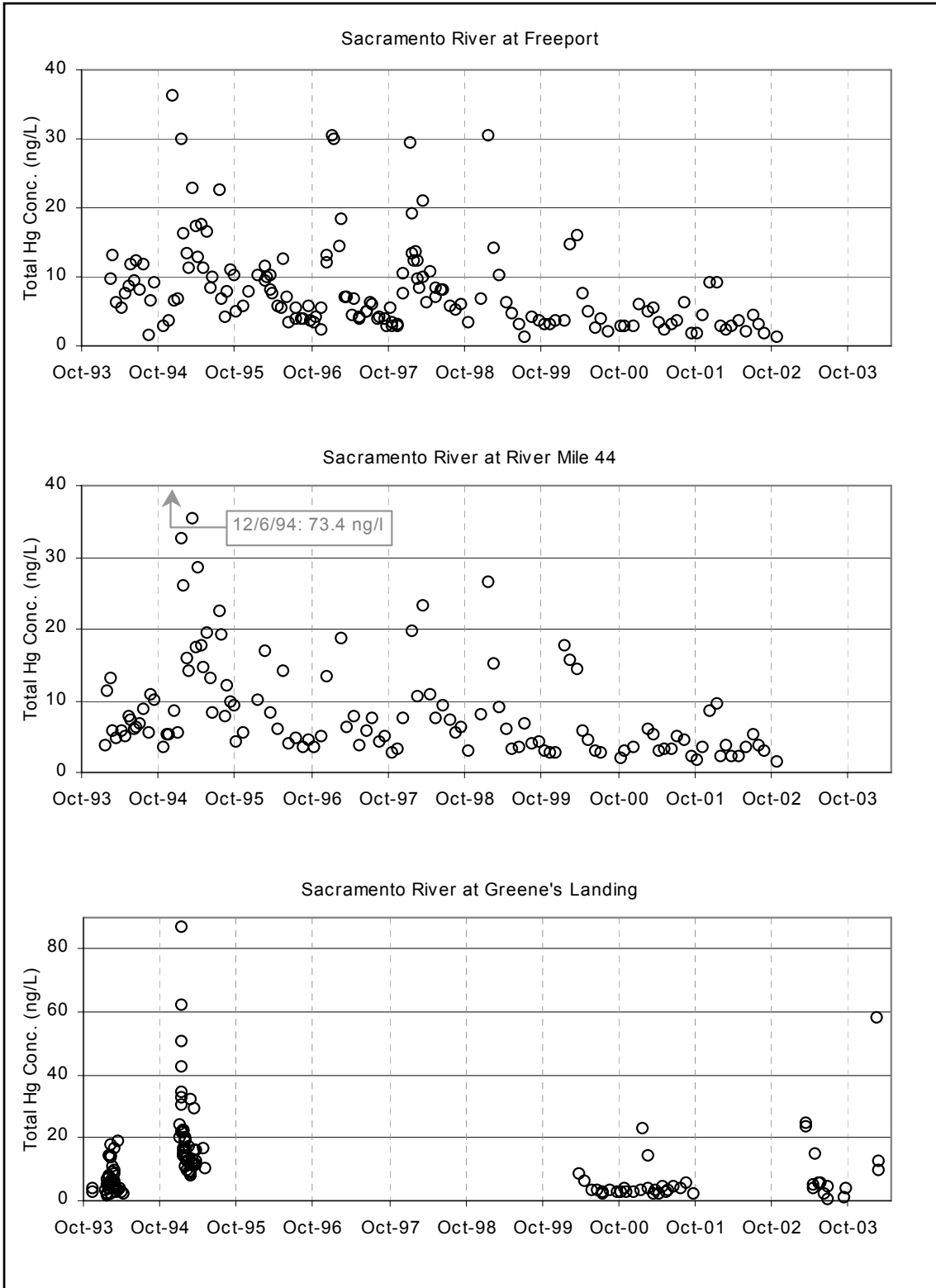


Figure J.2a: Available Total Mercury Concentration Data for the Sacramento River.



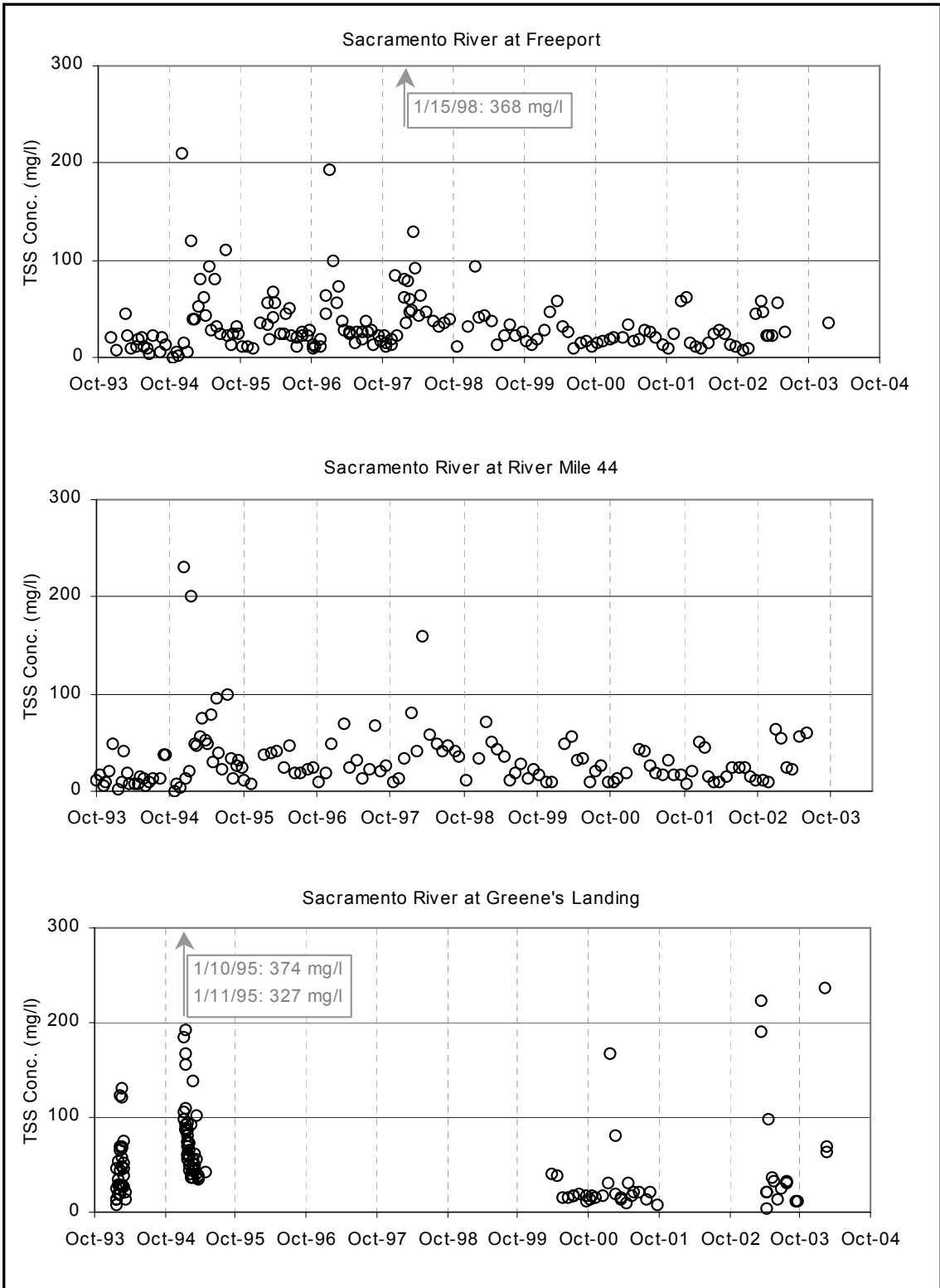


Figure J.2b: Available TSS Concentration Data for the Sacramento River.

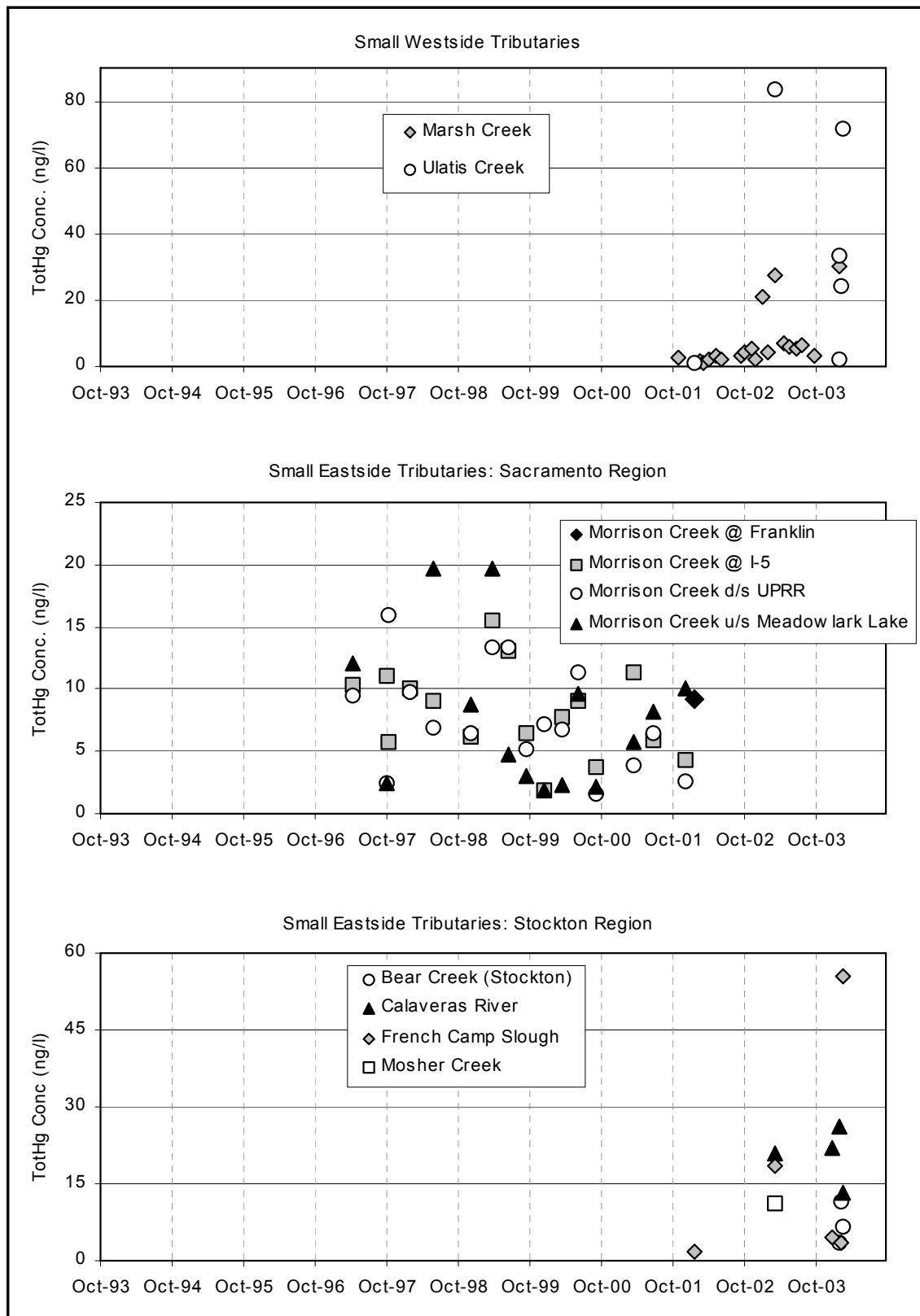


Figure J.3a: Available Total Mercury Concentration Data for Small Westside and Eastside Tributaries.

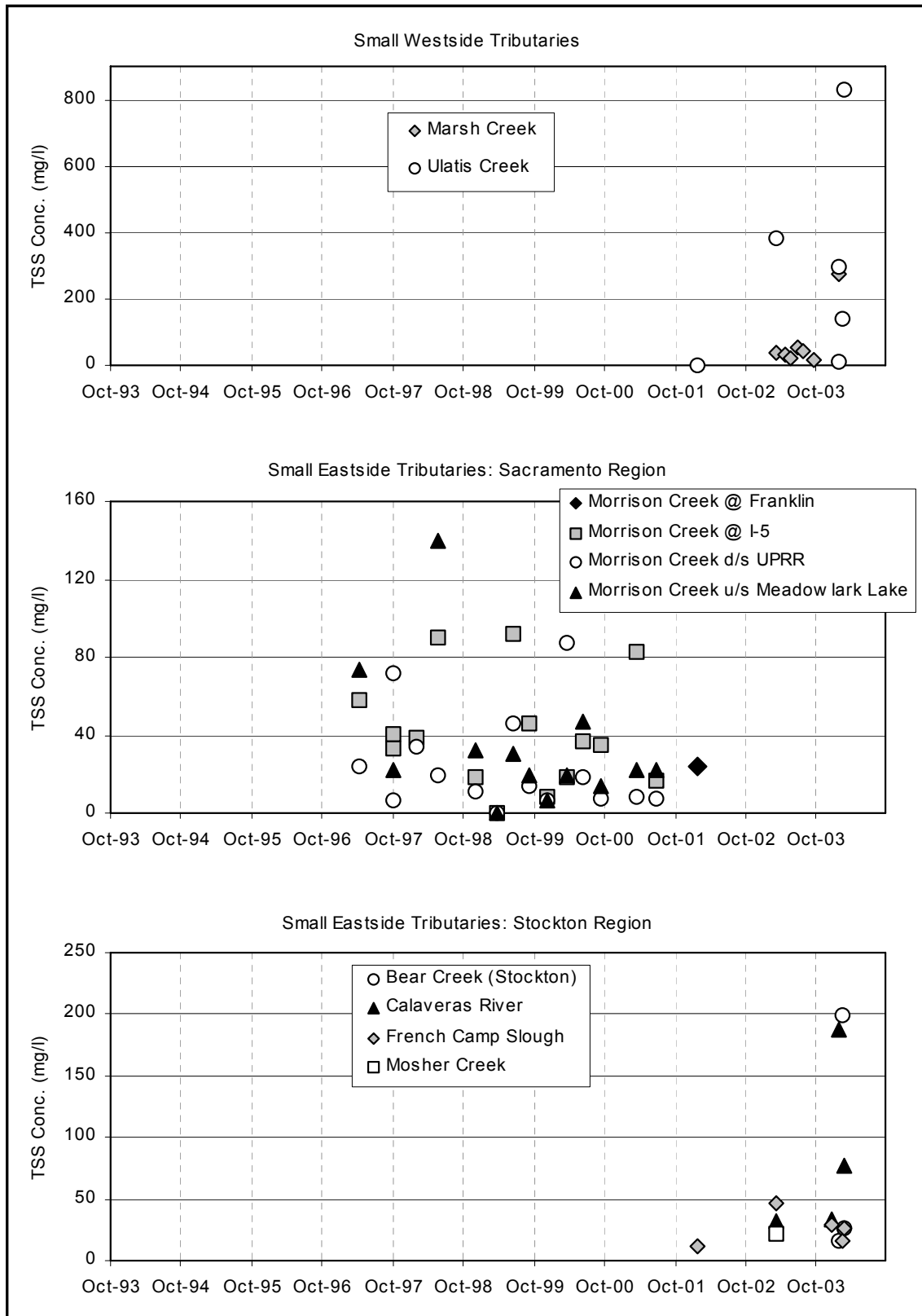


Figure J.3b: Available TSS Concentration Data for Small Westside and Eastside Tributaries.

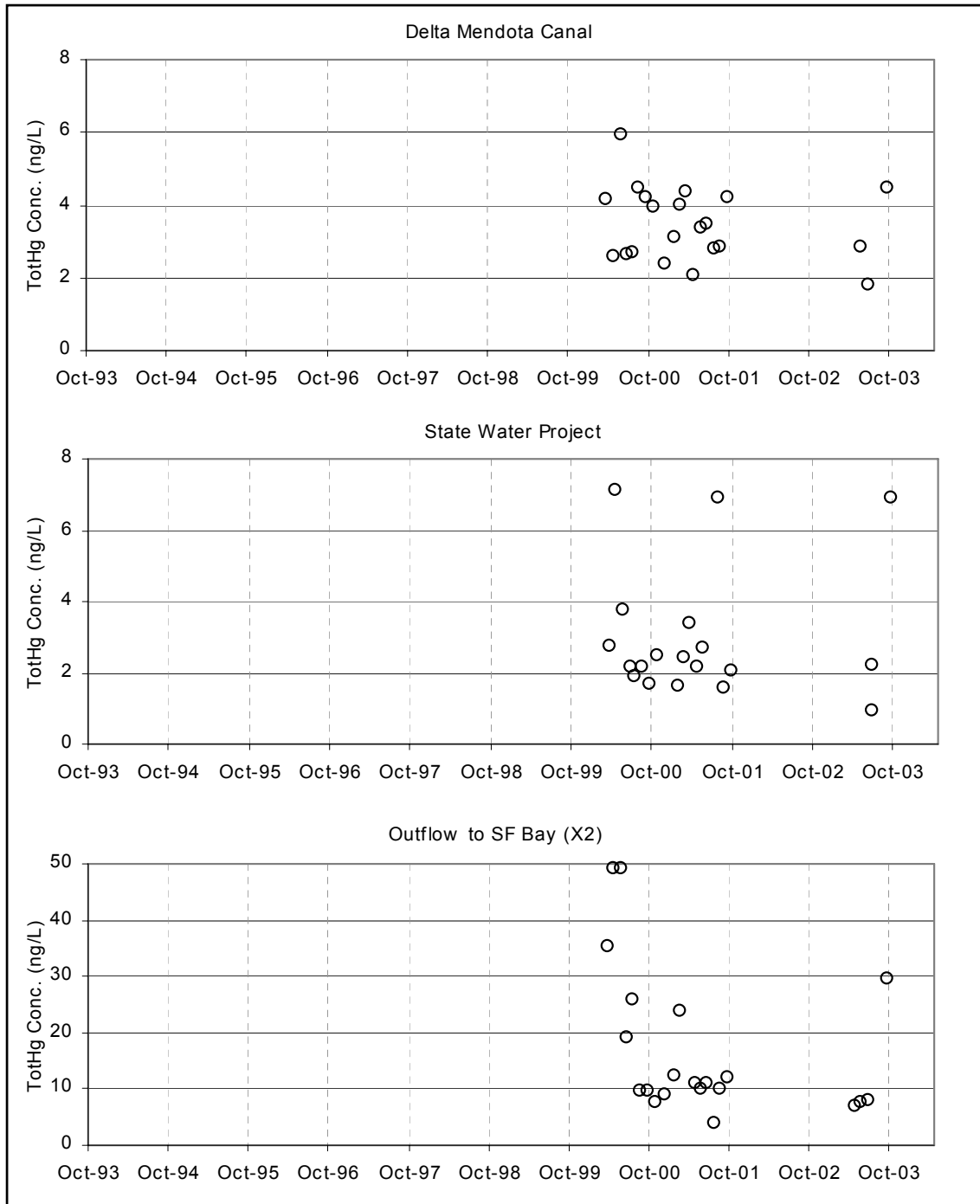


Figure J.4a: Available Total Mercury Concentration Data for Major Delta Exports.

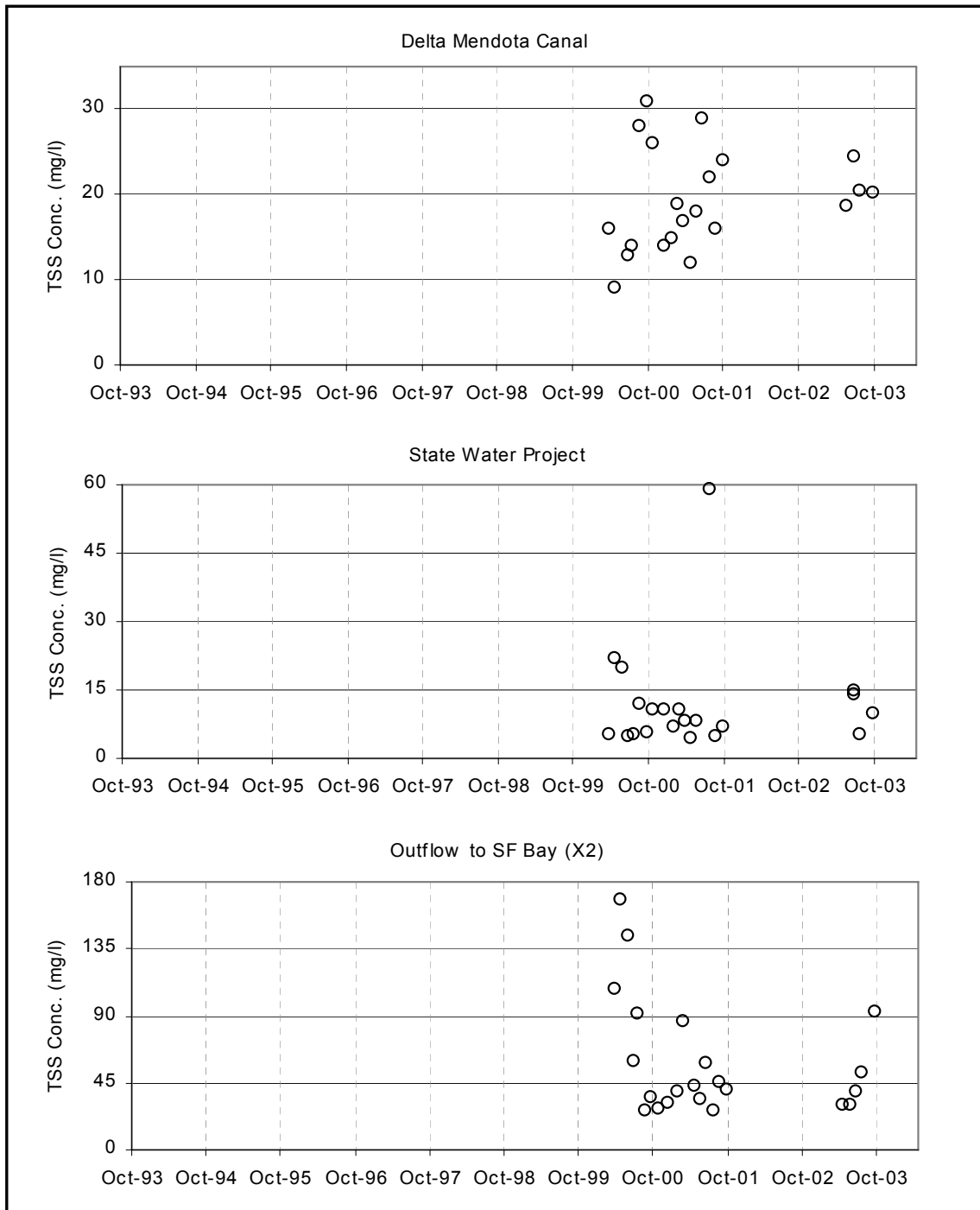


Figure J.4b: Available TSS Concentration Data for Major Delta Exports.

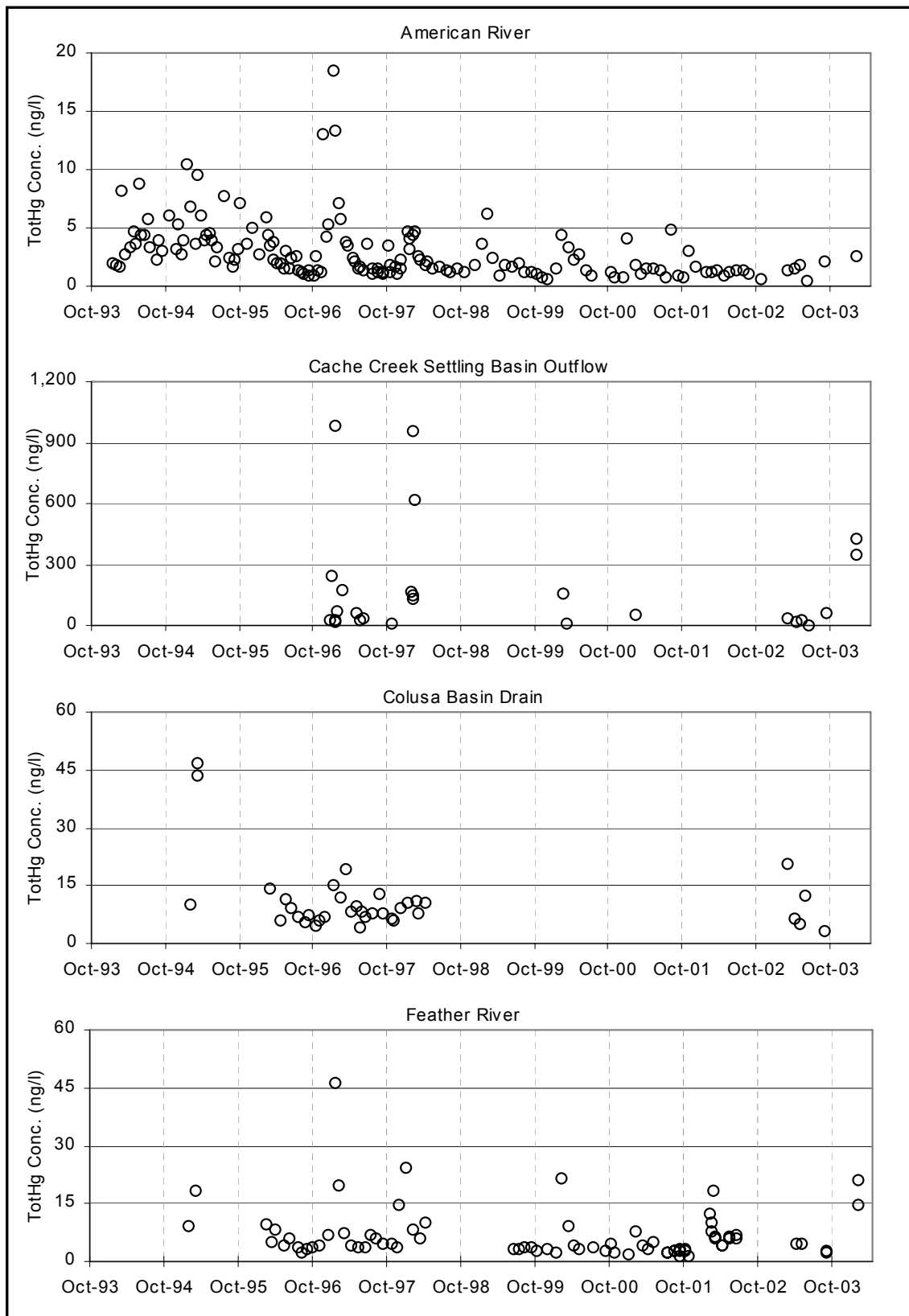


Figure J.5a: Available Total Mercury Concentration Data for American River, Cache Creek, Colusa Basin & Feather River Watershed Outflow Locations.

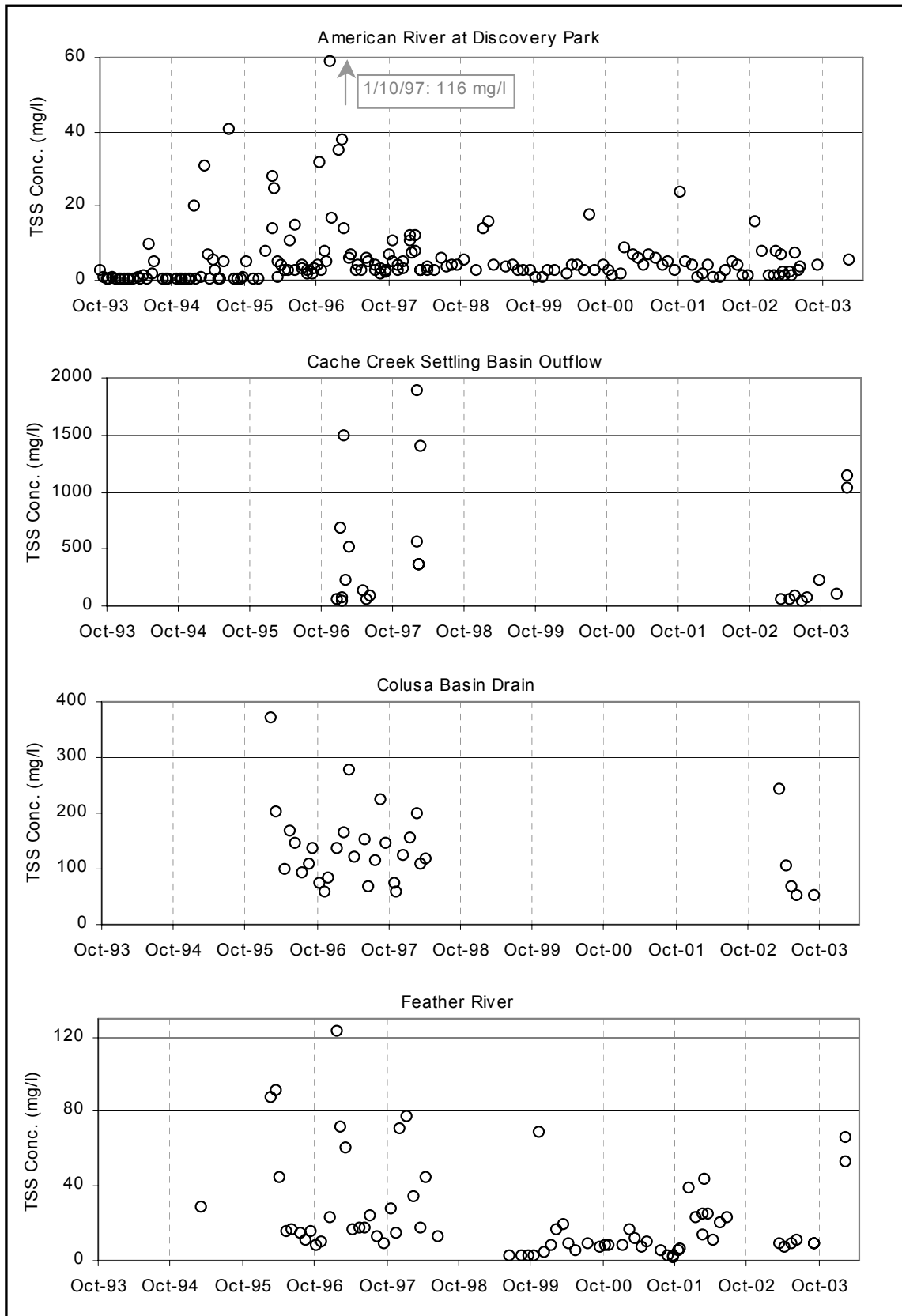


Figure J.5b: Available TSS Concentration Data for American River, Cache Creek, Colusa Basin & Feather River Watershed Outflow Locations.

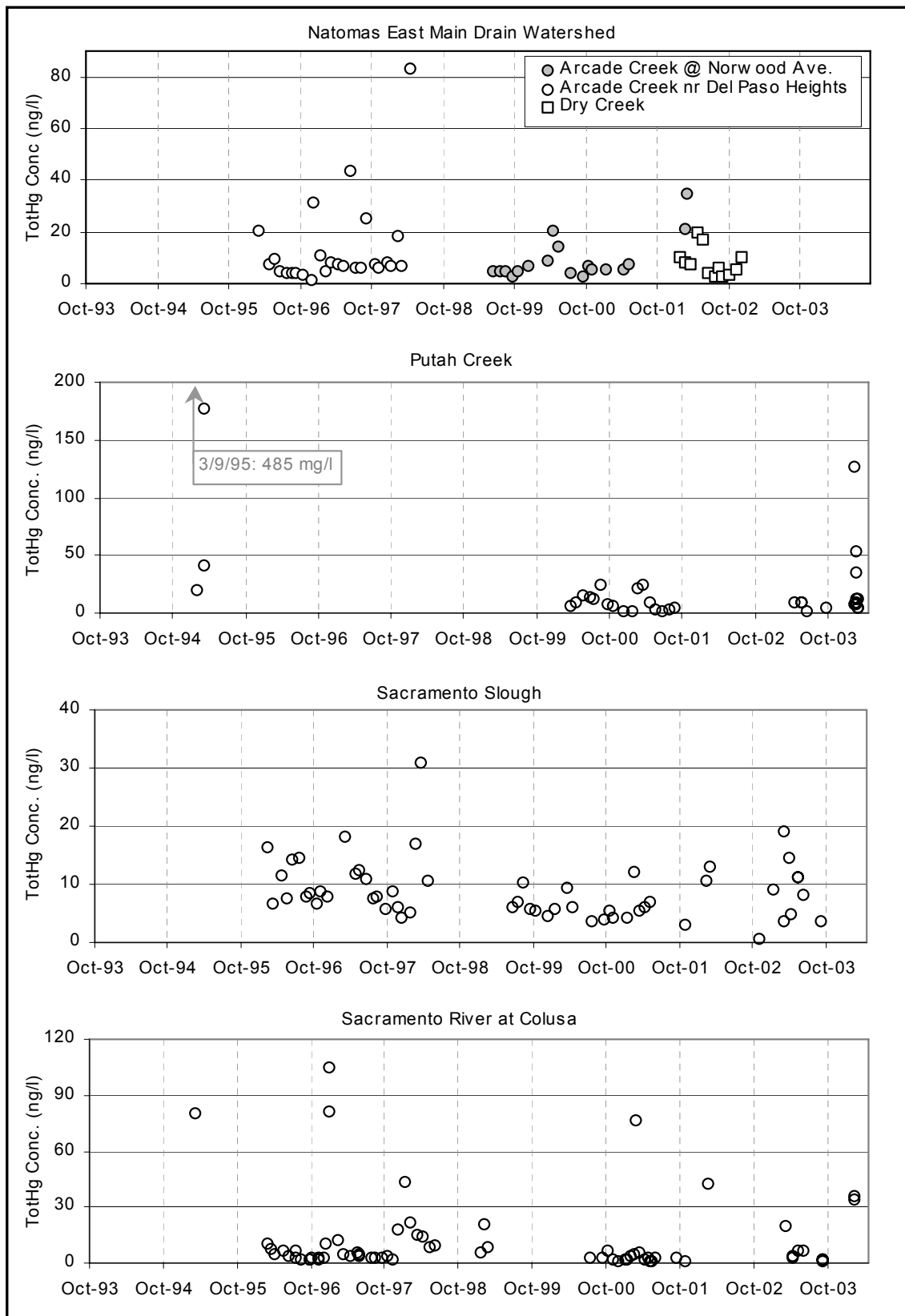


Figure J.6a: Available Total Mercury Concentration Data for Natomas East Main Drain, Putah Creek, Sacramento Slough (Sutter Bypass) & Sacramento River above Colusa Watershed Outflow Locations.



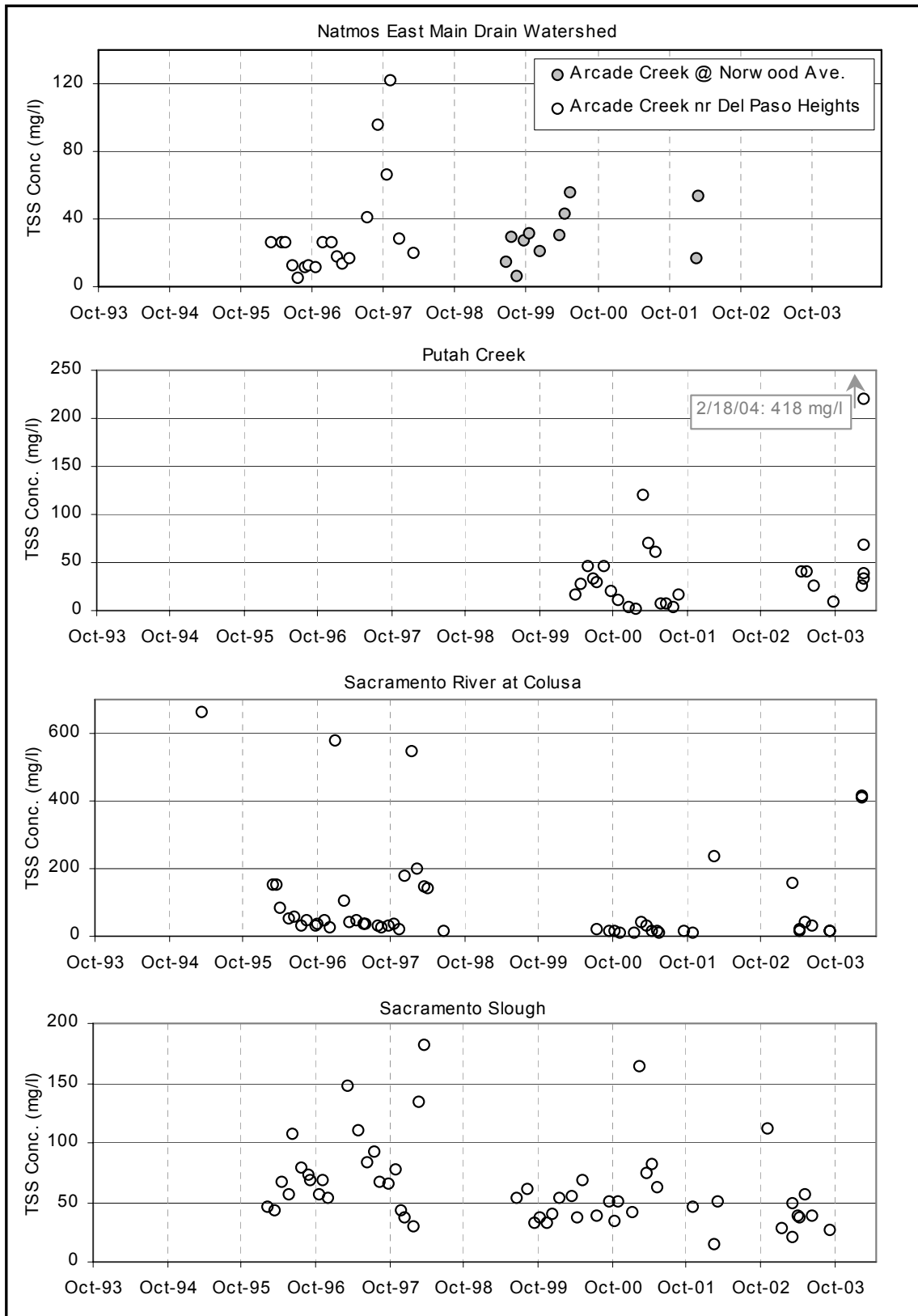


Figure J.6b: Available TSS Concentration Data for Natomas East Main Drain, Putah Creek, Sacramento Slough (Sutter Bypass) & Sacramento River above Colusa Watershed Outflow Locations.

**K 2002 ANNUAL TOTAL MERCURY LOADS FROM AIR EMISSION FACILITIES THAT REPORTED TO THE CALIFORNIA AIR RESOURCES BOARD (ARB, 2003)**

FACILITY TYPE / TOTAL MERCURY LOAD (kg)	American River below Folsom Dam	Bear Creek, Fresno R. & San Joaquin R. abv Res.	Butte Creek / Sutter Bypass	Cache Creek	Colusa Basin	Coon Creek & Cross Canal	Delta	Feather River below Oroville Dam	Morrison Creek	Natomas East Main Drain & Arcade Creek	Putah - Cache Lowlands	Sac'to River abv Colusa	Sac'to River abv Keswick Dam	San Joaquin River abv Vernalis	Ulatis Creek	Grand Total
ANIMAL & MARINE FATS AND OILS	4.048															<b>4.048</b>
BEET SUGAR							1.438									<b>1.438</b>
BRICK AND STRUCTURAL CLAY TILE								0.006								<b>0.006</b>
CANNED FRUITS AND VEGETABLES											0.00026			0.384		<b>0.384</b>
CANNED SPECIALTIES														0.000045		<b>0.000045</b>
CEMENT, HYDRAULIC												35.337				<b>35.337</b>
CHOCOLATE AND COCOA PRODUCTS														0.000076		<b>0.00008</b>
COLLEGES & UNIVERSITIES, NEC	0.002															<b>0.002</b>
COMMERCIAL PRINT / LITHOGRAPH									0.803							<b>0.803</b>
CONCRETE PRODUCTS, NEC									10.579							<b>10.579</b>
CONSTRUCTION SAND AND GRAVEL	0.004			2.275					0.104			0.00005				<b>2.383</b>
CORRECTIONAL INSTITUTIONS															0.012	<b>0.012</b>
COTTON GINNING														0.077		<b>0.077</b>
COTTONSEED OIL MILLS														8.844		<b>8.844</b>
CROP PREPARATION SVCS FOR MKT			0.001		0.006	0.001		0.003								<b>0.011</b>

FACILITY TYPE / TOTAL MERCURY LOAD (kg)	American River below Folsom Dam	Bear Creek, Fresno R. & San Joaquin R. abv Res.	Butte Creek / Sutter Bypass	Cache Creek	Colusa Basin	Coon Creek & Cross Canal	Delta	Feather River below Oroville Dam	Morrison Creek	Natomas East Main Drain & Arcade Creek	Putah - Cache Lowlands	Sac'to River abv Colusa	Sac'to River abv Keswick Dam	San Joaquin River abv Vernalis	Ulatris Creek	Grand Total
CRUSHED AND BROKEN STONE, NEC					0.018											0.018
DRILLING AND OIL AND GAS WELLS			0.003													0.003
ELECTRIC & OTHER SERVICES COMB					9.934		4.193					0.324	0.658	0.00004		15.109
ELECTRIC SERVICES							3.656									3.656
FOOD PREPARATIONS, NEC									1.313							1.313
FUNERAL SERVICE & CREMATORIES	1.643							0.617	7.194	2.343		2.801				14.598
GENERAL MED/SURGICAL HOSPITALS	0.00042								0.00011							0.001
GLASS CONTAINERS														0.00014		0.00014
GUIDED MISSILES AND SPACE VEH	0.00025															0.00025
INDUSTRIAL ORGANIC CHMLS, NEC									0.00005							0.00005
LAMINATED PLSTCS PLATE & SHEET						0.025										0.025
LAND MINERAL WILDLIFE CONSERV	0.006															0.006
MILLWORK										0.018						0.018
MISC NONMETALLIC MINERALS												0.053				0.053
NATIONAL SECURITY							0.000	13.041	0.001							13.042
NITROGENOUS FERTILIZERS														0.00035		0.00035

FACILITY TYPE / TOTAL MERCURY LOAD (kg)	American River below Folsom Dam	Bear Creek, Fresno R. & San Joaquin R. abv Res.	Butte Creek / Sutter Bypass	Cache Creek	Colusa Basin	Coon Creek & Cross Canal	Delta	Feather River below Oroville Dam	Morrison Creek	Natomas East Main Drain & Arcade Creek	Putah - Cache Lowlands	Sac'to River abv Colusa	Sac'to River abv Keswick Dam	San Joaquin River abv Vernalis	Ulatas Creek	Grand Total
PAPER MILLS							0.577									0.577
PAVING MIXTURES AND BLOCKS		0.030							0.045	0.079		5.382		0.002		5.538
PLASTICS MATERIALS AND RESINS									0.00010							0.00010
PREPARED FEEDS, NEC							0.00132									0.00132
RICE MILLING			0.0006		0.014		0.00093				0.001					0.017
SANITARY SERVICES, NEC												2.050				2.050
SAWMILLS & PLANING MILLS, GNL						0.005						0.068	3.062			3.134
SEMICONDUCTOR S/RELATED DEVICES	0.002															0.002
VEGETABLES OIL MILLS, NEC					0.00059											0.00059
VET SERV, SPECIALISTS	0.009									0.232						0.241
<b>Grand Total</b>	<b>5.714</b>	<b>0.030</b>	<b>0.005</b>	<b>2.275</b>	<b>9.972</b>	<b>0.031</b>	<b>9.867</b>	<b>13.661</b>	<b>20.045</b>	<b>2.672</b>	<b>0.001</b>	<b>45.964</b>	<b>3.772</b>	<b>9.308</b>	<b>0.012</b>	<b>123.330</b>

## L FISH MERCURY CONCENTRATION DATA INCORPORATED IN TMDL REPORT

Regional Board staff compiled and evaluated mercury concentration results for more than 2,800 fish samples collected from Delta waterways between 1969 and 2002. Because of the extensive nature of the raw data, it is not included in this report. Staff will provide the database electronically in a Microsoft Excel file upon request. The database includes sample results from the following sources:

CDFG. 1973. Department of Fish and Game Striped Bass Mercury Data, 1970-1973.

Davis, J.A, B.K. Greenfield, G. Ichikawa and M. Stephenson. 2003. *Mercury in Sport Fish from the Delta Region*. Final report submitted to the CALFED Bay-Delta Program for the project: An Assessment of the Ecological and Human Health Impacts of Mercury in the Bay-Delta Watershed (Task 2A). San Francisco Estuary Institute and Moss Landing Marine Laboratories. Available at: <http://loer.tamug.tamu.edu/calfed/FinalReports.htm>.

Davis, J.A., M.D. May, G. Ichikawa, and D. Crane. 2000. *Contaminant Concentrations in Fish from the Sacramento-San Joaquin Delta and Lower San Joaquin River – 1998*. San Francisco Estuary Institute report. Richmond, California. September 2000. Available at: <http://www.sfei.org/sfeireports.htm>.

ICEM. 1971. *Mercury in the California Environment*. Compiled by the Interagency Committee on Environmental Mercury, July 1970 - July 1971. Published by the California State Department of Public Health, Environmental Health and Consumer Protection Program. Berkeley, California.

LWA. 2003. *Sacramento River Watershed Program Annual Monitoring Report: 2001–2002 (Public Draft)*. Larry Walker and Associates (LWA). Davis, CA. April 2003. Available at: <http://www.sacriver.org/>.

Schwarzbach, S. and T. Adelsbach. 2002. *Field Assessment of Avian Mercury Exposure in the Bay-Delta Ecosystem*. Submitted to the CALFED Bay-Delta Program for the project: An Assessment of the Ecological and Human Health Impacts of Mercury in the Bay-Delta Watershed (Task 3A). U.S. Geological Survey Biological Research Division and U.S. Fish and Wildlife Service. September 2002. Available at: <http://loer.tamug.tamu.edu/calfed/FinalReports.htm>.

SWRCB-DWQ. 2002. State Mussel Watch Program / Toxic Substances Monitoring Program. Electronic databases. State Water Resources Control Board, Division of Water Quality (SWRCB-DWQ). Available at: <http://www.waterboards.ca.gov/programs/smw/>.

Slotton, D.G., S.M. Ayers, T.H. Suchanek, R.D. Weyland, A.M. Liston, C. Asher, D.C. Nelson, and B. Johnson. 2002. *The Effects of Wetland Restoration on the Production and Bioaccumulation of Methylmercury in the Sacramento-San Joaquin Delta, California*. Draft final report submitted to the CALFED Bay-Delta Program for the project: An Assessment of the Ecological and Human Health Impacts of Mercury in the Bay-Delta Watershed. University of California, Davis, Dept. of Environmental Science and Policy, Dept. of Wildlife, Fish & Conservation Biology, and Division of Microbiology; U.S. Fish and Wildlife Service, Division of Environmental Contaminants. Available at: <http://loer.tamug.tamu.edu/calfed/DraftReports.htm>.

## M AQUEOUS METHYLMERCURY, TOTAL MERCURY AND TSS CONCENTRATION DATA INCORPORATED IN TMDL REPORT

Regional Board staff compiled and evaluated methylmercury, total mercury, and TSS concentration results for thousands of waters samples characterizing Delta inputs and exports. Because of the extensive nature of the raw data, it is not included in this report. Staff will provide the database electronically in a Microsoft Excel file upon request. The database includes sample results from ongoing Regional Board sampling programs, NPDES facility and MS4 monitoring reports, and the following sources:

Alpers, C.N., R.C. Antweiler, H.E. Taylor, P.D. Dileanis, and J.L. Domagalski, 2000. *Metals Transport in the Sacramento River, California, 1996-1997, Volume 1: Methods and Data*. U.S. Geological Survey Water-Resources Investigation Report 99-4286. Sacramento, CA.

CMP. 2004. Microsoft Access database that compiles Sacramento River Watershed water quality data collected for the Coordinated Monitoring Program. Database provided by Sacramento Regional County Sanitation District (Steve Nebozuk, CMP Program Manager) to Central Valley Regional Water Quality Control Board (Michelle Wood, Environmental Scientist, Sacramento).

Domagalski J, Slotton DG, Alpers CN, Suchanek TH, Churchill RK, Bloom NS, Ayers SM, Clinkenbeard JP, 2002. Summary and Synthesis of Mercury Studies in the Cache Creek Watershed, California, 2000-2001. Final Report., U.S. Geological Survey; UC Davis; U.S. Fish and Wildlife Service; California Department of Conservation; California Geological Survey; and Frontier Geosciences, Inc. Prepared for the CALFED Bay-Delta Program, Directed Action #99-B06. Available at: <http://loer.tamug.tamu.edu/calfed/FinalReports.htm>.

Domagalski, J.L., P.D. Dileanis, D.L. Knifong, C.M. Munday, J.T. May, B.J. Dawson, J.L. Shelton, and C.N. Alpers. 2000. Water-Quality Assessment of the Sacramento River Basin, California: Water-Quality, Sediment and Tissue Chemistry, and Biological Data, 1995-1998. U.S. Geological Survey Open-File Report 00-391. Available at: [http://ca.water.usgs.gov/sac\\_nawqa/waterindex.html](http://ca.water.usgs.gov/sac_nawqa/waterindex.html)

DWR. 2001. California Department of Water Resources Special Tributary Project and Offstream Storage Investigation (OSI). Unpublished electronic data e-mailed by DWR (Jerry Boles) to Central Valley Regional Water Quality Control Board (Michelle Wood, Environmental Scientist, Sacramento) on October 15, 2001.

Foe, C.G. 2003. *Mercury Mass Balance for the Freshwater Sacramento-San Joaquin Bay-Delta Estuary*. Final report submitted to the CALFED Bay-Delta Program for the project: An Assessment of the Ecological and Human Health Impacts of Mercury in the Bay-Delta Watershed (Task 1A). California Regional Water Quality Control Board, Central Valley Region. Sacramento, CA. Available at: <http://loer.tamug.tamu.edu/calfed/FinalReports.htm>.

Foe, C.G. and W. Croyle. 1998. *Mercury Concentrations and Loads from the Sacramento River and from Cache Creek to the Sacramento-San Joaquin Delta Estuary*. California Regional Water Quality Control Board, Central Valley Region. Sacramento, CA. Staff report. June 1998.

Slotton, D.G., S.M. Ayers, T.H. Suchanek, R.D. Weyland, A.M. Liston, C. Asher, D.C. Nelson, and B. Johnson. 2002. *The Effects of Wetland Restoration on the Production and Bioaccumulation of Methylmercury in the Sacramento-San Joaquin Delta, California*. Draft final report submitted to the CALFED Bay-Delta Program for the project: An Assessment of the Ecological and Human Health Impacts of Mercury in the Bay-Delta Watershed. University of California, Davis, Dept. of Environmental Science and Policy, Dept. of Wildlife, Fish & Conservation Biology, and Division of

Microbiology; U.S. Fish and Wildlife Service, Division of Environmental Contaminants.  
Available at: <http://loer.tamug.tamu.edu/calfed/DraftReports.htm>.

SRWP. 2004. Microsoft Access database that compiles Sacramento River Watershed water quality data collected for the Sacramento River Watershed Program. Database provided by Larry Walker Associates (Claus Suverkropp) to Central Valley Regional Water Quality Control Board (Michelle Wood, Environmental Scientist, Sacramento).

Stephenson, M., B. Sohst and S. Mundell. 2002. *Mercury Lagrangian Study Between Colusa and Hamilton City*. Study Conducted by Moss Landing Marine Labs and California Department of Fish and Game for the Sacramento Regional County Sanitation District. January 2002.

USGS. 2003. Microsoft Excel Spreadsheets of unpublished data for Bear River Mercury Cycling Project. Data provided by USGS (Charlie Alpers, Research Chemist) to Central Valley Regional Water Quality Control Board (Michelle Wood, Environmental Scientist, Sacramento).

## N SUMMARY OF AVAILABLE AQUEOUS METHYLMERCURY DATA FOR THE FEATHER RIVER AND CACHE CREEK SETTLING BASIN OUTFLOWS

Table N.1: Summary of Raw (Unfiltered) Methylmercury Data for Feather River and Cache Creek Settling Basin Outflows

Sample Date	Data Source	Feather River near Nicolaus (ng/l)	Cache Creek Settling Basin (ng/l)
3/1/00	Foe, 2002		0.443
3/18/00	Foe, 2002		0.204
7/21/00	SRWP, 2003	0.035	
9/21/00	SRWP, 2003	0.057	
10/19/00	SRWP, 2003	0.080	
11/8/00	SRWP, 2003	0.058	
1/17/01	SRWP, 2003	0.062	
2/21/01	SRWP, 2003	0.118	
2/22/01	Foe, 2002		0.328
3/21/01	SRWP, 2003	0.105	
4/18/01	SRWP, 2003	0.152	
5/16/01	SRWP, 2003	0.277	
9/26/01	SRWP, 2003	0.094	
11/4/01	SRWP, 2003	0.118	
2/22/02	SRWP, 2003	0.090	
3/8/02	SRWP, 2003	0.106	
4/21/03	Foe, 2002	0.099	
5/20/03	Foe, 2002	0.067	
5/27/03	Foe, 2002		0.532
6/30/03	Foe, 2002		0.421
9/17/03	Foe, 2002	0.057	
9/29/03	Foe, 2002		0.991 (a)
<b>Average:</b>		<b>0.098</b>	<b>0.486</b>

(a) Average of field duplicates, 0.971 and 1.010 ng/l.