

Appendix F

**Statistical Comparison of Measured
Values and Modeled Values for
Flow and Water Quality**

Used in the Chollas Creek Metals Total Maximum Daily Load

California Regional Water Quality Control Board, San Diego Region

Introduction

This appendix compares measured flow and water quality values against those generated from model runs. Data are presented side-by-side for direct comparison. Simple statistical comparisons are also offered.

Flow

Table 1 lists all modeled and measured values from November 1, 2001 to December 30, 2003 for the Chollas Creek Watershed. Table 2 shows all observed values above 2.28 cubic feet per second (cfs), which is the definition of wet weather conditions, and the corresponding modeled average flows. Also in Table 2 are the percent and actual differences. Table 3 gives the total volume per day in cubic feet (cf) for corresponding dates in Table 2. Figure 1 plots volume per day from the model versus volume per day from the observed values. The R^2 value is 0.7035 for 26 data pairs. Table 4 gives the total volume for the 28 days in liters for modeled and observed values and the percent differences and actual differences between the two. Table 5 gives summary statistics of the 26 values in both the modeled and observed value data sets and from the percent differences and actual differences.

Water Quality

Tables 6 and 7 show the measured water quality data and the corresponding model results. Tables 8 and 9 show the percent and actual differences of the water quality data that corresponds with flows over 2.28 cfs. Tables 10 and 11 show the five dates that both measured flow and water quality data were available. The loads per day were calculated and compared, by percent and actual difference, with the model values for the same days.

Table 1. All modeled and measured values. Observed values have approximately the same significant figures as the original values in copermittees reports.

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2001	11	1	11/1/01	0.000	
2001	11	2	11/2/01	0.000	
2001	11	3	11/3/01	0.000	
2001	11	4	11/4/01	6.723	
2001	11	5	11/5/01	13.326	
2001	11	6	11/6/01	0.082	
2001	11	7	11/7/01	0.080	
2001	11	8	11/8/01	0.059	
2001	11	9	11/9/01	0.060	
2001	11	10	11/10/01	0.069	
2001	11	11	11/11/01	0.059	
2001	11	12	11/12/01	10.591	
2001	11	13	11/13/01	1.907	
2001	11	14	11/14/01	0.099	
2001	11	15	11/15/01	0.088	
2001	11	16	11/16/01	0.090	
2001	11	17	11/17/01	0.091	
2001	11	18	11/18/01	0.087	
2001	11	19	11/19/01	0.074	
2001	11	20	11/20/01	0.075	
2001	11	21	11/21/01	0.076	
2001	11	22	11/22/01	0.077	
2001	11	23	11/23/01	0.074	
2001	11	24	11/24/01	15.867	
2001	11	25	11/25/01	0.791	
2001	11	26	11/26/01	0.133	
2001	11	27	11/27/01	0.106	
2001	11	28	11/28/01	0.114	0
2001	11	29	11/29/01	2.801	18
2001	11	30	11/30/01	0.207	
2001	12	1	12/1/01	0.126	
2001	12	2	12/2/01	0.112	
2001	12	3	12/3/01	0.183	
2001	12	4	12/4/01	0.570	
2001	12	5	12/5/01	0.115	
2001	12	6	12/6/01	0.086	
2001	12	7	12/7/01	0.047	
2001	12	8	12/8/01	0.005	
2001	12	9	12/9/01	0.070	
2001	12	10	12/10/01	0.085	
2001	12	11	12/11/01	0.073	
2001	12	12	12/12/01	0.073	
2001	12	13	12/13/01	0.070	

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2001	12	14	12/14/01	0.082	
2001	12	15	12/15/01	0.061	
2001	12	16	12/16/01	0.058	
2001	12	17	12/17/01	0.052	
2001	12	18	12/18/01	0.053	
2001	12	19	12/19/01	0.048	
2001	12	20	12/20/01	0.054	
2001	12	21	12/21/01	11.824	
2001	12	22	12/22/01	0.134	
2001	12	23	12/23/01	0.108	
2001	12	24	12/24/01	0.081	
2001	12	25	12/25/01	0.082	
2001	12	26	12/26/01	0.078	
2001	12	27	12/27/01	0.079	
2001	12	28	12/28/01	0.084	
2001	12	29	12/29/01	0.080	
2001	12	30	12/30/01	0.073	
2001	12	31	12/31/01	0.084	
2002	1	1	1/1/02	0.070	
2002	1	2	1/2/02	0.064	
2002	1	3	1/3/02	5.539	
2002	1	4	1/4/02	0.084	
2002	1	5	1/5/02	0.077	
2002	1	6	1/6/02	0.068	
2002	1	7	1/7/02	0.054	
2002	1	8	1/8/02	0.055	
2002	1	9	1/9/02	0.067	
2002	1	10	1/10/02	0.054	
2002	1	11	1/11/02	0.047	
2002	1	12	1/12/02	0.031	
2002	1	13	1/13/02	0.044	
2002	1	14	1/14/02	0.048	
2002	1	15	1/15/02	0.054	
2002	1	16	1/16/02	0.044	
2002	1	17	1/17/02	0.042	
2002	1	18	1/18/02	0.040	
2002	1	19	1/19/02	0.036	
2002	1	20	1/20/02	0.037	
2002	1	21	1/21/02	0.033	
2002	1	22	1/22/02	0.034	
2002	1	23	1/23/02	0.027	
2002	1	24	1/24/02	0.024	
2002	1	25	1/25/02	0.026	
2002	1	26	1/26/02	0.028	
2002	1	27	1/27/02	0.027	

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2002	1	28	1/28/02	0.026	
2002	1	29	1/29/02	4.119	
2002	1	30	1/30/02	0.057	
2002	1	31	1/31/02	0.043	
2002	2	1	2/1/02	0.035	
2002	2	2	2/2/02	0.032	
2002	2	3	2/3/02	0.032	
2002	2	4	2/4/02	0.029	
2002	2	5	2/5/02	0.026	
2002	2	6	2/6/02	0.028	
2002	2	7	2/7/02	0.027	
2002	2	8	2/8/02	0.028	
2002	2	9	2/9/02	0.013	
2002	2	10	2/10/02	0.000	
2002	2	11	2/11/02	0.013	
2002	2	12	2/12/02	0.017	
2002	2	13	2/13/02	0.020	
2002	2	14	2/14/02	0.020	
2002	2	15	2/15/02	0.019	
2002	2	16	2/16/02	0.021	
2002	2	17	2/17/02	7.614	3
2002	2	18	2/18/02	0.401	
2002	2	19	2/19/02	0.055	
2002	2	20	2/20/02	0.041	
2002	2	21	2/21/02	0.021	
2002	2	22	2/22/02	0.012	
2002	2	23	2/23/02	0.036	
2002	2	24	2/24/02	0.034	
2002	2	25	2/25/02	0.032	
2002	2	26	2/26/02	0.015	
2002	2	27	2/27/02	0.024	
2002	2	28	2/28/02	0.029	
2002	3	1	3/1/02	0.028	
2002	3	2	3/2/02	0.023	
2002	3	3	3/3/02	0.021	
2002	3	4	3/4/02	0.021	
2002	3	5	3/5/02	0.023	
2002	3	6	3/6/02	0.024	
2002	3	7	3/7/02	0.023	7
2002	3	8	3/8/02	0.021	1
2002	3	9	3/9/02	0.018	
2002	3	10	3/10/02	0.018	
2002	3	11	3/11/02	0.018	
2002	3	12	3/12/02	0.016	
2002	3	13	3/13/02	0.018	

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2002	3	14	3/14/02	0.016	
2002	3	15	3/15/02	0.014	
2002	3	16	3/16/02	0.014	
2002	3	17	3/17/02	14.441	
2002	3	18	3/18/02	22.644	
2002	3	19	3/19/02	0.136	
2002	3	20	3/20/02	0.124	
2002	3	21	3/21/02	0.113	
2002	3	22	3/22/02	0.107	
2002	3	23	3/23/02	0.110	
2002	3	24	3/24/02	0.098	
2002	3	25	3/25/02	0.093	
2002	3	26	3/26/02	0.089	
2002	3	27	3/27/02	0.097	
2002	3	28	3/28/02	0.122	
2002	3	29	3/29/02	0.083	
2002	3	30	3/30/02	0.085	
2002	3	31	3/31/02	0.071	
2002	4	1	4/1/02	0.068	
2002	4	2	4/2/02	0.069	
2002	4	3	4/3/02	0.071	
2002	4	4	4/4/02	0.063	
2002	4	5	4/5/02	0.069	
2002	4	6	4/6/02	0.058	
2002	4	7	4/7/02	0.052	
2002	4	8	4/8/02	0.053	
2002	4	9	4/9/02	0.051	
2002	4	10	4/10/02	0.045	
2002	4	11	4/11/02	0.043	
2002	4	12	4/12/02	0.039	
2002	4	13	4/13/02	0.039	
2002	4	14	4/14/02	0.035	
2002	4	15	4/15/02	0.039	
2002	4	16	4/16/02	0.035	
2002	4	17	4/17/02	0.036	
2002	4	18	4/18/02	0.032	
2002	4	19	4/19/02	0.030	
2002	4	20	4/20/02	0.027	
2002	4	21	4/21/02	0.026	
2002	4	22	4/22/02	0.023	
2002	4	23	4/23/02	0.024	
2002	4	24	4/24/02	0.031	
2002	4	25	4/25/02	0.022	
2002	4	26	4/26/02	0.026	
2002	4	27	4/27/02	0.022	

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2002	4	28	4/28/02	0.019	
2002	4	29	4/29/02	0.017	
2002	4	30	4/30/02	0.018	
2002	5	1	5/1/02	0.017	
2002	5	2	5/2/02	0.015	
2002	5	3	5/3/02	0.015	
2002	5	4	5/4/02	0.015	
2002	5	5	5/5/02	0.015	
2002	5	6	5/6/02	0.015	
2002	5	7	5/7/02	0.017	
2002	5	8	5/8/02	0.013	
2002	5	9	5/9/02	0.012	
2002	5	10	5/10/02	0.012	
2002	5	11	5/11/02	0.011	
2002	5	12	5/12/02	0.009	
2002	5	13	5/13/02	0.007	
2002	5	14	5/14/02	0.009	
2002	5	15	5/15/02	0.010	
2002	5	16	5/16/02	0.010	
2002	5	17	5/17/02	0.009	
2002	5	18	5/18/02	0.010	
2002	5	19	5/19/02	0.009	
2002	5	20	5/20/02	0.007	
2002	5	21	5/21/02	0.007	
2002	5	22	5/22/02	0.006	
2002	5	23	5/23/02	0.006	
2002	5	24	5/24/02	0.006	
2002	5	25	5/25/02	0.007	
2002	5	26	5/26/02	0.006	
2002	5	27	5/27/02	0.006	
2002	5	28	5/28/02	0.005	
2002	5	29	5/29/02	0.005	
2002	5	30	5/30/02	0.005	
2002	5	31	5/31/02	0.004	
2002	6	1	6/1/02	0.005	
2002	6	2	6/2/02	0.004	
2002	6	3	6/3/02	0.004	
2002	6	4	6/4/02	0.004	
2002	6	5	6/5/02	0.004	
2002	6	6	6/6/02	0.003	
2002	6	7	6/7/02	0.003	
2002	6	8	6/8/02	0.003	
2002	6	9	6/9/02	0.004	
2002	6	10	6/10/02	0.004	
2002	6	11	6/11/02	0.003	

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2002	6	12	6/12/02	0.003	
2002	6	13	6/13/02	0.003	
2002	6	14	6/14/02	0.002	
2002	6	15	6/15/02	0.002	
2002	6	16	6/16/02	0.002	
2002	6	17	6/17/02	0.002	
2002	6	18	6/18/02	0.002	
2002	6	19	6/19/02	0.002	
2002	6	20	6/20/02	0.002	
2002	6	21	6/21/02	0.002	
2002	6	22	6/22/02	0.002	
2002	6	23	6/23/02	0.002	
2002	6	24	6/24/02	0.002	
2002	6	25	6/25/02	0.002	
2002	6	26	6/26/02	0.002	
2002	6	27	6/27/02	0.001	
2002	6	28	6/28/02	0.001	
2002	6	29	6/29/02	0.001	
2002	6	30	6/30/02	0.001	
2002	7	1	7/1/02	0.001	
2002	7	2	7/2/02	0.001	
2002	7	3	7/3/02	0.001	
2002	7	4	7/4/02	0.001	
2002	7	5	7/5/02	0.001	
2002	7	6	7/6/02	0.001	
2002	7	7	7/7/02	0.001	
2002	7	8	7/8/02	0.001	
2002	7	9	7/9/02	0.001	
2002	7	10	7/10/02	0.001	
2002	7	11	7/11/02	0.001	
2002	7	12	7/12/02	0.001	
2002	7	13	7/13/02	0.001	
2002	7	14	7/14/02	0.001	
2002	7	15	7/15/02	0.001	
2002	7	16	7/16/02	0.001	
2002	7	17	7/17/02	0.001	
2002	7	18	7/18/02	0.001	
2002	7	19	7/19/02	0.001	
2002	7	20	7/20/02	0.001	
2002	7	21	7/21/02	0.001	
2002	7	22	7/22/02	0.001	
2002	7	23	7/23/02	0.000	
2002	7	24	7/24/02	0.000	
2002	7	25	7/25/02	0.000	
2002	7	26	7/26/02	0.000	

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2002	7	27	7/27/02	0.000	
2002	7	28	7/28/02	0.000	
2002	7	29	7/29/02	0.000	
2002	7	30	7/30/02	0.000	
2002	7	31	7/31/02	0.000	
2002	8	1	8/1/02	0.000	
2002	8	2	8/2/02	0.000	
2002	8	3	8/3/02	0.000	
2002	8	4	8/4/02	0.000	
2002	8	5	8/5/02	0.000	
2002	8	6	8/6/02	0.000	
2002	8	7	8/7/02	0.000	
2002	8	8	8/8/02	0.000	
2002	8	9	8/9/02	0.000	
2002	8	10	8/10/02	0.000	
2002	8	11	8/11/02	0.000	
2002	8	12	8/12/02	0.000	
2002	8	13	8/13/02	0.000	
2002	8	14	8/14/02	0.000	
2002	8	15	8/15/02	0.000	
2002	8	16	8/16/02	0.000	
2002	8	17	8/17/02	0.000	
2002	8	18	8/18/02	0.000	
2002	8	19	8/19/02	0.000	
2002	8	20	8/20/02	0.000	
2002	8	21	8/21/02	0.000	
2002	8	22	8/22/02	0.000	
2002	8	23	8/23/02	0.000	
2002	8	24	8/24/02	0.000	
2002	8	25	8/25/02	0.000	
2002	8	26	8/26/02	0.000	
2002	8	27	8/27/02	0.000	
2002	8	28	8/28/02	0.000	
2002	8	29	8/29/02	0.000	
2002	8	30	8/30/02	0.000	
2002	8	31	8/31/02	0.000	
2002	9	1	9/1/02	0.000	
2002	9	2	9/2/02	0.000	
2002	9	3	9/3/02	0.000	
2002	9	4	9/4/02	0.000	
2002	9	5	9/5/02	0.000	
2002	9	6	9/6/02	2.065	
2002	9	7	9/7/02	23.162	
2002	9	8	9/8/02	0.069	
2002	9	9	9/9/02	0.062	

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2002	9	10	9/10/02	0.055	
2002	9	11	9/11/02	0.057	
2002	9	12	9/12/02	0.054	
2002	9	13	9/13/02	0.048	
2002	9	14	9/14/02	0.046	
2002	9	15	9/15/02	0.044	
2002	9	16	9/16/02	0.045	
2002	9	17	9/17/02	0.044	
2002	9	18	9/18/02	0.045	
2002	9	19	9/19/02	0.037	
2002	9	20	9/20/02	0.038	
2002	9	21	9/21/02	0.037	
2002	9	22	9/22/02	0.033	
2002	9	23	9/23/02	0.031	
2002	9	24	9/24/02	0.030	
2002	9	25	9/25/02	0.031	
2002	9	26	9/26/02	0.029	
2002	9	27	9/27/02	0.030	
2002	9	28	9/28/02	0.033	
2002	9	29	9/29/02	0.030	
2002	9	30	9/30/02	0.028	
2002	10	1	10/1/02	0.027	
2002	10	2	10/2/02	0.023	
2002	10	3	10/3/02	0.022	
2002	10	4	10/4/02	0.021	
2002	10	5	10/5/02	0.019	
2002	10	6	10/6/02	0.019	
2002	10	7	10/7/02	0.017	
2002	10	8	10/8/02	0.018	
2002	10	9	10/9/02	0.017	
2002	10	10	10/10/02	0.017	
2002	10	11	10/11/02	0.017	
2002	10	12	10/12/02	0.019	
2002	10	13	10/13/02	0.015	
2002	10	14	10/14/02	0.016	
2002	10	15	10/15/02	0.016	
2002	10	16	10/16/02	0.016	
2002	10	17	10/17/02	0.016	
2002	10	18	10/18/02	0.015	
2002	10	19	10/19/02	0.014	
2002	10	20	10/20/02	0.012	
2002	10	21	10/21/02	0.013	
2002	10	22	10/22/02	0.012	
2002	10	23	10/23/02	0.011	
2002	10	24	10/24/02	0.011	

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2002	10	25	10/25/02	0.011	
2002	10	26	10/26/02	0.010	
2002	10	27	10/27/02	0.009	
2002	10	28	10/28/02	0.009	
2002	10	29	10/29/02	0.009	
2002	10	30	10/30/02	0.008	
2002	10	31	10/31/02	0.008	
2002	11	1	11/1/02	0.008	0
2002	11	2	11/2/02	0.007	0
2002	11	3	11/3/02	0.006	0
2002	11	4	11/4/02	0.007	0
2002	11	5	11/5/02	0.006	0
2002	11	6	11/6/02	0.006	0
2002	11	7	11/7/02	0.006	0
2002	11	8	11/8/02	3.241	35
2002	11	9	11/9/02	8.193	43
2002	11	10	11/10/02	0.967	13
2002	11	11	11/11/02	0.048	
2002	11	12	11/12/02	0.017	
2002	11	13	11/13/02	0.035	
2002	11	14	11/14/02	0.032	
2002	11	15	11/15/02	0.010	
2002	11	16	11/16/02	0.010	
2002	11	17	11/17/02	0.030	
2002	11	18	11/18/02	0.021	
2002	11	19	11/19/02	0.019	
2002	11	20	11/20/02	0.014	
2002	11	21	11/21/02	0.011	
2002	11	22	11/22/02	0.023	
2002	11	23	11/23/02	0.026	
2002	11	24	11/24/02	0.024	
2002	11	25	11/25/02	0.016	
2002	11	26	11/26/02	0.013	
2002	11	27	11/27/02	0.009	
2002	11	28	11/28/02	0.009	
2002	11	29	11/29/02	0.020	
2002	11	30	11/30/02	0.018	
2002	12	1	12/1/02	0.019	
2002	12	2	12/2/02	0.017	
2002	12	3	12/3/02	0.017	
2002	12	4	12/4/02	0.015	
2002	12	5	12/5/02	0.014	
2002	12	6	12/6/02	0.013	
2002	12	7	12/7/02	0.014	
2002	12	8	12/8/02	0.013	

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2002	12	9	12/9/02	0.013	
2002	12	10	12/10/02	0.013	
2002	12	11	12/11/02	0.012	
2002	12	12	12/12/02	0.011	
2002	12	13	12/13/02	0.011	0
2002	12	14	12/14/02	0.011	0
2002	12	15	12/15/02	0.010	0
2002	12	16	12/16/02	0.010	30
2002	12	17	12/17/02	0.010	0
2002	12	18	12/18/02	0.009	0
2002	12	19	12/19/02	0.008	5
2002	12	20	12/20/02	0.010	0
2002	12	21	12/21/02	0.009	0
2002	12	22	12/22/02	0.008	0
2002	12	23	12/23/02	0.007	0
2002	12	24	12/24/02	0.008	0
2002	12	25	12/25/02	0.007	0
2002	12	26	12/26/02	0.007	0
2002	12	27	12/27/02	0.006	0
2002	12	28	12/28/02	0.006	0
2002	12	29	12/29/02	0.006	0
2002	12	30	12/30/02	0.006	0
2002	12	31	12/31/02	0.005	0
2003	1	1	1/1/03	0.004	0
2003	1	2	1/2/03	0.004	0
2003	1	3	1/3/03	0.004	0
2003	1	4	1/4/03	0.004	0
2003	1	5	1/5/03	0.004	0
2003	1	6	1/6/03	0.003	0
2003	1	7	1/7/03	0.003	0
2003	1	8	1/8/03	0.003	0
2003	1	9	1/9/03	0.003	0
2003	1	10	1/10/03	0.003	0
2003	1	11	1/11/03	0.003	
2003	1	12	1/12/03	0.003	
2003	1	13	1/13/03	0.003	
2003	1	14	1/14/03	0.002	
2003	1	15	1/15/03	0.002	
2003	1	16	1/16/03	0.002	
2003	1	17	1/17/03	0.002	
2003	1	18	1/18/03	0.002	
2003	1	19	1/19/03	0.002	
2003	1	20	1/20/03	0.002	
2003	1	21	1/21/03	0.002	
2003	1	22	1/22/03	0.002	

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2003	1	23	1/23/03	0.001	
2003	1	24	1/24/03	0.001	
2003	1	25	1/25/03	0.001	
2003	1	26	1/26/03	0.001	
2003	1	27	1/27/03	0.001	
2003	1	28	1/28/03	0.001	
2003	1	29	1/29/03	0.001	
2003	1	30	1/30/03	0.001	
2003	1	31	1/31/03	0.001	
2003	2	1	2/1/03	0.001	
2003	2	2	2/2/03	0.001	
2003	2	3	2/3/03	0.001	
2003	2	4	2/4/03	0.001	
2003	2	5	2/5/03	0.001	
2003	2	6	2/6/03	0.001	
2003	2	7	2/7/03	0.001	0
2003	2	8	2/8/03	0.001	
2003	2	9	2/9/03	0.001	
2003	2	10	2/10/03	0.001	
2003	2	11	2/11/03	50.308	59
2003	2	12	2/12/03	153.553	
2003	2	13	2/13/03	116.327	
2003	2	14	2/14/03	55.564	
2003	2	15	2/15/03	2.439	
2003	2	16	2/16/03	2.031	
2003	2	17	2/17/03	1.739	
2003	2	18	2/18/03	1.538	
2003	2	19	2/19/03	1.410	
2003	2	20	2/20/03	1.244	
2003	2	21	2/21/03	1.120	
2003	2	22	2/22/03	1.042	
2003	2	23	2/23/03	0.943	
2003	2	24	2/24/03	0.866	0
2003	2	25	2/25/03	190.710	132
2003	2	26	2/26/03	28.383	13
2003	2	27	2/27/03	31.744	86
2003	2	28	2/28/03	8.011	31
2003	3	1	3/1/03	5.550	0
2003	3	2	3/2/03	4.193	10
2003	3	3	3/3/03	3.367	2
2003	3	4	3/4/03	2.781	31
2003	3	5	3/5/03	2.912	45
2003	3	6	3/6/03	2.097	5
2003	3	7	3/7/03	1.839	12
2003	3	8	3/8/03	1.629	20

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2003	3	9	3/9/03	1.481	17
2003	3	10	3/10/03	1.373	12
2003	3	11	3/11/03	1.279	8
2003	3	12	3/12/03	1.164	8
2003	3	13	3/13/03	1.088	18
2003	3	14	3/14/03	1.018	10
2003	3	15	3/15/03	96.332	
2003	3	16	3/16/03	51.539	
2003	3	17	3/17/03	5.526	
2003	3	18	3/18/03	4.174	
2003	3	19	3/19/03	3.297	
2003	3	20	3/20/03	2.713	
2003	3	21	3/21/03	2.300	
2003	3	22	3/22/03	1.996	
2003	3	23	3/23/03	1.824	
2003	3	24	3/24/03	1.650	
2003	3	25	3/25/03	1.493	
2003	3	26	3/26/03	1.389	
2003	3	27	3/27/03	1.301	
2003	3	28	3/28/03	1.188	
2003	3	29	3/29/03	1.114	
2003	3	30	3/30/03	1.040	
2003	3	31	3/31/03	1.141	
2003	4	1	4/1/03	0.974	
2003	4	2	4/2/03	0.920	
2003	4	3	4/3/03	0.886	
2003	4	4	4/4/03	0.849	
2003	4	5	4/5/03	0.805	
2003	4	6	4/6/03	0.765	
2003	4	7	4/7/03	0.705	
2003	4	8	4/8/03	0.636	
2003	4	9	4/9/03	0.612	
2003	4	10	4/10/03	0.603	
2003	4	11	4/11/03	0.567	
2003	4	12	4/12/03	0.523	
2003	4	13	4/13/03	0.504	
2003	4	14	4/14/03	127.782	
2003	4	15	4/15/03	6.659	
2003	4	16	4/16/03	1.486	
2003	4	17	4/17/03	23.888	
2003	4	18	4/18/03	1.572	
2003	4	19	4/19/03	1.378	
2003	4	20	4/20/03	1.250	
2003	4	21	4/21/03	1.163	
2003	4	22	4/22/03	1.095	

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2003	4	23	4/23/03	1.018	
2003	4	24	4/24/03	0.941	
2003	4	25	4/25/03	0.882	
2003	4	26	4/26/03	0.836	
2003	4	27	4/27/03	0.793	
2003	4	28	4/28/03	0.738	
2003	4	29	4/29/03	0.704	
2003	4	30	4/30/03	0.799	
2003	5	1	5/1/03	0.639	
2003	5	2	5/2/03	0.601	
2003	5	3	5/3/03	21.329	
2003	5	4	5/4/03	0.717	
2003	5	5	5/5/03	0.634	
2003	5	6	5/6/03	0.602	
2003	5	7	5/7/03	0.564	
2003	5	8	5/8/03	0.534	
2003	5	9	5/9/03	0.506	
2003	5	10	5/10/03	0.479	
2003	5	11	5/11/03	0.442	
2003	5	12	5/12/03	0.416	
2003	5	13	5/13/03	0.390	
2003	5	14	5/14/03	0.378	
2003	5	15	5/15/03	0.360	
2003	5	16	5/16/03	0.338	
2003	5	17	5/17/03	0.322	
2003	5	18	5/18/03	0.306	
2003	5	19	5/19/03	0.289	
2003	5	20	5/20/03	0.272	
2003	5	21	5/21/03	0.255	
2003	5	22	5/22/03	0.245	
2003	5	23	5/23/03	0.236	
2003	5	24	5/24/03	0.225	
2003	5	25	5/25/03	0.212	
2003	5	26	5/26/03	0.201	
2003	5	27	5/27/03	0.189	
2003	5	28	5/28/03	0.179	
2003	5	29	5/29/03	0.172	
2003	5	30	5/30/03	0.164	
2003	5	31	5/31/03	0.197	
2003	6	1	6/1/03	0.152	
2003	6	2	6/2/03	0.145	
2003	6	3	6/3/03	0.136	
2003	6	4	6/4/03	0.129	
2003	6	5	6/5/03	0.122	
2003	6	6	6/6/03	0.116	

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2003	6	7	6/7/03	0.110	
2003	6	8	6/8/03	0.104	
2003	6	9	6/9/03	0.099	
2003	6	10	6/10/03	0.090	
2003	6	11	6/11/03	0.085	
2003	6	12	6/12/03	0.080	
2003	6	13	6/13/03	0.075	
2003	6	14	6/14/03	0.070	
2003	6	15	6/15/03	0.066	
2003	6	16	6/16/03	0.061	
2003	6	17	6/17/03	0.057	
2003	6	18	6/18/03	0.053	
2003	6	19	6/19/03	0.050	
2003	6	20	6/20/03	0.046	
2003	6	21	6/21/03	0.042	
2003	6	22	6/22/03	0.039	
2003	6	23	6/23/03	0.035	
2003	6	24	6/24/03	0.032	
2003	6	25	6/25/03	0.028	
2003	6	26	6/26/03	0.025	
2003	6	27	6/27/03	0.021	
2003	6	28	6/28/03	0.018	
2003	6	29	6/29/03	0.014	
2003	6	30	6/30/03	0.012	
2003	7	1	7/1/03	0.010	
2003	7	2	7/2/03	0.009	
2003	7	3	7/3/03	0.008	
2003	7	4	7/4/03	0.008	
2003	7	5	7/5/03	0.007	
2003	7	6	7/6/03	0.007	
2003	7	7	7/7/03	0.007	
2003	7	8	7/8/03	0.007	
2003	7	9	7/9/03	0.006	
2003	7	10	7/10/03	0.007	
2003	7	11	7/11/03	0.007	
2003	7	12	7/12/03	0.007	
2003	7	13	7/13/03	0.006	
2003	7	14	7/14/03	0.006	
2003	7	15	7/15/03	0.006	
2003	7	16	7/16/03	0.006	
2003	7	17	7/17/03	0.005	
2003	7	18	7/18/03	0.005	
2003	7	19	7/19/03	0.005	
2003	7	20	7/20/03	0.005	
2003	7	21	7/21/03	0.004	

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2003	7	22	7/22/03	0.004	
2003	7	23	7/23/03	0.004	
2003	7	24	7/24/03	0.004	
2003	7	25	7/25/03	0.004	
2003	7	26	7/26/03	0.004	
2003	7	27	7/27/03	0.003	
2003	7	28	7/28/03	0.003	
2003	7	29	7/29/03	0.003	
2003	7	30	7/30/03	0.003	
2003	7	31	7/31/03	0.003	
2003	8	1	8/1/03	0.003	
2003	8	2	8/2/03	0.003	
2003	8	3	8/3/03	0.003	
2003	8	4	8/4/03	0.002	
2003	8	5	8/5/03	0.002	
2003	8	6	8/6/03	0.002	
2003	8	7	8/7/03	0.002	
2003	8	8	8/8/03	0.002	
2003	8	9	8/9/03	0.002	
2003	8	10	8/10/03	0.002	
2003	8	11	8/11/03	0.002	
2003	8	12	8/12/03	0.002	
2003	8	13	8/13/03	0.002	
2003	8	14	8/14/03	0.002	
2003	8	15	8/15/03	0.002	
2003	8	16	8/16/03	0.001	
2003	8	17	8/17/03	0.001	
2003	8	18	8/18/03	0.001	
2003	8	19	8/19/03	0.001	
2003	8	20	8/20/03	0.001	
2003	8	21	8/21/03	0.001	
2003	8	22	8/22/03	0.001	
2003	8	23	8/23/03	0.001	
2003	8	24	8/24/03	0.001	
2003	8	25	8/25/03	0.001	
2003	8	26	8/26/03	0.001	
2003	8	27	8/27/03	0.001	
2003	8	28	8/28/03	0.001	
2003	8	29	8/29/03	0.001	
2003	8	30	8/30/03	0.001	
2003	8	31	8/31/03	0.001	
2003	9	1	9/1/03	0.001	
2003	9	2	9/2/03	0.001	
2003	9	3	9/3/03	0.001	
2003	9	4	9/4/03	0.001	

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2003	9	5	9/5/03	0.001	
2003	9	6	9/6/03	0.001	
2003	9	7	9/7/03	0.001	
2003	9	8	9/8/03	0.001	
2003	9	9	9/9/03	0.001	
2003	9	10	9/10/03	0.001	
2003	9	11	9/11/03	0.000	
2003	9	12	9/12/03	0.000	
2003	9	13	9/13/03	0.000	
2003	9	14	9/14/03	0.000	
2003	9	15	9/15/03	0.000	
2003	9	16	9/16/03	0.000	
2003	9	17	9/17/03	0.000	
2003	9	18	9/18/03	0.000	
2003	9	19	9/19/03	0.000	
2003	9	20	9/20/03	0.000	
2003	9	21	9/21/03	0.000	
2003	9	22	9/22/03	0.000	
2003	9	23	9/23/03	0.000	
2003	9	24	9/24/03	0.000	
2003	9	25	9/25/03	0.000	
2003	9	26	9/26/03	0.000	
2003	9	27	9/27/03	0.000	
2003	9	28	9/28/03	0.000	
2003	9	29	9/29/03	0.000	
2003	9	30	9/30/03	0.000	
2003	10	1	10/1/03	0.000	
2003	10	2	10/2/03	0.000	
2003	10	3	10/3/03	0.000	
2003	10	4	10/4/03	0.000	
2003	10	5	10/5/03	0.000	
2003	10	6	10/6/03	0.000	
2003	10	7	10/7/03	0.000	
2003	10	8	10/8/03	0.000	
2003	10	9	10/9/03	0.000	
2003	10	10	10/10/03	0.000	
2003	10	11	10/11/03	0.000	
2003	10	12	10/12/03	0.000	
2003	10	13	10/13/03	0.000	
2003	10	14	10/14/03	0.000	
2003	10	15	10/15/03	0.000	
2003	10	16	10/16/03	0.000	
2003	10	17	10/17/03	0.000	
2003	10	18	10/18/03	0.000	
2003	10	19	10/19/03	0.000	

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2003	10	20	10/20/03	0.000	
2003	10	21	10/21/03	0.000	
2003	10	22	10/22/03	0.000	
2003	10	23	10/23/03	0.000	
2003	10	24	10/24/03	0.000	
2003	10	25	10/25/03	0.000	
2003	10	26	10/26/03	0.000	
2003	10	27	10/27/03	0.000	
2003	10	28	10/28/03	0.000	
2003	10	29	10/29/03	0.000	
2003	10	30	10/30/03	0.000	
2003	10	31	10/31/03	0.000	
2003	11	1	11/1/03	0.000	
2003	11	2	11/2/03	0.000	
2003	11	3	11/3/03	0.000	
2003	11	4	11/4/03	0.000	
2003	11	5	11/5/03	0.000	
2003	11	6	11/6/03	0.000	
2003	11	7	11/7/03	0.000	
2003	11	8	11/8/03	0.000	
2003	11	9	11/9/03	0.000	
2003	11	10	11/10/03	0.000	
2003	11	11	11/11/03	0.000	
2003	11	12	11/12/03	15.002	
2003	11	13	11/13/03	0.056	
2003	11	14	11/14/03	0.047	
2003	11	15	11/15/03	0.039	
2003	11	16	11/16/03	0.038	
2003	11	17	11/17/03	0.036	
2003	11	18	11/18/03	0.035	
2003	11	19	11/19/03	0.033	
2003	11	20	11/20/03	0.033	
2003	11	21	11/21/03	0.031	
2003	11	22	11/22/03	0.030	
2003	11	23	11/23/03	0.030	
2003	11	24	11/24/03	0.029	
2003	11	25	11/25/03	0.028	
2003	11	26	11/26/03	0.026	
2003	11	27	11/27/03	0.025	
2003	11	28	11/28/03	0.026	
2003	11	29	11/29/03	0.025	
2003	11	30	11/30/03	0.024	
2003	12	1	12/1/03	0.023	
2003	12	2	12/2/03	0.022	
2003	12	3	12/3/03	0.021	

Year	Month	Day	Date	Model Daily Average Flow	Measured Daily Average Flow
Units				cfs	cfs
2003	12	4	12/4/03	0.020	
2003	12	5	12/5/03	0.019	
2003	12	6	12/6/03	0.019	
2003	12	7	12/7/03	0.018	
2003	12	8	12/8/03	0.017	
2003	12	9	12/9/03	0.016	
2003	12	10	12/10/03	0.016	
2003	12	11	12/11/03	0.015	
2003	12	12	12/12/03	0.014	
2003	12	13	12/13/03	0.014	
2003	12	14	12/14/03	0.013	
2003	12	15	12/15/03	0.013	
2003	12	16	12/16/03	0.012	
2003	12	17	12/17/03	0.012	
2003	12	18	12/18/03	0.011	
2003	12	19	12/19/03	0.011	
2003	12	20	12/20/03	0.010	
2003	12	21	12/21/03	0.010	
2003	12	22	12/22/03	0.009	
2003	12	23	12/23/03	0.009	
2003	12	24	12/24/03	0.278	
2003	12	25	12/25/03	43.532	
2003	12	26	12/26/03	0.878	
2003	12	27	12/27/03	0.154	
2003	12	28	12/28/03	0.146	
2003	12	29	12/29/03	0.139	
2003	12	30	12/30/03	0.133	

Table 2. Modeled Flow vs Measured Flows

Date	Model Daily Average Flow -cfs	Observed Daily Average Flow -cfs	Percent Difference -%, difference of observed from model over observed	Actual Difference -cfs, observed from model
11/29/01	2.801	18	-84.4%	-15.20
2/17/02	7.614	3	153.8%	4.61
3/7/02	0.023	7	-99.7%	-6.98
11/8/02	3.241	35	-90.7%	-31.76
11/9/02	8.193	43	-80.9%	-34.81
11/10/02	0.967	13	-92.6%	-12.03
12/16/02	0.010	30	-99.97%	-29.99
12/19/02	0.008	5	-99.8%	-4.99
2/11/03	50.308	59	-14.7%	-8.69
2/25/03	190.710	132	44.5%	58.71
2/26/03	28.383	13	118.3%	15.38
2/27/03	31.744	86	-63.1%	-54.26
2/28/03	8.011	31	-74.2%	-22.99
3/2/03	4.193	10	-58.1%	-5.81
3/3/03	3.367	2	68.4%	1.37
3/4/03	2.781	31	-91.0%	-28.22
3/5/03	2.912	45	-93.5%	-42.09
3/6/03	2.097	5	-58.1%	-2.90
3/7/03	1.839	12	-84.7%	-10.16
3/8/03	1.629	20	-91.9%	-18.37
3/9/03	1.481	17	-91.3%	-15.52
3/10/03	1.373	12	-88.6%	-10.63
3/11/03	1.279	8	-84.0%	-6.72
3/12/03	1.164	8	-85.5%	-6.84
3/13/03	1.088	18	-94.0%	-16.91
3/14/03	1.018	10	-89.8%	-8.98

Table 3. Modeled Volume vs. Measured Volume

Date	Changing Model Values to Daily Volume, cf	Changing Observed Values to Daily Volume, cf
11/29/01	241996	1555200
2/17/02	657867	259200
3/7/02	1982	604800
11/8/02	280035	3024000
11/9/02	707867	3715200
11/10/02	83510	1123200
12/16/02	904	2592000
12/19/02	715	432000
2/11/03	4346577	5097600
2/25/03	16477344	11404800
2/26/03	2452326	1123200
2/27/03	2742682	7430400
2/28/03	692118	2678400
3/2/03	362239	864000
3/3/03	290940	172800
3/4/03	240244	2678400
3/5/03	251590	3888000
3/6/03	181142	432000
3/7/03	158903	1036800
3/8/03	140781	1728000
3/9/03	127993	1468800
3/10/03	118657	1036800
3/11/03	110532	691200
3/12/03	100566	691200
3/13/03	94005	1555200
3/14/03	87948	864000

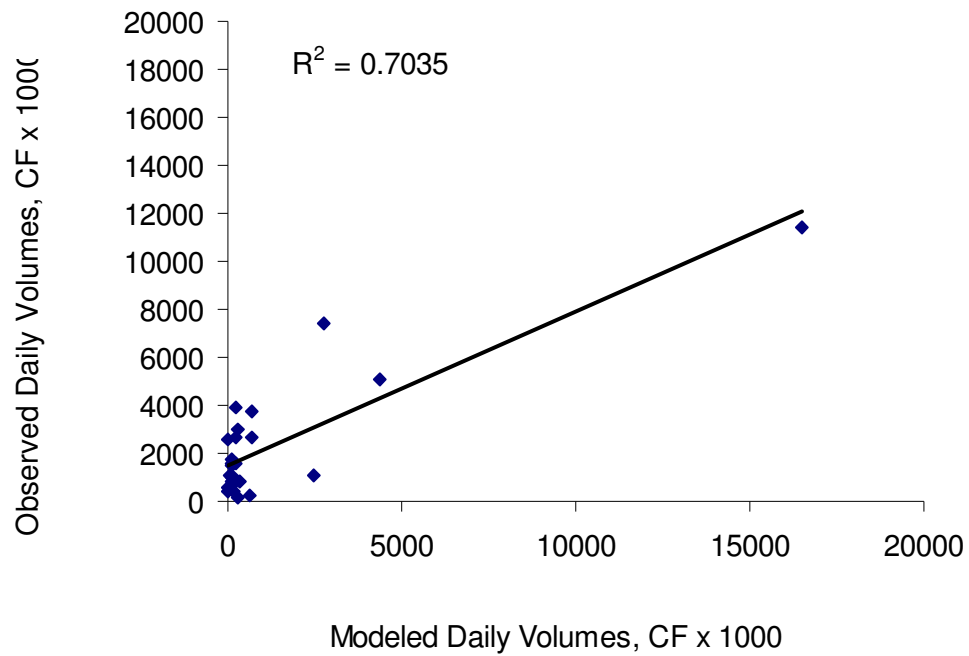


Figure 1. Measured Daily Volumes vs Modeled Daily Volumes

Table 4. Modeled Total Volume vs Measured Total Volume

Total Modeled Volumes for 26 days, L	Total Observed Volumes for 26 days, L	Percent Difference -%, difference of observed from model over observed	Actual Difference -L, observed from model
876421612	1646496115	47%	-770074503

Table 5. Comparison of Modeled and Measured Flows

Statistics of Directly Comparable Model Values to Observed Values Above CFS of 2.28 (26 Values)		Statistics of Observed Values Above CFS of 2.28 (26 Values)	
Mean	14	Mean	26
Median	2	Median	15
25th	1	25th	9
75th	7	75th	31
STDEV	38	STDEV	29
Statistics of Percent Differences		Statistics of Actual Differences	
Mean	-55%	Mean	-12
Median	-85%	Median	-10
25th	-92%	25th	-22
75th	-59%	75th	-6
STDEV	0.70	STDEV	21

Table 6. Modeled Water Quality, All Values.

Number	Date	Flow	Total Copper	Total Lead	Total Zinc
			µg/L	µg/L	µg/L
19004	2/17/94	80.6874	14	14	78
19004	3/24/94	77.9417	6	6	35
19004	4/24/94	15.4465	32	34	175
19004	11/10/94	14.4909	24	24	134
19004	1/11/95	47.9248	5	5	30
19004	2/14/95	285.361	31	31	173
19004	4/16/95	47.6048	32	32	176
19004	11/1/95	24.6359	74	76	408
19004	12/9/96	10.7718	19	18	106
19004	1/16/97	1.78252	1	0	4
19004	12/6/97	51.7472	53	53	294
19004	3/14/98	2.98883	0	0	0
19004	11/8/98	28.7118	41	42	228
19004	1/25/99	88.7292	42	43	231
19004	3/15/99	8.14882	39	39	216
19004	2/12/00	45.11	43	44	237
19004	2/21/00	216.509	22	22	121
19004	3/5/00	79.8623	24	24	134
19004	4/17/00	41.7563	21	22	118
19004	10/27/00	37.9718	28	28	157
19004	1/8/01	28.0362	26	26	142
19004	2/13/01	54.4753	50	50	280
19004	11/12/01	10.5909	17	18	95
19004	11/29/01	2.80088	32	32	175
19004	2/17/02	7.6142	53	54	293
19004	11/8/02	3.24115	33	34	183
19004	2/11/03	50.3076	38	38	206
19004	2/25/03	190.71	23	23	129
19006	2/12/00	13.2766	63	74	316
19006	2/21/00	63.4845	25	28	128
19006	1/8/01	8.38546	31	36	157
19006	2/13/01	16.4391	57	64	293
19006	11/12/01	3.47155	17	20	89
19014	1/8/01	0.866875	27	32	151
19014	2/13/01	1.68843	51	59	292
19014	11/12/01	0.362798	12	14	69
19016	2/12/00	7.75739	33	33	181
19016	2/21/00	37.1424	17	16	93
19016	1/8/01	4.87796	17	17	96
19016	2/13/01	9.55507	38	36	212
19016	11/12/01	1.94136	11	10	58
19018	1/8/01	11.6857	22	19	125
19018	2/13/01	22.7255	46	40	267
19018	11/12/01	4.22921	16	14	91
19024	2/12/00	30.7277	40	38	221

Number	Date	Flow	Total Copper	Total Lead	Total Zinc
			µg/L	µg/L	µg/L
19024	2/21/00	150.342	21	20	120
19024	1/8/01	18.9028	28	26	154
19024	2/13/01	37.2259	50	47	282
19024	11/12/01	7.10023	18	17	102
19026	1/8/01	14.8463	25	23	140
19026	2/13/01	29.3028	48	44	275
19026	11/12/01	5.99581	16	15	91
19028	2/12/00	9.20883	60	60	332
19028	2/21/00	44.0897	28	27	159
19028	1/8/01	5.8327	31	30	169
19028	2/13/01	11.6731	60	56	334
19028	11/12/01	2.49796	15	15	85
19035	2/12/00	2.48031	20	18	110
19035	2/21/00	11.9094	11	10	64
19035	1/8/01	1.57353	10	9	58
19035	2/13/01	3.18453	24	22	134
19035	11/12/01	0.668691	6	6	35

Table 7. Observed Water Quality, All Values.

Subwatershed Number	Date	Total Copper	Total Lead	Total Zinc
		µg/L	µg/L	µg/L
19004	2/17/94	34	110	260
19004	3/24/94	29	140	240
19004	4/24/94	44	70	320
19004	11/10/94	36	35	180
19004	1/11/95	17	44	150
19004	2/14/95	40	110	360
19004	4/16/95	85	140	560
19004	11/1/95	46	23	25
19004	12/9/96	20	16	70
19004	1/16/97	10	58	200
19004	12/6/97	28	42	110
19004	3/14/98	28	95	92
19004	11/8/98	6	1	30
19004	1/25/99	5	7	48
19004	3/15/99	15	82	210
19004	2/12/00	29	15	96
19004	2/21/00	16	1	50
19004	3/5/00	16	1	50
19004	4/17/00	14	5	80
19004	10/27/00	27	22	150
19004	1/8/01	57	69	255
19004	2/13/01	16	25	110
19004	11/12/01	97	94	740
19004	11/29/01	27	28	162
19004	2/17/02	53	32	314

Subwatershed Number	Date	Total Copper	Total Lead	Total Zinc
		µg/L	µg/L	µg/L
19004	11/8/02	28	17	118
19004	2/11/03	33	29	230
19004	2/25/03	16	23	154
19006	2/12/00	68	34	160
19006	2/21/00	23	23	180
19006	1/8/01	52	91	420
19006	2/13/01	16	29	100
19006	11/12/01	49	39	370
19014	1/8/01	36	21	230
19014	2/13/01	19	18	110
19014	11/12/01	37	12	200
19016	2/12/00	68	52	300
19016	2/21/00	19	19	160
19016	1/8/01	65	90	480
19016	2/13/01	15	21	110
19016	11/12/01	45	52	300
19018	1/8/01	70	68	660
19018	2/13/01	38	53	280
19018	11/12/01	42	29	340
19024	2/12/00	33	83	327
19024	2/21/00	19	26	81
19024	1/8/01	56	59	360
19024	2/13/01	41	61	280
19024	11/12/01	32	19	180
19026	1/8/01	32	27	190
19026	2/13/01	17	23	120
19026	11/12/01	170	270	1400
19028	2/12/00	43	76	370
19028	2/21/00	27	35	10
19028	1/8/01	37	29	260
19028	2/13/01	33	59	270
19028	11/12/01	180	170	1900
19035	2/12/00	23	16	100
19035	2/21/00	10	10	54
19035	1/8/01	32	19	160
19035	2/13/01	10	9	55
19035	11/12/01	49	36	290

Table 8. Percent Differences for Water Qualities with Flows Over 2.28 cfs.

Subwatershed Number	Date	Total Copper	Total Lead	Total Zinc
		%	%	%
19004	2/17/94	-59%	-87%	-70%
19004	3/24/94	-78%	-95%	-85%
19004	4/24/94	-27%	-51%	-45%
19004	11/10/94	-33%	-32%	-25%
19004	1/11/95	-68%	-88%	-80%
19004	2/14/95	-22%	-72%	-52%
19004	4/16/95	-63%	-77%	-69%
19004	11/1/95	62%	231%	1534%
19004	12/9/96	-6%	15%	51%
19004	12/6/97	89%	26%	167%
19004	3/14/98	-100%	-100%	-100%
19004	11/8/98	591%	4097%	660%
19004	1/25/99	741%	513%	381%
19004	3/15/99	161%	-52%	3%
19004	2/12/00	49%	195%	147%
19004	2/21/00	37%	2105%	142%
19004	3/5/00	50%	2292%	168%
19004	4/17/00	53%	335%	47%
19004	10/27/00	5%	28%	4%
19004	1/8/01	-54%	-62%	-44%
19004	2/13/01	215%	106%	154%
19004	11/12/01	-82%	-81%	-87%
19004	11/29/01	18%	14%	8%
19004	2/17/02	1%	68%	-7%
19004	11/8/02	19%	99%	55%
19004	2/11/03	14%	32%	-10%
19004	2/25/03	45%	1%	-16%
19006	2/12/00	-8%	116%	97%
19006	2/21/00	8%	22%	-29%
19006	1/8/01	-40%	-61%	-63%
19006	2/13/01	255%	119%	193%
19006	11/12/01	-64%	-49%	-76%
19016	2/12/00	-51%	-37%	-40%
19016	2/21/00	-10%	-14%	-42%
19016	1/8/01	-73%	-81%	-80%
19016	2/13/01	156%	73%	93%
19018	1/8/01	-69%	-73%	-81%
19018	2/13/01	21%	-25%	-5%
19018	11/12/01	-63%	-53%	-73%
19024	2/12/00	20%	-54%	-32%
19024	2/21/00	12%	-23%	49%
19024	1/8/01	-51%	-56%	-57%
19024	2/13/01	22%	-24%	1%
19024	11/12/01	-43%	-10%	-43%
19026	1/8/01	-23%	-14%	-26%

Subwatershed Number	Date	Total Copper	Total Lead	Total Zinc
		%	%	%
19026	2/13/01	183%	92%	129%
19026	11/12/01	-91%	-95%	-94%
19028	2/12/00	41%	-21%	-10%
19028	2/21/00	5%	-24%	1489%
19028	1/8/01	-17%	4%	-35%
19028	2/13/01	81%	-5%	24%
19028	11/12/01	-91%	-91%	-96%
19035	2/12/00	-14%	12%	10%
19035	2/21/00	15%	4%	19%
19035	2/13/01	141%	143%	145%

Table 9. Actual Differences for Water Qualities with Flows Over 2.28 cfs.

Subwatershed Number	Date	Total Copper	Total Lead	Total Zinc
		µg/L	µg/L	µg/L
19004	2/17/94	-20	-96	-182
19004	3/24/94	-23	-134	-205
19004	4/24/94	-12	-36	-145
19004	11/10/94	-12	-11	-46
19004	1/11/95	-12	-39	-120
19004	2/14/95	-9	-79	-187
19004	4/16/95	-53	-108	-384
19004	11/1/95	28	53	383
19004	12/9/96	-1	2	36
19004	12/6/97	25	11	184
19004	3/14/98	-28	-95	-92
19004	11/8/98	35	41	198
19004	1/25/99	37	36	183
19004	3/15/99	24	-43	6
19004	2/12/00	14	29	141
19004	2/21/00	6	21	71
19004	3/5/00	8	23	84
19004	4/17/00	7	17	38
19004	10/27/00	1	6	7
19004	1/8/01	-31	-43	-113
19004	2/13/01	34	26	170
19004	11/12/01	-80	-76	-645
19004	11/29/01	5	4	13
19004	2/17/02	0	22	-21
19004	11/8/02	5	17	65
19004	2/11/03	5	9	-24
19004	2/25/03	7	0	-25
19006	2/12/00	-5	40	156
19006	2/21/00	2	5	-52
19006	1/8/01	-21	-55	-263
19006	2/13/01	41	35	193
19006	11/12/01	-32	-19	-281
19016	2/12/00	-35	-19	-119
19016	2/21/00	-2	-3	-67
19016	1/8/01	-48	-73	-384
19016	2/13/01	23	15	102
19018	1/8/01	-48	-49	-535
19018	2/13/01	8	-13	-13
19018	11/12/01	-26	-15	-249
19024	2/12/00	7	-45	-106
19024	2/21/00	2	-6	39
19024	1/8/01	-28	-33	-206
19024	2/13/01	9	-14	2
19024	11/12/01	-14	-2	-78
19026	1/8/01	-7	-4	-50

Subwatershed Number	Date	Total Copper	Total Lead	Total Zinc
		µg/L	µg/L	µg/L
19026	2/13/01	31	21	155
19026	11/12/01	-154	-255	-1309
19028	2/12/00	17	-16	-38
19028	2/21/00	1	-8	149
19028	1/8/01	-6	1	-91
19028	2/13/01	27	-3	64
19028	11/12/01	-165	-155	-1815
19035	2/12/00	-3	2	10
19035	2/21/00	1	0	10
19035	2/13/01	14	13	79

Table 10. Water Quality Statistical Summary of Modeled and Observed Data Sets and Percent and Actual Differences.

Statistics of Modeled Values (55 values)	Copper - ug/L	Lead -ug/L	Zinc -ug/L	Statistics of Modeled Values that directly compared to Observed Values (55 values)	Copper -ug/L	Lead -ug/L	Zinc -ug/L
Mean	31	31	170	Mean	39	51	270
Median	28	28	157	Median	32	32	180
25th	19	18	100	25th	18	22	100
75th	40	45	317	75th	45	70	320
Statistics of Percent Differences (55 Values)	Copper -%	Lead -%	Zinc -%	Statistics of Actual Differences (55 Values)	Copper -ug/L	Lead -ug/L	Zinc -ug/L
Mean	33%	166%	76%	Mean	-8.1	-20.0	-96.5
Median	5%	-14%	-10%	Median	1.3	-3.1	-23.9
25th	-51%	-55%	-55%	25th	-21	-41	-132
75th	47%	71%	74%	75th	8.5	14.1	68.0

Table 11. Calculated Loads for Modeled and Observed Values.

Sub watershed Number	Date	Flow Volume	Total Copper	Total Lead	Total Zinc	Total Copper	Total Lead	Total Zinc
			Modeled	Modeled	Modeled	Observed	Observed	Observed
Units		L	g	g	g	g	g	g
19004	11/29/01	6,852,360	217	219	1197	185	192	1110
19004	2/17/02	18,628,159	992	1003	5452	987	596	5849
19004	11/8/02	7,929,481	264	268	1451	222	135	936
19004	2/11/03	123,077,664	4629	4724	25361	4062	3569	28308
19004	2/25/03	466,572,473	10789	10856	60216	7465	10731	71852

Table 12. Percent and Actual Differences Between Model and Observed Values in Table B-11.

Subwatershed Number	Date	Total Copper	Total Lead	Total Zinc	Total Copper	Total Lead	Total Zinc
		Percent Difference	Percent Difference	Percent Difference	Actual Difference	Actual Difference	Actual Difference
Units		%	%	%	g	g	g
19004	11/29/01	18%	14%	8%	32.48	27	87
19004	2/17/02	0.5%	68%	-7%	5.0	407	(397)
19004	11/8/02	19%	99%	55%	42.27	132.8	515
19004	2/11/03	14%	32%	-10%	567	1,154	(2,947)
19004	2/25/03	45%	1.2%	-16%	3,324	125	(11,636)