Selenium Project
Southeast Idaho Phosphate Resource Area

Final

2003 Supplement to 2001 Total Maximum Daily Load Baseline Monitoring Report

JANUARY 2004

Prepared for

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AREA-WIDE INVESTIGATION
SOUTHEAST IDAHO PHOSPHATE MINING RESOURCE AREA
Contract Number C023
Task Order AWI-01-01

Prepared for

IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY
Pocatello, Idaho
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FINAL
2003 SUPPLEMENT TO
2001 TOTAL MAXIMUM DAILY LOAD
BASELINE MONITORING REPORT

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Southeast Idaho Phosphate Mining Resource Area

January 2004

Prepared by

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EXECUTIVE SUMMARY

This report supplements the "Final 2001 Total Maximum Daily Load Baseline Monitoring Report" and "Final 2002 Supplement to 2001 Total Maximum Daily Load Baseline Monitoring Report." The two reports were prepared by Tetra Tech EM Inc. (TtEMI) for the Idaho Department of Environmental Quality (IDEQ) in April 2002 and November 2002, respectively. The main objective of this report is to update the previous reports with results of surface water monitoring performed by TtEMI and IDEQ in May 2003 on streams within the upper Blackfoot River, Salt River, and Bear River watersheds in southeastern Idaho. Data from 2003 will assist IDEQ and other stakeholders in assessing whether water quality is protective of aquatic life. This discussion is limited to total (unfiltered) selenium and the dissolved (filtered) phase of seven toxic metals regulated by Idaho Administrative Code and enforced by IDEQ.

In May 2003, surface water data were collected from 13 monitoring stations located downstream of current and historical phosphate mining activities. Eleven of the stations were sampled previously in 2001 or 2002 and selenium was detected at concentrations potentially deleterious to aquatic life. At all 13 stations, samples were collected following 4-day averaging protocol to support IDEQ data requirements. Selenium was the only chemical detected at concentrations that exceed State of Idaho surface water quality criteria. The 4-day average selenium concentrations exceeded the Criteria Continuous Concentration at four stations in the upper Blackfoot River watershed and one station in the Salt River watershed. At two stations in the upper Blackfoot River watershed, selenium also exceeded the Criteria Maximum Concentration.

Data from the 2003 monitoring efforts were compared to results of monitoring performed by TtEMI, IDEQ, and Montgomery Watson between 1998 and 2002. Results suggest that surface water selenium concentrations appear to be influenced by yearly fluctuations in snow water equivalent and accumulated precipitation. However, other factors appear to influence the timing and magnitude of selenium release to streams. Such factors may include mobilization and immobilization processes involving sediment, discharge of shallow groundwater, uptake by plants and other biota, locations and management practices associated with phosphate mining activity, and chemical transport and cycling in upland soils.

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ACRONYMS AND ABBREVIATIONS

<	Less than
µg/L	Micrograms per Liter
ACPR	Accumulated Precipitation
ACZ	ACZ Laboratories, Inc.
CCC	Criteria Continuous Concentration
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CMC	Criteria Maximum Concentration
EPA	U.S. Environmental Protection Agency
°F	Degrees Fahrenheit
gpd	Grams per Day
IDEQ	Idaho Department of Environmental Quality
IMA	Idaho Mining Association
MDL	Method Detection Limit
mg $CaCO_3$/L	Milligrams Calcium Carbonate per Liter
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MW	Montgomery Watson
NRCS	National Resource Conservation Service
PQL	Practical Quantitation Limit
QAPP	Quality Assurance Project Plan
QC	Quality control
Resource Area	Southeastern Idaho Phosphate Resource Area
SAP	Sampling and Analysis Plan
SWEQ	Snow Water Equivalent
TMDL	Total Maximum Daily Load
TtEMI	Tetra Tech EM Inc.
U of I	University of Idaho Analytical Sciences Laboratory
USGS	U.S. Geological Survey
WQS	Water Quality Standard
WY	Water Year

1.0 INTRODUCTION

In May 2003, Tetra Tech EM Inc. (TtEMI) and the Idaho Department of Environmental Quality (IDEQ) monitored stream water quality in the upper Blackfoot River, upper Salt River, and upper Bear River watersheds in the Southeastern Idaho Phosphate Mining Resource Area (Resource Area) (see Figure 1). The monitoring was a continuation of baseline monitoring activities conducted in 2001 and 2002. Results of monitoring in 2001 and 2002 are documented in the "Final TMDL Baseline Monitoring Report" (TtEMI 2002a) and the "Final 2002 Supplement to 2001 TMDL Baseline Monitoring Report" (TtEMI 2002b), respectively. This report supplements the previous reports by presenting results of monitoring activities conducted in May 2003 and comparing them to previous results. This report also incorporates results from monitoring efforts completed by Montgomery Watson (MW) from 1998 through 2000. Data collected by MW, TtEMI, and IDEQ were analyzed in relation to concurrent climatic conditions for the Resource Area. The remainder of this section provides project background information and summarizes objectives and results of baseline monitoring activities performed by TtEMI and IDEQ in 2001 and 2002.

The following sections discuss the 2003 monitoring event including climatic and hydrologic conditions (see Section 2.0), methods used in the field and laboratory (see Section 3.0), field activities and results (see Section 4.0), selenium data related to climatic conditions (see Section 5.0), laboratory data quality (see Section 6.0), and a summary of the project (see Section 7.0).

1.1 PROJECT BACKGROUND

Phosphate mining has been conducted in the Resource Area since 1907. Concerns over possible impacts from historical and current mining prompted IDEQ to assess surface water quality in the Resource Area. Previous investigations demonstrated that selenium, cadmium, and other trace metals are present in the Resource Area watersheds at concentrations potentially deleterious to aquatic life beneficial uses. The presence of selenium and other toxic constituents in these watersheds is ultimately related to the watersheds' underlying geology and mineralogy. Mining activity in these watersheds over the last 100 years is believed to have accelerated the rate at which these substances are exposed to weathering processes and released to surface waters within the watershed.

All perennial streams within the Resource Area watersheds include aquatic life as a beneficial use. A water quality standard (WQS), as defined by the Clean Water Act and Idaho state law, links a beneficial use with criteria for protection of that use (Grafe and others 2000). Criteria are expressed as numeric values or narrative statements for specific physical and chemical water quality constituents. Only

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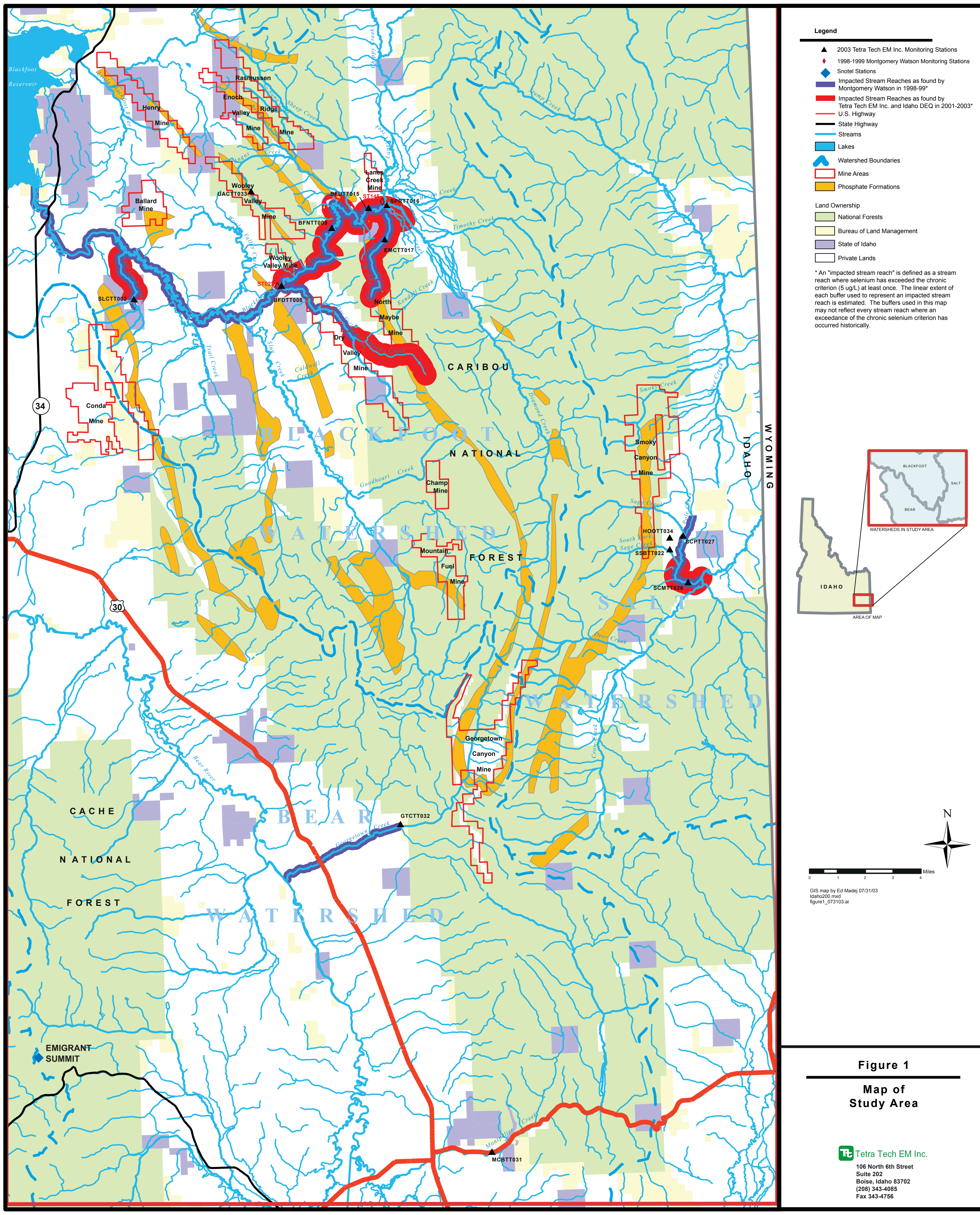

Figure 1

Map of Study Area

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numeric criteria expressed for the protection of aquatic life beneficial uses are discussed in this report. Numeric criteria are typically expressed as single-value concentrations that, if exceeded, may indicate impairment of beneficial uses. In the case of selenium and metals, criteria represent toxicity thresholds for sensitive species established by scientific research. Subpart 210.01 of Idaho Administrative Code, Idaho Administrative Procedures Act, chapter 58.01.02, specifies criteria for selenium and metals in terms of chronic and acute exposure durations. Any stream or stream reach assessed by IDEQ as impaired is identified in the State's 305(b) report and then placed on the State's 303(d) list. Once placed on the 303(d) list, IDEQ must schedule and subsequently develop a total maximum daily load (TMDL) or equivalent action for each listed pollutant in each waterbody or waterbody segment. Further discussion on TMDL water quality standards and the TMDL process in Idaho is provided by TtEMI (2002a).

Streams from each of the three study watersheds are listed on the State of Idaho 1998 303(d) list. Pollutants identified as impairing the streams were mainly sediment and nutrients. Only one stream, Meadow Creek in the Bear River watershed, was listed for metals; however, IDEQ has not been able to verify the reason for its initial listing (TtEMI 2002a). The Blackfoot River, which is considered to be a high-priority for TMDL development, was listed for nutrients, sediment, and organic constituents. In 2001, IDEQ released the report, "Blackfoot River TMDL—Waterbody Assessment and Total Maximum Daily Load" (IDEQ 2001). The report presents results from IDEQ's subbasin assessment and loading analyses for the entire Blackfoot subbasin; however, the report assessed sediment and nutrients only. In 2003, IDEQ released the "Draft 2002-03 Integrated 303(d)/305(b) Report" (IDEQ 2003). This report contains the draft 2002-03 303(d) list. Of all the perennial streams in the three study watersheds, six streams are listed for selenium. The streams include Maybe Canyon, Dry Valley, Chicken, Spring, East Mill, and Pole Canyon creeks. These listings are based in part on results of baseline monitoring performed on Resource Area streams by TtEMI and IDEQ in 2001 and 2002. IDEQ is currently receiving public comments on the draft report and 303(d) list. Until the report is submitted to EPA and receives EPA approval, the 1998 303(d) list is the official list for the State of Idaho.

1.2 2001 BASELINE MONITORING ACTIVITIES

IDEQ retained TtEMI in October 2000 to perform an independent review of the existing data and a preliminary risk assessment compiled and published by the Idaho Mining Association (IMA) Selenium Committee. TtEMI also assisted IDEQ in developing area-wide human health and ecological risk assessments associated with past phosphate mining operations in the Resource Area. Under a separate action, IDEQ contracted TtEMI to conduct surface water and sediment sampling to support the development of the risk assessments and to assist in evaluating surface water quality for compliance with regulatory requirements. Surface water quality data needs for the risk assessments and the TMDL process were similar; therefore, the data collection efforts were combined to avoid duplication and to reduce costs.

TtEMI and IDEQ performed three surface water monitoring events on streams within the three Resource Area watersheds in May, June, and September 2001. Objectives of the 2001 monitoring events were to (1) fulfill data needs of concurrent human health and ecological risk assessments, and (2) assist IDEQ in determining baseline surface water quality in the Resource Area. Surface water samples were collected from 31 monitoring stations during baseline monitoring in 2001. Of the 31 stations, 22 were located downstream from mining activities, and 9 were assumed to represent background or reference conditions. Surface water samples were analyzed in the laboratory for a full suite of analytes including selenium and about 20 other toxic or trace metals of potential concern. Results of 2001 baseline monitoring activities are summarized by TtEMI (2002a). The report focused on results pertinent to the regulatory interests of IDEQ. Emphasis was placed on streams where results of laboratory analyses indicated toxic pollutants were present at concentrations that exceeded regulatory criteria and could potentially impair aquatic life. Toxic pollutants included selenium and metals, as defined by Idaho WQS and regulated by IDEQ. Results of TtEMI's human health and ecological risk assessments are presented by TtEMI (2003a).

Overall, concentrations of selenium and metals observed in 2001 were less than those reported in previous studies. This decrease may have been influenced by stream flows that were notably lower than during previous years. On average, concentrations of selenium and other metals were highest during flows associated with peak snowmelt conditions. Arsenic was below laboratory detection limits for water samples collected from all stations during all three monitoring events. Copper, nickel, and zinc were detected at the majority of impacted and background stations during all three events. Results for other metals exhibited variation in the number of stations where they were detected over the course of 2001 monitoring. Selenium was detected at 10 to 13 impacted stations during each event and at only three background stations in September. Selenium concentrations exceeded chronic criteria in Spring Creek during the May and June monitoring events, exceeded acute criteria in East Mill Creek during all three monitoring events, and exceeded chronic criteria near the mouth of Sage Creek during the September monitoring event only. During each event, the highest selenium concentration was observed in East Mill Creek, downstream of the North Maybe Mine.

The 2001 baseline monitoring activities also included selenium loading analyses to evaluate trends over the course of 2001 monitoring at individual monitoring stations and along stream reaches within the study area watersheds. At most stations, selenium loads were highest during the May 2001 monitoring event and consistently decreased over the course of monitoring. In 2001, based on an evaluation of selenium loads in the Blackfoot River, unknown sources of selenium contributed to loading in Resource Area streams. Such sources may include discharge of shallow groundwater, tributary streams, or entrainment of selenium from in-stream bank or bottom materials. Results also suggest that selenium is immobilized or somehow withdrawn from the water column in certain streams.

To further assist IDEQ in assessing selenium concentrations in Resource Area streams, TtEMI compiled analytical results from surface water monitoring performed by MW in 1998 and 1999, and TtEMI in July 2001. In general, selenium concentrations in streams sampled in 1998, 1999, or both years were considerably greater than selenium concentrations observed in the same streams sampled in 2001. This decrease appears strongly related to low-flow conditions associated with decreased runoff in 2001, compared to conditions in 1998 and 1999. Evaluation of the combined data indicated that chronic selenium criteria had been exceeded at least once in Georgetown Creek, Sage Creek, East Mill Creek, Spring Creek, Maybe Creek, Dry Valley Creek, Trail Creek, State Land Creek, and the Blackfoot River.

1.3 2002 BASELINE MONITORING ACTIVITIES

TtEMI and IDEQ conducted one surface water monitoring event in May 2002. Surface water data were collected from Resource Area streams at 10 monitoring stations located downstream of current and historical phosphate mining activities where selenium was detected in 2001 at concentrations potentially deleterious to aquatic life. At the request of IDEQ, East Mill Creek was not included in the 2002 monitoring program. At eight stations, samples were collected following 4-day averaging protocol to support IDEQ data requirements. At the remaining two stations, only one sample was collected. Laboratories analyzed the first sample collected from each monitoring station for unfiltered selenium, dissolved metals, hardness, nutrients, alkalinity, total organic carbon, and total suspended solids. All subsequent samples were analyzed for selenium, metals, and hardness only. Water quality field parameters were measured every time a surface water sample was collected. With one exception, stream flow was also measured every time a surface water sample was collected.

At most stations, observed flows in May 2002 were greater than flows observed in May 2001. Similarly, at most stations sampled in 2002, analytical results indicated that selenium concentrations were higher in May 2002 than in May 2001. A selenium loading analysis was performed using the May 2002 laboratory and stream flow data. A comparison of the 2001 and 2002 selenium loads showed that, at most stations, the highest selenium loads occurred in May 2002. Results of the May 2001 and 2002 selenium loading analyses suggested that selenium loads in Resource Area streams are influenced by in-stream mobilization or demobilization processes, nonpoint source contributions of selenium from groundwater discharge or land surface runoff, or selenium input or dilutions accompanying unsampled tributary inflows.

In May 2002, selenium was the only chemical to exceed State of Idaho surface water quality criteria. At three stations on the Blackfoot River and one station at the mouth of Spring Creek, 4-day averaged selenium concentrations exceeded the Criteria Continuous Concentration (CCC). Selenium in Spring Creek also exceeded the Criteria Maximum Concentration (CMC).

Results of the May 2002 monitoring event were integrated with results of previous monitoring performed by TtEMI, IDEQ, and MW between 1998 and 2001. The combined data were then related to concurrent climatic conditions for the Resource Area. Results suggested that surface water selenium concentrations appear to be influenced by yearly fluctuations in snow water equivalent (SWEQ). The greatest selenium concentrations were observed when SWEQ and percent of normal SWEQ were greatest at the time of sample collection.

1.4 2003 SURFACE WATER MONITORING OBJECTIVES

The goal of the 2003 baseline surface water monitoring plan was to further assist IDEQ in determining whether Resource Area streams are meeting water quality standards or are impaired due to excessive concentrations of selenium and other toxics. The 2003 monitoring efforts were similar to 2002 monitoring efforts and focused primarily on streams where historical water quality data have exceeded the Idaho regulatory criteria for selenium and select toxic metals. The overall objectives of 2003 monitoring were as follows:

1. Conduct surface water sampling at select streams within the Resource Area following 4-day averaging protocol
2. Determine water quality exceedances by comparing analytical results for selenium and other toxic constituents with regulatory criteria
3. Estimate constituent loads at individual surface water sampling stations

To meet these objectives, one surface water monitoring event was conducted in May 2003.

2.0 CLIMATIC AND HYDROLOGIC CONDITIONS FOR RESOURCE AREA

TtEMI evaluated daily accumulated precipitation (ACPR) and SWEQ data collected by the National Resource Conservation Service (NRCS) at its SNOTEL station located at Emigrant Summit, Idaho (elevation 7,390 feet) (see Figure 1). The SNOTEL data is provided by the Western Regional Climate Center (http://www.wrcc.dri.edu). ACPR is the total precipitation, regardless of form, accumulated at a station over the course of a water year (WY), which runs from October 1 to September 30. SWEQ is the depth of water potentially obtained by melting the snow cover. SWEQ is influenced by meteorological factors such as temperature, relative humidity, and wind.

Snowmelt runoff heavily influences stream flow in the Resource Area. Figure 2 presents observed and average ACPR for the Emigrant Summit SNOTEL station from WY 1997 through June 2003. Figure 3 presents observed and average SWEQ reported for the same SNOTEL station and time period. As shown in Figures 2 and 3, both ACPR and SWEQ were above average during WY 1997. During WY 1998 and 1999, ACPR was slightly above average, while SWEQ was close to average. During WYs 2000 to 2003, ACPR and SWEQ were below average. ACPR is comparable from 2000 to 2003, but SWEQ is more variable over the same time period. During this time, while ACPR stayed relatively constant, SWEQ was greater in 2002 and 2003 than in 2001. This suggests that in WYs 2002 and 2003, the snowpack held more water than in WY 2001. In addition, this suggests that snowmelt runoff in WYs 2002 and 2003 were greater than in WY 2001.

TtEMI analyzed U.S. Geological Survey (USGS) flow data for the Blackfoot River from the gaging station above Blackfoot Reservoir near Henry, Idaho. Figure 4 presents the observed daily mean flows from April 2001 to June 2003. Daily mean flow is the mean flow calculated for all flow rates observed at a gaging station on a specific date (month/date/year). The figure also presents the mean of daily mean flows based on a 30-year period of record comprising April 1914 to September 1925, August 1967 to September 1982, and April to September 2001. Mean of daily mean flows is the mean of all daily mean flows observed on a specific date (month/date) over a period of record. From April 2001 through June 2003, daily mean flow was below average except for brief durations of above-average flows that occurred in March and April 2002, and March and April 2003. Daily mean flow data is not available for WYs 1998 through part of 2001.

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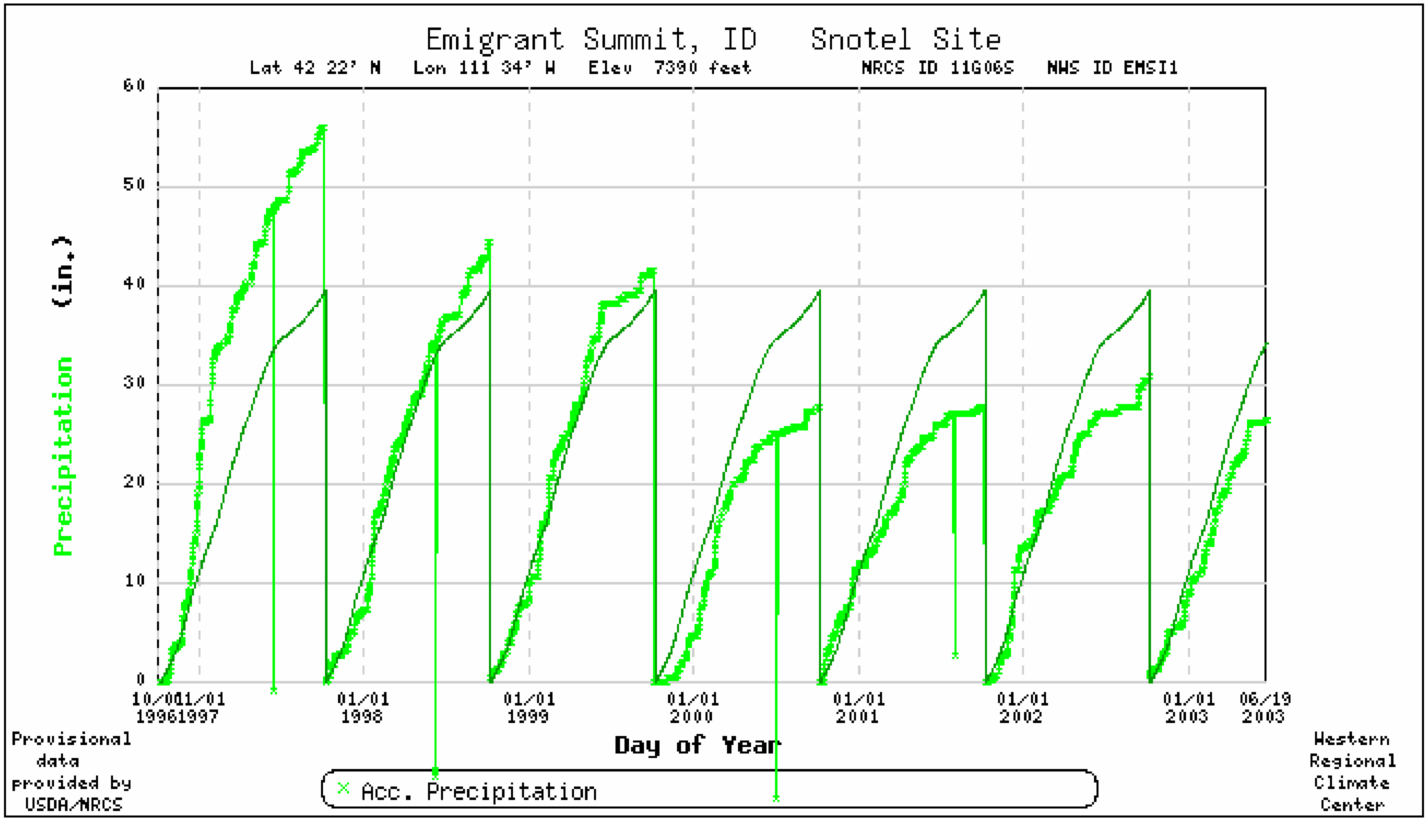
FIGURE 2

ACCUMULATED PRECIPITATION, EMIGRANT SUMMIT, IDAHO, SNOTEL STATION, 1997 TO 2003



<u>Notes</u>

1. Data are available from Western Regional Climate Center (http://www.wrcc.dri.edu).
2. Varying green line represents observed daily accumulated precipitation reported (APCR) for SNOTEL station.
3. Repeating green line represents average daily APCR for SNOTEL station, 1971 to 2000.

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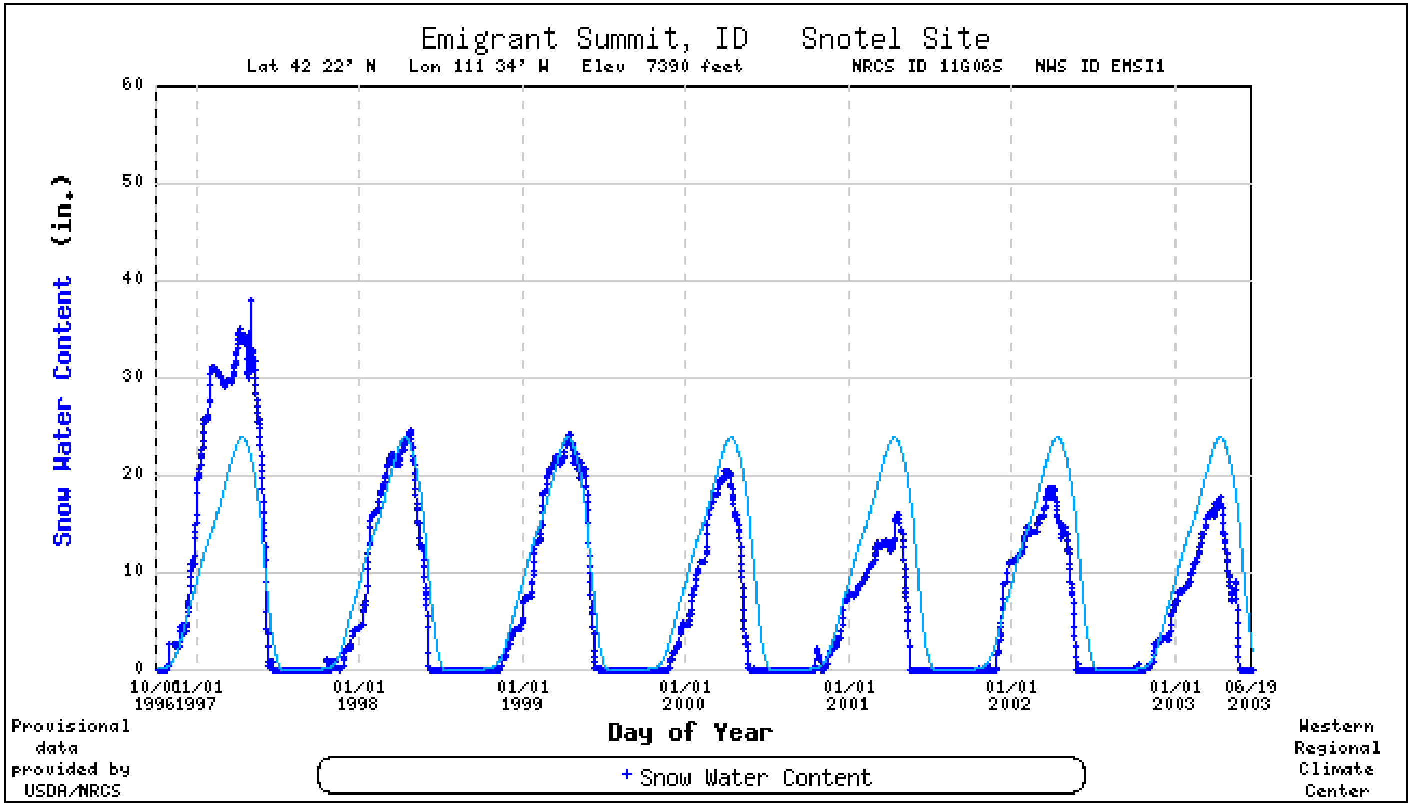
FIGURE 3

SNOW WATER EQUIVALENT, EMIGRANT SUMMIT, IDAHO, SNOTEL STATION, 1997 TO 2003



Notes

1. Data are available from Western Regional Climate Center (http://www.wrcc.dri.edu).
2. Varying blue line represents observed daily snow water equivalent (SWEQ) for SNOTEL station.
3. Repeating blue line represents average daily SWEQ reported for SNOTEL station, 1971 to 2000

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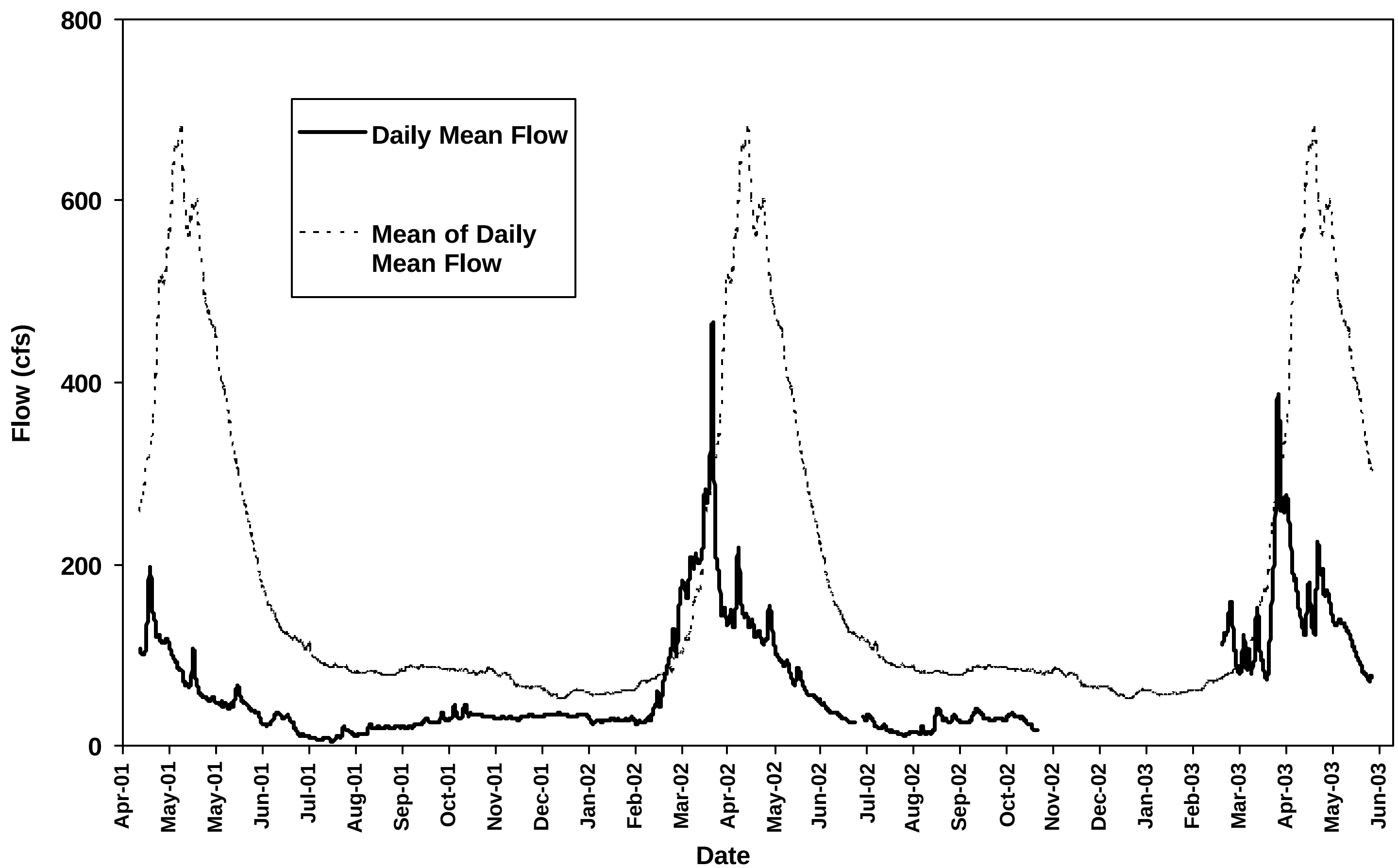
FIGURE 4
DAILY MEAN FLOW, BLACKFOOT RIVER ABOVE RESERVOIR NEAR HENRY, IDAHO
USGS GAGE 13063000
APRIL 2001 TO JUNE 2003



<u>Notes</u>

cfs Cubic feet per second

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3.0 METHODS

This section discusses development of the 2003 sampling plan, selection of monitoring stations for the 2003 monitoring event, field sampling methods, field parameter and stream flow measurement methods, and laboratory analytical methods. Overall, methods for the 2003 monitoring event were very similar to methods used during the 2001 and 2002 monitoring events. The only notable exception was the addition of two new monitoring stations.

3.1 WORK PLAN DEVELOPMENT

Prior to sampling in 2003, TtEMI prepared a sampling and analysis plan (SAP) addendum (TtEMI 2003b), which included a field sampling plan (FSP) addendum and quality assurance project plan (QAPP) addendum. The SAP addendum deferred entirely to the health and safety plan (HSP) provided earlier by TtEMI (2001).

3.2 2003 MONITORING STATIONS

Table 1 presents the 13 monitoring stations sampled in May 2003. Sample collection efforts in May 2003 focused primarily on streams identified by TtEMI (2002a) where water quality data historically exceeded Idaho regulatory criteria for selenium. Of the 13 stations, 10 were previously sampled in 2001 and 2002, and one (East Mill Creek [EMCTT017]) was previously sampled only during the three monitoring events in 2001. As directed by IDEQ, two new surface water monitoring stations were added in 2003. The new stations were established at Upper Angus Creek (UACTT033) and Hoopes Spring (HOOTT034) (see Figure 1). Station UACTT033 is upstream of two stations on Angus Creek (Angus Creek-mouth [ANGTT008] and Middle Angus Creek [MACTT011]) (not shown on Figure 1); both were monitored by TtEMI and IDEQ in 2001. Station UACTT033 is downstream of a detention basin at the Wooley Valley Mine. Hoopes Spring and station HOOTT034 are downgradient of the Smoky Canyon Mine. While the hydrogeology of Hoopes Spring is not characterized, the springs discharge to Sage Creek and have been identified by IDEQ as a potential pathway for selenium loading to Sage Creek.

3.3 SAMPLE COLLECTION METHODS

During the May 2003 monitoring event, TtEMI and IDEQ field teams followed the same sampling methods developed during previous TMDL baseline monitoring events and described by TtEMI (2001, 2002a, and 2003b).

Field teams followed USGS and Federal Interagency Sedimentation Project sampling methods described by TtEMI (2001, 2002a, and 2003b). At all 13 stations, 4-day averaging protocol was followed to support comparisons of laboratory results with chronic water quality criteria. The 4day averaging protocol requires the collection of three samples over a 4day (96-hour) period. Field teams collected both unfiltered and filtered samples following methods described by TtEMI (2002a). Field quality control (QC) samples were collected and included field duplicates, equipment rinsates, one source water blank, and splits. Sample identification procedures in 2003 followed those described by TtEMI (2002a, 2003b). Sample documentation, chain of custody, shipment, and decontamination procedures followed those described by TtEMI (2001).

TABLE 1

2003 SURFACE WATER MONITORING STATIONS

Station Identification	Station Name	Watershed
SLCTT002	State Land Creek	Blackfoot
BFDTT008	Blackfoot River above Dry Valley Creek	Blackfoot
BFNTT009	Blackfoot River above Narrows	Blackfoot
BFUTT015	Blackfoot River at upper bridge	Blackfoot
SPRTT016	Spring Creek (mouth)	Blackfoot
EMCTT017	East Mill Creek above split	Blackfoot
UACTT033	Upper Angus Creek	Blackfoot
SSBTT022	South Fork Sage Creek below mining	Salt
SCMTT026	Sage Creek (mouth)	Salt
SCPTT027	Sage Creek below Pole Creek	Salt
HOOTT034	Hoopes Spring	Salt
MCBTT031	Montpelier Creek below mining	Bear
GTCTT032	Georgetown Creek	Bear

3.4 FIELD PARAMETER AND STREAM FLOW MEASUREMENT METHODS

Field parameters were measured when samples were collected at each station. Water quality parameters measured in the field included pH, oxidation and reduction potential, specific conductance, dissolved oxygen, turbidity, and temperature. In-stream measurements of all field parameters were taken. On smaller, tributary streams, field parameter measurement methods in 2003 followed those described by TtEMI (2001, 2002a). At monitoring stations on larger streams, such as the mainstem of the Blackfoot River, field teams measured field parameters at three locations along the stream cross-section, perpendicular to the flow direction.

In 2003, field teams measured stream flow at all monitoring stations where and when samples were collected. Flow measurement procedures followed those described by TtEMI (2001, 2002a).

3.5 LABORATORY ANALYSES

ACZ Laboratories, Inc. (ACZ), in Steamboat Springs, Colorado, was the primary laboratory used by TtEMI and IDEQ in 2003. The University of Idaho Analytical Sciences Laboratory (U of I) in Moscow, Idaho analyzed split samples collected in the field. All sample containers were provided by the laboratories and certified to be clean. Both laboratories provided pre-preserved bottles for analysis of samples requiring preservation. All samples collected in the field were placed in coolers with double-bagged ice and shipped under chain of custody to the laboratories for receipt within the required holding time.

Table 2 presents the laboratory analyses performed by the laboratories, including analytical methods and corresponding method detection limits (MDL). While the MDLs varied slightly between the two laboratories, the MDLs for all toxic constituents were less than the applicable regulatory criteria for all analyses.

TABLE 2
2003 LABORATORY ANALYTICAL METHODS

Analyte	ACZ Laboratories, Inc.		University of Idaho Analytical Sciences Laboratory		Units
	MDL	Method	MDL	Method	
Bicarbonate alkalinity	2.0	SM 2320B	NA	NA	mg $CaCO_3$/L
Cadmium, dissolved	0.10	EPA 200.8 ICP-MS	0.13	EPA 200.8 ICP-MS	µg/L
Calcium, dissolved	200	EPA 200.7 ICP	20	EPA 200.7 ICP	µg/L
Carbonate alkalinity	2.0	SM 2320B	NA	NA	mg $CaCO_3$/L
Chromium, dissolved	0.10	EPA 200.8 ICP-MS	0.50	EPA 200.8 ICP-MS	µg/L
Copper, dissolved	0.50	EPA 200.8 ICP-MS	0.13	EPA 200.8 ICP-MS	µg/L
Hardness	1.0	SM 2340B-Calculation	NA	NA	mg $CaCO_3$/L
Hydroxide alkalinity	2.0	SM 2320B	NA	NA	mg $CaCO_3$/L
Lead, dissolved	0.10	EPA 200.8 ICP-MS	0.25	EPA 200.8 ICP-MS	µg/L
Magnesium, dissolved	200	EPA 200.7 ICP	5.0	EPA 200.7 ICP	µg/L
Nickel, dissolved	0.20	EPA 200.8 ICP-MS	0.13	EPA 200.8 ICP-MS	µg/L
Nitrate-N+Nitrite-N	20	EPA 353.2	NA	NA	µg/L
Selenium	1.0	SM 3114 C, AA-Hydride	1.0	ICP - HG	µg/L
Silver	0.05	EPA 200.8 ICP-MS	0.25	EPA 200.8 ICP-MS	µg/L
Total alkalinity	2.0	SM 2320B	NA	NA	mg $CaCO_3$/L
Total organic carbon	1.0	EPA 415.1 Combustion/IR	NA	NA	mg/L
Total phosphorus	10	EPA 365.1 – Auto Ascorbic Acid	NA	NA	µg/L
Total suspended solids	5.0	EPA 160.2 - Gravimetric	NA	NA	mg/L
Zinc, dissolved	10	EPA 200.7 ICP	10	EPA 200.7 ICP	µg/L

<u>Notes:</u>
µg/L Microgram per liter
AA Atomic adsorption

TABLE 2 (Continued)

2003 LABORATORY ANALYTICAL METHODS

Notes (continued):

EPA	U.S. Environmental Protection Agency
ICP	Inductively coupled plasma atomic emission spectrometer
ICP-HG	Inductively coupled plasma-hydride generation
ICP-MS	Inductively coupled plasma-mass spectrometer
IR	Infrared spectrometer
MDL	Method detection limit
mg $CaCO_3$/L	Milligrams of calcium carbonate per liter
mg/l	Milligram per liter
N	Nitrogen
NA	Not applicable
Se	Selenium
SM	Standard method

4.0 FIELD ACTIVITIES AND RESULTS

This section describes field activities, stream flow measurements, and analytical results. The results and discussion in this section are limited to selenium and metals within the 2003 sampling and analysis program that have WQS enforced by IDEQ. Analytes with observed concentrations exceeding chronic and acute numeric criteria are emphasized. Surface water laboratory results and field data are presented in Appendix A and B, respectively.

4.1 FIELD ACTIVITIES

The 2003 monitoring event began on May 5 and ended on May 9, 2003. Two- to four-person field teams, composed of TtEMI, IDEQ, and U.S. Forest Service staff, performed the monitoring. Volunteers from the Shoshone-Bannock Tribe supported monitoring teams led by TtEMI and IDEQ staff on three days of the event. The number of teams in the field each day varied over the course of the event.

Meteorological conditions varied among the three watersheds over the course of the monitoring. On May 5 and 6, intermittent rain and snow flurries occurred with light to strong winds and temperatures ranging from approximately 30 to 55 degrees Fahrenheit (°F). On May 7, weather conditions were cloudy with light winds, and temperatures again ranged from about 30 to 55 °F. On May 8, weather conditions were partly cloudy to mostly sunny with moderate winds and temperatures ranging from about 30 to 70 °F. On May 9, heavy rains early in the morning turned to snow later in the day, with calm winds and temperatures ranging from about 30 to 40 °F.

At all 13 monitoring stations, field teams collected samples following 4-day averaging procedures. Field QC samples included a total of four field duplicates, two equipment rinsates, one source water blank, and four split samples. Stream flow and water quality field parameters were measured in situ when each surface water sample was collected.

Surface water and field QC samples were submitted to ACZ and U of I laboratories. ACZ performed the full suite of analyses listed in Table 3 on the first sample collected from each monitoring station as well as the first two field duplicates, the one source water blank, and the first equipment rinsate. On all subsequent surface water and field QC samples, ACZ performed selenium analyses only. U of I performed the full suite of analyses listed in Table 3 on the first two split samples collected in the field. On the third and fourth split samples collected in the field, U of I performed selenium analyses only. At the request of TtEMI, U of I analyzed 6 additional split samples that ACZ prepared in the laboratory and shipped to U of I directly under chain of custody. U of I analyzed the additional 6 split samples for selenium only.

4.2 OBSERVED STREAM FLOW

Field teams measured stream flow at all monitoring stations where surface water samples were collected. Figures 5 and 6 show bar graphs of observed stream flows in the upper Blackfoot and combined Salt and Bear watersheds, respectively. For both figures, monitoring stations presented on the X-axis are arranged so that the higher-elevation stations are toward the right and the lower-elevation stations, closer to the watershed's outlet, are toward the left. Figures 5 and 6 also show the average of the three flow measurements observed at each station in May 2003. For comparison purposes, where available, May 2001 and May 2002 flows recorded at the same stations are also shown on Figures 5 and 6. For streams with multiple monitoring stations, such as the Blackfoot River and Sage Creek, observed flows generally increased with distance downstream. Such increases are typically expected as a result of increasing downstream inflows from tributaries and shallow groundwater discharge. Exceptions to this may have resulted from flow measurement error, diurnal variations in stream flows, influence of rainfall, or flow diversions.

4.3 DETECTIONS AND NUMERIC CRITERIA EXCEEDANCES

This section discusses laboratory results for selenium and other toxic constituents included in the 2003 sampling and analysis program that are IDEQ-regulated. Emphasis is placed on observed exceedances of chronic and acute criteria. *Exceedances* are defined as laboratory result values that exceed Idaho numeric criteria for the protection of aquatic life.

All observed data and respective criteria were compared directly, except for chromium. Dissolved total chromium observations were compared with Idaho trivalent and hexavalent chromium criteria because the State of Idaho does not provide criteria for total chromium. This approach also was used as part of evaluations of chromium data collected in 2001 (TtEMI 2002a). Prior to the beginning of 2001 monitoring, TtEMI conservatively decided to analyze for total chromium, rather than for each species separately. The decision was based on the assumption that if the results for total chromium did not exceed criteria, then individual chromium species would not present a regulatory concern. However, if the results for total chromium exceeded criteria for either trivalent or hexavalent chromium, TtEMI would recommend analyzing for both species during future sampling. Total chromium did not exceed chronic or acute criteria for either species during the three monitoring events performed in 2001. This approach for

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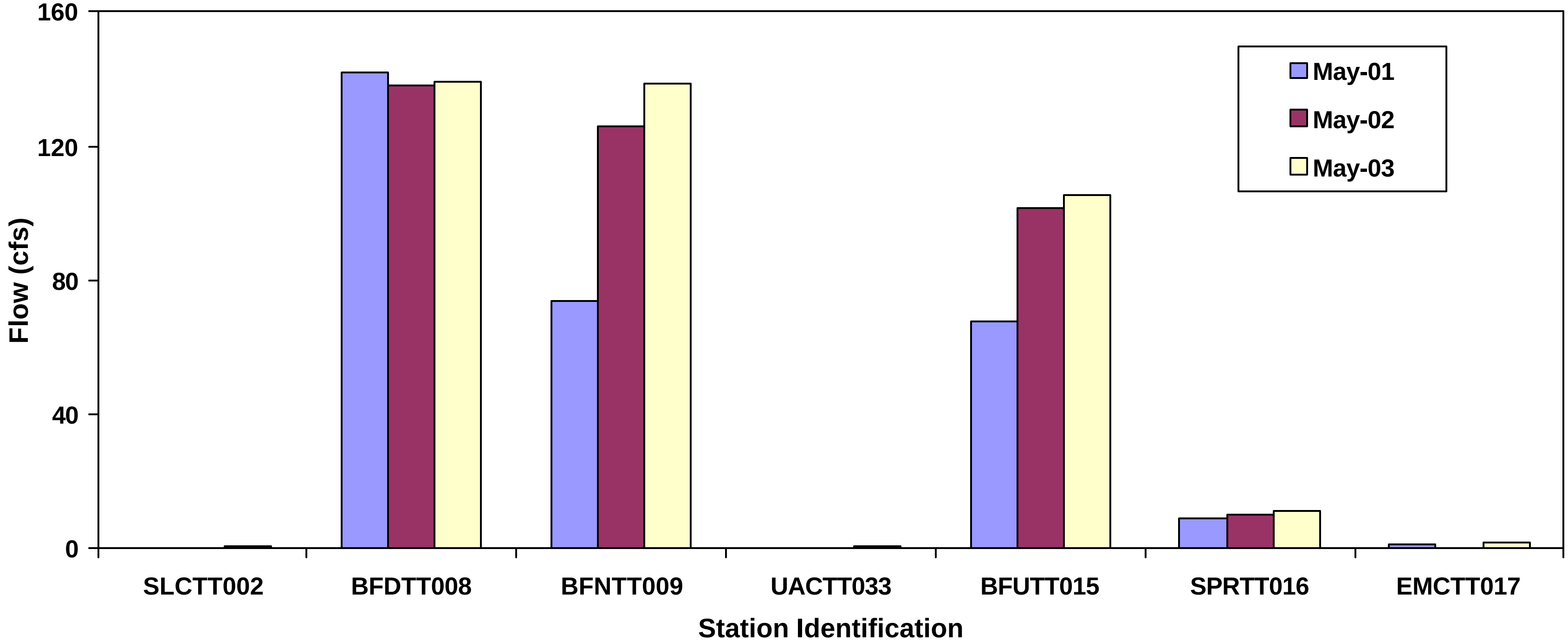
FIGURE 5

FLOWS IN UPPER BLACKFOOT RIVER WATERSHED
MAY 2001 TO 2003



Notes

cfs Cubic feet per second
Monitoring stations along X-axis are arranged upstream-to-downstream from right-to-left

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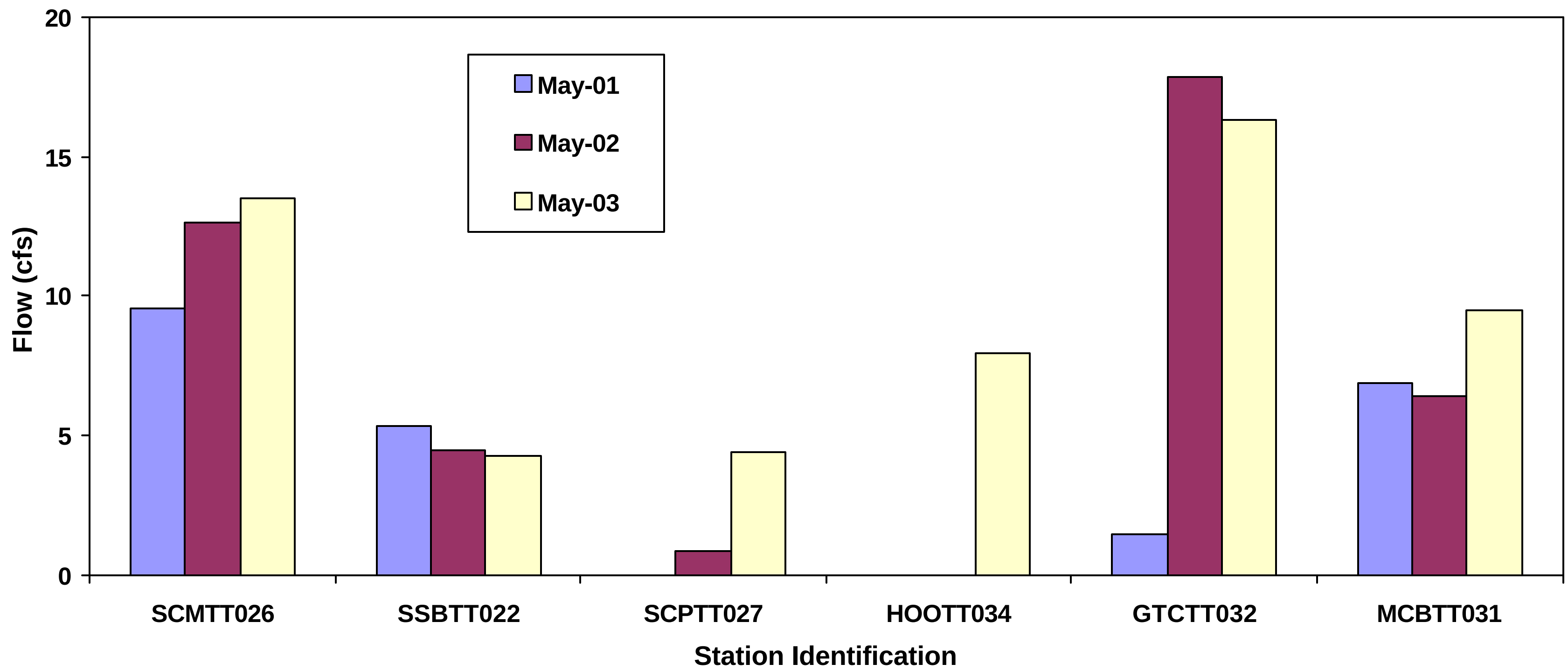
FIGURE 6

FLOWS IN SALT AND BEAR RIVER WATERSHEDS
MAY 2001 TO 2003



Notes

cfs Cubic feet per second
Monitoring stations MCBTT031 and GTCTT032 are in the Bear River watershed. The remaining four stations are in the Salt River watershed and are arranged on x-axis upstream-to-downstream right-to-left.

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sample collection and analysis for total chromium was followed during the May 2002 and May 2003 monitoring events.

Table 3 summarizes data for the 2003 monitoring stations where concentrations of selenium and metals were greater than laboratory detection limits and Idaho regulatory criteria. The information in Table 3 is based solely on evaluation of laboratory results reported by ACZ. Cadmium and lead concentrations were less than laboratory detection limits at all 13 stations. Copper was detected at eight stations, and zinc was detected at seven stations. Chromium and nickel were detected at all 13 stations. Selenium was detected at 11 stations and was the only analyte that exceeded Idaho regulatory criteria.

Table 4 presents selenium concentration results for 2003. Both individual concentrations and 4-day averaged concentrations are shown. The 4-day averaged selenium concentrations exceeded the Idaho CCC at five stations: State Land Creek (SLCTT002), Blackfoot River at Upper Bridge (BFUTT015), Spring Creek-mouth (SPRTT016), EMCTT017, and HOOTT034. Selenium in all samples collected at stations SPRTT016 and EMCTT017 exceeded the Idaho CMC. At station SPRTT016, the selenium CCC was exceeded in May and June 2001, May 2002, and May 2003; the selenium CMC was exceeded at SPRTT016 in May 2002 and May 2003. At station EMCTT017, the selenium CMC was exceeded in May, June, and September 2001, and May 2003. The exceedances of the selenium CCC at stations SLCTT002 and HOOTT034 constitute the first exceedances of selenium regulatory criteria documented for these stations under the TtEMI-IDEQ monitoring program.

4.4 EVALUATION OF 2001, 2002, AND 2003 SELENIUM DATA

The May 2003 selenium concentration and stream flow data were combined with data from May 2001 and 2002 to evaluate selenium concentrations and loads in the study watersheds. The following sections discuss the selenium concentration and loading data.

4.4.1 Selenium Concentrations

Figure 7 presents selenium concentrations at the 13 monitoring stations sampled in May 2003. When available, selenium concentrations are shown for the same stations during the May 2001 and 2002 monitoring events. In cases where samples were collected for 4-day averaging, selenium concentrations reflect the average at a station for a given event.

TABLE 3

LABORATORY DETECTIONS AND EXCEEDANCES OF NUMERIC CRITERIA BY ANALYTE AT 2003 MONITORING STATIONS

Analyte [a]	Number of stations detected	Number of stations exceeding chronic criterion	Number of stations exceeding CCC[b]	Number of stations exceeding CMC[b]
Cadmium	0	0	0	0
Chromium (III) [c]	13	0	0	0
Chromium (VI) [c]	13	0	0	0
Copper	8	0	0	0
Lead	0	0	0	0
Nickel	13	0	0	0
Selenium	11	6	5	2
Silver	1	NA[d]	NA[d]	0
Zinc	7	0	0	0

Notes:

III	Trivalent
VI	Hexavalent
µg/L	Micrograms per liter
CCC	Criteria continuous concentration
CMC	Criteria maximum concentration
NA	Not applicable
STA	Monitoring station

[a] Results for all toxic constituents apply to dissolved (unfiltered) phase, except for selenium.
[b] State of Idaho CCC for selenium = 5.0 µg/L; CMC = 18.0 µg/L
[c] Laboratory results for total recoverable chromium were compared with numeric criteria for chromium (III) and chromium (VI).
[d] Criterion not available under Idaho Administrative Code

TABLE 4

SELENIUM CONCENTRATIONS OBSERVED AT 2003 SURFACE WATER MONITORING STATIONS

Watershed	Station Identification	Sample 1 (µg/L)	Sample 2 (µg/L)	Sample 3 (µg/L)	4-day AVG (µg/L)
Upper Blackfoot River	SLCTT002	13	15	16	14.7
	BFDTT008	3.0	4.0	5.0	4.0
	BFNTT009	3.0	5.0	6.0	4.7
	BFUTT015	4.0	6.0	6.0	5.3
	UACTT033	3.0	4.0	4.0	3.7
	SPRTT016	39	37	38	38
	EMCTT017	430	360	340	377
Bear River	MCBTT031	BDL	BDL	BDL	< 1.0
	GTCTT032	1.0	1.0	BDL	< 1.0
Salt River	SCMTT026	4.0	4.0	4.0	4.0
	SCPTT027	BDL	BDL	BDL	< 1.0
	SSBTT022	BDL	BDL	BDL	< 1.0
	HOOTT034	10	11	10	10.3

Notes:

<	Less than
µg/L	Micrograms per liter
AVG	Average
BDL	Below laboratory method detection limit (1.0 µg/L)

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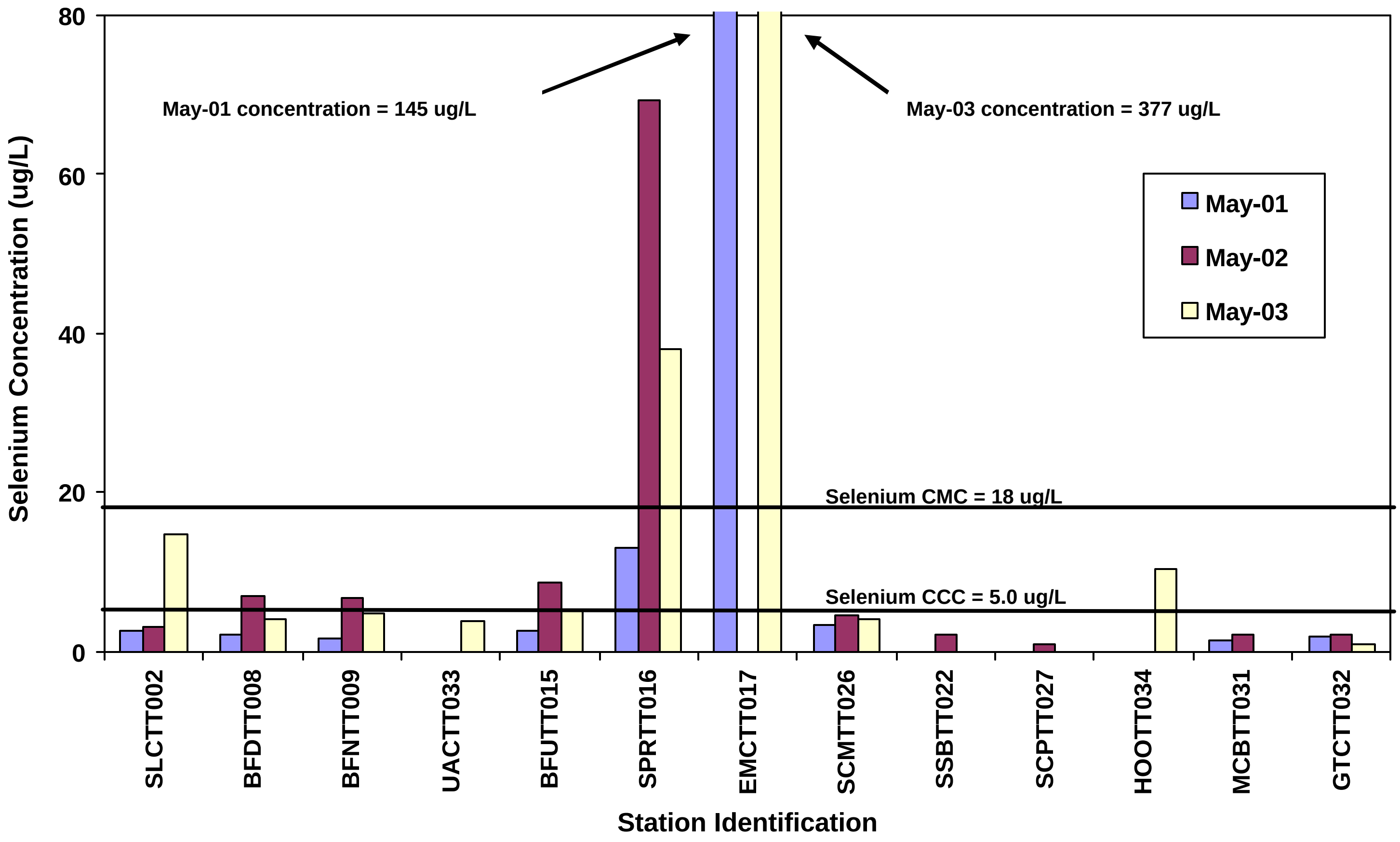
FIGURE 7

SELENIUM CONCENTRATIONS
MAY 2001 TO 2003



Notes

µg/L	Micrograms per liter
CCC	Criteria Continuous Concentration
CMC	Criteria Maximum Concentration

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In the upper Blackfoot watershed at the mainstem Blackfoot River monitoring stations (BFDTT008, BFNTT009, and BFUTT015), average selenium concentrations in 2003 were less than May 2002 concentrations but were greater than concentrations in May 2001. For these three stations, no large differences in selenium concentrations were observed from upstream to downstream in May 2003. At station SLCTT002, the average May 2003 selenium concentration was greater than both the May 2001 and May 2002 average concentrations. The May 2003 selenium average concentration at station SPRTT016 was less than the May 2002 average concentration but greater than the May 2001 concentration. The May 2003 selenium average concentration observed at station EMCTT017 was greater than the May 2001 concentration. Among the monitoring stations in the Salt and Bear River watersheds, the highest May 2003 selenium average concentration was observed at station HOOTT034. Selenium concentrations at all other monitoring stations in the Salt and Bear River watersheds were either less than ACZ's MDL (1.0 micrograms per liter [ug/L]) or less than May 2002 concentrations. Some of the spatial and temporal comparisons provided above are limited in their significance because selenium concentrations at a number of stations have consistently been observed at or near laboratory reporting limits.

4.4.2 Selenium Loads

The selenium data discussed in the previous section and presented on Figure 7 were used to estimate selenium loads (grams per day [g/d]) at each monitoring station during each 4-day assessment period. Selenium loading was determined by multiplying the observed concentrations by the respective flow rate and converting units. Figure 8 presents calculated selenium loads at all 13 monitoring stations observed in May 2001, 2002, and 2003.

In the upper Blackfoot River watershed, selenium loads observed at mainstem Blackfoot River stations in May 2003 were less than those observed in May 2002 but greater than those observed in May 2001. Observed selenium concentrations at some monitoring stations (such as SLCTT002) translate to negligible selenium loads during the sampling period relative to the magnitude of selenium loads observed in the upper Blackfoot River watershed. At station SPRTT016, the May 2003 selenium load was less than the May 2002 selenium load, but greater than the May 2001 selenium load. At EMCTT017, the May 2003 selenium load was greater than the May 2001 selenium load.

Figure 8 shows that on an upstream-to-downstream basis, the May 2003 trend for selenium loads at the mainstem Blackfoot River stations differs from May 2001 and 2002 trends. In 2003, the selenium load increased from station BFUTT015 to BFNTT009 and then decreased from station BFNTT009 to

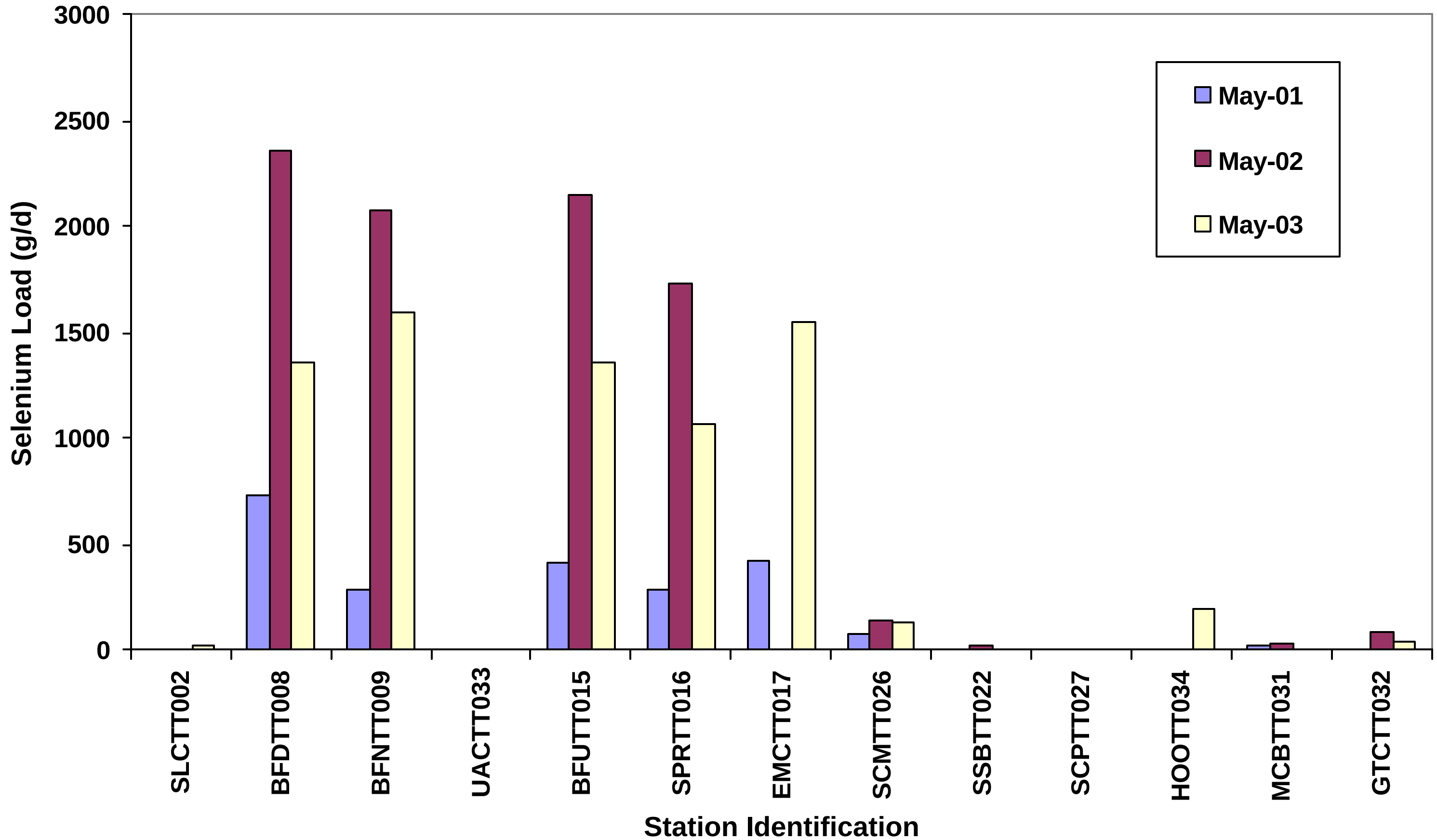
BFDTT008. During the May 2001 and May 2003 monitoring events, selenium loads decreased between EMCTT017 and SPRTT016. During all three May 2001 thru 2003 events, the selenium load observed at BFUTT015 was greater than the selenium load observed at SPRTT016. Some of the spatial and temporal comparisons of selenium loads are limited in the significance because selenium concentrations were detected at or near laboratory reporting limits. These results and the mass loading calculations are further complicated by the uncertainty associated with stream flow measurements performed during the monitoring events. As part of streamflow measurements, field teams typically measure velocity at 10 to 15 depths along a channel cross-section. With these quantities of depths or velocity measurements being performed, the uncertainty associated with the resulting streamflow data may be as high as 20 percent. This uncertainty then applies to the load estimates, which require streamflow data for calculation.

Selenium load estimates for EMCTT017 and SPRTT016 suggest that certain site conditions or processes may influence selenium loads reaching the Blackfoot River from the Spring Creek drainage. East Mill Creek is a tributary to Spring Creek. As mentioned previously, in May 2001 and May 2003, selenium loads decreased between EMCTT017, located on East Mill Creek, and SPRTT016, located at the mouth of Spring Creek. In May 2003, average selenium loads at stations EMCTT017 and SPRTT016 were approximately 1,600 and 1,100 g/d, suggesting a 31 percent decrease in selenium loading. One factor that may explain the difference between EMCTT017 and SPRTT016 selenium loads is the presence of wetlands and beaver dam complexes along the lower reach of Spring Creek. In the aquatic cycle of selenium, natural immobilization processes including chemical and microbial reduction, adsorption, reaction with iron species, coprecipitation, and settling; these process remove selenium from solution and sequester it in sediments. These selenium immobilization processes are especially effective in still water habitats and wetlands (Lemly 1997). Selenium loads entering Spring Creek from East Mill Creek may be immobilized within the wetlands and beaver dam complexes along Spring Creek.

At stations in the Salt and Bear River watersheds, selenium loads observed in May 2003 were comparable to selenium loads observed previously in May 2001 and 2002 (see Figure 8). Since TtEMI and IDEQ began monitoring in May 2001, selenium concentrations and loads have been negligible at most stations in the Salt Creek watershed with the exception of the station at the mouth of Sage Creek (SCMTT026). In 2001 and 2002, the source of selenium in Sage Creek at station SCMTT026 was not clear. Selenium loading data for May 2003 from Hoopes Spring at station HOOTT034 suggests a clearer understanding of the source of selenium in Sage Creek at SCMTT026. In May 2003, the average selenium loads observed

FIGURE 8

SELENIUM LOADS
MAY 2001 TO 2003



Notes

g/d Grams per day

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at stations HOOTT034 and SCMTT026 were about 200 g/d and 132 g/d, respectively. These calculated load estimates suggest that Hoopes Spring is the source of the selenium loads observed at SCMTT026 and that selenium loads are reduced by as much as 34 percent along the Hoopes Spring-Sage Creek flowpath.

The differences observed in selenium loading since 2001 from station-to-station or year-to-year may result from natural processes such as in-stream mobilization or immobilization processes, nonpoint source contributions of selenium from shallow groundwater discharge, or selenium input or dilutions accompanying tributary inflows that have not been sampled. However, such deductions assume steady-state conditions over the course of the individual monitoring events in 2001, 2002, and 2003. This assumption is difficult to make in light of the possible influence of natural system heterogeneity, flow diversions, diurnal and interannual variations in snowmelt, or rainfall and runoff processes. In addition, potential sampling or sampling design artifacts also tend to complicate the direct interpretation of potential steady-state relationships. Because of the limited data and the low statistical power available for trend analysis, statistical inferences regarding selenium loading to streams in the Resource Area must be considered tentative at best. A better understanding of selenium loading as well as selenium sources, pathways, and variables influencing its bioavailability may be possible with further data collection and assessment.

5.0 SELENIUM DATA IN RELATION TO CONCURRENT CLIMATIC CONDITIONS

Since TtEMI and IDEQ initiated surface water quality monitoring on Resource Area streams in 2001, ACPR and SWEQ have been consistently below average. An analysis of previous data (TtEMI 2002b) demonstrated that about 50 percent of the variability in selenium concentrations detected in the Blackfoot River and Spring Creek may be associated with the variability in SWEQ. With below-average SWEQ occurring in the Resource Area every year since 2001, the selenium loads observed in Resource Area streams since then may also be below average. Knowledge of natural trends in pollutant concentrations, loads, and the factors influencing them are very important from a TMDL perspective. Between 1998 and 2000, MW characterized selenium concentrations in numerous Resource Area streams. These data were collected during above-average to average SWEQ conditions. However, because MW did not report stream flow in conjunction with surface water sample collection, selenium loads cannot be assessed during those years. In addition, the USGS gaging station on the Blackfoot River near Henry, Idaho, was not in operation during those years, further limiting any analyses requiring stream flow data.

This section is a continuation of a discussion by TtEMI (2002b) in which May 1998 to 2002 selenium concentration data from two streams in the upper Blackfoot River watershed were related to SWEQ. This section updates that discussion by incorporating 2003 selenium and SWEQ data. In addition, this section presents results of an analysis relating selenium concentration to ACPR. Section 3 discusses climatic conditions of the Resource Area in terms of ACPR and SWEQ.

Results of relevant surface water quality monitoring by MW are discussed in TtEMI (2002 a,b). Highlights of those results are presented here. Seven stream locations sampled by MW monitoring in 1998 and 1999 are in close proximity to TtEMI-IDEQ monitoring stations sampled in 2001. Six of the seven locations were sampled by MW in May 1998 or 1999, and then sampled by TtEMI and IDEQ in May 2001. At all six locations, selenium concentrations in 1998 and 1999 were greater than those detected in 2001. Previous analyses (TtEMI 2002b) focused on two monitoring locations: (1) TtEMI station BFDTT008 on the Blackfoot River below Dry Valley Creek, near MW station ST023; and (2) TtEMI station SPRTT016 at the mouth of Spring Creek, near MW station ST145. MW stations ST023 and ST145 are shown on Figure 1.

In the previous analyses (TtEMI 2002b), selenium concentrations at the two station pairs were evaluated and related to SWEQ observed at the Emigrant Summit SNOTEL station. At both locations, May selenium concentrations tended to be higher with greater SWEQ depths. Linear regression analyses indicated that the percent of normal SWEQ was associated with about 55 percent and 45 percent of the variability in selenium concentrations observed at stations BFDTT008/ST023 and SPRTT016/ST145, respectively. The percent of normal SWEQ was calculated by dividing the observed SWEQ reported by NRCS for a sample date by the daily average SWEQ for the same date over the period of record from WY 1971 to WY 2000. The regression results were not statistically significant at a probability level of P = 0.05.

For this report, the analyses relating selenium concentration and SWEQ were performed again, incorporating selenium and SWEQ data collected for 2003. The selenium concentrations and SWEQ depths for the May sample dates at stations BFDTT008/ST023 and SPRTT016/ST145 are shown on Figures 9 and 10, respectively. Both figures are double Y-axis graphs indicating that May selenium concentrations tend to be greater when greater SWEQ. This relationship may explain why selenium concentrations and loads observed in May 2002 and 2003 exceeded those observed in May 2001. It may also explain why concentrations in May 2001 through 2003 were generally lower than those reported by MW in 1998 and 1999.

Figures 11 and 12 are scatter plots of selenium concentration and percent of normal SWEQ for stations BFDTT008/ST023 and SPRTT016/ST145, respectively. Both figures present the least square line and r^2 coefficient of determination based on linear regression analyses. On both figures, selenium concentrations generally increase with increased SWEQ. The regression analysis indicates that percent of normal SWEQ is associated with 55 percent of the variation in these selenium concentration data from the Blackfoot River downstream of Dry Valley Creek. Similarly, percent of normal SWEQ explains 45 percent of the variation in the selenium concentration data for the mouth of Spring Creek. Neither linear regression is statistically significant at a probability level of P = 0.05. These results are almost identical to results obtained for previous data (TtEMI 2002b).

For this report, the influence of climatic conditions on in-stream selenium concentrations was further assessed by evaluating the May 1998 through 2003 selenium concentrations observed at locations BFDTT008/ST023 and SPRTT016/ST145, and then comparing the selenium data to ACPR data for the same period. Figures 13 and 14 are scatter plots of selenium concentration and ACPR for BFDTT008/ST023 and SPRTT016/ST145, respectively. Both figures present the least square line and r^2 coefficient of determination based on linear regression analyses. The regression analysis indicates that percent of normal SWEQ is associated with 62 percent of the variation in these selenium concentration data from the Blackfoot River downstream of Dry Valley Creek. Percent of normal SWEQ explains only

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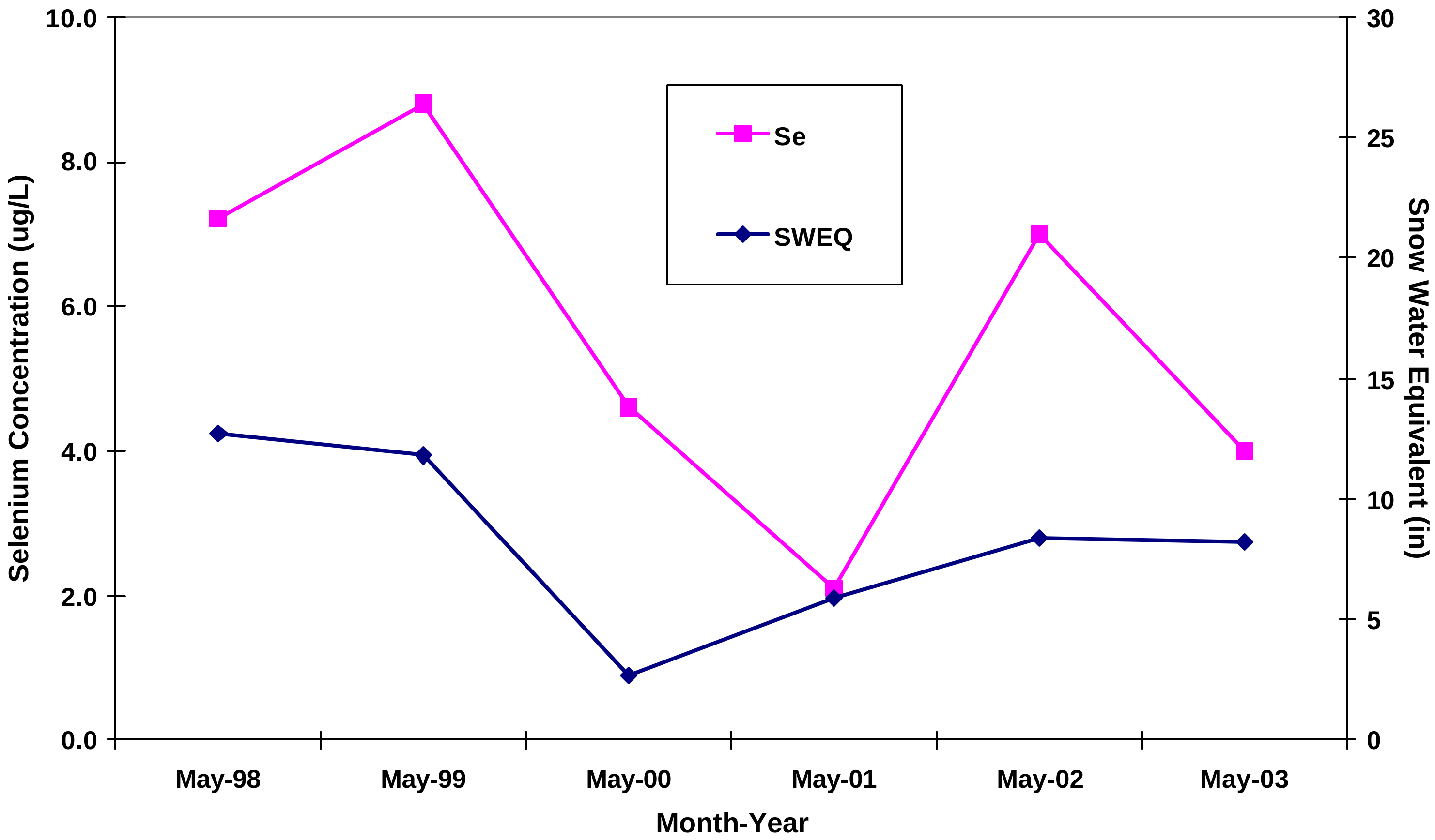
FIGURE 9
SELENIUM CONCENTRATION AND SAMPLE DATE SNOW WATER EQUIVALENT
BLACKFOOT RIVER BELOW DRY VALLEY CREEK (BFDTT008/ST023)
MAY 1998 TO 2003



Notes
µg/L Micrograms per liter
in Inches

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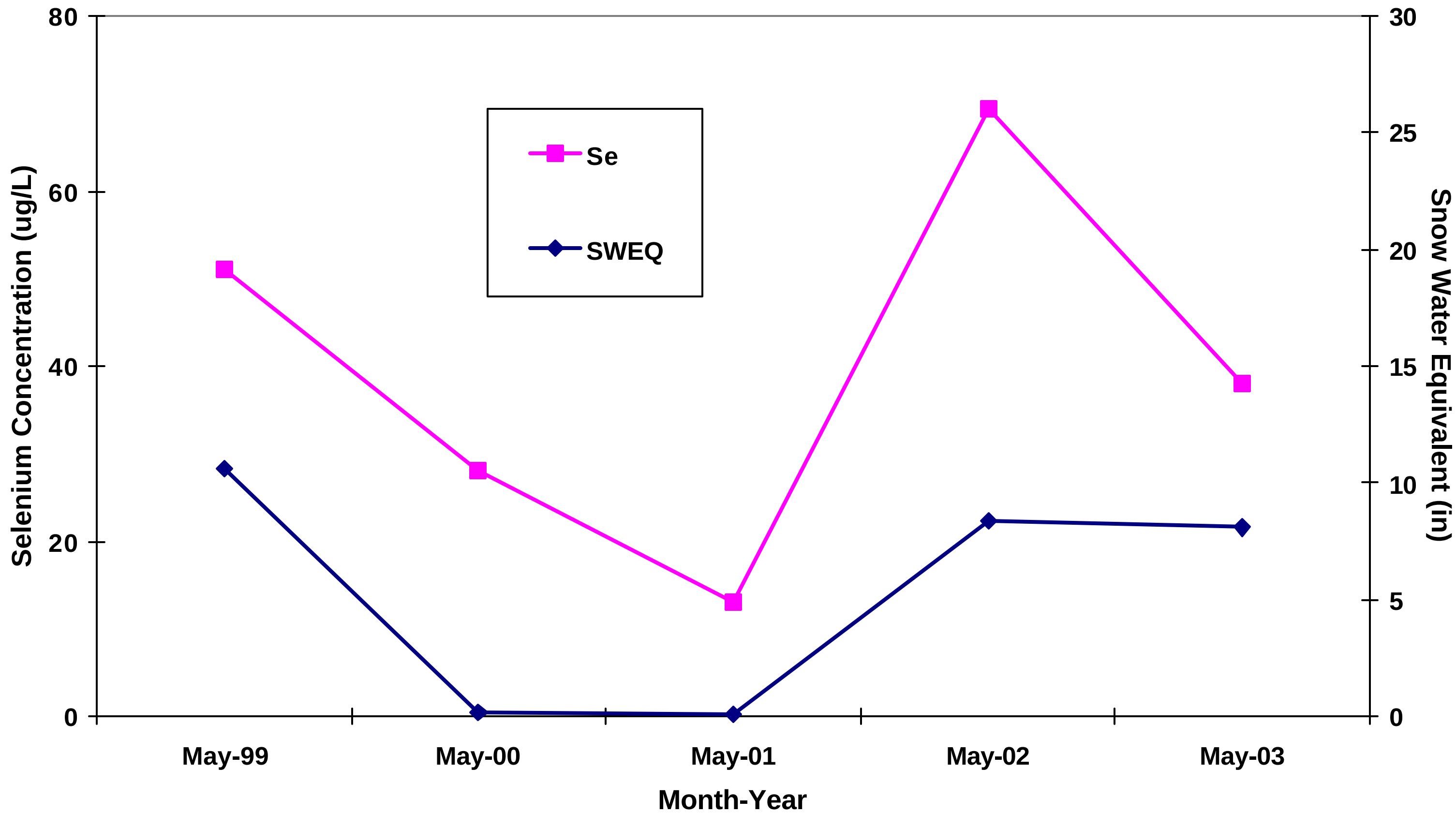
FIGURE 10
SELENIUM CONCENTRATION AND SAMPLE DATE SNOW WATER EQUIVALENT
SPRING CREEK-MOUTH (SPRTT016/ST145)
MAY 1999 TO 2003



<u>Notes</u>

µg/L Micrograms per liter
in Inches

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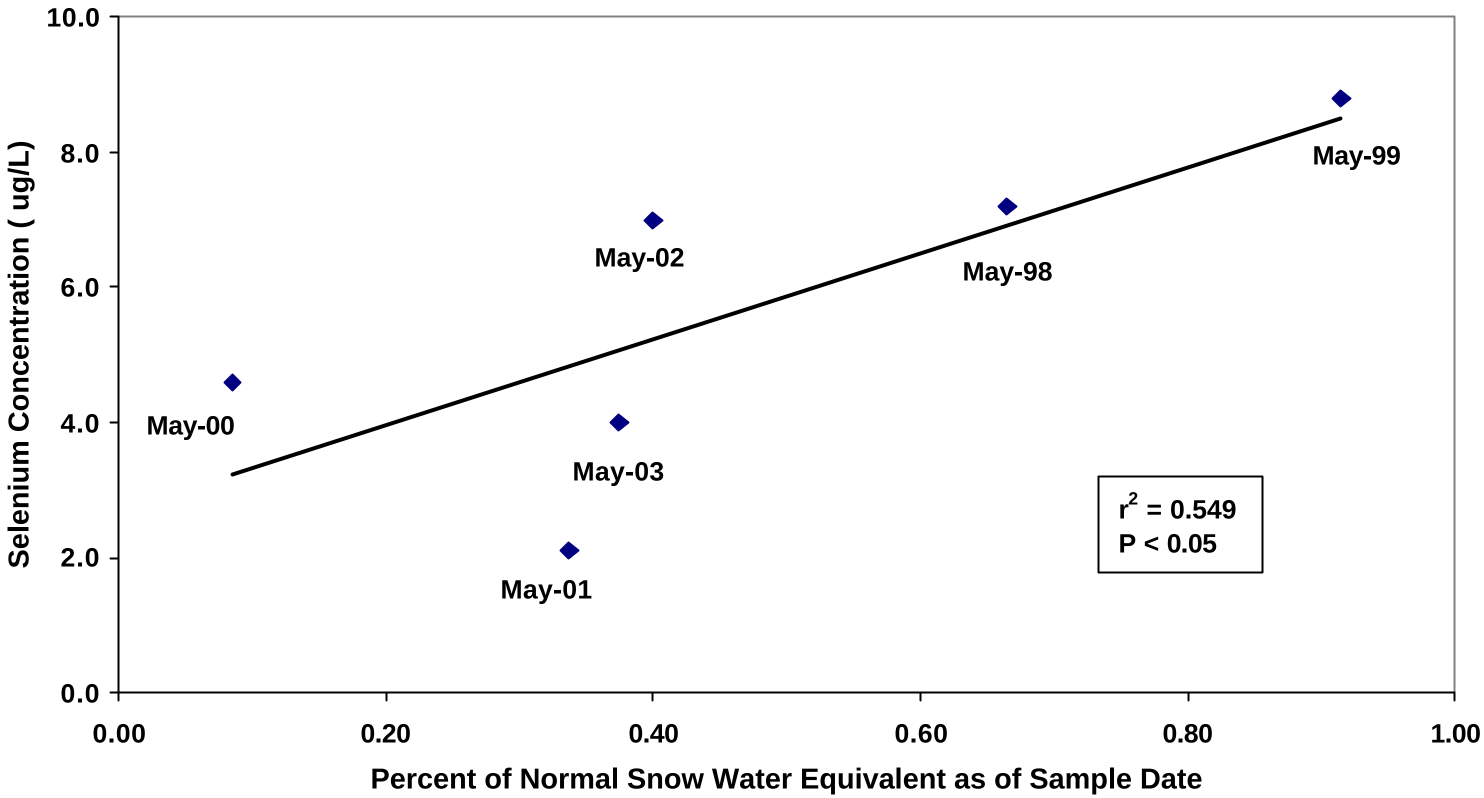
FIGURE 11
SELENIUM CONCENTRATIONS AND SAMPLE DATE
PERCENT OF NORMAL SNOW WATER EQUIVALENT
BLACKFOOT RIVER BELOW DRY VALLEY CREEK (BFDTT008/ST023)
MAY 1998 TO 2003



<u>Notes</u>

µg/L Micrograms per liter

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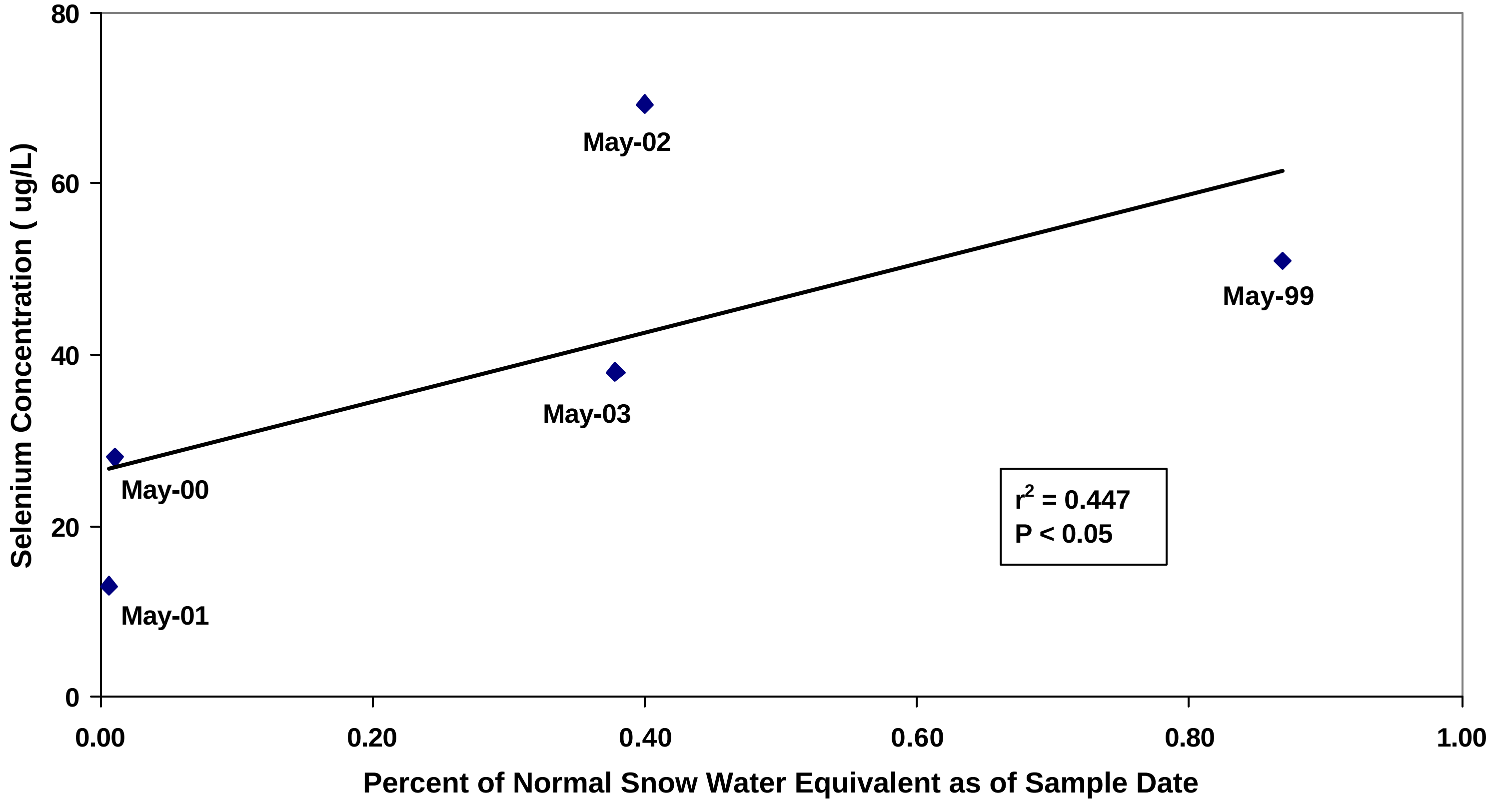
FIGURE 12
SELENIUM CONCENTRATION AND SAMPLE DATE
PERCENT OF NORMAL SNOW WATER EQUIVALENT
SPRING CREEK-MOUTH (SPRTT016/ST145)
MAY 1999 TO 2003



Notes

µg/L Micrograms per liter

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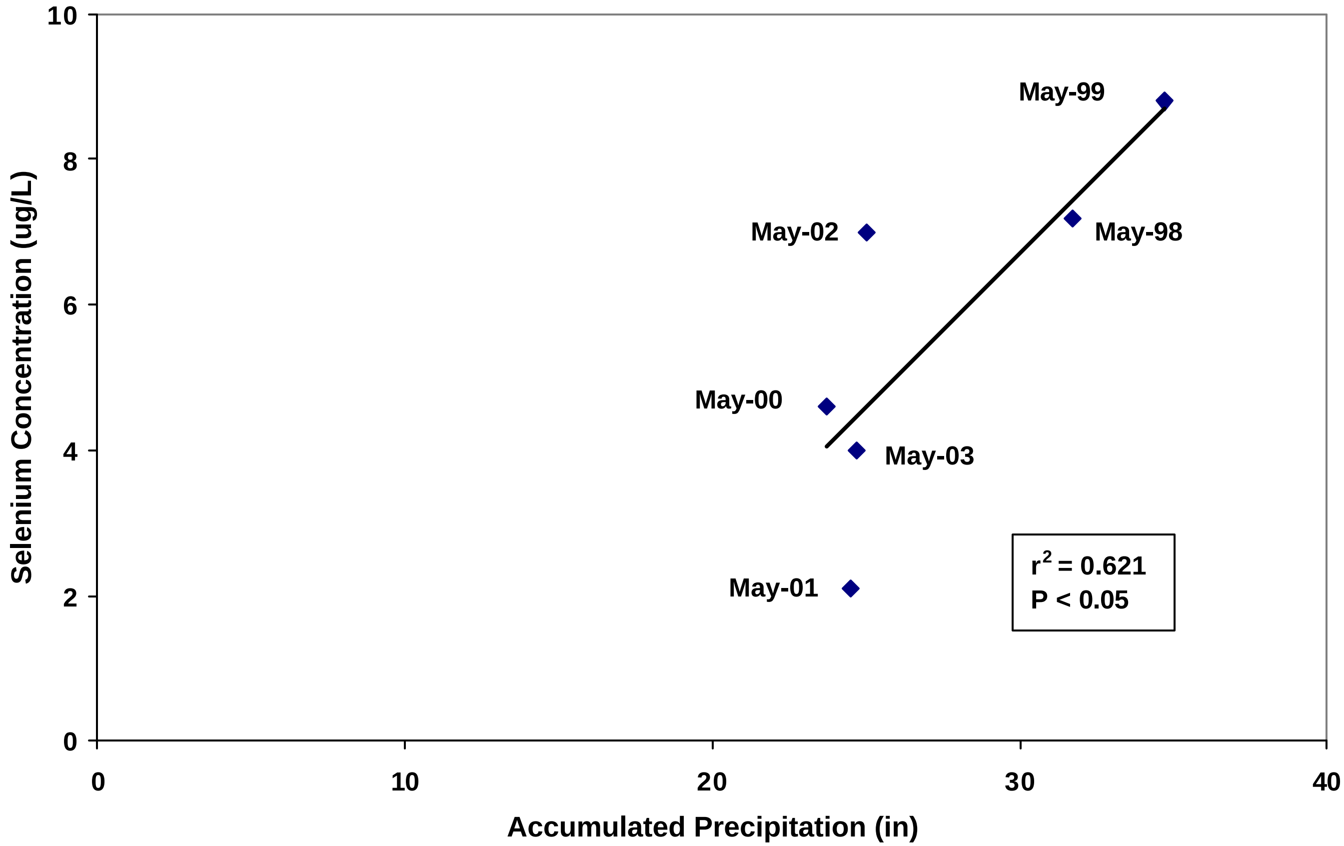
FIGURE 13
SELENIUM CONCENTRATION AND SAMPLE DATE ACCUMULATED PRECIPITATION
BLACKFOOT RIVER BELOW DRY VALLEY CREEK (BFDTT008/ST023)
MAY 1998 TO 2003



Notes

µg/L	Micrograms per liter
in	Inches

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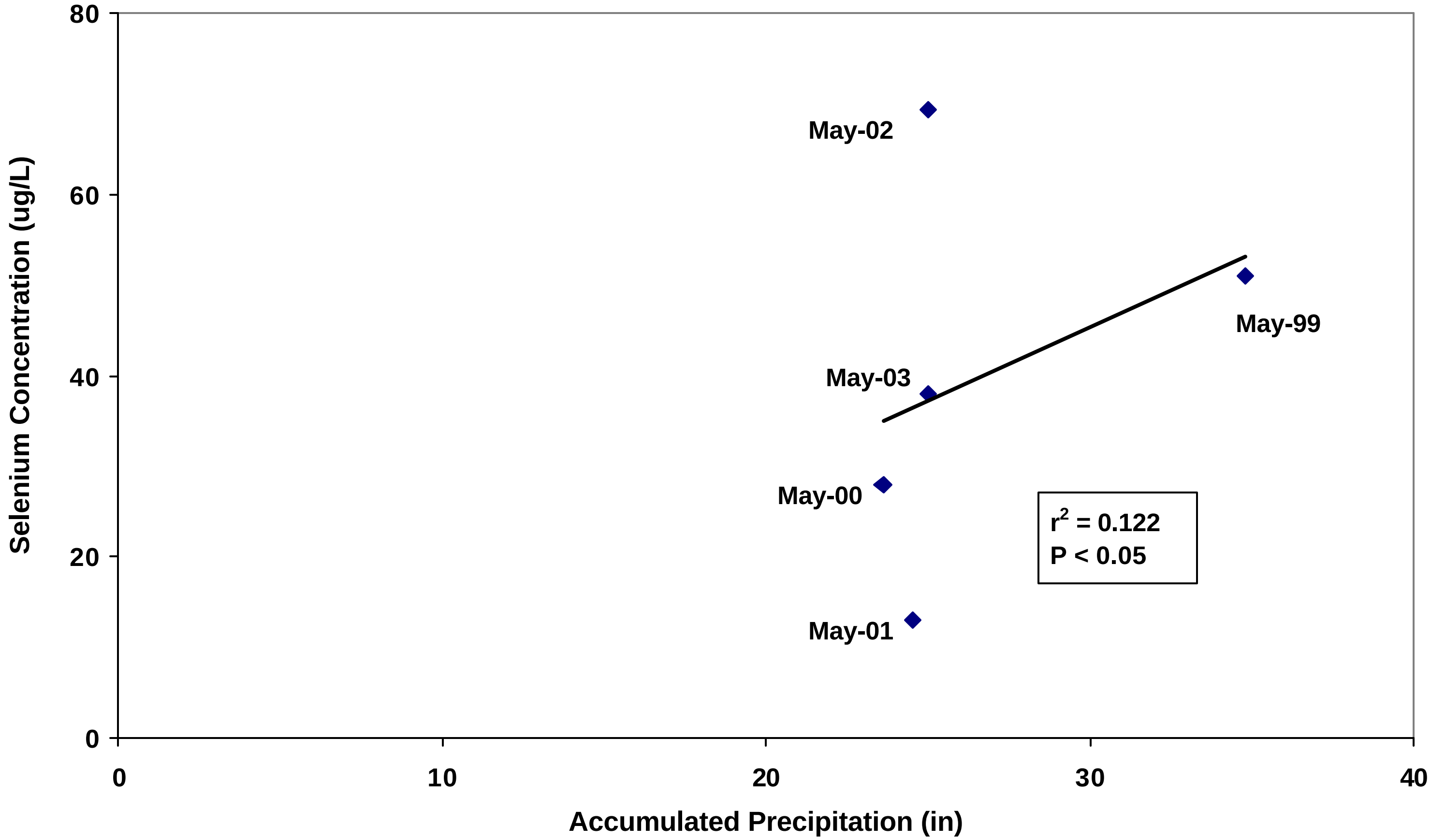
FIGURE 14
SELENIUM CONCENTRATION AND SAMPLE DATE ACCUMULATED PRECIPITATION
SPRING CREEK-MOUTH (SPRTT016/ST145)
MAY 1999 TO 2003



Notes

µg/L Micrograms per liter
in Inches

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12 percent of the variation in the selenium concentration data for the mouth of Spring Creek. Neither linear regression is statistically significant at a probability level of P = 0.05. The vertical distribution, or stacking, of the data points suggests that other factors besides ACPR influence the variability of selenium concentrations in the Blackfoot River and Spring Creek. These analyses would be much more meaningful if selenium loads were plotted instead of selenium concentrations. With the unavailability of flow data for 1998 and 1999, when the Resource Area received above-average precipitation, such analyses are constrained.

Numerous factors and variables may influence the transport of selenium through Resource Area watersheds and, ultimately, the magnitude of selenium concentrations and loads in Resource Area streams. Evaluation of data collected during the past three years suggests that processes within wetlands and beaver dam complexes may immobilize selenium from the water column. Conversely, in fast-moving streams, selenium may be mobilized from sediment when flow velocities entrain particulates with sorbed selenium. Discharge of shallow groundwater may also diffusely transport selenium to streams. Uptake of selenium by plants, benthic invertebrates, fish, and other wildlife are means for selenium removal. As locations of phosphate mining activity change or as phosphate mine management practices change, the sources and pathways for selenium release may also change. Other factors that may influence selenium loading to Resource Area streams are related to selenium cycling and transport through upland soils before it reaches tributary streams. The selenium load reaching an area stream may have originally been released from a phosphate mine or upland area a number of years prior. As TMDL evaluations for selenium continue, it will be important to design and implement studies aimed at understanding how these and other factors influence the sources, pathways, and timing of selenium release to Resource Area streams.

6.0 LABORATORY DATA QUALITY

Laboratory analyses of the samples collected during the 2003 monitoring event were performed according to EPA approved methods as described in the SAP (TtEMI 2001) and QAPP addendum (TtEMI 2003). Results from sampling events were evaluated to assess the quality of the laboratory data. This evaluation included a review of QC information in the raw data package, analytical methods, and discussions with the current ACZ laboratory staff. In particular, the following data were evaluated:

- Calibration verification standards
- Blanks
- Matrix spike/matrix spike duplicate (MS/MSD) samples
- Laboratory control samples
- Split samples

The laboratory quality assessment was restricted to selenium and constituents analyzed using the EPA 200.7 and 200.8 methods.

6.1 CALIBRATION VERIFICATION STANDARDS

Calibration verification standards were reported consistently. The calibration verification standard recoveries were generally within 95 to 100 percent. The recoveries were never outside of the QC guidance limits of 85 and 115 percent. The recoveries for calibration verification standards indicate that the instruments maintained calibration throughout the analytical runs.

6.2 BLANKS

Laboratory reagent blanks and calibration blanks were reported consistently. The laboratory reagent blank (or method blank) results were less than MDLs. With the exception of lead, detectable concentrations of the analytes rarely occurred in the calibration blanks. The detectable concentrations in the calibration blanks are near the MDL, well below the reporting limit, and are probably related to normal analytical variability rather than laboratory contamination. Normal analytical variability is exacerbated by the very low detection limits selected for the project. Lead was detected in the calibration blanks of one sample delivery group but this laboratory contamination did not affect the samples because lead was not detected in the samples. Thus, blank results indicate that laboratory contamination was minimal.

6.3 MATRIX SPIKES

MS recoveries were within the QC guidance limits of 75 to 125 percent with one exception. One MSD recovery was outside of the guidance limits with a recovery of 24 percent. In this instance, the sample contained significantly more selenium than was added by the spike, and the low recovery may be explained by analytical variability.

6.4 LABORATORY CONTROL SAMPLES

Laboratory fortified blanks were reported. Laboratory control sample (laboratory fortified blank) recoveries were within the QC guidance of 80 to 120 percent. These data indicate that analytical accuracy was reasonable and within acceptable analytical bounds.

6.5 SENSITIVITY

The detection limits were less than the proposed regulatory benchmarks and met the criteria listed in the QAPP addendum (TtEMI 2003). The data are adequate from this perspective.

6.6 SPLIT SAMPLES

Results of the analysis of split samples by U of I generally confirmed the precision of the laboratory results. Split samples are replicate samples submitted to different laboratories and subjected to the same environmental conditions and steps as those used in the measurement process. Two split samples were analyzed for dissolved metals by EPA 200.7 and 200.8. Ten split samples were analyzed for selenium. Results from split samples were compared based on the criteria used for MSDs. For sample results greater than or equal to five times the practical quantitation limit (PQL), the acceptance criteria is plus or minus 20 percent relative percent difference. For sample results less than five times the PQL, the acceptance criteria is a difference of plus or minus the PQL. Two of the 10 selenium values slightly exceeded the stated acceptance criteria; one result was slightly high, and the other was slightly low. Split samples did not indicate a general precision or bias problem for the selenium data set.

6.7 OVERALL ASSESSMENT OF LABORATORY DATA

Overall, only minor and isolated problems were noted with calibrations, blanks, MSs, laboratory control samples, and split samples. The data are considered both accurate and precise based on calibration, blank, and MSD analyses. The detection limits are appropriate for the proposed regulatory comparisons.

7.0 SUMMARY

This report supplements TtEMI's "Final 2001 TMDL Baseline Monitoring Report" (TtEMI 2002a). In May 2003, surface water samples were collected at 13 stations within the upper Blackfoot River, Salt River, and Bear River watersheds in the Resource Area. The majority of the monitoring stations were located on streams where selenium concentrations have previously exceeded criteria established to protect aquatic life. Two monitoring stations, Upper Angus Creek (UACTT033) and Hoopes Spring (HOOTT034), were added to the sampling program in 2003. At all 13 stations, samples were collected following 4-day averaging protocol to support IDEQ data requirements. The 4-day averaged selenium concentrations exceeded the State of Idaho CCC at monitoring stations on State Land Creek (SLCTT002), Blackfoot River at Upper Bridge (BFUTT015), Spring Creek mouth (SPRTT016), East Mill Creek above split (EMCTT017), and HOOTT034. At stations SPRTT016 and EMCTT017, selenium concentrations exceeded the State of Idaho CMC.

At two locations within the upper Blackfoot River watershed where TtEMI and IDEQ monitoring stations in 2001 to 2003 overlap closely with MW stations in 1998 to 2000, selenium concentrations observed in May of each year were related to concurrent SWEQ and ACPR. Regression analyses suggest that about 50 percent of the variability in surface water selenium concentrations in the Blackfoot River may be directly related to ACPR, SWEQ, or a combination of both. Other factors explain the remaining 50 percent of variability in selenium concentrations. Such factors may include the presence of wetlands and beaver dam complexes, discharge of shallow groundwater, mobilization and immobilization processes, uptake by plants and other biota, locations or management practices associated with phosphate mining activity, and transport and cycling within upland soils.

This report provides critical information to IDEQ in documenting streams where aquatic life may be impaired by selenium. Results of 2003 baseline monitoring may justify including the assessed streams on the State of Idaho 303(d) list. However, protection of beneficial uses and development of TMDLs by IDEQ for selenium-impacted streams require a better understanding of which streams are impacted, what levels of selenium are considered "safe" for chronic and acute exposure by aquatic life, the degree to which selenium is influenced by climatic variability, and the overall sources and pathways of selenium in Resource Area streams. Future data collection as part of more specialized studies is necessary to resolve these issues and to give IDEQ the information needed to protect and manage Idaho resources effectively.

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APPENDIX A

SURFACE WATER LABORATORY RESULTS

ON 3.5-INCH DISKETTE
STORED IN POCKET LOCATED ON BACK, INSIDE COVER OF BINDER

TABLE H-10

TETRA TECH EM INC. 2001 EVENT 4 SURFACE WATER ANALYTICAL RESULTS AND FIELD DATA

(Page 1 OF 3)

STATION ID	STATION NAME	SAMPLE TYPE[1]	ANALYTICAL RESULTS																	
			Aluminum		Antimony		Arsenic		Barium		Beryllium		Boron		Cadmium		Chromium		Copper	
			(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)
EMCNTT045	East Mill Creek North (wetland area)	UNF	760		BDL	U (0.2)	BDL	U (0.5)	34		BDL	U (0.1)	10	B	0.7		4.6		2.3	B
EMCTT043	East Mill Creek	UNF	64.6		BDL	U (0.2)	BDL	U (0.5)	24		BDL	U (0.1)	10	B	BDL	U (0.1)	0.3	B	BDL	U (0.5)
KCTT042	Kendall Creek	UNF	34.1		BDL	U (0.2)	BDL	U (0.5)	29		BDL	U (0.1)	20	B	BDL	U (0.1)	BDL	U (0.1)	BDL	U (0.5)
LSCTT040	Lower Sage Creek	UNF	10		BDL	U (0.2)	BDL	U (0.5)	41		BDL	U (0.1)	20	B	BDL	U (0.1)	0.2	B	BDL	U (0.5)
MCTT044	Maybe Creek	UNF	218		BDL	U (0.4)	5	B	33		5		30	B	1.8		0.9	B	1	B
SCAETT047	Spring Creek above East Mill Creek	UNF	10.7		BDL	U (0.2)	0.6	B	40		BDL	U (0.1)	10	B	BDL	U (0.1)	0.4	B	BDL	U (0.5)
SCAETT047	Spring Creek above East Mill Creek	UNF/DUP	16.6		BDL	U (0.2)	BDL	U (0.5)	41		BDL	U (0.1)	10	B	BDL	U (0.1)	BDL	U (0.1)	1	B
SCBETT046	Spring Creek below East Mill Creek	UNF	45.1		BDL	U (0.2)	BDL	U (0.5)	38		BDL	U (0.1)	10	B	BDL	U (0.1)	BDL	U (0.1)	BDL	U (0.5)
USCTT041	Upper Sage Creek	UNF	99		BDL	U (0.4)	BDL	U (1)	29		BDL	U (0.2)	20	B	BDL	U (0.2)	BDL	U (0.2)	BDL	U (1)

STATION ID	STATION NAME	SAMPLE TYPE[1]	ANALYTICAL RESULTS																	
			Lead		Magnesium		Manganese		Mercury		Molybdenum		Nickel		Selenium		Silver		Thallium	
			(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)
EMCNTT045	East Mill Creek North (wetland area)	UNF	0.7		11800		119		0.0094		0.3	B	5.4		38		0.07	BO	BDL	U (0.05)
EMCTT043	East Mill Creek	UNF	BDL	U (0.1)	12100		12	B	0.0014		BDL	U (0.1)	1.2		36		BDL	UO (0.05)	BDL	U (0.05)
KCTT042	Kendall Creek	UNF	BDL	U (0.1)	7800		BDL	U (5)	0.0008		0.1	B	0.9	B	BDL	U (1)	BDL	UO (0.05)	BDL	U (0.05)
LSCTT040	Lower Sage Creek	UNF	BDL	U (0.1)	19400		BDL	U (5)	0.0007		1.5		1.2		4	B	BDL	UO (0.05)	BDL	U (0.05)
MCTT044	Maybe Creek	UNF	BDL	U (0.2)	38500		31		0.0009		10.1		28.5		1140		BDL	UO (0.1)	0.2	B
SCAETT047	Spring Creek above East Mill Creek	UNF	BDL	U (0.1)	10900		BDL	U (5)	0.0006		0.2	B	0.8	B	BDL	U (1)	BDL	U (0.05)	BDL	U (0.05)
SCAETT047	Spring Creek above East Mill Creek	UNF/DUP	BDL	U (0.1)	10900		6	B	0.0009		0.1	B	1.5		1	B	BDL	UO (0.05)	BDL	U (0.05)
SCBETT046	Spring Creek below East Mill Creek	UNF	BDL	U (0.1)	11000		20	B	0.0028		0.2	B	1.1		3	B	BDL	UO (0.05)	BDL	U (0.05)
USCTT041	Upper Sage Creek	UNF	BDL	U (0.2)	14000		18	B	0.0005		BDL	U (0.2)	1	B	BDL	U (1)	BDL	UO (0.1)	BDL	U (0.1)

TABLE H-10

TETRA TECH EM INC. 2001 EVENT 4 SURFACE WATER ANALYTICAL RESULTS AND FIELD DATA

(Page 2 OF 3)

			ANALYTICAL RESULTS																	
			Uranium		Vanadium		Zinc		Bicarbonate Alkalinity		Carbonate Alkalinity		Hardness		Hydroxide Alkalinity		Total Alkalinity		Total Organic Carbon	
STATION ID	STATION NAME	SAMPLE TYPE[1]	(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)	(ug/L)	Flag (ug/L)	(mg $CaCO_3$/L)	Flag (mg $CaCO_3$/L)	(mg $CaCO_3$/L)	Flag (mg $CaCO_3$/L)	(mg $CaCO_3$/L)	Flag (mg $CaCO_3$/L)	(mg $CaCO_3$/L)	Flag (mg $CaCO_3$/L)	(mg $CaCO_3$/L)	Flag (mg $CaCO_3$/L)	(mg/L)	Flag (mg/L)
EMCNTT045	East Mill Creek North (wetland area)	UNF	0.55		4.76		50	B	184		BDL	U (2)	179		BDL	U (2)	184		2	B
EMCTT043	East Mill Creek	UNF	0.35		0.72		20	B	182		BDL	U (2)	175		BDL	U (2)	182		BDL	U (1)
KCTT042	Kendall Creek	UNF	0.32		BDL	U (0.05)	20	B	167		BDL	U (2)	161		BDL	U (2)	167		BDL	U (1)
LSCTT040	Lower Sage Creek	UNF	1.41		1.23		10	B	185		7	B	213		BDL	U (2)	192		2	B
MCTT044	Maybe Creek	UNF	5.4		6.2		90		171		BDL	U (2)	548		BDL	U (2)	171		4	B
SCAETT047	Spring Creek above East Mill Creek	UNF	0.35		0.47		20	B	168		10		173		BDL	U (2)	178		2	B
SCAETT047	Spring Creek above East Mill Creek	UNF/DUP	0.4		0.52		20	B	168		10	B	173		BDL	U (2)	178		2	B
SCBETT046	Spring Creek below East Mill Creek	UNF	0.39		0.62		20	B	189		BDL	U (2)	177		BDL	U (2)	189		2	B
USCTT041	Upper Sage Creek	UNF	0.4	B	BDL	U (0.1)	20	B	176		BDL	U (2)	188		BDL	U (2)	176		BDL	U (1)

			FIELD PARAMETERS					
			DO	ORP	pH	SC	Temp	Turb
STATION ID	STATION NAME	SAMPLE TYPE[1]	(mg/L)	(mV)	(Field)	(mS/cm)	(Deg C)	(NTU)
EMCNTT045	East Mill Creek North (wetland area)	UNF	9.38	100	7.68	0.233	11.5	ND
EMCTT043	East Mill Creek	UNF	10.0	223	7.83	0.206	10.8	ND
KCTT042	Kendall Creek	UNF	10.6	79.4	7.92	0.194	10.1	ND
LSCTT040	Lower Sage Creek	UNF	10.2	222	8.16	0.338	17.1	ND
MCTT044	Maybe Creek	UNF	9.27	170	8.04	0.768	12.2	ND
SCAETT047	Spring Creek above East Mill Creek	UNF	14.6	120	8.15	0.279	16.8	ND
SCAETT047	Spring Creek above East Mill Creek	UNF/DUP						ND
SCBETT046	Spring Creek below East Mill Creek	UNF	12.3	198	7.66	0.297	15.0	ND
USCTT041	Upper Sage Creek	UNF	7.98	149	8.35	0.289	15.0	ND

Notes:

1 UNF = Unfiltered, DUP = Field Duplicate

BDL	Below detection limit	mg $CaCO_3$/L	Miligram calcium carbonate per liter	ND	No data	Temp	Temperature
CFS	Cubic feet per second	mg/L	Milligram per liter	NTU	Nephelometric units	Turb	Turbidity
Deg C	Degree Celsius	mv	Millivolt	ORP	Oxygen and reduction potential	ug/L	Microgram per liter
DO	Dissolved oxygen	mS/cm	Millisiemens per centimeter	SC	Specific conductance		

Revised 2/23/04

TABLE H-10

TETRA TECH EM INC. 2001 EVENT 4 SURFACE WATER ANALYTICAL RESULTS AND FIELD DATA

Notes (continued):

Flag columns present data qualifiers reported by analytical laboratories. More than one flag may be reported.
When result presented as BDL, number in parentheses in corresponding flag column represents method detection limit (MDL) reported by laboratory

Data qualifier definitions:

B	Analyte concentration detected at a value between Method Detection Limit (MDL) and Practical Quantitation Limit (PQL)
O	Value estimated due to QC outside acceptable limits
U	Analyte was analyzed for but not detected at the indicated MDL

2003 SUPPLEMENT TO 2001 TMDL BASELINE MONITORING REPORT
APPENDIX A--SURFACE WATER LABORATORY RESULTS
LABORATORY DATA REPORTED BY UNIVERSITY OF IDAHO ANALYTICAL SCIENCES LABORATORY

SAMPLE ID	ANALYTE	MDL	RESULT	QC FLAG	UNITS	SAMPLE TYPE
SW-050503-BFDTT008-SPL	Selenium	1.0	6.0		ug/L	SPL
SW-050503-BFDTT008-SPL	Vanadium	0.25	1.50		ug/L	SPL
SW-050503-BFDTT008-SPL	Chromium	0.50	0.55		ug/L	SPL
SW-050503-BFDTT008-SPL	Nickel	0.13	0.67		ug/L	SPL
SW-050503-BFDTT008-SPL	Copper	0.13	0.73		ug/L	SPL
SW-050503-BFDTT008-SPL	Silver	0.25	BDL		ug/L	SPL
SW-050503-BFDTT008-SPL	Cadmium	0.13	BDL		ug/L	SPL
SW-050503-BFDTT008-SPL	Lead	0.25	BDL		ug/L	SPL
SW-050503-BFDTT008-SPL	Calcium	0.020	54		mg/L	SPL
SW-050503-BFDTT008-SPL	Magnesium	0.0050	9.7		mg/L	SPL
SW-050503-BFDTT008-SPL	Zinc	0.010	0.011		mg/L	SPL
SW-050503-UACTT033-SPL	Selenium	1.0	6.6		ug/L	SPL
SW-050503-UACTT033-SPL	Vanadium	0.25	1.40		ug/L	SPL
SW-050503-UACTT033-SPL	Chromium	0.50	0.69		ug/L	SPL
SW-050503-UACTT033-SPL	Nickel	0.13	0.82		ug/L	SPL
SW-050503-UACTT033-SPL	Copper	0.13	0.68		ug/L	SPL
SW-050503-UACTT033-SPL	Silver	0.25	BDL		ug/L	SPL
SW-050503-UACTT033-SPL	Cadmium	0.13	BDL		ug/L	SPL
SW-050503-UACTT033-SPL	Lead	0.25	BDL		ug/L	SPL
SW-050503-UACTT033-SPL	Calcium	0.020	88		mg/L	SPL
SW-050503-UACTT033-SPL	Magnesium	0.0050	22		mg/L	SPL
SW-050503-UACTT033-SPL	Zinc	0.010	BDL		mg/L	SPL
SW-050503-BFUTT015-SPL	Selenium	1.0	6.2		ug/L	SPL
SW-050503-MCBTT031-SPL	Selenium	1.0	2.0		ug/L	SPL
SW-050703-EMCTT017-SPL	Selenium	1.0	470.0		ug/L	SPL
SW-050803-SPRTT016-SPL	Selenium	1.0	34.0		ug/L	SPL
SW-050903-EMCTT017-SPL	Selenium	1.0	420.0		ug/L	SPL
SW-050903-EMCTT017-SPL	Selenium	1.0	430.0		ug/L	SPL
SW-050903-SLCTT002-SPL	Selenium	1.0	10.0		ug/L	SPL
SW-050903-SPRTT016-SPL	Selenium	1.0	32.0		ug/L	SPL

2003 SUPPLEMENT TO 2001 TMDL BASELINE MONITORING REPORT
APPENDIX A--SURFACE WATER LABORATORY RESULTS
KEY TO "ACZ ALL DATA" WORKSHEET

QC FLAG	EXPLANATION
B	Analyte concentration detected at a value between MDL and PQL
H	Analysis exceeded method hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

NOTES RE: QC FLAG	
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PQL	Practical Quantitation Limit, typically 5 times the MDL.

SAMPLE TYPE	EXPLANATION
FO	Field original sample
DUP	Field duplicate sample
ER	Equipment rinsate
SWB	Source water blank

NOTES RE: SAMPLE ID
1. Sample station and date information are nested in SAMPLE ID.
2. See TtEMI (2002a,b) for explanation of SAMPLE IDs.

2003 SUPPLEMENT TO 2001 TMDL BASELINE MONITORING REPORT
APPENDIX A--SURFACE WATER LABORATORY RESULTS
LABORATORY DATA REPORTED BY ACZ LABORATORIES, INC.

SAMPLE ID	ANALYTE	MDL	RESULT	QC FLAG	UNITS	SAMPLE TYPE
DW-050503-X1-101	BICARBONATE AS CACO3	2	2	B	MG/L	ER
DW-050503-X1-101	CADMIUM, DISSOLVED	0.0001		U	MG/L	ER
DW-050503-X1-101	CALCIUM, DISSOLVED	0.2		U	MG/L	ER
DW-050503-X1-101	CARBON, TOTAL ORGANIC (TOC)	1		U	MG/L	ER
DW-050503-X1-101	CARBONATE AS CACO3	2		U	MG/L	ER
DW-050503-X1-101	CHROMIUM, DISSOLVED	0.0001	0.0003	B	MG/L	ER
DW-050503-X1-101	COBALT, DISSOLVED	0.01		U	MG/L	ER
DW-050503-X1-101	COPPER, DISSOLVED	0.0005		U	MG/L	ER
DW-050503-X1-101	HARDNESS AS CACO3	1	n/a		MG/L	ER
DW-050503-X1-101	HYDROXIDE AS CACO3	2		U	MG/L	ER
DW-050503-X1-101	LEAD, DISSOLVED	0.0001		U	MG/L	ER
DW-050503-X1-101	MAGNESIUM, DISSOLVED	0.2		U	MG/L	ER
DW-050503-X1-101	NICKEL, DISSOLVED	0.0002		U	MG/L	ER
DW-050503-X1-101	NITRATE/NITRITE AS N	0.02		U	MG/L	ER
DW-050503-X1-101	PHOSPHORUS, TOTAL	0.01		U	MG/L	ER
DW-050503-X1-101	RESIDUE, NON-FILTERABLE (TSS)	5		UH	MG/L	ER
DW-050503-X1-101	SELENIUM, TOTAL	0.001		U	MG/L	ER
DW-050503-X1-101	SILVER, DISSOLVED	0.00005		U	MG/L	ER
DW-050503-X1-101	TOTAL ALKALINITY	2	2	B	MG/L	ER
DW-050503-X1-101	VANADIUM, DISSOLVED	0.00005		U	MG/L	ER
DW-050503-X1-101	ZINC, DISSOLVED	0.01	0.01	B	MG/L	ER
DW-050503-Y1-101	BICARBONATE AS CACO3	2	2	B	MG/L	SWB
DW-050503-Y1-101	CADMIUM, DISSOLVED	0.0001		U	MG/L	SWB
DW-050503-Y1-101	CALCIUM, DISSOLVED	0.2		U	MG/L	SWB
DW-050503-Y1-101	CARBON, TOTAL ORGANIC (TOC)	1		U	MG/L	SWB
DW-050503-Y1-101	CARBONATE AS CACO3	2		U	MG/L	SWB
DW-050503-Y1-101	CHROMIUM, DISSOLVED	0.0001	0.0001	B	MG/L	SWB
DW-050503-Y1-101	COBALT, DISSOLVED	0.01		U	MG/L	SWB
DW-050503-Y1-101	COPPER, DISSOLVED	0.0005		U	MG/L	SWB
DW-050503-Y1-101	HARDNESS AS CACO3	1	n/a		MG/L	SWB
DW-050503-Y1-101	HYDROXIDE AS CACO3	2		U	MG/L	SWB
DW-050503-Y1-101	LEAD, DISSOLVED	0.0001		U	MG/L	SWB
DW-050503-Y1-101	MAGNESIUM, DISSOLVED	0.2		U	MG/L	SWB
DW-050503-Y1-101	NICKEL, DISSOLVED	0.0002		U	MG/L	SWB
DW-050503-Y1-101	NITRATE/NITRITE AS N	0.02		U	MG/L	SWB
DW-050503-Y1-101	PHOSPHORUS, TOTAL	0.01		U	MG/L	SWB
DW-050503-Y1-101	RESIDUE, NON-FILTERABLE (TSS)	5		UH	MG/L	SWB
DW-050503-Y1-101	SELENIUM, TOTAL	0.001		U	MG/L	SWB
DW-050503-Y1-101	SILVER, DISSOLVED	0.00005		U	MG/L	SWB
DW-050503-Y1-101	TOTAL ALKALINITY	2	2	B	MG/L	SWB
DW-050503-Y1-101	VANADIUM, DISSOLVED	0.00005		U	MG/L	SWB
DW-050503-Y1-101	ZINC, DISSOLVED	0.01	0.01	B	MG/L	SWB
DW-050703-X2-101	SELENIUM, TOTAL RECOVERABLE	0.001		U	MG/L	ER
SW-050503-BFDTT008-101	BICARBONATE AS CACO3	2	158		MG/L	FO
SW-050503-BFDTT008-101	CADMIUM, DISSOLVED	0.0001		U	MG/L	FO
SW-050503-BFDTT008-101	CALCIUM, DISSOLVED	0.2	51.2		MG/L	FO
SW-050503-BFDTT008-101	CARBON, TOTAL ORGANIC (TOC)	1	6		MG/L	FO
SW-050503-BFDTT008-101	CARBONATE AS CACO3	2		U	MG/L	FO
SW-050503-BFDTT008-101	CHROMIUM, DISSOLVED	0.0001	0.0004	B	MG/L	FO
SW-050503-BFDTT008-101	COBALT, DISSOLVED	0.01		U	MG/L	FO

SW-050503-BFDTT008-101	COPPER, DISSOLVED	0.0005	0.0009	B	MG/L	FO
SW-050503-BFDTT008-101	HARDNESS AS CACO3	1	165		MG/L	FO
SW-050503-BFDTT008-101	HYDROXIDE AS CACO3	2		U	MG/L	FO
SW-050503-BFDTT008-101	LEAD, DISSOLVED	0.0001		U	MG/L	FO
SW-050503-BFDTT008-101	MAGNESIUM, DISSOLVED	0.2	9.1		MG/L	FO
SW-050503-BFDTT008-101	NICKEL, DISSOLVED	0.0002	0.0011		MG/L	FO
SW-050503-BFDTT008-101	NITRATE/NITRITE AS N	0.02		U	MG/L	FO
SW-050503-BFDTT008-101	PHOSPHORUS, TOTAL	0.01	0.06		MG/L	FO
SW-050503-BFDTT008-101	RESIDUE, NON-FILTERABLE (TSS)	5	14	BH	MG/L	FO
SW-050503-BFDTT008-101	SELENIUM, TOTAL	0.001	0.003	B	MG/L	FO
SW-050503-BFDTT008-101	SILVER, DISSOLVED	0.00005		U	MG/L	FO
SW-050503-BFDTT008-101	TOTAL ALKALINITY	2	158		MG/L	FO
SW-050503-BFDTT008-101	VANADIUM, DISSOLVED	0.00005	0.00081		MG/L	FO
SW-050503-BFDTT008-101	ZINC, DISSOLVED	0.01	0.01	B	MG/L	FO
SW-050503-BFNTT009-101	BICARBONATE AS CACO3	2	159		MG/L	FO
SW-050503-BFNTT009-101	CADMIUM, DISSOLVED	0.0001		U	MG/L	FO
SW-050503-BFNTT009-101	CALCIUM, DISSOLVED	0.2	51.1		MG/L	FO
SW-050503-BFNTT009-101	CARBON, TOTAL ORGANIC (TOC)	1	6		MG/L	FO
SW-050503-BFNTT009-101	CARBONATE AS CACO3	2		U	MG/L	FO
SW-050503-BFNTT009-101	CHROMIUM, DISSOLVED	0.0001	0.0007		MG/L	FO
SW-050503-BFNTT009-101	COBALT, DISSOLVED	0.01		U	MG/L	FO
SW-050503-BFNTT009-101	COPPER, DISSOLVED	0.0005	0.0009	B	MG/L	FO
SW-050503-BFNTT009-101	HARDNESS AS CACO3	1	164		MG/L	FO
SW-050503-BFNTT009-101	HYDROXIDE AS CACO3	2		U	MG/L	FO
SW-050503-BFNTT009-101	LEAD, DISSOLVED	0.0001		U	MG/L	FO
SW-050503-BFNTT009-101	MAGNESIUM, DISSOLVED	0.2	8.9		MG/L	FO
SW-050503-BFNTT009-101	NICKEL, DISSOLVED	0.0002	0.0011		MG/L	FO
SW-050503-BFNTT009-101	NITRATE/NITRITE AS N	0.02		U	MG/L	FO
SW-050503-BFNTT009-101	PHOSPHORUS, TOTAL	0.01	0.06		MG/L	FO
SW-050503-BFNTT009-101	RESIDUE, NON-FILTERABLE (TSS)	5	16	BH	MG/L	FO
SW-050503-BFNTT009-101	SELENIUM, TOTAL	0.001	0.003	B	MG/L	FO
SW-050503-BFNTT009-101	SILVER, DISSOLVED	0.00005		U	MG/L	FO
SW-050503-BFNTT009-101	TOTAL ALKALINITY	2	159		MG/L	FO
SW-050503-BFNTT009-101	VANADIUM, DISSOLVED	0.00005	0.00088		MG/L	FO
SW-050503-BFNTT009-101	ZINC, DISSOLVED	0.01	0.01	B	MG/L	FO
SW-050503-BFUTT015-101	BICARBONATE AS CACO3	2	167		MG/L	FO
SW-050503-BFUTT015-101	CADMIUM, DISSOLVED	0.0001		U	MG/L	FO
SW-050503-BFUTT015-101	CALCIUM, DISSOLVED	0.2	53.5		MG/L	FO
SW-050503-BFUTT015-101	CARBON, TOTAL ORGANIC (TOC)	1	5	B	MG/L	FO
SW-050503-BFUTT015-101	CARBONATE AS CACO3	2		U	MG/L	FO
SW-050503-BFUTT015-101	CHROMIUM, DISSOLVED	0.0001	0.0005		MG/L	FO
SW-050503-BFUTT015-101	COBALT, DISSOLVED	0.01		U	MG/L	FO
SW-050503-BFUTT015-101	COPPER, DISSOLVED	0.0005	0.0009	B	MG/L	FO
SW-050503-BFUTT015-101	HARDNESS AS CACO3	1	172		MG/L	FO
SW-050503-BFUTT015-101	HYDROXIDE AS CACO3	2		U	MG/L	FO
SW-050503-BFUTT015-101	LEAD, DISSOLVED	0.0001		U	MG/L	FO
SW-050503-BFUTT015-101	MAGNESIUM, DISSOLVED	0.2	9.4		MG/L	FO
SW-050503-BFUTT015-101	NICKEL, DISSOLVED	0.0002	0.0011		MG/L	FO
SW-050503-BFUTT015-101	NITRATE/NITRITE AS N	0.02	0.04	B	MG/L	FO
SW-050503-BFUTT015-101	PHOSPHORUS, TOTAL	0.01	0.05		MG/L	FO
SW-050503-BFUTT015-101	RESIDUE, NON-FILTERABLE (TSS)	5	18	BH	MG/L	FO
SW-050503-BFUTT015-101	SELENIUM, TOTAL	0.001	0.004	B	MG/L	FO
SW-050503-BFUTT015-101	SILVER, DISSOLVED	0.00005		U	MG/L	FO
SW-050503-BFUTT015-101	TOTAL ALKALINITY	2	167		MG/L	FO
SW-050503-BFUTT015-101	VANADIUM, DISSOLVED	0.00005	0.00083		MG/L	FO

SW-050503-BFUTT015-101	ZINC, DISSOLVED	0.01	0.01	B	MG/L	FO
SW-050503-GTCTT032-101	BICARBONATE AS CACO3	2	181		MG/L	FO
SW-050503-GTCTT032-101	CADMIUM, DISSOLVED	0.0001		U	MG/L	FO
SW-050503-GTCTT032-101	CALCIUM, DISSOLVED	0.2	58.2		MG/L	FO
SW-050503-GTCTT032-101	CARBON, TOTAL ORGANIC (TOC)	1	3	B	MG/L	FO
SW-050503-GTCTT032-101	CARBONATE AS CACO3	2		U	MG/L	FO
SW-050503-GTCTT032-101	CHROMIUM, DISSOLVED	0.0001	0.0009		MG/L	FO
SW-050503-GTCTT032-101	COBALT, DISSOLVED	0.01		U	MG/L	FO
SW-050503-GTCTT032-101	COPPER, DISSOLVED	0.0005		U	MG/L	FO
SW-050503-GTCTT032-101	HARDNESS AS CACO3	1	212		MG/L	FO
SW-050503-GTCTT032-101	HYDROXIDE AS CACO3	2		U	MG/L	FO
SW-050503-GTCTT032-101	LEAD, DISSOLVED	0.0001		U	MG/L	FO
SW-050503-GTCTT032-101	MAGNESIUM, DISSOLVED	0.2	16.1		MG/L	FO
SW-050503-GTCTT032-101	NICKEL, DISSOLVED	0.0002	0.0008	B	MG/L	FO
SW-050503-GTCTT032-101	NITRATE/NITRITE AS N	0.02	0.12		MG/L	FO
SW-050503-GTCTT032-101	PHOSPHORUS, TOTAL	0.01	0.03	B	MG/L	FO
SW-050503-GTCTT032-101	RESIDUE, NON-FILTERABLE (TSS)	5	6	BH	MG/L	FO
SW-050503-GTCTT032-101	SELENIUM, TOTAL	0.001	0.001	B	MG/L	FO
SW-050503-GTCTT032-101	SILVER, DISSOLVED	0.00005		U	MG/L	FO
SW-050503-GTCTT032-101	TOTAL ALKALINITY	2	181		MG/L	FO
SW-050503-GTCTT032-101	VANADIUM, DISSOLVED	0.00005	0.00132		MG/L	FO
SW-050503-GTCTT032-101	ZINC, DISSOLVED	0.01		U	MG/L	FO
SW-050503-MCBTT031-101	BICARBONATE AS CACO3	2	172		MG/L	FO
SW-050503-MCBTT031-101	CADMIUM, DISSOLVED	0.0001		U	MG/L	FO
SW-050503-MCBTT031-101	CALCIUM, DISSOLVED	0.2	71.9		MG/L	FO
SW-050503-MCBTT031-101	CARBON, TOTAL ORGANIC (TOC)	1	3	B	MG/L	FO
SW-050503-MCBTT031-101	CARBONATE AS CACO3	2	3	B	MG/L	FO
SW-050503-MCBTT031-101	CHROMIUM, DISSOLVED	0.0001	0.0005	B	MG/L	FO
SW-050503-MCBTT031-101	COBALT, DISSOLVED	0.01		U	MG/L	FO
SW-050503-MCBTT031-101	COPPER, DISSOLVED	0.0005	0.0005	B	MG/L	FO
SW-050503-MCBTT031-101	HARDNESS AS CACO3	1	266		MG/L	FO
SW-050503-MCBTT031-101	HYDROXIDE AS CACO3	2		U	MG/L	FO
SW-050503-MCBTT031-101	LEAD, DISSOLVED	0.0001		U	MG/L	FO
SW-050503-MCBTT031-101	MAGNESIUM, DISSOLVED	0.2	21.1		MG/L	FO
SW-050503-MCBTT031-101	NICKEL, DISSOLVED	0.0002	0.001		MG/L	FO
SW-050503-MCBTT031-101	NITRATE/NITRITE AS N	0.02		U	MG/L	FO
SW-050503-MCBTT031-101	PHOSPHORUS, TOTAL	0.01	0.01	B	MG/L	FO
SW-050503-MCBTT031-101	RESIDUE, NON-FILTERABLE (TSS)	5	6	BH	MG/L	FO
SW-050503-MCBTT031-101	SELENIUM, TOTAL	0.001		U	MG/L	FO
SW-050503-MCBTT031-101	SILVER, DISSOLVED	0.00005	0.00005	B	MG/L	FO
SW-050503-MCBTT031-101	TOTAL ALKALINITY	2	175		MG/L	FO
SW-050503-MCBTT031-101	VANADIUM, DISSOLVED	0.00005	0.00097		MG/L	FO
SW-050503-MCBTT031-101	ZINC, DISSOLVED	0.01		U	MG/L	FO
SW-050503-MCBTT031-201	BICARBONATE AS CACO3	2	172		MG/L	DUP
SW-050503-MCBTT031-201	CADMIUM, DISSOLVED	0.0001		U	MG/L	DUP
SW-050503-MCBTT031-201	CALCIUM, DISSOLVED	0.2	70		MG/L	DUP
SW-050503-MCBTT031-201	CARBON, TOTAL ORGANIC (TOC)	1	3	B	MG/L	DUP
SW-050503-MCBTT031-201	CARBONATE AS CACO3	2	3	B	MG/L	DUP
SW-050503-MCBTT031-201	CHROMIUM, DISSOLVED	0.0001	0.0004	B	MG/L	DUP
SW-050503-MCBTT031-201	COBALT, DISSOLVED	0.01		U	MG/L	DUP
SW-050503-MCBTT031-201	COPPER, DISSOLVED	0.0005		U	MG/L	DUP
SW-050503-MCBTT031-201	HARDNESS AS CACO3	1	260		MG/L	DUP
SW-050503-MCBTT031-201	HYDROXIDE AS CACO3	2		U	MG/L	DUP
SW-050503-MCBTT031-201	LEAD, DISSOLVED	0.0001		U	MG/L	DUP
SW-050503-MCBTT031-201	MAGNESIUM, DISSOLVED	0.2	20.6		MG/L	DUP

SW-050503-MCBTT031-201	NICKEL, DISSOLVED	0.0002	0.0009	B	MG/L	DUP
SW-050503-MCBTT031-201	NITRATE/NITRITE AS N	0.02		U	MG/L	DUP
SW-050503-MCBTT031-201	PHOSPHORUS, TOTAL	0.01	0.01	B	MG/L	DUP
SW-050503-MCBTT031-201	RESIDUE, NON-FILTERABLE (TSS)	5	6	BH	MG/L	DUP
SW-050503-MCBTT031-201	SELENIUM, TOTAL	0.001		U	MG/L	DUP
SW-050503-MCBTT031-201	SILVER, DISSOLVED	0.00005		U	MG/L	DUP
SW-050503-MCBTT031-201	TOTAL ALKALINITY	2	175		MG/L	DUP
SW-050503-MCBTT031-201	VANADIUM, DISSOLVED	0.00005	0.00096		MG/L	DUP
SW-050503-MCBTT031-201	ZINC, DISSOLVED	0.01		U	MG/L	DUP
SW-050503-UACTT033-101	BICARBONATE AS CACO3	2	179		MG/L	FO
SW-050503-UACTT033-101	CADMIUM, DISSOLVED	0.0001		U	MG/L	FO
SW-050503-UACTT033-101	CALCIUM, DISSOLVED	0.2	86.3		MG/L	FO
SW-050503-UACTT033-101	CARBON, TOTAL ORGANIC (TOC)	1	3	B	MG/L	FO
SW-050503-UACTT033-101	CARBONATE AS CACO3	2		U	MG/L	FO
SW-050503-UACTT033-101	CHROMIUM, DISSOLVED	0.0001	0.0004	B	MG/L	FO
SW-050503-UACTT033-101	COBALT, DISSOLVED	0.01		U	MG/L	FO
SW-050503-UACTT033-101	COPPER, DISSOLVED	0.0005	0.0008	B	MG/L	FO
SW-050503-UACTT033-101	HARDNESS AS CACO3	1	303		MG/L	FO
SW-050503-UACTT033-101	HYDROXIDE AS CACO3	2		U	MG/L	FO
SW-050503-UACTT033-101	LEAD, DISSOLVED	0.0001		U	MG/L	FO
SW-050503-UACTT033-101	MAGNESIUM, DISSOLVED	0.2	21.2		MG/L	FO
SW-050503-UACTT033-101	NICKEL, DISSOLVED	0.0002	0.0015		MG/L	FO
SW-050503-UACTT033-101	NITRATE/NITRITE AS N	0.02	0.02	B	MG/L	FO
SW-050503-UACTT033-101	PHOSPHORUS, TOTAL	0.02	0.07	B	MG/L	FO
SW-050503-UACTT033-101	RESIDUE, NON-FILTERABLE (TSS)	5		UH	MG/L	FO
SW-050503-UACTT033-101	SELENIUM, TOTAL	0.001	0.003	B	MG/L	FO
SW-050503-UACTT033-101	SILVER, DISSOLVED	0.00005		U	MG/L	FO
SW-050503-UACTT033-101	TOTAL ALKALINITY	2	179		MG/L	FO
SW-050503-UACTT033-101	VANADIUM, DISSOLVED	0.00005	0.00051		MG/L	FO
SW-050503-UACTT033-101	ZINC, DISSOLVED	0.01		U	MG/L	FO
SW-050603-BFDTT008-201	SELENIUM, TOTAL RECOVERABLE	0.001	0.004	B	MG/L	FO
SW-050603-BFNTT009-201	SELENIUM, TOTAL RECOVERABLE	0.001	0.005	B	MG/L	FO
SW-050603-BFUTT015-201	SELENIUM, TOTAL RECOVERABLE	0.001	0.006		MG/L	FO
SW-050603-GTCTT032-201	SELENIUM, TOTAL RECOVERABLE	0.001	0.001	B	MG/L	FO
SW-050603-HOOTT034-101	BICARBONATE AS CACO3	2	195		MG/L	FO
SW-050603-HOOTT034-101	CADMIUM, DISSOLVED	0.0001		U	MG/L	FO
SW-050603-HOOTT034-101	CALCIUM, DISSOLVED	0.2	59		MG/L	FO
SW-050603-HOOTT034-101	CARBON, TOTAL ORGANIC (TOC)	1	4	B	MG/L	FO
SW-050603-HOOTT034-101	CARBONATE AS CACO3	2		U	MG/L	FO
SW-050603-HOOTT034-101	CHROMIUM, DISSOLVED	0.0001	0.0007		MG/L	FO
SW-050603-HOOTT034-101	COBALT, DISSOLVED	0.01		U	MG/L	FO
SW-050603-HOOTT034-101	COPPER, DISSOLVED	0.0005		U	MG/L	FO
SW-050603-HOOTT034-101	HARDNESS AS CACO3	1	235		MG/L	FO
SW-050603-HOOTT034-101	HYDROXIDE AS CACO3	2		U	MG/L	FO
SW-050603-HOOTT034-101	LEAD, DISSOLVED	0.0001		U	MG/L	FO
SW-050603-HOOTT034-101	MAGNESIUM, DISSOLVED	0.2	21.3		MG/L	FO
SW-050603-HOOTT034-101	NICKEL, DISSOLVED	0.0002	0.0012		MG/L	FO
SW-050603-HOOTT034-101	NITRATE/NITRITE AS N	0.02	0.07	B	MG/L	FO
SW-050603-HOOTT034-101	PHOSPHORUS, TOTAL	0.01	0.06		MG/L	FO
SW-050603-HOOTT034-101	RESIDUE, NON-FILTERABLE (TSS)	5	26		MG/L	FO
SW-050603-HOOTT034-101	SELENIUM, TOTAL	0.001	0.01		MG/L	FO
SW-050603-HOOTT034-101	SILVER, DISSOLVED	0.00005		U	MG/L	FO
SW-050603-HOOTT034-101	TOTAL ALKALINITY	2	195		MG/L	FO
SW-050603-HOOTT034-101	VANADIUM, DISSOLVED	0.00005	0.00146		MG/L	FO
SW-050603-HOOTT034-101	ZINC, DISSOLVED	0.01		U	MG/L	FO

SW-050603-MCBTT031-301	SELENIUM, TOTAL RECOVERABLE	0.001		U	MG/L	FO
SW-050603-SCMTT026-101	BICARBONATE AS CACO3	2	191		MG/L	FO
SW-050603-SCMTT026-101	CADMIUM, DISSOLVED	0.0001		U	MG/L	FO
SW-050603-SCMTT026-101	CALCIUM, DISSOLVED	0.2	57.9		MG/L	FO
SW-050603-SCMTT026-101	CARBON, TOTAL ORGANIC (TOC)	1	2	B	MG/L	FO
SW-050603-SCMTT026-101	CARBONATE AS CACO3	2		U	MG/L	FO
SW-050603-SCMTT026-101	CHROMIUM, DISSOLVED	0.0001	0.0006		MG/L	FO
SW-050603-SCMTT026-101	COBALT, DISSOLVED	0.01		U	MG/L	FO
SW-050603-SCMTT026-101	COPPER, DISSOLVED	0.0005		U	MG/L	FO
SW-050603-SCMTT026-101	HARDNESS AS CACO3	1	225		MG/L	FO
SW-050603-SCMTT026-101	HYDROXIDE AS CACO3	2		U	MG/L	FO
SW-050603-SCMTT026-101	LEAD, DISSOLVED	0.0001		U	MG/L	FO
SW-050603-SCMTT026-101	MAGNESIUM, DISSOLVED	0.2	19.6		MG/L	FO
SW-050603-SCMTT026-101	NICKEL, DISSOLVED	0.0002	0.0012		MG/L	FO
SW-050603-SCMTT026-101	NITRATE/NITRITE AS N	0.02		U	MG/L	FO
SW-050603-SCMTT026-101	PHOSPHORUS, TOTAL	0.01	0.03	B	MG/L	FO
SW-050603-SCMTT026-101	RESIDUE, NON-FILTERABLE (TSS)	5	18	B	MG/L	FO
SW-050603-SCMTT026-101	SELENIUM, TOTAL	0.001	0.004	B	MG/L	FO
SW-050603-SCMTT026-101	SILVER, DISSOLVED	0.00005		U	MG/L	FO
SW-050603-SCMTT026-101	TOTAL ALKALINITY	2	191		MG/L	FO
SW-050603-SCMTT026-101	VANADIUM, DISSOLVED	0.00005	0.00114		MG/L	FO
SW-050603-SCMTT026-101	ZINC, DISSOLVED	0.01		U	MG/L	FO
SW-050603-SCPTT027-101	BICARBONATE AS CACO3	2	184		MG/L	FO
SW-050603-SCPTT027-101	CADMIUM, DISSOLVED	0.0001		U	MG/L	FO
SW-050603-SCPTT027-101	CALCIUM, DISSOLVED	0.2	60.3		MG/L	FO
SW-050603-SCPTT027-101	CARBON, TOTAL ORGANIC (TOC)	1	2	B	MG/L	FO
SW-050603-SCPTT027-101	CARBONATE AS CACO3	2		U	MG/L	FO
SW-050603-SCPTT027-101	CHROMIUM, DISSOLVED	0.0001	0.0005	B	MG/L	FO
SW-050603-SCPTT027-101	COBALT, DISSOLVED	0.01		U	MG/L	FO
SW-050603-SCPTT027-101	COPPER, DISSOLVED	0.0005		U	MG/L	FO
SW-050603-SCPTT027-101	HARDNESS AS CACO3	1	210		MG/L	FO
SW-050603-SCPTT027-101	HYDROXIDE AS CACO3	2		U	MG/L	FO
SW-050603-SCPTT027-101	LEAD, DISSOLVED	0.0001		U	MG/L	FO
SW-050603-SCPTT027-101	MAGNESIUM, DISSOLVED	0.2	14.4		MG/L	FO
SW-050603-SCPTT027-101	NICKEL, DISSOLVED	0.0002	0.0009	B	MG/L	FO
SW-050603-SCPTT027-101	NITRATE/NITRITE AS N	0.02	0.03	B	MG/L	FO
SW-050603-SCPTT027-101	PHOSPHORUS, TOTAL	0.01	0.06		MG/L	FO
SW-050603-SCPTT027-101	RESIDUE, NON-FILTERABLE (TSS)	5	22		MG/L	FO
SW-050603-SCPTT027-101	SELENIUM, TOTAL	0.001		U	MG/L	FO
SW-050603-SCPTT027-101	SILVER, DISSOLVED	0.00005		U	MG/L	FO
SW-050603-SCPTT027-101	TOTAL ALKALINITY	2	184		MG/L	FO
SW-050603-SCPTT027-101	VANADIUM, DISSOLVED	0.00005	0.00053		MG/L	FO
SW-050603-SCPTT027-101	ZINC, DISSOLVED	0.01		U	MG/L	FO
SW-050603-SSBTT022-101	BICARBONATE AS CACO3	2	198		MG/L	FO
SW-050603-SSBTT022-101	CADMIUM, DISSOLVED	0.0001		U	MG/L	FO
SW-050603-SSBTT022-101	CALCIUM, DISSOLVED	0.2	51.8		MG/L	FO
SW-050603-SSBTT022-101	CARBON, TOTAL ORGANIC (TOC)	1		U	MG/L	FO
SW-050603-SSBTT022-101	CARBONATE AS CACO3	2		U	MG/L	FO
SW-050603-SSBTT022-101	CHROMIUM, DISSOLVED	0.0001	0.0008		MG/L	FO
SW-050603-SSBTT022-101	COBALT, DISSOLVED	0.01		U	MG/L	FO
SW-050603-SSBTT022-101	COPPER, DISSOLVED	0.0005	0.0005	B	MG/L	FO
SW-050603-SSBTT022-101	HARDNESS AS CACO3	1	216		MG/L	FO
SW-050603-SSBTT022-101	HYDROXIDE AS CACO3	2		U	MG/L	FO
SW-050603-SSBTT022-101	LEAD, DISSOLVED	0.0001		U	MG/L	FO
SW-050603-SSBTT022-101	MAGNESIUM, DISSOLVED	0.2	21.1		MG/L	FO

SW-050603-SSBTT022-101	NICKEL, DISSOLVED	0.0002	0.0013		MG/L	FO
SW-050603-SSBTT022-101	NITRATE/NITRITE AS N	0.2		U	MG/L	FO
SW-050603-SSBTT022-101	PHOSPHORUS, TOTAL	0.01	0.01	B	MG/L	FO
SW-050603-SSBTT022-101	RESIDUE, NON-FILTERABLE (TSS)	5		U	MG/L	FO
SW-050603-SSBTT022-101	SELENIUM, TOTAL	0.001		U	MG/L	FO
SW-050603-SSBTT022-101	SILVER, DISSOLVED	0.00005		U	MG/L	FO
SW-050603-SSBTT022-101	TOTAL ALKALINITY	2	198		MG/L	FO
SW-050603-SSBTT022-101	VANADIUM, DISSOLVED	0.00005	0.00136		MG/L	FO
SW-050603-SSBTT022-101	ZINC, DISSOLVED	0.01	0.01	B	MG/L	FO
SW-050603-UACTT033-201	SELENIUM, TOTAL RECOVERABLE	0.001	0.004	B	MG/L	FO
SW-050703-EMCTT017-101	BICARBONATE AS CACO3	2	184		MG/L	FO
SW-050703-EMCTT017-101	CADMIUM, DISSOLVED	0.0001		U	MG/L	FO
SW-050703-EMCTT017-101	CALCIUM, DISSOLVED	0.2	61.1		MG/L	FO
SW-050703-EMCTT017-101	CARBON, TOTAL ORGANIC (TOC)	1	2	B	MG/L	FO
SW-050703-EMCTT017-101	CARBONATE AS CACO3	2		U	MG/L	FO
SW-050703-EMCTT017-101	CHROMIUM, DISSOLVED	0.0001	0.0004	B	MG/L	FO
SW-050703-EMCTT017-101	COBALT, DISSOLVED	0.01		U	MG/L	FO
SW-050703-EMCTT017-101	COPPER, DISSOLVED	0.0005	0.0006	B	MG/L	FO
SW-050703-EMCTT017-101	HARDNESS AS CACO3	1	198		MG/L	FO
SW-050703-EMCTT017-101	HYDROXIDE AS CACO3	2		U	MG/L	FO
SW-050703-EMCTT017-101	LEAD, DISSOLVED	0.0001		U	MG/L	FO
SW-050703-EMCTT017-101	MAGNESIUM, DISSOLVED	0.2	11.1		MG/L	FO
SW-050703-EMCTT017-101	NICKEL, DISSOLVED	0.0002	0.0012		MG/L	FO
SW-050703-EMCTT017-101	NITRATE/NITRITE AS N	0.02	0.65		MG/L	FO
SW-050703-EMCTT017-101	PHOSPHORUS, TOTAL	0.01	0.12		MG/L	FO
SW-050703-EMCTT017-101	RESIDUE, NON-FILTERABLE (TSS)	5	6	B	MG/L	FO
SW-050703-EMCTT017-101	SELENIUM, TOTAL	0.01	0.43		MG/L	FO
SW-050703-EMCTT017-101	SILVER, DISSOLVED	0.00005		U	MG/L	FO
SW-050703-EMCTT017-101	TOTAL ALKALINITY	2	184		MG/L	FO
SW-050703-EMCTT017-101	VANADIUM, DISSOLVED	0.00005	0.00042		MG/L	FO
SW-050703-EMCTT017-101	ZINC, DISSOLVED	0.01	0.01	B	MG/L	FO
SW-050703-GTCTT032-301	SELENIUM, TOTAL RECOVERABLE	0.001		U	MG/L	FO
SW-050703-HOOTT034-201	SELENIUM, TOTAL RECOVERABLE	0.001	0.011		MG/L	FO
SW-050703-MCBTT031-401	SELENIUM, TOTAL RECOVERABLE	0.001		U	MG/L	FO
SW-050703-SCMTT026-201	SELENIUM, TOTAL RECOVERABLE	0.001	0.004	B	MG/L	FO
SW-050703-SCPTT027-201	SELENIUM, TOTAL RECOVERABLE	0.001		U	MG/L	FO
SW-050703-SLCTT002-101	BICARBONATE AS CACO3	2	109		MG/L	FO
SW-050703-SLCTT002-101	CADMIUM, DISSOLVED	0.0001		U	MG/L	FO
SW-050703-SLCTT002-101	CALCIUM, DISSOLVED	0.2	42.7		MG/L	FO
SW-050703-SLCTT002-101	CARBON, TOTAL ORGANIC (TOC)	1	5		MG/L	FO
SW-050703-SLCTT002-101	CARBONATE AS CACO3	2		U	MG/L	FO
SW-050703-SLCTT002-101	CHROMIUM, DISSOLVED	0.0001	0.0004	B	MG/L	FO
SW-050703-SLCTT002-101	COBALT, DISSOLVED	0.01		U	MG/L	FO
SW-050703-SLCTT002-101	COPPER, DISSOLVED	0.0005	0.0012	B	MG/L	FO
SW-050703-SLCTT002-101	HARDNESS AS CACO3	1	143		MG/L	FO
SW-050703-SLCTT002-101	HYDROXIDE AS CACO3	2		U	MG/L	FO
SW-050703-SLCTT002-101	LEAD, DISSOLVED	0.0001		U	MG/L	FO
SW-050703-SLCTT002-101	MAGNESIUM, DISSOLVED	0.2	8.7		MG/L	FO
SW-050703-SLCTT002-101	NICKEL, DISSOLVED	0.0002	0.0029		MG/L	FO
SW-050703-SLCTT002-101	NITRATE/NITRITE AS N	0.02		U	MG/L	FO
SW-050703-SLCTT002-101	PHOSPHORUS, TOTAL	0.02	0.1		MG/L	FO
SW-050703-SLCTT002-101	RESIDUE, NON-FILTERABLE (TSS)	5		U	MG/L	FO
SW-050703-SLCTT002-101	SELENIUM, TOTAL	0.001	0.013		MG/L	FO
SW-050703-SLCTT002-101	SILVER, DISSOLVED	0.00005		U	MG/L	FO
SW-050703-SLCTT002-101	TOTAL ALKALINITY	2	109		MG/L	FO

SW-050703-SLCTT002-101	VANADIUM, DISSOLVED	0.00005	0.00228		MG/L	FO
SW-050703-SLCTT002-101	ZINC, DISSOLVED	0.01	0.01	B	MG/L	FO
SW-050703-SPRTT016-101	BICARBONATE AS CACO3	2	186		MG/L	FO
SW-050703-SPRTT016-101	CADMIUM, DISSOLVED	0.0002		U	MG/L	FO
SW-050703-SPRTT016-101	CALCIUM, DISSOLVED	0.2	72.3		MG/L	FO
SW-050703-SPRTT016-101	CARBON, TOTAL ORGANIC (TOC)	1	2	B	MG/L	FO
SW-050703-SPRTT016-101	CARBONATE AS CACO3	2		U	MG/L	FO
SW-050703-SPRTT016-101	CHROMIUM, DISSOLVED	0.0001	0.0011		MG/L	FO
SW-050703-SPRTT016-101	COBALT, DISSOLVED	0.01		U	MG/L	FO
SW-050703-SPRTT016-101	COPPER, DISSOLVED	0.0005	0.0007	B	MG/L	FO
SW-050703-SPRTT016-101	HARDNESS AS CACO3	1	243		MG/L	FO
SW-050703-SPRTT016-101	HYDROXIDE AS CACO3	2		U	MG/L	FO
SW-050703-SPRTT016-101	LEAD, DISSOLVED	0.0002		U	MG/L	FO
SW-050703-SPRTT016-101	MAGNESIUM, DISSOLVED	0.2	15.1		MG/L	FO
SW-050703-SPRTT016-101	NICKEL, DISSOLVED	0.0002	0.0017		MG/L	FO
SW-050703-SPRTT016-101	NITRATE/NITRITE AS N	0.02	0.05	B	MG/L	FO
SW-050703-SPRTT016-101	PHOSPHORUS, TOTAL	0.01	0.02	B	MG/L	FO
SW-050703-SPRTT016-101	RESIDUE, NON-FILTERABLE (TSS)	5		U	MG/L	FO
SW-050703-SPRTT016-101	SELENIUM, TOTAL	0.001	0.037		MG/L	FO
SW-050703-SPRTT016-101	SILVER, DISSOLVED	0.0001		U	MG/L	FO
SW-050703-SPRTT016-101	TOTAL ALKALINITY	2	186		MG/L	FO
SW-050703-SPRTT016-101	VANADIUM, DISSOLVED	0.00005	0.00124		MG/L	FO
SW-050703-SPRTT016-101	ZINC, DISSOLVED	0.01		U	MG/L	FO
SW-050703-SPRTT016-201	BICARBONATE AS CACO3	2	187		MG/L	DUP
SW-050703-SPRTT016-201	CADMIUM, DISSOLVED	0.0001		U	MG/L	DUP
SW-050703-SPRTT016-201	CALCIUM, DISSOLVED	0.2	61.2		MG/L	DUP
SW-050703-SPRTT016-201	CARBON, TOTAL ORGANIC (TOC)	1	2	B	MG/L	DUP
SW-050703-SPRTT016-201	CARBONATE AS CACO3	2		U	MG/L	DUP
SW-050703-SPRTT016-201	CHROMIUM, DISSOLVED	0.0001	0.0006		MG/L	DUP
SW-050703-SPRTT016-201	COBALT, DISSOLVED	0.01		U	MG/L	DUP
SW-050703-SPRTT016-201	COPPER, DISSOLVED	0.0005	0.0007	B	MG/L	DUP
SW-050703-SPRTT016-201	HARDNESS AS CACO3	1	198		MG/L	DUP
SW-050703-SPRTT016-201	HYDROXIDE AS CACO3	2		U	MG/L	DUP
SW-050703-SPRTT016-201	LEAD, DISSOLVED	0.0001		U	MG/L	DUP
SW-050703-SPRTT016-201	MAGNESIUM, DISSOLVED	0.2	10.9		MG/L	DUP
SW-050703-SPRTT016-201	NICKEL, DISSOLVED	0.0002	0.0013		MG/L	DUP
SW-050703-SPRTT016-201	NITRATE/NITRITE AS N	0.02	0.06	B	MG/L	DUP
SW-050703-SPRTT016-201	PHOSPHORUS, TOTAL	0.01	0.02	B	MG/L	DUP
SW-050703-SPRTT016-201	RESIDUE, NON-FILTERABLE (TSS)	5		U	MG/L	DUP
SW-050703-SPRTT016-201	SELENIUM, TOTAL	0.001	0.041		MG/L	DUP
SW-050703-SPRTT016-201	SILVER, DISSOLVED	0.00005		U	MG/L	DUP
SW-050703-SPRTT016-201	TOTAL ALKALINITY	2	187		MG/L	DUP
SW-050703-SPRTT016-201	VANADIUM, DISSOLVED	0.00005	0.00054		MG/L	DUP
SW-050703-SPRTT016-201	ZINC, DISSOLVED	0.01	0.01	B	MG/L	DUP
SW-050703-SSBTT022-201	SELENIUM, TOTAL RECOVERABLE	0.001		U	MG/L	FO
SW-050703-SSBTT022-301	SELENIUM, TOTAL RECOVERABLE	0.001		U	MG/L	DUP
SW-050803-BFDTT008-301	SELENIUM, TOTAL RECOVERABLE	0.001	0.005	B	MG/L	FO
SW-050803-BFNTT009-301	SELENIUM, TOTAL RECOVERABLE	0.001	0.006		MG/L	FO
SW-050803-BFUTT015-301	SELENIUM, TOTAL RECOVERABLE	0.001	0.006		MG/L	FO
SW-050803-EMCTT017-201	SELENIUM, TOTAL RECOVERABLE	0.02	0.36		MG/L	FO
SW-050803-HOOTT034-301	SELENIUM, TOTAL RECOVERABLE	0.001	0.01		MG/L	FO
SW-050803-SCMTT026-301	SELENIUM, TOTAL RECOVERABLE	0.001	0.004	B	MG/L	FO
SW-050803-SCPTT027-301	SELENIUM, TOTAL RECOVERABLE	0.001		U	MG/L	FO
SW-050803-SLCTT002-201	SELENIUM, TOTAL RECOVERABLE	0.001	0.015		MG/L	FO
SW-050803-SPRTT016-301	SELENIUM, TOTAL RECOVERABLE	0.001	0.037		MG/L	FO

SW-050803-SSBTT022-401	SELENIUM, TOTAL RECOVERABLE	0.001	0.001	B	MG/L	FO
SW-050803-UACTT033-301	SELENIUM, TOTAL RECOVERABLE	0.001	0.004	B	MG/L	FO
SW-050903-EMCTT017-301	SELENIUM, TOTAL RECOVERABLE	0.02	0.33		MG/L	FO
SW-050903-EMCTT017-401	SELENIUM, TOTAL RECOVERABLE	0.02	0.35		MG/L	DUP
SW-050903-SLCTT002-301	SELENIUM, TOTAL RECOVERABLE	0.001	0.016		MG/L	FO
SW-050903-SPRTT016-401	SELENIUM, TOTAL RECOVERABLE	0.001	0.038		MG/L	FO

2003 SUPPLEMENT TO 2001 TMDL BASELINE MONITORING REPORT
APPENDIX A--SURFACE WATER LABORATORY RESULTS
KEY TO "U OF I ALL DATA" WORKSHEET

RESULT
BDL

NOTES RE: RESULT
MDL

SAMPLE TYPE
SPL

NOTES RE: SAMPLE ID
1. Sample station and date information are nested in SAMPLE ID.
2. See TtEMI (2002a,b) for explanation of SAMPLE IDs.

EXPLANATION
Analyte was analyzed for but not detected at the indicated MDL

Method Detection Limit

EXPLANATION
Split

APPENDIX B

SURFACE WATER FIELD PARAMETER AND FLOW RESULTS

ON 3.5-INCH DISKETTE

STORED IN POCKET LOCATED ON BACK, INSIDE COVER OF BINDER

2003 SUPPLEMENT TO 2001 TMDL BASELINE MONITORING REPORT
APPENDIX B
SURFACE WATER FLOW MEASUREMENT DATA

STATION	DATE	FLOW	UNITS
SLCTT002	5/7/03	0.41	CFS
SLCTT002	5/8/03	0.38	CFS
SLCTT002	5/9/03	1.32	CFS
BFDTT008	5/5/03	167.78	CFS
BFDTT008	5/6/03	143.67	CFS
BFDTT008	5/8/03	105.65	CFS
BFNTT009	5/5/03	162.49	CFS
BFNTT009	5/6/03	141.35	CFS
BFNTT009	5/8/03	112.29	CFS
BFUTT015	5/5/03	119.44	CFS
BFUTT015	5/6/03	104.44	CFS
BFUTT015	5/8/03	91.38	CFS
SPRTT016	5/7/03	11.02	CFS
SPRTT016	5/8/03	9.61	CFS
SPRTT016	5/9/03	13.71	CFS
EMCTT017	5/7/03	1.78	CFS
EMCTT017	5/8/03	1.20	CFS
EMCTT017	5/9/03	2.06	CFS
SSBTT022	5/6/03	4.19	CFS
SSBTT022	5/7/03	4.35	CFS
SSBTT022	5/8/03	4.32	CFS
SCMTT026	5/6/03	12.76	CFS
SCMTT026	5/7/03	14.77	CFS
SCMTT026	5/8/03	12.90	CFS
SCPTT027	5/6/03	4.42	CFS
SCPTT027	5/7/03	4.54	CFS
SCPTT027	5/8/03	4.22	CFS
MCBTT031	5/5/03	10.15	CFS
MCBTT031	5/6/03	9.04	CFS
MCBTT031	5/7/03	9.24	CFS
GTCTT032	5/5/03	16.88	CFS
GTCTT032	5/6/03	16.48	CFS
GTCTT032	5/7/03	15.53	CFS
UACTT033	5/5/03	0.87	CFS
UACTT033	5/6/03	0.73	CFS
UACTT033	5/8/03	0.95	CFS
HOOTT034	5/6/03	7.35	CFS
HOOTT034	5/7/03	7.63	CFS
HOOTT034	5/8/03	8.80	CFS

2003 SUPPLEMENT TO 2001 TMDL BASELINE MONITORING REPORT
APPENDIX B
SURFACE WATER FIELD PARAMETER DATA

STATION	SAMPLE ID	FIELD PARAMETER	OBSERVATION #	RESULT	UNITS
SLCTT002	SW-050703-SLCTT002-101	temp	1	12.58	deg C
SLCTT002	SW-050703-SLCTT002-101	temp	2		
SLCTT002	SW-050703-SLCTT002-101	temp	3		
SLCTT002	SW-050703-SLCTT002-101	pH	1	7.90	
SLCTT002	SW-050703-SLCTT002-101	pH	2		
SLCTT002	SW-050703-SLCTT002-101	pH	3		
SLCTT002	SW-050703-SLCTT002-101	sc	1	292	uS/cm
SLCTT002	SW-050703-SLCTT002-101	sc	2		
SLCTT002	SW-050703-SLCTT002-101	sc	3		
SLCTT002	SW-050703-SLCTT002-101	turb	1	3	NTU
SLCTT002	SW-050703-SLCTT002-101	turb	2		
SLCTT002	SW-050703-SLCTT002-101	turb	3		
SLCTT002	SW-050703-SLCTT002-101	do	1	9.49	
SLCTT002	SW-050703-SLCTT002-101	do	2		
SLCTT002	SW-050703-SLCTT002-101	do	3		
SLCTT002	SW-050703-SLCTT002-101	orp	1	194.8	mV
SLCTT002	SW-050703-SLCTT002-101	orp	2		
SLCTT002	SW-050703-SLCTT002-101	orp	3		
BFDTT008	SW-050503-BFDTT008-101	temp	1	5.22	deg C
BFDTT008	SW-050503-BFDTT008-101	temp	2	5.23	deg C
BFDTT008	SW-050503-BFDTT008-101	temp	3	5.23	deg C
BFDTT008	SW-050503-BFDTT008-101	pH	1	8.00	
BFDTT008	SW-050503-BFDTT008-101	pH	2	8.23	
BFDTT008	SW-050503-BFDTT008-101	pH	3	8.26	
BFDTT008	SW-050503-BFDTT008-101	sc	1	314	uS/cm
BFDTT008	SW-050503-BFDTT008-101	sc	2	316	uS/cm
BFDTT008	SW-050503-BFDTT008-101	sc	3	317	uS/cm
BFDTT008	SW-050503-BFDTT008-101	turb	1		
BFDTT008	SW-050503-BFDTT008-101	turb	2	14	NTU
BFDTT008	SW-050503-BFDTT008-101	turb	3	14	NTU
BFDTT008	SW-050503-BFDTT008-101	do	1	11.43	
BFDTT008	SW-050503-BFDTT008-101	do	2	11.76	
BFDTT008	SW-050503-BFDTT008-101	do	3	11.88	
BFDTT008	SW-050503-BFDTT008-101	orp	1	269.5	mV
BFDTT008	SW-050503-BFDTT008-101	orp	2	265.9	mV
BFDTT008	SW-050503-BFDTT008-101	orp	3	262.3	mV
BFDTT008	SW-050603-BFDTT008-201	temp	1	5.68	deg C
BFDTT008	SW-050603-BFDTT008-201	temp	2	5.68	deg C
BFDTT008	SW-050603-BFDTT008-201	temp	3	5.70	deg C
BFDTT008	SW-050603-BFDTT008-201	pH	1	8.30	
BFDTT008	SW-050603-BFDTT008-201	pH	2	8.31	
BFDTT008	SW-050603-BFDTT008-201	pH	3	8.35	
BFDTT008	SW-050603-BFDTT008-201	sc	1	322	uS/cm
BFDTT008	SW-050603-BFDTT008-201	sc	2	322	uS/cm
BFDTT008	SW-050603-BFDTT008-201	sc	3	321	uS/cm
BFDTT008	SW-050603-BFDTT008-201	turb	1	12.5	NTU
BFDTT008	SW-050603-BFDTT008-201	turb	2		

BFDTT008	SW-050603-BFDTT008-201	turb	3		
BFDTT008	SW-050603-BFDTT008-201	do	1	12.43	
BFDTT008	SW-050603-BFDTT008-201	do	2	12.82	
BFDTT008	SW-050603-BFDTT008-201	do	3	13.02	
BFDTT008	SW-050603-BFDTT008-201	orp	1	266.9	mV
BFDTT008	SW-050603-BFDTT008-201	orp	2	266.0	mV
BFDTT008	SW-050603-BFDTT008-201	orp	3	265.0	mV
BFDTT008	SW-050803-BFDTT008-301	temp	1	8.36	deg C
BFDTT008	SW-050803-BFDTT008-301	temp	2	8.37	deg C
BFDTT008	SW-050803-BFDTT008-301	temp	3	8.38	deg C
BFDTT008	SW-050803-BFDTT008-301	pH	1	7.85	
BFDTT008	SW-050803-BFDTT008-301	pH	2	8.10	
BFDTT008	SW-050803-BFDTT008-301	pH	3	8.12	
BFDTT008	SW-050803-BFDTT008-301	sc	1	349	uS/cm
BFDTT008	SW-050803-BFDTT008-301	sc	2	349	uS/cm
BFDTT008	SW-050803-BFDTT008-301	sc	3	348	uS/cm
BFDTT008	SW-050803-BFDTT008-301	turb	1	8.5	NTU
BFDTT008	SW-050803-BFDTT008-301	turb	2		
BFDTT008	SW-050803-BFDTT008-301	turb	3		
BFDTT008	SW-050803-BFDTT008-301	do	1	10.94	
BFDTT008	SW-050803-BFDTT008-301	do	2	11.61	
BFDTT008	SW-050803-BFDTT008-301	do	3	11.86	
BFDTT008	SW-050803-BFDTT008-301	orp	1	250.0	mV
BFDTT008	SW-050803-BFDTT008-301	orp	2	251.7	mV
BFDTT008	SW-050803-BFDTT008-301	orp	3	252.2	mV
BFNTT009	SW-050503-BFNTT009-101	temp	1	4.99	deg C
BFNTT009	SW-050503-BFNTT009-101	temp	2	4.99	deg C
BFNTT009	SW-050503-BFNTT009-101	temp	3	5.00	deg C
BFNTT009	SW-050503-BFNTT009-101	pH	1	8.28	
BFNTT009	SW-050503-BFNTT009-101	pH	2	8.27	
BFNTT009	SW-050503-BFNTT009-101	pH	3	8.27	
BFNTT009	SW-050503-BFNTT009-101	sc	1	316	uS/cm
BFNTT009	SW-050503-BFNTT009-101	sc	2	316	uS/cm
BFNTT009	SW-050503-BFNTT009-101	sc	3	316	uS/cm
BFNTT009	SW-050503-BFNTT009-101	turb	1	14	NTU
BFNTT009	SW-050503-BFNTT009-101	turb	2		
BFNTT009	SW-050503-BFNTT009-101	turb	3		
BFNTT009	SW-050503-BFNTT009-101	do	1	11.81	
BFNTT009	SW-050503-BFNTT009-101	do	2	12.06	
BFNTT009	SW-050503-BFNTT009-101	do	3	12.14	
BFNTT009	SW-050503-BFNTT009-101	orp	1	252	mV
BFNTT009	SW-050503-BFNTT009-101	orp	2	251	mV
BFNTT009	SW-050503-BFNTT009-101	orp	3	250	mV
BFNTT009	SW-050603-BFNTT009-201	temp	1	5.76	deg C
BFNTT009	SW-050603-BFNTT009-201	temp	2	5.74	deg C
BFNTT009	SW-050603-BFNTT009-201	temp	3	5.78	deg C
BFNTT009	SW-050603-BFNTT009-201	pH	1	8.34	
BFNTT009	SW-050603-BFNTT009-201	pH	2	8.32	
BFNTT009	SW-050603-BFNTT009-201	pH	3	8.31	
BFNTT009	SW-050603-BFNTT009-201	sc	1	325	uS/cm
BFNTT009	SW-050603-BFNTT009-201	sc	2	327	uS/cm
BFNTT009	SW-050603-BFNTT009-201	sc	3	325	uS/cm

BFNTT009	SW-050603-BFNTT009-201	turb	1	12.2	NTU
BFNTT009	SW-050603-BFNTT009-201	turb	2		
BFNTT009	SW-050603-BFNTT009-201	turb	3		
BFNTT009	SW-050603-BFNTT009-201	do	1	12.67	
BFNTT009	SW-050603-BFNTT009-201	do	2	13.12	
BFNTT009	SW-050603-BFNTT009-201	do	3	13.31	
BFNTT009	SW-050603-BFNTT009-201	orp	1	173.6	mV
BFNTT009	SW-050603-BFNTT009-201	orp	2	176.0	mV
BFNTT009	SW-050603-BFNTT009-201	orp	3	179.8	mV
BFNTT009	SW-050803-BFNTT009-301	temp	1	8.79	deg C
BFNTT009	SW-050803-BFNTT009-301	temp	2	8.76	deg C
BFNTT009	SW-050803-BFNTT009-301	temp	3	8.76	deg C
BFNTT009	SW-050803-BFNTT009-301	pH	1	8.22	
BFNTT009	SW-050803-BFNTT009-301	pH	2	8.27	
BFNTT009	SW-050803-BFNTT009-301	pH	3	8.31	
BFNTT009	SW-050803-BFNTT009-301	sc	1	349	uS/cm
BFNTT009	SW-050803-BFNTT009-301	sc	2	349	uS/cm
BFNTT009	SW-050803-BFNTT009-301	sc	3	348	uS/cm
BFNTT009	SW-050803-BFNTT009-301	turb	1	9.5	NTU
BFNTT009	SW-050803-BFNTT009-301	turb	2		
BFNTT009	SW-050803-BFNTT009-301	turb	3		
BFNTT009	SW-050803-BFNTT009-301	do	1	11.53	
BFNTT009	SW-050803-BFNTT009-301	do	2	12.21	
BFNTT009	SW-050803-BFNTT009-301	do	3	12.38	
BFNTT009	SW-050803-BFNTT009-301	orp	1	274.7	mV
BFNTT009	SW-050803-BFNTT009-301	orp	2	272.4	mV
BFNTT009	SW-050803-BFNTT009-301	orp	3	270.2	mV
BFUTT015	SW-050503-BFUTT015-101	temp	1	6.40	deg C
BFUTT015	SW-050503-BFUTT015-101	temp	2	6.41	deg C
BFUTT015	SW-050503-BFUTT015-101	temp	3	6.43	deg C
BFUTT015	SW-050503-BFUTT015-101	pH	1	8.23	
BFUTT015	SW-050503-BFUTT015-101	pH	2	8.23	
BFUTT015	SW-050503-BFUTT015-101	pH	3	8.23	
BFUTT015	SW-050503-BFUTT015-101	sc	1	326	uS/cm
BFUTT015	SW-050503-BFUTT015-101	sc	2	326	uS/cm
BFUTT015	SW-050503-BFUTT015-101	sc	3	326	uS/cm
BFUTT015	SW-050503-BFUTT015-101	turb	1	15	NTU
BFUTT015	SW-050503-BFUTT015-101	turb	2		
BFUTT015	SW-050503-BFUTT015-101	turb	3		
BFUTT015	SW-050503-BFUTT015-101	do	1	11.69	
BFUTT015	SW-050503-BFUTT015-101	do	2	11.72	
BFUTT015	SW-050503-BFUTT015-101	do	3	11.70	
BFUTT015	SW-050503-BFUTT015-101	orp	1	226.7	mV
BFUTT015	SW-050503-BFUTT015-101	orp	2	225.7	mV
BFUTT015	SW-050503-BFUTT015-101	orp	3	224.4	mV
BFUTT015	SW-050603-BFUTT015-201	temp	1	6.84	deg C
BFUTT015	SW-050603-BFUTT015-201	temp	2	6.84	deg C
BFUTT015	SW-050603-BFUTT015-201	temp	3	6.85	deg C
BFUTT015	SW-050603-BFUTT015-201	pH	1	8.21	
BFUTT015	SW-050603-BFUTT015-201	pH	2	8.20	
BFUTT015	SW-050603-BFUTT015-201	pH	3	8.19	
BFUTT015	SW-050603-BFUTT015-201	sc	1	333	uS/cm

BFUTT015	SW-050603-BFUTT015-201	sc	2	333	uS/cm
BFUTT015	SW-050603-BFUTT015-201	sc	3	333	uS/cm
BFUTT015	SW-050603-BFUTT015-201	turb	1		
BFUTT015	SW-050603-BFUTT015-201	turb	2		
BFUTT015	SW-050603-BFUTT015-201	turb	3		
BFUTT015	SW-050603-BFUTT015-201	do	1	11.88	
BFUTT015	SW-050603-BFUTT015-201	do	2	12.13	
BFUTT015	SW-050603-BFUTT015-201	do	3	12.28	
BFUTT015	SW-050603-BFUTT015-201	orp	1	179.6	mV
BFUTT015	SW-050603-BFUTT015-201	orp	2	179.9	mV
BFUTT015	SW-050603-BFUTT015-201	orp	3	180.3	mV
BFUTT015	SW-050803-BFUTT015-301	temp	1	10.32	deg C
BFUTT015	SW-050803-BFUTT015-301	temp	2	10.38	deg C
BFUTT015	SW-050803-BFUTT015-301	temp	3	10.41	deg C
BFUTT015	SW-050803-BFUTT015-301	pH	1	8.16	
BFUTT015	SW-050803-BFUTT015-301	pH	2	8.17	
BFUTT015	SW-050803-BFUTT015-301	pH	3	8.18	
BFUTT015	SW-050803-BFUTT015-301	sc	1	354	uS/cm
BFUTT015	SW-050803-BFUTT015-301	sc	2	353	uS/cm
BFUTT015	SW-050803-BFUTT015-301	sc	3	353	uS/cm
BFUTT015	SW-050803-BFUTT015-301	turb	1	13	NTU
BFUTT015	SW-050803-BFUTT015-301	turb	2		
BFUTT015	SW-050803-BFUTT015-301	turb	3		
BFUTT015	SW-050803-BFUTT015-301	do	1	11.62	
BFUTT015	SW-050803-BFUTT015-301	do	2	11.74	
BFUTT015	SW-050803-BFUTT015-301	do	3	11.81	
BFUTT015	SW-050803-BFUTT015-301	orp	1	236.1	mV
BFUTT015	SW-050803-BFUTT015-301	orp	2	235.9	mV
BFUTT015	SW-050803-BFUTT015-301	orp	3	235.4	mV
SPRTT016	SW-050703-SPRTT016-101	temp	1	5.82	deg C
SPRTT016	SW-050703-SPRTT016-101	temp	2	5.79	deg C
SPRTT016	SW-050703-SPRTT016-101	temp	3	5.82	deg C
SPRTT016	SW-050703-SPRTT016-101	pH	1	8.09	
SPRTT016	SW-050703-SPRTT016-101	pH	2	8.09	
SPRTT016	SW-050703-SPRTT016-101	pH	3	8.07	
SPRTT016	SW-050703-SPRTT016-101	sc	1	358	uS/cm
SPRTT016	SW-050703-SPRTT016-101	sc	2	359	uS/cm
SPRTT016	SW-050703-SPRTT016-101	sc	3	359	uS/cm
SPRTT016	SW-050703-SPRTT016-101	turb	1	3	NTU
SPRTT016	SW-050703-SPRTT016-101	turb	2		
SPRTT016	SW-050703-SPRTT016-101	turb	3		
SPRTT016	SW-050703-SPRTT016-101	do	1	11.32	
SPRTT016	SW-050703-SPRTT016-101	do	2	11.68	
SPRTT016	SW-050703-SPRTT016-101	do	3	11.86	
SPRTT016	SW-050703-SPRTT016-101	orp	1	185.6	mV
SPRTT016	SW-050703-SPRTT016-101	orp	2	185.2	mV
SPRTT016	SW-050703-SPRTT016-101	orp	3	186.5	mV
SPRTT016	SW-050803-SPRTT016-301	temp	1	10.43	deg C
SPRTT016	SW-050803-SPRTT016-301	temp	2	10.47	deg C
SPRTT016	SW-050803-SPRTT016-301	temp	3	10.56	deg C
SPRTT016	SW-050803-SPRTT016-301	pH	1	8.27	
SPRTT016	SW-050803-SPRTT016-301	pH	2	8.23	

SPRTT016	SW-050803-SPRTT016-301	pH	3	8.20	
SPRTT016	SW-050803-SPRTT016-301	sc	1	363	uS/cm
SPRTT016	SW-050803-SPRTT016-301	sc	2	362	uS/cm
SPRTT016	SW-050803-SPRTT016-301	sc	3	361	uS/cm
SPRTT016	SW-050803-SPRTT016-301	turb	1	0	NTU
SPRTT016	SW-050803-SPRTT016-301	turb	2	0	NTU
SPRTT016	SW-050803-SPRTT016-301	turb	3	0	NTU
SPRTT016	SW-050803-SPRTT016-301	do	1	11.26	
SPRTT016	SW-050803-SPRTT016-301	do	2	11.38	
SPRTT016	SW-050803-SPRTT016-301	do	3	11.24	
SPRTT016	SW-050803-SPRTT016-301	orp	1		
SPRTT016	SW-050803-SPRTT016-301	orp	2		
SPRTT016	SW-050803-SPRTT016-301	orp	3		
SPRTT016	SW-050903-SPRTT016-401	temp	1	4.02	deg C
SPRTT016	SW-050903-SPRTT016-401	temp	2	4.05	deg C
SPRTT016	SW-050903-SPRTT016-401	temp	3	4.11	deg C
SPRTT016	SW-050903-SPRTT016-401	pH	1	7.94	
SPRTT016	SW-050903-SPRTT016-401	pH	2	7.93	
SPRTT016	SW-050903-SPRTT016-401	pH	3	7.92	
SPRTT016	SW-050903-SPRTT016-401	sc	1	365	uS/cm
SPRTT016	SW-050903-SPRTT016-401	sc	2	367	uS/cm
SPRTT016	SW-050903-SPRTT016-401	sc	3	365	uS/cm
SPRTT016	SW-050903-SPRTT016-401	turb	1	2.12	NTU
SPRTT016	SW-050903-SPRTT016-401	turb	2		
SPRTT016	SW-050903-SPRTT016-401	turb	3		
SPRTT016	SW-050903-SPRTT016-401	do	1	10.92	
SPRTT016	SW-050903-SPRTT016-401	do	2	10.85	
SPRTT016	SW-050903-SPRTT016-401	do	3	10.81	
SPRTT016	SW-050903-SPRTT016-401	orp	1	198.6	mV
SPRTT016	SW-050903-SPRTT016-401	orp	2	196.2	mV
SPRTT016	SW-050903-SPRTT016-401	orp	3	194.6	mV
SSBTT022	SW-050603-SSBTT022-101	temp	1	11.41	deg C
SSBTT022	SW-050603-SSBTT022-101	temp	2	11.41	deg C
SSBTT022	SW-050603-SSBTT022-101	temp	3	11.37	deg C
SSBTT022	SW-050603-SSBTT022-101	pH	1	7.89	
SSBTT022	SW-050603-SSBTT022-101	pH	2	7.89	
SSBTT022	SW-050603-SSBTT022-101	pH	3	7.89	
SSBTT022	SW-050603-SSBTT022-101	sc	1	403	uS/cm
SSBTT022	SW-050603-SSBTT022-101	sc	2	402	uS/cm
SSBTT022	SW-050603-SSBTT022-101	sc	3	404	uS/cm
SSBTT022	SW-050603-SSBTT022-101	turb	1	1.12	NTU
SSBTT022	SW-050603-SSBTT022-101	turb	2		
SSBTT022	SW-050603-SSBTT022-101	turb	3		
SSBTT022	SW-050603-SSBTT022-101	do	1	8.30	
SSBTT022	SW-050603-SSBTT022-101	do	2	8.28	
SSBTT022	SW-050603-SSBTT022-101	do	3	8.05	
SSBTT022	SW-050603-SSBTT022-101	orp	1	181.6	mV
SSBTT022	SW-050603-SSBTT022-101	orp	2	183.9	mV
SSBTT022	SW-050603-SSBTT022-101	orp	3	185.0	mV
SCMTT026	SW-050603-SCMTT026-101	temp	1	7.46	deg C
SCMTT026	SW-050603-SCMTT026-101	temp	2	7.48	deg C
SCMTT026	SW-050603-SCMTT026-101	temp	3	7.50	deg C

SCMTT026	SW-050603-SCMTT026-101	pH	1	8.46	
SCMTT026	SW-050603-SCMTT026-101	pH	2	8.47	
SCMTT026	SW-050603-SCMTT026-101	pH	3	8.47	
SCMTT026	SW-050603-SCMTT026-101	sc	1	423	uS/cm
SCMTT026	SW-050603-SCMTT026-101	sc	2	424	uS/cm
SCMTT026	SW-050603-SCMTT026-101	sc	3	426	uS/cm
SCMTT026	SW-050603-SCMTT026-101	turb	1	4.89	NTU
SCMTT026	SW-050603-SCMTT026-101	turb	2		
SCMTT026	SW-050603-SCMTT026-101	turb	3		
SCMTT026	SW-050603-SCMTT026-101	do	1	10.46	
SCMTT026	SW-050603-SCMTT026-101	do	2	10.37	
SCMTT026	SW-050603-SCMTT026-101	do	3	10.28	
SCMTT026	SW-050603-SCMTT026-101	orp	1	201.3	mV
SCMTT026	SW-050603-SCMTT026-101	orp	2	198.0	mV
SCMTT026	SW-050603-SCMTT026-101	orp	3	196.6	mV
SCMTT026	SW-050703-SCMTT026-201	temp	1	8.61	deg C
SCMTT026	SW-050703-SCMTT026-201	temp	2	8.62	deg C
SCMTT026	SW-050703-SCMTT026-201	temp	3	8.64	deg C
SCMTT026	SW-050703-SCMTT026-201	pH	1	8.48	
SCMTT026	SW-050703-SCMTT026-201	pH	2	8.48	
SCMTT026	SW-050703-SCMTT026-201	pH	3	8.47	
SCMTT026	SW-050703-SCMTT026-201	sc	1	421	uS/cm
SCMTT026	SW-050703-SCMTT026-201	sc	2	423	uS/cm
SCMTT026	SW-050703-SCMTT026-201	sc	3	425	uS/cm
SCMTT026	SW-050703-SCMTT026-201	turb	1	5.49	NTU
SCMTT026	SW-050703-SCMTT026-201	turb	2		
SCMTT026	SW-050703-SCMTT026-201	turb	3		
SCMTT026	SW-050703-SCMTT026-201	do	1	10.79	
SCMTT026	SW-050703-SCMTT026-201	do	2	10.61	
SCMTT026	SW-050703-SCMTT026-201	do	3	10.64	
SCMTT026	SW-050703-SCMTT026-201	orp	1	185.0	mV
SCMTT026	SW-050703-SCMTT026-201	orp	2	185.2	mV
SCMTT026	SW-050703-SCMTT026-201	orp	3	185.7	mV
SCMTT026	SW-050803-SCMTT026-301	temp	1	8.64	deg C
SCMTT026	SW-050803-SCMTT026-301	temp	2	8.65	deg C
SCMTT026	SW-050803-SCMTT026-301	temp	3	8.70	deg C
SCMTT026	SW-050803-SCMTT026-301	pH	1	8.50	
SCMTT026	SW-050803-SCMTT026-301	pH	2	8.48	
SCMTT026	SW-050803-SCMTT026-301	pH	3	8.49	
SCMTT026	SW-050803-SCMTT026-301	sc	1	423	uS/cm
SCMTT026	SW-050803-SCMTT026-301	sc	2	424	uS/cm
SCMTT026	SW-050803-SCMTT026-301	sc	3	412	uS/cm
SCMTT026	SW-050803-SCMTT026-301	turb	1	4.83	NTU
SCMTT026	SW-050803-SCMTT026-301	turb	2		
SCMTT026	SW-050803-SCMTT026-301	turb	3		
SCMTT026	SW-050803-SCMTT026-301	do	1	10.37	
SCMTT026	SW-050803-SCMTT026-301	do	2	10.49	
SCMTT026	SW-050803-SCMTT026-301	do	3	10.47	
SCMTT026	SW-050803-SCMTT026-301	orp	1	207.2	mV
SCMTT026	SW-050803-SCMTT026-301	orp	2	212.6	mV
SCMTT026	SW-050803-SCMTT026-301	orp	3	215.5	mV
SCPTT027	SW-050603-SCPTT027-101	temp	1	8.37	deg C

SCPTT027	SW-050603-SCPTT027-101	temp	2	8.38	deg C
SCPTT027	SW-050603-SCPTT027-101	temp	3	8.40	deg C
SCPTT027	SW-050603-SCPTT027-101	pH	1	8.34	
SCPTT027	SW-050603-SCPTT027-101	pH	2	8.31	
SCPTT027	SW-050603-SCPTT027-101	pH	3	8.33	
SCPTT027	SW-050603-SCPTT027-101	sc	1	392	uS/cm
SCPTT027	SW-050603-SCPTT027-101	sc	2	392	uS/cm
SCPTT027	SW-050603-SCPTT027-101	sc	3	391	uS/cm
SCPTT027	SW-050603-SCPTT027-101	turb	1	9.73	NTU
SCPTT027	SW-050603-SCPTT027-101	turb	2		
SCPTT027	SW-050603-SCPTT027-101	turb	3		
SCPTT027	SW-050603-SCPTT027-101	do	1	9.96	
SCPTT027	SW-050603-SCPTT027-101	do	2	9.82	
SCPTT027	SW-050603-SCPTT027-101	do	3	9.84	
SCPTT027	SW-050603-SCPTT027-101	orp	1	235.0	mV
SCPTT027	SW-050603-SCPTT027-101	orp	2	234.9	mV
SCPTT027	SW-050603-SCPTT027-101	orp	3	235.7	mV
SCPTT027	SW-050703-SCPTT027-201	temp	1	6.55	deg C
SCPTT027	SW-050703-SCPTT027-201	temp	2	6.56	deg C
SCPTT027	SW-050703-SCPTT027-201	temp	3	6.56	deg C
SCPTT027	SW-050703-SCPTT027-201	pH	1	8.37	
SCPTT027	SW-050703-SCPTT027-201	pH	2	8.36	
SCPTT027	SW-050703-SCPTT027-201	pH	3	8.34	
SCPTT027	SW-050703-SCPTT027-201	sc	1	375	uS/cm
SCPTT027	SW-050703-SCPTT027-201	sc	2	392	uS/cm
SCPTT027	SW-050703-SCPTT027-201	sc	3	394	uS/cm
SCPTT027	SW-050703-SCPTT027-201	turb	1	7.73	NTU
SCPTT027	SW-050703-SCPTT027-201	turb	2		
SCPTT027	SW-050703-SCPTT027-201	turb	3		
SCPTT027	SW-050703-SCPTT027-201	do	1	11.48	
SCPTT027	SW-050703-SCPTT027-201	do	2	11.11	
SCPTT027	SW-050703-SCPTT027-201	do	3	11.24	
SCPTT027	SW-050703-SCPTT027-201	orp	1	228.7	mV
SCPTT027	SW-050703-SCPTT027-201	orp	2	229.8	mV
SCPTT027	SW-050703-SCPTT027-201	orp	3	229.7	mV
SCPTT027	SW-050803-SCPTT027-301	temp	1	7.93	deg C
SCPTT027	SW-050803-SCPTT027-301	temp	2	7.93	deg C
SCPTT027	SW-050803-SCPTT027-301	temp	3	7.98	deg C
SCPTT027	SW-050803-SCPTT027-301	pH	1	8.42	
SCPTT027	SW-050803-SCPTT027-301	pH	2	8.41	
SCPTT027	SW-050803-SCPTT027-301	pH	3	8.39	
SCPTT027	SW-050803-SCPTT027-301	sc	1	393	uS/cm
SCPTT027	SW-050803-SCPTT027-301	sc	2	395	uS/cm
SCPTT027	SW-050803-SCPTT027-301	sc	3	395	uS/cm
SCPTT027	SW-050803-SCPTT027-301	turb	1	6.85	NTU
SCPTT027	SW-050803-SCPTT027-301	turb	2		
SCPTT027	SW-050803-SCPTT027-301	turb	3		
SCPTT027	SW-050803-SCPTT027-301	do	1	10.88	
SCPTT027	SW-050803-SCPTT027-301	do	2	10.89	
SCPTT027	SW-050803-SCPTT027-301	do	3	10.96	
SCPTT027	SW-050803-SCPTT027-301	orp	1	194.0	mV
SCPTT027	SW-050803-SCPTT027-301	orp	2	192.6	mV

SCPTT027	SW-050803-SCPTT027-301	orp	3	191.0	mV
MCBTT031	SW-050503-MCBTT031-101	temp	1	7.59	deg C
MCBTT031	SW-050503-MCBTT031-101	temp	2	7.51	deg C
MCBTT031	SW-050503-MCBTT031-101	temp	3	7.56	deg C
MCBTT031	SW-050503-MCBTT031-101	pH	1	8.57	
MCBTT031	SW-050503-MCBTT031-101	pH	2	8.58	
MCBTT031	SW-050503-MCBTT031-101	pH	3	8.59	
MCBTT031	SW-050503-MCBTT031-101	sc	1	504	uS/cm
MCBTT031	SW-050503-MCBTT031-101	sc	2	503	uS/cm
MCBTT031	SW-050503-MCBTT031-101	sc	3	503	uS/cm
MCBTT031	SW-050503-MCBTT031-101	turb	1	5.33	NTU
MCBTT031	SW-050503-MCBTT031-101	turb	2	6.13	NTU
MCBTT031	SW-050503-MCBTT031-101	turb	3	4.86	NTU
MCBTT031	SW-050503-MCBTT031-101	do	1	10.67	
MCBTT031	SW-050503-MCBTT031-101	do	2	10.03	
MCBTT031	SW-050503-MCBTT031-101	do	3	11.59	
MCBTT031	SW-050503-MCBTT031-101	orp	1	156.5	mV
MCBTT031	SW-050503-MCBTT031-101	orp	2	157.4	mV
MCBTT031	SW-050503-MCBTT031-101	orp	3	149.7	mV
MCBTT031	SW-050603-MCBTT031-301	temp	1	8.62	deg C
MCBTT031	SW-050603-MCBTT031-301	temp	2	8.62	deg C
MCBTT031	SW-050603-MCBTT031-301	temp	3	8.62	deg C
MCBTT031	SW-050603-MCBTT031-301	pH	1	8.33	
MCBTT031	SW-050603-MCBTT031-301	pH	2	8.35	
MCBTT031	SW-050603-MCBTT031-301	pH	3	8.36	
MCBTT031	SW-050603-MCBTT031-301	sc	1	511	uS/cm
MCBTT031	SW-050603-MCBTT031-301	sc	2	511	uS/cm
MCBTT031	SW-050603-MCBTT031-301	sc	3	511	uS/cm
MCBTT031	SW-050603-MCBTT031-301	turb	1	4.41	NTU
MCBTT031	SW-050603-MCBTT031-301	turb	2		
MCBTT031	SW-050603-MCBTT031-301	turb	3		
MCBTT031	SW-050603-MCBTT031-301	do	1	10.37	
MCBTT031	SW-050603-MCBTT031-301	do	2	10.55	
MCBTT031	SW-050603-MCBTT031-301	do	3	10.66	
MCBTT031	SW-050603-MCBTT031-301	orp	1	230.6	mV
MCBTT031	SW-050603-MCBTT031-301	orp	2	233.2	mV
MCBTT031	SW-050603-MCBTT031-301	orp	3	233.0	mV
MCBTT031	SW-050703-MCBTT031-401	temp	1	9.07	deg C
MCBTT031	SW-050703-MCBTT031-401	temp	2	9.07	deg C
MCBTT031	SW-050703-MCBTT031-401	temp	3	9.07	deg C
MCBTT031	SW-050703-MCBTT031-401	pH	1	8.38	
MCBTT031	SW-050703-MCBTT031-401	pH	2	8.36	
MCBTT031	SW-050703-MCBTT031-401	pH	3	8.35	
MCBTT031	SW-050703-MCBTT031-401	sc	1	536	uS/cm
MCBTT031	SW-050703-MCBTT031-401	sc	2	535	uS/cm
MCBTT031	SW-050703-MCBTT031-401	sc	3	526	uS/cm
MCBTT031	SW-050703-MCBTT031-401	turb	1	4.13	NTU
MCBTT031	SW-050703-MCBTT031-401	turb	2		
MCBTT031	SW-050703-MCBTT031-401	turb	3		
MCBTT031	SW-050703-MCBTT031-401	do	1	11.12	
MCBTT031	SW-050703-MCBTT031-401	do	2	11.30	
MCBTT031	SW-050703-MCBTT031-401	do	3	11.41	

MCBTT031	SW-050703-MCBTT031-401	orp	1	233.5	mV
MCBTT031	SW-050703-MCBTT031-401	orp	2	234.6	mV
MCBTT031	SW-050703-MCBTT031-401	orp	3	235.3	mV
GTCTT032	SW-050503-GTCTT032-101	temp	1	7.85	deg C
GTCTT032	SW-050503-GTCTT032-101	temp	2	7.80	deg C
GTCTT032	SW-050503-GTCTT032-101	temp	3	7.81	deg C
GTCTT032	SW-050503-GTCTT032-101	pH	1	8.46	
GTCTT032	SW-050503-GTCTT032-101	pH	2	8.44	
GTCTT032	SW-050503-GTCTT032-101	pH	3	8.43	
GTCTT032	SW-050503-GTCTT032-101	sc	1	388	uS/cm
GTCTT032	SW-050503-GTCTT032-101	sc	2	389	uS/cm
GTCTT032	SW-050503-GTCTT032-101	sc	3	388	uS/cm
GTCTT032	SW-050503-GTCTT032-101	turb	1		
GTCTT032	SW-050503-GTCTT032-101	turb	2		
GTCTT032	SW-050503-GTCTT032-101	turb	3		
GTCTT032	SW-050503-GTCTT032-101	do	1	10.92	
GTCTT032	SW-050503-GTCTT032-101	do	2	10.52	
GTCTT032	SW-050503-GTCTT032-101	do	3	10.62	
GTCTT032	SW-050503-GTCTT032-101	orp	1	147.2	mV
GTCTT032	SW-050503-GTCTT032-101	orp	2	144.9	mV
GTCTT032	SW-050503-GTCTT032-101	orp	3	142.8	mV
GTCTT032	SW-050603-GTCTT032-201	temp	1	8.09	deg C
GTCTT032	SW-050603-GTCTT032-201	temp	2	8.08	deg C
GTCTT032	SW-050603-GTCTT032-201	temp	3	8.08	deg C
GTCTT032	SW-050603-GTCTT032-201	pH	1	8.26	
GTCTT032	SW-050603-GTCTT032-201	pH	2	8.25	
GTCTT032	SW-050603-GTCTT032-201	pH	3	8.25	
GTCTT032	SW-050603-GTCTT032-201	sc	1	387	uS/cm
GTCTT032	SW-050603-GTCTT032-201	sc	2	388	uS/cm
GTCTT032	SW-050603-GTCTT032-201	sc	3	388	uS/cm
GTCTT032	SW-050603-GTCTT032-201	turb	1	3.16	NTU
GTCTT032	SW-050603-GTCTT032-201	turb	2		
GTCTT032	SW-050603-GTCTT032-201	turb	3		
GTCTT032	SW-050603-GTCTT032-201	do	1	10.65	
GTCTT032	SW-050603-GTCTT032-201	do	2	10.53	
GTCTT032	SW-050603-GTCTT032-201	do	3	10.49	
GTCTT032	SW-050603-GTCTT032-201	orp	1	184.7	mV
GTCTT032	SW-050603-GTCTT032-201	orp	2	185.5	mV
GTCTT032	SW-050603-GTCTT032-201	orp	3	186.2	mV
GTCTT032	SW-050703-GTCTT032-301	temp	1	8.36	deg C
GTCTT032	SW-050703-GTCTT032-301	temp	2	8.34	deg C
GTCTT032	SW-050703-GTCTT032-301	temp	3	8.34	deg C
GTCTT032	SW-050703-GTCTT032-301	pH	1	8.31	
GTCTT032	SW-050703-GTCTT032-301	pH	2	8.29	
GTCTT032	SW-050703-GTCTT032-301	pH	3	8.28	
GTCTT032	SW-050703-GTCTT032-301	sc	1	400	uS/cm
GTCTT032	SW-050703-GTCTT032-301	sc	2	400	uS/cm
GTCTT032	SW-050703-GTCTT032-301	sc	3	400	uS/cm
GTCTT032	SW-050703-GTCTT032-301	turb	1	3.05	NTU
GTCTT032	SW-050703-GTCTT032-301	turb	2		
GTCTT032	SW-050703-GTCTT032-301	turb	3		
GTCTT032	SW-050703-GTCTT032-301	do	1	10.78	

GTCTT032	SW-050703-GTCTT032-301	do	2	10.58	
GTCTT032	SW-050703-GTCTT032-301	do	3	10.53	
GTCTT032	SW-050703-GTCTT032-301	orp	1	272.1	mV
GTCTT032	SW-050703-GTCTT032-301	orp	2	271.6	mV
GTCTT032	SW-050703-GTCTT032-301	orp	3	270.8	mV
SLCTT002	SW-050803-SLCTT002-201	temp	1	5.34	deg C
SLCTT002	SW-050803-SLCTT002-201	temp	2	5.94	deg C
SLCTT002	SW-050803-SLCTT002-201	temp	3		
SLCTT002	SW-050803-SLCTT002-201	pH	1	7.90	
SLCTT002	SW-050803-SLCTT002-201	pH	2	7.60	
SLCTT002	SW-050803-SLCTT002-201	pH	3		
SLCTT002	SW-050803-SLCTT002-201	sc	1	304	uS/cm
SLCTT002	SW-050803-SLCTT002-201	sc	2	305	uS/cm
SLCTT002	SW-050803-SLCTT002-201	sc	3		
SLCTT002	SW-050803-SLCTT002-201	turb	1	0.8	NTU
SLCTT002	SW-050803-SLCTT002-201	turb	2	1.0	NTU
SLCTT002	SW-050803-SLCTT002-201	turb	3		
SLCTT002	SW-050803-SLCTT002-201	do	1	12.00	
SLCTT002	SW-050803-SLCTT002-201	do	2	10.24	
SLCTT002	SW-050803-SLCTT002-201	do	3		
SLCTT002	SW-050803-SLCTT002-201	orp	1		
SLCTT002	SW-050803-SLCTT002-201	orp	2		
SLCTT002	SW-050803-SLCTT002-201	orp	3		
SLCTT002	SW-050903-SLCTT002-301	temp	1	6.15	deg C
SLCTT002	SW-050903-SLCTT002-301	temp	2		
SLCTT002	SW-050903-SLCTT002-301	temp	3		
SLCTT002	SW-050903-SLCTT002-301	pH	1	8.00	
SLCTT002	SW-050903-SLCTT002-301	pH	2		
SLCTT002	SW-050903-SLCTT002-301	pH	3		
SLCTT002	SW-050903-SLCTT002-301	sc	1	298	uS/cm
SLCTT002	SW-050903-SLCTT002-301	sc	2		
SLCTT002	SW-050903-SLCTT002-301	sc	3		
SLCTT002	SW-050903-SLCTT002-301	turb	1	3.78	NTU
SLCTT002	SW-050903-SLCTT002-301	turb	2		
SLCTT002	SW-050903-SLCTT002-301	turb	3		
SLCTT002	SW-050903-SLCTT002-301	do	1	12.46	
SLCTT002	SW-050903-SLCTT002-301	do	2		
SLCTT002	SW-050903-SLCTT002-301	do	3		
SLCTT002	SW-050903-SLCTT002-301	orp	1	165.1	mV
SLCTT002	SW-050903-SLCTT002-301	orp	2		
SLCTT002	SW-050903-SLCTT002-301	orp	3		
EMCTT017	SW-050703-EMCTT017-101	temp	1	7.47	deg C
EMCTT017	SW-050703-EMCTT017-101	temp	2		
EMCTT017	SW-050703-EMCTT017-101	temp	3		
EMCTT017	SW-050703-EMCTT017-101	pH	1	8.25	
EMCTT017	SW-050703-EMCTT017-101	pH	2		
EMCTT017	SW-050703-EMCTT017-101	pH	3		
EMCTT017	SW-050703-EMCTT017-101	sc	1	442	uS/cm
EMCTT017	SW-050703-EMCTT017-101	sc	2		
EMCTT017	SW-050703-EMCTT017-101	sc	3		
EMCTT017	SW-050703-EMCTT017-101	turb	1	12	NTU
EMCTT017	SW-050703-EMCTT017-101	turb	2		

EMCTT017	SW-050703-EMCTT017-101	turb	3		
EMCTT017	SW-050703-EMCTT017-101	do	1	10.84	
EMCTT017	SW-050703-EMCTT017-101	do	2		
EMCTT017	SW-050703-EMCTT017-101	do	3		
EMCTT017	SW-050703-EMCTT017-101	orp	1	231.8	mV
EMCTT017	SW-050703-EMCTT017-101	orp	2		
EMCTT017	SW-050703-EMCTT017-101	orp	3		
EMCTT017	SW-050803-EMCTT017-201	temp	1	9.47	deg C
EMCTT017	SW-050803-EMCTT017-201	temp	2	9.72	deg C
EMCTT017	SW-050803-EMCTT017-201	temp	3		
EMCTT017	SW-050803-EMCTT017-201	pH	1	8.30	
EMCTT017	SW-050803-EMCTT017-201	pH	2	8.17	
EMCTT017	SW-050803-EMCTT017-201	pH	3		
EMCTT017	SW-050803-EMCTT017-201	sc	1	447	uS/cm
EMCTT017	SW-050803-EMCTT017-201	sc	2	446	uS/cm
EMCTT017	SW-050803-EMCTT017-201	sc	3		
EMCTT017	SW-050803-EMCTT017-201	turb	1	8.1	NTU
EMCTT017	SW-050803-EMCTT017-201	turb	2	8.6	NTU
EMCTT017	SW-050803-EMCTT017-201	turb	3		
EMCTT017	SW-050803-EMCTT017-201	do	1	9.91	
EMCTT017	SW-050803-EMCTT017-201	do	2	9.18	
EMCTT017	SW-050803-EMCTT017-201	do	3		
EMCTT017	SW-050803-EMCTT017-201	orp	1		
EMCTT017	SW-050803-EMCTT017-201	orp	2		
EMCTT017	SW-050803-EMCTT017-201	orp	3		
EMCTT017	SW-050903-EMCTT017-301	temp	1	3.29	deg C
EMCTT017	SW-050903-EMCTT017-301	temp	2		
EMCTT017	SW-050903-EMCTT017-301	temp	3		
EMCTT017	SW-050903-EMCTT017-301	pH	1	8.25	
EMCTT017	SW-050903-EMCTT017-301	pH	2		
EMCTT017	SW-050903-EMCTT017-301	pH	3		
EMCTT017	SW-050903-EMCTT017-301	sc	1	444	uS/cm
EMCTT017	SW-050903-EMCTT017-301	sc	2		
EMCTT017	SW-050903-EMCTT017-301	sc	3		
EMCTT017	SW-050903-EMCTT017-301	turb	1		
EMCTT017	SW-050903-EMCTT017-301	turb	2		
EMCTT017	SW-050903-EMCTT017-301	turb	3		
EMCTT017	SW-050903-EMCTT017-301	do	1	12.01	
EMCTT017	SW-050903-EMCTT017-301	do	2		
EMCTT017	SW-050903-EMCTT017-301	do	3		
EMCTT017	SW-050903-EMCTT017-301	orp	1	181.7	mV
EMCTT017	SW-050903-EMCTT017-301	orp	2		
EMCTT017	SW-050903-EMCTT017-301	orp	3		
SSBTT022	SW-050703-SSBTT022-201	temp	1	11.37	deg C
SSBTT022	SW-050703-SSBTT022-201	temp	2	11.35	deg C
SSBTT022	SW-050703-SSBTT022-201	temp	3	11.41	deg C
SSBTT022	SW-050703-SSBTT022-201	pH	1	7.93	
SSBTT022	SW-050703-SSBTT022-201	pH	2	7.91	
SSBTT022	SW-050703-SSBTT022-201	pH	3	7.88	
SSBTT022	SW-050703-SSBTT022-201	sc	1	404	uS/cm
SSBTT022	SW-050703-SSBTT022-201	sc	2	405	uS/cm
SSBTT022	SW-050703-SSBTT022-201	sc	3	399	uS/cm

SSBTT022	SW-050703-SSBTT022-201	turb	1	1.86	NTU
SSBTT022	SW-050703-SSBTT022-201	turb	2		
SSBTT022	SW-050703-SSBTT022-201	turb	3		
SSBTT022	SW-050703-SSBTT022-201	do	1	9.03	
SSBTT022	SW-050703-SSBTT022-201	do	2	8.96	
SSBTT022	SW-050703-SSBTT022-201	do	3	8.88	
SSBTT022	SW-050703-SSBTT022-201	orp	1	191.4	mV
SSBTT022	SW-050703-SSBTT022-201	orp	2	192.7	mV
SSBTT022	SW-050703-SSBTT022-201	orp	3	192.9	mV
SSBTT022	SW-050803-SSBTT022-401	temp	1	11.63	deg C
SSBTT022	SW-050803-SSBTT022-401	temp	2	11.62	deg C
SSBTT022	SW-050803-SSBTT022-401	temp	3	11.64	deg C
SSBTT022	SW-050803-SSBTT022-401	pH	1	7.97	
SSBTT022	SW-050803-SSBTT022-401	pH	2	7.90	
SSBTT022	SW-050803-SSBTT022-401	pH	3	7.94	
SSBTT022	SW-050803-SSBTT022-401	sc	1	405	uS/cm
SSBTT022	SW-050803-SSBTT022-401	sc	2	403	uS/cm
SSBTT022	SW-050803-SSBTT022-401	sc	3	404	uS/cm
SSBTT022	SW-050803-SSBTT022-401	turb	1	11.3	NTU
SSBTT022	SW-050803-SSBTT022-401	turb	2	11.5	NTU
SSBTT022	SW-050803-SSBTT022-401	turb	3		
SSBTT022	SW-050803-SSBTT022-401	do	1	8.84	
SSBTT022	SW-050803-SSBTT022-401	do	2	8.48	
SSBTT022	SW-050803-SSBTT022-401	do	3	8.67	
SSBTT022	SW-050803-SSBTT022-401	orp	1	225.7	mV
SSBTT022	SW-050803-SSBTT022-401	orp	2	233.8	mV
SSBTT022	SW-050803-SSBTT022-401	orp	3	236.2	mV
UACTT033	SW-050503-UACTT033-101	temp	1	4.61	deg C
UACTT033	SW-050503-UACTT033-101	temp	2	4.72	deg C
UACTT033	SW-050503-UACTT033-101	temp	3	4.70	deg C
UACTT033	SW-050503-UACTT033-101	pH	1	7.78	
UACTT033	SW-050503-UACTT033-101	pH	2	7.82	
UACTT033	SW-050503-UACTT033-101	pH	3	7.82	
UACTT033	SW-050503-UACTT033-101	sc	1	555	uS/cm
UACTT033	SW-050503-UACTT033-101	sc	2	554	uS/cm
UACTT033	SW-050503-UACTT033-101	sc	3	554	uS/cm
UACTT033	SW-050503-UACTT033-101	turb	1	1.23	NTU
UACTT033	SW-050503-UACTT033-101	turb	2	1.37	NTU
UACTT033	SW-050503-UACTT033-101	turb	3	1.24	NTU
UACTT033	SW-050503-UACTT033-101	do	1	10.86	
UACTT033	SW-050503-UACTT033-101	do	2	11.29	
UACTT033	SW-050503-UACTT033-101	do	3	11.28	
UACTT033	SW-050503-UACTT033-101	orp	1	210.4	mV
UACTT033	SW-050503-UACTT033-101	orp	2	171.6	mV
UACTT033	SW-050503-UACTT033-101	orp	3	163.5	mV
UACTT033	SW-050603-UACTT033-201	temp	1	7.86	deg C
UACTT033	SW-050603-UACTT033-201	temp	2		
UACTT033	SW-050603-UACTT033-201	temp	3		
UACTT033	SW-050603-UACTT033-201	pH	1	7.77	
UACTT033	SW-050603-UACTT033-201	pH	2		
UACTT033	SW-050603-UACTT033-201	pH	3		
UACTT033	SW-050603-UACTT033-201	sc	1	560	uS/cm

UACTT033	SW-050603-UACTT033-201	sc	2		
UACTT033	SW-050603-UACTT033-201	sc	3		
UACTT033	SW-050603-UACTT033-201	turb	1	1.1	NTU
UACTT033	SW-050603-UACTT033-201	turb	2		
UACTT033	SW-050603-UACTT033-201	turb	3		
UACTT033	SW-050603-UACTT033-201	do	1	10.32	
UACTT033	SW-050603-UACTT033-201	do	2		
UACTT033	SW-050603-UACTT033-201	do	3		
UACTT033	SW-050603-UACTT033-201	orp	1	182.9	mV
UACTT033	SW-050603-UACTT033-201	orp	2		
UACTT033	SW-050603-UACTT033-201	orp	3		
UACTT033	SW-050803-UACTT033-301	temp	1	8.50	deg C
UACTT033	SW-050803-UACTT033-301	temp	2	8.68	deg C
UACTT033	SW-050803-UACTT033-301	temp	3		
UACTT033	SW-050803-UACTT033-301	pH	1	7.70	
UACTT033	SW-050803-UACTT033-301	pH	2	7.59	
UACTT033	SW-050803-UACTT033-301	pH	3		
UACTT033	SW-050803-UACTT033-301	sc	1	578	uS/cm
UACTT033	SW-050803-UACTT033-301	sc	2	577	uS/cm
UACTT033	SW-050803-UACTT033-301	sc	3		
UACTT033	SW-050803-UACTT033-301	turb	1	0.0	NTU
UACTT033	SW-050803-UACTT033-301	turb	2	0.0	NTU
UACTT033	SW-050803-UACTT033-301	turb	3		
UACTT033	SW-050803-UACTT033-301	do	1	9.56	
UACTT033	SW-050803-UACTT033-301	do	2	8.96	
UACTT033	SW-050803-UACTT033-301	do	3		
UACTT033	SW-050803-UACTT033-301	orp	1		
UACTT033	SW-050803-UACTT033-301	orp	2		
UACTT033	SW-050803-UACTT033-301	orp	3		
HOOTT034	SW-050603-HOOTT034-101	temp	1	11.48	deg C
HOOTT034	SW-050603-HOOTT034-101	temp	2	11.64	deg C
HOOTT034	SW-050603-HOOTT034-101	temp	3	11.75	deg C
HOOTT034	SW-050603-HOOTT034-101	pH	1	7.70	
HOOTT034	SW-050603-HOOTT034-101	pH	2	7.70	
HOOTT034	SW-050603-HOOTT034-101	pH	3	7.67	
HOOTT034	SW-050603-HOOTT034-101	sc	1	456	uS/cm
HOOTT034	SW-050603-HOOTT034-101	sc	2	460	uS/cm
HOOTT034	SW-050603-HOOTT034-101	sc	3	459	uS/cm
HOOTT034	SW-050603-HOOTT034-101	turb	1	3.51	NTU
HOOTT034	SW-050603-HOOTT034-101	turb	2		
HOOTT034	SW-050603-HOOTT034-101	turb	3		
HOOTT034	SW-050603-HOOTT034-101	do	1	7.54	
HOOTT034	SW-050603-HOOTT034-101	do	2	7.62	
HOOTT034	SW-050603-HOOTT034-101	do	3	7.62	
HOOTT034	SW-050603-HOOTT034-101	orp	1	177.9	mV
HOOTT034	SW-050603-HOOTT034-101	orp	2	185.5	mV
HOOTT034	SW-050603-HOOTT034-101	orp	3	187.9	mV
HOOTT034	SW-050703-HOOTT034-201	temp	1	11.68	deg C
HOOTT034	SW-050703-HOOTT034-201	temp	2	11.67	deg C
HOOTT034	SW-050703-HOOTT034-201	temp	3	11.61	deg C
HOOTT034	SW-050703-HOOTT034-201	pH	1	7.82	
HOOTT034	SW-050703-HOOTT034-201	pH	2	7.74	

HOOTT034	SW-050703-HOOTT034-201	pH	3	7.74	
HOOTT034	SW-050703-HOOTT034-201	sc	1	457	uS/cm
HOOTT034	SW-050703-HOOTT034-201	sc	2	456	uS/cm
HOOTT034	SW-050703-HOOTT034-201	sc	3	458	uS/cm
HOOTT034	SW-050703-HOOTT034-201	turb	1	7.67	NTU
HOOTT034	SW-050703-HOOTT034-201	turb	2		
HOOTT034	SW-050703-HOOTT034-201	turb	3		
HOOTT034	SW-050703-HOOTT034-201	do	1	8.13	
HOOTT034	SW-050703-HOOTT034-201	do	2	7.96	
HOOTT034	SW-050703-HOOTT034-201	do	3	7.99	
HOOTT034	SW-050703-HOOTT034-201	orp	1	204.5	mV
HOOTT034	SW-050703-HOOTT034-201	orp	2	208.9	mV
HOOTT034	SW-050703-HOOTT034-201	orp	3	208.6	mV
HOOTT034	SW-050803-HOOTT034-301	temp	1	12.26	deg C
HOOTT034	SW-050803-HOOTT034-301	temp	2	12.13	deg C
HOOTT034	SW-050803-HOOTT034-301	temp	3	12.08	deg C
HOOTT034	SW-050803-HOOTT034-301	pH	1	7.93	
HOOTT034	SW-050803-HOOTT034-301	pH	2	7.83	
HOOTT034	SW-050803-HOOTT034-301	pH	3	7.80	
HOOTT034	SW-050803-HOOTT034-301	sc	1	459	uS/cm
HOOTT034	SW-050803-HOOTT034-301	sc	2	457	uS/cm
HOOTT034	SW-050803-HOOTT034-301	sc	3	461	uS/cm
HOOTT034	SW-050803-HOOTT034-301	turb	1	10.5	NTU
HOOTT034	SW-050803-HOOTT034-301	turb	2	10.7	NTU
HOOTT034	SW-050803-HOOTT034-301	turb	3		
HOOTT034	SW-050803-HOOTT034-301	do	1	7.89	
HOOTT034	SW-050803-HOOTT034-301	do	2	7.65	
HOOTT034	SW-050803-HOOTT034-301	do	3	7.85	
HOOTT034	SW-050803-HOOTT034-301	orp	1	233.5	mV
HOOTT034	SW-050803-HOOTT034-301	orp	2	238.3	mV
HOOTT034	SW-050803-HOOTT034-301	orp	3	239.9	mV

2003 SUPPLEMENT TO 2001 TMDL BASELINE MONITORING REPORT
APPENDIX B
KEY TO "FIELD PARAMETER DATA"

FIELD PARAMETER	EXPLANATION
temp	Temperature
pH	pH
sc	Specific conductance
turb	Turbidity
do	Dissolved Oxygen
orp	Oxidation-reduction potential

UNITS	EXPLANATION
deg C	Degrees Celsius
uS/cm	Microsiemens per centimeter
NTU	Nephelometric turbidity units
mg/L	Milligrams per liter
mV	Millivolts

2003 SUPPLEMENT TO 2001 TMDL BASELINE MONITORING REPORT
APPENDIX B
KEY TO "FLOW DATA"

ACRONYM	EXPLANATION
ND	No data collected
CFS	Cubic feet per second