



DEPARTMENT OF
ECOLOGY
State of Washington

**Goosmus Creek (Ferry County)
Ambient Monitoring
at the U.S./Canada Border**

Data Summary Report

November 2012

Publication No. 12-03-025

Publication and Contact Information

This report is available on the Department of Ecology's website at <https://fortress.wa.gov/ecy/publications/SummaryPages/1203025.html>

Data for this project are available at Ecology's Environmental Information Management (EIM) website www.ecy.wa.gov/eim/index.htm. Search User Study ID, jros0001.

The Activity Tracker Code for this study is 09-237.

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Data Summary Report

by

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Abstract

This report documents the findings of a three-year sampling study on Goosmus Creek, Ferry County, Washington near the U.S./Canada border. The objective was to investigate the impact of the Lexington-Grenoble Mine discharge on water quality in Goosmus Creek. The mine discharge point is located in British Columbia, Canada, 1,000 feet north of the international border.

Shortly before sampling for this project began in 2008, mining activities at the Lexington-Grenoble pit ceased. The facility was placed under care and maintenance due to financial difficulties. Therefore, the data collected do not show the impact of active mining. However, this project will provide a data set for comparison with any future sampling on this system.

From 2008-2010, the Washington State Department of Ecology (Ecology) collected samples from Goosmus Creek three times per year during low-flow periods. Ecology sampled an additional site on Little Goosmus Creek to determine the water quality of a system in the same region that was not receiving discharge effluent. Sediment samples also were collected at both locations once per year to determine metals concentrations in the substrate.

This report is a summary of the data collected and includes a data quality evaluation.

Field measurements included temperature, conductivity, pH, and dissolved oxygen.

Laboratory analytes in the water samples were turbidity, total dissolved solids, total suspended solids, alkalinity, nitrate and nitrite nitrogen, ammonia, total persulfate nitrogen, total phosphorus, orthophosphate, arsenic, aluminum, cadmium, calcium, chloride, chromium, copper, hardness, iron, lead, magnesium, mercury, nickel, potassium, selenium, silver, sodium, sulfate, and zinc.

Laboratory analytes in the sediment samples were arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc.

Acknowledgements

The author thanks the following Washington State Department of Ecology staff for their contributions to this project:

- Jim Ross, Environmental Assessment Program, Eastern Operations Section
- Tighe Stuart, Environmental Assessment Program, Eastern Operations Section
- Pat Hallinan, Water Quality Program, Eastern Regional Office

Introduction

Goosmus Creek is located in northwest Ferry County, Washington. The headwaters of Goosmus Creek originate in British Columbia (B.C.), Canada (Ross, 2008). In 2007, Huakan International Mining Inc. (Huakan) began making preparations to resume mining at the Lexington-Grenoble gold and copper mine near Greenwood B.C. In 2008, they received a permit to discharge mine water into a small tributary of Goosmus Creek. The discharge point is approximately 1,000 feet north of the U.S./Canada border (Ross, 2008).

At the request of the Washington State Department of Ecology (Ecology) Water Quality Program, Ecology's Environmental Assessment Program collected water quality samples at one site on Goosmus Creek just below the international border and at an additional site on Little Goosmus Creek. The goal was to investigate the impact of the mine discharge on water quality in Goosmus Creek by comparing it to a tributary not receiving mine discharge.

Active mining operations ceased in 2007. According to Huakan's website, the facility was placed under care and maintenance due to financial difficulties. Therefore, this 2008-2010 project became a baseline monitoring effort. If mining activity resumes, additional samples can be collected and compared to data presented in this report.

The purpose of this document is to detail the sampling methods, results, and conclusions drawn from monitoring Goosmus Creek and Little Goosmus Creek.

Methods

Over a three-year period (2008-2010), water quality and sediment samples were collected from Goosmus Creek (60NFGC04.8) and Little Goosmus Creek (60SFGC02.9). The study design consisted of three sampling events per year during the critical period (June-October). For each event, a single sampling crew collected samples and field measurements to characterize conditions at each site. Water quality samples were collected three times per year at Goosmus Creek and one time per year at Little Goosmus Creek. Sediment samples were collected once per year at each site.



Figure 1. Map showing sampling locations.

The following standard operating procedures (SOPs) were followed, as appropriate. Ecology's Environmental Assessment Program (EAP) SOPs can be found at www.ecy.wa.gov/programs/eap/quality.html

- EAP011 Instantaneous Measurement of Temperature in Water.
- EAP013 Determining Global Positioning System Coordinates.
- EAP015 Grab Sampling – Fresh Water.
- EAP023 Winkler Determination of Dissolved Oxygen.
- EAP031 Measurement of pH in Freshwater.
- EAP032 Measurement of Conductivity in Freshwater.
- EAP033 Hydrolab® DataSonde and MiniSonde Multiprobes.
- EAP035 Measurement of Dissolved Oxygen in Surface Water.
- EAP029 Metals Sampling.
- EAP040 Freshwater Sediment Sampling.

Methods for collecting laboratory and field parameters are described in Ecology's field measurements and sampling protocols manual (Ecology, 1993). The sampling schedule is shown in Table 1.

Table 1. Sampling schedule.

Year	Water			Sediment	
	60NFGC02.9	60SFGC04.8	Blank	60NFGC02.9	60SFGC04.8
2008	3	1	1	1	1
2009	3	1	1	1	1
2010	2	0	1	0	0

All samples were collected in pre-cleaned bottles and jars supplied by Manchester Environmental Laboratories (MEL, 2008). Orthophosphate and dissolved metals samples were filtered in the field with syringes and filters supplied by MEL. Sediment samples were collected in glass jars also provided by MEL. Sample collection details were documented in a field notebook. Samples were stored in the dark on ice until transferred to an ice chest for shipping via air freight to MEL. Samples were processed and analyzed within required holding times for elements and compounds listed in Table 2 (Joy, 2006). Trace metal analysis methods and reporting limits are listed in Table 3.

All field measurements were collected using a Hydrolab® MiniSonde. The MiniSonde was calibrated before each sample run using techniques described in SOP EAP033, Hydrolab® DataSonde and MiniSonde Multiprobes.

One set of duplicate water samples was collected per year to obtain estimates of total analytical variability. One set of field blanks for metals was collected per year at Ecology's Eastern Regional Office Lab on return from the field (Joy, 2010). MEL ran standard blank and check samples under their usual procedures (MEL, 2012). Sample methods and measurement quality objectives are listed in Table 2.

Table 2. Sample methods and measurement quality objectives.

Analysis	Method	Precision RSD	Bias	Method Reporting Limits and/or Resolution
Laboratory Analysis				
Total Suspended Solids	SM 2540D	<20%	N/A	1 mg/L
Total Dissolved Solids	SM 2540C	<20%	N/A	1 mg/L
Turbidity	SM 2130B	<20%	N/A	1 NTU
Chloride	EPA 300.0	<20%	±20%	0.1 mg/L
Sulfate	EPA 300.0	<20%	±20%	0.1 mg/L
Alkalinity	SM 2320B	<20%	±20%	1 mg/L
Total Persulfate Nitrogen	SM 4500-NO3 B	<20%	±20%	25 ug/L
Ammonia Nitrogen	SM 4500-NH3 H	<20%	±20%	10 ug/L
Nitrate & Nitrite Nitrogen	SM 4500-NO3 I	<20%	±20%	10 ug/L
Orthophosphate	SM 4500-P G	<20%	±20%	3 ug/L
Total Phosphorus	SM 4500-P F	<20%	±20%	5 ug/L
Trace Metals	See Table 3	<15%	±10%	See Table 3
Calcium, Magnesium, Potassium, Sodium	See Table 3	<15%	±10%	See Table 3
Hardness	SM 2340B	<15%	±10%	See Table 3
Field Measurements				
Water	EAP033	N/A	N/A	0.01°C
Specific Conductivity	EAP033	N/A	N/A	0.1 uS/cm
pH	EAP033	N/A	N/A	0.05 s.u.
Dissolved Oxygen	EAP033	N/A	N/A	0.01 mg/L

RSD: relative standard deviation

SM: standard method

EPA: U.S. Environmental Protection Agency

EAP: Ecology's Environmental Assessment Program

N/A: not applicable

Table 3. Trace metal analysis methods and reporting limits.

Element	Method	Water (ug/L)		Sediment (mg/Kg)
		Dissolved	Total Recoverable	
Arsenic	EPA 200.8	0.1	0.1	0.1
Cadmium	EPA 200.8	0.02	0.1	0.1
Chromium	EPA 200.8	0.25	0.5	0.5
Copper	EPA 200.8	0.1	0.1	0.1
Lead	EPA 200.8	0.02	0.1	0.1
Nickel	EPA 200.8	0.1	0.1	0.1
Selenium	EPA 200.8	0.5	0.5	0.5
Silver	EPA 200.8	0.02	0.1	0.1
Zinc	EPA 200.8	1	5	5
Mercury	EPA 245.7/EPA 245.5	N/A	0.05	0.005
Iron	EPA 200.7	20	N/A	N/A
Aluminum	EPA 200.7	20	N/A	N/A
Calcium	EPA 200.7	50	N/A	N/A
Magnesium	EPA 200.7	50	N/A	N/A
Potassium	EPA 200.7	500	N/A	N/A
Sodium	EPA 200.7	50	N/A	N/A

Results

All data collected during the 2008-2010 *Goosmus Creek Ambient Monitoring Study* are arranged by site, date, and matrix and are presented in the following appendices:

- Appendix A describes the sample locations.
- Appendix B contains field measurements.
- Appendix C lists laboratory data provided by MEL.

All data in Appendices A, B, and C are available from Ecology's Environmental Information Management (EIM) database located at www.ecy.wa.gov/eim/. Results may be accessed by searching EIM using the User Study ID jros0001 or the Study Name *Goosmus Creek Ambient Monitoring at the U.S./Canada Border*.

MEL performed all laboratory analyses within specified holding times using appropriate quality assurance measures, unless noted with qualifier codes (Table 4). Qualifiers place specific conditions on the laboratory data. Descriptions of the data qualifiers relevant to this study are listed in Table 4.

Table 4. Data qualifier codes.

Qualifier	Definition
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
U	The analyte was not detected at or above the reported sample quantitation limit.

Data reported with qualifiers should be used with caution, and data variability must be taken into consideration when interpreting results and applying data to other analyses. Although there are no significant problems with the data, variability associated with qualifiers should be considered when using the data. All other data reported by MEL may be used without qualification (Ross, 2010).

Applicable water quality criteria are listed for selenium in Appendix C, Table C-1. Criteria for arsenic, cadmium, chromium, copper, lead, nickel, silver, and zinc are listed in Table C-2. Hardness-based calculations were made using the spreadsheet [tsdcalcOct11.xlsm found here](#). Ammonia toxicity is pH-based. Because ammonia was not detected above reporting limits in any sample collected, ammonia criteria were not included in Table C-3. All chloride results listed in Table C-3 are well below (> two orders of magnitude) the chronic criteria of 230 mg/L.

Data Quality

Ecology calibrated all field monitoring equipment according to manufacturers' specifications and pre-calibrated and post-checked Hydrolab® meters with certified standards.

Ecology took replicate field samples for laboratory parameter analyses. Field replicates are two samples collected from the same location at the same time. Ecology collects field replicates to check the precision of the entire process of sampling and analysis. The percentage of replicates taken per parameter can be seen in Table 5. Both the frequency of field replicates and precision of the replicated samples met criteria with the exception of potassium (Ross, 2010).

Table 5. Field replicate summary showing relative percent difference (RPD) and relative standard deviation (RSD) statistics.

Parameter	Number of Samples	Number of Replicates	% Replicated	Average RPD	Average RSD
Alkalinity	12	2	16%	2.71%	1.92%
Aluminum	12	2	16%	8.34%	5.90%
Ammonia	12	2	16%	0.00%	0.00%
Arsenic	23	4	17%	9.00%	6.37%
Cadmium	23	4	17%	0.00%	0.00%
Calcium	12	2	16%	0.58%	0.41%
Chloride	12	2	16%	1.93%	1.37%
Chromium	25	4	16%	1.95%	1.38%
Copper	25	4	16%	5.21%	3.69%
Iron	12	2	16%	0.00%	0.00%
Lead	24	4	16%	0.00%	0.00%
Magnesium	12	3	25%	1.08%	0.76%
Mercury	11	2	18%	4.76%	3.37%
Nickel	24	5	20%	10.98%	7.76%
Nitrate-Nitrite	12	3	25%	3.59%	2.54%
Orthophosphate	11	2	18%	3.03%	2.14%
Potassium	12	3	25%	55.78%	39.44%
Selenium	25	4	16%	2.48%	1.75%
Silver	25	4	16%	0.00%	0.00%
Sodium	12	2	16%	1.04%	0.74%
Sulfate	12	3	25%	0.10%	0.07%
Total Dissolved Solids	11	2	18%	6.86%	4.85%
Total Persulfate Nitrogen	12	2	16%	7.17%	5.07%
Total Phosphorus	11	2	18%	10.93%	7.73%
Total Suspended Solids	10	2	20%	0.00%	0.00%
Turbidity	12	3	25%	11.82%	8.36%
Zinc	24	5	20.83%	13.33%	9.43%

Discussion/Conclusions

Ecology attempted to contact Huakan to inquire about daily activities at the mine and efforts undertaken for “care and maintenance”. These attempts did not yield any useful information.

Although no flow measurements were taken, Goosmus Creek appeared to maintain the same stage height throughout the critical period. Typically this is the time when flows begin to decline. It is possible that the mine operators are continuously dewatering the mine pit as part of their maintenance practices. Dewatering is the removal of groundwater that has infiltrated underground mine workings and has seeped into the pit. This water is then pumped out and discharged into Goosmus Creek. Elevated conductivity readings collected on the creek also support this idea as groundwater tends to have higher conductivities due to higher concentrations of dissolved minerals. The site on Little Goosmus Creek did not show these characteristics. The water cycle for that system is typical of similar streams in eastern Washington. All samples from both streams met all applicable water quality criteria during this study.

The stable flow suggests that there was activity upstream of the sampling location. However, to appropriately evaluate the impact of the Lexington-Grenoble Mine operation on Goosmus Creek, additional sampling will need to be done if the mine becomes active. The baseline data presented in this report should be useful for comparison with future data sets collected on the creek.

Recommendations

Results of this 2008-2010 study support the following recommendations:

- Continue to attempt contacting Huakan to determine current activities and intentions for the Lexington-Grenoble Mine.
- Re-sample Goosmus Creek if mining operations commence.
- Collect flow measurements on Goosmus Creek to determine stream discharge.

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Appendices

Appendix A. Sample Locations

Table A-1. Sampling locations.

Location ID	Location Name	Latitude	Longitude
60NFGC02.9	Goosmus Creek below Lone Star Pit	48.99793	-118.61
60SFGC04.8	Little Goosmus Creek at Forest Service Rd. 2114	48.97158	-118.634

Appendix B. Field Measurements

Table B-1. Field measurements.

Location	Date	Time	DO mg/L	pH	Cond uS/CM	Temp degC
60NFGC02.9	8/25/2008	13:45	9.97	7.54	509	9.11
60NFGC02.9	9/23/2008	12:34	10.94	8.12	542	6.58
60NFGC02.9	10/28/2008	12:50	12.04	8.04	549.1	4.16
60NFGC02.9	7/13/2009	13:00	10.26	8.26	401.9	8.57
60NFGC02.9	8/26/2009	12:15	9.68	8.23	473	9.83
60NFGC02.9	10/13/2009	11:00	11.46	8.18	502.7	3.15
60NFGC02.9	6/15/2010	12:35	10.7	8.11	515	9.23
60NFGC02.9	7/14/2010	12:50	10.24	8.21	506	9.13
60SFGC04.8	9/23/2008	10:50	10.77	7.54	194	5.38
60SFGC04.8	10/28/2008	11:30	12.66	7.67	184.8	2.28
60SFGC04.8	7/13/2009	11:15	9.75	7.77	151.5	9.18
60SFGC04.8	10/13/2009	9:55	11.58	7.55	195.5	1.19

DO: Dissolved oxygen

Cond: Conductivity

Temp: Temperature

Appendix C. Laboratory Data

Table C-1. Laboratory data for total recoverable metals.

Location	Date	Parameter	Result	Unit of Meas.	Qualifier	Acute Criteria	Chronic Criteria
60NFGC02.9	8/25/2008	Arsenic	1.27	ug/L			
60NFGC02.9	8/25/2008	Cadmium	0.1	ug/L	U		
60NFGC02.9	8/25/2008	Chromium	3.6	ug/L			
60NFGC02.9	8/25/2008	Copper	7.03	ug/L			
60NFGC02.9	8/25/2008	Lead	0.16	ug/L			
60NFGC02.9	8/25/2008	Mercury	0.003	ug/L			
60NFGC02.9	8/25/2008	Nickel	4.05	ug/L			
60NFGC02.9	8/25/2008	Selenium	1.2	ug/L		20	5
60NFGC02.9	8/25/2008	Silver	0.1	ug/L	U		
60NFGC02.9	8/25/2008	Zinc	5	ug/L	U		
60NFGC02.9	9/23/2008	Arsenic	1.14	ug/L			
60NFGC02.9	9/23/2008	Cadmium	0.1	ug/L	U		
60NFGC02.9	9/23/2008	Chromium	2.4	ug/L			
60NFGC02.9	9/23/2008	Copper	1.73	ug/L			
60NFGC02.9	9/23/2008	Lead	0.1	ug/L	U		
60NFGC02.9	9/23/2008	Mercury	0.002	ug/L	U		
60NFGC02.9	9/23/2008	Nickel	0.98	ug/L			
60NFGC02.9	9/23/2008	Selenium	1.1	ug/L		20	5
60NFGC02.9	9/23/2008	Silver	0.1	ug/L	U		
60NFGC02.9	9/23/2008	Zinc	5	ug/L	U		
60NFGC02.9	10/28/2008	Arsenic	1.32	ug/L			
60NFGC02.9	10/28/2008	Cadmium	0.1	ug/L	U		
60NFGC02.9	10/28/2008	Chromium	2.6	ug/L			
60NFGC02.9	10/28/2008	Copper	1.41	ug/L			
60NFGC02.9	10/28/2008	Lead	0.1	ug/L	U		
60NFGC02.9	10/28/2008	Mercury	0.002	ug/L	U		
60NFGC02.9	10/28/2008	Nickel	1.26	ug/L			
60NFGC02.9	10/28/2008	Selenium	1.3	ug/L		20	5
60NFGC02.9	10/28/2008	Silver	0.1	ug/L	U		
60NFGC02.9	10/28/2008	Zinc	5	ug/L	U		
60NFGC02.9	7/13/2009	Arsenic	1.2	ug/L			
60NFGC02.9	7/13/2009	Cadmium	0.1	ug/L	U		
60NFGC02.9	7/13/2009	Chromium	2.13	ug/L			
60NFGC02.9	7/13/2009	Copper	3.42	ug/L			
60NFGC02.9	7/13/2009	Lead	0.1	ug/L	U		

Location	Date	Parameter	Result	Unit of Meas.	Qualifier	Acute Criteria	Chronic Criteria
60NFGC02.9	7/13/2009	Mercury	0.002	ug/L	U		
60NFGC02.9	7/13/2009	Nickel	2.48	ug/L			
60NFGC02.9	7/13/2009	Selenium	0.7	ug/L		20	5
60NFGC02.9	7/13/2009	Silver	0.1	ug/L	U		
60NFGC02.9	7/13/2009	Zinc	5	ug/L	U		
60NFGC02.9	10/13/2009	Arsenic	1.23	ug/L			
60NFGC02.9	10/13/2009	Cadmium	0.1	ug/L	U		
60NFGC02.9	10/13/2009	Chromium	3.13	ug/L			
60NFGC02.9	10/13/2009	Copper	1.68	ug/L			
60NFGC02.9	10/13/2009	Lead	0.1	ug/L	U		
60NFGC02.9	10/13/2009	Mercury	0.002	ug/L	U		
60NFGC02.9	10/13/2009	Nickel	1.04	ug/L			
60NFGC02.9	10/13/2009	Selenium	0.92	ug/L		20	5
60NFGC02.9	10/13/2009	Silver	0.1	ug/L	U		
60NFGC02.9	10/13/2009	Zinc	5	ug/L	U		
60NFGC02.9	6/15/2010	Arsenic	0.97	ug/L			
60NFGC02.9	6/15/2010	Cadmium	0.02	ug/L	J		
60NFGC02.9	6/15/2010	Chromium	1.99	ug/L			
60NFGC02.9	6/15/2010	Copper	3.78	ug/L			
60NFGC02.9	6/15/2010	Lead	0.11	ug/L			
60NFGC02.9	6/15/2010	Mercury	0.002	ug/L	U		
60NFGC02.9	6/15/2010	Nickel	2.56	ug/L			
60NFGC02.9	6/15/2010	Selenium	0.76	ug/L		20	5
60NFGC02.9	6/15/2010	Silver	0.1	ug/L	U		
60NFGC02.9	6/15/2010	Zinc	1.6	ug/L	J		
60NFGC02.9	7/14/2010	Arsenic	0.74	ug/L			
60NFGC02.9	7/14/2010	Cadmium	0.1	ug/L	U		
60NFGC02.9	7/14/2010	Chromium	1.09	ug/L			
60NFGC02.9	7/14/2010	Copper	1.71	ug/L			
60NFGC02.9	7/14/2010	Lead	0.1	ug/L	U		
60NFGC02.9	7/14/2010	Mercury	0.002	ug/L	U		
60NFGC02.9	7/14/2010	Nickel	0.8	ug/L			
60NFGC02.9	7/14/2010	Selenium	0.67	ug/L		20	5
60NFGC02.9	7/14/2010	Silver	0.1	ug/L	U		
60NFGC02.9	7/14/2010	Zinc	5	ug/L	U		
60SFGC04.8	9/23/2008	Arsenic	0.26	ug/L			
60SFGC04.8	9/23/2008	Cadmium	0.1	ug/L	U		
60SFGC04.8	9/23/2008	Chromium	0.5	ug/L	U		
60SFGC04.8	9/23/2008	Copper	0.64	ug/L			
60SFGC04.8	9/23/2008	Lead	0.1	ug/L	U		

Location	Date	Parameter	Result	Unit of Meas.	Qualifier	Acute Criteria	Chronic Criteria
60SFGC04.8	9/23/2008	Mercury	0.002	ug/L	U		
60SFGC04.8	9/23/2008	Nickel	0.13	ug/L			
60SFGC04.8	9/23/2008	Ortho-Phosphate	0.007	mg/L			
60SFGC04.8	9/23/2008	Selenium	0.5	ug/L	U	20	5
60SFGC04.8	9/23/2008	Silver	0.1	ug/L	U		
60SFGC04.8	9/23/2008	Total Persulfate Nitrogen	0.05	mg/L			
60SFGC04.8	9/23/2008	Total Phosphorus	0.007	mg/L			
60SFGC04.8	9/23/2008	Zinc	5	ug/L	U		
60SFGC04.8	7/13/2009	Arsenic	0.33	ug/L			
60SFGC04.8	7/13/2009	Cadmium	0.1	ug/L	U		
60SFGC04.8	7/13/2009	Chromium	0.5	ug/L	U		
60SFGC04.8	7/13/2009	Copper	1.05	ug/L			
60SFGC04.8	7/13/2009	Lead	0.1	ug/L	U		
60SFGC04.8	7/13/2009	Mercury	0.002	ug/L	U		
60SFGC04.8	7/13/2009	Nickel	0.48	ug/L			
60SFGC04.8	7/13/2009	Ortho-Phosphate	0.012	mg/L			
60SFGC04.8	7/13/2009	Selenium	0.5	ug/L	U	20	5
60SFGC04.8	7/13/2009	Silver	0.1	ug/L	U		
60SFGC04.8	7/13/2009	Total Persulfate Nitrogen	0.058	mg/L			
60SFGC04.8	7/13/2009	Total Phosphorus	0.016	mg/L			
60SFGC04.8	7/13/2009	Zinc	5	ug/L	U		
60SFGC04.8	10/28/2008	Chromium	0.5	ug/L	U		
60SFGC04.8	10/28/2008	Copper	0.1	ug/L	U		
60SFGC04.8	10/28/2008	Silver	0.1	ug/L	U		
60SFGC04.8	10/28/2008	Total Persulfate Nitrogen	0.041	mg/L			
60SFGC04.8	10/28/2008	Selenium	0.5	ug/L	U	20	5
60SFGC04.8	10/28/2008	Nickel	0.1	ug/L	U		
60SFGC04.8	10/28/2008	Mercury	0.002	ug/L	U		
60SFGC04.8	10/28/2008	Zinc	5	ug/L	U		
60SFGC04.8	10/28/2008	Lead	0.1	ug/L	U		

Table C-2. Laboratory data for dissolved metals.

Location	Date	Parameter	Result	Unit of Meas.	Qualifier	Acute Criteria	Chronic Criteria
60NFGC02.9	8/25/2008	Aluminum	0.065	mg/L	J		
60NFGC02.9	8/25/2008	Arsenic	1.36	ug/L		360	190
60NFGC02.9	8/25/2008	Cadmium	0.02	ug/L	U	10.09	2.04
60NFGC02.9	8/25/2008	Calcium	51.6	mg/L			
60NFGC02.9	8/25/2008	Chromium	2.84	ug/L		1171	380
60NFGC02.9	8/25/2008	Copper	1.4	ug/L		40.71	25.04
60NFGC02.9	8/25/2008	Iron	0.05	mg/L	U		
60NFGC02.9	8/25/2008	Lead	0.02	ug/L	U	174.1	6.78
60NFGC02.9	8/25/2008	Magnesium	30	mg/L			
60NFGC02.9	8/25/2008	Nickel	1.15	ug/L		3098	344
60NFGC02.9	8/25/2008	Potassium	2.8	mg/L			
60NFGC02.9	8/25/2008	Selenium	1.66	ug/L			
60NFGC02.9	8/25/2008	Silver	0.02	ug/L	U	16.96	
60NFGC02.9	8/25/2008	Sodium	3.48	mg/L			
60NFGC02.9	8/25/2008	Zinc	3.2	ug/L		250.8	229
60NFGC02.9	9/23/2008	Aluminum	0.095	mg/L	J		
60NFGC02.9	9/23/2008	Arsenic	1.33	ug/L		360	190
60NFGC02.9	9/23/2008	Cadmium	0.02	ug/L	U	11.25	2.20
60NFGC02.9	9/23/2008	Calcium	53.7	mg/L			
60NFGC02.9	9/23/2008	Chromium	2.63	ug/L		1272	412.5
60NFGC02.9	9/23/2008	Copper	1.17	ug/L		44.75	27.28
60NFGC02.9	9/23/2008	Iron	0.05	mg/L	U		
60NFGC02.9	9/23/2008	Lead	0.02	ug/L	U	193.4	7.54
60NFGC02.9	9/23/2008	Magnesium	35.2	mg/L			
60NFGC02.9	9/23/2008	Nickel	0.73	ug/L		3372	374.5
60NFGC02.9	9/23/2008	Potassium	2.8	mg/L			
60NFGC02.9	9/23/2008	Selenium	1.39	ug/L			
60NFGC02.9	9/23/2008	Silver	0.02	ug/L	U	20.15	
60NFGC02.9	9/23/2008	Sodium	4.18	mg/L			
60NFGC02.9	9/23/2008	Zinc	1	ug/L	U	273	249
60NFGC02.9	10/28/2008	Aluminum	0.053	mg/L	J		
60NFGC02.9	10/28/2008	Arsenic	1.43	ug/L		360	190
60NFGC02.9	10/28/2008	Cadmium	0.02	ug/L	U	11.88	2.28
60NFGC02.9	10/28/2008	Calcium	58.2	mg/L			
60NFGC02.9	10/28/2008	Chromium	3.49	ug/L		1326	430
60NFGC02.9	10/28/2008	Copper	1.03	ug/L		46.94	28.49
60NFGC02.9	10/28/2008	Iron	0.05	mg/L	U		
60NFGC02.9	10/28/2008	Lead	0.02	ug/L	U	203.9	7.95
60NFGC02.9	10/28/2008	Magnesium	36	mg/L			

Location	Date	Parameter	Result	Unit of Meas.	Qualifier	Acute Criteria	Chronic Criteria
60NFGC02.9	10/28/2008	Nickel	1.02	ug/L		3520	391
60NFGC02.9	10/28/2008	Potassium	2.73	mg/L			
60NFGC02.9	10/28/2008	Selenium	1.6	ug/L			
60NFGC02.9	10/28/2008	Silver	0.02	ug/L	U	21.99	
60NFGC02.9	10/28/2008	Sodium	4.16	mg/L			
60NFGC02.9	10/28/2008	Zinc	1.5	ug/L		285	260
60NFGC02.9	7/13/2009	Aluminum	0.05	mg/L	U		
60NFGC02.9	7/13/2009	Arsenic	1.16	ug/L		360	190
60NFGC02.9	7/13/2009	Cadmium	0.02	ug/L	U	8.41	1.80
60NFGC02.9	7/13/2009	Calcium	45.4	mg/L			
60NFGC02.9	7/13/2009	Chromium	2.47	ug/L		1021	331.2
60NFGC02.9	7/13/2009	Copper	1.76	ug/L		34.76	21.7
60NFGC02.9	7/13/2009	Iron	0.05	mg/L	U		
60NFGC02.9	7/13/2009	Lead	0.021	ug/L		145.9	5.68
60NFGC02.9	7/13/2009	Magnesium	24.3	mg/L			
60NFGC02.9	7/13/2009	Nickel	1.36	ug/L		2688	298.5
60NFGC02.9	7/13/2009	Potassium	2.29	mg/L			
60NFGC02.9	7/13/2009	Selenium	1.14	ug/L	J		
60NFGC02.9	7/13/2009	Silver	0.02	ug/L	U	12.71	
60NFGC02.9	7/13/2009	Sodium	2.95	mg/L			
60NFGC02.9	7/13/2009	Zinc	9.2	ug/L		218	199
60NFGC02.9	10/13/2009	Aluminum	0.05	mg/L	U		
60NFGC02.9	10/13/2009	Arsenic	1.51	ug/L		360	190
60NFGC02.9	10/13/2009	Cadmium	0.02	ug/L	U	12.49	2.36
60NFGC02.9	10/13/2009	Calcium	56.2	mg/L			
60NFGC02.9	10/13/2009	Chromium	3.93	ug/L		1377	446.7
60NFGC02.9	10/13/2009	Copper	1.16	ug/L		49.04	29.64
60NFGC02.9	10/13/2009	Iron	0.05	mg/L	U		
60NFGC02.9	10/13/2009	Lead	0.02	ug/L	U	214	8.34
60NFGC02.9	10/13/2009	Magnesium	40.6	mg/L			
60NFGC02.9	10/13/2009	Nickel	0.73	ug/L		3661	406.6
60NFGC02.9	10/13/2009	Potassium	2.53	mg/L			
60NFGC02.9	10/13/2009	Selenium	1.24	ug/L			
60NFGC02.9	10/13/2009	Silver	0.02	ug/L	U	23.82	
60NFGC02.9	10/13/2009	Sodium	3.98	mg/L			
60NFGC02.9	10/13/2009	Zinc	1	ug/L	U	296.5	270.7
60NFGC02.9	6/15/2010	Aluminum	0.05	mg/L	U		
60NFGC02.9	6/15/2010	Arsenic	1.01	ug/L		360	190
60NFGC02.9	6/15/2010	Cadmium	0.02	ug/L	U	3.83	1.06
60NFGC02.9	6/15/2010	Calcium	40.9	mg/L			

Location	Date	Parameter	Result	Unit of Meas.	Qualifier	Acute Criteria	Chronic Criteria
60NFGC02.9	6/15/2010	Chromium	1.55	ug/L		562.9	182.6
60NFGC02.9	6/15/2010	Copper	1.33	ug/L		17.52	11.66
60NFGC02.9	6/15/2010	Iron	0.004	mg/L	J		
60NFGC02.9	6/15/2010	Lead	0.011	ug/L	J	66.8	2.6
60NFGC02.9	6/15/2010	Magnesium	0.25	mg/L			
60NFGC02.9	6/15/2010	Nickel	0.75	ug/L		1453	161.4
60NFGC02.9	6/15/2010	Potassium	2.27	mg/L			
60NFGC02.9	6/15/2010	Selenium	0.99	ug/L			
60NFGC02.9	6/15/2010	Silver	0.012	ug/L	J	3.64	
60NFGC02.9	6/15/2010	Sodium	3.02	mg/L			
60NFGC02.9	6/15/2010	Zinc	1.8	ug/L		117.5	107.3
60NFGC02.9	7/14/2010	Aluminum	0.05	mg/L	U		
60NFGC02.9	7/14/2010	Arsenic	1.05	ug/L		360	190
60NFGC02.9	7/14/2010	Cadmium	0.02	ug/L	U	8.25	1.78
60NFGC02.9	7/14/2010	Calcium	46.3	mg/L			
60NFGC02.9	7/14/2010	Chromium	1.41	ug/L		1005.6	326.2
60NFGC02.9	7/14/2010	Copper	1.03	ug/L		34.16	21.35
60NFGC02.9	7/14/2010	Iron	0.05	mg/L	U		
60NFGC02.9	7/14/2010	Lead	0.02	ug/L	U	143	5.57
60NFGC02.9	7/14/2010	Magnesium	22.8	mg/L			
60NFGC02.9	7/14/2010	Nickel	0.35	ug/L		2646	293.9
60NFGC02.9	7/14/2010	Potassium	2.51	mg/L			
60NFGC02.9	7/14/2010	Selenium	1.08	ug/L	U		
60NFGC02.9	7/14/2010	Silver	0.02	ug/L	U	12.31	
60NFGC02.9	7/14/2010	Sodium	3.07	mg/L			
60NFGC02.9	7/14/2010	Zinc	1.2	ug/L		214.2	195.6
60SFGC04.8	9/23/2008	Aluminum	0.055	mg/L	J		
60SFGC04.8	9/23/2008	Arsenic	0.28	ug/L		360	190
60SFGC04.8	9/23/2008	Cadmium	0.02	ug/L	U	3.03	0.90
60SFGC04.8	9/23/2008	Calcium	25.6	mg/L			
60SFGC04.8	9/23/2008	Chromium	0.25	ug/L	U	471.4	152.9
60SFGC04.8	9/23/2008	Copper	0.48	ug/L		14.29	9.69
60SFGC04.8	9/23/2008	Iron	0.05	mg/L	U		
60SFGC04.8	9/23/2008	Lead	0.02	ug/L	U	52.74	2.06
60SFGC04.8	9/23/2008	Magnesium	4.65	mg/L			
60SFGC04.8	9/23/2008	Nickel	0.1	ug/L	U	1209.9	134.4
60SFGC04.8	9/23/2008	Potassium	2	mg/L			
60SFGC04.8	9/23/2008	Selenium	0.5	ug/L	U		
60SFGC04.8	9/23/2008	Silver	0.02	ug/L	U	2.51	
60SFGC04.8	9/23/2008	Sodium	4.87	mg/L			

Location	Date	Parameter	Result	Unit of Meas.	Qualifier	Acute Criteria	Chronic Criteria
60SFGC04.8	9/23/2008	Zinc	1	ug/L	U	97.8	89.3
60SFGC04.8	7/13/2009	Aluminum	0.05	mg/L	U		
60SFGC04.8	7/13/2009	Arsenic	0.27	ug/L		360	190
60SFGC04.8	7/13/2009	Cadmium	0.02	ug/L	U	2.61	0.81
60SFGC04.8	7/13/2009	Calcium	23.1	mg/L			
60SFGC04.8	7/13/2009	Chromium	0.46	ug/L		421.1	136.6
60SFGC04.8	7/13/2009	Copper	0.76	ug/L		12.55	8.61
60SFGC04.8	7/13/2009	Iron	0.05	mg/L	U		
60SFGC04.8	7/13/2009	Lead	0.02	ug/L	U	45.35	1.77
60SFGC04.8	7/13/2009	Magnesium	3.57	mg/L			
60SFGC04.8	7/13/2009	Nickel	0.35	ug/L		1077	119.6
60SFGC04.8	7/13/2009	Potassium	1.84	mg/L			
60SFGC04.8	7/13/2009	Selenium	0.5	ug/L	U		
60SFGC04.8	7/13/2009	Silver	0.02	ug/L	U	1.98	
60SFGC04.8	7/13/2009	Sodium	3.49	mg/L			
60SFGC04.8	7/13/2009	Zinc	1	ug/L	U	87.03	79.47

Table C-3. Laboratory data for nutrients and general chemistry parameters.

Location	Date	Time	Matrix	Parameter	Result	Unit of Meas.	Data Qualifier
60NFGC02.9	8/25/2008	13:50:00	Water	Ammonia	0.01	mg/L	U
60NFGC02.9	8/25/2008	13:50:00	Water	Chloride	1.19	mg/L	
60NFGC02.9	8/25/2008	13:50:00	Water	Nitrite-Nitrate	2.42	mg/L	
60NFGC02.9	8/25/2008	13:50:00	Water	Ortho-Phosphate	0.017	mg/L	
60NFGC02.9	8/25/2008	13:50:00	Water	Sulfate	52	mg/L	
60NFGC02.9	8/25/2008	13:50:00	Water	Total Dissolved Solids	324	mg/L	
60NFGC02.9	8/25/2008	13:50:00	Water	Total Persulfate Nitrogen	2.57	mg/L	
60NFGC02.9	8/25/2008	13:50:00	Water	Total Phosphorus	0.041	mg/L	
60NFGC02.9	8/25/2008	13:50:00	Water	Total Suspended Solids	4	mg/L	
60NFGC02.9	8/25/2008	13:50:00	Water	Turbidity	4.4	NTU	
60NFGC02.9	9/23/2008	12:34:00	Water	Alkalinity, Total	234	mg/L	J
60NFGC02.9	9/23/2008	12:34:00	Water	Ammonia	0.01	mg/L	U
60NFGC02.9	9/23/2008	12:34:00	Water	Chloride	1.26	mg/L	
60NFGC02.9	9/23/2008	12:34:00	Water	Nitrite-Nitrate	4.16	mg/L	
60NFGC02.9	9/23/2008	12:34:00	Water	Ortho-Phosphate	0.01	mg/L	
60NFGC02.9	9/23/2008	12:34:00	Water	Sulfate	58.8	mg/L	
60NFGC02.9	9/23/2008	12:34:00	Water	Total Dissolved Solids	349	mg/L	
60NFGC02.9	9/23/2008	12:34:00	Water	Total Persulfate Nitrogen	4.15	mg/L	
60NFGC02.9	9/23/2008	12:34:00	Water	Total Phosphorus	0.012	mg/L	
60NFGC02.9	9/23/2008	12:34:00	Water	Total Suspended Solids	1	mg/L	
60NFGC02.9	9/23/2008	12:34:00	Water	Turbidity	0.5	NTU	
60NFGC02.9	10/28/2008	12:50:00	Water	Alkalinity, Total	5	mg/L	U
60NFGC02.9	10/28/2008	12:50:00	Water	Ammonia	0.01	mg/L	U
60NFGC02.9	10/28/2008	12:50:00	Water	Chloride	1.4	mg/L	
60NFGC02.9	10/28/2008	12:50:00	Water	Nitrite-Nitrate	5.2	mg/L	
60NFGC02.9	10/28/2008	12:50:00	Water	Ortho-Phosphate	0.0071	mg/L	
60NFGC02.9	10/28/2008	12:50:00	Water	Sulfate	59.3	mg/L	
60NFGC02.9	10/28/2008	12:50:00	Water	Total Dissolved Solids	370	mg/L	
60NFGC02.9	10/28/2008	12:50:00	Water	Total Persulfate Nitrogen	5.32	mg/L	
60NFGC02.9	10/28/2008	12:50:00	Water	Total Phosphorus	0.0086	mg/L	
60NFGC02.9	10/28/2008	12:50:00	Water	Total Suspended Solids	2	mg/L	
60NFGC02.9	10/28/2008	12:50:00	Water	Turbidity	0.8	NTU	
60NFGC02.9	7/13/2009	13:00:00	Water	Alkalinity, Total	185	mg/L	
60NFGC02.9	7/13/2009	13:00:00	Water	Ammonia	0.01	mg/L	U
60NFGC02.9	7/13/2009	13:00:00	Water	Chloride	1	mg/L	
60NFGC02.9	7/13/2009	13:00:00	Water	Nitrate-Nitrite as N	0.823	mg/L	
60NFGC02.9	7/13/2009	13:00:00	Water	Ortho-Phosphate	0.0161	mg/L	
60NFGC02.9	7/13/2009	13:00:00	Water	Sulfate	37.3	mg/L	
60NFGC02.9	7/13/2009	13:00:00	Water	Total Dissolved Solids	264	mg/L	

Location	Date	Time	Matrix	Parameter	Result	Unit of Meas.	Data Qualifier
60NFGC02.9	7/13/2009	13:00:00	Water	Total Persulfate Nitrogen	0.885	mg/L	
60NFGC02.9	7/13/2009	13:00:00	Water	Total Phosphorus	0.0223	mg/L	
60NFGC02.9	7/13/2009	13:00:00	Water	Total Suspended Solids	6	mg/L	
60NFGC02.9	7/13/2009	13:00:00	Water	Turbidity	2.4	NTU	
60NFGC02.9	10/13/2009	11:00:00	Water	Alkalinity, Total	236	mg/L	
60NFGC02.9	10/13/2009	11:00:00	Water	Ammonia	0.01	mg/L	U
60NFGC02.9	10/13/2009	11:00:00	Water	Chloride	1.22	mg/L	
60NFGC02.9	10/13/2009	11:00:00	Water	Nitrate-Nitrite as N	1.17	mg/L	
60NFGC02.9	10/13/2009	11:00:00	Water	Ortho-Phosphate	0.0107	mg/L	
60NFGC02.9	10/13/2009	11:00:00	Water	Sulfate	47.6	mg/L	
60NFGC02.9	10/13/2009	11:00:00	Water	Total Dissolved Solids	318	mg/L	
60NFGC02.9	10/13/2009	11:00:00	Water	Total Persulfate Nitrogen	1.2	mg/L	
60NFGC02.9	10/13/2009	11:00:00	Water	Total Phosphorus	0.0125	mg/L	
60NFGC02.9	10/13/2009	11:00:00	Water	Total Suspended Solids	1	mg/L	U
60NFGC02.9	10/13/2009	11:00:00	Water	Turbidity	0.5	NTU	U
60NFGC02.9	6/15/2010	12:35:00	Water	Alkalinity, Total	155	mg/L	
60NFGC02.9	6/15/2010	12:35:00	Water	Ammonia	0.01	mg/L	U
60NFGC02.9	6/15/2010	12:35:00	Water	Chloride	0.96	mg/L	
60NFGC02.9	6/15/2010	12:35:00	Water	Nitrate-Nitrite as N	0.287	mg/L	
60NFGC02.9	6/15/2010	12:35:00	Water	Ortho-Phosphate	0.0131	mg/L	
60NFGC02.9	6/15/2010	12:35:00	Water	Sulfate	31.9	mg/L	
60NFGC02.9	6/15/2010	12:35:00	Water	Total Dissolved Solids	218	mg/L	
60NFGC02.9	6/15/2010	12:35:00	Water	Total Persulfate Nitrogen	0.357	mg/L	
60NFGC02.9	6/15/2010	12:35:00	Water	Total Phosphorus	0.025	mg/L	
60NFGC02.9	6/15/2010	12:35:00	Water	Total Suspended Solids	12	mg/L	J
60NFGC02.9	6/15/2010	12:35:00	Water	Turbidity	4.6	NTU	
60NFGC02.9	7/14/2010	12:50:00	Water	Alkalinity, Total	180	mg/L	
60NFGC02.9	7/14/2010	12:50:00	Water	Ammonia	0.01	mg/L	U
60NFGC02.9	7/14/2010	12:50:00	Water	Chloride	0.93	mg/L	
60NFGC02.9	7/14/2010	12:50:00	Water	Nitrate-Nitrite as N	0.291	mg/L	
60NFGC02.9	7/14/2010	12:50:00	Water	Ortho-Phosphate	0.0105	mg/L	
60NFGC02.9	7/14/2010	12:50:00	Water	Sulfate	38.1	mg/L	
60NFGC02.9	7/14/2010	12:50:00	Water	Total Dissolved Solids	256	mg/L	
60NFGC02.9	7/14/2010	12:50:00	Water	Total Persulfate Nitrogen	0.315	mg/L	
60NFGC02.9	7/14/2010	12:50:00	Water	Total Phosphorus	0.0091	mg/L	
60NFGC02.9	7/14/2010	12:50:00	Water	Total Suspended Solids	1	mg/L	
60NFGC02.9	7/14/2010	12:50:00	Water	Turbidity	0.5	NTU	U
60SFGC04.8	9/23/2008	10:50:00	Water	Alkalinity, Total	89.1	mg/L	J
60SFGC04.8	9/23/2008	10:50:00	Water	Ammonia	0.01	mg/L	U
60SFGC04.8	9/23/2008	10:50:00	Water	Chloride	0.73	mg/L	

Location	Date	Time	Matrix	Parameter	Result	Unit of Meas.	Data Qualifier
60SFGC04.8	9/23/2008	10:50:00	Water	Nitrite-Nitrate	0.01	mg/L	U
60SFGC04.8	9/23/2008	10:50:00	Water	Ortho-Phosphate	0.0067	mg/L	
60SFGC04.8	9/23/2008	10:50:00	Water	Sulfate	12.2	mg/L	
60SFGC04.8	9/23/2008	10:50:00	Water	Total Dissolved Solids	107	mg/L	
60SFGC04.8	9/23/2008	10:50:00	Water	Total Persulfate Nitrogen	0.05	mg/L	
60SFGC04.8	9/23/2008	10:50:00	Water	Total Phosphorus	0.0073	mg/L	
60SFGC04.8	9/23/2008	10:50:00	Water	Total Suspended Solids	1	mg/L	
60SFGC04.8	9/23/2008	10:50:00	Water	Turbidity	7.8	NTU	
60SFGC04.8	7/13/2009	11:15:00	Water	Alkalinity, Total	69.6	mg/L	
60SFGC04.8	7/13/2009	11:15:00	Water	Ammonia	0.01	mg/L	U
60SFGC04.8	7/13/2009	11:15:00	Water	Chloride	0.3	mg/L	
60SFGC04.8	7/13/2009	11:15:00	Water	Nitrate-Nitrite as N	0.01	mg/L	U
60SFGC04.8	7/13/2009	11:15:00	Water	Ortho-Phosphate	0.012	mg/L	
60SFGC04.8	7/13/2009	11:15:00	Water	Sulfate	8.87	mg/L	
60SFGC04.8	7/13/2009	11:15:00	Water	Total Dissolved Solids	117	mg/L	
60SFGC04.8	7/13/2009	11:15:00	Water	Total Persulfate Nitrogen	0.058	mg/L	
60SFGC04.8	7/13/2009	11:15:00	Water	Total Phosphorus	0.0161	mg/L	
60SFGC04.8	7/13/2009	11:15:00	Water	Total Suspended Solids	2	mg/L	
60SFGC04.8	7/13/2009	11:15:00	Water	Turbidity	1.2	NTU	

Table C-4. Laboratory data for sediment samples.

Location	Date	Time	Matrix	Sample Fraction	Parameter	Result	Unit of Meas.
60NFGC02.9	8/25/2008	13:50:00	Solid/Sediment	Soil	Arsenic	11	mg/Kg
60NFGC02.9	8/25/2008	13:50:00	Solid/Sediment	Soil	Cadmium	0.31	mg/Kg
60NFGC02.9	8/25/2008	13:50:00	Solid/Sediment	Soil	Chromium	154	mg/Kg
60NFGC02.9	8/25/2008	13:50:00	Solid/Sediment	Soil	Copper	239	mg/Kg
60NFGC02.9	8/25/2008	13:50:00	Solid/Sediment	Soil	Lead	18	mg/Kg
60NFGC02.9	8/25/2008	13:50:00	Solid/Sediment	Soil	Mercury	0.0057	mg/Kg
60NFGC02.9	8/25/2008	13:50:00	Solid/Sediment	Soil	Nickel	186	mg/Kg
60NFGC02.9	8/25/2008	13:50:00	Solid/Sediment	Soil	Selenium	0.65	mg/Kg
60NFGC02.9	8/25/2008	13:50:00	Solid/Sediment	Soil	Silver	0.14	mg/Kg
60NFGC02.9	8/25/2008	13:50:00	Solid/Sediment	Soil	Zinc	56.4	mg/Kg
60NFGC02.9	10/13/2009	11:00:00	Solid/Sediment	Soil	Arsenic	23.8	mg/Kg
60NFGC02.9	10/13/2009	11:00:00	Solid/Sediment	Soil	Cadmium	0.34	mg/Kg
60NFGC02.9	10/13/2009	11:00:00	Solid/Sediment	Soil	Chromium	166	ug/L
60NFGC02.9	10/13/2009	11:00:00	Solid/Sediment	Soil	Copper	263	mg/Kg
60NFGC02.9	10/13/2009	11:00:00	Solid/Sediment	Soil	Lead	7.76	mg/Kg
60NFGC02.9	10/13/2009	11:00:00	Solid/Sediment	Soil	Mercury	0.0119	mg/Kg
60NFGC02.9	10/13/2009	11:00:00	Solid/Sediment	Soil	Nickel	289	mg/Kg
60NFGC02.9	10/13/2009	11:00:00	Solid/Sediment	Soil	Selenium	1.89	mg/Kg
60NFGC02.9	10/13/2009	11:00:00	Solid/Sediment	Soil	Silver	0.16	mg/Kg
60NFGC02.9	10/13/2009	11:00:00	Solid/Sediment	Soil	Solids	61.1	%
60NFGC02.9	10/13/2009	11:00:00	Solid/Sediment	Soil	Zinc	72.4	mg/Kg
60SFGC04.8	10/28/2008	11:30:00	Solid/Sediment	Soil	Arsenic	3.45	mg/Kg
60SFGC04.8	10/28/2008	11:30:00	Solid/Sediment	Soil	Cadmium	0.26	mg/Kg
60SFGC04.8	10/28/2008	11:30:00	Solid/Sediment	Soil	Chromium	39.1	mg/Kg
60SFGC04.8	10/28/2008	11:30:00	Solid/Sediment	Soil	Copper	18.1	mg/Kg
60SFGC04.8	10/28/2008	11:30:00	Solid/Sediment	Soil	Lead	4.97	mg/Kg
60SFGC04.8	10/28/2008	11:30:00	Solid/Sediment	Soil	Mercury	0.0071	mg/Kg
60SFGC04.8	10/28/2008	11:30:00	Solid/Sediment	Soil	Nickel	27.9	mg/Kg
60SFGC04.8	10/28/2008	11:30:00	Solid/Sediment	Soil	Selenium	0.58	mg/Kg
60SFGC04.8	10/28/2008	11:30:00	Solid/Sediment	Soil	Silver	0.11	mg/Kg
60SFGC04.8	10/28/2008	11:30:00	Solid/Sediment	Soil	Zinc	48.5	mg/Kg
60SFGC04.8	10/13/2009	9:55:00	Solid/Sediment	Soil	Arsenic	4.97	mg/Kg
60SFGC04.8	10/13/2009	9:55:00	Solid/Sediment	Soil	Cadmium	0.98	mg/Kg
60SFGC04.8	10/13/2009	9:55:00	Solid/Sediment	Soil	Chromium	36.9	ug/L
60SFGC04.8	10/13/2009	9:55:00	Solid/Sediment	Soil	Copper	53.3	mg/Kg
60SFGC04.8	10/13/2009	9:55:00	Solid/Sediment	Soil	Lead	7.59	mg/Kg
60SFGC04.8	10/13/2009	9:55:00	Solid/Sediment	Soil	Mercury	0.0736	mg/Kg
60SFGC04.8	10/13/2009	9:55:00	Solid/Sediment	Soil	Nickel	42	mg/Kg
60SFGC04.8	10/13/2009	9:55:00	Solid/Sediment	Soil	Selenium	4.33	mg/Kg

Location	Date	Time	Matrix	Sample Fraction	Parameter	Result	Unit of Meas.
60SFGC04.8	10/13/2009	9:55:00	Solid/Sediment	Soil	Silver	0.37	mg/Kg
60SFGC04.8	10/13/2009	9:55:00	Solid/Sediment	Soil	Solids	15	%
60SFGC04.8	10/13/2009	9:55:00	Solid/Sediment	Soil	Zinc	68.8	mg/Kg

Appendix D. Glossary, Acronyms, and Abbreviations

Glossary

Ambient: Surrounding environmental condition (for example, surrounding air temperature).

Conductivity: A measure of water's ability to conduct an electrical current. Conductivity is related to the concentration and charge of dissolved ions in water.

Dissolved oxygen (DO): A measure of the amount of oxygen dissolved in water.

Effluent: An outflowing of water from a natural body of water or from a man-made structure. For example, the treated outflow from a wastewater treatment plant.

Parameter: Water quality constituent being measured (analyte). A physical, chemical, or biological property whose values determine environmental characteristics or behavior.

pH: A measure of the acidity or alkalinity of water. A low pH value (0 to 7) indicates that an acidic condition is present, while a high pH (7 to 14) indicates a basic or alkaline condition. A pH of 7 is considered to be neutral. Since the pH scale is logarithmic, a water sample with a pH of 8 is ten times more basic than one with a pH of 7.

Acronyms and Abbreviations

DO	(See Glossary above)
EAP	Ecology's Environmental Assessment Program
Ecology	Washington State Department of Ecology
EIM	Environmental Information Management database
EPA	U.S. Environmental Protection Agency
GIS	Geographic Information System software
MEL	Manchester Environmental Laboratory
RPD	Relative percent difference
RSD	Relative standard deviation
SOP	Standard operating procedures

Units of Measurement

°C	degrees centigrade
kg	kilograms, a unit of mass equal to 1,000 grams.
mg/Kg	milligrams per kilogram (parts per million)
mg/L	milligrams per liter (parts per million)
NTU	nephelometric turbidity units
s.u.	standard units