



**Background Water Quality of Lower
Minto Creek for Application in the
Derivation of Post-Closure Water Quality
Objectives**

Report Prepared For:
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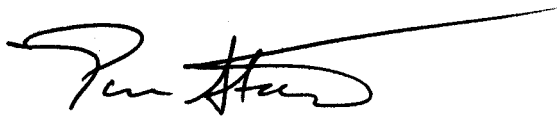
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1.0 INTRODUCTION

1.1 Site Description

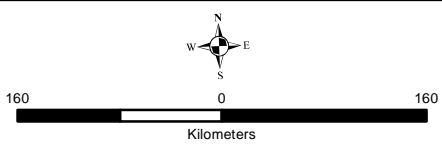
The Minto Mine is a high-grade copper mine located within Selkirk First Nation (SFN) Category A Settlement Land Parcel R-6A approximately 240 km northwest of Whitehorse, Yukon Territory (62°37'N latitude and 137°15'W longitude; Figure 1.1). It is owned and operated by Minto Explorations Ltd., a wholly owned subsidiary of Capstone Mining Corporation. Development of the mine was initiated in 1997, commercial operations started in October 2007 and the currently anticipated operating life is to 2018. The facility is permitted to conduct open pit and underground mining, and includes a mill with a capacity of 4,200 tonnes of ore per day. The Minto Mine produced 16,500 kilo-tonnes of copper in 2015 (average copper grade 1.38%). Mineral reserves as of January 1st 2016 were approximately 5,500 kilo-tonnes at an average copper grade of 1.87%.

In addition to open pit mines, underground mines and the mill, the Minto Mine site includes a number of waste rock dumps, a concentrate storage shed, tailings storage facilities, a water retention dam with a water storage pond, a water treatment plant, administrative offices, an airstrip and a camp (Figure 1.2). Mill tailings are stored in dry stack tailings storage facilities and in mined-out open pits. Mine-impacted seepage from the tailings storage facilities and under the Mill Valley Fill Extension (MVFE) is collected at the Mill Valley Fill Extension Stage 2 Collection Sump and is pumped to the main pit (Figure 1.2). Non-impacted water and treated mine-impacted water are collected in a Water Storage Pond (WSP; Figure 1.2). Effluent from the WSP is periodically discharged to Minto Creek under conditions specified in the Minto Mine's Water Use Licence (WUL) QZ14-031 (August 2015; YWB 2015). Minto Creek, in turn, discharges to the Yukon River approximately 7.7 km south-east of the WSP (Figure 1.2).

The Minto Mine is actively planning for closure, which could potentially occur as soon as late 2018. Conceptually, closure will include three stages: 1) an active closure period; 2) post-closure 1; and 3) post-closure 2. All major reclamation work will be completed during the active closure period. This will include re-contouring, cover placement, re-vegetation, construction of closure water conveyance channels, construction of wetland water treatment systems, and building demolition. Water will be actively managed during the active closure period. Post-closure 1 follows the completion of all major reclamation work and represents the period when the closure measures completed during the active closure period become fully established (e.g., vegetation is established, cover material self-armors, constructed wetlands are established, water flow through closure conveyances is established). Water treatment during post-closure 1 will be both active and passive. Post-closure 2 follows post-closure 1 and final



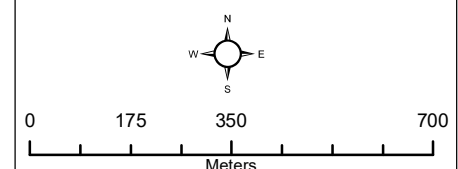
Figure 1.1: Location of the Minto Mine



MAP INFORMATION
 Datum: NAD 83 Map Projection: UTM Zone 8V
 Data Source: Department of Natural Resources Canada
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 Project No. 167202.0062



- Features**
- Final Effluent Discharge Point
 - Waterbody
 - Minto Creek Detention Structure
 - Building
 - Watercourse
 - Mine Road
 - ➔ Water Flow Direction



MAP INFORMATION
 Datum: NAD 83 Map Projection: UTM Zone 8V
 Data Source: National Topographic Data Base (NTDB)
 compiled by Department of Natural Resources Canada
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Mine infrastructure data provided by Access Mining
 Consultants Inc.
 Mine site contours derived from 2012 aerial imagery
 obtained from Challenger Geomatics.

Creation Date: June 2016
 Project No. 167202.0062

**Figure 1.2: Minto Mine Site
 Layout and Receiving
 Environment**



decommissioning (e.g., of the water treatment plant and potentially the camp). It represents the period when all closure measures are fully established, including final water conveyances. Water treatment during post-closure 2 will be by passive treatment only.

1.2 Background

The Minto Mine's WUL includes Water Quality Objectives (WQOs) for lower Minto Creek at water quality monitoring station W2 (Figure 1.3). These WQOs apply during the operational period and are anticipated to also apply during the active closure period and in post-closure 1. A separate set of WQOs will be developed for the post-closure 2 period. The Minto Mine's WUL requires a Reclamation and Closure Plan (RCP) that includes WQOs for post-closure that meet the criteria for non-degradation of background concentrations. Two approaches have been provided in the WUL as guidance to developing closure WQOs (YWB 2015; Clause 112):

- 1) Establish closure WQOs that meet the criteria for non-degradation of background concentrations in Minto and McGinty creeks; and
- 2) If non-degradation of water quality is not achievable, the closure WQOs shall be set at no more than 50% of the assimilative capacity of Minto Creek using the following formula:

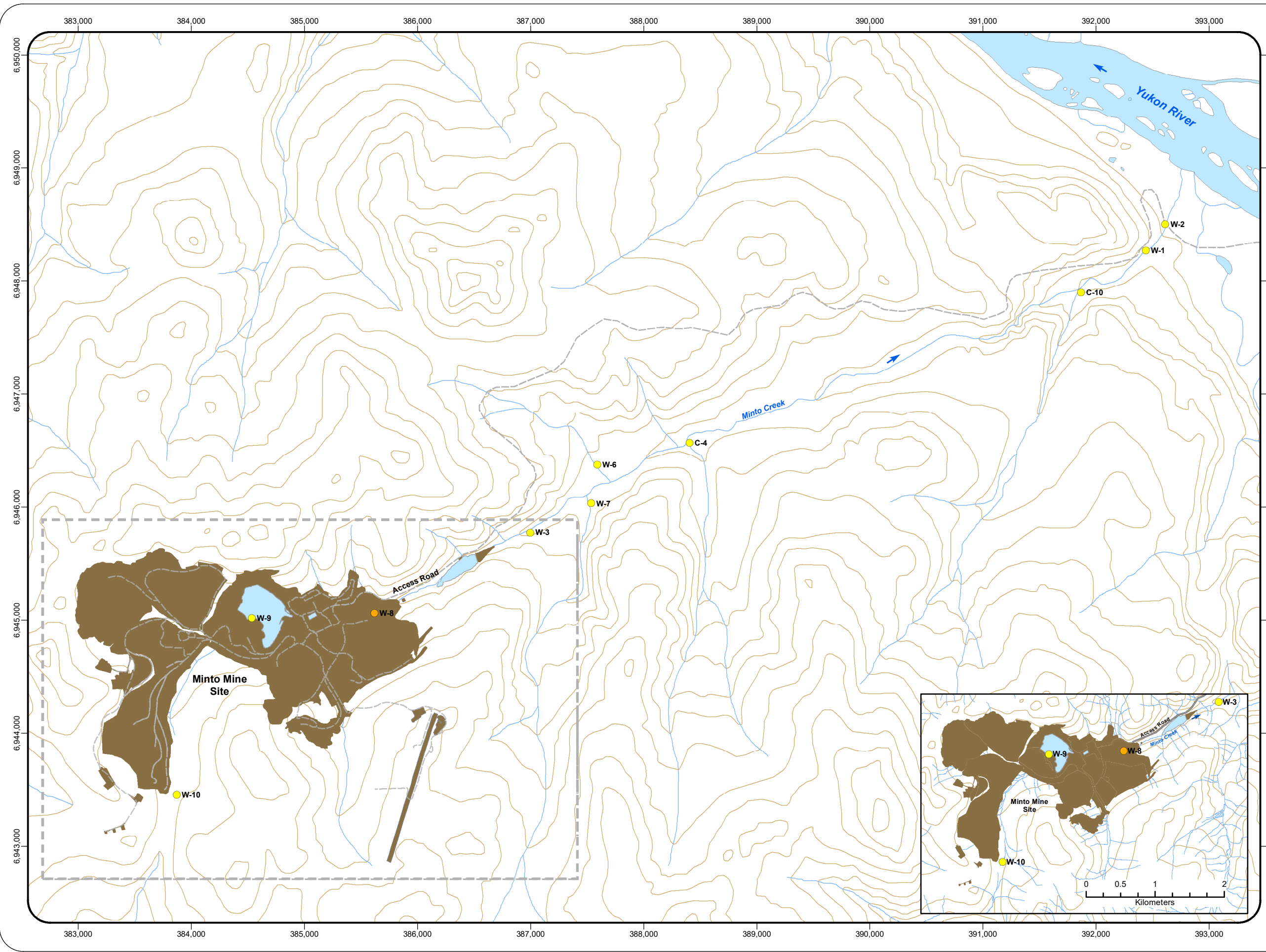
$$\text{Closure WQO} = \text{BKGD} + (0.5 * [\text{WQO}_{\text{Operations}} - \text{BKGD}])$$

where: *BKGD* = background concentration.

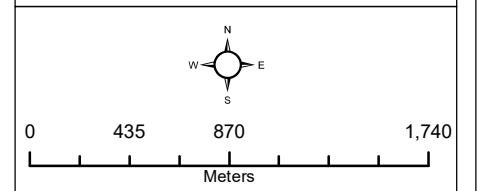
Both approaches for the development of closure WQOs require a clearly-defined background water quality condition.

1.3 Objective

The objective of this report is to define the background water quality data set to be used to develop background water quality for lower Minto Creek and to determine background summary statistics for key analytes to be used in calculating the post-closure WQOs. This document outlines the approach used in considering what data points should be included to define background water quality. This document incorporates the outcomes of discussions among the Minto Mine, SFN, and technical consultants (Appendix A). These discussions covered a number of factors critical to the definition of background water quality, including representative sampling stations, contaminants of potential concern (COPCs), dealing with less than method detection limit (MDL) results, dealing with replicate results, identifying outliers, evaluation of possible data groupings, and designation of summary statistics. The



- Features**
- Excluded Water Quality Sampling Station
 - Water Quality Sampling Station
 - Waterbody
 - Mine Footprint (2013)
 - Watercourse
 - - - Mine Road
 - Contour
 - ➔ Water Flow Direction



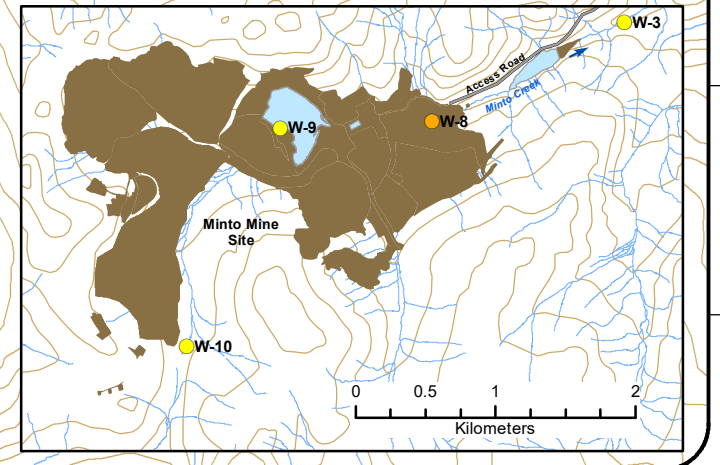
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Mine infrastructure data provided by Access Mining
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 Mine site contours derived from 2012 aerial imagery
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**Figure 1.3: Water Quality
 Sampling Stations,
 2005 - 2013, used to
 Develop Background
 Concentrations**

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background water quality data set is then used to calculate summary statistics for the COPCs for application as WQOs for the post-closure 2 period.

1.4 Report Organization

Section 2.0 provides a detailed overview of data organization and step-wise work-through the process of defining background water quality for the development of post-closure WQOs. Section 3.0 provides the proposed background water quality statistics. All references cited in the report are provided in Section 4.0.

2.0 DATA ORGANIZATION

Raw data from the Minto Mine's water quality database were received on May 31st, 2016. The database contained concentrations of water quality analytes measured throughout the open water season from 2005 to 2013. The database was sorted and organized as described below, to obtain a final water quality data set to be used to calculate the background concentrations of COPCs. For a few sampling dates, it was noted that water quality analyses were incomplete (e.g., incomplete dissolved metals in a multi-element scan). Minto Mine and Access Consulting Group were contacted to inquire about any missing data but older data sets were unavailable as they were collected by The North Air Group (Vancouver, BC).

2.1 Sampling Stations

The database included six sampling stations (W1, W2, W3, W8, W9 and W10) that were sampled during baseline studies in 2005 and were subsequently influenced by the mine (Figure 1.3; Appendix B). The database also included four reference sampling stations, W6 (2005 – 2013), W7 (2005 – 2013), C4 (2012, 2013) and C10 (2012, 2013; Figure 1.3; Appendix B).

Data collected at sampling station W8 were removed from the final background data set because water quality at station W8 was determined to poorly represent water quality at station W2 (lower Minto Creek; the point of WQO application). Data collected at W6 from 2009 to 2011 were not included, as these water quality samples were accidentally collected at the Minto Creek main stem and not at the W6 tributary. These data would not represent background concentrations because the mine was operational from 2009 to 2011.

2.2 Contaminants of Potential Concern

The COPCs considered herein are those identified in the Water Use Licence (WUL; QZ14-031; YWB 2015). These COPCs are ammonia, pH (laboratory and field), nitrite, nitrate and the following dissolved metals; aluminum, arsenic, cadmium, chromium, copper, iron, lead, molybdenum, nickel, selenium, silver and zinc. In addition to the COPCs, several additional analytes are considered herein due to their importance as supporting parameters (e.g., parameters that may affect other WQOs). These include dissolved organic carbon (DOC), total and dissolved hardness, total suspended solids (TSS) and total dissolved solids (TDS).

2.3 Method Detection Limits

Concentrations that were reported as less than MDL and where the associated MDL exceeded the maximum detected concentration were removed from the data set. Such cases (and consequent removals) were observed for dissolved chromium (11% of samples) and dissolved

silver (24% of samples; Table 2.1). The remaining analytes reported as less than method detection limits (MDL) were substituted with half the MDL for calculations of summary statistics.

2.4 Replicate Samples

Some water samples were collected multiple times in one day at a given sampling station. To account for this, the average concentration of the analyte at a given station on the same day was used to represent the concentration for that day. The relative percent difference (RPD) of the minimum and maximum daily concentrations were calculated prior to calculating a daily mean concentration (Table 2.2). If the RPD was greater than 25% they were investigated further (Table 2.2).

Many analytes that had RPD greater than 25% were dissolved metals or TSS. Although there were instances where the RPD was greater than 25%, this is expected in multi-element scans. The investigation indicated no systemic problems (e.g., instances where all analytes had RPD greater than 25%), therefore all data were retained in the estimate of the daily mean. Regardless of RPDs between the minimum and maximum concentrations, the mean of concentrations measured on the same day were considered to best represent the concentration on that day.

2.5 Outliers

Outliers were evaluated based on data distributions for each analyte. The term “outlier” in the context of this report is used to refer to an observation that is unusually small or large relative to the distribution of observations. Outliers were investigated further to determine whether the value was naturally possible or whether the value could have resulted from an analytical error. The background data distributions for all analytes were non-normally distributed. Outliers were therefore identified using a non-parametric rule (the lower outer fence and upper outer fence) that is frequently used to identify outliers on boxplots (Dawson 2011).

$$\text{Lower outer fence} = Q1 - 3 (IQR)$$

$$\text{Upper outer fence} = Q3 + 3 (IQR)$$

where: $Q1 = 1^{\text{st}}$ Quartile

$Q3 = 3^{\text{rd}}$ Quartile

$IQR = \text{Interquartile Range } (Q3 - Q1)$

Observations less than the lower outer fence or greater than the upper outer fence were considered outliers. Although the rule is non-parametric, the calculation of the IQR is influenced by data transformations. The outlier evaluation was therefore conducted using untransformed and \log_{10} -transformed concentrations because many distributions of water

Table 2.1: Samples with high Method Detection Limits (MDL) that were removed from the background dataset.

Analyte	Max Value (All Stations)	MDL greater than Max Value	Station	Total Sample Size	Number of samples that exceeded Max Value
Dissolved Chromium	0.0017	0.0020	W7	110	20
Dissolved Silver	0.000060	0.00010	W6	23	1
			W7	110	43

Table 2.2: Relative Percent Difference (RPD) of maximum and minimum values for samples collected at the same sampling stations and date. Highlighted cells had RPD > 25%.

Station	Date	DOC (mg/L)	Dissolved Hardness (mg/L)	Total Hardness (mg/L)	TSS (mg/L)	TDS (mg/L)	Ammonia (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Lab pH (pH Units)	Field pH (pH Units)	Dissolved Aluminum (mg/L)	Dissolved Arsenic (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Chromium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)	Dissolved Lead (mg/L)	Dissolved Molybdenum (mg/L)	Dissolved Nickle (mg/L)	Dissolved Selenium (mg/L)	Dissolved Silver (mg/L)	Dissolved Zinc (mg/L)	
W2	5/27/2005			100	21	138	0.026	0.0015	0.057	8.06		0.016	0.00025	0.000025	0.00050	0.0033	0.16	0.00025	0.00050	0.0015	0.00050	0.000010		
				72	79	80	0.010	0.00050	0.034	8.03		0.011												0.0025
RPD				32%	118%	53%	89%	100%	50%	0%		41%												
W10	5/27/2005			46	1.5	115	0.027	0.00050	0.0094	7.47		0.14	0.00025	0.000025	0.00050	0.018	0.11	0.00025	0.00050	0.0016	0.00050	0.000010	0.0085	
							0.010	0.00050					0.00025	0.000025	0.00050	0.00050	0.015	0.00025	0.00050	0.00050	0.00050	0.000010	0.0025	
RPD							92%	0%				0%	0%	0%	189%	150%	0%	0%	105%	0%	0%	109%		
W7	6/15/2006		100		53	114						0.013	0.00040	0.0000050	0.00025	0.0010	0.090	0.000050	0.0010	0.0010	0.00020		0.00050	
RPD																								
W7	7/26/2006		128		9.0							0.016												
													0.0080	0.00040	0.0000050	0.00025	0.0020	0.10	0.000050	0.00050	0.00210	0.00010		0.00050
RPD																								
W7	8/25/2006		129			180						0.027												
													0.012	0.00040	0.0000050	0.00060	0.0010	0.080	0.000050	0.0010	0.00090	0.00010		0.0030
RPD																								
W7	6/5/2007			108	76	162	0.025	0.025	0.050	7.98														
				120	76	158	0.025	0.050	0.050	7.97														
				111	73	166	0.025	0.025	0.050	7.97														
RPD				11%	4%	5%	0%	67%	0%	0%														
W7	7/18/2007	14.3	128	126	4.0	170	0.025	0.025	0.30	7.72		0.011	0.00050	0.0000050	0.0010	0.0020	0.040	0.000050	0.0010	0.00070	0.00010		0.0060	
				125	7.0	182	0.025	0.025	0.30	7.80														
				125	6.0	184	0.025	0.025	0.30	7.83														
RPD				1%	55%	8%	0%	0%	0%	1%														
W7	8/24/2007						0.025																	
							0.025																	
							0.025																	
				122	4.0	198		0.025	0.20	8.04														
RPD				5%	0%	6%	0%	0%	0%	0%														
W7	10/30/2007			130	3.0	176	0.025	0.14	0.010	7.74														
				128	10	182	0.025	0.14	0.010	7.74														
				130	7.0	166	0.025	0.13	0.010	7.74														
				6.0	172		0.13	0.010	7.68															
RPD				2%	108%	9%	0%	7%	0%	1%														
W7	4/22/2008		186		1.0	264	0.025	0.070	0.010	8.40		0.010	0.00010	0.000040	0.0012	0.00050	0.010	0.000050	0.0016	0.00050	0.00030		0.0010	
			193		1.0	274	0.025	0.040	0.010	8.41		0.010	0.00040	0.000040	0.0014	0.0020	0.070	0.00010	0.0017	0.0020	0.00030		0.0030	
			182		1.0	270	0.025	0.070	0.010	8.40		0.010	0.00030	0.000040	0.00030	0.0010	0.010	0.000050	0.0017	0.00050	0.00030		0.0010	
				1.0	262		0.040	0.010	8.40															
RPD			6%		0%	4%	0%	55%	0%	0%	0%	0%	120%	0%	129%	120%	150%	67%	5%	120%	0%		100%	
W7	6/3/2008			97	1.0	134	0.025	0.040	0.030	8.01														
				96	19	132	0.025	0.040	0.040	8.01														
				101	26	146	0.025	0.040	0.040	8.03														
RPD			92									0.005	0.00010	0.000040	0.0013	0.00050	0.050	0.000050	0.0012	0.0010	0.00030	0.0000050	0.0020	
RPD				5%	185%	10%	0%	0%	29%	0%														

Table 2.2: Relative Percent Difference (RPD) of maximum and minimum values for samples collected at the same sampling stations and date. Highlighted cells had RPD > 25%.

Station	Date	DOC (mg/L)	Dissolved Hardness (mg/L)	Total Hardness (mg/L)	TSS (mg/L)	TDS (mg/L)	Ammonia (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Lab pH (pH Units)	Field pH (pH Units)	Dissolved Aluminum (mg/L)	Dissolved Arsenic (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Chromium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)	Dissolved Lead (mg/L)	Dissolved Molybdenum (mg/L)	Dissolved Nickle (mg/L)	Dissolved Selenium (mg/L)	Dissolved Silver (mg/L)	Dissolved Zinc (mg/L)	
W7	8/6/2008			123	92	162	0.025	0.0050	0.14	7.9														
				123	139	168	0.025	0.0050	0.14	7.9														
				125	85	170		0.0050	0.15	8.0														
	RPD	9.0	123				0.025					0.014	0.00040	0.0000050	0.00060	0.0020	0.070	0.000050	0.0010	0.0010	0.00010	0.000060	0.0060	
W7	10/28/2008				4.0	192	0.025			7.84														
					6.0	188	0.025			7.83														
					7.0	168	0.025			7.85														
	RPD	11	123									0.0090	0.00050	0.0000050	0.00050	0.0010	0.078	0.000050	0.0011	0.0010	0.00030	0.0000050	0.0010	
W7	10/7/2009	6.9	123		7.0	180			0.12	7.87	8.24													
	RPD																							
W7	10/25/2009	8.7	126	141	2.0	130	0.010	0.0025	0.15	8.10	8.23	0.0070	0.00030	0.000040	0.00050	0.0012	0.046	0.00010	0.0010	0.00050	0.00020	0.000010	0.0025	
					2.0	110				8.00														
W7	9/12/2010			105																				
		17	107	102	11	210	0.039	0.0025	0.030	7.98	8.02	0.016	0.00050	0.000050		0.0010	0.23	0.00010	0.0010	0.0020	0.00040		0.0050	
W7	5/6/2012			3%																				
		17	46	45	2.4	80	0.010	0.0025	0.010	6.05		0.030	0.00043	0.000013	0.00050	0.0030	0.43	0.00010	0.00050	0.0011	0.000050	0.000010	0.0025	
		17	46	45	4.2	88	0.011	0.0025	0.010	5.74	7.10	0.044	0.00044	0.000016	0.00050	0.0027	0.46	0.00010	0.00050	0.0012	0.000050	0.000010	0.0025	
RPD	2%	1%	0%	55%	10%	10%	0%	0%	5%		39%	2%	21%	0%	10%	8%	0%	0%	9%	0%	0%	0%		
W7	6/19/2013	11	113	114	11	152	0.052	0.0025	0.14	8.08		0.013	0.00052	0.0000050	0.00050	0.0012	0.29	0.00010	0.0015	0.0013	0.00011	0.000010	0.0025	
		11	114	115	10	164	0.040	0.0025	0.14	8.07	8.60	0.013	0.00051	0.0000050	0.00050	0.0012	0.29	0.00010	0.0016	0.0012	0.00019	0.000010	0.0025	
RPD	7%	1%	1%	10%	8%	26%	0%	1%	0%		7%	2%	0%	0%	7%	2%	0%	6%	8%	53%	0%	0%		
C4	10/18/2013	13	129	142	16	214	0.091	0.0025	0.069	8.18		0.022	0.001060	0.000005	0.00050	0.0011	1.2	0.00010	0.00050	0.0023	0.000050	0.000010	0.0025	
		13	129	139	16	220	0.080	0.0025	0.065	8.24	7.16	0.025	0.001070	0.000005	0.00050	0.0012	1.2	0.00010	0.0012	0.0025	0.000050	0.000010	0.0025	
RPD	2%	0%	2%	0%	3%	13%	0%	6%	1%		12%	1%	0%	0%	5%	1%	0%	82%	8%	0%	0%	0%		
C10	9/8/2013	16	150	163	25	186	0.046	0.0076	0.18	7.94		0.025	0.001660	0.0000050	0.00050	0.0013	1.3	0.00010	0.00050	0.0025	0.000050	0.000010	0.0025	
		16	150	162	22	206	0.055	0.0070	0.19	8.13	8.16	0.024	0.001580	0.000010	0.0017	0.0013	1.3	0.00010	0.00050	0.0025	0.000050	0.000010	0.0025	
RPD	1%	0%	1%	16%	10%	18%	8%	9%	2%		5%	5%	67%	109%	6%	2%	0%	0%	0%	0%	0%	0%		

quality analytes are approximately log-normal. Since pH is reported on the logarithmic scale, the outlier rule was applied to the pH data that were untransformed and anti-logged. Any observations that were identified as potential outliers based on both the untransformed and \log_{10} -transformed scale (Appendix C) were investigated further. When Q3 could not be estimated because it was below the MDL, the upper outer fence was estimated using the following formula:

$$MDL_{Q3} + 3 * MDL_{Q3}$$

where: MDL_{Q3} = the MDL corresponding to the observation at the third quartile

One observation - dissolved arsenic at station C4 on November 17th 2013 (0.0056 mg/L) - was identified as an outlier based on the above rules (Table 2.3). Further investigation of this potential outlier included consideration of potential elevations of other analytes and consideration of analyte ratios (i.e., chemical signature). Hardness, dissolved iron and dissolved manganese were also elevated in this sample. Because the potential outlying value appeared to be naturally possible, was consistent with observations of elevation of other analytes, and there was no unequivocal evidence of unusual ratios of arsenic relative to other analytes (Appendix Table D.1), the concentration of dissolved arsenic at station C4 was retained in the background data set.

2.6 Baseline Investigation

Water samples collected in 2005 before mine operations were considered baseline data. Concentrations of COPCs were plotted using an individual value plot for all sampling stations to determine if concentrations for each station were similar to station W2 and could be used as baseline data to represent station W2 (Figure 2.1). The median and 95th percentile of the background data sets for each analyte were calculated separately for W2 and all sampling stations (including W2) in 2005 (Table 2.4). There appears to be close agreement between the median and 95th percentiles for the two data sets (i.e., W2 and all sampling stations in 2005; Table 2.4). Total hardness differed most among data sets (was greater at station W2), but summary statistics for many analytes did not differ between W2 and all sampling stations (Table 2.4). In general, the distribution of concentrations of COPCs at station W2 was similar to the distribution of concentrations of COPCs from the other sampling stations in 2005, supporting the use of the designated reference water quality data set as representative of station W2.

Table 2.3: Outliers identified and rationale for removing or keeping the data point.

Station	Date	Identified Outlier			
		Analyte	Value	Decision	Rationale
C4	11/17/2013	Dissolved Arsenic (mg/L)	0.0056	Retained	High Hardness, dissolved iron and dissolved manganese in sample.

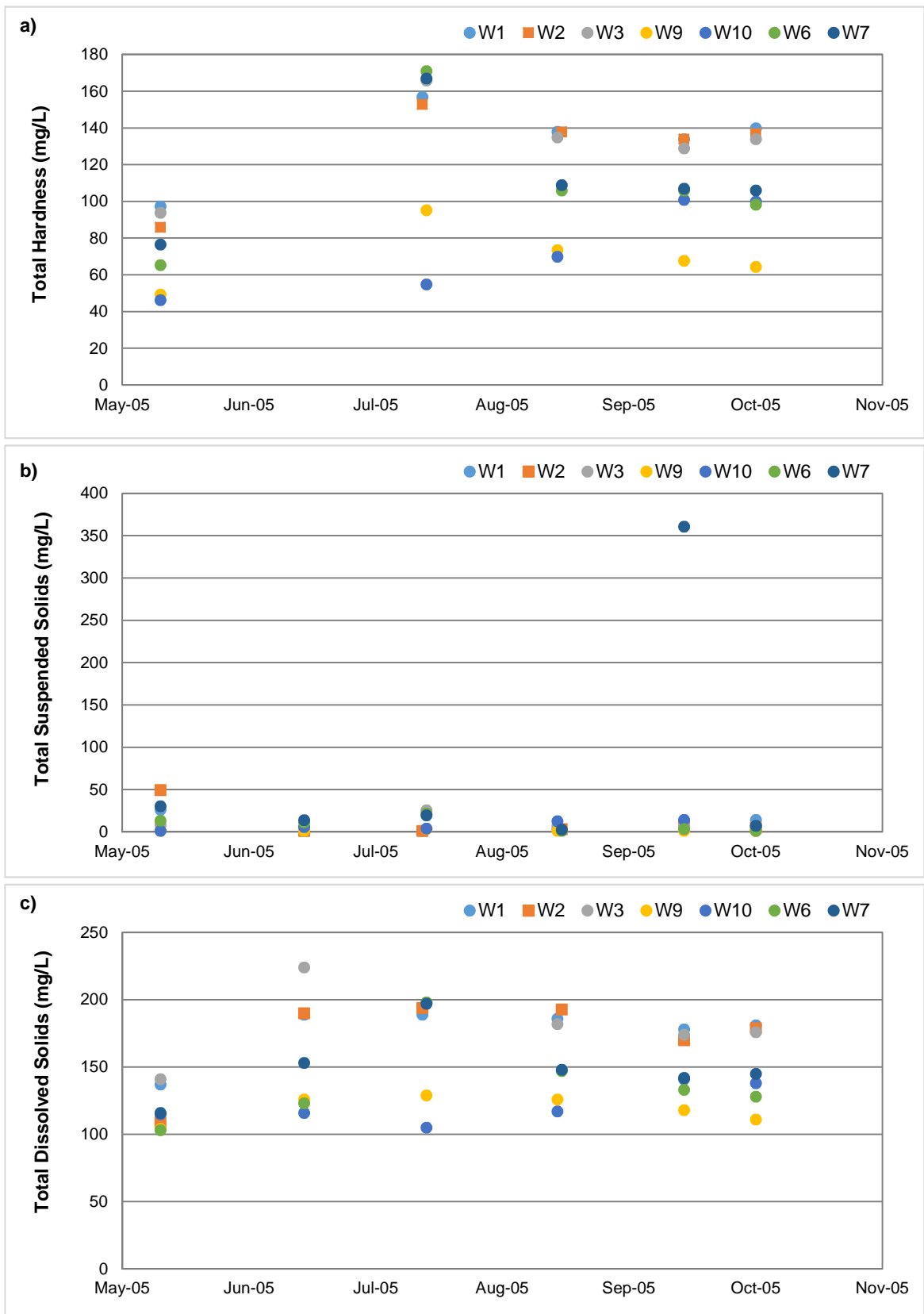


Figure 2.1: Baseline concentrations of contaminants of potential concern, Minto Mine, 2005. Values less than method detection limits were substituted with half of the MDL value.

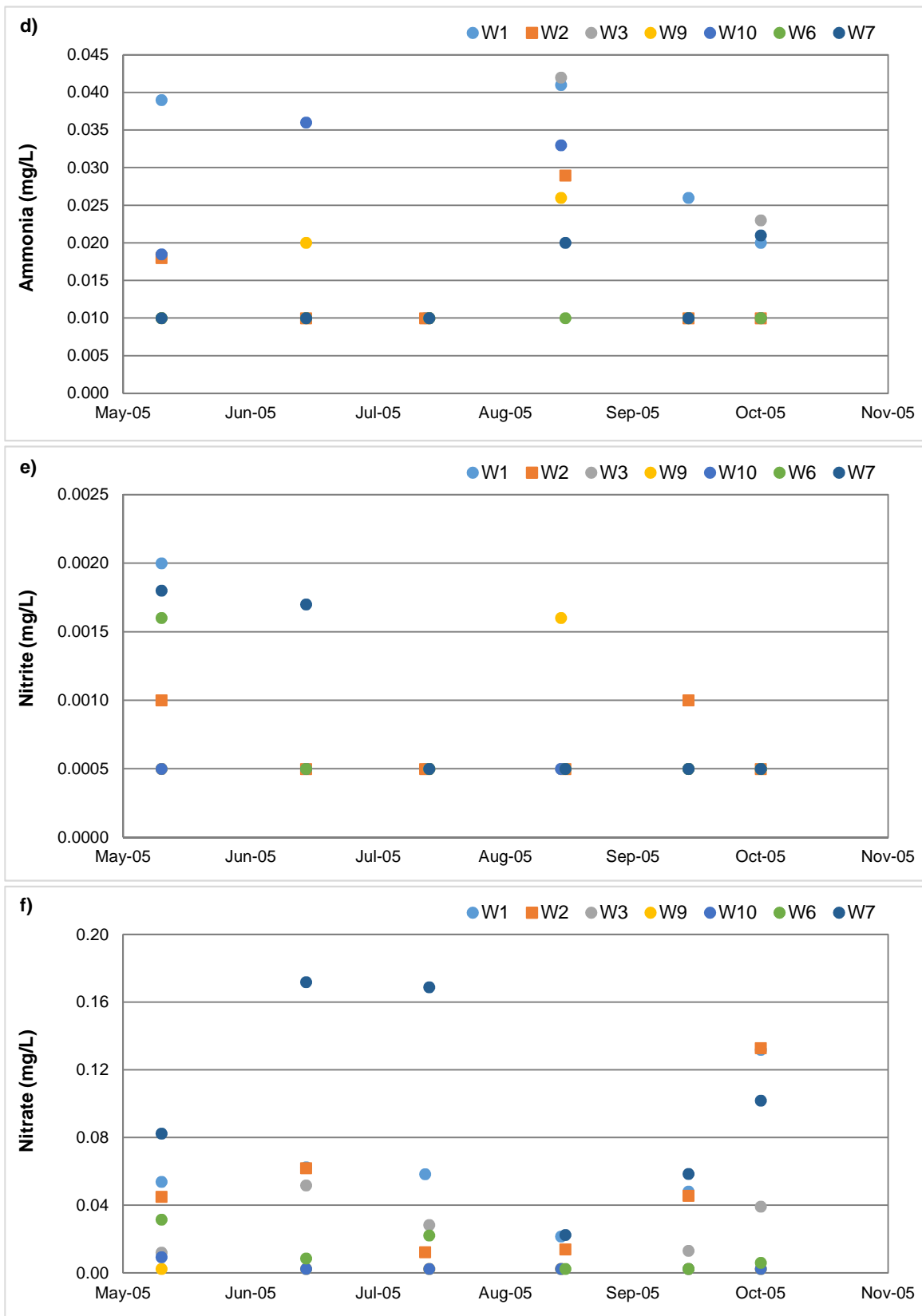


Figure 2.1: Baseline concentrations of contaminants of potential concern, Minto Mine, 2005. Values less than method detection limits were substituted with half of the MDL value.

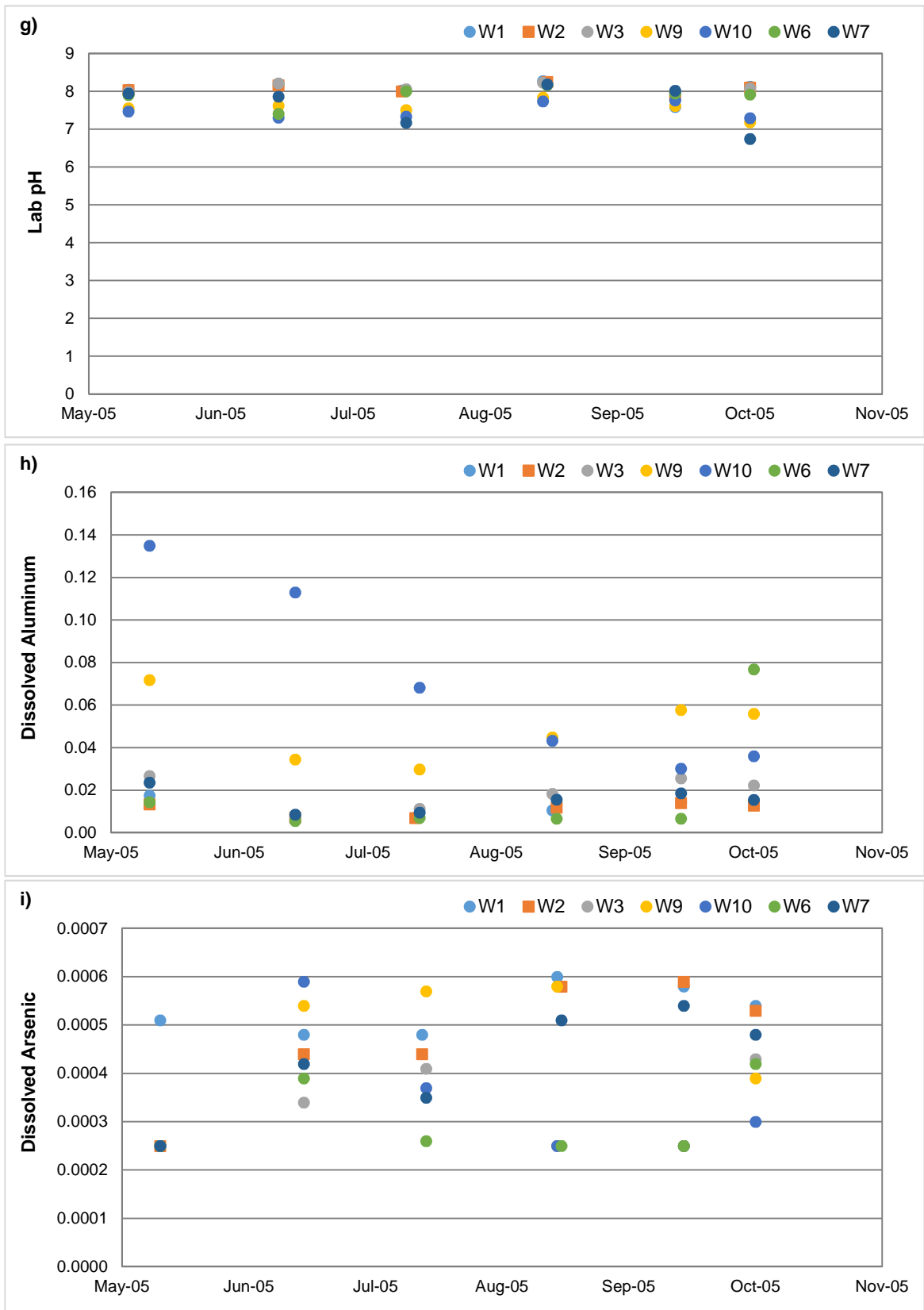


Figure 2.1: Baseline concentrations of contaminants of potential concern, Minto Mine, 2005. Values less than method detection limits were substituted with half of the MDL value.

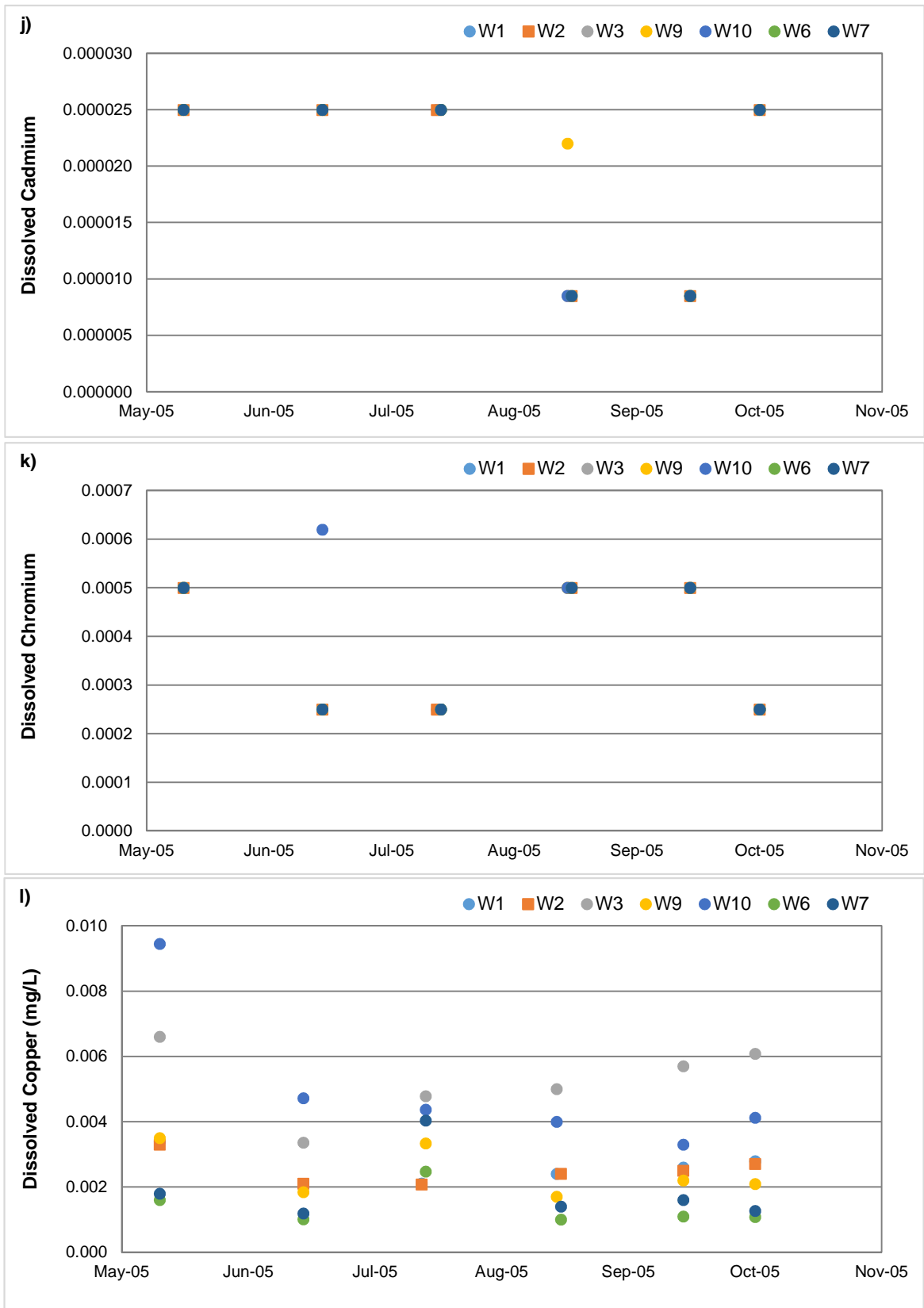


Figure 2.1: Baseline concentrations of contaminants of potential concern, Minto Mine, 2005. Values less than method detection limits were substituted with half of the MDL value.

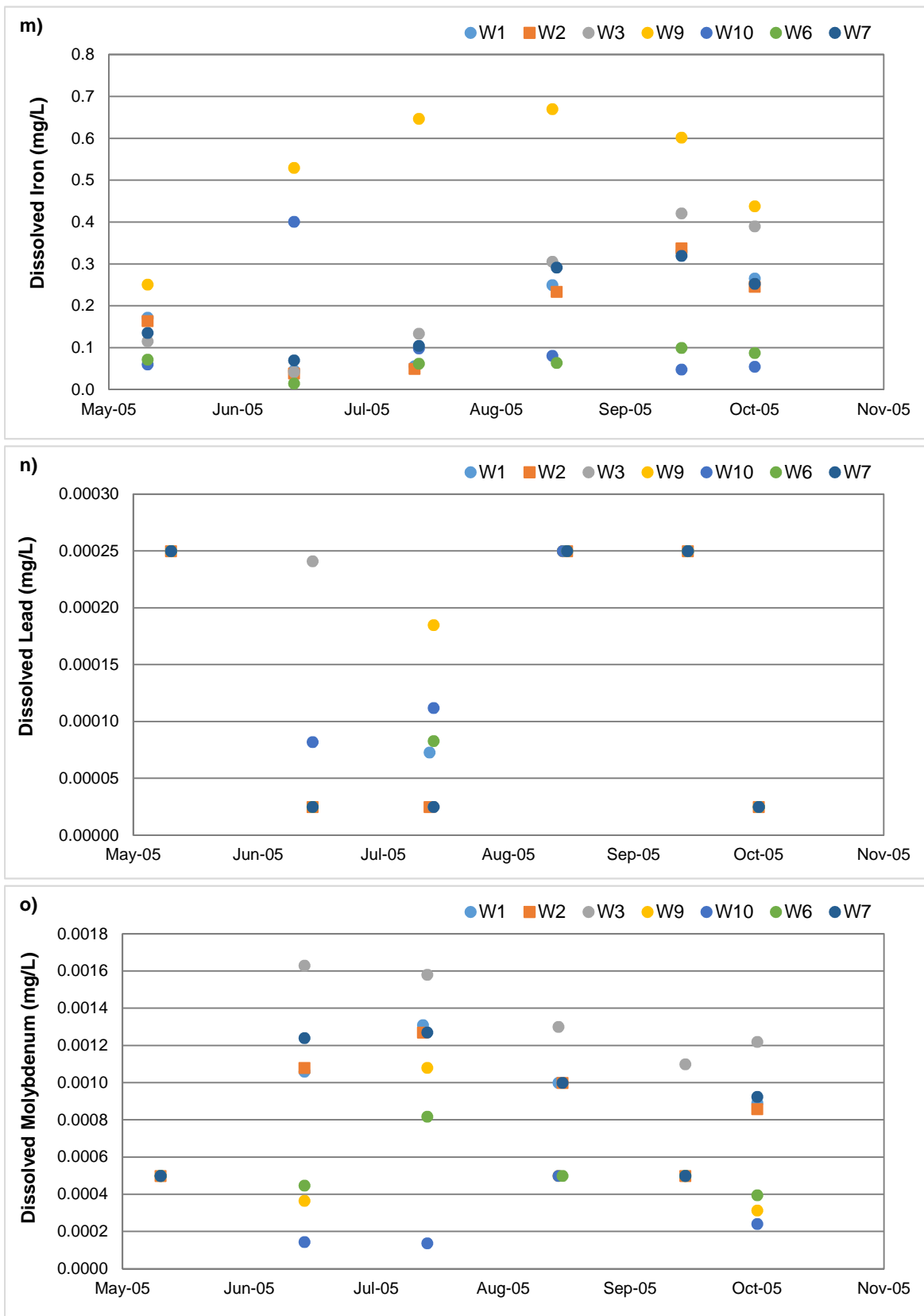


Figure 2.1: Baseline concentrations of contaminants of potential concern, Minto Mine, 2005. Values less than method detection limits were substituted with half of the MDL value.

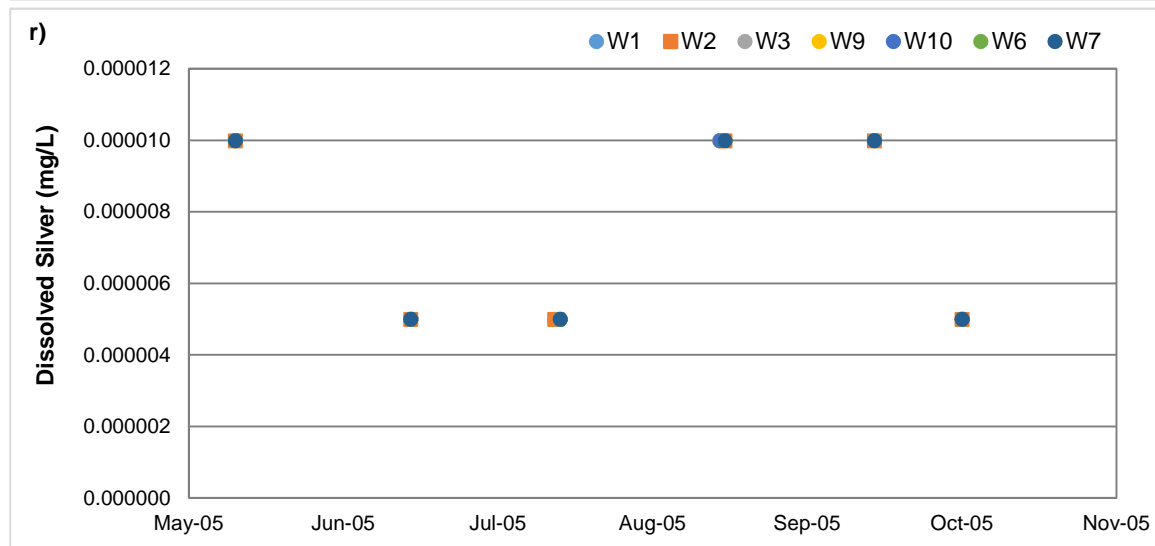
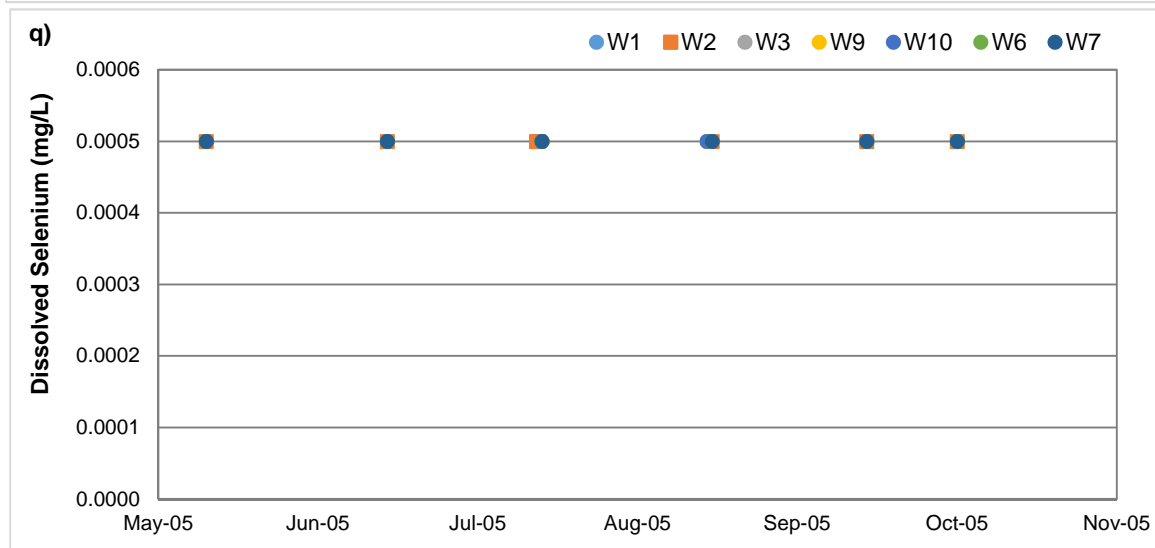
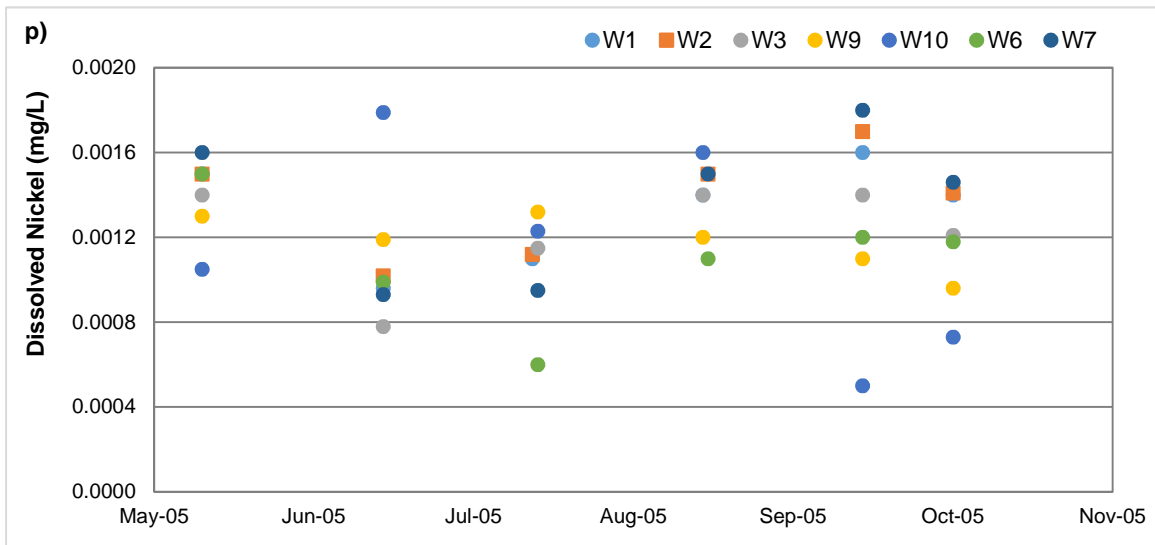


Figure 2.1: Baseline concentrations of contaminants of potential concern, Minto Mine, 2005. Values less than method detection limits were substituted with half of the MDL value.

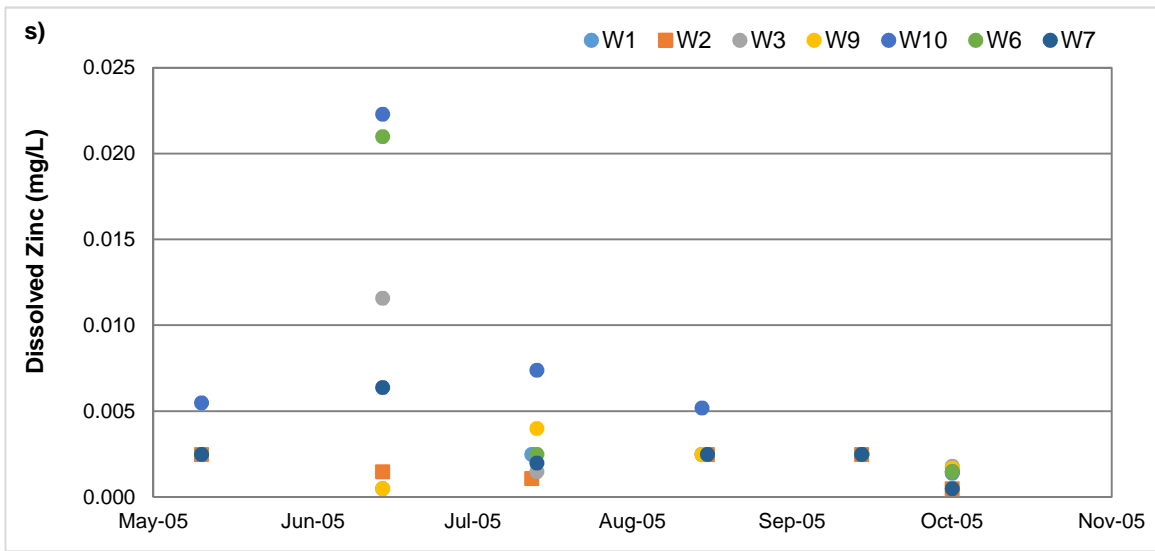


Figure 2.1: Baseline concentrations of contaminants of potential concern, Minto Mine, 2005. Values less than method detection limits were substituted with half of the MDL value.

Table 2.4: Median and 95th Percentile for W2 and All sampling stations (including W2) in 2005.

Analyte	W2			All Sampling Stations		
	Sample Size	Median	95th Percentile	Sample Size	Median	95th Percentile
Total Hardness (mg/L)	5	137	150	35	106	166
TSS (mg/L)	6	4.5	40	42	5.8	30
TDS (mg/L)	6	185	194	42	144	198
Ammonia (mg/L)	6	0.010	0.026	42	0.010	0.039
Nitrite (mg/L)	6	0.00050	0.0010	42	0.00050	0.0017
Nitrate (mg/L)	6	0.046	0.12	42	0.018	0.13
Lab pH (pH Units)	6	8.08	8.24	42	7.95	8.24
Dissolved Aluminum (mg/L)	6	0.012	0.014	42	0.016	0.077
Dissolved Arsenic (mg/L)	6	0.00049	0.00059	42	0.00042	0.00059
Dissolved Cadmium (mg/L)	6	0.000025	0.000025	42	0.000025	0.000025
Dissolved Chromium (mg/L)	6	0.00038	0.00050	42	0.00050	0.00050
Dissolved Copper (mg/L)	6	0.0025	0.0032	42	0.0025	0.0061
Dissolved Iron (mg/L)	6	0.20	0.32	42	0.15	0.60
Dissolved Lead (mg/L)	6	0.00014	0.00025	42	0.00025	0.00025
Dissolved Molybdenum (mg/L)	6	0.0009295	0.0012	42	0.00050	0.0013
Dissolved Nickel (mg/L)	6	0.0015	0.0017	42	0.0012	0.0017
Dissolved Selenium (mg/L)	6	0.00050	0.00050	42	0.00050	0.00050
Dissolved Silver (mg/L)	6	0.0000075	0.000010	42	0.0000075	0.000010
Dissolved Zinc (mg/L)	6	0.0020	0.0025	42	0.0025	0.011

2.7 Data Grouping

Water quality sampling was typically conducted in batches or “sampling campaigns” such that water quality samples were collected from multiple sampling stations on the same day or within a one week period. Samples collected on the same day may not be fully independent of each other, and therefore different methods of grouping the data were explored. Three options were evaluated: Option 1 did not involve any grouping (i.e., all data were used), Option 2 grouped samples by week, and Option 3 grouped samples by month (Table 2.5; Figure 2.2; Appendix Table D.1). Data were combined for Option 2 by calculating the mean from all sampling stations that were collected within a one week period (Table D.2). Data were combined for Option 3 in two steps: 1) by calculating the mean for each individual sampling station by month; and 2) then calculating the mean of the monthly sampling station means (Table D.3).

2.8 Summary Statistics

The designated reference water quality data set, developed as outlined above, was used to calculate summary statistics for each of the three options. For each analyte, the sample size, mean, median and 95th percentile were calculated for all stations combined over time for all three Options (Table 2.6). In addition, annual medians were calculated for each of the three options, and the 95th percentile of those annual medians was calculated (Table 2.7).

Table 2.5: Data grouping decisions for Option 2 and Option 3.

Year	Month	Day	Sampling Station								Option 2	Option 3		
			W1	W2	W3	W9	W10	W6	W7	C4			C10	
2005	May	27	X	X	X	X	X	X	X	-	-	• Average of all sampling stations	-	
	June	30	X	X	X	X	X	X	X	-	-	• Average of all sampling stations	-	
	July	28	X	X	-	-	-	-	-	-	-	-	• Average of all sampling stations from both days	-
		29	-	-	X	X	X	X	X	X	-	-		
	August	29	X	-	X	X	X	-	-	-	-	-	• Average of all sampling stations from both days	-
		30	-	X	-	-	-	X	X	-	-	-		
	September	28	X	X	X	X	X	X	X	X	-	-	• Average of all sampling stations	-
October	15	X	X	X	X	X	X	X	X	-	-	• Average of all sampling stations	-	
2006	June	2	-	-	-	-	-	X	X	-	-	• Average of all sampling stations	• Average of W7 sampling stations • Take average of W7 (averaged value) and W6	
		8	-	-	-	-	-	-	X	-	-	• Use W7 sampling station		
		15	-	-	-	-	-	-	-	X	-	-		• Use W7 sampling station
		23	-	-	-	-	-	-	-	X	-	-		• Use W7 sampling station
		28	-	-	-	-	-	-	-	X	-	-		• Use W7 sampling station
	July	7	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	• Average of W7 sampling stations
		12	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	
		20	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	
		26	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	
	August	2	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	• Average of W7 sampling stations • Take average of W7 (averaged value) and W6
		10	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	
		25	-	-	-	-	-	X	X	-	-	-	• Average of all sampling stations	
		30	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	
	September	6	-	-	-	-	-	X	X	-	-	-	• Average of all sampling stations	• Average of W7 sampling stations • Take average of W7 (averaged value) and W6
		13	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	
		20	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	
28		-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station		
October	4	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	• Average of W7 sampling stations	
	12	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station		
2007	June	5	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	• Average of W7 sampling stations • Take average of W7 (averaged value) and W6	
		20	-	-	-	-	-	X	X	-	-	• Average of all sampling stations		
	July	18	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-	
	August	24	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-	
	September	18	-	-	-	-	-	X	X	-	-	• Average of all sampling stations	-	
October	30	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-	
2008	April	22	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-	
	June	3	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	• Average of W7 sampling stations • Take average of W7 (averaged value) and W6	
		17	-	-	-	-	-	X	X	-	-	• Average of all sampling stations		
	August	6	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-	
	September	18	-	-	-	-	-	X	X	-	-	• Average of all sampling stations	-	
October	28	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-	
2009	April	30	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-	
	June	8	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-	
	July	28	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-	
	August	6	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	• Average of W7 sampling stations
		25	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	
		31	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	
October	7	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	• Average of W7 sampling stations	
	25	-	-	-	-	-	-	-	X	-	-	• Use W7 sampling station		

Table 2.5: Data grouping decisions for Option 2 and Option 3.

Year	Month	Day	Sampling Station								Option 2	Option 3	
			W1	W2	W3	W9	W10	W6	W7	C4			C10
2010	April	19	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	• Average of W7 sampling stations
		27	-	-	-	-	-	-	X	-	-	• Average of W7 sampling stations on both days	
		29	-	-	-	-	-	-	X	-	-		
	May	1	-	-	-	-	-	-	X	-	-	• Average of W7 sampling stations on all four days	• Average of W7 sampling stations
		3	-	-	-	-	-	-	X	-	-		
		5	-	-	-	-	-	-	X	-	-		
		7	-	-	-	-	-	-	X	-	-		
		9	-	-	-	-	-	-	X	-	-	• Average of W7 sampling stations on all four days	
		10	-	-	-	-	-	-	X	-	-		
		12	-	-	-	-	-	-	X	-	-		
		14	-	-	-	-	-	-	X	-	-		
		16	-	-	-	-	-	-	X	-	-	• Average of W7 sampling stations on all four days	
		17	-	-	-	-	-	-	X	-	-		
		19	-	-	-	-	-	-	X	-	-		
		21	-	-	-	-	-	-	X	-	-		
		23	-	-	-	-	-	-	X	-	-	• Average of W7 sampling stations on all four days	
		25	-	-	-	-	-	-	X	-	-		
	27	-	-	-	-	-	-	X	-	-			
	29	-	-	-	-	-	-	X	-	-			
	31	-	-	-	-	-	-	X	-	-	• Average of W7 sampling stations on all four days		
	June	2	-	-	-	-	-	-	X	-		-	
		4	-	-	-	-	-	-	X	-		-	
		6	-	-	-	-	-	-	X	-		-	
		14	-	-	-	-	-	-	X	-		-	
		16	-	-	-	-	-	-	X	-		-	• Average of W7 sampling stations on all four days
		18	-	-	-	-	-	-	X	-		-	
		20	-	-	-	-	-	-	X	-		-	
		22	-	-	-	-	-	-	X	-	-		
24	-	-	-	-	-	-	X	-	-	• Average of W7 sampling stations on all four days			
26	-	-	-	-	-	-	X	-	-				
28	-	-	-	-	-	-	X	-	-				
July	5	-	-	-	-	-	-	X	-		-	• Use W7 sampling station	-
August	5	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-	
September	12	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-	
October	8	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-	
2011	April	27	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-
	May	2	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-
	June	1	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	• Average of W7 sampling stations
		16	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	
	July	1	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-
	August	2	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	• Average of W7 sampling stations
		16	-	-	-	-	-	-	X	-	-	• Average of W7 sampling stations	
	19	-	-	-	-	-	-	X	-	-	• Use W7 sampling station		
	September	12	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-
	October	6	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-
November	22	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-	

Table 2.5: Data grouping decisions for Option 2 and Option 3.

Year	Month	Day	Sampling Station								Option 2	Option 3	
			W1	W2	W3	W9	W10	W6	W7	C4			C10
2012	January	24	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-
	February	25	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-
	March	5	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-
	April	24	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-
	May	6	-	-	-	-	-	-	X	X	-	• Average of all sampling stations from both days	-
		12	-	-	-	-	-	-	-	-	X		
	June	19	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-
	July	17	-	-	-	-	-	X	X	-	-	• Average of all sampling stations	• Average sampling stations separately • Using station averages take average for all days
		30	-	-	-	-	-	X	X	-	X	• Average of all sampling stations	
	August	1	-	-	-	-	-	-	-	X	-	• Average of all sampling stations from all days	• Average sampling stations separately • Using station averages take average for all days
		8	-	-	-	-	-	-	X	X	-		
		9	-	-	-	-	-	X	-	-	-		
		10	-	-	-	-	-	-	-	-	X		
		23	-	-	-	-	-	-	-	X	-		
		25	-	-	-	-	-	X	-	X	-		
	27	-	-	-	-	-	-	-	-	-	X		
September	13	-	-	-	-	-	X	X	-	-	• Average of all sampling stations	-	
October	13	-	-	-	-	-	X	-	-	-	• Average of all sampling stations from both days	-	
	16	-	-	-	-	-	-	X	-	-			
November	2	-	-	-	-	-	-	X	-	-	• Use W7 sampling station • Use W6 sampling station	• Average of all sampling stations from both days	
	12	-	-	-	-	-	X	-	-	-			
December	29	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-	
2013	April	30	-	-	-	-	-	-	X	-	-	• Use W7 sampling station	-
	May	14	-	-	-	-	-	X	X	-	-	• Average of all sampling stations	-
	June	19	-	-	-	-	-	-	X	-	-	• Average of all sampling stations from both days	-
		22	-	-	-	-	-	X	-	X	X		
	July	12	-	-	-	-	-	X	-	-	-	• Average of all sampling stations from both days	• Average of all sampling stations
		13	-	-	-	-	-	-	X	-	-		
		19	-	-	-	-	-	-	-	X	-		
	August	23	-	-	-	-	-	-	-	-	X	• Average of all sampling stations from both days	-
		21	-	-	-	-	-	-	X	-	-		
		22	-	-	-	-	-	X	-	X	X		
	September	6	-	-	-	-	-	X	X	X	-	• Average of all sampling stations from both days	-
		8	-	-	-	-	-	-	-	-	X		
	October	7	-	-	-	-	-	X	-	-	-	• Use W6 sampling station	• Average of all sampling stations
		18	-	-	-	-	-	-	-	X	X		
		21	-	-	-	-	-	-	X	-	-		
November	16	-	-	-	-	-	X	X	-	-	• Average of all sampling stations from both days	-	
	17	-	-	-	-	-	-	-	X	-			
December	7	-	-	-	-	-	X	X	-	-	• Average of all sampling stations	-	

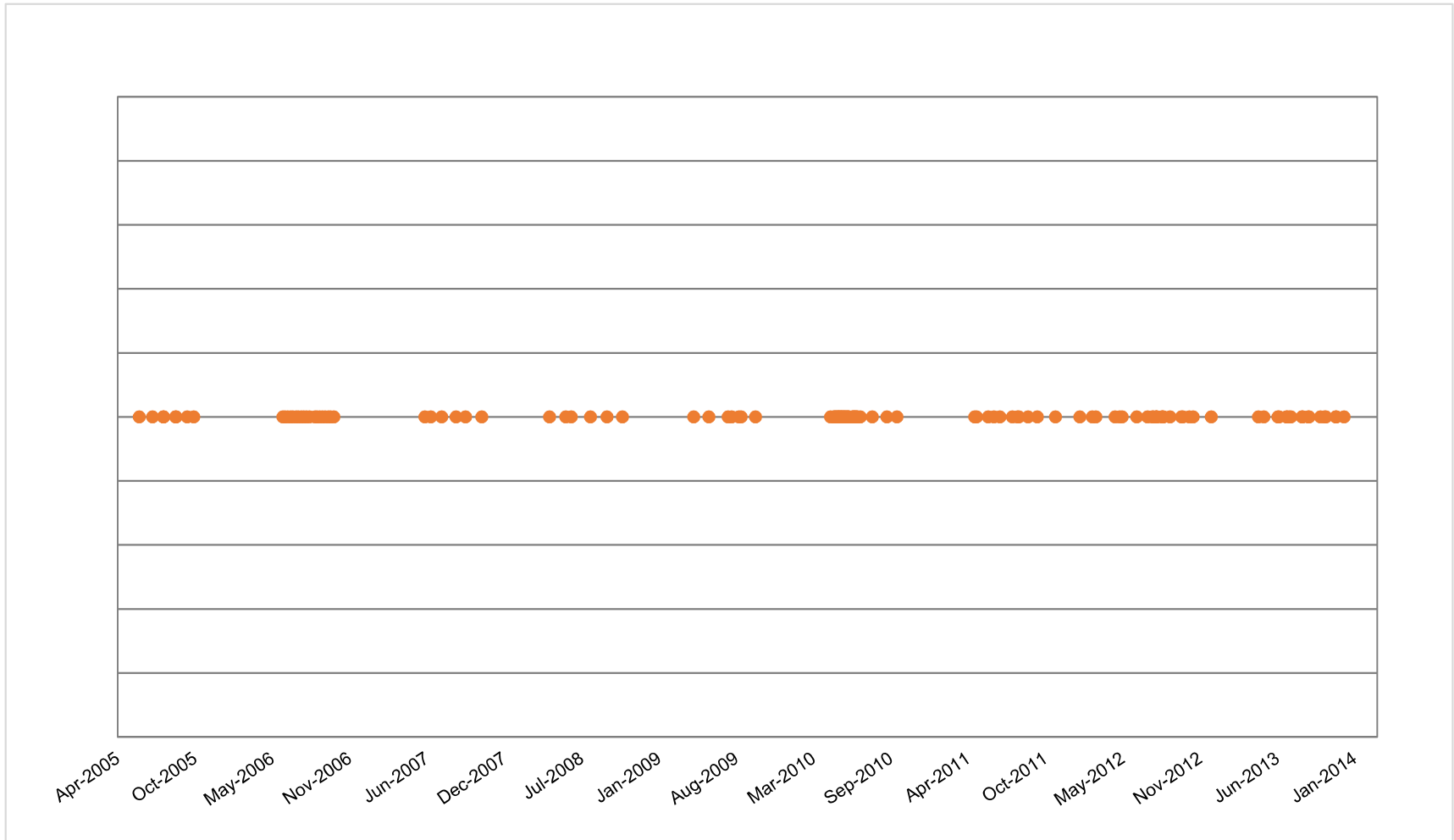


Figure 2.2: Distribution of water quality sampling events from 2005 to 2013.

Table 2.6: Summary statistics for Options 1, 2 and 3.

Analytes	Option 1 (No Grouping)				Option 2 (Grouped by Week)				Option 3 (Grouped by Month)			
	Sample Size	Mean	Median	95th Percentile	Sample Size	Mean	Median	95th Percentile	Sample Size	Mean	Median	95th Percentile
DOC (mg/L)	108	12	11	22	59	12	12	21	46	13	12	21
Dissolved Hardness (mg/L)	134	113	117	162	80	115	120	169	53	113	118	181
Total Hardness (mg/L)	149	120	121	200	66	120	121	185	49	120	124	185
TSS (mg/L)	184	114	11	772	89	89	11	485	61	77	11	278
TDS (mg/L)	178	153	150	217	83	156	158	216	62	158	160	226
Ammonia (mg/L)	175	0.040	0.021	0.15	83	0.036	0.025	0.12	56	0.037	0.025	0.12
Nitrite (mg/L)	161	0.0071	0.0025	0.025	67	0.010	0.0025	0.038	52	0.010	0.0025	0.040
Nitrate (mg/L)	181	0.085	0.067	0.21	85	0.10	0.090	0.22	57	0.091	0.075	0.22
Lab pH (pH Units)	187	7.93	8.00	8.26	91	7.92	7.97	8.20	61	7.90	7.96	8.18
Field pH (pH Units)	93	7.73	7.76	8.30	46	7.72	7.77	8.24	33	7.71	7.80	8.13
Dissolved Aluminum (mg/L)	179	0.026	0.016	0.071	88	0.025	0.014	0.056	59	0.023	0.019	0.053
Dissolved Arsenic (mg/L)	179	0.00057	0.00044	0.0015	88	0.00053	0.00041	0.0013	59	0.00053	0.00041	0.0011
Dissolved Cadmium (mg/L)	179	0.000019	0.0000085	0.000050	88	0.000020	0.0000053	0.000050	59	0.000019	0.000010	0.000050
Dissolved Chromium (mg/L)	159	0.00054	0.00050	0.0011	81	0.00060	0.00050	0.0013	55	0.00057	0.00050	0.0011
Dissolved Copper (mg/L)	179	0.0021	0.0016	0.0050	88	0.0021	0.0015	0.0051	59	0.0024	0.0017	0.0054
Dissolved Iron (mg/L)	179	0.38	0.11	1.2	88	0.31	0.11	0.95	59	0.34	0.15	0.91
Dissolved Lead (mg/L)	179	0.00012	0.00010	0.00025	88	0.00012	0.00010	0.00028	59	0.00012	0.00010	0.00025
Dissolved Molybdenum (mg/L)	179	0.00096	0.0010	0.0020	88	0.00097	0.0010	0.0017	59	0.00094	0.0010	0.0015
Dissolved Nickel (mg/L)	179	0.0013	0.0011	0.0027	88	0.0013	0.0011	0.0024	59	0.0012	0.0011	0.0020
Dissolved Selenium (mg/L)	179	0.00027	0.00020	0.00050	88	0.00023	0.00011	0.00050	59	0.00025	0.00015	0.00050
Dissolved Silver (mg/L)	137	0.0000092	0.000010	0.000010	60	0.0000098	0.000010	0.000010	47	0.000010	0.000010	0.000010
Dissolved Zinc (mg/L)	179	0.0032	0.0025	0.0060	88	0.0029	0.0025	0.0060	59	0.0033	0.0025	0.0084

Table 2.7: Annual Medians and the 95th percentile of annual medians for Option 1, 2 and 3.

Option	Year	Annual Medians																					
		DOC (mg/L)	Dissolved Hardness (mg/L)	Total Hardness (mg/L)	TSS (mg/L)	TDS (mg/L)	Ammonia (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Lab pH (pH Units)	Field pH (pH Units)	Dissolved Aluminum (mg/L)	Dissolved Arsenic (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Chromium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)	Dissolved Lead (mg/L)	Dissolved Molybdenum (mg/L)	Dissolved Nickel (mg/L)	Dissolved Selenium (mg/L)	Dissolved Silver (mg/L)	Dissolved Zinc (mg/L)
Option 1 (No Group)	2005	-	-	106	5.8	144	0.010	0.00050	0.018	7.95	-	0.016	0.00042	0.000025	0.00050	0.0025	0.15	0.00025	0.00050	0.0012	0.00050	0.0000075	0.0025
	2006	-	128	-	4.0	164	0.015	0.0010	0.11	7.85	-	0.0080	0.00042	0.0000050	0.00070	0.0010	0.090	0.000050	0.0010	0.00090	0.00010	0.0000050	0.0010
	2007	11	110	119	7.3	173	0.025	0.025	0.08	7.90	-	0.011	0.00040	0.0000050	0.0010	0.0020	0.050	0.000050	0.0010	0.00070	0.00010	-	0.0040
	2008	14	123	98	13	161	0.025	0.040	0.030	7.91	-	0.012	0.00030	0.000005	0.0013	0.0012	0.070	0.000050	0.0011	0.0010	0.00030	0.0000050	0.0020
	2009	8.7	121	141	2.8	148	0.010	0.0025	0.15	8.02	7.89	0.010	0.00030	0.000040	0.00050	0.0020	0.050	0.00010	0.0010	0.00050	0.00030	0.0000050	0.0025
	2010	9.2	99	106	18	140	0.022	0.0025	0.070	8.10	7.72	0.017	0.00040	0.000050	0.00050	0.0017	0.07	0.00010	0.0010	0.0010	0.00040	0.000010	0.0050
	2011	18	93	94	22	130	0.015	0.0025	0.055	7.96	7.79	0.033	0.00060	0.000010	0.00050	0.0019	0.35	0.00010	0.00050	0.0020	0.00010	0.000010	0.0025
	2012	12	129	145	45	166	0.025	0.0025	0.078	8.11	7.84	0.019	0.00078	0.0000050	0.00050	0.0016	0.58	0.00010	0.0011	0.0015	0.00012	0.000010	0.0025
	2013	11	129	153	23	176	0.049	0.0025	0.10	8.09	7.75	0.014	0.00059	0.0000050	0.00050	0.0012	0.36	0.00010	0.0011	0.0013	0.000050	0.000010	0.0025
	95th Percentile of Annual Medians	17	129	150	36	175	0.040	0.034	0.13	8.11	7.88	0.027	0.00071	0.000046	0.0012	0.0023	0.49	0.00019	0.0011	0.0018	0.00046	0.000010	0.0046
Option 2 (Grouped by Week)	2005	-	-	111	8.4	154	0.015	0.00061	0.040	7.83	-	0.025	0.00042	0.000025	0.00040	0.0028	0.21	0.00016	0.00076	0.0013	0.00050	0.0000075	0.0027
	2006	-	126	-	4.0	170	0.014	0.0010	0.12	7.85	-	0.0080	0.00040	0.0000050	0.00070	0.0010	0.090	0.000050	0.0010	0.00085	0.00010	0.0000050	0.0010
	2007	11	110	119	8.8	176	0.025	0.025	0.13	7.89	-	0.011	0.00040	0.0000050	0.0010	0.0020	0.050	0.000050	0.0010	0.00070	0.00010	-	0.0040
	2008	11	123	98	14	163	0.025	0.040	0.037	7.90	-	0.012	0.00031	0.000023	0.0011	0.0011	0.070	0.000050	0.0012	0.0010	0.00030	0.0000050	0.0020
	2009	8.7	121	141	2.8	148	0.010	0.0025	0.15	8.02	7.89	0.010	0.00030	0.000040	0.00050	0.0020	0.050	0.00010	0.0010	0.00050	0.00030	0.0000050	0.0025
	2010	12	106	106	13	145	0.027	0.0036	0.070	8.06	7.69	0.017	0.00033	0.000050	0.00050	0.0020	0.10	0.00010	0.0010	0.0010	0.00040	0.000010	0.0050
	2011	16	94	95	23	125	0.015	0.0025	0.050	7.98	7.79	0.029	0.00050	0.000010	0.00050	0.0019	0.28	0.00010	0.00050	0.0016	0.00010	0.000010	0.0025
	2012	11	129	154	30	164	0.025	0.0025	0.083	8.08	7.80	0.021	0.00060	0.0000050	0.00050	0.0016	0.50	0.00010	0.0011	0.0014	0.00012	0.000010	0.0025
	2013	12	129	151	34	179	0.078	0.0025	0.10	8.09	7.80	0.015	0.00088	0.0000050	0.00050	0.0012	0.59	0.00010	0.0010	0.0018	0.000093	0.000010	0.0025
	95th Percentile of Annual Medians	15	129	153	33	178	0.058	0.034	0.14	8.09	7.87	0.027	0.00077	0.000046	0.0011	0.0025	0.55	0.00014	0.0011	0.0017	0.00046	0.000010	0.0046
Option 3 (Grouped by Month)	2005	-	-	111	8.4	154	0.015	0.00061	0.038	7.83	-	0.025	0.00042	0.000025	0.00040	0.0028	0.21	0.00016	0.00076	0.0013	0.00050	0.0000075	0.0029
	2006	-	120	-	3.8	175	0.017	0.0010	0.083	7.78	-	0.0079	0.00046	0.0000050	0.00059	0.0011	0.10	0.000050	0.00088	0.00083	0.00013	0.0000050	0.0017
	2007	11	110	124	6.5	177	0.025	0.025	0.14	7.84	-	0.011	0.00040	0.0000050	0.0010	0.0020	0.050	0.000050	0.0010	0.00070	0.00010	-	0.0040
	2008	11	123	108	15	167	0.025	0.030	0.033	7.90	-	0.013	0.00035	0.0000050	0.0010	0.0012	0.070	0.000050	0.0011	0.0010	0.00030	0.0000050	0.0020
	2009	10	96	141	4.0	149	0.010	0.0025	0.16	7.90	7.73	0.019	0.00028	0.000035	0.00055	0.0028	0.060	0.00010	0.00092	0.00067	0.00030	0.0000050	0.0033
	2010	13	107	106	32	150	0.037	0.0031	0.070	8.04	7.85	0.016	0.00038	0.000050	0.00050	0.0020	0.13	0.00010	0.0010	0.0010	0.00040	0.000010	0.0050
	2011	19	79	89	17	125	0.016	0.0025	0.050	7.81	7.79	0.036	0.00050	0.000016	0.00050	0.0029	0.26	0.00010	0.00050	0.0012	0.00010	0.000010	0.000010
	2012	11	128	156	19	167	0.024	0.0025	0.092	8.10	7.59	0.021	0.00056	0.0000056	0.00050	0.0018	0.45	0.00010	0.0011	0.0014	0.00014	0.000010	0.0025
	2013	12	130	151	40	185	0.080	0.0037	0.11	8.09	7.90	0.019	0.0011	0.0000056	0.00050	0.0012	0.65	0.00010	0.0011	0.0018	0.000093	0.000010	0.0025
	95th Percentile of Annual Medians	17	129	154	37	182	0.063	0.028	0.15	8.10	7.89	0.032	0.00086	0.000044	0.00099	0.0029	0.57	0.00014	0.0011	0.0016	0.00046	0.000010	0.0046

3.0 BACKGROUND WATER QUALITY SUMMARY STATISTICS

Based primarily on consideration of potential water quality monitoring frequencies at the post-closure 2 stage (proposed spring, summer, fall), Option 3 is put forward as the proposed basis for defining background water quality. Two key sets of background water quality statistics are appropriate for defining background water quality:

1. the 95th percentile of the background data; and
2. the 95th percentile of the annual medians of the background data.

The intended use of the former (Table 3.1; Appendix Table D.4) is as an “individual data point evaluator” and the intended use of the latter (Table 3.1; Appendix Tables D.5 and D.6) is as a “central tendency evaluator”.

Although application of the WQOs in defining attainment is the subject of ongoing discussion between the Minto Mine and Selkirk First Nation, a fundamental guiding principle is that, because the summary statistics are 95th percentiles, they will be exceeded at an average rate of 5% in the absence of any mine influence on water quality. Thus, definition of attainment must consider natural exceedance rate, and initial response to any observed exceedance must be focussed on distinguishing a mine related influence from natural variability.

Table 3.1: Background water quality summary statistics representing lower Minto Creek (Minnow 2016) ¹

Analytes	Background Concentration Summary Statistics	
	Individual Data Point Evaluator (95 th percentile)	Central Tendency Evaluator (95 th percentile of annual medians)
Ammonia (mg/L)	0.12	0.063
Nitrite (mg/L)	0.040	0.028
Nitrate (mg/L)	0.22	0.15
Dissolved Aluminum (mg/L)	0.053	0.032
Dissolved Arsenic (mg/L)	0.0011	0.00086
Dissolved Cadmium (mg/L)	0.000050	0.000044
Dissolved Chromium (mg/L)	0.0011	0.0010
Dissolved Copper (mg/L)	0.0054	0.0029
Dissolved Iron (mg/L)	0.91	0.57
Dissolved Lead (mg/L)	0.00025	0.00014
Dissolved Molybdenum (mg/L)	0.0015	0.0011
Dissolved Nickel (mg/L)	0.0020	0.0016
Dissolved Selenium (mg/L)	0.00050	0.00046
Dissolved Silver (mg/L)	0.000010	0.000010
Dissolved Zinc (mg/L)	0.0084	0.0046

¹ for contaminants of potential concern (COPCs)

4.0 REFERENCES

Dawson, R. 2011. How significant is a boxplot outlier? Journal of Statistics Education 19: 2.

YWB (Yukon Water Board). 2015. Minto Mine Type A Water Use Licence Number QZ14-031.
Issued to Minto Explorations Ltd. August 2015.

APPENDIX A
JUNE 2ND, 2016 MEETING MINUTES

Minto Mine Bilateral Technical Working Group Meeting

Characterizing Background Water Quality for Use as Water Quality Objectives

SRK Consulting – Vancouver, June 2, 2016

Meeting Notes

Attendees: Bill Slater, Don MacDonald, Jesse Sinclair, Ryan Herbert, Pierre Stecko, Dylan MacGregor

Agenda (developed jointly)

- Background Dataset
- Dealing with Duplicates
- Multiple locations per sampling date
- Dealing with Outliers
- Method Detection Limits
- Conditions / Binning
- Summary Statistics
- Attainment
- Confirmation of COPC list
- Water Quality Predictions Use

Key

Black text = items discussed

Blue text = agreed path forward

Red text = action item

1. Background Dataset

- Rationalize stations
- Test differences? Necessary?
- NOTE → W6 samples were taken at the wrong location in 2009-2011 (see extreme copper concentration from April 09) ... exclude W6 for this timeframe
- Exclude W8
- “Background Dataset” was agreed upon ... see PHOTOGRAPH of whiteboard matrix
- As with Access 2014, removed W6 data from 2009 to 2011 due to uncertainty about sampling location (may have been sampled in Minto Creek mainstem at some times)
- Prepare the dataset per spreadsheet
- Check against Access 2014. The only difference should be the exclusion of W8

2. Dealing with Duplicates

- There are duplicates in the database, some instances of greater replication
- Approach to consolidate to one data point per site per sampling

- Average discussed. Simple decision when they agree well. What if they do not?
- Average by site and date
- Identify the replicates and compare
- If good agreement, use average

3. Multiple locations per sampling date

- This was an MESL addition to the agenda
- Objective is to best represent water quality at Station W2
- Is there pseudo-replication by including numerous reference sites to represent W2 on a given date when an alternative (better?) approach might be to use the reference dataset to identify an surrogate W2 value for that date (or campaign if within a few days)
- Option 1 → use all data as independent
- Option 2 → consolidate by sampling date (or campaign) to get one estimate of “W2 background” for that date and then use those data for summary statistics
- Jesse Sinclair ran scenarios on the spot (using R?)
 - D Copper Option 1 → N 184 95th 6.52 median 1.70
 - D Copper Option 2 → N 124 95th 4.94 median 1.46
 - Not much difference for TDS or NO3
- Tim Barrett to apply this approach and indicate implications overall (e.g., lower BG for copper [but perhaps better representative of W2])
- Alternative from Don MacDonald = only consider W2 in 2005?
- Group ... no, now that we have agreed on background dataset, stick with it
- Check → in baseline ONLY (2005), how would Option 1 versus Option 2 compare to actual W2 (admittedly small dataset!)

4. Dealing with Outliers

- Box plot approach suggested by Tim is appropriate.
- MESL agrees with boxplot approach, indicates that there is more than one way, but that the 3IQR method is appropriate
- Go ahead and complete the identification of potential outliers
- Evaluate concurrent conditions
- Provide list of outliers to Ryan Herbert at Minto Mine
- Ryan can help decide what is feasible to investigate. If we can't investigate may have to make a (or practical to just toss)
- Prepare a final list of proposed outliers to be eliminated
- Provide list to SFN / MESL

5. Method Detection Limits

- Significant issue for a number of COPCs
- Pierre Stecko → issue could potentially be avoided by using non-parametric statistics
- How does ½ substitution affect results if MDLs decrease in the future?
- Pierre → acknowledge ABOVE in the document and propose a defensible way to deal with them. Part of our responsibility is to make sure that this set up in a way that can be easily

picked up in future reviews. Implications of method changes need to be identified and, to the extent possible, guidance provided on how they should be dealt with (e.g., Tim suggests the Kaplan-Meier method).

6. Conditions / Binning

- Desirable not to bin
- Evidence of seasonal patterns that indicate a need to “bin”
- Investigated “under ice” versus “ice free”
- Ice April to October = ice free; “under ice” = Nov 1 to Apr 1
- Is under ice necessary? Frozen solid, no source?
- AGREE ... no need to apply under ice (background characterization of “under ice” period is not required)
- Ascending versus descending hydrograph (divisions from MESL 2013)
- Box plots appear comparable for the analytes that we looked at (copper, nitrate, TDS)
- Compare these two “bins” for each of the COPCs
- Statistical contrast of the two groups
- Discuss with SFN / MESL and make final decisions
- It is possible that some analytes require binning whereas others do not

7. Summary Statistics

- Two types – “Individual” (applies to grab sample) and “Central Tendency” (applies to average over a specified time frame [year?])
- Individual
 - 95th percentiles are appropriate
 - See attainment
 - Calculate following agreement on final dataset and approach (all previous items) with SFN / MESL
- Central Tendency
 - Fairly brief discussion on this
 - PS indicated preference for non-parametric if feasible and defensible (e.g., 95th percentile of medians), but key questions is whether data supports this in a defensible way
 - Calculate the 95th percentile on medians; is this defensible with the given data
 - Calculate other measures of central tendency (UCL of the mean)
 - Compare the methods
 - Select more appropriate

8. Attainment

- Individual (95th percentiles)
 - Exceedances on 2 consecutive samples. If independent, 5% * 5% probability = 0.25%
 - Sufficient time between sample to have reasonable assurance
 - This approach allows a more rapid response than waiting to evaluate exceedance rates

- Incorporate the final concept(s) into background report
- Central Tendency
 - Evaluate compliance annually. Does the annual median or mean fall within the range of background medians or means.
 - As above, must still recognize small chance of exceedance in the absence of any change.
 - Functionally, this could be an annual review item. Presumably, if the “central tendency” WQO has been exceeded, some “individual” exceedance has also occurred. The annual review should include investigation.
 - One analyte or many?
 - Frequency of exceedance of the “individual WQO”
 - Trending
 - Other?
 - Incorporate the final concept(s) into background report
- Bill Slater → these concepts work well when we are just considering future water quality relative to background, but become more complicated when considering a WQO that is a composite of background and the operation WQO.
- Don MacDonald – SFN would like to see WQO set somewhere between background and 50% of current operational WQO (WUL definition of assimilative capacity).

COPC List

- Don MacDonald – Would like to include TDS as a COPC with reasoning around making it easier to apply it is a communication piece with SFN. Don discussed having TDS as a major ion to follow and show the community that there are no problems with the WQ in Minto Creek.
- The group generally agrees that TDS is not expected to be an issue in closure as it relates to effects on aquatic life.
- No agreement on the inclusion of TDS in the COPC list was confirmed.
- Minto’s team to discuss internally the merits of including TDS as a COPC.
- Don MacDonald – asked if we need to develop a framework to evaluating COPC’s.
- Dylan MacGregor – Given the time remaining (until August 5th) it was probably not the best use of resources. The group as whole generally agreed.

Water Quality Prediction Appropriate Use

- Dylan MacGregor –Will have updated water quality predictions including CWTS performance expectations near end of month. Dylan has concerns regarding how water quality predictions will be used.
- Don MacDonald – we have to use predictions to determine where WQO should be set.
- Dylan MacGregor – we could use the current predictions as we have said we expect to have the CWTS performance to range from 0 to some upper percentage of removal therefore CWTS performance may not have an impact.
- Further discussions need to be had to agree on how best to use WQ predictions.

TIMING

- Items 1 to 6 by week of June 13th ...
- Discuss week of June 20th ??

APPENDIX B
RAW WATER QUALITY DATA

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Total Coliforms	Fecal Coliforms	E.Coli	COD (mg/L)	Specific Conductivity in Field (µS/cm)	Radium - 226 (Bq/L)	CBOD (mg/L)	LC50 (%)	LT50 (h)	BOD5 (mg/L)	DO (mg/L)	Cond-F (µS/cm)	DO (%)	ORP (mV)
W1	5/27/2005														
W1	6/30/2005						<0.0050								
W1	7/28/2005						<0.0050								
W1	8/29/2005						<0.0050								
W1	9/28/2005						<0.0050								
W1	10/15/2005						<0.0050								
W2	5/27/2005														
W2	5/27/2005														
W2	6/30/2005						<0.0050								
W2	7/28/2005						<0.0050								
W2	8/30/2005						<0.0050								
W2	9/28/2005						0.007								
W2	10/15/2005						<0.0050								
W3	5/27/2005														
W3	6/30/2005						<0.0050								
W3	7/29/2005						<0.0050								
W3	8/29/2005						<0.0050								
W3	9/28/2005						<0.0050								
W3	10/15/2005						<0.0050								
W8	5/27/2005														
W8	6/30/2005														
W8	7/29/2005														
W8	8/30/2005														
W8	9/28/2005														
W8	10/15/2005														
W9	5/27/2005														
W9	6/30/2005						<0.0050								
W9	7/29/2005						0.007								
W9	8/29/2005						<0.0050								
W9	9/28/2005						<0.0050								
W9	10/15/2005						<0.0050								
W10	5/27/2005														
W10	5/27/2005														
W10	6/30/2005						<0.0050								
W10	7/29/2005						<0.0050								
W10	8/29/2005						<0.0050								
W10	9/28/2005						<0.0050								
W10	10/15/2005						0.007								
W6	5/27/2005														
W6	6/30/2005														
W6	7/29/2005														
W6	8/30/2005														
W6	9/28/2005														
W6	10/15/2005														
W6	6/2/2006														
W6	8/25/2006														
W6	9/6/2006														
W6	6/20/2007														
W6	9/18/2007														
W6	6/17/2008														
W6	9/18/2008														
W6	4/14/2009														
W6	4/30/2009												0.17	170	
W6	7/28/2009														
W6	8/6/2009												4.25		
W6	8/6/2009														
W6	8/18/2009												415		
W6	8/25/2009														
W6	10/7/2009														
W6	10/7/2009												485	108.5	
W6	10/25/2009												502	99.4	
W6	4/19/2010												283		
W6	5/16/2010												192.4		
W6	5/17/2010												124.4		
W6	5/19/2010												196.2		
W6	5/21/2010												164.3		
W6	5/23/2010												216		
W6	5/25/2010												177		
W6	5/29/2010												152.3		
W6	6/2/2010												448		
W6	6/4/2010												182.2		
W6	6/6/2010												191		
W6	6/14/2010												197		
W6	6/16/2010												287		
W6	6/18/2010												279		
W6	6/20/2010												279		
W6	6/22/2010												186	102	
W6	6/24/2010												187	101.2	
W6	6/26/2010														
W6	6/26/2010												189	99.4	
W6	6/28/2010												178	101.7	
W6	7/5/2010												164	101.4	
W6	8/5/2010												205	76.7	
W6	9/9/2010												205	79.6	
W6	10/8/2010												209	94.2	
W6	8/19/2011														
W6	7/17/2012					193.9						117	118.9	92.3	74.9
W6	7/30/2012					174.4						12.56	108.3	98.8	22.5
W6	8/9/2012					217.6						12.03	140.2	97.9	-22.9
W6	8/25/2012					196						11.94	120.1	92.8	134.6
W6	9/13/2012					171.5						13.7	95.8	94.3	64.9
W6	10/13/2012					194.5						13.83	101.6	94.7	27.8
W6	11/12/2012					365.5							190		249.6
W6	5/14/2013					53.6						13.22	28.1	92.1	137.8
W6	6/22/2013					172.6						12.33		88.6	79.4
W6	7/12/2013					180.5						11.38	109	87.7	93.3
W6	8/22/2013					204.1						11.81	127.8	102.4	22.8
W6	9/6/2013					201.8						11.85	122.7	98.7	20.4
W6	10/7/2013					191						14.61	104.1	102.3	36.2
W6	11/16/2013					196.2						8.31	102.6	68.3	98.6
W6	12/7/2013												231		
W7	5/27/2005														
W7	6/30/2005														
W7	7/29/2005														
W7	8/30/2005														
W7	9/28/2005														
W7	10/15/2005														
W7	6/2/2006														
W7	6/8/2006														

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Total Coliforms	Fecal Coliforms	E.Coli	COD (mg/L)	Specific Conductivity in Field (µS/cm)	Radium - 226 (Bq/L)	CBOD (mg/L)	LC50 (%)	LT50 (h)	BOD5 (mg/L)	DO (mg/L)	Cond-F (µS/cm)	DO (%)	ORP (mV)
W7	6/15/2006														
W7	6/15/2006														
W7	6/23/2006														
W7	6/28/2006														
W7	7/7/2006														
W7	7/12/2006														
W7	7/20/2006														
W7	7/26/2006														
W7	7/26/2006														
W7	8/2/2006														
W7	8/10/2006														
W7	8/25/2006														
W7	8/25/2006														
W7	8/30/2006														
W7	9/6/2006														
W7	9/13/2006														
W7	9/20/2006														
W7	9/28/2006														
W7	10/4/2006														
W7	10/12/2006														
W7	6/5/2007														
W7	6/5/2007														
W7	6/5/2007														
W7	6/20/2007														
W7	7/18/2007														
W7	7/18/2007														
W7	7/18/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	9/18/2007														
W7	10/30/2007														
W7	10/30/2007														
W7	10/30/2007														
W7	10/30/2007														
W7	4/22/2008														
W7	4/22/2008														
W7	4/22/2008														
W7	4/22/2008														
W7	6/3/2008														
W7	6/3/2008														
W7	6/3/2008														
W7	6/3/2008														
W7	6/17/2008														
W7	8/6/2008														
W7	8/6/2008														
W7	8/6/2008														
W7	8/6/2008														
W7	9/18/2008														
W7	10/28/2008														
W7	10/28/2008														
W7	10/28/2008														
W7	4/30/2009						<0.006						37.6	183	
W7	6/8/2009												211		
W7	7/28/2009														
W7	8/6/2009												289		
W7	8/24/2009						0.01								
W7	8/25/2009												253		
W7	8/31/2009														
W7	10/7/2009														
W7	10/7/2009						<0.005						258	109	
W7	10/25/2009						<0.005						269	88	
W7	10/25/2009														
W7	4/19/2010												437		
W7	4/27/2010												67	59.2	
W7	4/29/2010												35	8.8	
W7	5/1/2010												82	102.2	
W7	5/3/2010												89	90.2	
W7	5/5/2010														
W7	5/7/2010												118	83.3	
W7	5/9/2010												171	129.2	
W7	5/10/2010												175	133.9	
W7	5/12/2010														
W7	5/12/2010														
W7	5/14/2010												145		
W7	5/16/2010												167.4		
W7	5/17/2010												161.6		
W7	5/19/2010												199.4		
W7	5/21/2010												191		
W7	5/23/2010												216		
W7	5/25/2010												224		
W7	5/27/2010												234		
W7	5/29/2010												243		
W7	5/31/2010												249		
W7	6/2/2010												254		
W7	6/4/2010												667		
W7	6/6/2010												262		
W7	6/14/2010												297		
W7	6/16/2010												364		
W7	6/18/2010												360		
W7	6/20/2010												342		
W7	6/22/2010												205	107.1	
W7	6/24/2010												211	105.6	
W7	6/26/2010												229	107.3	
W7	6/28/2010												245	105.1	
W7	7/5/2010												194	104.5	
W7	8/5/2010												240	78.1	
W7	9/12/2010														
W7	9/12/2010						<0.005						210	84.5	
W7	10/8/2010												235	100.3	
W7	4/27/2011														
W7	5/2/2011														
W7	6/1/2011														
W7	6/16/2011														
W7	7/1/2011														

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Total Coliforms	Fecal Coliforms	E.Coli	COD (mg/L)	Specific Conductivity in Field (µS/cm)	Radium - 226 (Bq/L)	CBOD (mg/L)	LC50 (%)	LT50 (h)	BOD5 (mg/L)	DO (mg/L)	Cond-F (µS/cm)	DO (%)	ORP (mV)
W7	8/2/2011														
W7	8/16/2011														
W7	8/19/2011														
W7	9/12/2011											18.55	204.1	133.5	
W7	10/6/2011											12.13	250.8	83.1	
W7	11/22/2011														
W7	1/24/2012														
W7	2/25/2012					296.9						10.92	155.2	74.6	
W7	3/5/2012					272.6						11.47	142.3	78.9	
W7	4/24/2012					75.6						15.55	39.5	106.3	
W7	5/6/2012														
W7	5/6/2012					88.8						8.53	46.4	58.4	116.8
W7	6/19/2012					202.6						12.45	121.6	95.1	44.5
W7	7/17/2012					244.2						12.31	152.9	97.4	45.6
W7	7/30/2012					235.1						12.64	142.6	97.6	16
W7	8/8/2012					268.5						12.65	164.5	98.5	-6.2
W7	8/23/2012					264.6						10.94	161.3	84.8	-2.4
W7	9/13/2012					224						13.04	126.2	94.1	76.7
W7	10/16/2012					258.9						17.1	137.8	118.3	18
W7	11/2/2012														
W7	12/29/2012					2107						9.38	1090	72.5	289.9
W7	4/30/2013					365.3							190.6	101.8	-50
W7	5/14/2013					59.7						13.46	31.1	92.4	109.7
W7	6/19/2013														
W7	6/19/2013												249		
W7	7/13/2013					250.7						11.92	148	90	108.7
W7	8/21/2013					280.6						12.06	168	101	32.7
W7	9/6/2013					277.3						11.37	166.3	93.5	38.1
W7	10/21/2013					286.3						11.57	149.3	77.7	16.6
W7	11/16/2013					197.6						7.17	104.3	61.8	94.7
W7	12/7/2013												198		
C4	5/6/2012					100.1						10.69	52.4	73.1	63.9
C4	8/1/2012					196.8						10.45	138.1	91.3	-38.1
C4	8/8/2012					246.3						11.52	165.3	97.1	-54.1
C4	8/25/2012					230.8						11.18	148.8	91	-21.8
C4	6/22/2013					223.8						10.58		87.9	93.7
C4	7/19/2013												260		
C4	8/22/2013					246.6						11.35	166.1	103.6	11.6
C4	9/6/2013					246.2						11.56	153.8	98.7	-28.8
C4	10/18/2013														
C4	10/18/2013					257.1						13.73	134.1	92.3	-20.1
C4	11/17/2013					274.1						4.27	142.7	28.4	101.5
C10	5/12/2012					144						13.64	82	99.9	45.3
C10	7/30/2012														
C10	7/30/2012					216.7						9.03	159.3	3	44.8
C10	8/10/2012					269						12.15	179	101.3	-28.1
C10	8/27/2012					257.4						11.33	170.7	94.1	27
C10	6/22/2013					242.7						9.91		91.1	85.9
C10	7/23/2013					227.6						11.31	153	95.3	97.7
C10	8/22/2013					304.4						11.25	206.6	101.4	143.1
C10	9/8/2013														
C10	9/8/2013					213.8						10.32	146.2	96.1	103.3
C10	10/18/2013					262.4						14.43	137.1	96.2	84.9

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Field pH (pH units)	Field Turbidity (NTU)	Field Temp (°C)	Sulphide (mg/L)	Dissolved SO4 (mg/L)	Total SO4 (mg/L)	TT CN (mg/L)	Chloride (mg/L)	Bromine (mg/L)	Fluoride (mg/L)	Chromium 6 (mg/L)	Chromium III (mg/L)	Cu-D-IH (mg/L)	Al-D-IH (mg/L)
W1	5/27/2005					19.7	12.8		<0.50						
W1	6/30/2005					22.4	22.4	0.011	1.2						
W1	7/28/2005						19.1	0.0054	0.64						
W1	8/29/2005					12.4	12.4	0.0065	0.52						
W1	9/28/2005					11.8	11.8	0.0118	0.73						
W1	10/15/2005						13.9	0.125	0.91						
W2	5/27/2005						12.8		<0.50						
W2	5/27/2005					9.64			<0.5						
W2	6/30/2005					22.1	22.1	<0.0050	1.23						
W2	7/28/2005						19	<0.0050	0.66						
W2	8/30/2005					12.6	12.6	0.0053	0.53						
W2	9/28/2005					11.6	11.6	0.0106	0.72						
W2	10/15/2005						14	0.0101	0.88						
W3	5/27/2005					2.4	19.7		<0.50						
W3	6/30/2005					45.5	45.5	<0.0050	0.86						
W3	7/29/2005						29.6	<0.0050	<0.50						
W3	8/29/2005					25.5	25.5	0.0091	<0.50						
W3	9/28/2005					23.9	23.9	0.013	<0.50						
W3	10/15/2005						24.7	0.014	<0.50						
W8	5/27/2005					166	7.62		<0.50						
W8	6/30/2005					<1	<1.0		0.86						
W8	7/29/2005						7.08		<0.50						
W8	8/30/2005					5.1	5.1		<0.50						
W8	9/28/2005					7.72	7.72		<0.50						
W8	10/15/2005						24.8		<0.50						
W9	5/27/2005					35.3	11.8		<0.50						
W9	6/30/2005					18.4	18.4	<0.0050	<5.0						
W9	7/29/2005						16.5	<0.0050	<0.50						
W9	8/29/2005					17.9	17.9	0.0124	<0.50						
W9	9/28/2005					16.7	16.7	0.0128	<0.50						
W9	10/15/2005						17.4	0.0164	<0.50						
W10	5/27/2005						<0.50		<0.50						
W10	5/27/2005								<0.5						
W10	6/30/2005					<10	<10	<0.0050	<5.0						
W10	7/29/2005						1.56	<0.0050	<0.50						
W10	8/29/2005					1.82	1.82	0.0226	<0.50						
W10	9/28/2005					4.13	4.13	0.0136	<0.50						
W10	10/15/2005						4.19	0.018	<0.50						
W6	5/27/2005					11.8	2.4		<0.50						
W6	6/30/2005					<1	<1.0		0.73						
W6	7/29/2005						29.2		<0.50						
W6	8/30/2005					2.62	2.62		<0.50						
W6	9/28/2005					4.04	4.04		0.5						
W6	10/15/2005						4.69		0.52						
W6	6/2/2006					1.88			<0.5	<0.05	0.176				
W6	8/25/2006					2.4									
W6	9/6/2006					2.3									
W6	6/20/2007					2.1			0.4						
W6	9/18/2007					2.51			0.59						
W6	6/17/2008					1.64			0.29						
W6	9/18/2008					3.29			0.41						
W6	4/14/2009					6.28			6.32						
W6	4/30/2009	8.2		5.6		7.44			0.76						
W6	7/28/2009					42.9			6.17						
W6	8/6/2009														
W6	8/6/2009	7.25		9.6		48.4			9.84						
W6	8/18/2009														
W6	8/25/2009	7.82		10.8											
W6	10/7/2009					62.2			27.8						
W6	10/7/2009	8.14		4.22		63.3			33.3						
W6	10/25/2009	8.12		2.36											
W6	4/19/2010	6.6		1		30.3			<0.02						
W6	5/16/2010	7.52		1.1		6.2			1	<0.4	0.56				
W6	5/17/2010	7.7		1.1		8.1			0.8	<0.4	0.22				
W6	5/19/2010	7.87		1.1		13			1	<0.4	0.27				
W6	5/21/2010	8.01		2.6		7.2	8.01		0.9	<0.4	0.26				
W6	5/23/2010	7.34		1		16			2.1	<0.4	0.31				
W6	5/25/2010	7.48		1		17			1.4	<0.4	0.29				
W6	5/29/2010	7.79		1.4		3.5			0.8	<0.4	0.24				
W6	6/2/2010	7.38		1.5		49			6.4	<0.4	0.43				
W6	6/4/2010	7.87		2.6		<0.5			<0.5	<0.4	0.2				
W6	6/6/2010			1.6		<0.5			<0.5	<0.4	0.21				
W6	6/14/2010	6.65		3.8		1.4			<0.5	<0.4	0.23				
W6	6/16/2010	6.8		2.5		<0.5			<0.5	<0.4	0.22				
W6	6/18/2010	7.03		2.9		<0.5			<0.5	<0.4	0.23				
W6	6/20/2010	6.38		3.1		0.7			<0.5	<0.4	0.23				
W6	6/22/2010	7.8	-0.2	1.92		<0.5			<0.5	<0.4	0.23				
W6	6/24/2010	7.91	-1.2	2.38		<0.5			<0.5	<0.4	0.25				
W6	6/26/2010					<0.5			<0.5	<0.4	0.24				
W6	6/26/2010	7.78	-1	2.45											
W6	6/28/2010	7.99	5.2	2.79		<0.5			<0.5	<0.4	0.22				
W6	7/5/2010	7.99	23.1	3.71		<0.5			<0.5	<0.4	0.2				
W6	8/5/2010	7.96	-0.4	6.72		<0.5			0.5	<0.4	0.23				
W6	9/9/2010	7.99	9.5	5.1		<0.5			0.7	<0.4	0.26				
W6	10/8/2010	7.75	-1.3	-0.18		2.1			<0.5	<0.4	0.21				
W6	8/19/2011														
W6	7/17/2012	7.92		4.8		1.82			1		0.25				
W6	7/30/2012	7.89		5.2		<0.50			0.58		0.3				
W6	8/9/2012	8.09		6.4		0.64			1.1		0.28				
W6	8/25/2012	7.76		4.7		<0.50			0.92		0.28				
W6	9/13/2012	7.95		1.9		0.62			1.1		0.22				
W6	10/13/2012	8.3		0		1.52			0.87		0.23				
W6	11/12/2012	6.69		-0.1		5.81			1.1		0.23				
W6	5/14/2013	7.6		0.1		<0.50			1.5		0.083				
W6	6/22/2013	7.61		1.6		1.88			1.1		0.22				
W6	7/12/2013	7.69		4.4		1.27			1		0.23				
W6	8/22/2013	7.81		5.4		0.53			0.84		0.23				
W6	9/6/2013	7.60		4.5		0.62			1.2		0.26				
W6	10/7/2013	7.66		1.2		1.89			0.8		0.25				
W6	11/16/2013	7.96		-0.1		1.48			0.78		0.24				
W6	12/7/2013	7.50		0		5.36			1.4		0.28				
W7	5/27/2005					<0.5	6.18		<0.50						
W7	6/30/2005					10.2	10.2		0.92						
W7	7/29/2005						29.9		<0.50						
W7	8/30/2005					6.02	6.02		<0.50						
W7	9/28/2005					5.62	5.62		<0.50						
W7	10/15/2005						7.47		<0.50						
W7	6/2/2006					2.98			<0.5	<0.05	0.155				
W7	6/8/2006														

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Station Name	Sample Date	Field pH (pH units)	Field Turbidity (NTU)	Field Temp (° C)	Sulphide (mg/L)	Dissolved SO4 (mg/L)	Total SO4 (mg/L)	TT CN (mg/L)	Chloride (mg/L)	Bromine (mg/L)	Fluoride (mg/L)	Chromium 6 (mg/L)	Chromium III (mg/L)	Cu-D-IH (mg/L)	Al-D-IH (mg/L)
W7	6/15/2006														
W7	6/15/2006					10.5									
W7	6/23/2006					15.1									
W7	6/28/2006														
W7	7/7/2006					10.8									
W7	7/12/2006					10.4									
W7	7/20/2006					10.5									
W7	7/26/2006														
W7	7/26/2006					11.6									
W7	8/2/2006					10									
W7	8/10/2006					10									
W7	8/25/2006														
W7	8/25/2006					11									
W7	8/30/2006					10.5									
W7	9/6/2006					10.3									
W7	9/13/2006					10									
W7	9/20/2006					11									
W7	9/28/2006					11									
W7	10/4/2006					10.9									
W7	10/12/2006					11.3									
W7	6/5/2007					11			0.7						
W7	6/5/2007					11			0.7						
W7	6/5/2007					11			0.7						
W7	6/20/2007					12.2			0.6						
W7	7/18/2007					11.9			0.6						
W7	7/18/2007					11.9			0.6						
W7	7/18/2007					11.9			0.6						
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007					10.3			0.3						
W7	8/24/2007					10.2			0.3						
W7	8/24/2007					10.3			0.3						
W7	9/18/2007					8.21			0.46						
W7	10/30/2007					13			0.96						
W7	10/30/2007					13.6			1.32						
W7	10/30/2007					13			0.88						
W7	10/30/2007					13			0.91						
W7	4/22/2008					27.6			0.8						
W7	4/22/2008					27.8			0.62						
W7	4/22/2008					27.8			0.78						
W7	4/22/2008					27.8			0.62						
W7	6/3/2008					10.4			0.38						
W7	6/3/2008					10.4			0.37						
W7	6/3/2008					10.4			0.38						
W7	6/3/2008														
W7	6/17/2008					12.9			0.42						
W7	8/6/2008					9.89			0.29						
W7	8/6/2008					9.98			0.29						
W7	8/6/2008					9.98			0.3						
W7	8/6/2008														
W7	9/18/2008					5.44			0.57						
W7	10/28/2008					9.43			0.34						
W7	10/28/2008					9.36			0.31						
W7	10/28/2008					9.44			0.31						
W7	10/28/2008														
W7	4/30/2009	7.6		0.4		0.65			0.38						
W7	6/8/2009	7.74		3.27		8.6			4.1						
W7	7/28/2009					13			0.82						
W7	8/6/2009	7.5		4.4		13			0.39						
W7	8/24/2009														
W7	8/25/2009	8.04		3.02											
W7	8/31/2009														
W7	10/7/2009														
W7	10/7/2009	8.24		-0.8		9.9			0.61						
W7	10/25/2009	8.23		0.2											
W7	10/25/2009														
W7	4/19/2010	7.31		1		8.2			0.91						
W7	4/27/2010	7.65	0	-0.07		7			1.4	<0.4	0.08				
W7	4/29/2010	7.72	-0.4	-0.07		<5			0.9	<0.4	0.09				
W7	5/1/2010	7.15	6.9	-0.06		<5			1.2	<0.4	0.11				
W7	5/3/2010	7.74	6.3	0.04		<0.5			0.8	<0.4	0.11				
W7	5/5/2010					<0.5			0.9	<0.4	0.13				
W7	5/7/2010	7.95	5.6	0.03		<0.5			0.8	<0.4	0.13				
W7	5/9/2010	8.03	-0.8	0.8		9.1			1.2	<0.4	0.22				
W7	5/10/2010	8.06	-0.9	0.07		3.9			0.6	<0.4	0.2				
W7	5/12/2010														
W7	5/12/2010					5.4			<0.5	<0.4	0.11				
W7	5/14/2010	7.26		1.1		5.2			<0.5	<0.4	0.18				
W7	5/16/2010	7.32		1.10		7.6			0.6	<0.4	0.2				
W7	5/17/2010	7.52		1		5.6			<0.5	<0.4	0.19				
W7	5/19/2010	7.62		1		9.7			<0.5	<0.4	0.25				
W7	5/21/2010	8.02		1.2		9.3			0.8	<0.4	0.26				
W7	5/23/2010	7.61		1		9.9			1	<0.4	0.28				
W7	5/25/2010	7.24		1.2		11			0.8	<0.4	0.28				
W7	5/27/2010	7.53		3		12			<0.5	<0.4	0.3				
W7	5/29/2010	7.73		1		12			0.7	<0.4	0.32				
W7	5/31/2010	7.83		1.2		12			0.7	<0.4	0.32				
W7	6/2/2010	7.26		1.4		12			<0.5	<0.4	0.31				
W7	6/4/2010	7.48		3.1		13			0.8	<0.4	0.31				
W7	6/6/2010			1.9		12			<0.5	<0.4	0.32				
W7	6/14/2010			3.8		13			<0.5	<0.4	0.35				
W7	6/16/2010	6.78		2.6		14			<0.5	<0.4	0.35				
W7	6/18/2010	7.03		3		12			<0.5	<0.4	0.34				
W7	6/20/2010	7.1		3.4		10			0.5	<0.4	0.31				
W7	6/22/2010	7.92	135	3.25		8.2			<0.5	<0.4	0.25				
W7	6/24/2010	7.95	30	3.55		6.4			<0.5	<0.4	0.28				
W7	6/26/2010	8.03	9.7	3.12		7.8			<0.5	<0.4	0.3				
W7	6/28/2010	7.89	2.3	2.94		9.7			<0.5	<0.4	0.29				
W7	7/5/2010	8.02	35.4	4.48		2.5			<0.5	<0.4	0.22				
W7	8/5/2010	7.91	3.1	5.57											
W7	9/12/2010														
W7	9/12/2010	8.02	0.8	4.06		6.4			0.7	<0.4	0.22				
W7	10/8/2010	7.85	-2.7	-0.18		8.8			<0.5	<0.4	0.23				
W7	4/27/2011					<5			1.9		0.1				
W7	5/2/2011					<5			1.7		0.08				
W7	6/1/2011					6.1			0.5		0.24				
W7	6/16/2011														
W7	7/1/2011					<0.5									

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Field pH (pH units)	Field Turbidity (NTU)	Field Temp (° C)	Sulphide (mg/L)	Dissolved SO4 (mg/L)	Total SO4 (mg/L)	TT CN (mg/L)	Chloride (mg/L)	Bromine (mg/L)	Fluoride (mg/L)	Chromium 6 (mg/L)	Chromium III (mg/L)	Cu-D-IH (mg/L)	Al-D-IH (mg/L)
W7	8/2/2011								1.8		0.14				
W7	8/16/2011														
W7	8/19/2011														
W7	9/12/2011	7.92		1.9					1.3						
W7	10/6/2011	7.65		0		8.9			1						
W7	11/22/2011								0.8						
W7	1/24/2012					18			0.8		0.43				
W7	2/25/2012	7.16		0.00		17.8			0.9		0.42				
W7	3/5/2012	6.72		0		19			0.5		0.42				
W7	4/24/2012	7.43		0		<0.50			1.4		0.1				
W7	5/6/2012					<0.50			0.58		0.12				
W7	5/6/2012	7.1		0		<0.50			<0.50		0.12				
W7	6/19/2012	7.59		4.1		<0.50			1.1		0.17				
W7	7/17/2012	7.76		5.4		4.63			0.96		0.23				
W7	7/30/2012	7.86		4.4		5.31			0.58		0.28				
W7	8/8/2012	8.44		4.7		5.43			1.2		0.29				
W7	8/23/2012	7.79		4.6		5.23			1.2		0.27				
W7	9/13/2012	7.98		1.9		3.85			1.2		0.18				
W7	10/16/2012	7.89		0.4		7.47			1.2		0.19				
W7	11/2/2012					14.4			0.82		0.29				
W7	12/29/2012	7.97		-0.3		29.1			1.9		0.43				
W7	4/30/2013	8.18		0		24.1			1.4		0.53				
W7	5/14/2013	8.2		0		<0.50			1.5		0.064				
W7	6/19/2013					8.07			1.2		0.25				
W7	6/19/2013	8.6		4.6		7.87			1.1		0.25				
W7	7/13/2013	7.74		3.6		9.73			0.99		0.26				
W7	8/21/2013	7.81		4.2		8.32			0.93		0.27				
W7	9/6/2013	7.75		4		5.66			1.3		0.24				
W7	10/21/2013	7.58		0		10.3			1.3		0.25				
W7	11/16/2013	7.69		-0.1		15.1			1		0.35				
W7	12/7/2013	6.30		0		16.7			1.2		0.31				
C4	5/6/2012	7.51		0		<0.50			0.54		0.14				
C4	8/1/2012	7.75		9.3		3.37			0.89		0.2				
C4	8/8/2012	7.81		7.8		<5.0			<5.0		0.22				
C4	8/25/2012	7.81		6.3		2.19			1.4		0.22				
C4	6/22/2013	7.68		7.3		10.6			1.4		0.27				
C4	7/19/2013	8.20		9.6		7.45			1.5		0.27				
C4	8/22/2013	7.88		7.7		4.75			1.5		0.21				
C4	9/6/2013	7.69		5.3		4.27			1.3		0.19				
C4	10/18/2013					11.1			1.2		0.19				
C4	10/18/2013	7.16		-0.1		38.1			2.4		0.2				
C4	11/17/2013	7.17		-0.1		6.33			2.4		0.29				
C10	5/12/2012	7.89		2.4		<0.50			1.1		0.2				
C10	7/30/2012					<0.50			1.2		0.29				
C10	7/30/2012	8.16		11.2											
C10	8/10/2012	8.71		7.4		<0.50			0.75		4				
C10	8/27/2012	8.3		7.4		<0.50			2		0.24				
C10	6/22/2013	8.29		11.7		0.97			1.3		0.21				
C10	7/23/2013	8.31		7.8		<0.50			1.3		0.21				
C10	8/22/2013	8.18		8.2		<0.50			1.6		0.21				
C10	9/8/2013					<0.50			1.6		0.2				
C10	9/8/2013	8.16		9		<0.50			1.3		0.2				
C10	10/18/2013	7.78		0		3.24			1.5		0.17				

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Cd-D-IH (mg/L)	Se-D-IH (mg/L)	Ag-D (mg/L)	Dissolved Al (mg/L)	Dissolved As (mg/L)	Dissolved Ba (mg/L)	Dissolved B (mg/L)	Dissolved Be (mg/L)	Dissolved Bi (mg/L)	Dissolved Ca (mg/L)	Dissolved Cd (mg/L)	Dissolved Co (mg/L)	Dissolved Cr (mg/L)	Dissolved Cu (mg/L)
W1	5/27/2005			<0.000020	0.0176	0.00051	0.049	<0.10	<0.0010		25	<0.000050	<0.00030	<0.0010	0.0034
W1	6/30/2005			<0.000010	0.0065	0.00048	0.0554	<0.010	<0.00050	<0.00050	37.5	<0.000050	<0.00010	<0.00050	0.00204
W1	7/28/2005			<0.000010	0.0072	0.00048	0.0575	<0.010	<0.00050	<0.00050	40.4	<0.000050	<0.00010	<0.00050	0.00211
W1	8/29/2005			<0.000020	0.0106	0.0006	0.058	<0.10	<0.0010		35.9	<0.000017	<0.00030	<0.0010	0.0024
W1	9/28/2005			<0.000020	0.0143	0.00058	0.055	<0.10	<0.0010		35.3	<0.000017	<0.00030	<0.0010	0.0026
W1	10/15/2005			<0.000010	0.0137	0.00054	0.0492	<0.010	<0.00050	<0.00050	36.8	<0.000050	<0.00010	<0.00050	0.00279
W2	5/27/2005			<0.000020	0.0163	<0.00050	0.05	<0.10	<0.0010		25.6	<0.000050	<0.00030	<0.0010	0.0033
W2	5/27/2005				0.0108		0.032				20.3				
W2	6/30/2005			<0.000010	0.0073	0.00044	0.0574	<0.010	<0.00050	<0.00050	36.9	<0.000050	<0.00010	<0.00050	0.0021
W2	7/28/2005			<0.000010	0.0071	0.00044	0.0604	<0.010	<0.00050	<0.00050	39.6	<0.000050	<0.00010	<0.00050	0.00208
W2	8/30/2005			<0.000020	0.0119	0.00058	0.059	<0.10	<0.0010		35.7	<0.000017	<0.00030	<0.0010	0.0024
W2	9/28/2005			<0.000020	0.0141	0.00059	0.055	<0.10	<0.0010		35.2	<0.000017	<0.00030	<0.0010	0.0025
W2	10/15/2005			<0.000010	0.0129	0.00053	0.0492	<0.010	<0.00050	<0.00050	35.9	<0.000050	<0.00010	<0.00050	0.00271
W3	5/27/2005			<0.000020	0.0267	<0.00050	0.041	<0.10	<0.0010		22	<0.000050	<0.00030	<0.0010	0.0066
W3	6/30/2005			<0.000010	0.008	0.00034	0.0507	<0.010	<0.00050	<0.00050	38.5	<0.000050	<0.00010	<0.00050	0.00336
W3	7/29/2005			<0.000010	0.0113	0.00041	0.0553	<0.010	<0.00050	<0.00050	38	<0.000050	0.0001	<0.00050	0.00478
W3	8/29/2005			<0.000020	0.0184	<0.00050	0.057	<0.10	<0.0010		31.8	<0.000017	<0.00030	<0.0010	0.005
W3	9/28/2005			<0.000020	0.0257	<0.00050	0.055	<0.10	<0.0010		30.4	<0.000017	<0.00030	<0.0010	0.0057
W3	10/15/2005			<0.000010	0.0223	0.00043	0.0475	<0.010	<0.00050	<0.00050	31.6	<0.000050	0.00016	<0.00050	0.00608
W8	5/27/2005			<0.000020	0.0427	<0.00050	0.039	<0.10	<0.0010		16.6	<0.000050	<0.00030	<0.0010	0.0141
W8	6/30/2005			<0.000010	0.0193	0.00043	0.0466	<0.010	<0.00050	<0.00050	24.8	<0.000050	<0.00010	0.00061	0.00942
W8	7/29/2005			<0.000010	0.0201	0.00045	0.0538	<0.010	<0.00050	<0.00050	30.9	<0.000050	0.00014	0.00052	0.00863
W8	8/30/2005			<0.000020	0.0259	<0.00050	0.054	<0.10	<0.0010		26.3	<0.000017	<0.00030	<0.0010	0.0081
W8	9/28/2005			<0.000020	0.0305	<0.00050	0.049	<0.10	<0.0010		25.3	<0.000017	<0.00030	<0.0010	0.0081
W8	10/15/2005			0.000031	0.0258	0.0005	0.0479	<0.010	<0.00050	<0.00050	26.8	<0.000050	0.00028	<0.00050	0.00561
W9	5/27/2005			<0.000020	0.0718	<0.00050	0.042	<0.10	<0.0010		12.9	<0.000050	<0.00030	<0.0010	0.0035
W9	6/30/2005			<0.000010	0.0345	0.00054	0.0525	<0.010	<0.00050	<0.00050	18.9	<0.000050	0.00018	<0.00050	0.00184
W9	7/29/2005			<0.000010	0.0298	0.00057	0.056	<0.010	<0.00050	<0.00050	25.9	<0.000050	0.00018	<0.00050	0.00334
W9	8/29/2005			<0.000020	0.0449	0.00058	0.055	<0.10	<0.0010		19.1	0.000022	<0.00030	<0.0010	0.0017
W9	9/28/2005			<0.000020	0.0578	<0.00050	0.049	<0.10	<0.0010		17.7	<0.000017	<0.00030	<0.0010	0.0022
W9	10/15/2005			<0.000010	0.056	0.00039	0.0421	<0.010	<0.00050	<0.00050	16.6	<0.000050	0.00016	<0.00050	0.00209
W10	5/27/2005			<0.000020	0.135	<0.00050	0.052	<0.10	<0.0010		13.1	<0.000050	<0.00030	<0.0010	0.0184
W10	5/27/2005			<0.00002		<0.0005		<0.1	<0.001			<0.00005	<0.0003	<0.001	<0.001
W10	6/30/2005			<0.000010	0.113	0.00059	0.0396	<0.010	<0.00050	<0.00050	13.1	<0.000050	0.00046	0.00062	0.00472
W10	7/29/2005			<0.000010	0.0683	0.00037	0.0369	<0.010	<0.00050	<0.00050	14.7	<0.000050	0.00011	<0.00050	0.00437
W10	8/29/2005			<0.000020	0.0433	<0.00050	0.044	<0.10	<0.0010		18.2	<0.000017	<0.00030	<0.0010	0.004
W10	9/28/2005			<0.000020	0.0302	<0.00050	0.057	<0.10	<0.0010		25.8	<0.000017	<0.00030	<0.0010	0.0033
W10	10/15/2005			<0.000010	0.0361	0.0003	0.0487	<0.010	<0.00050	<0.00050	25.4	<0.000050	<0.00010	<0.00050	0.00412
W6	5/27/2005			<0.000020	0.0144	<0.00050	0.035	<0.10	<0.0010		17.9	<0.000050	<0.00030	<0.0010	0.0016
W6	6/30/2005			<0.000010	0.0056	0.00039	0.0429	<0.010	<0.00050	<0.00050	25.2	<0.000050	<0.00010	<0.00050	0.00101
W6	7/29/2005			<0.000010	0.007	0.00026	0.0668	<0.010	<0.00050	<0.00050	46.9	<0.000050	<0.00010	<0.00050	0.00247
W6	8/30/2005			<0.000020	0.0067	<0.00050	0.053	<0.10	<0.0010		29	<0.000017	<0.00030	<0.0010	0.001
W6	9/28/2005			<0.000020	0.0067	<0.00050	0.048	<0.10	<0.0010		28.8	<0.000017	<0.00030	<0.0010	0.0011
W6	10/15/2005			<0.000010	0.0769	0.00042	0.0419	<0.010	<0.00050	<0.00050	26.7	<0.000050	<0.00010	<0.00050	0.00108
W6	6/2/2006			<0.00001	0.0252	0.00044	0.0315	<0.01	<0.0005	<0.0005	17.8	<0.00005	<0.0001	<0.0005	0.00175
W6	8/25/2006										31.7				
W6	9/6/2006			<0.0001	0.008	0.0005	0.051	<0.002	<0.0001	<0.0005	30	<0.00001	0.0001	0.0006	0.001
W6	6/20/2007														
W6	9/18/2007														
W6	6/17/2008														
W6	9/18/2008			<0.00001	0.012	0.0004	0.039	<0.004	<0.00004		23.7	<0.00001	0.00022	0.0013	0.002
W6	4/14/2009			<0.00001	0.038	0.0004	0.046	0.017	<0.00004	<0.0001	23.6	0.00002	0.00033	0.0004	0.043
W6	4/30/2009			<0.00001	0.097	0.0003	0.026	0.007	<0.00004	<0.0001	14.5	0.00023	0.00014	0.0007	0.008
W6	7/28/2009														
W6	8/6/2009														
W6	8/6/2009														
W6	8/18/2009			<0.00001	0.03	0.0004	0.101	0.023	<0.00004	<0.001	46.1	<0.00001	0.00014	0.001	0.004
W6	8/25/2009														
W6	10/7/2009														
W6	10/7/2009														
W6	10/25/2009			<0.00002	0.023	0.0003	0.118	<0.05	<0.0001	<0.001	57.9	0.00001	<0.0005	<0.001	0.0021
W6	4/19/2010			<0.00001	0.024	0.0002	0.048	0.009	<0.00004	<0.001	32.3	0.00003	0.00016	<0.0004	0.019
W6	5/16/2010			<0.00002	<0.003	0.0004	0.025	<0.05	<0.0001	<0.001	25.4	<0.00001	<0.0005	<0.001	0.0015
W6	5/17/2010			<0.00002	0.009	0.0003	0.033	<0.05	<0.0001	<0.001	20.8	<0.00001	<0.0005	<0.001	0.0022
W6	5/19/2010			<0.00002	0.004	0.0003	0.039	<0.05	<0.0001	<0.001	26	<0.00001	<0.0005	<0.001	0.0027
W6	5/21/2010			<0.0001	<0.01	<0.0004	0.04	<0.1	<0.0002	<0.001	25	<0.0001	<0.0005	<0.002	0.003
W6	5/23/2010			<0.0001	<0.01	<0.0004	0.046	<0.1	<0.0002	<0.001	28	<0.0001	<0.0005	<0.002	0.003
W6	5/25/2010			<0.0001	<0.01	<0.0004	0.045	<0.1	<0.0005	<0.001	29	<0.0001	<0.0005	<0.002	0.006
W6	5/29/2010			<0.0001	<0.01	<0.0004	0.037	<0.1	<0.0002	<0.001	21	<0.0001	<0.0005	<0.002	0.003
W6	6/2/2010			<0.0001	<0.01	<0.0004	0.074	<0.1	<0.0002	<0.001	56	<0.0001	<0.0005	<0.002	0.001
W6	6/4/2010			<0.0001	<0.01	<0.0004	0.043	<0.1	<0.0002	<0.001	23	<0.0001	<0.0005	<0.002	<0.001
W6	6/6/2010			<0.0001	<0.01	0.0004	0.046	<0.1	<0.0002	<0.001	27	<0.0001	<0.0005	<0.002	0.001
W6	6/14/2010			<0.0001	<0.01	<0.0004	0.038	<0.1	<0.0002	<0.001	25	<0.0001	<0.0005	<0.002	0.001
W6	6/16/2010			<0.0001	<0.01	0.0005	0.044	<0.1	<0.0002	<0.001	25	<0.0001	<0.0005	<0.002	0.006
W6	6/18/2010			<0.0001	<0.01	<0.00									

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Cd-D-IH (mg/L)	Se-D-IH (mg/L)	Ag-D (mg/L)	Dissolved Al (mg/L)	Dissolved As (mg/L)	Dissolved Ba (mg/L)	Dissolved B (mg/L)	Dissolved Be (mg/L)	Dissolved Bi (mg/L)	Dissolved Ca (mg/L)	Dissolved Cd (mg/L)	Dissolved Co (mg/L)	Dissolved Cr (mg/L)	Dissolved Cu (mg/L)
W7	6/15/2006														
W7	6/15/2006			<0.0001	0.013	0.0004	0.063	0.003	<0.0001	<0.0005	26.9	<0.00001	0.0001	<0.0005	0.001
W7	6/23/2006			<0.0001	0.011	0.0005	0.067	0.002	<0.0001	<0.0005	31.8	<0.00001	0.0001	0.0007	<0.001
W7	6/28/2006			<0.0001	0.407	0.0008	0.079	0.002	<0.0001	<0.0005	22.8	0.00003	0.0009	0.0015	0.003
W7	7/7/2006			<0.0001	<0.005	0.0006	0.067	0.005	<0.0001	0.0007	26.5	<0.00001	<0.0001	0.0011	0.001
W7	7/12/2006			<0.0001	0.006	0.0005	0.064	0.005	<0.0001	0.0007	26.9	<0.00001	<0.0001	0.001	0.001
W7	7/20/2006			<0.0001	0.006	0.0004	0.068	0.004	<0.0001	<0.0005	33	<0.00001	<0.0001	0.0007	<0.001
W7	7/26/2006														
W7	7/26/2006			<0.0001	0.008	0.0004	0.072	<0.002	<0.0001	<0.0005	33.4	<0.00001	<0.0001	<0.0005	0.002
W7	8/2/2006			<0.0001	0.008	<0.0002	0.07	0.004	<0.0001	<0.0005	33.3	<0.00001	<0.0001	<0.0005	0.001
W7	8/10/2006			<0.0001	0.009	0.0005	0.073	0.005	<0.0001	<0.0005	32.9	<0.00001	<0.0001	0.0007	0.001
W7	8/25/2006														
W7	8/25/2006			<0.0001	0.012	0.0004	0.071	0.005	<0.0001	<0.0005	32.4	<0.00001	0.0002	0.0006	0.001
W7	8/30/2006			<0.0001	0.013	0.0004	0.067	0.004	<0.0001	<0.0005	33.6	<0.00001	0.0001	0.0008	0.002
W7	9/6/2006			<0.0001	0.005	0.0005	0.068	0.005	<0.0001	<0.0005	33.5	<0.00001	<0.0001	0.0008	0.002
W7	9/13/2006			<0.0001	0.008	0.0003	0.064	0.005	<0.0001	<0.0005	32.3	<0.00001	<0.0001	0.0009	0.001
W7	9/20/2006			<0.0001	0.007	0.0005	0.069	0.005	<0.0001	<0.0005	33.5	0.00028	<0.0001	0.0007	0.001
W7	9/28/2006			<0.0001	0.011	0.0004	0.071	0.003	<0.0001	<0.0005	33.3	<0.00001	<0.0001	0.0008	0.001
W7	10/4/2006			<0.0001	<0.005	0.0003	0.068	0.004	<0.0001	<0.0005	32.6	<0.00001	<0.0001	<0.0005	<0.001
W7	10/12/2006			<0.0001	0.007	0.0004	0.067	0.005	<0.0001	<0.0005	34	<0.00001	<0.0001	<0.0005	0.001
W7	6/5/2007														
W7	6/5/2007														
W7	6/5/2007														
W7	6/20/2007			<0.0001	0.014	0.0004	0.06	0.005	<0.0001	<0.0005	29.6	<0.00001	<0.0001	0.0006	0.002
W7	7/18/2007			<0.0001	0.011	0.0005	0.066	0.005	<0.0001	<0.0005	32	<0.00001	<0.0001	0.001	0.002
W7	7/18/2007														
W7	7/18/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	9/18/2007			<0.0001	0.007	0.0004	0.059	0.004	<0.0001	<0.0005	26.9	<0.00001	<0.0001	0.0016	0.001
W7	10/30/2007														
W7	10/30/2007														
W7	10/30/2007														
W7	4/22/2008			<0.0010	<0.02	<0.0002	0.075	<0.005	<0.00004		40.9	<0.00008	0.00008	0.0012	<0.001
W7	4/22/2008			<0.0010	<0.02	0.0004	0.08	<0.005	<0.00004		42.2	<0.00008	0.00012	0.0014	0.002
W7	4/22/2008			<0.0010	<0.02	0.0003	0.073	<0.005	<0.00004		39.9	<0.00008	0.00023	<0.0006	0.001
W7	4/22/2008														
W7	6/3/2008														
W7	6/3/2008														
W7	6/3/2008			<0.00001	<0.01	<0.0002	0.05	<0.004	<0.00004		23.2	<0.00008	0.00011	0.0013	<0.001
W7	6/17/2008			<0.00001	0.02	<0.0002	0.056	0.006	<0.00004			<0.00008	0.00014	0.0013	0.001
W7	8/6/2008														
W7	8/6/2008														
W7	8/6/2008														
W7	8/6/2008			0.00006	0.014	0.0004	0.068	0.004	<0.0001	<0.0005	31.8	<0.00001	0.0001	0.0006	0.002
W7	9/18/2008			<0.00001	0.07	0.0003	0.043	<0.004	<0.00004		20	<0.00001	0.00025	0.0016	0.004
W7	10/28/2008														
W7	10/28/2008														
W7	10/28/2008			<0.00001	0.009	0.0005	0.061	0.006	<0.00004		30.5	<0.00001	0.0001	0.0005	0.001
W7	4/30/2009			<0.00001	0.053	<0.0002	0.01	<0.004	<0.00004	<0.0001	5.23	0.00008	0.0001	0.0006	0.005
W7	6/8/2009			<0.00001	0.013	0.0003	0.052	<0.004	<0.00004	<0.0001	23.8	<0.00001	0.00013	<0.0004	0.002
W7	7/28/2009														
W7	8/6/2009														
W7	8/24/2009														
W7	8/25/2009														
W7	8/31/2009			<0.00001	0.01	0.0004	0.056	<0.004	<0.00004	<0.001	29.1	<0.00001	0.0001	0.0012	0.004
W7	10/7/2009														
W7	10/7/2009														
W7	10/25/2009			<0.00002	0.007	0.0003	0.067	<0.05	<0.0001	<0.001	32.6	0.00004	<0.0005	<0.001	0.0012
W7	10/25/2009														
W7	4/19/2010			<0.00001	0.019	0.0003	0.039	<0.004	<0.00004	<0.001	19.9	0.00002	0.00017	0.0004	0.006
W7	4/27/2010			<0.00002	0.075	0.0003	0.022	<0.05	<0.0001	<0.001	9.79	<0.00001	<0.0005	<0.001	0.0041
W7	4/29/2010			<0.00002	0.065	0.0003	0.023	<0.05	<0.0001	<0.001	9.79	<0.00001	<0.0005	<0.001	0.0034
W7	5/1/2010			<0.00002	0.053	0.0004	0.025	<0.05	<0.0001	<0.001	11	0.00002	<0.0005	<0.001	0.0032
W7	5/3/2010			<0.00002	0.047	0.0004	0.027	<0.05	<0.0001	<0.001	12	<0.00001	<0.0005	<0.001	0.0027
W7	5/5/2010			<0.00002	0.038	0.0005	0.03	<0.05	<0.0001	<0.001	12.9	<0.00001	<0.0005	<0.001	0.0025
W7	5/7/2010			<0.00002	0.028	0.0004	0.034	<0.05	<0.0001	<0.001	14.7	0.00001	<0.0005	<0.001	0.0026
W7	5/9/2010			<0.00002	0.023	0.0004	0.044	<0.05	<0.0001	<0.001	20.5	<0.00001	<0.0005	<0.001	0.0018
W7	5/10/2010			<0.00002	0.021	0.0004	0.046	<0.05	<0.0001	<0.001	20.7	0.00002	<0.0005	<0.001	0.0022
W7	5/12/2010														
W7	5/12/2010			<0.00002	0.017	0.0004	0.046	<0.05	<0.0001	<0.001	21.1	<0.00001	<0.0005	<0.001	0.0016
W7	5/14/2010			<0.00002	0.096	0.0004	0.044	<0.05	<0.0001	<0.001	18.7	0.00001	<0.0005	<0.001	0.0031
W7	5/16/2010			<0.00002	0.012	0.0003	0.045	<0.05	<0.0001	<0.001	22.3	<0.00001	<0.0005	<0.001	0.0013
W7	5/17/2010			<0.00002	0.018	0.0004	0.043	<0.05	<0.0001	<0.001	20.9	<0.00001	<0.0005	<0.001	0.0012
W7	5/19/2010			<0.00002	0.016	0.0003	0.049	<0.05	<0.0001	<0.001	24.4	<0.00001	<0.0005	<0.001	0.0017
W7	5/21/2010			<0.0001	0.013	<0.0004	0.05	<0.1	<0.0002	<0.001	24	<0.0001	<0.0005	<0.002	0.001
W7	5/23/2010			<0.0001	0.017	<0.0004	0.053	<0.1	<0.0002	<0.001	25	<0.0001	<0.0005	<0.002	0.001
W7	5/25/2010			<0.0001	0.024	<0.001	0.065	<0.1	<0.0005	<0.001	30	<0.0001	<0.0005	<0.002	0.003
W7	5/27/2010			<0.0001	0.028	<0.001	0.055	<0.1	<0.0005	<0.001	27	<0.0001	<0.0005	<0.002	0.003
W7	5/29/2010			<0.0001	0.017	0.0005	0.056	<0.1	<0.0002	<0.001	29	<0.0001	<0.0005	<0.002	0.002
W7	5/31/2010			<0.0001	0.02	<0.0004	0.058	<0.1	<0.0002	<0.001	27	<0.0001	<0.0005	<0.002	0.002
W7	6/2/2010			<0.0001	0.012	0.0004	0.058	<0.1	<0.0002	<0.001	29	<0.0001	<0.0005	<0.002	0.001
W7	6/4/2010			<0.0001	0.013	0.0004	0.058	<0.1	<0.0002	<0.001	29	<0.0001	<0.0005	<0.002	0.001
W7	6/6/2010			<0.0001	<0.01	<0.0004	0.062	<0.1	<0.0002	<0.001	33	<0.0001	<0.0005	<0.002	0.001
W7	6/14/2010			<											

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Cd-D-IH (mg/L)	Se-D-IH (mg/L)	Ag-D (mg/L)	Dissolved Al (mg/L)	Dissolved As (mg/L)	Dissolved Ba (mg/L)	Dissolved B (mg/L)	Dissolved Be (mg/L)	Dissolved Bi (mg/L)	Dissolved Ca (mg/L)	Dissolved Cd (mg/L)	Dissolved Co (mg/L)	Dissolved Cr (mg/L)	Dissolved Cu (mg/L)
W7	8/2/2011			<0.00002	0.051	0.0007	0.048	<0.05	<0.0001	<0.001	15.6	0.00002	<0.0005	<0.001	0.0041
W7	8/16/2011			<0.00002	0.036	0.0007	0.057	<0.05	<0.0001	<0.001	26	<0.00001	<0.0005	<0.001	0.0019
W7	8/19/2011			<0.00002	0.033	0.0008	0.053	<0.05	<0.0001	<0.001	24.2	0.00001	<0.0005	<0.001	0.002
W7	9/12/2011			<0.00002	0.024	0.0007	0.061	<0.05	<0.0001	<0.001	30.8	0.00001	<0.0005	<0.001	0.0016
W7	10/6/2011			<0.00002	0.013	0.0006	0.057	<0.05	<0.0001	<0.001	27.9	0.00003	<0.0005	<0.001	0.0012
W7	11/22/2011			<0.000020	0.0076	0.0004	0.075	<0.05	<0.00010	<0.0010	38.3	<0.000010	<0.00050	<0.0010	0.00109
W7	1/24/2012			<0.000020	0.0053	0.00041	0.0882	<0.05	<0.00010	<0.0010	43	0.000035	<0.00050	<0.0010	0.00114
W7	2/25/2012			<0.000020	0.0211	0.00033	0.0796	<0.05	<0.00010	<0.0010	41.2	0.000064	<0.00050	<0.0010	0.0154
W7	3/5/2012			<0.000020	0.0031	0.00039	0.0803	<0.05	<0.00010	<0.0010	41.2	<0.000010	<0.00050	<0.0010	0.00122
W7	4/24/2012			<0.000020	0.0499	0.00048	0.0319	<0.05	<0.00010	<0.0010	10.2	0.000023	<0.00050	<0.0010	0.00523
W7	5/6/2012			<0.000020	0.0298	0.00043	0.0319	<0.05	<0.00010	<0.0010	12	0.000013	<0.00050	<0.0010	0.00303
W7	5/6/2012			<0.000020	0.0442	0.00044	0.0324	<0.05	<0.00010	<0.0010	11.9	0.000016	<0.00050	<0.0010	0.00273
W7	6/19/2012			<0.000020	0.0265	0.0007	0.0543	<0.05	<0.00010	<0.0010	23.5	<0.000010	<0.00050	<0.0010	0.00163
W7	7/17/2012			<0.000020	0.0197	0.00086	0.0706	<0.05	<0.00010	<0.0010	33	0.000012	<0.00050	<0.0010	0.00127
W7	7/30/2012			<0.000020	0.0171	0.00095	0.0727	<0.05	<0.00010	<0.0010	33.9	<0.000010	<0.00050	<0.0010	0.00123
W7	8/8/2012			<0.000020	0.0184	0.001	0.0769	<0.05	<0.00010	<0.0010	35.9	<0.000010	<0.00050	<0.0010	0.00112
W7	8/23/2012			<0.000020	0.0178	0.00088	0.0756	<0.05	<0.00010	<0.0010	35.7	<0.000010	<0.00050	<0.0010	0.0017
W7	9/13/2012			<0.000020	0.0239	0.00074	0.0599	<0.05	<0.00010	<0.0010	30.1	<0.000010	<0.00050	<0.0010	0.00244
W7	10/16/2012			<0.000020	0.0114	0.0006	0.0633	<0.05	<0.00010	<0.0010	33.2	<0.000010	<0.00050	<0.0010	0.00094
W7	11/2/2012			<0.000020	0.0095	0.00053	0.0862	<0.05	<0.00010	<0.0010	39.3	0.000031	<0.00050	<0.0010	0.00236
W7	12/29/2012			<0.000020	0.0061	0.00051	0.119	<0.05	<0.00010	<0.0010	56.1	<0.000010	<0.00050	<0.0010	0.00232
W7	4/30/2013			<0.000020	0.0031	0.00025	0.101	<0.05	<0.00010	<0.0010	46.8	<0.000010	<0.00050	<0.0010	0.00108
W7	5/14/2013			<0.000020	0.0436	0.00029	0.023	<0.05	<0.00010	<0.0010	8.81	0.00001	<0.00050	<0.0010	0.00365
W7	6/19/2013			<0.000020	0.0125	0.00052	0.0665	<0.05	<0.00010	<0.0010	29.9	<0.000010	<0.00050	<0.0010	0.00116
W7	6/19/2013			<0.000020	0.0134	0.00051	0.0664	<0.05	<0.00010	<0.0010	30	<0.000010	<0.00050	<0.0010	0.00124
W7	7/13/2013			<0.000020	0.0138	0.00053	0.072	<0.05	<0.00010	<0.0010	34.9	<0.000010	<0.00050	<0.0010	0.00121
W7	8/21/2013			<0.000020	0.0122	0.00056	0.0737	<0.05	<0.00010	<0.0010	35.2	<0.000010	<0.00050	<0.0010	0.00101
W7	9/6/2013			<0.000020	0.016	0.00081	0.0718	<0.05	<0.00010	<0.0010	34.9	<0.000010	<0.00050	<0.0010	0.00113
W7	10/21/2013			<0.000020	0.0093	0.00067	0.0715	<0.05	<0.00010	<0.0010	38	<0.000010	<0.00050	<0.0010	0.00111
W7	11/16/2013			<0.000020	0.0053	0.00048	0.08	<0.05	<0.00010	<0.0010	39.4	<0.000010	<0.00050	<0.0010	0.0008
W7	12/7/2013			<0.000020	0.0035	0.00053	0.0919	<0.05	<0.00010	<0.0010	43.3	<0.000010	<0.00050	<0.0010	0.00078
C4	5/6/2012			<0.000020	0.0622	0.00104	0.0488	<0.05	<0.00010	<0.0010	12	0.000029	0.00071	<0.0010	0.00314
C4	8/1/2012			<0.000020	0.059	0.00184	0.0984	<0.05	<0.00010	<0.0010	31.9	<0.000010	0.00111	<0.0010	0.00181
C4	8/8/2012			<0.000020	0.0425	0.00203	0.0987	<0.05	<0.00010	<0.0010	33.7	<0.000010	0.00108	<0.0010	0.00132
C4	8/25/2012			<0.000020	0.04	0.00197	0.098	<0.05	<0.00010	<0.0010	35	<0.000010	0.00113	<0.0010	0.00176
C4	6/22/2013			<0.000020	0.0342	0.00225	0.075	<0.05	<0.00010	<0.0010	35	<0.000010	0.00063	<0.0010	0.0017
C4	7/19/2013			<0.000020	0.0317	0.00207	0.0699	<0.05	<0.00010	<0.0010	36	<0.000010	0.00062	<0.0010	0.00137
C4	8/22/2013			<0.000020	0.0455	0.00179	0.0794	<0.05	<0.00010	<0.0010	33.1	<0.000010	0.00073	<0.0010	0.00143
C4	9/6/2013			<0.000020	0.0405	0.00196	0.0798	<0.05	<0.00010	<0.0010	34.2	<0.000010	0.00092	<0.0010	0.00161
C4	10/18/2013			<0.000020	0.0221	0.00106	0.0735	<0.05	<0.00010	<0.0010	34.2	<0.000010	0.00079	<0.0010	0.00112
C4	10/18/2013			<0.000020	0.0249	0.00107	0.0732	<0.05	<0.00010	<0.0010	34.5	<0.000010	0.00074	<0.0010	0.00118
C4	11/17/2013			<0.000020	0.033	0.00559	0.169	<0.05	<0.00010	<0.0010	72.1	0.000022	0.00611	0.0013	0.00095
C10	5/12/2012			<0.000020	0.0583	0.0012	0.0501	<0.05	<0.00010	<0.0010	19.9	0.000018	0.00054	<0.0010	0.00212
C10	7/30/2012			<0.000020	0.0571	0.00142	0.0795	<0.05	<0.00010	<0.0010	38.8	<0.000010	<0.00050	<0.0010	0.00198
C10	7/30/2012														
C10	8/10/2012			<0.000020	0.0505	0.00134	0.0786	<0.05	<0.00010	<0.0010	39.8	<0.000010	<0.00050	<0.0010	0.00189
C10	8/27/2012			<0.000020	0.0262	0.00149	0.0804	<0.05	<0.00010	<0.0010	41.8	<0.000010	<0.00050	<0.0010	0.00148
C10	6/22/2013			<0.000020	0.0785	0.00123	0.0721	<0.05	<0.00010	<0.0010	45.1	0.000019	<0.00050	<0.0010	0.00313
C10	7/23/2013			<0.000020	0.0252	0.00116	0.0668	<0.05	<0.00010	<0.0010	37.4	<0.000010	<0.00050	<0.0010	0.00135
C10	8/22/2013			<0.000020	0.0197	0.00141	0.0724	<0.05	<0.00010	<0.0010	48	<0.000010	<0.00050	<0.0010	0.00134
C10	9/8/2013			<0.000020	0.0254	0.00166	0.0764	<0.05	<0.00010	<0.0010	45	<0.000010	0.00058	<0.0010	0.00125
C10	9/8/2013			<0.000020	0.0241	0.00158	0.0763	<0.05	<0.00010	<0.0010	44.8	0.00001	0.0006	0.0017	0.00133
C10	10/18/2013			<0.000020	0.0108	0.00089	0.0599	<0.05	<0.00010	<0.0010	40.1	<0.000010	<0.00050	<0.0010	0.00091

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Dissolved Fe (mg/L)	Dissolved Hg (mg/L)	Dissolved K (mg/L)	Dissolved Li (mg/L)	Dissolved Mg (mg/L)	Dissolved Mn (mg/L)	Dissolved Mo (mg/L)	Dissolved Na (mg/L)	Dissolved Ni (mg/L)	Dissolved Pb (mg/L)	Dissolved P (mg/L)	Dissolved Sb (mg/L)	Dissolved S (mg/L)	Dissolved Se (mg/L)
W1	5/27/2005	0.172	<0.000020	<2.0	<0.0050	8.46	0.00579	<0.0010	4.9	0.0015	<0.00050		<0.00050		<0.0010
W1	6/30/2005	0.046		<2.0	<0.0050	12.6	0.00391	0.00106	8.8	0.00096	<0.00050	<0.30	<0.00010		<0.0010
W1	7/28/2005	0.056		<2.0	<0.0050	13.6	0.0119	0.00131	9.2	0.0011	0.00073	<0.30	<0.00010		<0.0010
W1	8/29/2005	0.25	<0.000020	<2.0	<0.0050	11.7	0.0157	0.001	6.9	0.0014	<0.00050		<0.00050		<0.0010
W1	9/28/2005	0.331	<0.000020	<2.0	<0.0050	11.2	0.0355	<0.0010	6.2	0.0016	<0.00050		<0.00050		<0.0010
W1	10/15/2005	0.266		<2.0	<0.0050	11.7	0.0228	0.000892	6.4	0.0014	<0.00050	<0.30	<0.00010		<0.0010
W2	5/27/2005	0.164	<0.000020	<2.0	<0.0050	8.72	0.00507	<0.0010	5	0.0015	<0.00050		<0.00050		<0.0010
W2	5/27/2005					5.19	0.00345								
W2	6/30/2005	0.039		<2.0	<0.0050	12.3	0.00684	0.00108	8.6	0.00102	<0.00050	<0.30	<0.00010		<0.0010
W2	7/28/2005	0.05		<2.0	<0.0050	13.2	0.014	0.00127	8.7	0.00112	<0.00050	<0.30	<0.00010		<0.0010
W2	8/30/2005	0.234	<0.000020	<2.0	<0.0050	11.7	0.0152	0.001	7	0.0015	<0.00050		<0.00050		<0.0010
W2	9/28/2005	0.338	<0.000020	<2.0	<0.0050	11.2	0.0341	<0.0010	6.2	0.0017	<0.00050		<0.00050		<0.0010
W2	10/15/2005	0.246		<2.0	<0.0050	11.5	0.0208	0.000859	6.3	0.00141	<0.00050	<0.30	<0.00010		<0.0010
W3	5/27/2005	0.116	<0.000020	<2.0	<0.0050	9.48	0.0094	<0.0010	5.2	0.0014	<0.00050		<0.00050		<0.0010
W3	6/30/2005	0.042		<2.0	<0.0050	17.4	0.0052	0.00163	11.7	0.00078	0.000241	<0.30	<0.00010		<0.0010
W3	7/29/2005	0.134		<2.0	<0.0050	17.3	0.0311	0.00158	9.7	0.00115	<0.00050	<0.30	<0.00010		<0.0010
W3	8/29/2005	0.306	<0.000020	<2.0	<0.0050	13.6	0.0657	0.0013	8	0.0014	<0.00050		<0.00050		<0.0010
W3	9/28/2005	0.421	<0.000020	<2.0	<0.0050	12.8	0.102	0.0011	7.7	0.0014	<0.00050		<0.00050		<0.0010
W3	10/15/2005	0.39		<2.0	<0.0050	13.4	0.112	0.00122	7.5	0.00121	<0.00050	<0.30	<0.00010		<0.0010
W8	5/27/2005	0.194	<0.000020	<2.0	<0.0050	5.05	0.00284	<0.0010	2.6	0.0018	<0.00050		<0.00050		<0.0010
W8	6/30/2005	0.249		<2.0	<0.0050	7.68	0.0142	0.000547	4.5	0.00144	<0.00050	<0.30	<0.00010		<0.0010
W8	7/29/2005	0.352		<2.0	<0.0050	9.39	0.0206	0.000589	3.9	0.00157	<0.00050	<0.30	<0.00010		<0.0010
W8	8/30/2005	0.544	<0.000020	<2.0	<0.0050	8.28	0.0296	<0.0010	3.9	0.0016	<0.00050		<0.00050		<0.0010
W8	9/28/2005	0.556	<0.000020	<2.0	<0.0050	7.73	0.0387	<0.0010	3.9	0.0015	<0.00050		<0.00050		<0.0010
W8	10/15/2005	0.711		<2.0	<0.0050	7.92	0.223	0.00169	4.8	0.00096	<0.00050	<0.30	<0.00010		<0.0010
W9	5/27/2005	0.251	0.000038	<2.0	<0.0050	4.18	0.00696	<0.0010	2.3	0.0013	<0.00050		<0.00050		<0.0010
W9	6/30/2005	0.53		<2.0	<0.0050	6.05	0.0378	0.000365	4.1	0.00119	<0.00050	<0.30	<0.00010		<0.0010
W9	7/29/2005	0.647		<2.0	<0.0050	7.46	0.057	0.00108	4	0.00132	0.000185	<0.30	<0.00010		<0.0010
W9	8/29/2005	0.67	<0.000020	<2.0	<0.0050	6.3	0.0606	<0.0010	3.6	0.0012	<0.00050		<0.00050		<0.0010
W9	9/28/2005	0.602	<0.000020	<2.0	<0.0050	5.69	0.0451	<0.0010	3.2	0.0011	<0.00050		<0.00050		<0.0010
W9	10/15/2005	0.438		<2.0	<0.0050	5.55	0.0335	0.000313	3.1	0.00096	<0.00050	<0.30	<0.00010		<0.0010
W10	5/27/2005	0.106	<0.000020	<2.0	<0.0050	3.31	0.00042	<0.0010	<2.0	0.0016	<0.00050		<0.00050		<0.0010
W10	5/27/2005	<0.03	<0.00002	<2.0	<0.005		0.00271	<0.001	<2	<0.001	<0.0005		<0.0005		<0.001
W10	6/30/2005	0.401		<2.0	<0.0050	3.68	0.0299	0.000144	3.5	0.00179	0.000082	<0.30	<0.00010		<0.0010
W10	7/29/2005	0.099		<2.0	<0.0050	4.39	0.00483	0.000137	4.7	0.00123	0.000112	<0.30	<0.00010		<0.0010
W10	8/29/2005	0.081	<0.000020	<2.0	<0.0050	5.95	0.00447	<0.0010	5.4	0.0016	<0.00050		<0.00050		<0.0010
W10	9/28/2005	0.048	<0.000020	<2.0	<0.0050	8.93	0.00069	<0.0010	5.4	<0.0010	<0.00050		<0.00050		<0.0010
W10	10/15/2005	0.055		<2.0	<0.0050	8.98	0.000385	0.000241	4.7	0.00073	<0.00050	<0.30	<0.00010		<0.0010
W6	5/27/2005	0.072	<0.000020	<2.0	<0.0050	5.01	0.00543	<0.0010	2.8	0.0015	<0.00050		<0.00050		<0.0010
W6	6/30/2005	<0.030		<2.0	<0.0050	6.72	0.00324	0.000448	4.8	0.00099	<0.00050	<0.30	<0.00010		<0.0010
W6	7/29/2005	0.062		<2.0	<0.0050	13.2	0.0145	0.000818	7.3	0.0006	0.000083	<0.30	<0.00010		<0.0010
W6	8/30/2005	0.064	<0.000020	<2.0	<0.0050	8.1	0.0211	<0.0010	4.6	0.0011	<0.00050		<0.00050		<0.0010
W6	9/28/2005	0.1	<0.000020	<2.0	<0.0050	8.25	0.0245	<0.0010	4.4	0.0012	<0.00050		<0.00050		<0.0010
W6	10/15/2005	0.088		<2.0	<0.0050	7.66	0.0162	0.000395	4.5	0.00118	<0.00050	<0.30	<0.00010		<0.0010
W6	6/2/2006	0.096		<2	<0.005	4.95	0.00673	0.000305	3.3	0.00182	<0.0005	<0.3	<0.0001		<0.001
W6	8/25/2006					8.7									
W6	9/6/2006	0.11		0.6	0.001	7.7	0.046	<0.001	4.8	0.0006	<0.0001		<0.0002	0.9	<0.0002
W6	6/20/2007														
W6	9/18/2007														
W6	6/17/2008														
W6	9/18/2008	0.09	<0.00001	0.4	<0.001	6.33	0.0099	0.00027	4.27	0.002	<0.0001	0.02	0.0008		0.0012
W6	4/14/2009	0.06	<0.00001	7.4	0.004	45.8	0.0307	0.00312	35.1	<0.001	0.0002	0.13	0.003	34.5	0.0011
W6	4/30/2009	0.12	0.00001	1.9	<0.001	4.9	0.0147	0.00042	3	0.001	0.0003	0.05	0.0006	2.5	<0.0006
W6	7/28/2009														
W6	8/6/2009														
W6	8/6/2009														
W6	8/18/2009	0.02	<0.00001	3.5	0.002	14.2	0.0808	0.0098	14.9	0.001	0.0005	0.01	0.0013	16.6	0.0012
W6	8/25/2009														
W6	10/7/2009														
W6	10/7/2009														
W6	10/25/2009	0.01	<0.00002	3.34	<0.005	15.2	0.215	0.015	17.3	<0.001	<0.0002		0.0006	24	0.002
W6	4/19/2010	0.06	<0.00001	2.3	0.002	13.2	0.0461	0.0017	8.6	<0.001	0.0002	0.02	0.0011	10.1	<0.0006
W6	5/16/2010	0.01	<0.0002	1.39	<0.005	8.38	<0.001	<0.001	4.49	<0.001	<0.0002	<0.01	<0.0005	<3	0.0002
W6	5/17/2010	0.016	<0.0002	1	<0.005	5.28	<0.001	<0.001	3.32	<0.001	<0.0002	0.016	<0.0005	<3	<0.0001
W6	5/19/2010	0.021	<0.00002	1.19	<0.005	7.41	<0.001	<0.001	5.01	<0.001	<0.0002	0.013	<0.0005	5	0.0001
W6	5/21/2010	<0.02	<0.0002	<1	<0.01	5	<0.001	<0.001	3	<0.001	<0.0002		<0.0005	<60	<0.0008
W6	5/23/2010	0.029	<0.0002	1	<0.01	8	<0.001	<0.001	6	<0.001	<0.0002		<0.0005	<60	<0.0008
W6	5/25/2010	0.024	<0.00002	1	<0.01	9	<0.001	<0.001	8	<0.003	<0.0002		<0.0005	<60	<0.001
W6	5/29/2010	0.03	<0.00002	<1	<0.01	4	<0.001	<0.001	2	<0.001	<0.0002		<0.0005	<60	<0.0008
W6	6/2/2010	<0.02	<0.0002	2	<0.01	20	0.01	0.003	13	<0.001	<0.0002		<0.0005	<60	<0.0008
W6	6/4/2010	0.027	<0.0002	<1	<0.01	6	<0.001	<0.001	3	<0.001	<0.0002		<0.0005	<60	<0.0008
W6	6/6/2010	0.027		<1	<0.01	7	<0.001	<0.001	4	0.001	<0.0002		<0.0005	<60	<0.0008
W6	6/14/2010	0.021	<0.0002	<1	<0.01	7	<0.001	<0.001	5	0.001	<0.0002		<0.0005	<60	<0.0008
W6	6/16/2010	0.021	<0.0002	<1	<0.01	7	<0.001	<0.001	4	<0.001	<0.0002		<0.0005	<60	<0.0008
W6	6/18/2010	0.021	<0.0002	<1	<0.01	7	<0.001	<0.001	4	<0.001	<0.0002		<0.0005	<60	<0.0008
W6	6/20/2010	0.027	<0.0002	<1	<0.01	7	<0.001	<0.001	4	0.001	<0.0002		<0.0005	<60	<0.0008
W6	6/22/2010	0.025	<0.0002												

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Dissolved Fe (mg/L)	Dissolved Hg (mg/L)	Dissolved K (mg/L)	Dissolved Li (mg/L)	Dissolved Mg (mg/L)	Dissolved Mn (mg/L)	Dissolved Mo (mg/L)	Dissolved Na (mg/L)	Dissolved Ni (mg/L)	Dissolved Pb (mg/L)	Dissolved P (mg/L)	Dissolved Sb (mg/L)	Dissolved S (mg/L)	Dissolved Se (mg/L)
W7	6/15/2006														
W7	6/15/2006	0.09		<0.4	<0.001	8.9	0.044	0.001	5.9	0.001	<0.0001		<0.0002	3.5	0.0002
W7	6/23/2006	0.09		1.1	<0.001	10.4	0.043	0.001	5.9	0.0013	<0.0001		<0.0002	4.3	0.0003
W7	6/28/2006	0.06		0.8	<0.001	9.2	0.011	<0.001	6.2	0.0036	0.0005		<0.0002	3.4	<0.0002
W7	7/7/2006	0.06		0.8	0.001	10.7	0.023	0.002	6.7	0.0015	<0.0001		<0.0002	4	<0.0002
W7	7/12/2006	0.06		0.9	0.001	10.5	0.022	0.001	6.6	0.0007	<0.0001		<0.0002	4	0.0002
W7	7/20/2006	0.11		1	0.001	11.7	0.042	0.001	6.7	0.0006	0.0002		<0.0002	4.1	<0.0002
W7	7/26/2006														
W7	7/26/2006	0.1		1	<0.001	10.9	0.044	<0.001	7	0.0021	<0.0001		<0.0002	4.2	<0.0002
W7	8/2/2006	0.07		1.1	<0.001	11	0.033	<0.001	7.2	0.0006	<0.0001		<0.0002	4	<0.0002
W7	8/10/2006	0.08		1	0.001	10.8	0.039	0.001	7.2	0.0006	<0.0001		<0.0002	4	<0.0002
W7	8/25/2006														
W7	8/25/2006	0.08		0.9	0.001	11.7	0.037	0.001	6.7	0.0009	<0.0001		<0.0002	3.8	<0.0002
W7	8/30/2006	0.1		1.2	0.002	11.7	0.038	0.001	7.7	0.0012	<0.0001		<0.0002	3.7	<0.0002
W7	9/6/2006	0.1		0.8	0.002	11.2	0.036	0.001	7.5	0.001	<0.0001		<0.0002	3.7	<0.0002
W7	9/13/2006	0.11		0.9	0.002	11.4	0.03	0.001	7.4	0.0009	<0.0001		<0.0002	3.5	<0.0002
W7	9/20/2006	0.09		1	0.002	11.6	0.04	0.001	6.6	<0.0005	<0.0001		<0.0002	3.9	0.0002
W7	9/28/2006	0.08		1.1	0.001	11.1	0.035	0.001	7.4	0.0008	<0.0001		<0.0002	3.7	<0.0002
W7	10/4/2006	0.11		1.1	0.001	10.9	0.035	0.001	7.3	0.0007	<0.0001		<0.0002	3.7	<0.0002
W7	10/12/2006	0.09		1.1	0.001	11.4	0.043	0.001	7.4	0.0006	<0.0001		<0.0002	3.9	0.0003
W7	6/5/2007														
W7	6/5/2007														
W7	6/5/2007														
W7	6/20/2007	0.05	<0.0001	1	0.001	9.8	0.031	0.001	7.4	<0.0005	<0.0001		<0.0002	4.2	<0.0002
W7	7/18/2007	0.04	<0.0001	0.9	0.001	11.6	0.019	0.001	7.6	0.0007	<0.0001		<0.0002	3.9	<0.0002
W7	7/18/2007														
W7	7/18/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	9/18/2007	0.08	<0.0001	0.9	0.001	9.8	0.018	0.002	7.2	0.0008	<0.0001		<0.0002	2.9	<0.0002
W7	10/30/2007														
W7	10/30/2007														
W7	10/30/2007														
W7	10/30/2007														
W7	4/22/2008	<0.02	<0.00001	2.68	0.002	20.4	0.025	0.00161	12.6	<0.001	<0.0001	<0.01	0.006		<0.0006
W7	4/22/2008	0.07	<0.00001	2.78	0.002	21.2	0.027	0.0017	12.7	0.002	0.0001	0.02	0.0084	12.7	<0.0006
W7	4/22/2008	<0.02	<0.00001	2.63	0.002	19.9	0.0242	0.00166	12.4	<0.001	<0.0001	<0.01	0.0016		<0.0006
W7	4/22/2008														
W7	6/3/2008														
W7	6/3/2008														
W7	6/3/2008														
W7	6/3/2008	0.05	<0.00001	0.84	<0.001	8.39	0.0418	0.00124	6.82	0.001	<0.0001		0.0006		<0.0006
W7	6/17/2008	0.07			<0.001		0.0682	0.00149		0.001	<0.0001		0.001		0.0022
W7	8/6/2008														
W7	8/6/2008														
W7	8/6/2008														
W7	8/6/2008	0.07	<0.0001	1	0.001	10.6	0.02	0.001	7.4	0.001	<0.0001	<0.05	0.0014	3.5	<0.0002
W7	9/18/2008	0.2	<0.00001	0.53	<0.001	6.63	0.0198	0.00072	4.92	0.001	0.0017	0.02	0.0008		<0.0006
W7	10/28/2008														
W7	10/28/2008														
W7	10/28/2008	0.078	<0.00001	0.8	<0.001	11.4	0.0338	0.00108	6.4	0.001	<0.0001	<0.01	0.0009		<0.0006
W7	4/30/2009	0.07	0.00001	1.5	<0.001	1.68	0.0114	0.00013	1.2	<0.001	0.0001	0.06	0.0007	0.4	<0.0006
W7	6/8/2009	0.05	<0.00001	0.7	<0.001	8.18	0.0129	0.00127	5.3	0.001	<0.0001	0.01	0.0011	2.8	<0.0006
W7	7/28/2009														
W7	8/6/2009														
W7	8/24/2009														
W7	8/25/2009														
W7	8/31/2009	0.1	<0.00001	0.9	<0.001	9.9	0.0128	0.0011	6.8	0.001	0.0004	0.03	0.0009	3	<0.0006
W7	10/7/2009														
W7	10/7/2009														
W7	10/25/2009	0.046	<0.00002	0.95	<0.005	10.8	0.024	0.001	6.68	<0.001	<0.0002		<0.0005	4	0.0002
W7	10/25/2009														
W7	4/19/2010	0.09	<0.00001	2.1	<0.001	7.3	0.0188	0.0008	5	<0.001	0.0003	0.02	0.001	2.7	<0.0006
W7	4/27/2010	0.15	<0.00002	1.04	<0.005	2.87	<0.001	<0.001	1.86	0.001	<0.0002		<0.0005	<3	<0.0001
W7	4/29/2010	0.18	<0.00002	0.9	<0.005	2.86	<0.001	<0.001	1.92	0.001	<0.0002		<0.0005	<3	<0.0001
W7	5/1/2010	0.26	<0.00002	0.71	<0.005	3.26	<0.001	<0.001	2.22	0.001	<0.0002	0.023	<0.0005	<3	<0.0001
W7	5/3/2010	0.378	<0.00002	0.64	<0.005	3.67	<0.001	<0.001	2.6	0.001	<0.0002		<0.0005	<3	<0.0001
W7	5/5/2010	0.574	<0.00002	0.57	<0.005	4.09	<0.001	<0.001	2.85	0.001	<0.0002	0.021	<0.0005	<3	<0.0001
W7	5/7/2010	0.359	<0.00002	0.68	<0.005	4.9	<0.001	<0.001	3.35	0.002	<0.0002	0.017	<0.0005	<3	<0.0001
W7	5/9/2010	0.297	<0.00002	0.78	<0.005	6.97	<0.001	<0.001	4.54	0.001	<0.0002	0.014	<0.0005	<3	0.0001
W7	5/10/2010	0.276	<0.00002	0.8	<0.005	7.08	<0.001	<0.001	4.69	0.001	<0.0002	0.013	<0.0005	3	0.0001
W7	5/12/2010														
W7	5/12/2010	0.173	0.00002	0.77	<0.005	7.06	<0.001	0.001	4.6	0.001	<0.0002	<0.01	<0.0005	<3	0.0001
W7	5/14/2010	0.339	<0.00002	0.71	<0.005	6.27	0.039	<0.001	4.05	0.002	<0.0002		<0.0005	<3	0.0001
W7	5/16/2010	0.08	<0.0002	0.8	<0.005	7.28	<0.001	0.001	4.75	<0.001	<0.0002	<0.01	<0.0005	<3	0.0001
W7	5/17/2010	0.068	<0.0002	0.78	<0.005	6.82	<0.001	0.001	4.36	<0.001	<0.0002	<0.01	<0.0005	<3	0.0001
W7	5/19/2010	0.069	<0.00002	0.85	<0.005	9.16	<0.001	0.001	6.6	<0.001	<0.0002	<0.01	<0.0005	3	0.0003
W7	5/21/2010	0.057	<0.0002	<1	<0.01	8	<0.001	0.001	6	0.001	<0.0002		<0.0005	<60	<0.0008
W7	5/23/2010	0.069	<0.0002	<1	<0.01	9	<0.001	0.001	6	0.001	<0.0002		<0.0005	<60	<0.0008
W7	5/25/2010	0.062	<0.00002	1	<0.01	12	0.001	0.002	8	<0.003	<0.0002		<0.0005	<60	<0.001
W7	5/27/2010	0.069	<0.00002	1	<0.01	11	0.014	0.002	8	<0.003	<0.0002		<0.0005	<60	<0.001
W7	5/29/2010	0.051	<0.00002	1	<0.01	10	0.015	0.002	6	0.001	<0.0002		<0.0005	<60	<0.0008
W7	5/31/2010	0.05	<0.00002	<1	<0.01	10	0.012	0.002	7	<0.001	<0.0002		<0.0005	<60	<0.0008
W7	6/2/2010	0.03	<0.0002	<1	<0.01	10	<0.001	0.002	6	<0.001	<0.0002		<0.0005	<60	<0.0008
W7	6/4/2010	0.03	<0.0002	<1	<0.01	10	0.001	0.002	6	<0.001	<0.0002		<0.0005	<60	<0.0008
W7	6/6/2010	0.024		1	<0.01	11	0.004	0.002	7	<0.001	<0.0002		<0.0005	<60	<0.0008
W7	6/14/2010	0.025	<0.0002	1	<0.01	11	0.002	0.002	8	<0.001	<0.0002		<0.0005	<60	<0.0008
W7	6/16/2010	0.026													

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Dissolved Fe (mg/L)	Dissolved Hg (mg/L)	Dissolved K (mg/L)	Dissolved Li (mg/L)	Dissolved Mg (mg/L)	Dissolved Mn (mg/L)	Dissolved Mo (mg/L)	Dissolved Na (mg/L)	Dissolved Ni (mg/L)	Dissolved Pb (mg/L)	Dissolved P (mg/L)	Dissolved Sb (mg/L)	Dissolved S (mg/L)	Dissolved Se (mg/L)
W7	8/2/2011	0.614	<0.00002	0.29	<0.005	4.85	0.064	<0.001	3.69	0.003	<0.0002	0.02	<0.0005	<3	0.0001
W7	8/16/2011	0.593	<0.00002	0.46	<0.005	7.96	0.054	<0.001	4.81	0.002	<0.0002	0.023	<0.0005	<3	0.0001
W7	8/19/2011	0.556	<0.00002	0.41	<0.005	7.89	0.06	<0.001	4.58	0.002	<0.0002	0.032	<0.0005	<3	0.0001
W7	9/12/2011	0.616	<0.00002	0.62	<0.005	10.1	0.079	<0.001	5.73	0.002	<0.0002	0.023	<0.0005	<3	0.0001
W7	10/6/2011	0.346	<0.00002	0.62	<0.005	9.89	0.07	0.001	5.68	0.001	<0.0002	0.015	<0.0005	<3	0.0001
W7	11/22/2011	0.167	<0.000020	0.864	<0.0050	12.8	0.0626	0.0013	6.99	0.0012	<0.00020	0.014	<0.00050	4.6	0.00016
W7	1/24/2012	0.0944	<0.000010	1.6	<0.0050	14.9	0.0614	0.0015	8.72	<0.0010	<0.00020	0.012	<0.00050	7.3	0.00043
W7	2/25/2012	0.0488	<0.000010	1.63	<0.0050	15.1	0.007	0.0014	8.86	<0.0010	0.00024	0.031	<0.00050	7.3	0.00034
W7	3/5/2012	0.0124	<0.000010	1.5	<0.0050	14.2	0.0015	0.0011	8.03	<0.0010	<0.00020	<0.01	<0.00050	6.1	0.00031
W7	4/24/2012	0.475	<0.000010	1.18	<0.0050	3.2	0.0486	<0.0010	1.9	0.0012	<0.00020	0.027	<0.00050	<3.0	<0.00010
W7	5/6/2012	0.427	<0.000010	0.932	<0.0050	3.95	0.0108	<0.0010	2.4	0.0011	<0.00020	0.021	<0.00050	<3.0	<0.00010
W7	5/6/2012	0.462	<0.000010	0.948	<0.0050	4.04	0.0113	<0.0010	2.44	0.0012	<0.00020	0.021	<0.00050	<3.0	<0.00010
W7	6/19/2012	0.56	<0.000010	0.583	<0.0050	8.07	0.0433	0.0013	5.29	0.002	<0.00020	0.02	<0.00050	<3.0	0.00015
W7	7/17/2012	0.965	<0.000010	0.791	<0.0050	11	0.0366	0.0015	6.55	0.0016	<0.00020	0.035	<0.00050	<3.0	0.00013
W7	7/30/2012	0.964	<0.000010	0.833	<0.0050	12.1	0.0534	0.0015	6.98	0.0015	<0.00020	0.032	<0.00050	<3.0	0.00016
W7	8/8/2012	1.06	<0.000010	0.882	<0.0050	12.6	0.0554	0.0016	7.09	0.0017	<0.00020	0.033	<0.00050	<3.0	0.00014
W7	8/23/2012	0.978	<0.000010	0.942	<0.0050	13	0.057	0.0016	7.35	0.0016	<0.00020	0.031	<0.00050	3.1	0.00015
W7	9/13/2012	0.734	<0.000010	0.567	<0.0050	9.91	0.0956	<0.0010	5.77	0.0036	<0.00020	0.023	<0.00050	<3.0	0.00014
W7	10/16/2012	0.603	<0.000010	0.675	<0.0050	11.2	0.073	0.0011	6.34	0.0015	<0.00020	0.021	<0.00050	3.4	0.00014
W7	11/2/2012	0.183	<0.000010	1.34	<0.0050	14.6	0.101	0.0013	8.07	0.0012	0.00021	0.031	<0.00050	5.2	0.00018
W7	12/29/2012	0.0301	<0.000010	2.54	<0.0050	20.2	0.0374	0.0012	12.2	0.0011	<0.00020	<0.01	<0.00050	10.9	0.00045
W7	4/30/2013	0.0143	<0.000010	1.92	<0.0050	18.3	0.0528	0.0013	10.1	<0.0010	<0.00020	<0.01	<0.00050	8	0.00043
W7	5/14/2013	0.306	<0.000010	1.03	<0.0050	2.75	0.103	<0.0010	1.52	0.001	<0.00020	0.027	<0.00050	<3.0	<0.00010
W7	6/19/2013	0.285	<0.000010	0.94	<0.0050	9.4	0.0317	0.0015	5.9	0.0013	<0.00020	0.019	<0.00050	3.2	0.00011
W7	6/19/2013	0.291	<0.000010	0.955	<0.0050	9.47	0.0339	0.0016	5.88	0.0012	<0.00020	0.019	<0.00050	3.5	0.00019
W7	7/13/2013	0.416	<0.000010	0.91	<0.0050	11	0.026	0.0015	6.52	0.0013	<0.00020	0.016	<0.00050	3.2	0.00015
W7	8/21/2013	0.3	<0.000010	0.934	<0.0050	12.7	0.0355	0.0015	7.34	0.0012	<0.00020	0.017	<0.00050	3.2	0.00015
W7	9/6/2013	0.663	<0.000010	0.887	<0.0050	12.3	0.081	0.0013	7.31	0.0016	<0.00020	0.026	<0.00050	<3.0	0.00017
W7	10/21/2013	0.549	<0.000010	0.878	<0.0050	12.6	0.1	0.0012	7.03	0.0012	<0.00020	0.025	<0.00050	4.2	0.00017
W7	11/16/2013	0.169	<0.000010	1.15	<0.0050	13.3	0.0809	0.0016	7.71	<0.0010	<0.00020	0.017	<0.00050	5.4	0.00024
W7	12/7/2013	0.109	<0.000010	1.38	<0.0050	14.5	0.143	0.0011	8.17	<0.0010	<0.00020	<0.01	<0.00050	5.3	0.00024
C4	5/6/2012	1.11	<0.000010	0.895	<0.0050	3.4	0.243	<0.0010	2.4	0.0023	<0.00020	0.037	<0.00050	<3.0	<0.00010
C4	8/1/2012	1.5	<0.000010	0.754	<0.0050	9.12	0.622	0.0011	4.95	0.0031	<0.00020	0.049	<0.00050	3	0.00011
C4	8/8/2012	1.6	<0.000010	0.759	<0.0050	9.81	0.683	0.0011	5.16	0.0027	<0.00020	0.047	<0.00050	<3.0	0.00011
C4	8/25/2012	1.68	<0.000010	0.989	<0.0050	10.3	0.682	0.0012	5.21	0.0029	<0.00020	0.06	<0.00050	<3.0	<0.00010
C4	6/22/2013	1.2	<0.000010	0.983	<0.0050	9.29	0.405	0.0018	5.62	0.0027	<0.00020	0.041	<0.00050	3.2	0.00013
C4	7/19/2013	1.56	<0.000010	0.845	<0.0050	9.31	0.385	0.0017	5.66	0.0025	<0.00020	0.04	<0.00050	<3.0	0.00012
C4	8/22/2013	1.44	<0.000010	0.776	<0.0050	9.87	0.448	0.0013	5.49	0.0027	<0.00020	0.043	<0.00050	<3.0	0.00012
C4	9/6/2013	1.78	<0.000010	0.777	<0.0050	9.52	0.495	0.001	5.28	0.0028	<0.00020	0.048	<0.00050	3.1	<0.00010
C4	10/18/2013	1.15	<0.000010	0.754	<0.0050	10.5	0.417	<0.0010	5.46	0.0023	<0.00020	0.033	<0.00050	4.5	<0.00010
C4	10/18/2013	1.16	<0.000010	0.762	<0.0050	10.4	0.408	0.0012	5.38	0.0025	<0.00020	0.036	<0.00050	4.4	<0.00010
C4	11/17/2013	14.2	<0.000010	0.985	<0.0050	18.8	3.09	0.0011	8.06	0.0061	<0.00020	0.117	<0.00050	4.5	0.00024
C10	5/12/2012	1.55	<0.000010	1.08	<0.0050	4.24	0.305	<0.0010	2.95	0.0019	0.00025	0.035	<0.00050	<3.0	0.0001
C10	7/30/2012	1.15	<0.000010	0.921	<0.0050	8.1	0.189	0.0014	5.64	0.0023	0.00067	0.039	<0.00050	<3.0	0.00014
C10	7/30/2012														
C10	8/10/2012	0.883	<0.000010	0.824	<0.0050	8.59	0.252	0.0019	5.34	0.0022	<0.00020	0.034	<0.00050	<3.0	0.0001
C10	8/27/2012	1	<0.000010	1.02	<0.0050	8.82	0.27	0.0011	5.26	0.0023	<0.00020	0.038	<0.00050	<3.0	0.00012
C10	6/22/2013	0.802	<0.000010	1.45	<0.0050	8.63	0.0628	0.0012	6.07	0.0025	<0.00020	0.053	<0.00050	<3.0	0.00011
C10	7/23/2013	0.54	<0.000010	0.848	<0.0050	7.65	0.154	0.001	5.75	0.0022	<0.00020	0.025	<0.00050	<3.0	<0.00010
C10	8/22/2013	0.992	<0.000010	0.979	<0.0050	9.84	0.063	0.0015	6.05	0.0023	<0.00020	0.032	<0.00050	<3.0	<0.00010
C10	9/8/2013	1.26	<0.000010	1.03	<0.0050	9.12	0.137	<0.0010	5.65	0.0025	<0.00020	0.04	<0.00050	<3.0	<0.00010
C10	9/8/2013	1.28	<0.000010	1.03	<0.0050	9.37	0.139	<0.0010	5.79	0.0025	<0.00020	0.043	<0.00050	<3.0	<0.00010
C10	10/18/2013	0.761	<0.000010	0.844	<0.0050	8.73	0.187	<0.0010	5.44	0.0019	<0.00020	0.027	<0.00050	<3.0	<0.00010

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Dissolved Si (mg/L)	Dissolved Sn (mg/L)	Dissolved Sr (mg/L)	Dissolved Te (mg/L)	Dissolved Th (mg/L)	Dissolved Ti (mg/L)	Dissolved Tl (mg/L)	Dissolved U (mg/L)	Dissolved V (mg/L)	Dissolved Zn (mg/L)	Dissolved Zr (mg/L)	P-E (mg/L)	TT Ag (mg/L)	TT Al (mg/L)
W1	5/27/2005		<0.00050				<0.010	<0.00020	0.00049	<0.030	<0.0050			0.000036	0.613
W1	6/30/2005	5.53	<0.00010	0.3			<0.010	<0.00010	0.00113	<0.0010	<0.0010			<0.000010	0.0218
W1	7/28/2005	5.55	<0.00010	0.331			<0.010	<0.00010	0.00133	<0.0010	0.0025			<0.000010	0.0174
W1	8/29/2005		<0.00050				<0.010	<0.00020	0.00077	<0.030	<0.0050			<0.000020	0.0524
W1	9/28/2005		<0.00050				<0.010	<0.00020	0.00055	<0.030	<0.0050			<0.000020	0.127
W1	10/15/2005	6.25	<0.00010	0.257			<0.010	<0.00010	0.000727	<0.0010	0.0014			<0.000010	0.15
W2	5/27/2005		<0.00050				<0.010	<0.00020						<0.000020	0.362
W2	5/27/2005						<0.01		0.00081	<0.03	<0.005				1.14
W2	6/30/2005	5.4	<0.00010	0.307			<0.010	<0.00010	0.0011	<0.0010	0.0015			<0.000010	0.0111
W2	7/28/2005	5.31	<0.00010	0.341			<0.010	<0.00010	0.00127	<0.0010	0.0011			<0.000010	0.0127
W2	8/30/2005		<0.00050				<0.010	<0.00020	0.00077	<0.030	<0.0050			<0.000020	0.0475
W2	9/28/2005		<0.00050				<0.010	<0.00020	0.00055	<0.030	<0.0050			<0.000020	0.133
W2	10/15/2005	6.19	<0.00010	0.256			<0.010	<0.00010	0.000713	<0.0010	<0.0010			<0.000010	0.0972
W3	5/27/2005		<0.00050				<0.010	<0.00020	0.00031	<0.030	<0.0050			<0.000020	0.152
W3	6/30/2005	5.89	<0.00010	0.297			<0.010	<0.00010	0.000903	<0.0010	0.0116			<0.000010	0.0313
W3	7/29/2005	5.56	<0.00010	0.279			<0.010	<0.00010	0.000717	<0.0010	0.0015			<0.000030	0.732
W3	8/29/2005		<0.00050				<0.010	<0.00020	0.00045	<0.030	<0.0050			0.000027	0.267
W3	9/28/2005		<0.00050				<0.010	<0.00020	0.00034	<0.030	<0.0050			0.000029	0.236
W3	10/15/2005	6.16	<0.00010	0.225			<0.010	<0.00010	0.00042	<0.0010	0.0018			<0.000010	0.09
W8	5/27/2005		<0.00050				<0.010	<0.00020	<0.00020	<0.030	<0.0050			<0.000020	0.0506
W8	6/30/2005	5.25	<0.00010	0.113			<0.010	<0.00010	0.000059	<0.0010	0.0012			<0.000010	0.0807
W8	7/29/2005	4.95	<0.00010	0.132			<0.010	<0.00010	0.000074	<0.0010	0.0019			<0.000010	0.033
W8	8/30/2005		<0.00050				<0.010	<0.00020	<0.00020	<0.030	<0.0050			<0.000020	0.0688
W8	9/28/2005		<0.00050				<0.010	<0.00020	<0.00020	<0.030	<0.0050			<0.000020	0.0509
W8	10/15/2005	6.54	<0.00010	0.171			<0.010	<0.00010	0.000093	<0.0010	<0.0010			<0.000010	0.116
W9	5/27/2005		<0.00050				<0.010	<0.00020	<0.00020	<0.030	<0.0050			<0.000020	0.0732
W9	6/30/2005	5.35	<0.00010	0.0957			<0.010	<0.00010	0.000024	<0.0010	<0.0010			<0.000010	0.0401
W9	7/29/2005	5.69	<0.00010	0.14			<0.010	<0.00010	0.00005	<0.0010	0.004			<0.000010	0.0478
W9	8/29/2005		<0.00050				<0.010	<0.00020	<0.00020	<0.030	<0.0050			<0.000020	0.0564
W9	9/28/2005		<0.00050				<0.010	<0.00020	<0.00020	<0.030	<0.0050			<0.000020	0.0642
W9	10/15/2005	6.13	<0.00010	0.0806			<0.010	<0.00010	0.000023	<0.0010	0.0017			<0.000010	0.0622
W10	5/27/2005		<0.00050				<0.010	<0.00020	<0.00020	<0.030	0.0085			<0.000020	0.151
W10	5/27/2005		<0.0005				<0.01	<0.0002	0.00079	<0.03	<0.005			<0.00002	
W10	6/30/2005	5.43	<0.00010	0.0772			<0.010	<0.00010	0.000028	<0.0010	0.0223			<0.000010	0.142
W10	7/29/2005	5.64	<0.00010	0.0921			<0.010	<0.00010	<0.000010	<0.0010	0.0074			<0.000030	2.59
W10	8/29/2005		<0.00050				<0.010	<0.00020	<0.00020	<0.030	0.0052			<0.000020	0.587
W10	9/28/2005		<0.00050				<0.010	<0.00020	<0.00020	<0.030	<0.0050			<0.000020	0.0818
W10	10/15/2005	5.82	<0.00010	0.147			<0.010	<0.00010	0.000013	<0.0010	0.0015			<0.000010	0.089
W6	5/27/2005		<0.00050				<0.010	<0.00020	<0.00020	<0.030	<0.0050			<0.000020	0.229
W6	6/30/2005	7.18	<0.00010	0.102			<0.010	<0.00010	0.000134	<0.0010	0.021			<0.000010	0.17
W6	7/29/2005	5.51	<0.00010	0.274			<0.010	<0.00010	0.0014	<0.0010	0.0025			<0.000020	0.598
W6	8/30/2005		<0.00050				<0.010	<0.00020	<0.00020	<0.030	<0.0050			<0.000020	0.0181
W6	9/28/2005		<0.00050				<0.010	<0.00020	<0.00020	<0.030	<0.0050			<0.000020	0.0321
W6	10/15/2005	6.93	<0.00010	0.108			<0.010	<0.00010	0.000122	<0.0010	0.0015			<0.000010	0.0251
W6	6/2/2006	4.84	<0.0001	0.0682			<0.01	<0.0001	0.000081	<0.001	0.003			0.000021	1.95
W6	8/25/2006													<0.0002	0.024
W6	9/6/2006	7.54	<0.001	0.136			0.0005	<0.00005	<0.0005	0.0016	0.002			<0.0001	0.035
W6	6/20/2007													<0.0001	0.042
W6	9/18/2007													<0.0001	0.023
W6	6/17/2008													<0.00001	0.14
W6	9/18/2008	6.29	<0.0001	0.098	<0.0001	<0.0001	0.001	<0.00001	<0.0004	0.00073	0.003	0.0002		0.00008	0.022
W6	4/14/2009	3.63	<0.0001	0.419	<0.0001	<0.0001	0.0032	<0.00001	0.004	0.00029	0.049	<0.0001		0.00021	1.3
W6	4/30/2009	2.3	<0.0001	0.099	<0.0001	<0.0001	0.0044	<0.00001	<0.0004	0.00047	0.006	0.0004		<0.00001	5.31
W6	7/28/2009														
W6	8/6/2009													<0.00001	0.085
W6	8/6/2009													<0.00001	0.07
W6	8/18/2009	4.06	<0.0001	0.584	<0.0001	<0.0004	0.0004	<0.00001	0.0008	0.0006	0.002	<0.0001			
W6	8/25/2009														
W6	10/7/2009														
W6	10/7/2009													<0.00001	0.171
W6	10/25/2009	4.2	<0.005	0.817			<0.005	<0.00005	0.0009	<0.005	<0.005	<0.0005		<0.00002	0.065
W6	4/19/2010	3.81	<0.0001	0.372	<0.0001	<0.0004	<0.01	<0.00001	0.0013	0.0006	0.005	<0.0001		<0.00002	1.25
W6	5/16/2010	5.52	<0.005	0.199			<0.005	<0.00005	<0.0001	<0.005	<0.005	<0.0005		0.00002	0.041
W6	5/17/2010	2.22	<0.005	0.219			<0.005	<0.00005	0.0005	<0.005	<0.005	<0.0005		<0.00002	0.025
W6	5/19/2010	2.79	<0.005	0.245			<0.005	<0.00005	0.0005	<0.005	<0.005	<0.0005		<0.00002	0.03
W6	5/21/2010	2.14	<0.005	0.243			<0.01	<0.00005	0.0006	<0.005	<0.01	<0.002		<0.0001	0.162
W6	5/23/2010	2.58	<0.005	0.285			<0.01	<0.00005	0.0006	<0.005	<0.01	<0.002		<0.0001	0.027
W6	5/25/2010	2.6	<0.005	0.306			<0.01	<0.00005	0.0005	<0.005	<0.01	<0.002		<0.0001	0.061
W6	5/29/2010	<2	<0.005	0.221			<0.01	<0.00005	0.0005	<0.005	<0.01	<0.002		<0.0001	0.09
W6	6/2/2010	5.16	<0.005	0.623			<0.01	<0.00005	0.0028	<0.005	<0.01	<0.002		<0.0001	0.036
W6	6/4/2010	5.66	<0.005	0.099			<0.01	<0.00005	0.0003	<0.005	<0.01	<0.002		<0.0001	0.049
W6	6/6/2010	6.95	<0.005	0.115			<0.01	<0.00005	0.0004	<0.005	<0.01	<0.002		<0.0001	0.142
W6	6/14/2010	7.21	<0.005	0.099			<0.01	<0.00005	0.0003	<0.005	<0.01	<0.002		<0.0001	0.274
W6	6/16/2010	6.57	<0.005	0.117			<0.01	<0.00005	0.0003	<0.005	<0.01	<0.002		<0.0001	0.274
W6	6/18/2010	7.25	<0.005	0.111			<0.01	<0.00005	0.0003	<0.005	<0.01	<0.002		<0.0001	0.154
W6	6/20/2010	6.72	<0.005	0.109			<0.01	<0.00005	0.0003	<0.005	<0.01	<0.002		<0.0001	0.138
W6	6/22/2010	6.78	<0.005	0.109			<0.01	<0.00005	0.0003	<0.005	<0.01	<0.002		<0.0001	0.208
W6	6/24/2010	6.84	<0.005	0.109			<0.01	<0.00005	0.0003	<0.005	<0.01	<0.002		<0.0001	0.118
W6	6/26/2010	6.94	<0.005	0.118			<0.01	<0.00005	0.0003	<0.005	<0.01	<0.002		<0.0001	0.143
W6	6/26/2010														
W6	6/28/2010	7.64	<0.005	0.115											

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Dissolved Si (mg/L)	Dissolved Sn (mg/L)	Dissolved Sr (mg/L)	Dissolved Te (mg/L)	Dissolved Th (mg/L)	Dissolved Ti (mg/L)	Dissolved Tl (mg/L)	Dissolved U (mg/L)	Dissolved V (mg/L)	Dissolved Zn (mg/L)	Dissolved Zr (mg/L)	P-E (mg/L)	TT Ag (mg/L)	TT Al (mg/L)
W7	6/15/2006														
W7	6/15/2006	5.35	<0.001	0.236			0.0007	<0.00005	0.0007	0.0011	<0.001			<0.0001	1.48
W7	6/23/2006	5.5	<0.001	0.321			0.0006	<0.00005	0.001	0.001	0.002			0.0003	5.09
W7	6/28/2006	6.48	<0.001	0.284			0.0117	<0.00005	0.0009	0.0029	0.005			<0.0001	1.69
W7	7/7/2006	6.8	<0.001	0.322			0.0007	<0.00005	0.0005	0.0013	0.001			<0.0001	0.096
W7	7/12/2006	5.36	<0.001	0.322			0.0005	<0.00005	0.0007	0.0018	<0.001			<0.0001	0.078
W7	7/20/2006	6.34	<0.001	0.284			<0.0005	<0.00005	0.001	0.0016	<0.001			<0.0001	0.058
W7	7/26/2006														
W7	7/26/2006	5.35	<0.001	0.274			<0.0005	<0.00005	0.001	0.0007	<0.001			<0.0001	0.099
W7	8/2/2006	5.87	<0.001	0.247			0.0005	<0.00005	0.001	0.0013	<0.001			0.0002	0.06
W7	8/10/2006	5.9	<0.001	0.343			0.0006	<0.00005	0.001	0.0015	0.001			<0.0001	0.034
W7	8/25/2006														
W7	8/25/2006	6.32	<0.001	0.344			0.0005	<0.00005	0.0011	0.0017	0.003			<0.0002	0.048
W7	8/30/2006	5.84	<0.001	0.333			0.0008	<0.00005	0.001	0.0008	0.005			<0.0001	0.054
W7	9/6/2006	6.02	<0.001	0.355			0.0005	<0.00005	0.001	0.0018	0.002			<0.0001	0.049
W7	9/13/2006	5.56	<0.001	0.321			0.0006	<0.00005	0.001	0.0014	0.001			<0.0001	0.025
W7	9/20/2006	5.74	<0.001	0.319			<0.0005	<0.00005	0.001	0.0015	<0.001			<0.0001	0.074
W7	9/28/2006	5.97	<0.001	0.34			<0.0005	<0.00005	0.001	0.0015	0.002			<0.0002	0.042
W7	10/4/2006	5.93	<0.001	0.326			0.0007	<0.00005	0.001	0.0011	0.001			<0.0002	0.082
W7	10/12/2006	6.08	<0.001	0.344			0.0006	<0.00005	0.0011	0.0009	0.002			<0.0001	0.264
W7	6/5/2007													<0.0001	1.56
W7	6/5/2007													<0.0002	1.77
W7	6/5/2007													<0.0001	1.85
W7	6/20/2007	5.02	<0.001	0.307			0.0009	<0.00005	0.0012	0.0016	0.004			<0.0001	0.172
W7	7/18/2007	6.1	<0.001	0.34			0.0006	<0.00005	0.0012	0.0024	0.006			<0.0001	0.231
W7	7/18/2007													<0.0001	0.216
W7	7/18/2007													<0.0001	0.211
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007													<0.0001	0.205
W7	8/24/2007													<0.0001	0.098
W7	8/24/2007													<0.0001	0.092
W7	9/18/2007	6.17	<0.001	0.31			0.0006	<0.00005	0.0006	0.0044	0.002			<0.0001	0.33
W7	10/30/2007													<0.0001	0.121
W7	10/30/2007													<0.0001	0.071
W7	10/30/2007													<0.0001	0.076
W7	10/30/2007														
W7	4/22/2008	3.97	<0.004	0.497	<0.0001	<0.0001	0.0011	<0.00001	0.0021	0.00059	0.001	<0.0001		<0.0001	<0.02
W7	4/22/2008	4.03	<0.004	0.51	<0.0001	<0.0001	0.0009	<0.00001	0.0024	0.00077	0.003	0.0001		<0.0001	0.02
W7	4/22/2008	3.95	<0.004	0.491	<0.0001	<0.0001	0.0014	<0.00001	0.0022	0.0003	0.001	<0.0001		<0.0001	0.02
W7	4/22/2008														
W7	6/3/2008													<0.0001	0.4
W7	6/3/2008													<0.0001	0.38
W7	6/3/2008													<0.0001	0.42
W7	6/3/2008	2.27	<0.0001	0.226	<0.0001	<0.0001	0.0005	<0.00001	0.001	0.00062	0.002	0.0004			
W7	6/17/2008		<0.0001	0.289	0.0002	<0.0001	0.0015	<0.00001	0.0014	0.00091	0.002	0.0003		<0.00001	0.21
W7	8/6/2008													0.00001	0.817
W7	8/6/2008													0.00001	1.27
W7	8/6/2008													0.00001	1.36
W7	8/6/2008	5.81	<0.001	0.336			<0.0005	<0.00005	0.0011	0.001	0.006				
W7	9/18/2008	5.8	<0.0001	0.173	<0.0001	<0.0001	0.0055	<0.00001	<0.0004	0.00094	0.003	0.0004		0.00006	0.469
W7	10/28/2008													<0.00001	0.084
W7	10/28/2008													<0.00001	0.038
W7	10/28/2008													<0.00001	0.031
W7	10/28/2008	6.6	<0.0001	0.276	<0.0001	<0.0001	0.0011	<0.00001	0.0007	0.00067	0.001	0.0002			
W7	4/30/2009	1.48	<0.0001	0.029	<0.0001	<0.0001	0.0015	<0.00001	<0.0004	0.00024	0.009	0.0002		<0.00001	0.138
W7	6/8/2009	4.13	<0.0001	0.24	<0.0001	<0.0001	0.0011	<0.00001	0.0008	0.0008	0.002	0.0003		0.00002	0.595
W7	7/28/2009														
W7	8/6/2009													0.00002	0.071
W7	8/24/2009														
W7	8/25/2009														
W7	8/31/2009	6.04	<0.0001	0.256	<0.0001	<0.0004	0.0004	<0.00001	0.0007	0.0007	0.001	0.0002			
W7	10/7/2009														
W7	10/7/2009													<0.00001	0.189
W7	10/25/2009	6.3	<0.005	0.334			<0.005	<0.00005	0.0012	<0.005	<0.005	<0.0005		<0.00002	0.052
W7	10/25/2009														
W7	4/19/2010	4.15	<0.0001	0.212	<0.0001	<0.0004	<0.01	<0.00001	0.0005	0.0005	0.005	<0.0001		<0.00001	0.033
W7	4/27/2010	2.94	<0.005	0.071			<0.005	<0.00005	0.0001	<0.005	<0.005	<0.0005		<0.00002	0.113
W7	4/29/2010	2.89	<0.005	0.076			<0.005	<0.00005	0.0001	<0.005	<0.005	<0.0005		<0.00002	0.11
W7	5/1/2010	3.27	<0.005	0.088			<0.005	<0.00005	0.0002	<0.005	<0.005	<0.0005		<0.00002	0.502
W7	5/3/2010	3.63	<0.005	0.097			<0.005	<0.00005	0.0002	<0.005	<0.005	<0.0005		0.00003	0.406
W7	5/5/2010	3.84	<0.005	0.116			<0.005	<0.00005	0.0003	<0.005	<0.005	<0.0005		<0.00002	0.394
W7	5/7/2010	3.77	<0.005	0.129			<0.005	<0.00005	0.0003	<0.005	<0.005	<0.0005		<0.00002	0.407
W7	5/9/2010	4.61	<0.005	0.192			<0.005	<0.00005	0.0006	<0.005	<0.005	<0.0005		<0.00002	0.183
W7	5/10/2010	4.62	<0.005	0.195			<0.005	<0.00005	0.0006	<0.005	<0.005	<0.0005		<0.00002	0.125
W7	5/12/2010														
W7	5/12/2010	5	<0.005	0.201			<0.005	<0.00005	0.0006	<0.005	<0.005	<0.0005		<0.00002	0.123
W7	5/14/2010	4.35	<0.005	0.178			<0.005	<0.00005	0.0005	<0.005	<0.005	<0.0005		<0.00002	0.286
W7	5/16/2010	4.68	<0.005	0.207			<0.005	<0.00005	0.0007	<0.005	<0.005	<0.0005		<0.00002	0.207
W7	5/17/2010	4.22	<0.005	0.191			<0.005	<0.00005	0.0006	<0.005	<0.005	<0.0005		<0.00002	0.219
W7	5/19/2010	5.24	<0.005	0.21			<0.005	<0.00005	0.0008	<0.005	<0.005	<0.0005		<0.00002	0.105
W7	5/21/2010	4.98	<0.005	0.22			<0.01	<0.00005	0.0008	<0.005	<0.01	<0.002		<0.0001	0.457
W7	5/23/2010	5.24	<0.005	0.235			<0.01	<0.00005	0.0009	<0.005	<0.01	<0.002		<0.0001	2.14
W7	5/25/2010	6.05	<0.005	0.306			<0.01	<0.00005	0.0011	<0.005	<0.01	<0.002		<0.0001	4.2
W7	5/27/2010	5.4	<0.005	0.277			<0.01	<0.00005	0.0011	<0.005	<0.01	<0.002		<0.0001	10.3
W7	5/29/2010	5.26	<0.005	0.289			<0.01	<0.00005	0.0014	<0.005	<0.01	<0.002		<0.0001	3.93
W7	5/31/2010		<0.005	0.286			<0.01	<0.00005	0.0014	<0.005	<0.01	<0.002		<0.0001	4.54
W7	6/2/2010	5.16	<0.005	0.293			<0.01	<0.00005	0.0015	<0.005	<0.01	<0.002		<0.0001	2.91
W7	6/4/2010	4.96	<0.005	0.275			<0.01	<0.00005	0.0014	<0.005	<0.01	<0.002		<0.0001	1.64
W7	6/6/2010	5.46	<0.005	0.313			<0.01	<0.00005	0.0015</						

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Dissolved Si (mg/L)	Dissolved Sn (mg/L)	Dissolved Sr (mg/L)	Dissolved Te (mg/L)	Dissolved Th (mg/L)	Dissolved Ti (mg/L)	Dissolved Tl (mg/L)	Dissolved U (mg/L)	Dissolved V (mg/L)	Dissolved Zn (mg/L)	Dissolved Zr (mg/L)	P-E (mg/L)	TT Ag (mg/L)	TT Al (mg/L)
W7	8/2/2011	5.78	<0.005	0.12			<0.005	<0.00005	0.0002	<0.005	<0.005	<0.0005		0.00008	9.23
W7	8/16/2011	6.96	<0.005	0.21			<0.005	<0.00005	0.0004	<0.005	<0.005	<0.0005		<0.00002	0.403
W7	8/19/2011	6.9	<0.005	0.197			<0.005	<0.00005	0.0003	<0.005	<0.005	<0.0005		<0.00002	0.444
W7	9/12/2011	7.71	<0.005	0.266			<0.005	<0.00005	0.0005	<0.005	<0.005	<0.0005		<0.00002	0.08
W7	10/6/2011	6.17	<0.005	0.266			<0.005	<0.00005	0.0006	<0.005	<0.005	<0.0005		<0.00002	0.065
W7	11/22/2011	8.07	<0.0050	0.366			<0.0050	<0.000050	0.00106	<0.0050	<0.0050	<0.00050		<0.00002	0.407
W7	1/24/2012	7.24	<0.0050	0.456			<0.0050	<0.000050	0.00163	<0.0050	<0.0050	<0.00050		<0.00002	0.01
W7	2/25/2012	6.43	<0.0050	0.448			<0.0050	<0.000050	0.0015	<0.0050	0.0083	<0.00050		<0.00002	0.018
W7	3/5/2012	5.99	<0.0050	0.468			<0.0050	<0.000050	0.00145	<0.0050	<0.0050	<0.00050		<0.00002	0.043
W7	4/24/2012	2.94	<0.0050	0.0774			<0.0050	<0.000050	0.00014	<0.0050	<0.0050	<0.00050		<0.000020	0.766
W7	5/6/2012	3.66	<0.0050	0.106			<0.0050	<0.000050	<0.00010	<0.0050	<0.0050	<0.00050		<0.000020	0.11
W7	5/6/2012	3.7	<0.0050	0.105			<0.0050	<0.000050	<0.00010	<0.0050	<0.0050	<0.00050		<0.000020	0.131
W7	6/19/2012	6.21	<0.0050	0.191			<0.0050	<0.000050	0.00043	<0.0050	<0.0050	<0.00050		0.00003	5.38
W7	7/17/2012	6.79	<0.0050	0.306			<0.0050	<0.000050	0.00074	<0.0050	<0.0050	<0.00050		<0.000020	0.93
W7	7/30/2012	6.86	<0.0050	0.329			<0.0050	<0.000050	0.00091	<0.0050	<0.0050	<0.00050		<0.000020	0.2
W7	8/8/2012	7	<0.0050	0.357			<0.0050	<0.000050	0.00096	<0.0050	<0.0050	<0.00050		<0.000020	0.0828
W7	8/23/2012	7.06	<0.0050	0.35			<0.0050	<0.000050	0.00097	<0.0050	<0.0050	<0.00050		<0.000020	0.0342
W7	9/13/2012	6.7	<0.0050	0.247			<0.0050	<0.000050	0.00052	<0.0050	<0.0050	<0.00050		<0.000020	0.139
W7	10/16/2012	6.8	<0.0050	0.303			<0.0050	<0.000050	0.00077	<0.0050	<0.0050	<0.00050		<0.000020	0.127
W7	11/2/2012	6.94	<0.0050	0.407			<0.0050	<0.000050	0.00135	<0.0050	<0.0050	<0.00050		<0.000020	0.0576
W7	12/29/2012	9.63	<0.0050	0.535			<0.0050	<0.000050	0.00133	<0.0050	<0.0050	<0.00050		<0.000020	0.0127
W7	4/30/2013	6.83	<0.0050	0.607			<0.0050	<0.000050	0.00213	<0.0050	<0.0050	<0.00050		<0.000020	0.0111
W7	5/14/2013	2.15	<0.0050	0.063			<0.0050	<0.000050	<0.00010	<0.0050	<0.0050	<0.00050		<0.000020	1.34
W7	6/19/2013	5.93	<0.0050	0.276			<0.0050	<0.000050	0.00097	<0.0050	<0.0050	<0.00050		<0.000020	0.256
W7	6/19/2013	5.92	<0.0050	0.277			<0.0050	<0.000050	0.00098	<0.0050	<0.0050	<0.00050		<0.000020	0.213
W7	7/13/2013	7.01	<0.0050	0.327			<0.0050	<0.000050	0.00105	<0.0050	<0.0050	<0.00050		0.000024	0.127
W7	8/21/2013	6.79	<0.0050	0.364			<0.0050	<0.000050	0.00107	<0.0050	<0.0050	<0.00050		<0.000020	0.137
W7	9/6/2013	7.12	<0.0050	0.339			<0.0050	<0.000050	0.00088	<0.0050	<0.0050	<0.00050		<0.000020	0.37
W7	10/21/2013	7.18	<0.0050	0.353			<0.0050	<0.000050	0.00093	<0.0050	<0.0050	<0.00050		<0.000020	0.0931
W7	11/16/2013	6.47	<0.0050	0.418			<0.0050	<0.000050	0.0015	<0.0050	<0.0050	<0.00050		<0.000020	0.0389
W7	12/7/2013	7.02	<0.0050	0.439			<0.0050	<0.000050	0.00126	<0.0050	<0.0050	<0.00050		0.000046	0.0098
C4	5/6/2012	4.02	<0.0050	0.0653			<0.0050	<0.000050	0.00015	<0.0050	<0.0050	0.00054		0.00021	29.7
C4	8/1/2012	8.03	<0.0050	0.206			<0.0050	<0.000050	0.00065	<0.0050	<0.0050	0.00061		0.000056	7.06
C4	8/8/2012	7.91	<0.0050	0.225			<0.0050	<0.000050	0.00075	<0.0050	<0.0050	0.00053		0.000051	7.01
C4	8/25/2012	7.53	<0.0050	0.231			<0.0050	<0.000050	0.00076	<0.0050	<0.0050	0.00058		0.00002	4.45
C4	6/22/2013	6.82	<0.0050	0.184			<0.0050	<0.000050	0.00115	<0.0050	<0.0050	0.00052		0.000074	20.4
C4	7/19/2013	7.14	<0.0050	0.193			<0.0050	<0.000050	0.001	<0.0050	<0.0050	<0.00050		0.000087	13.5
C4	8/22/2013	7.18	<0.0050	0.209			<0.0050	<0.000050	0.00095	<0.0050	<0.0050	0.00058		0.000063	13.8
C4	9/6/2013	7.73	<0.0050	0.214			<0.0050	<0.000050	0.00075	<0.0050	<0.0050	0.00055		0.000021	5.43
C4	10/18/2013	7.06	<0.0050	0.217			<0.0050	<0.000050	0.00068	<0.0050	<0.0050	<0.00050		0.000052	0.349
C4	10/18/2013	7.12	<0.0050	0.218			<0.0050	<0.000050	0.0007	<0.0050	<0.0050	<0.00050		0.000124	0.358
C4	11/17/2013	8.74	<0.0050	0.405			<0.0050	<0.000050	0.00063	<0.0050	<0.0050	0.00111		<0.000020	0.0856
C10	5/12/2012	3.83	<0.0050	0.0919			<0.0050	<0.000050	0.00057	<0.0050	<0.0050	<0.00050		0.000337	39.6
C10	7/30/2012	6.28	<0.0050	0.189			<0.0050	<0.000050	0.00243	<0.0050	<0.0050	<0.00050		0.0002	21.3
C10	7/30/2012														
C10	8/10/2012	6.7	<0.0050	0.2			<0.0050	<0.000050	0.00182	<0.0050	<0.0050	<0.00050		0.000187	21.1
C10	8/27/2012	6.39	<0.0050	0.214			<0.0050	<0.000050	0.00149	<0.0050	<0.0050	<0.00050		0.000217	24.8
C10	6/22/2013	6.15	<0.0050	0.195			<0.0050	<0.000050	0.0011	<0.0050	0.0104	<0.00050		<0.000020	1.31
C10	7/23/2013	6.42	<0.0050	0.177			<0.0050	<0.000050	0.00075	<0.0050	<0.0050	<0.00050		0.000021	4.86
C10	8/22/2013	7.14	<0.0050	0.242			<0.0050	<0.000050	0.00117	<0.0050	<0.0050	<0.00050		<0.000020	0.947
C10	9/8/2013	7.12	<0.0050	0.255			<0.0050	<0.000050	0.00094	<0.0050	<0.0050	<0.00050		<0.000020	0.509
C10	9/8/2013	7.01	<0.0050	0.254			<0.0050	<0.000050	0.0009	<0.0050	<0.0050	<0.00050		<0.000020	0.483
C10	10/18/2013	5.99	<0.0050	0.201			<0.0050	<0.000050	0.0007	<0.0050	<0.0050	<0.00050		0.000068	1.14

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	TT As (mg/L)	Ba (mg/L)	Total Be (mg/L)	Total Bi (mg/L)	Total B (mg/L)	Total Ca (mg/L)	Total Cd (mg/L)	Total Co (mg/L)	Total Cr (mg/L)	Total Cu (mg/L)	Total Fe (mg/L)	Total Hg (mg/L)	Total K (mg/L)	Total La (mg/L)
W1	5/27/2005	0.0009	0.062	<0.0010		<0.10	25.9	<0.000050	0.00058	0.002	0.0059	1.05	<0.000020	<2.0	
W1	6/30/2005	0.00047	0.0545	<0.00050	<0.00050	<0.010	36.7	<0.000050	<0.00010	<0.00050	0.00204	0.088		<2.0	
W1	7/28/2005	0.00045	0.0597	<0.00050	<0.00050	<0.010	38.5	<0.000050	<0.00010	<0.00050	0.00229	0.079		<2.0	
W1	8/29/2005	0.00062	0.059	<0.0010		<0.10	35	<0.000017	<0.00030	<0.0010	0.0026	0.387	<0.000020	<2.0	
W1	9/28/2005	0.00068	0.059	<0.0010		<0.10	35.5	<0.000017	<0.00030	<0.0010	0.0039	0.691	<0.000020	<2.0	
W1	10/15/2005	0.00062	0.054	<0.00050	<0.00050	<0.010	34.2	<0.000050	0.00026	0.00068	0.00458	0.526		<2.0	
W2	5/27/2005	0.00075	0.058	<0.0010		<0.10	24.8	<0.000050	0.00043	0.0012	0.0049	0.778	<0.000020	<2.0	
W2	5/27/2005	0.00104	0.053	<0.001		<0.1	19.9	<0.00005	0.00087	0.0027	0.0037	1.49			
W2	6/30/2005	0.00045	0.0569	<0.00050	<0.00050	<0.010	37.5	<0.000050	<0.00010	<0.00050	0.00207	0.052		<2.0	
W2	7/28/2005	0.00046	0.0576	<0.00050	<0.00050	<0.010	39.1	<0.000050	<0.00010	<0.00050	0.00245	0.079		<2.0	
W2	8/30/2005	0.00063	0.06	<0.0010		<0.10	35.4	<0.000017	<0.00030	<0.0010	0.0026	0.373	<0.000020	<2.0	
W2	9/28/2005	0.00069	0.057	<0.0010		<0.10	34.3	<0.000017	<0.00030	<0.0010	0.0039	0.674	<0.000020	<2.0	
W2	10/15/2005	0.00061	0.0528	<0.00050	<0.00050	<0.010	34.1	<0.000050	0.00018	0.00059	0.00404	0.436		<2.0	
W3	5/27/2005	<0.00050	0.042	<0.0010		<0.10	20.9	<0.000050	<0.00030	<0.0010	0.0078	0.32	<0.000020	<2.0	
W3	6/30/2005	0.00037	0.0518	<0.00050	<0.00050	<0.010	39.1	<0.000050	<0.00010	0.0005	0.00374	0.081		<2.0	
W3	7/29/2005	0.00081	0.0667	<0.00050	<0.00050	<0.010	37.3	<0.000050	0.00062	0.002	0.0149	1.32		<2.0	
W3	8/29/2005	0.00054	0.06	<0.0010		<0.10	30.8	<0.000017	<0.00030	<0.0010	0.0086	0.698	<0.000020	<2.0	
W3	9/28/2005	0.00055	0.055	<0.0010		<0.10	28.7	<0.000017	0.0003	<0.0010	0.01	0.794	<0.000020	<2.0	
W3	10/15/2005	0.00045	0.0489	<0.00050	<0.00050	<0.010	29.4	<0.000050	0.00023	<0.00050	0.00855	0.497		<2.0	
W8	5/27/2005	<0.00050	0.04	<0.0010		<0.10	16.9	<0.000050	<0.00030	<0.0010	0.0143	0.23	<0.000020	<2.0	
W8	6/30/2005	0.00048	0.0503	<0.00050	<0.00050	<0.010	24.3	<0.000050	0.00021	0.00073	0.0103	0.503		<2.0	
W8	7/29/2005	0.00047	0.0546	<0.00050	<0.00050	<0.010	30.9	<0.000050	0.00017	0.00056	0.00891	0.435		<2.0	
W8	8/30/2005	0.00052	0.055	<0.0010		<0.10	25.6	<0.000017	<0.00030	<0.0010	0.0094	0.722	<0.000020	<2.0	
W8	9/28/2005	<0.00050	0.049	<0.0010		<0.10	24.7	<0.000017	<0.00030	<0.0010	0.0088	0.706	<0.000020	<2.0	
W8	10/15/2005	0.00054	0.0504	<0.00050	<0.00050	<0.010	25.1	<0.000050	0.00037	<0.00050	0.0104	0.887		<2.0	
W9	5/27/2005	<0.00050	0.042	<0.0010		<0.10	12.9	<0.000050	<0.00030	<0.0010	0.0035	0.277	0.000023	<2.0	
W9	6/30/2005	0.00058	0.0532	<0.00050	<0.00050	<0.010	18.9	<0.000050	0.00019	<0.00050	0.0021	0.799		<2.0	
W9	7/29/2005	0.00061	0.058	<0.00050	<0.00050	<0.010	25.1	<0.000050	0.0002	0.0006	0.00345	0.894		<2.0	
W9	8/29/2005	0.00064	0.054	<0.0010		<0.10	18.3	<0.000017	0.00031	<0.0010	0.002	1.01	<0.000020	<2.0	
W9	9/28/2005	0.00051	0.048	<0.0010		<0.10	17.2	<0.000017	<0.00030	<0.0010	0.0024	0.783	<0.000020	<2.0	
W9	10/15/2005	0.00042	0.0424	<0.00050	<0.00050	<0.010	15.6	<0.000050	0.00016	0.00051	0.00214	0.543		<2.0	
W10	5/27/2005	<0.00050	0.053	<0.0010		<0.10	12.9	<0.000050	<0.00030	<0.0010	0.02	0.113	<0.000020	<2.0	
W10	5/27/2005	<0.0005		<0.001		<0.1			0.00088	<0.001			<0.00002	<2.0	
W10	6/30/2005	0.00076	0.0459	<0.00050	<0.00050	<0.010	13.1	<0.000050	0.00063	0.00069	0.00534	1.01		<2.0	
W10	7/29/2005	0.00095	0.0868	<0.00050	<0.00050	<0.010	15.5	0.000097	0.00241	0.00499	0.0138	2.84		<2.0	
W10	8/29/2005	<0.00050	0.059	<0.0010		<0.10	18.5	0.000038	0.00053	0.0012	0.0056	0.681	<0.000020	<2.0	
W10	9/28/2005	<0.00050	0.057	<0.0010		<0.10	25.4	<0.000017	<0.00030	<0.0010	0.0035	0.097	<0.000020	<2.0	
W10	10/15/2005	0.0003	0.051	<0.00050	<0.00050	<0.010	24	<0.000050	0.00011	<0.00050	0.0045	0.121		<2.0	
W6	5/27/2005	0.00052	0.038	<0.0010		<0.10	17.4	<0.000050	<0.00030	<0.0010	0.0021	0.363	<0.000020	<2.0	
W6	6/30/2005	0.00045	0.0462	<0.00050	<0.00050	<0.010	24.7	<0.000050	0.00017	<0.00050	0.00148	0.266		<2.0	
W6	7/29/2005	0.00063	0.0683	<0.00050	<0.00050	<0.010	41.1	<0.000050	0.00049	0.00145	0.0118	1.08		<2.0	
W6	8/30/2005	<0.00050	0.053	<0.0010		<0.10	28.6	<0.000017	<0.00030	<0.0010	0.0012	0.088	<0.000020	<2.0	
W6	9/28/2005	<0.00050	0.048	<0.0010		<0.10	28.2	<0.000017	<0.00030	<0.0010	0.0012	0.148	<0.000020	<2.0	
W6	10/15/2005	0.00043	0.0424	<0.00050	<0.00050	<0.010	25.1	<0.000050	0.00011	<0.00050	0.00107	0.116		<2.0	
W6	6/2/2006	0.00131	0.0679	<0.0005	<0.0005	<0.01	18.9	<0.00005	0.00127	0.00384	0.00531	2.74		<2	
W6	8/25/2006	0.0006	0.056	<0.0002	<0.001	0.004	31.5	<0.00002	<0.0002	<0.001	<0.002	<0.2		<0.8	
W6	9/6/2006	0.0005	0.052	<0.0001	<0.0005	0.003	29	<0.00001	0.0001	0.0005	0.001	0.1		0.5	
W6	6/20/2007	0.0004	0.042	<0.0001	<0.0005	0.004	23.2	<0.00001	0.0001	<0.0005	0.002	0.1	<0.0001	0.4	
W6	9/18/2007	0.0004	0.046	<0.0001	<0.0005	0.002	25.8	<0.00001	0.0001	<0.0005	0.001	<0.1	<0.0001	0.4	
W6	6/17/2008	0.0004	0.042	<0.00004		<0.005	23.8	<0.00008	0.00018	0.0011	0.001	0.35		0.46	
W6	9/18/2008	<0.0002	0.039	<0.00004	<0.0001	<0.005	24.6	<0.00001	0.00008	0.001	0.001	0.09	<0.00001	0.4	
W6	4/14/2009	0.0006	0.08	0.00006	<0.0001	0.017	36	0.00024	0.00079	0.0029	0.454	2.19	0.00002	9.2	
W6	4/30/2009	0.0023	0.111	0.00014	<0.0001	0.006	18.6	0.00008	0.00275	0.0096	0.068	8	0.00002	2.6	
W6	7/28/2009														
W6	8/6/2009	0.0008	0.098	<0.00004	<0.001	0.025	49.4	0.00002	0.00016	0.0008	0.011	0.053		3.4	
W6	8/6/2009	0.0008	0.09	<0.00004	<0.001	0.018	49.7	0.00003	0.00015	0.0008	0.011	0.055		3.4	
W6	8/18/2009														
W6	8/25/2009														
W6	10/7/2009														
W6	10/7/2009	0.0002	0.132	<0.00004	<0.001	0.039	58	<0.00001	0.00025	0.001	0.004	0.059	<0.00001	3.2	
W6	10/25/2009	0.0003	0.129	<0.0001	<0.001	<0.05	59.9	0.00002	<0.0005	<0.001	0.0066	0.076	<0.00002	3.41	
W6	4/19/2010	0.0006	0.068	<0.00004	<0.001	0.013	35.2	0.00003	0.00075	0.0012	0.051	1.73	<0.00001	2.7	
W6	5/16/2010	0.0004	0.024	<0.0001	<0.001	<0.05	25.1	<0.00001	<0.0005	<0.001	0.0051	0.08	<0.0002	1.34	
W6	5/17/2010	0.0002	0.028	<0.0001	<0.001	<0.05	19.6	0.00002	<0.0005	<0.001	0.0064	0.073	<0.0002	0.89	
W6	5/19/2010	<0.001	0.045	<0.0005	<0.001	<0.05	27.2	0.00003	<0.0005	0.001	0.007	0.069	<0.00002	1.32	
W6	5/21/2010	<0.0004	0.046	<0.0002	<0.001	<0.1	25	<0.00001	<0.0005	<0.002	0.033	0.263	<0.0002	1	
W6	5/23/2010	<0.0004	0.047	<0.0002	<0.001	<0.1	27	<0.00001	<0.0005	<0.002	0.007	0.083	<0.0002	1	
W6	5/25/2010	<0.001	0.049	<0.0005	<0.001	<0.1	32	<0.00001	<0.0005	<0.002	0.028	0.133	<0.00002	1	
W6	5/29/2010	<0.0004	0.04	<0.0002	<0.001	<0.1	21	<0.00001	<0.0005	<0.002	0.022	0.21	<0.00002	<1	
W6	6/2/2010	<0.0004	0.077	<0.0002	<0.001	<0.1	61	<0.00001	<0.0005	<0.002	0.002	0.081	<0.0002	2	
W6	6/4/2010	0.0004	0.047	<0.0002	<0.001	<0.1	26	<0.00001	<0.0005	<0.002	0.002	0.12	<0.0002	<1	
W6	6/6/2010	0.0005	0.053	<0.0002	<0.001	<0.1	27	<0.00001	<0.0005	<0.002	0.001	0.2			

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	TT As (mg/L)	Ba (mg/L)	Total Be (mg/L)	Total Bi (mg/L)	Total B (mg/L)	Total Ca (mg/L)	Total Cd (mg/L)	Total Co (mg/L)	Total Cr (mg/L)	Total Cu (mg/L)	Total Fe (mg/L)	Total Hg (mg/L)	Total K (mg/L)	Total La (mg/L)
W7	6/15/2006														
W7	6/15/2006	0.0008	0.082	<0.0001	<0.0005	0.006	25.4	0.00002	0.0011	0.0032	0.004	1.7		1.1	
W7	6/23/2006	0.0022	0.167	0.0002	<0.0005	0.005	34.5	0.00008	0.0037	0.0091	0.01	7.2		1.6	
W7	6/28/2006	0.001	0.09	<0.0001	<0.0005	0.006	27.4	0.00003	0.001	0.0031	0.004	2.5		1.1	
W7	7/7/2006	0.0004	0.07	<0.0001	<0.0005	0.005	31.2	<0.00001	<0.0001	<0.0005	0.001	0.2		1	
W7	7/12/2006	0.0004	0.067	<0.0001	<0.0005	0.005	31	<0.00001	<0.0001	<0.0005	0.001	0.2		1	
W7	7/20/2006	0.0005	0.065	<0.0001	<0.0005	0.029	31.8	<0.00001	<0.0001	<0.0005	0.001	0.2		0.9	
W7	7/26/2006														
W7	7/26/2006	0.0005	0.072	<0.0001	<0.0005	0.004	33.9	<0.00001	0.0001	<0.0005	0.001	0.3		1.1	
W7	8/2/2006	0.0006	0.07	<0.0001	<0.0005	0.006	32.9	<0.00001	<0.0001	<0.0005	0.001	0.1		1	
W7	8/10/2006	0.0005	0.072	<0.0001	<0.0005	0.005	34.6	<0.00001	0.0004	<0.0005	<0.001	0.1		1.1	
W7	8/25/2006														
W7	8/25/2006	0.0004	0.069	<0.0002	<0.001	0.007	31.8	<0.00002	<0.0002	<0.001	<0.002	<0.2		1.2	
W7	8/30/2006	0.0005	0.07	<0.0001	<0.0005	0.005	30.8	<0.00001	<0.0001	0.0008	<0.001	0.1		1	
W7	9/6/2006	0.0004	0.07	<0.0001	<0.0005	0.006	31.1	<0.00001	0.0001	0.0008	0.001	0.1		1	
W7	9/13/2006	<0.0002	0.037	<0.0001	<0.0005	0.004	32.2	<0.00001	<0.0001	<0.0005	<0.001	<0.2		0.9	
W7	9/20/2006	0.0005	0.07	<0.0001	<0.0005	0.006	32.4	<0.00001	0.0001	<0.0005	0.001	0.2		0.9	
W7	9/28/2006	<0.0004	0.073	<0.0002	<0.001	0.007	32.5	<0.00002	<0.0002	<0.001	<0.002	<0.2		1.1	
W7	10/4/2006	0.0004	0.074	<0.0002	<0.001	0.005	31.6	<0.00002	<0.0002	<0.001	<0.002	<0.2		0.9	
W7	10/12/2006	0.0004	0.076	<0.0001	<0.0005	0.006	33.5	<0.00001	0.0002	0.0007	0.002	0.5		1	
W7	6/5/2007	0.0008	0.084	<0.0001	<0.0005	0.009	26.4	0.00003	0.0012	0.0031	0.003	2	<0.0001	1.1	
W7	6/5/2007	0.0007	0.095	<0.0002	<0.001	0.01	28.1	0.00003	0.001	0.0037	0.003	2.3	<0.0001	1	
W7	6/5/2007	0.001	0.09	<0.0001	<0.0005	0.008	27.2	0.00003	0.0013	0.0036	0.004	2.5	<0.0001	1.3	
W7	6/20/2007	0.0004	0.066	<0.0001	<0.0005	0.007	30.2	<0.00001	0.0002	0.0005	0.002	0.2	<0.0001	1	
W7	7/18/2007	0.0005	0.071	<0.0001	<0.0005	0.006	32.2	0.00002	0.0002	0.0008	0.002	0.3	<0.0001	1	
W7	7/18/2007	0.0003	0.073	<0.0001	<0.0005	0.006	31.9	0.00001	0.0002	0.0007	0.001	0.3	<0.0001	0.9	
W7	7/18/2007	<0.0002	0.072	<0.0001	<0.0005	0.006	31.8	<0.00001	0.0001	0.0007	0.001	0.3	<0.0001	0.9	
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007	0.0003	0.075	<0.0001	<0.0005	0.006	31.2	<0.00001	0.0002	0.0008	0.002	0.2	<0.0001	1	
W7	8/24/2007	0.0004	0.074	<0.0001	<0.0005	0.006	31.5	<0.00001	0.0001	0.0005	0.001	0.2	<0.0001	1	
W7	8/24/2007	0.0004	0.077	<0.0001	<0.0005	0.006	32.9	<0.00001	0.0001	0.0005	0.001	0.2	<0.0001	1.1	
W7	9/18/2007	0.0005	0.067	<0.0001	<0.0005	0.005	27	<0.00001	0.0003	0.0011	0.003	0.5	<0.0001	0.9	
W7	10/30/2007	0.0004	0.076	<0.0001	<0.0005	0.007	33.5	0.00004	0.0003	0.0007	0.012	0.3	<0.0001	1.6	
W7	10/30/2007	0.0002	0.075	<0.0001	<0.0005	0.006	33	0.00002	0.0001	0.0008	0.005	0.2	<0.0001	1.1	
W7	10/30/2007	<0.0002	0.074	<0.0001	<0.0005	0.006	33.6	0.00002	0.0001	0.0007	0.003	0.2	<0.0001	1.1	
W7	10/30/2007														
W7	4/22/2008	0.0005	0.073	<0.00004		0.006	40.2	<0.00007	0.00007	<0.0005	0.004	0.05	<0.00001	2.56	
W7	4/22/2008	0.0012	0.077	<0.00004		0.006	43.2	<0.00007	0.00009	<0.0005	0.004	0.05	<0.00001	2.77	
W7	4/22/2008	0.0006	0.078	<0.00004		0.006	42.4	<0.00007	0.0001	<0.0005	0.004	0.06	<0.00001	2.7	
W7	4/22/2008														
W7	6/3/2008	0.0007	0.061	<0.00004		<0.005	24.4	<0.00007	0.0004	0.0028	0.002	0.78	<0.00001	0.94	
W7	6/3/2008	0.0013	0.06	<0.00004		<0.005	24.2	<0.00007	0.00041	0.0028	0.001	0.71	<0.00001	0.93	
W7	6/3/2008	0.0008	0.062	0.00004		<0.005	25.2	<0.00007	0.00042	0.003	0.002	0.79	<0.00001	0.94	
W7	6/3/2008														
W7	6/17/2008	0.0006	0.064	<0.00004		<0.005	29.2	<0.00008	0.00028	0.0012	0.001	0.4		1.01	
W7	8/6/2008	0.0006	0.083	<0.0001	<0.0005	0.008	31.5	0.00002	0.0006	0.002	0.002	1.02	<0.0001	1	
W7	8/6/2008	0.0007	0.088	<0.0001	<0.0005	0.007	31.4	0.00002	0.0007	0.0026	0.003	1.36	<0.0001	1.1	
W7	8/6/2008	0.0008	0.093	<0.0001	<0.0005	0.008	31.8	0.00002	0.0008	0.0025	0.003	1.46	<0.0001	1.1	
W7	8/6/2008														
W7	9/18/2008	0.0005	0.06	<0.00004	<0.0001	<0.005	23	0.00002	0.00046	0.0022	0.003	0.91	<0.00001	0.68	
W7	10/28/2008	0.0004	0.057	<0.00004	<0.0001	<0.005	32.4	<0.00001	0.00015	0.0013	0.004	0.34	<0.00001	0.9	
W7	10/28/2008	0.0005	0.06	<0.00004	<0.0001	<0.005	32.3	0.00002	0.00011	0.0008	0.004	0.24	<0.00001	0.9	
W7	10/28/2008	0.0004	0.057	<0.00004	<0.0001	<0.005	32.4	<0.00001	0.0001	0.0005	0.003	0.17	<0.00001	0.8	
W7	10/28/2008														
W7	4/30/2009	<0.0002	0.012	<0.00004	<0.0001	<0.005	5.54	0.00008	0.0001	0.0012	0.013	0.19	0.00002	1.5	
W7	6/8/2009	0.0005	0.069	0.00004	<0.0001	0.005	27	0.00001	0.00052	0.0014	0.003	0.92	<0.00001	0.9	
W7	7/28/2009														
W7	8/6/2009	0.0007	0.081	<0.00004	<0.001	<0.005	35.1	<0.00001	0.00013	0.0009	0.001	0.126		1.1	
W7	8/24/2009														
W7	8/25/2009														
W7	8/31/2009														
W7	10/7/2009														
W7	10/7/2009	0.0004	0.067	<0.00004	<0.001	0.008	34.2	0.000091	0.00022	0.0014	0.006	0.357	<0.00001	0.7	
W7	10/25/2009	0.0004	0.077	<0.0001	<0.001	<0.05	35.7	0.00001	<0.0005	<0.001	0.0021	0.141	<0.00002	1.02	
W7	10/25/2009														
W7	4/19/2010	0.0004	0.04	<0.00004	<0.001	0.006	20.5	0.00001	0.0001	0.0004	0.006	0.104	<0.00001	2.1	
W7	4/27/2010	0.0003	0.023	<0.0001	<0.001	<0.05	9.35	0.00003	<0.0005	<0.001	0.0055	0.211	<0.00002	1.01	
W7	4/29/2010	0.0004	0.025	<0.0001	<0.001	<0.05	9.54	0.00002	<0.0005	<0.001	0.0037	0.259	<0.00002	0.9	
W7	5/1/2010	0.0006	0.035	<0.0001	<0.001	<0.05	11.5	0.00002	<0.0005	0.002	0.0074	0.902	<0.00002	0.81	
W7	5/3/2010	0.0007	0.035	<0.0001	<0.001	<0.05	12.3	0.00003	<0.0005	0.001	0.0045	0.983	<0.00002	0.72	
W7	5/5/2010	0.0007	0.039	<0.0001	<0.001	<0.05	14.3	0.00004	<0.0005	0.001	0.0058	1.14	<0.00002	0.72	
W7	5/7/2010	0.0005	0.041	<0.0001	<0.001	<0.05	14.7	0.00003	<0.0005	<0.001	0.0045	0.92	<0.00002	0.68	
W7	5/9/2010	0.0004	0.043	<0.0001	<0.001	<0.05	18.2	0.00005	<0.0005	0.001	0.0147	0.468	<0.00002	0.74	
W7	5/10/2010	0.0005	0.055	<0.0001	<0.001	<0.05	23.3	0.00011	<0.0005	<0.001	0.0059	0.452	<0.00002	0.91	
W7	5/12/2010										<.03	0.19			
W7	5/12/2010	0.0004	0.048	<0.0001	<0.001	<0.05	22.1	0.00009	<0.0005	<0.001	0.0075	0.378	<0.00002	0.98	
W7	5/14/2010	0.0004	0.046	<0.0001	<0.001	<0.05	18.2	0.00005	<0.0005	<0.001	0.0055	0.556	<0.00002	0.71	
W7	5/16/2010	0.0004	0.044	<0.0001	<0.001	<0.05	19.8	0.00005	<0.0005	0.001	0.0031	0.369	<0.00002	0.72	
W7	5/17/2010	0.0005	0.046	<0.0001	<0.001	<0.05	19.6	0.00001	<0.0005	<0.001	0.0035	0.405	<0.00002	0.7	

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	TT As (mg/L)	Ba (mg/L)	Total Be (mg/L)	Total Bi (mg/L)	Total B (mg/L)	Total Ca (mg/L)	Total Cd (mg/L)	Total Co (mg/L)	Total Cr (mg/L)	Total Cu (mg/L)	Total Fe (mg/L)	Total Hg (mg/L)	Total K (mg/L)	Total La (mg/L)
W7	8/2/2011	0.0037	0.211	0.0003	<0.001	<0.05	20.7	0.00017	0.0064	0.021	0.0197	13.8	<0.00002	1.11	
W7	8/16/2011	0.001	0.069	<0.0001	<0.001	<0.05	25.4	0.00004	0.0006	0.001	0.0143	1.25	<0.00002	0.53	
W7	8/19/2011	0.0009	0.061	<0.0001	<0.001	<0.05	24.1	0.00002	0.0006	0.001	0.0028	1.21	<0.00002	0.47	
W7	9/12/2011	0.0008	0.061	<0.0001	<0.001	<0.05	30.1	0.00005	<0.0005	<0.001	0.0024	0.738	<0.00002	0.6	
W7	10/6/2011	0.0005	0.058	<0.0001	<0.001	<0.05	28.4	0.00001	<0.0005	<0.001	0.0012	0.49	<0.00002	0.62	
W7	11/22/2011	0.0006	0.085	<0.0001	<0.001	<0.05	36.4	0.00025	<0.0005	0.001	0.0108	0.865	<0.000020	1.09	
W7	1/24/2012	0.0004	0.087	<0.0001	<0.001	<0.05	39.5	0.00001	<0.0005	<0.001	0.0013	0.113	<0.000010	1.57	
W7	2/25/2012	0.0003	0.082	<0.0001	<0.001	<0.05	41	0.00003	<0.0005	<0.001	0.0055	0.043	<0.000010	1.51	
W7	3/5/2012	0.0004	0.083	<0.0001	<0.001	<0.05	39.7	0.00001	<0.0005	<0.001	0.0068	0.108	<0.000010	1.46	
W7	4/24/2012	0.00074	0.0404	<0.00010	<0.0010	<0.05	9.61	0.000029	0.00056	0.0015	0.00635	1.32	<0.000010	1.2	
W7	5/6/2012	0.00045	0.0317	<0.00010	<0.0010	<0.05	11.2	0.000015	<0.00050	<0.0010	0.00299	0.551	<0.000010	0.881	
W7	5/6/2012	0.00049	0.0316	<0.00010	<0.0010	<0.05	11.1	0.000016	<0.00050	<0.0010	0.00373	0.572	<0.000010	0.912	
W7	6/19/2012	0.00232	0.154	0.00016	<0.0010	<0.05	26.4	0.000119	0.00326	0.0112	0.0102	7.88	<0.000010	1.09	
W7	7/17/2012	0.00118	0.0843	<0.00010	<0.0010	<0.05	31.7	0.000034	0.00075	0.0024	0.0035	2.28	<0.000010	0.824	
W7	7/30/2012	0.00095	0.0737	<0.00010	<0.0010	<0.05	32.1	0.000014	<0.00050	<0.0010	0.0045	1.32	<0.000010	1.14	
W7	8/8/2012	0.00085	0.0731	<0.00010	<0.0010	<0.05	35.7	<0.000010	<0.00050	<0.0010	0.00108	1.13	<0.000010	0.894	
W7	8/23/2012	0.00093	0.0778	<0.00010	<0.0010	<0.05	39.1	<0.000010	<0.00050	<0.0010	0.00134	1.12	<0.000010	0.929	
W7	9/13/2012	0.0007	0.0629	<0.00010	<0.0010	<0.05	31.2	<0.000010	<0.00050	<0.0010	0.00208	1.15	<0.000010	0.589	
W7	10/16/2012	0.00065	0.0693	<0.00010	<0.0010	<0.05	36	<0.000010	<0.00050	<0.0010	0.00144	0.995	<0.000010	0.748	
W7	11/2/2012	0.00058	0.0848	<0.00010	<0.0010	<0.05	37.3	0.000015	<0.00050	<0.0010	0.00231	0.289	<0.000010	1.16	
W7	12/29/2012	0.00042	0.104	<0.00010	<0.0010	<0.05	49.6	0.000015	<0.00050	<0.0010	0.0028	0.0724	<0.000010	2.29	
W7	4/30/2013	0.00019	0.0996	<0.00010	<0.0010	<0.05	47.8	<0.000010	<0.00050	<0.0010	0.0021	0.0288	<0.000010	1.95	
W7	5/14/2013	0.00072	0.0462	<0.00010	<0.0010	<0.05	9.61	0.000025	0.00107	0.0027	0.0084	2.2	<0.000010	1.18	
W7	6/19/2013	0.00064	0.0691	<0.00010	<0.0010	<0.05	29.1	0.000011	<0.00050	<0.0010	0.00222	0.702	<0.000010	0.847	
W7	6/19/2013	0.00058	0.0683	<0.00010	<0.0010	<0.05	29.7	<0.000010	<0.00050	<0.0010	0.00191	0.657	<0.000010	0.872	
W7	7/13/2013	0.00063	0.0712	<0.00010	<0.0010	<0.05	35.1	<0.000010	<0.00050	<0.0010	0.00143	0.631	<0.000010	0.856	
W7	8/21/2013	0.0007	0.0755	<0.00010	<0.0010	<0.05	35.8	<0.000010	<0.00050	<0.0010	0.00138	0.619	<0.000010	0.951	
W7	9/6/2013	0.00099	0.0815	<0.00010	<0.0010	<0.05	38.7	<0.000010	<0.00050	0.0014	0.0017	1.48	<0.000010	0.968	
W7	10/21/2013	0.00061	0.0642	<0.00010	<0.0010	<0.05	31.8	<0.000010	<0.00050	<0.0010	0.00119	0.683	<0.000010	0.754	
W7	11/16/2013	0.00052	0.0832	<0.00010	<0.0010	<0.05	39.8	<0.000010	<0.00050	<0.0010	0.00124	0.296	<0.000010	1.14	
W7	12/7/2013	0.00059	0.0967	<0.00010	<0.0010	<0.05	46.7	0.000013	<0.00050	<0.0010	0.00141	0.227	<0.000010	1.52	
C4	5/6/2012	0.0125	0.56	0.00088	<0.0010	<0.05	23.9	0.000416	0.0178	0.06	0.0585	45.8	<0.000010	3.02	
C4	8/1/2012	0.00497	0.24	0.00031	<0.0010	<0.05	34.3	0.000114	0.00591	0.0135	0.0167	13.9	<0.000010	1.34	
C4	8/8/2012	0.00635	0.261	0.00033	<0.0010	<0.05	36.5	0.000107	0.00701	0.0148	0.015	16.1	<0.000010	1.45	
C4	8/25/2012	0.00759	0.373	0.00042	<0.0010	<0.05	45.6	0.000202	0.00894	0.0079	0.0218	18.2	<0.000010	1.19	
C4	6/22/2013	0.0123	0.539	0.00075	<0.0010	<0.05	55.7	0.000317	0.0172	0.0426	0.0479	36.2	0.000018	2.77	
C4	7/19/2013	0.00864	0.373	0.00048	<0.0010	<0.05	54	0.000209	0.0113	0.0287	0.0323	24.4	0.000015	2.21	
C4	8/22/2013	0.00939	0.438	0.00055	<0.0010	<0.05	51	0.000308	0.0133	0.0268	0.0347	26.2	0.000033	2.02	
C4	9/6/2013	0.00462	0.189	0.00019	<0.0010	<0.05	43.1	0.000066	0.00447	0.0107	0.0103	11	<0.000010	1.5	
C4	10/18/2013	0.00153	0.0845	<0.00010	<0.0010	<0.05	37.3	0.000017	0.00102	0.0012	0.0019	2.12	<0.000010	0.858	
C4	10/18/2013	0.00151	0.0837	<0.00010	<0.0010	<0.05	36.9	0.000012	0.00101	0.0013	0.00263	2.1	<0.000010	0.833	
C4	11/17/2013	0.00545	0.17	<0.00010	<0.0010	<0.05	70.5	0.000022	0.00621	0.0015	0.00357	14.7	<0.000010	1.05	
C10	5/12/2012	0.0208	0.942	0.00176	<0.0010	<0.05	51.2	0.000982	0.0315	0.0779	0.1	73.2	<0.000010	4.64	
C10	7/30/2012	0.0123	0.549	0.0008	<0.0010	<0.05	56.3	0.000365	0.0151	0.0385	0.0527	37.5	0.000062	3.36	
C10	7/30/2012														
C10	8/10/2012	0.0124	0.666	0.00102	<0.0010	<0.05	67.1	0.000486	0.0185	0.0378	0.0597	38.9	<0.000010	3.11	
C10	8/27/2012	0.0156	0.754	0.00117	<0.0010	<0.05	72.2	0.000526	0.0213	0.0455	0.0624	45.6	<0.000010	3.37	
C10	6/22/2013	0.00203	0.0981	<0.00010	<0.0010	<0.05	44.4	0.000019	0.00109	0.0022	0.00492	3.18	<0.000010	1.46	
C10	7/23/2013	0.00386	0.174	0.00022	<0.0010	<0.05	45.1	0.000071	0.00371	0.0095	0.0114	9.35	<0.000010	1.71	
C10	8/22/2013	0.00213	0.1	<0.00010	<0.0010	<0.05	49.5	0.000016	0.00099	0.0019	0.00344	2.95	<0.000010	1.18	
C10	9/8/2013	0.00188	0.0869	<0.00010	<0.0010	<0.05	48.6	0.000019	0.00094	0.0013	0.00241	2.71	<0.000010	1.17	
C10	9/8/2013	0.00194	0.0852	<0.00010	<0.0010	<0.05	48	0.000093	0.00086	0.0012	0.00237	2.64	<0.000010	1.17	
C10	10/18/2013	0.00177	0.091	<0.00010	<0.0010	<0.05	46.8	0.00002	0.00139	0.0024	0.00355	3.33	<0.000010	1.1	

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Total Li (mg/L)	Total Mg (mg/L)	Total Mn (mg/L)	Total Mo (mg/L)	Total Na (mg/L)	Total Ni (mg/L)	Total Pb (mg/L)	Total P (mg/L)	Total Sb (mg/L)	Total Se (mg/L)	Total Si (mg/L)	Total Sn (mg/L)	Total Sr (mg/L)	Total S (mg/L)
W1	5/27/2005	<0.0050	8.65	0.0612	0.0011	4.9	0.0032	<0.00050		<0.00050	<0.0010		<0.00050		
W1	6/30/2005	<0.0050	12.3	0.00663	0.00107	8.6	0.00101	<0.000050	<0.30	<0.00010	<0.0010	5.43	<0.00010	0.293	
W1	7/28/2005	<0.0050	12.7	0.0164	0.00153	8.5	0.00113	<0.000050	<0.30	<0.00010	<0.0010	5.21	<0.00010	0.333	
W1	8/29/2005	<0.0050	11.5	0.0258	0.001	6.8	0.0016	<0.00050		<0.00050	<0.0010		<0.00050		
W1	9/28/2005	<0.0050	11.3	0.0559	<0.0010	6.3	0.0019	<0.00050		<0.00050	<0.0010		<0.00050		
W1	10/15/2005	<0.0050	10.9	0.0483	0.000867	5.9	0.0024	0.00012	<0.30	<0.00010	<0.0010	5.99	<0.00010	0.269	
W2	5/27/2005	<0.0050	8.37	0.0505	<0.0010	4.8	0.0026	<0.00050		<0.00050	<0.0010		<0.00050		
W2	5/27/2005	<0.005	5.78	0.0536			0.0033	0.00066		<0.0005					
W2	6/30/2005	<0.0050	12.5	0.00785	0.00103	8.7	0.00105	<0.000050	<0.30	<0.00010	<0.0010	5.48	<0.00010	0.304	
W2	7/28/2005	<0.0050	13.1	0.014	0.00134	8.7	0.00107	<0.000050	<0.30	<0.00010	<0.0010	5.32	<0.00010	0.338	
W2	8/30/2005	<0.0050	11.6	0.025	0.0011	6.9	0.0016	<0.00050		<0.00050	<0.0010		<0.00050		
W2	9/28/2005	<0.0050	11	0.0543	<0.0010	6	0.002	<0.00050		<0.00050	<0.0010		<0.00050		
W2	10/15/2005	<0.0050	10.8	0.0368	0.000916	6	0.00164	0.000078	<0.30	<0.00010	<0.0010	5.95	<0.00010	0.267	
W3	5/27/2005	<0.0050	9.03	0.023	0.0011	4.9	0.0017	<0.00050		<0.00050	<0.0010		<0.00050		
W3	6/30/2005	<0.0050	17.6	0.0084	0.00163	12.1	0.00087	0.000292	<0.30	<0.00010	<0.0010	6.04	<0.00010	0.299	
W3	7/29/2005	<0.0050	17.2	0.0641	0.0019	9.4	0.00257	0.000359	<0.30	0.0001	<0.0010	7.03	0.00011	0.295	
W3	8/29/2005	<0.0050	13.2	0.0806	0.0014	7.8	0.0017	<0.00050		<0.00050	<0.0010		<0.00050		
W3	9/28/2005	<0.0050	12	0.12	0.0012	7.1	0.0018	<0.00050		<0.00050	<0.0010		<0.00050		
W3	10/15/2005	<0.0050	12.5	0.124	0.00126	7	0.00136	<0.000050	<0.30	<0.00010	<0.0010	5.86	<0.00010	0.233	
W8	5/27/2005	<0.0050	5.03	0.00512	<0.0010	2.6	0.0018	<0.00050		<0.00050	<0.0010		<0.00050		
W8	6/30/2005	<0.0050	7.57	0.0445	0.000512	4.5	0.00172	0.000066	<0.30	<0.00010	<0.0010	5.21	<0.00010	0.112	
W8	7/29/2005	<0.0050	9.43	0.0268	0.000565	3.9	0.00146	0.000059	<0.30	<0.00010	<0.0010	5.04	<0.00010	0.133	
W8	8/30/2005	<0.0050	8.04	0.0447	<0.0010	3.8	0.0018	<0.00050		<0.00050	<0.0010		<0.00050		
W8	9/28/2005	<0.0050	7.45	0.0487	<0.0010	3.7	0.0017	<0.00050		<0.00050	<0.0010		<0.00050		
W8	10/15/2005	<0.0050	7.41	0.24	0.00171	4.5	0.00109	0.000064	<0.30	<0.00010	<0.0010	6.29	<0.00010	0.176	
W9	5/27/2005	<0.0050	4.1	0.00703	<0.0010	2.3	0.0013	<0.00050		<0.00050	<0.0010		<0.00050		
W9	6/30/2005	<0.0050	6.04	0.0432	0.000356	4.2	0.00125	<0.000050	<0.30	<0.00010	<0.0010	5.32	<0.00010	0.0956	
W9	7/29/2005	<0.0050	7.18	0.0638	0.00112	3.8	0.00152	0.000099	<0.30	<0.00010	<0.0010	5.5	<0.00010	0.146	
W9	8/29/2005	<0.0050	6	0.0669	<0.0010	3.5	0.0013	<0.00050		<0.00050	<0.0010		<0.00050		
W9	9/28/2005	<0.0050	5.52	0.0485	<0.0010	3.1	0.0012	<0.00050		<0.00050	<0.0010		<0.00050		
W9	10/15/2005	<0.0050	5.17	0.0363	0.000349	2.9	0.00105	<0.000050	<0.30	<0.00010	<0.0010	5.67	<0.00010	0.0837	
W10	5/27/2005	<0.0050	3.25	0.00326	<0.0010	<2.0	0.0018	<0.00050		<0.00050	<0.0010		<0.00050		
W10	5/27/2005	<0.005			<0.001	<2	0.0033	<0.0005			<0.001		<0.0005		
W10	6/30/2005	<0.0050	3.71	0.0457	0.000177	3.6	0.00191	0.000388	<0.30	<0.00010	<0.0010	5.43	<0.00010	0.0778	
W10	7/29/2005	<0.0050	5	0.174	0.000273	4.7	0.00411	0.00178	<0.30	0.00015	<0.0010	9.73	0.00026	0.108	
W10	8/29/2005	<0.0050	6.02	0.0422	<0.0010	5.3	0.0016	<0.00050		<0.00050	<0.0010		<0.00050		
W10	9/28/2005	<0.0050	8.84	0.00236	<0.0010	5.4	<0.0010	<0.00050		<0.00050	<0.0010		<0.00050		
W10	10/15/2005	<0.0050	8.41	0.00586	0.000277	4.4	0.00086	<0.000050	<0.30	<0.00010	<0.0010	5.52	<0.00010	0.153	
W6	5/27/2005	<0.0050	4.88	0.0169	<0.0010	2.7	0.0021	<0.00050		<0.00050	<0.0010		<0.00050		
W6	6/30/2005	<0.0050	6.65	0.0113	0.000448	4.6	0.00135	0.000134	<0.30	<0.00010	<0.0010	7.27	<0.00010	0.1	
W6	7/29/2005	<0.0050	15.4	0.0536	0.00133	8.4	0.00204	0.00035	<0.30	<0.00010	<0.0010	6.69	0.00013	0.286	
W6	8/30/2005	<0.0050	7.97	0.0224	<0.0010	4.5	0.0011	<0.00050		<0.00050	<0.0010		<0.00050		
W6	9/28/2005	<0.0050	8.02	0.0267	<0.0010	4.2	0.0013	<0.00050		<0.00050	<0.0010		<0.00050		
W6	10/15/2005	<0.0050	7.18	0.0188	0.000392	4	0.00131	<0.000050	<0.30	<0.00010	<0.0010	6.54	<0.00010	0.112	
W6	6/2/2006	<0.005	5.63	0.0835	0.000411	3.4	0.00535	0.000851	<0.3	0.00017	<0.001	7.95	0.0001	0.0816	
W6	8/25/2006	<0.002	7.8	0.04	<0.002	4.8	0.001	<0.0002		<0.0004	<0.0004	7.39	<0.002	0.14	0.9
W6	9/6/2006	0.001	7.3	0.042	<0.001	4.6	0.0015	0.0001		<0.0002	0.0003	7.42	<0.001	0.135	1
W6	6/20/2007	<0.001	5.6	0.011	<0.001	4.3	0.0017	<0.0001	0.18	<0.0002	0.0002	6.4	<0.001	0.104	0.9
W6	9/18/2007	0.001	6.9	0.023	<0.001	5	0.0012	<0.0001	<0.05	<0.0002	<0.0002	7.2	<0.001	0.125	1
W6	6/17/2008	<0.001	6.44	0.0215	0.00045	4.8	0.001	<0.0001	0.11	<0.0002	<0.0006	5.34	<0.0001	0.103	
W6	9/18/2008	<0.001	6.61	0.0098	0.00031	4.1	0.001	<0.0001	0.02	<0.0002	<0.0006	6.22	<0.0001	0.104	
W6	4/14/2009	0.005	50	0.083	0.00334	33.3	0.001	0.0011	0.34	0.0003	0.0017	6.62	<0.0001	0.524	42.4
W6	4/30/2009	0.004	7.92	0.167	0.00043	3.38	0.009	0.0024	0.25	<0.0002	<0.0006	11.5	<0.0001	0.142	2.7
W6	7/28/2009														
W6	8/6/2009	0.002	16.7	0.1	0.0092	15.5	0.002	0.0003	0.017	0.0002	<0.0006	4.67	<0.0001	0.666	14.7
W6	8/6/2009	0.002	16.7	0.0874	0.0088	15.8	0.001	0.0006	0.015	0.0003	0.0007	4.68	<0.0001	0.566	15
W6	8/18/2009														
W6	8/25/2009														
W6	10/7/2009														
W6	10/7/2009	0.002	15.4	0.28	0.016	19.4	0.002	0.0007	<0.05	0.0006	0.0018	3.6	<0.0001	0.842	22.4
W6	10/25/2009	<0.005	16.9	0.229	0.015	18.4	0.001	<0.0002		0.0006	0.0019	4.48	<0.005	0.844	27
W6	4/19/2010	0.002	14.7	0.119	0.0017	9.35	0.002	0.0006	0.08	<0.0002	<0.0006	6.58	<0.0001	0.392	10.9
W6	5/16/2010	<0.005	8.41	0.027	<0.001	4.4	<0.001	<0.0002	0.021	<0.0005	0.0002	5.35	<0.005	0.197	<3
W6	5/17/2010	<0.005	4.84	0.05	<0.001	2.96	<0.001	<0.0002	0.027	<0.0005	<0.0001	2.02	<0.005	0.19	<3
W6	5/19/2010	<0.005	8.01	0.026	<0.001	5.29	<0.003	<0.0002	0.037	<0.0005	0.0002	2.87	<0.005	0.304	4
W6	5/21/2010	<0.01	6	0.092	<0.001	4	<0.001	<0.0002		<0.0005	<0.0008	2.38	<0.005	0.279	<60
W6	5/23/2010	<0.01	7	0.024	<0.001	5	<0.001	<0.0002		<0.0005	<0.0008	2.36	<0.005	0.284	<60
W6	5/25/2010	<0.01	10	0.03	<0.001	8	<0.003	0.0004		<0.0005	<0.001	2.95	<0.005	0.328	<60
W6	5/29/2010	<0.01	4	0.039	<0.001	2	<0.001	<0.0002		<0.0005	<0.0008	<2	<0.005	0.225	<60
W6	6/2/2010	<0.01	22	0.044	0.003	15	<0.001	<0.0002		<0.0005	<0.0008	5.61	<0.005	0.704	<60
W6	6/4/2010	<0.01	7	0.008	<0.001	4	0.001	<0.0002		<0.0005	<0.0008	7.13	<0.005	0.116	<60
W6	6/6/2010	<0.01	8	0.012	<0.001	4	0.001	0.0005		<0.0005	<0.0008	6.82	<0.005	0.121	<60
W6	6/14/2010	<0.01	7	0.014	<0.001	4	0.002	0.0002		<0.0005	<0.0008	7.45	<0.005	0.123	<60
W6	6/16/2010	<0.01	7	0.013	<0.001	4	0.001	<0.0002		<0.0005	<0.0008	7.12	<0.005	0.114	<60
W6															

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Total Li (mg/L)	Total Mg (mg/L)	Total Mn (mg/L)	Total Mo (mg/L)	Total Na (mg/L)	Total Ni (mg/L)	Total Pb (mg/L)	Total P (mg/L)	Total Sb (mg/L)	Total Se (mg/L)	Total Si (mg/L)	Total Sn (mg/L)	Total Sr (mg/L)	Total S (mg/L)
W7	6/15/2006														
W7	6/15/2006	0.002	8.8	0.079	0.001	5.8	0.0052	0.0006		<0.0002	0.0002	7.24	<0.001	0.276	3.2
W7	6/23/2006	0.005	12.5	0.226	0.001	7	0.0117	0.002		<0.0002	0.0004	12.3	<0.001	0.367	4.2
W7	6/28/2006	0.002	9.3	0.086	0.001	6	0.0042	0.0007		<0.0002	<0.0002	8.36	<0.001	0.267	3.1
W7	7/7/2006	0.001	10.1	0.035	0.001	7.4	0.0019	<0.0001		<0.0002	0.0002	5.57	<0.001	0.329	3.7
W7	7/12/2006	0.001	9.5	0.035	0.001	6.5	0.0014	<0.0001		<0.0002	0.0002	5.73	<0.001	0.323	3.8
W7	7/20/2006	0.001	11.2	0.042	0.001	6.4	0.0011	<0.0001		<0.0002	<0.0002	5.72	<0.001	0.334	3.9
W7	7/26/2006														
W7	7/26/2006	0.001	11.7	0.051	0.001	6.5	0.0009	0.0001		<0.0002	<0.0002	6.21	<0.001	0.362	4.1
W7	8/2/2006	0.001	10.8	0.033	0.001	6.9	0.001	<0.0001		<0.0002	0.0005	5.94	<0.001	0.342	3.6
W7	8/10/2006	0.001	11.3	0.04	0.001	7.2	0.0009	<0.0001		<0.0002	<0.0002	5.82	<0.001	0.362	4
W7	8/25/2006														
W7	8/25/2006	<0.002	10	0.039	<0.002	6.7	0.001	<0.0002		<0.0004	<0.0004	5.49	<0.002	0.335	3.3
W7	8/30/2006	0.001	10.3	0.035	0.001	6.7	0.0013	<0.0001		<0.0002	<0.0002	5.49	<0.001	0.309	3.5
W7	9/6/2006	0.001	10.3	0.035	0.001	6.8	0.0013	0.0002		<0.0002	0.0004	5.74	<0.001	0.332	3.7
W7	9/13/2006	<0.001	11	0.033	<0.001	7.1	0.0007	<0.0001		<0.0002	0.0002	6.36	<0.001	0.187	3.6
W7	9/20/2006	0.001	11.7	0.042	0.001	6.6	0.0014	0.0001		<0.0002	0.0004	5.89	<0.001	0.347	3.7
W7	9/28/2006	<0.002	11	0.037	<0.002	6.9	0.002	<0.0002		<0.0004	0.0004	5.35	<0.002	0.328	3.6
W7	10/4/2006	<0.002	11	0.038	<0.002	7	0.002	<0.0002		<0.0004	0.0006	5.75	<0.002	0.347	3.5
W7	10/12/2006	0.001	11.8	0.063	0.001	6.6	0.0015	0.0002		<0.0002	<0.0002	6.51	<0.001	0.35	4
W7	6/5/2007	0.002	10.2	0.126	0.001	5.8	0.0033	0.0006	0.14	<0.0002	<0.0002	7.47	<0.001	0.275	3.4
W7	6/5/2007	<0.002	11	0.14	<0.002	6.1	0.0039	0.0007	0.11	<0.0004	<0.0004	8.37	<0.002	0.302	3.5
W7	6/5/2007	0.002	10.6	0.135	0.001	6	0.0041	0.0007	0.14	<0.0002	<0.0002	8.3	<0.001	0.276	3.5
W7	6/20/2007	0.001	9.8	0.044	0.002	7.2	0.0016	0.0001	<0.05	<0.0002	0.0003	5.45	<0.001	0.304	4.2
W7	7/18/2007	0.001	11	0.03	0.001	7.7	<0.0005	0.0004		<0.0002	0.0004	5.78	<0.001	0.38	4
W7	7/18/2007	0.001	11	0.035	0.001	7.6	0.0009	0.0001		<0.0002	0.0007	5.77	<0.001	0.379	3.9
W7	7/18/2007	0.001	11	0.026	0.001	7.6	0.0005	<0.0001		<0.0002	0.0005	5.73	<0.001	0.37	3.9
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007	0.001	10.7	0.033	0.001	7.9	0.0014	0.0001	<0.05	<0.0002	<0.0002	5.8	<0.001	0.34	3.3
W7	8/24/2007	0.001	10.8	0.03	0.001	7.6	0.0013	<0.0001	<0.05	<0.0002	<0.0002	5.92	<0.001	0.34	3.3
W7	8/24/2007	0.001	11.2	0.031	0.002	8	0.0014	<0.0001	<0.05	<0.0002	<0.0002	6.3	<0.001	0.376	3.5
W7	9/18/2007	0.002	9.5	0.034	0.001	7.3	0.0015	0.0002	<0.05	<0.0002	<0.0002	6.34	<0.001	0.309	2.8
W7	10/30/2007	0.001	11.2	0.054	0.002	8.1	0.0008	0.0023		<0.0002	0.0007	5.94	<0.001	0.395	4.6
W7	10/30/2007	0.001	11	0.046	0.001	7.7	0.001	0.0005		<0.0002	0.0003	5.09	<0.001	0.388	4.3
W7	10/30/2007	0.001	11.3	0.047	0.001	7.6	0.0009	0.0003		<0.0002	<0.0002	5.97	<0.001	0.385	4.2
W7	10/30/2007														
W7	4/22/2008	0.002	19	0.0257	0.00165	11.8	<0.001	<0.0001	0.02	<0.0002	<0.0006	3.8	<0.004	0.487	
W7	4/22/2008	0.002	20.6	0.0268	0.00185	12.4	<0.001	<0.0001	0.02	<0.0002	<0.0006	4.15	<0.004	0.518	
W7	4/22/2008	0.002	20.2	0.0268	0.00174	12	0.001	<0.0001	0.02	<0.0002	<0.0006	4.03	<0.004	0.514	
W7	4/22/2008														
W7	6/3/2008	0.001	8.68	0.0693	0.00131	6.6	0.002	0.0002	0.05	<0.0002	<0.0006	2.66	<0.0001	0.234	
W7	6/3/2008	0.001	8.71	0.0616	0.00129	6.8	0.002	0.0001	0.05	<0.0002	<0.0006	2.68	<0.0001	0.232	
W7	6/3/2008	0.001	9.15	0.065	0.00129	7	0.002	0.0002	0.05	<0.0002	0.0009	2.77	<0.0001	0.24	
W7	6/3/2008														
W7	6/17/2008	<0.001	10.1	0.0833	0.00148	7.5	0.001	0.0001	0.06	<0.0002	0.0008	4.43	<0.0001	0.294	
W7	8/6/2008	0.002	10.8	0.064	0.001	7	0.003	0.0003		<0.0002	<0.0002	6.15	<0.001	0.363	3.5
W7	8/6/2008	0.002	10.8	0.059	0.001	7.4	0.0034	0.0003		<0.0002	<0.0002	6.45	<0.001	0.361	3.5
W7	8/6/2008	0.002	11	0.071	0.001	7.4	0.0036	0.0004		<0.0002	<0.0002	7.39	<0.001	0.36	3.5
W7	8/6/2008														
W7	9/18/2008	<0.001	7.62	0.0347	0.00082	5.1	0.002	0.0003	0.04	<0.0002	0.0008	7.09	<0.0001	0.201	
W7	10/28/2008	<0.001	11.6	0.0347	0.00107	6.52	0.001	0.0001	0.016	<0.0002	<0.0006	7.13	<0.0001	0.263	
W7	10/28/2008	<0.001	11.5	0.0396	0.00114	6.24	0.003	0.0026	0.031	<0.0002	<0.0006	7.08	<0.0001	0.271	
W7	10/28/2008	<0.001	11.5	0.0337	0.00111	6.26	0.004	<0.0001	0.013	<0.0002	<0.0006	7.04	<0.0001	0.274	
W7	10/28/2008														
W7	4/30/2009	<0.001	1.97	0.0153	0.00016	1.29	<0.001	0.0002	0.09	<0.0002	<0.0006	1.67	<0.0001	0.036	0.5
W7	6/8/2009	0.001	9.53	0.0449	0.00141	6.08	0.002	0.0003	<0.05	<0.0002	<0.0006	5.67	<0.0001	0.281	3.2
W7	7/28/2009														
W7	8/6/2009	0.001	12.2	0.0278	0.0015	7.17	0.001	0.0004	0.011	<0.0002	<0.0006	5.7	<0.0001	0.38	4.3
W7	8/24/2009														
W7	8/25/2009														
W7	8/31/2009														
W7	10/7/2009								0.017						
W7	10/7/2009	0.001	11.9	0.0346	0.0013	7.38	0.002	0.0015	<0.05	<0.0002	<0.0006	6.46	<0.0001	0.312	4
W7	10/25/2009	<0.005	12.6	0.029	0.002	7.41	0.001	<0.0002		<0.0005	0.0001	7.24	<0.005	0.361	<3
W7	10/25/2009														
W7	4/19/2010	<0.001	7.53	0.0207	0.0008	5.17	0.001	0.0001	0.1	<0.0002	<0.0006	4.44	<0.0001	0.218	2.8
W7	4/27/2010	<0.005	2.83	0.007	<0.001	1.89	0.001	<0.0002		<0.0005	<0.0001	3.14	<0.005	0.073	<3
W7	4/29/2010	<0.005	3.01	0.01	<0.001	1.91	0.001	<0.0002		<0.0005	<0.0001	3.2	<0.005	0.077	<3
W7	5/1/2010	<0.005	3.62	0.03	<0.001	2.25	0.002	0.0003	0.052	<0.0005	<0.0001	4.34	<0.005	0.095	<3
W7	5/3/2010	<0.005	3.78	0.033	<0.001	2.55	0.002	0.0003		<0.0005	<0.0001	4.17	<0.005	0.108	<3
W7	5/5/2010	<0.005	4.7	0.03	<0.001	3.03	0.002	0.002	0.058	<0.0005	<0.0001	4.7	<0.005	0.12	<3
W7	5/7/2010	<0.005	4.7	0.039	<0.001	3.01	0.003	0.0003	0.049	<0.0005	<0.0001	4.5	<0.005	0.13	<3
W7	5/9/2010	<0.005	6.2	0.016	<0.001	3.97	0.002	0.0003	0.027	<0.0005	0.0001	4.24	<0.005	0.17	<3
W7	5/10/2010	<0.005	7.83	0.018	0.001	5.1	0.002	0.0003	0.03	<0.0005	0.0002	5.37	<0.005	0.22	<3
W7	5/12/2010			<.01											
W7	5/12/2010	<0.005	7.14	0.021	0.001	4.83	0.001	0.0002	0.022	<0.0005	0.0001	5.23	<0.005	0.206	<3
W7	5/14/2010	<0.005	6.29	0.042	<0.001	4.05	0.003	0.0002		<0.0005	0.0001	4.69	<0.005	0.177	<3
W7	5/16/2010	<0.005	6.52	0.037	<0.001	4.02	0.001	<0.0002	0.041	<0.0005	0.0001	4.45	<0.005	0.188	<3
W7	5/17/2010	<0.005	6.47	0.045	0.001	3.92	0.001	0.0002	0.031	<0.0005	0.0002	4.32	<0.005	0.193	<3
W7	5/19/2010	<0.005	9.58	0.019	0.001	6.7	<0.003	<0.0002	0.024	<0.0005	0.0002				

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Total Li (mg/L)	Total Mg (mg/L)	Total Mn (mg/L)	Total Mo (mg/L)	Total Na (mg/L)	Total Ni (mg/L)	Total Pb (mg/L)	Total P (mg/L)	Total Sb (mg/L)	Total Se (mg/L)	Total Si (mg/L)	Total Sn (mg/L)	Total Sr (mg/L)	Total S (mg/L)
W7	8/2/2011	0.005	8.29	0.304	<0.001	4.04	0.019	0.0035	0.412	<0.0005	0.0003	22.3	<0.005	0.161	<3
W7	8/16/2011	<0.005	8.1	0.081	<0.001	4.64	0.003	0.0004	0.058	<0.0005	0.0001	7	<0.005	0.209	<3
W7	8/19/2011	<0.005	8.05	0.078	<0.001	4.62	0.003	0.0002	0.043	<0.0005	0.0001	7	<0.005	0.201	<3
W7	9/12/2011	<0.005	10.6	0.083	0.001	6.09	0.002	<0.0002	0.033	<0.0005	0.0002	7.49	<0.005	0.247	<3
W7	10/6/2011	<0.005	10.2	0.073	0.001	5.59	0.001	<0.0002	0.023	<0.0005	0.0001	6.27	<0.005	0.264	<3
W7	11/22/2011	<0.005	12.8	0.093	0.001	6.69	0.002	0.0008	0.077	<0.0005	0.0002	7.33	<0.005	0.358	6.5
W7	1/24/2012	<0.005	14.5	0.06	0.001	8.39	<0.001	<0.0002	0.014	<0.0005	0.0003	6.36	<0.005	0.449	5.9
W7	2/25/2012	<0.005	13.9	0.004	0.001	8.08	<0.001	<0.0002	0.012	<0.0005	0.0003	6.3	<0.005	0.468	6
W7	3/5/2012	<0.005	14.6	0.005	0.001	8.36	<0.001	<0.0002	0.016	<0.0005	0.0004	6.35	<0.005	0.485	5.6
W7	4/24/2012	<0.0050	3.17	0.0582	<0.0010	1.84	0.0019	0.00029	0.048	<0.00050	<0.00010	4.08	<0.0050	0.0798	<3.0
W7	5/6/2012	<0.0050	4.06	0.0133	<0.0010	2.47	0.0013	<0.00020	0.031	<0.00050	0.00014	3.65	<0.0050	0.105	<3.0
W7	5/6/2012	<0.0050	4.12	0.0145	<0.0010	2.53	0.0014	<0.00020	0.034	<0.00050	0.00011	3.57	<0.0050	0.103	<3.0
W7	6/19/2012	<0.0050	9.46	0.199	0.0012	5.45	0.0107	0.00178	0.222	<0.00050	0.0002	16.3	<0.0050	0.236	<3.0
W7	7/17/2012	<0.0050	11	0.0937	0.0015	6.4	0.0032	0.00026	0.074	<0.00050	0.00019	8.31	<0.0050	0.305	<3.0
W7	7/30/2012	<0.0050	11.6	0.0683	0.0014	6.83	0.0025	<0.00020	0.044	<0.00050	0.00022	6.59	<0.0050	0.318	3.3
W7	8/8/2012	<0.0050	12.7	0.0626	0.0014	7.25	0.0016	<0.00020	0.036	<0.00050	0.00028	7.38	<0.0050	0.334	<3.0
W7	8/23/2012	<0.0050	13	0.0627	0.0016	7.39	0.0016	<0.00020	0.035	<0.00050	0.00017	7.8	<0.0050	0.374	<3.0
W7	9/13/2012	<0.0050	10.5	0.126	<0.0010	6	0.0022	<0.00020	0.034	<0.00050	0.00021	6.83	<0.0050	0.269	<3.0
W7	10/16/2012	<0.0050	13	0.101	0.0012	7.25	0.0023	<0.00020	0.046	<0.00050	0.0002	7.29	<0.0050	0.327	<3.0
W7	11/2/2012	<0.0050	14.4	0.103	0.0013	7.87	0.0014	<0.00020	0.023	<0.00050	0.00023	6.3	<0.0050	0.411	5.1
W7	12/29/2012	<0.0050	19.9	0.0405	0.0012	11.7	0.0016	<0.00020	0.022	<0.00050	0.00032	7.67	<0.0050	0.488	7.9
W7	4/30/2013	<0.0050	19	0.053	0.0013	10.1	<0.0010	<0.00020	<0.01	<0.00050	0.00042	7.29	<0.0050	0.603	8.1
W7	5/14/2013	<0.0050	3	0.164	<0.0010	1.5	0.0029	0.00046	0.116	<0.00050	0.00011	4.78	<0.0050	0.0703	<3.0
W7	6/19/2013	<0.0050	9.98	0.0448	0.0013	6.12	0.0018	<0.00020	0.036	<0.00050	0.00018	6.43	<0.0050	0.275	<3.0
W7	6/19/2013	<0.0050	9.92	0.042	0.0014	6.28	0.0019	<0.00020	0.028	<0.00050	0.00012	6.47	<0.0050	0.275	<3.0
W7	7/13/2013	<0.0050	12.1	0.0336	0.0016	7.03	0.0017	<0.00020	0.027	<0.00050	0.0002	6.88	<0.0050	0.341	<3.0
W7	8/21/2013	<0.0050	13.3	0.0492	0.0016	7.75	0.0014	<0.00020	0.028	<0.00050	0.00014	6.97	<0.0050	0.364	<3.0
W7	9/6/2013	<0.0050	13.9	0.102	0.0013	8.11	0.0019	<0.00020	0.044	<0.00050	0.00017	7.96	<0.0050	0.364	<3.0
W7	10/21/2013	<0.0050	11.3	0.0934	0.0011	6.34	0.0016	<0.00020	0.027	<0.00050	0.00021	6.38	<0.0050	0.303	<3.0
W7	11/16/2013	<0.0050	15.6	0.0906	0.0017	8.83	<0.0010	<0.00020	0.026	<0.00050	0.00017	6.95	<0.0050	0.436	<3.0
W7	12/7/2013	<0.0050	17.5	0.162	0.0013	10.1	0.001	<0.00020	0.021	<0.00050	0.00019	6.56	<0.0050	0.476	5.8
C4	5/6/2012	0.0188	14.4	0.936	0.0015	3.45	0.0498	0.0126	1.11	0.00084	0.00069	57.5	<0.0050	0.168	<3.0
C4	8/1/2012	<0.0050	11.5	0.868	<0.0010	5.22	0.0139	0.00303	0.41	<0.00050	0.00019	18.8	<0.0050	0.237	<3.0
C4	8/8/2012	0.0057	12.3	1	0.001	5.55	0.0151	0.00371	0.478	<0.00050	0.00021	18	<0.0050	0.26	<3.0
C4	8/25/2012	<0.0050	14.3	1.32	<0.0010	5.64	0.0179	0.00439	0.657	<0.00050	0.00016	13	<0.0050	0.321	<3.0
C4	6/22/2013	0.0152	20.2	1.24	0.0023	7.08	0.0483	0.00977	1.28	0.00084	0.00059	40.7	<0.0050	0.337	3.6
C4	7/19/2013	0.0106	15.8	0.913	0.002	6.66	0.0314	0.00631	0.591	0.00064	0.00071	32	<0.0050	0.323	<3.0
C4	8/22/2013	0.0094	17.3	1.25	0.0014	6.83	0.0352	0.00784	1.01	0.00058	0.00053	31	<0.0050	0.346	<3.0
C4	9/6/2013	<0.0050	14.2	0.732	0.0014	6.74	0.0124	0.00208	0.342	<0.00050	0.00016	18.3	<0.0050	0.276	<3.0
C4	10/18/2013	<0.0050	11.8	0.427	<0.0010	6.15	0.0031	<0.00020	0.06	<0.00050	<0.00010	8.27	<0.0050	0.237	4.6
C4	10/18/2013	<0.0050	11.3	0.425	<0.0010	6.01	0.0029	<0.00020	0.065	<0.00050	0.00011	8.14	<0.0050	0.236	3.6
C4	11/17/2013	<0.0050	21.5	3.19	0.0011	8.09	0.0077	<0.00020	0.158	<0.00050	0.00027	9.05	<0.0050	0.409	8.2
C10	5/12/2012	0.0292	21.1	2.09	0.0021	4.3	0.074	0.0214	2.08	0.00117	0.00116	66.7	<0.0050	0.307	<3.0
C10	7/30/2012	0.015	16.2	0.947	0.0021	6.41	0.041	0.00995	0.967	0.00096	0.00073	42.7	<0.0050	0.315	<3.0
C10	7/30/2012														
C10	8/10/2012	0.0172	18.8	1.31	0.0017	6.4	0.0467	0.0125	1.15	0.00087	0.00057	44.2	<0.0050	0.363	<3.0
C10	8/27/2012	0.0198	20.2	1.7	0.0023	6.34	0.0524	0.013	1.39	0.00115	0.00086	44	<0.0050	0.404	<3.0
C10	6/22/2013	<0.0050	9.68	0.0986	0.0012	6.32	0.0044	0.0006	0.083	<0.00050	0.0001	8.47	<0.0050	0.223	<3.0
C10	7/23/2013	<0.0050	10.6	0.407	0.0012	6.52	0.0099	0.00212	0.239	<0.00050	0.00024	15.9	<0.0050	0.226	<3.0
C10	8/22/2013	<0.0050	10.7	0.11	<0.0010	6.49	0.0038	0.00044	0.073	<0.00050	0.00013	8.98	<0.0050	0.259	<3.0
C10	9/8/2013	<0.0050	10.2	0.172	0.0014	6.24	0.0033	0.00025	0.063	<0.00050	0.00017	7.06	<0.0050	0.256	<3.0
C10	9/8/2013	<0.0050	10.3	0.174	<0.0010	6.4	0.0032	0.00025	0.067	<0.00050	0.00014	7.27	<0.0050	0.255	<3.0
C10	10/18/2013	<0.0050	10.4	0.321	<0.0010	6.3	0.0038	0.00054	0.105	<0.00050	0.00015	8.99	<0.0050	0.231	<3.0

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Total Te (mg/L)	Total Th (mg/L)	Total Ti (mg/L)	Total Tl (mg/L)	Total U (mg/L)	Total V (mg/L)	Total W (mg/L)	Total Zn (mg/L)	Total Zr (mg/L)	Total N (mg/L)	Ammonia (mg/L)	Ammoniu m (mg/L)	Ammoniu m (mg/L)	NO2+NO3 (mg/L)
W1	5/27/2005			0.022	<0.00020	0.0006	<0.030		0.0096			0.039			
W1	6/30/2005			<0.010	<0.00010	0.00113	<0.0010		<0.0010			<0.020			
W1	7/28/2005			<0.010	<0.00010	0.00122	<0.0010		<0.0010			<0.020			
W1	8/29/2005			<0.010	<0.00020	0.00077	<0.030		<0.0050			0.041			
W1	9/28/2005			<0.010	<0.00020	0.00058	<0.030		<0.0050			0.026			
W1	10/15/2005			<0.010	<0.00010	0.000786	0.0013		0.001			0.02			
W2	5/27/2005			0.016	<0.00020	0.00054	<0.030		<0.0050			0.026			
W2	5/27/2005			0.057		0.00096			0.006			<0.02			
W2	6/30/2005			<0.010	<0.00010	0.00108	<0.0010		<0.0010			<0.020			
W2	7/28/2005			<0.010	<0.00010	0.00136	<0.0010		<0.0010			<0.020			
W2	8/30/2005			<0.010	<0.00020	0.00082	<0.030		<0.0050			0.029			
W2	9/28/2005			<0.010	<0.00020	0.00059	<0.030		<0.0050			<0.020			
W2	10/15/2005			<0.010	<0.00010	0.000756	0.001		0.0011			<0.020			
W3	5/27/2005			<0.010	<0.00020	0.00035	<0.030		<0.0050			<0.020			
W3	6/30/2005			<0.010	<0.00010	0.0009	<0.0010		<0.0020			<0.020			
W3	7/29/2005			0.045	<0.00010	0.000778	0.0032		<0.0070			<0.020			
W3	8/29/2005			<0.010	<0.00020	0.00051	<0.030		<0.0050			0.042			
W3	9/28/2005			<0.010	<0.00020	0.00039	<0.030		<0.0050			<0.020			
W3	10/15/2005			<0.010	<0.00010	0.00044	<0.0010		<0.0010			0.023			
W8	5/27/2005			<0.010	<0.00020	<0.00020	<0.030		<0.0050			<0.020			
W8	6/30/2005			<0.010	<0.00010	0.000063	<0.0010		<0.0020			0.041			
W8	7/29/2005			<0.010	<0.00010	0.000083	<0.0010		0.0011			<0.020			
W8	8/30/2005			<0.010	<0.00020	<0.00020	<0.030		<0.0050			0.023			
W8	9/28/2005			<0.010	<0.00020	<0.00020	<0.030		<0.0050			<0.020			
W8	10/15/2005			<0.010	<0.00010	0.0001	<0.0010		0.0011			0.026			
W9	5/27/2005			<0.010	<0.00020	<0.00020	<0.030		<0.0050			<0.020			
W9	6/30/2005			<0.010	<0.00010	0.000027	<0.0010		<0.0050			0.02			
W9	7/29/2005			<0.010	<0.00010	0.000052	<0.0010		<0.0040			<0.020			
W9	8/29/2005			<0.010	<0.00020	<0.00020	<0.030		<0.0050			0.026			
W9	9/28/2005			<0.010	<0.00020	<0.00020	<0.030		<0.0050			<0.020			
W9	10/15/2005			<0.010	<0.00010	0.000025	<0.0010		<0.0010			<0.020			
W10	5/27/2005			<0.010	<0.00020	<0.00020	<0.030		<0.0050			0.027			
W10	5/27/2005			<0.01	<0.0002	0.00092	<0.03		<0.005			<0.02			
W10	6/30/2005			<0.010	<0.00010	0.000034	0.0015		0.0289			0.036			
W10	7/29/2005			0.09	<0.00010	0.000097	0.0067		0.017			<0.020			
W10	8/29/2005			0.018	<0.00020	<0.00020	<0.030		0.0071			0.033			
W10	9/28/2005			<0.010	<0.00020	<0.00020	<0.030		<0.0050			<0.020			
W10	10/15/2005			<0.010	<0.00010	0.000017	<0.0010		0.0014			<0.020			
W6	5/27/2005			<0.010	<0.00020	<0.00020	<0.030		<0.0050			<0.020			
W6	6/30/2005			<0.010	<0.00010	0.000151	0.0012		<0.0030			<0.020			
W6	7/29/2005			0.033	<0.00010	0.00106	0.0027		<0.0060			<0.020			
W6	8/30/2005			<0.010	<0.00020	<0.00020	<0.030		<0.0050			<0.020			
W6	9/28/2005			<0.010	<0.00020	<0.00020	<0.030		<0.0050			<0.020			
W6	10/15/2005			<0.010	<0.00010	0.000129	<0.0010		<0.0010			<0.020			
W6	6/2/2006			0.077	<0.0001	0.000215	0.0066		0.0085			0.021			
W6	8/25/2006			<0.0010	<0.0001	<0.001	0.0008		0.005	<0.002					
W6	9/6/2006			0.0014	<0.00005	<0.0005	0.0008		<0.001	<0.001					
W6	6/20/2007			<0.0005	<0.00005	<0.0005	0.0011		0.004	<0.001		<0.05			<0.1
W6	9/18/2007			0.0015	<0.00005	<0.0005	0.0007		0.008	<0.001		<0.05			<0.1
W6	6/17/2008	<0.0001	<0.0001	0.0059	<0.00001	<0.0004	0.00094		0.007	0.0004		<0.05			0.01
W6	9/18/2008	<0.0001	<0.0001	0.0015	<0.00001	<0.0004	0.00065		0.004	0.0003		<0.05			<0.01
W6	4/14/2009	0.0001	0.0001	0.064	<0.00001	0.0041	0.00381		0.276	0.0038			0.12	0.12	0.59
W6	4/30/2009	<0.0001	<0.0001	0.222	0.00003	0.0004	0.0142		0.023	0.0013			<0.05	<0.05	0.04
W6	7/28/2009														
W6	8/6/2009	<0.0001	<0.0004	0.0024	<0.00001	0.0015	0.0008		0.003	<0.0001					
W6	8/6/2009	<0.0001	<0.0004	0.0019	<0.00001	0.0015	0.0007		0.006	0.0001			0.06	0.06	2.93
W6	8/18/2009														
W6	8/25/2009														
W6	10/7/2009														
W6	10/7/2009	<0.0001	<0.0004	0.0022	<0.00001	0.0005	0.0006		0.005	<0.0001			0.1	0.1	8.18
W6	10/25/2009			<0.005	<0.00005	0.0009	<0.005		<0.005	<0.0005		0.134			7.9
W6	4/19/2010	<0.0001	<0.0004		<0.00001	0.0014	0.0043		0.014	0.0003			<0.05	<0.05	0.54
W6	5/16/2010			<0.005	<0.00005	0.0001	<0.005	<0.001	<0.005	<0.0005		0.046			<0.02
W6	5/17/2010			<0.005	<0.00005	0.0004	<0.005	<0.001	<0.005	<0.0005		<0.005			<0.02
W6	5/19/2010			<0.005	<0.00005	0.0005	<0.005	<0.001	<0.005	<0.0005		0.08			<0.02
W6	5/21/2010			<0.01	<0.00005	0.0006	<0.005		<0.01	<0.002		0.006			<0.02
W6	5/23/2010			<0.01	<0.00005	0.0006	<0.005		<0.01	<0.002		0.031			<0.02
W6	5/25/2010			<0.01	<0.00005	0.0006	<0.005		<0.01	<0.002		0.17			<0.02
W6	5/29/2010			<0.01	<0.00005	0.0005	<0.005		<0.01	<0.002		0.08			<0.02
W6	6/2/2010			<0.01	<0.00005	0.003	<0.005		<0.01	<0.002		0.031			0.97
W6	6/4/2010			<0.01	<0.00005	0.0003	<0.005		<0.01	<0.002		0.034			<0.02
W6	6/6/2010			<0.01	<0.00005	0.0004	<0.005		<0.01	<0.002		0.06			<0.02
W6	6/14/2010			0.011	<0.00005	0.0003	<0.005		<0.01	<0.002		0.016			<0.02
W6	6/16/2010			0.012	<0.00005	0.0003	<0.005		<0.01	<0.002		0.013			0.03
W6	6/18/2010			<0.01	<0.00005	0.0003	<0.005		<0.01	<0.002		<0.5			<0.02
W6	6/20/2010			<0.01	<0.00005	0.0003	<0.005		<0.01	<0.002		<0.5			0.02
W6	6/22/2010			<0.01	<0.00005	0.0003	<0.005		<0.01	<0.002		0.01			<0.02
W6	6/24/2010			<0.01	<0.00005	0.0002	<0.005		<0.01	<0.002		0.012			<0.02
W6	6/26/2010			<0.01	<0.00005	0.0003	<0.005		<0.01	<0.002		0.034			<0.02
W6	6/26/2010														
W6	6/28/2010			0.019	<0.00005	0.0003	<0.005		<0.01	<0.002		0.031			<0.02
W6	7/5/2010			0.051	<0.00005	0.0004	<0.005		<0.01	<0.002		0.15			<0.02
W6	8/5/2010			<0.01	<0.00005	0.0002	<0.005		<0.01	<0.002		0.014			<0.02
W6	9/9/2010			0.018	<0.00005	0.0003	<0.005		0.015	<0.002		<0.005			<0.02
W6	10/8/2010			0.016	<0.00005	0.0003	<0.005		<0.005	<0.0005		0.053			<0.02
W6	8/19/2011			<0.005	<0.00005	0.0025	<0.005		0.008	<0.0005		0.006			1.05
W6	7/17/2012			0.747	0.000147	0.0022	0.0672		0.073	0.00302		0.14			0.026
W6	7/30/2012			0.529	0.000108	0.0017	0.0475		0.0504	0.00202		0.07			0.059
W6	8/9/2012			0.299	0.000068	0.00102	0.0252		0.027	0.00116		0.025			0.029
W6	8/25/2012			0.063	<0.000050	0.00167	0.0348		0.0392	0.00101		0.023			

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Total Te (mg/L)	Total Th (mg/L)	Total Ti (mg/L)	Total Tl (mg/L)	Total U (mg/L)	Total V (mg/L)	Total W (mg/L)	Total Zn (mg/L)	Total Zr (mg/L)	Total N (mg/L)	Ammonia (mg/L)	Ammoniu m (mg/L)	Ammoniu m (mg/L)	NO2+NO3 (mg/L)
W7	6/15/2006											0.027			
W7	6/15/2006			0.0685	<0.00005	0.0008	0.0062		0.006	0.001					
W7	6/23/2006			0.257	<0.00005	0.0014	0.0173		0.022	0.002		0.028			
W7	6/28/2006			0.0822	<0.00005	0.0011	0.0064		0.006	0.001		0.01			
W7	7/7/2006			0.0044	<0.00005	0.0011	0.001		<0.001	<0.001					
W7	7/12/2006			0.0036	<0.00005	0.001	0.0009		0.015	<0.001		0.014			
W7	7/20/2006			0.0026	<0.00005	0.0012	0.0008		0.002	<0.001		0.012			
W7	7/26/2006											0.016			
W7	7/26/2006			0.006	<0.00005	0.0012	0.0011		0.002	<0.001					
W7	8/2/2006			0.004	<0.00005	0.001	0.001		0.001	<0.001		0.015			
W7	8/10/2006			0.0018	<0.00005	0.0009	0.0009		0.002	<0.001		0.014			
W7	8/25/2006											0.027			
W7	8/25/2006			<0.0010	<0.0001	0.001	0.0009		0.004	<0.002					
W7	8/30/2006			0.003	<0.00005	0.0011	0.0008		0.003	<0.001		0.012			
W7	9/6/2006			0.0026	<0.00005	0.0011	0.0009		0.001	<0.001		0.011	0.011	0.011	
W7	9/13/2006			0.0014	<0.00005	0.0006	0.0005		<0.001	<0.001		0.011			
W7	9/20/2006			0.0037	<0.00005	0.0011	0.0009		0.005	<0.001		0.008			
W7	9/28/2006			0.002	<0.0001	0.001	0.0009		0.008	<0.002		0.011			
W7	10/4/2006			0.0042	<0.0001	0.001	0.001		<0.002	<0.002		0.079			
W7	10/12/2006			0.0124	<0.00005	0.0011	0.0014		0.006	<0.001		0.024			
W7	6/5/2007			0.0776	<0.00005	0.0014	0.0054		0.009	0.001		<0.05			<0.1
W7	6/5/2007			0.0898	<0.0001	0.001	0.0059		0.01	<0.002		<0.05			0.28
W7	6/5/2007			0.0915	<0.00005	0.0015	0.006		0.012	0.001		<0.05			<0.1
W7	6/20/2007			0.0055	<0.00005	0.0014	0.0016		0.004	<0.001		<0.05			0.18
W7	7/18/2007			0.0096	<0.00005	0.0012	0.0014		0.005	<0.001		<0.05			0.22
W7	7/18/2007			0.0103	<0.00005	0.0013	0.0014		0.006	<0.001		<0.05			0.2
W7	7/18/2007			0.0096	<0.00005	0.0012	0.0013		0.003	<0.001		<0.05			0.2
W7	8/24/2007											<0.05			
W7	8/24/2007											<0.05			
W7	8/24/2007											<0.05			
W7	8/24/2007			<0.0005	<0.00005	0.0012	0.0013		0.01	<0.001					0.14
W7	8/24/2007			<0.0005	<0.00005	0.0012	0.0011		0.009	<0.001					0.14
W7	8/24/2007			<0.0005	<0.00005	0.0013	0.0012		0.006	<0.001					0.16
W7	9/18/2007			0.016	<0.00005	0.0008	0.002		0.008	<0.001		<0.05			0.06
W7	10/30/2007			0.0066	<0.00005	0.0009	0.0011		0.013	<0.001		<0.05			0.2
W7	10/30/2007			0.0043	<0.00005	0.0009	0.0008		0.011	<0.001		<0.05			0.24
W7	10/30/2007			0.0041	<0.00005	0.0009	0.0008		0.01	<0.001		<0.05			0.19
W7	10/30/2007														
W7	4/22/2008	<0.0001	<0.0001	0.0004	<0.00001	0.0021	0.00032		0.004	<0.0001		<0.05			<0.01
W7	4/22/2008	0.0001	0.0002	0.0017	0.00002	0.0021	0.0003		0.005	0.0001		<0.05			<0.01
W7	4/22/2008	<0.0001	0.0002	0.0003	0.00001	0.0023	0.0003		0.007	0.0002		<0.05			<0.01
W7	4/22/2008														
W7	6/3/2008	<0.0001	<0.0001	0.0128	<0.00001	0.0011	0.00207		0.004	0.0004		<0.05			0.03
W7	6/3/2008	<0.0001	<0.0001	0.0122	<0.00001	0.0011	0.002		0.005	0.0005		<0.05			0.04
W7	6/3/2008	<0.0001	<0.0001	0.0134	<0.00001	0.0011	0.00224		0.007	0.0005		<0.05			0.04
W7	6/3/2008														
W7	6/17/2008	<0.0001	<0.0001	0.0081	<0.00001	0.0014	0.0014		0.007	0.0004		<0.05			0.14
W7	8/6/2008			0.0357	<0.00005	0.0012	0.0031		0.01	<0.001		<0.05			0.16
W7	8/6/2008			0.0618	<0.00005	0.0011	0.004		0.011	<0.001		<0.05			0.16
W7	8/6/2008			0.0628	<0.00005	0.0012	0.0042		0.01	<0.001					
W7	8/6/2008											<0.05			0.14
W7	9/18/2008	<0.0001	<0.0001	0.0194	<0.00001	0.0004	0.00224		0.009	0.0006		<0.05			0.04
W7	10/28/2008	<0.0001	<0.0001	0.0045	<0.00001	0.0007	0.00086		0.008	0.0003		<0.05			0.13
W7	10/28/2008	<0.0001	<0.0001	0.0026	<0.00001	0.0007	0.00073		0.121	0.0003		<0.05			0.12
W7	10/28/2008	<0.0001	<0.0001	0.002	<0.00001	0.0007	0.00072		0.049	0.0003		<0.05			0.13
W7	10/28/2008														
W7	4/30/2009	<0.0001	<0.0001	0.0046	<0.00001	<0.0004	0.00037		0.008	0.0002		<0.05	<0.05	<0.05	<0.01
W7	6/8/2009	<0.0001	<0.0001	0.0256	<0.00001	0.001	0.00265		0.002	0.0005		<0.05	<0.05	<0.05	0.15
W7	7/28/2009														
W7	8/6/2009	<0.0001	<0.0004	0.0034	<0.00001	0.0014	0.0009		0.003	0.0002		<0.05	<0.05	<0.05	0.18
W7	8/24/2009														
W7	8/25/2009														
W7	8/31/2009														
W7	10/7/2009												<0.01	<0.01	
W7	10/7/2009	<0.0001	<0.0004	0.0068	<0.00001	0.0009	0.001		0.008	0.0002		<0.05	<0.05	<0.05	0.12
W7	10/25/2009			<0.005	<0.00005	0.0013	<0.005		<0.005	<0.0005		0.01			0.15
W7	10/25/2009														
W7	4/19/2010	<0.0001	<0.0004		<0.00001	0.0005	0.0005		0.008	0.0002			0.16	0.16	0.01
W7	4/27/2010			<0.005	<0.00005	0.0001	<0.005		<0.005	<0.0005		0.015			<0.02
W7	4/29/2010			<0.005	<0.00005	0.0001	<0.005		<0.005	<0.0005		0.016			<0.04
W7	5/1/2010			0.015	<0.00005	0.0002	<0.005	<0.001	<0.005	<0.0005		0.031			0.08
W7	5/3/2010			0.014	<0.00005	0.0002	<0.005		<0.005	<0.0005		0.016			<0.02
W7	5/5/2010			0.016	<0.00005	0.0002	<0.005	<0.001	0.007	<0.0005		<0.01			<0.02
W7	5/7/2010			0.016	<0.00005	0.0003	<0.005	<0.001	<0.005	<0.0005		0.051			0.11
W7	5/9/2010			<0.005	<0.00005	0.0005	<0.005	<0.001	<0.005	<0.0005		<0.005			0.07
W7	5/10/2010			<0.005	<0.00005	0.0007	<0.005	<0.001	0.005	<0.0005		0.015			0.14
W7	5/12/2010														
W7	5/12/2010			<0.005	<0.00005	0.0006	<0.005	<0.001	0.007	<0.0005		<0.05			0.03
W7	5/14/2010			0.008	<0.00005	0.0005	<0.005		<0.005	<0.0005		0.034			<0.02
W7	5/16/2010			0.008	<0.00005	0.0007	<0.005	<0.001	<0.005	<0.0005		0.068			0.03
W7	5/17/2010			0.01	<0.00005	0.0007	<0.005	<0.001	<0.005	<0.0005		0.037			<0.02
W7	5/19/2010			0.007	<0.00005	0.0008	<0.005	<0.001	<0.005	<0.0005		0.02			0.06
W7	5/21/2010			0.016	<0.00005	0.0009	<0.005		<0.01	<0.002		0.017			0.05
W7	5/23/2010			0.086	<0.00005	0.0012	0.007		0.012	<0.002		0.013			0.07
W7	5/25/2010			0.143	0.00005	0.0011	0.01		0.017	<0.002		0.07			0.1
W7	5/27/2010			0.285	0.00017	0.0016	0.024		0.049	<0.002		0.052			0.13
W7	5/29/2010			0.117	0.00006	0.0017	0.012		0.021	<0.002		0.1			0.23
W7	5/31/2010			0.14	0.00007	0.002	0.013		0.023	<0.002		<0.05			0.14
W7	6/2/2010			0.105	<0.00005	0.0018	0.01		0.011	<0.002		<0.01			0.17
W7	6/4/2010			0.057	<0.00005	0.0015	0.005		<0.01	<0.002		0.34			0.18
W7	6/6/2010			0.082	<0.00005	0.0018	0.006		0.011	<0.002		0.1			0.18
W7	6/14/2010			0.051	<0.00005	0.0018	<0.005		<0.01	<0.002		0.016			0.16
W7	6/16/2010			0.016	<0.0000										

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Total Te (mg/L)	Total Th (mg/L)	Total Ti (mg/L)	Total Tl (mg/L)	Total U (mg/L)	Total V (mg/L)	Total W (mg/L)	Total Zn (mg/L)	Total Zr (mg/L)	Total N (mg/L)	Ammonia (mg/L)	Ammonium (mg/L)	Ammonium (mg/L)	NO2+NO3 (mg/L)
W7	8/2/2011			0.354	0.00008	0.0009	0.031		0.029	0.002					0.06
W7	8/16/2011			0.016	<0.00005	0.0005	<0.005		0.017	0.0005		0.015			0.06
W7	8/19/2011			0.02	<0.00005	0.0004	<0.005		<0.005	<0.0005		0.006			0.04
W7	9/12/2011			<0.005	<0.00005	0.0005	<0.005		<0.005	<0.0005		0.025			0.05
W7	10/6/2011			<0.005	<0.00005	0.0006	<0.005		<0.005	<0.0005		0.019			0.11
W7	11/22/2011			0.02	<0.00005	0.001	<0.005		0.009	<0.0005		0.0214			0.136
W7	1/24/2012			<0.005	<0.00005	0.0019	<0.005		<0.005	<0.0005		0.005			0.324
W7	2/25/2012			<0.005	<0.00005	0.0015	<0.005		<0.005	<0.0005		0.006			0.289
W7	3/5/2012			<0.005	<0.00005	0.0015	<0.005		<0.005	<0.0005		0.0067			0.195
W7	4/24/2012			0.0264	<0.000050	0.00018	<0.0050		<0.0050	<0.00050		<0.0050			0.02
W7	5/6/2012			0.0055	<0.000050	<0.00010	<0.0050		<0.0050	<0.00050		0.01			<0.020
W7	5/6/2012			0.0062	<0.000050	<0.00010	<0.0050		<0.0050	<0.00050		0.011			<0.020
W7	6/19/2012			0.182	0.00005	0.00072	0.0164		0.015	0.00125		0.18			0.098
W7	7/17/2012			0.0379	<0.000050	0.00076	<0.0050		<0.0050	<0.00050		0.065			0.089
W7	7/30/2012			0.0092	<0.000050	0.00088	<0.0050		0.0063	<0.00050		0.13			0.124
W7	8/8/2012			<0.0050	<0.000050	0.00087	<0.0050		<0.0050	<0.00050		0.014			0.13
W7	8/23/2012			<0.0050	<0.000050	0.00097	<0.0050		<0.0050	<0.00050		0.049			0.21
W7	9/13/2012			<0.0050	<0.000050	0.00054	<0.0050		0.0055	<0.00050		0.0087			0.078
W7	10/16/2012			0.0061	<0.000050	0.00084	<0.0050		<0.0050	<0.00050		0.028			0.125
W7	11/2/2012			<0.0050	<0.000050	0.00137	<0.0050		0.0062	<0.00050		0.026			0.219
W7	12/29/2012			<0.0050	<0.000050	0.00121	<0.0050		<0.0050	<0.00050		0.025			0.063
W7	4/30/2013			<0.0050	<0.000050	0.00209	<0.0050		<0.0050	<0.00050		0.0082			0.132
W7	5/14/2013			0.0551	<0.000050	0.00016	<0.0050		0.0059	<0.00050		0.066			<0.020
W7	6/19/2013			0.0122	<0.000050	0.001	<0.0050		<0.0050	<0.00050		0.052			0.143
W7	6/19/2013			0.0094	<0.000050	0.00097	<0.0050		<0.0050	<0.00050		0.04			0.141
W7	7/13/2013			0.0073	<0.000050	0.001	<0.0050		<0.0050	<0.00050		0.023			0.17
W7	8/21/2013			0.0086	<0.000050	0.00114	<0.0050		<0.0050	<0.00050		0.051			0.157
W7	9/6/2013			0.0127	<0.000050	0.00095	<0.0050		<0.0050	<0.00050		0.017			0.128
W7	10/21/2013			<0.0050	<0.000050	0.00083	<0.0050		<0.0050	<0.00050		0.048			0.168
W7	11/16/2013			<0.0050	<0.000050	0.00148	<0.0050		<0.0050	<0.00050		0.027			0.257
W7	12/7/2013			<0.0050	<0.000050	0.00139	<0.0050		<0.0050	<0.00050		0.025			0.206
C4	5/6/2012			1.21	0.000244	0.00209	0.0946		0.0961	0.00346		0.088			0.029
C4	8/1/2012			0.248	0.000063	0.00116	0.0276		0.0272	0.0016		0.089			0.091
C4	8/8/2012			0.254	0.000066	0.00144	0.0292		0.0279	0.00138		0.09			0.107
C4	8/25/2012			0.08	<0.000050	0.00159	0.0377		0.0325	0.00202		0.005			<0.020
C4	6/22/2013			0.8	<0.000050	0.00305	0.0731		0.0872	0.00409		0.36			0.377
C4	7/19/2013			0.466	0.000122	0.00277	0.0477		0.0502	0.00309		0.26			0.089
C4	8/22/2013			0.497	0.000103	0.00228	0.055		0.0597	0.003		0.2			0.095
C4	9/6/2013			0.237	0.000053	0.00119	0.0188		0.0172	0.00149		0.12			0.07
C4	10/18/2013			0.0165	<0.000050	0.00083	<0.0050		<0.0050	<0.00050		0.091			0.069
C4	10/18/2013			0.017	<0.000050	0.00079	<0.0050		<0.0050	<0.00050		0.08			0.065
C4	11/17/2013			0.006	<0.000050	0.00063	<0.0050		<0.0050	0.001		0.28			<0.20
C10	5/12/2012			1.17	0.000369	0.00532	0.142		0.186	0.00514		0.18			0.058
C10	7/30/2012			0.571	0.000202	0.00449	0.0653		0.0956	0.0033		0.2			0.207
C10	7/30/2012														
C10	8/10/2012			0.554	0.000202	0.00407	0.0718		0.105	0.00332		0.12			0.196
C10	8/27/2012			0.805	0.000241	0.00375	0.0836		0.119	0.00453		<0.0050			0.103
C10	6/22/2013			0.0562	<0.000050	0.00114	0.0053		0.0055	0.00094		0.19			0.172
C10	7/23/2013			0.179	0.000067	0.00113	0.0156		0.0198	0.0017		0.14			<0.20
C10	8/22/2013			0.0342	<0.000050	0.00119	<0.0050		<0.0050	0.00065		0.056			0.143
C10	9/8/2013			0.017	<0.000050	0.00099	<0.0050		<0.0050	<0.00050		0.046			0.183
C10	9/8/2013			0.0166	<0.000050	0.00099	<0.0050		<0.0050	<0.00050		0.055			0.199
C10	10/18/2013			0.0427	<0.000050	0.00091	<0.0050		0.0054	0.00051		0.1			0.167

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	N-NO2 (mg/L)	N-NO3 (mg/L)	N-TKN (mg/L)	P-PO4-T (mg/L)	P-TDP (mg/L)	P-TRP (Ortho) (mg/L)	C-TIC (mg/L)	C-TOC (mg/L)	C-DOC (mg/L)	Cation Sum (meq/L)	Anion Sum (meq/L)	Hardness (CaCO3) (mg/L)	Acidity (pH 4.5) (mg/L)	Acidity pH 8.3 (mg/L)
W1	5/27/2005	0.002	0.0539												
W1	6/30/2005	<0.0010	0.0626												
W1	7/28/2005	<0.0010	0.0584												
W1	8/29/2005	<0.0010	0.0217												
W1	9/28/2005	<0.0010	0.0482												
W1	10/15/2005	<0.0010	0.132												
W2	5/27/2005	0.0015	0.0565												
W2	5/27/2005	<0.001	0.0339												
W2	6/30/2005	<0.0010	0.0621												
W2	7/28/2005	<0.0010	0.0124												
W2	8/30/2005	<0.0010	0.0141												
W2	9/28/2005	0.001	0.0458												
W2	10/15/2005	<0.0010	0.133												
W3	5/27/2005	<0.0010	0.0121												
W3	6/30/2005	<0.0010	0.0519												
W3	7/29/2005	<0.0010	0.0284												
W3	8/29/2005	<0.0010	<0.0050												
W3	9/28/2005	<0.0010	0.0132												
W3	10/15/2005	<0.0010	0.0393												
W8	5/27/2005	<0.0010	0.0225												
W8	6/30/2005	<0.0010	<0.0050												
W8	7/29/2005	<0.0010	<0.0050												
W8	8/30/2005	0.0011	<0.0050												
W8	9/28/2005	<0.0010	<0.0050												
W8	10/15/2005	<0.0010	0.0374												
W9	5/27/2005	<0.0010	<0.0050												
W9	6/30/2005	<0.0010	<0.0050												
W9	7/29/2005	<0.0010	<0.0050												
W9	8/29/2005	0.0016	<0.0050												
W9	9/28/2005	<0.0010	<0.0050												
W9	10/15/2005	<0.0010	<0.0050												
W10	5/27/2005	<0.0010	0.0094												
W10	5/27/2005	<0.001													
W10	6/30/2005	<0.0010	<0.0050												
W10	7/29/2005	<0.0010	<0.0050												
W10	8/29/2005	<0.0010	<0.0050												
W10	9/28/2005	<0.0010	<0.0050												
W10	10/15/2005	<0.0010	<0.0050												
W6	5/27/2005	0.0016	0.0316												
W6	6/30/2005	<0.0010	0.0086												
W6	7/29/2005	<0.0010	0.0223												
W6	8/30/2005	<0.0010	<0.0050												
W6	9/28/2005	<0.0010	<0.0050												
W6	10/15/2005	<0.0010	0.0061												
W6	6/2/2006	<0.001	0.0241												
W6	8/25/2006		<0.03												
W6	9/6/2006		<0.03												
W6	6/20/2007	<0.05	0.1	0.6	0.14	<0.02									
W6	9/18/2007	<0.02	<0.02	0.3	0.04	<0.02									
W6	6/17/2008	0.07	0.01	0.44	0.07										
W6	9/18/2008	<0.01	<0.01	0.47	<0.05		0.1		17.3	17.7					
W6	4/14/2009			5.73	0.06										
W6	4/30/2009			1.22	0.05										
W6	7/28/2009														
W6	8/6/2009														
W6	8/6/2009		2.92	0.5	0.02		<0.05								
W6	8/18/2009														
W6	8/25/2009								9.2	7.9					
W6	10/7/2009														
W6	10/7/2009		8.09	0.54	0.05				6.4	6.3					
W6	10/25/2009	0.061	7.8				<0.005								
W6	4/19/2010			0.53	0.05										
W6	5/16/2010	<0.005	<0.02				<0.005						5.3		
W6	5/17/2010	<0.005	<0.02				<0.005						2.9		
W6	5/19/2010	<0.005	<0.02				<0.005						3.4		
W6	5/21/2010	<0.005	<0.02				<0.005						1.6		
W6	5/23/2010	<0.005	<0.02				<0.005						5.2		
W6	5/25/2010	<0.005	<0.02				<0.005						5.7		
W6	5/29/2010	<0.005	<0.02				<0.005						1.4		
W6	6/2/2010	<0.005	0.97				<0.005						3.7		
W6	6/4/2010	<0.005	<0.02				<0.005						6.7		
W6	6/6/2010	<0.005	<0.02				<0.005								
W6	6/14/2010	<0.005	<0.02				<0.005						7.2		
W6	6/16/2010	<0.005	0.03				<0.005						7.9		
W6	6/18/2010	<0.005	<0.02				<0.005						7.7		
W6	6/20/2010	<0.005	0.02				<0.005						7.8		
W6	6/22/2010	<0.005	<0.02				<0.005		8.6	7.8					
W6	6/24/2010	<0.005	<0.02				<0.005		8.2	7.9					
W6	6/26/2010	<0.005	<0.02				<0.005		7.8	7.7					
W6	6/26/2010														
W6	6/28/2010	<0.005	<0.02				<0.005						7.8		
W6	7/5/2010	<0.005	<0.02				<0.005						15		
W6	8/5/2010	<0.005	<0.02				<0.005						13		
W6	9/9/2010	<0.005	<0.02				<0.005						12.9		
W6	10/8/2010	<0.005	<0.02				<0.005						13.2		
W6	8/19/2011	<0.005	1.05										8.4		
W6	7/17/2012	<0.0050	0.026		1.01								7.98		
W6	7/30/2012	0.0072	0.052		0.599								8.08		
W6	8/9/2012	0.0066	0.022												
W6	8/25/2012	<0.0050	0.045										7.68		
W6	9/13/2012	<0.0050	0.034						13.1	14.4					
W6	10/13/2012	<0.0050	0.042										9.91		
W6	11/12/2012	<0.0050	<0.020										8.74		
W6	5/14/2013	<0.0050	<0.020										22.2		
W6	6/22/2013	0.0132	0.028										7.79		
W6	7/12/2013	<0.0050	<0.020										8.29		
W6	8/22/2013	<0.0050	<0.020										7.4		
W6	9/6/2013	<0.0050	0.03										6.36		
W6	10/7/2013	<0.0050	0.042										8.17		
W6	11/16/2013	<0.0050	<0.020										8.79		
W6	12/7/2013	<0.0050	<0.020										8.77		
W7	5/27/2005	0.0018	0.0824												
W7	6/30/2005	0.0017	0.172												
W7	7/29/2005	<0.0010	0.169												
W7	8/30/2005	<0.0010	0.0226												
W7	9/28/2005	<0.0010	0.0586												
W7	10/15/2005	<0.0010	0.102												
W7	6/2/2006	0.0015	0.0449												
W7	6/8/2006														

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	N-NO2 (mg/L)	N-NO3 (mg/L)	N-TKN (mg/L)	P-PO4-T (mg/L)	P-TDP (mg/L)	P-TRP (Ortho) (mg/L)	C-TIC (mg/L)	C-TOC (mg/L)	C-DOC (mg/L)	Cation Sum (meq/L)	Anion Sum (meq/L)	Hardness (CaCO3) (mg/L)	Acidity (pH 4.5) (mg/L)	Acidity pH 8.3 (mg/L)
W7	6/15/2006														
W7	6/15/2006		0.18												
W7	6/23/2006		0.23												
W7	6/28/2006		0.112												
W7	7/7/2006		0.205												
W7	7/12/2006		0.18												
W7	7/20/2006		0.19												
W7	7/26/2006														
W7	7/26/2006		0.18												
W7	8/2/2006		0.15												
W7	8/10/2006		0.16												
W7	8/25/2006														
W7	8/25/2006		0.12												
W7	8/30/2006		0.11												
W7	9/6/2006		0.08												
W7	9/13/2006		0.094												
W7	9/20/2006		0.11												
W7	9/28/2006		0.08												
W7	10/4/2006		0.1												
W7	10/12/2006		0.12												
W7	6/5/2007	<0.05	<0.1	0.5	0.15	<0.02									
W7	6/5/2007	0.05	<0.1	0.11	0.12	<0.02									
W7	6/5/2007	<0.05	<0.1	0.4	0.13	<0.02									
W7	6/20/2007	<0.05	0.3	0.3	0.05	<0.02				8.2					
W7	7/18/2007	<0.05	0.3	0.31	<0.05	<0.02	0.05			14.3					
W7	7/18/2007	<0.05	0.3	0.36	0.05	<0.02	0.05								
W7	7/18/2007	<0.05	0.3	0.33	0.06	<0.02	0.05								
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007														
W7	8/24/2007	<0.05	0.2	0.3	0.04	<0.02									
W7	8/24/2007	<0.05	0.2	0.26	0.04	<0.02									
W7	8/24/2007	<0.05	0.2	0.24	0.04	<0.02									
W7	9/18/2007	<0.02	0.05	0.38	0.07	<0.02				11					
W7	10/30/2007	0.14	<0.02	0.51	<0.02	<0.02	<0.01								
W7	10/30/2007	0.14	<0.02	0.46	0.02	<0.02	<0.01								
W7	10/30/2007	0.13	<0.02	0.54	0.02	<0.02	<0.01								
W7	10/30/2007	0.13	<0.02		0.02	<0.02	<0.01								
W7	4/22/2008	0.07	<0.02	2.02	<0.05		0.09								
W7	4/22/2008	0.04	<0.02	0.34	<0.05		0.09								
W7	4/22/2008	0.07	<0.02	0.24	<0.05		0.09								
W7	4/22/2008	0.04	<0.02												
W7	6/3/2008	0.04	0.03	0.38	<0.05		0.04								
W7	6/3/2008	0.04	0.04	0.45	<0.05		0.04								
W7	6/3/2008	0.04	0.04	0.4	<0.05		0.04								
W7	6/3/2008					<0.01									
W7	6/17/2008	0.05	0.14	0.34	0.06				6.8						
W7	8/6/2008	<0.01	0.14	0.38	<0.05		0.06								
W7	8/6/2008	<0.01	0.14	0.32	0.08		0.06								
W7	8/6/2008	<0.01	0.15		<0.05										
W7	8/6/2008			0.32	0.05		0.06		9.3	9					
W7	9/18/2008	<0.01	0.03	0.51	<0.05		0.09		17.6	17.4					
W7	10/28/2008			0.33	<0.05		0.08								
W7	10/28/2008			0.37	<0.05		0.08								
W7	10/28/2008			0.32	<0.05		0.08								
W7	10/28/2008								10.7	11					
W7	4/30/2009			0.76	0.06				17.6	17.6					
W7	6/8/2009			0.49	0.03				9.4	9.2					
W7	7/28/2009														
W7	8/6/2009		0.18	0.24	0.02	<0.05									
W7	8/24/2009														
W7	8/25/2009								9.4	8.2					
W7	8/31/2009														
W7	10/7/2009														
W7	10/7/2009		0.12	0.35	0.07				8.1	6.9					
W7	10/25/2009	<0.005	0.15				<0.005		7.5	8.7					
W7	10/25/2009														
W7	4/19/2010			0.82	0.06										
W7	4/27/2010	<0.005	<0.02				0.008			22.7					
W7	4/29/2010	<0.01	<0.04				<0.005			19.3					
W7	5/1/2010	0.008	0.07				<0.005			19					
W7	5/3/2010	<0.005	<0.02				<0.005			22.2					
W7	5/5/2010	<0.005	<0.02				<0.005			14.5					
W7	5/7/2010	0.007	0.1				<0.005			12.8					
W7	5/9/2010	<0.005	0.07				<0.005			13.2					
W7	5/10/2010	0.006	0.13				<0.005			11.7					
W7	5/12/2010														
W7	5/12/2010	<0.005	0.03				<0.005			10.4					
W7	5/14/2010	<0.005	<0.02				<0.005			9.2					
W7	5/16/2010	<0.005	0.03				<0.005			8.8					
W7	5/17/2010	<0.005	<0.02				<0.005			7.2					
W7	5/19/2010	<0.005	0.06				<0.005			7.5					
W7	5/21/2010	<0.005	0.05				<0.005			8.7					
W7	5/23/2010	0.006	0.06				<0.005			8.2					
W7	5/25/2010	0.025	0.08				<0.005			8.1					
W7	5/27/2010	<0.005	0.13				<0.005			8.1					
W7	5/29/2010	0.011	0.22				<0.005			6.3					
W7	5/31/2010	0.023	0.12				<0.005			7.2					
W7	6/2/2010	0.023	0.14				<0.005			4.9					
W7	6/4/2010	0.014	0.16				<0.005			6.4					
W7	6/6/2010	0.013	0.16				<0.005								
W7	6/14/2010	<0.005	0.16				<0.005			5.9					
W7	6/16/2010	<0.005	0.17				<0.005			6.1					
W7	6/18/2010	<0.005	0.15				<0.005			6.2					
W7	6/20/2010	0.008	0.13				<0.005			7.6					
W7	6/22/2010	<0.005	0.12				<0.005		10.5	10.4					
W7	6/24/2010	0.007	0.07				<0.005		10.5	10.2					
W7	6/26/2010	<0.005	0.1				<0.005		9.2	9.3					
W7	6/28/2010	<0.005	0.13				<0.005			8.7					
W7	7/5/2010	<0.005	0.07				<0.005			16.1					
W7	8/5/2010									13.2					
W7	9/12/2010														
W7	9/12/2010	<0.005	0.03				<0.005		17.4	16.7					
W7	10/8/2010	<0.005	0.07				<0.005			12.7					
W7	4/27/2011	<0.005	<0.02						22	23					
W7	5/2/2011	<0.005	<0.02							22					
W7	6/1/2011									10.7					
W7	6/16/2011	<0.005	0.1							12.6					
W7	7/1/2011	0.007	0.05							21.1					

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	N-NO2 (mg/L)	N-NO3 (mg/L)	N-TKN (mg/L)	P-PO4-T (mg/L)	P-TDP (mg/L)	P-TRP (Ortho) (mg/L)	C-TIC (mg/L)	C-TOC (mg/L)	C-DOC (mg/L)	Cation Sum (meq/L)	Anion Sum (meq/L)	Hardness (CaCO3) (mg/L)	Acidity (pH 4.5) (mg/L)	Acidity pH 8.3 (mg/L)
W7	8/2/2011	<0.005	0.06							24.2					
W7	8/16/2011	<0.005	0.06							18.3					
W7	8/19/2011	<0.005	0.04							18.8					
W7	9/12/2011	<0.005	0.05						14	13.2					
W7	10/6/2011	<0.005	0.11						11.5	11.7					
W7	11/22/2011	<0.005	0.136						7.69	7.73					
W7	1/24/2012	<0.005	0.324							5.33					
W7	2/25/2012	<0.005	0.289				<0.0050			6.08					
W7	3/5/2012	<0.005	0.195							5.17					
W7	4/24/2012	0.0101	<0.020		0.0566				13.3	13.6					
W7	5/6/2012	<0.0050	<0.020		0.0297					17.4					
W7	5/6/2012	<0.0050	<0.020		0.0303					17					
W7	6/19/2012	0.0148	0.083		0.176				19.2	16.2					
W7	7/17/2012	<0.0050	0.089		0.078					13.3					
W7	7/30/2012	<0.0050	0.124		0.0432					12.7					
W7	8/8/2012	<0.0050	0.13							12.6					
W7	8/23/2012	<0.050	0.21		0.0322				11.3	10.3					
W7	9/13/2012	<0.0050	0.078						16.3	16.3					
W7	10/16/2012	<0.0050	0.125						12.1	12.6					
W7	11/2/2012	<0.0050	0.219		0.0227					8.19					
W7	12/29/2012	<0.0050	0.063							10.2					
W7	4/30/2013	<0.0050	0.132						4.71	4.64					
W7	5/14/2013	<0.0050	<0.020							15.3					
W7	6/19/2013	<0.0050	0.143							11.3					
W7	6/19/2013	<0.0050	0.141							10.5					
W7	7/13/2013	<0.0050	0.17							9.88					
W7	8/21/2013	<0.0050	0.157							9.84					
W7	9/6/2013	<0.0050	0.128							11					
W7	10/21/2013	<0.0050	0.168							11.9					
W7	11/16/2013	<0.0050	0.257							7.47					
W7	12/7/2013	<0.0050	0.206							7.3					
C4	5/6/2012	<0.0050	0.029		1.21					10.5					
C4	8/1/2012	0.0177	0.074		0.386					16.2					
C4	8/8/2012	0.012	0.095												
C4	8/25/2012	<0.0050	<0.020							<0.50					
C4	6/22/2013	0.0066	0.371							17.4					
C4	7/19/2013	0.0069	0.082												
C4	8/22/2013	0.0084	0.086							18.9					
C4	9/6/2013	<0.0050	0.07							15.1					
C4	10/18/2013	<0.0050	0.069							12.7					
C4	10/18/2013	<0.0050	0.065							12.5					
C4	11/17/2013	<0.050	<0.20							31.6					
C10	5/12/2012	0.0114	0.047		2.25					13.3					
C10	7/30/2012	0.0229	0.184		0.903					17.8					
C10	7/30/2012														
C10	8/10/2012	0.0111	0.184												
C10	8/27/2012	0.0086	0.095							17.8					
C10	6/22/2013	0.0198	0.152							15.3					
C10	7/23/2013	<0.050	<0.20												
C10	8/22/2013	0.0072	0.135							17.2					
C10	9/8/2013	0.0076	0.175							16					
C10	9/8/2013	0.007	0.192							16.2					
C10	10/18/2013	<0.0050	0.167							14.3					

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Lab pH (pH units)	Lab Conductance (µS/cm)	Dissolved Hardness (mg/L)	Total Hardness (mg/L)	Hardness-E (mg/L)	Turbidity (NTU)	Temp-obs-pH (°C)	IB (%)	TDS (mg/L)	TSS (mg/L)	Total Alkalinity (mg/L)	Alkalinity-P (mg/L)	Alkalinity-OH (mg/L)	Alkalinity-Carb (mg/L)	Alkalinity-Bicarb (mg/L)
W1	5/27/2005	8.05	195		97.3					137	26.5	78.7				89.2
W1	6/30/2005	8.17	290							189	<3.0	141				141
W1	7/28/2005	8.03	312		157					189	<3.0					151
W1	8/29/2005	8.28	266		138					186	4	138				138
W1	9/28/2005	7.59	244		134					178	9.5	117				117
W1	10/15/2005	8.13	253		140					181	14.5					121
W2	5/27/2005	8.06	198		99.8					138	20.5					89.3
W2	5/27/2005	8.03	148		72.2					80	79	67.1				
W2	6/30/2005	8.17	287							190	<3.0	140				140
W2	7/28/2005	8.01	305		153					194	<3.0					146
W2	8/30/2005	8.26	268		138					193	3.5	143				143
W2	9/28/2005	7.9	243		134					170	9	115				115
W2	10/15/2005	8.11	249		137					179	5.5					120
W3	5/27/2005	7.99	188		93.9					141	8.5	61.2				78.7
W3	6/30/2005	8.22	341							224	<3.0	153				153
W3	7/29/2005	8.06	322		166					198	25.7					143
W3	8/29/2005	8.24	267		135					182	7.5	122				122
W3	9/28/2005	7.99	238		129					174	8	101				101
W3	10/15/2005	8.08	245		134					176	<3.0					106
W8	5/27/2005	7.78	113		62.3					111	<3.0	174				49.1
W8	6/30/2005	7.83	176							144	<3.0	89				89
W8	7/29/2005	7.45	203		116					141	24.7					104
W8	8/30/2005	8.12	179		99.8					147	<3.0	99.2				99.2
W8	9/28/2005	7.96	165		95					135	<3.0	74.7				74.7
W8	10/15/2005	7.06	190		99.4					140	5.5					87.1
W9	5/27/2005	7.56	93.2		49.4					104	<3.0	142				32
W9	6/30/2005	7.63	145							126	<3.0	56.1				56.1
W9	7/29/2005	7.51	176		95.3					129	3.7					74.2
W9	8/29/2005	7.84	146		73.6					126	<3.0	57.7				57.7
W9	9/28/2005	7.62	125		67.8					118	<3.0	44				44
W9	10/15/2005	7.19	121		64.4					111	<3.0					51.8
W10	5/27/2005	7.47	75.4		46.3					115	<3.0					36.7
W10	5/27/2005															
W10	6/30/2005	7.31	84.2							116	6	41.5				41.5
W10	7/29/2005	7.34	111		54.9					105	4.2					58.2
W10	8/29/2005	7.74	145		70					117	13	79.1				79.1
W10	9/28/2005	7.77	181		101					141	14.5	92.3				92.3
W10	10/15/2005	7.3	175		100					138	6.5					96.4
W6	5/27/2005	7.91	127		65.4					103	13.5	32				61.2
W6	6/30/2005	7.41	174							123	11.5	99.1				99.1
W6	7/29/2005	8.01	319		171					198	22.2					147
W6	8/30/2005	8.17	200		106					147	<3.0	109				109
W6	9/28/2005	7.95	192		106					133	3.5	93				93
W6	10/15/2005	7.92	180		98.3					128	<3.0					99.3
W6	6/2/2006	7.64	112							96	115	76.6				
W6	8/25/2006	8.01	223	120						160		120		<5	<6	146
W6	9/6/2006	7.86	212	110							4	112		<5	<6	137
W6	6/20/2007	7.77	151		81		0.6			130	16	83		<5	<6	100
W6	9/18/2007	7.95	194		93		0.2			172	8	112		<5	<6	137
W6	6/17/2008	7.82	175		86		0.9			120	17	93		<5	<6	100
W6	9/18/2008	7.8	174				<0.1			150	4	87		<5	<6	100
W6	4/14/2009	7.92	624	248			24			464	138	201		<5	<6	240
W6	4/30/2009	7.34	104	56			39			112	190	41		<5	<6	50
W6	7/28/2009	7.86	338	148			27			228	38	92		<5	<6	100
W6	8/6/2009															
W6	8/6/2009	8.05	413	177						296	<2	155		<5	<6	190
W6	8/18/2009			173												
W6	8/25/2009															
W6	10/7/2009	7.86	478	195			0.5			314	<2	95		<5	<6	100
W6	10/7/2009	7.83	475	195			0.6			352	<3	96		<5	<6	100
W6	10/25/2009	8.1	501	207	219		1.8			270	<4	120	<0.5	<0.5	<0.5	150
W6	4/19/2010	7.93	292		135		38			196	29	117		<5	<6	140
W6	5/16/2010	8.1	200	98	97.2		0.7			130	<4	100	<0.5	<0.5	<0.5	120
W6	5/17/2010	7.8	152	73.7	68.8		1.6			120	<4	71	<0.5	<0.5	<0.5	87
W6	5/19/2010	8.1	192	95.5	101		1.2			120	3	90	<0.5	<0.5	<0.5	110
W6	5/21/2010	8	160	82.6	88.1		2.9			84	10	80	<0.5	<0.5	<0.5	97
W6	5/23/2010	8.1	219	102	96.4		2			150	9	100	<0.5	<0.5	<0.5	120
W6	5/25/2010	7.9	221	108	120		1.6			120	4	100	<0.5	<0.5	<0.5	120
W6	5/29/2010	8	141	69.2	70.1		2.8			84	10	74	<0.5	<0.5	<0.5	90
W6	6/2/2010	8.4	466	221	243		0.7			280	2	200	5.2	<0.5	6.3	230
W6	6/4/2010	8.1	189	81	92.6		1.7			96	1	100	<0.5	<0.5	<0.5	120
W6	6/6/2010	8	187	98.3	98.8		3.1			120	5	100	<0.5	<0.5	<0.5	130
W6	6/14/2010	8.2	184	92.4	94.5		3.6			130	13	100	<0.5	<0.5	<0.5	120
W6	6/16/2010	8.2	188	92	90.8		2.7			120	5	100	<0.5	<0.5	<0.5	130
W6	6/18/2010	8.2	191	93.9	89.2		1.7			120	6	100	<0.5	<0.5	<0.5	130
W6	6/20/2010	8.2	182	88.8	92.7		2.7			110	5	100	<0.5	<0.5	<0.5	120
W6	6/22/2010	8.17	190	92.6	94.3		3.4			120	8	100	<0.5	<0.5	<0.5	120
W6	6/24/2010	8.11	189	92.6	74.4		2.1			96	4	100	<0.5	<0.5	<0.5	120
W6	6/26/2010	8.11	189	90.3	90.7		3			92	5	100	<0.5	<0.5	<0.5	120
W6	6/26/2010															
W6	6/28/2010	7.87	189	89.5	91.4		6.8			130	19	99	<0.5	<0.5	<0.5	120
W6	7/5/2010	7.95	170	79.5	86.9		23			130	60	87	<0.5	<0.5	<0.5	110
W6	8/5/2010	8.06	207	108	101		2.2			130	8	110	<0.5	<0.5	<0.5	130
W6	9/9/2010	8.07	210	108	107		10.2			160	31	110	<0.5	<0.5	<0.5	130
W6	10/8/2010	8.07	209	103	100		6.7			140	46	110	<0.5	<0.5	<0.5	130
W6	8/19/2011	8.3	485	225	214					280	2	190	<0.5	<0.5	<0.5	240
W6	7/17/2012	7.98	201	104	163					122	1130	103	<0.50	<0.50	<0.50	126
W6	7/30/2012	8.09	202	101	145					124	614	103	<0.50	<0.50	<0.50	126
W6	8/9/2012	8.17	220	112	136					144	566	116	<0.50	<0.50	<0.50	141
W6	8/25/2012	8	212	103	161					138	1160	109	<0.50	<0.50	<0.50	133
W6	9/13/2012	8.04	174	87.7	93.1					118	50.3	87.1	<0.50	<0.50	<0.50	106
W6	10/13/2012	7.92	193		117					150	44.7	99.1	<0.50	<0.50	<0.50	121
W6	11/12/2012	7.93	275	153	155					162	2.2	138	<0.50	<0.50	<0.50	168
W6	5/14/2013	7.48	55.1	31.4	33.8					84	13.1	25.5	<0.50	<0.50	<0.50	31.1
W6	6/22/2013	8.07	195	94.9	115					118	172	97.8	<0.50	<0.50	<0.50	119
W6	7/12/2013	7.9	180	88.2	95.3					136	25.2	93.8	<0.50	<0.50	<0.50	115
W6	8/22/2013	8.04	205	102	106					144	19.7	107	<0.50	<0.50	<0.50	130
W6	9/6/2013	7.95	204	101	114					130	5.2	105	<0.50	<0.50	<0	

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Lab pH (pH units)	Lab Conductance (µS/cm)	Dissolved Hardness (mg/L)	Total Hardness (mg/L)	Hardness-E (mg/L)	Turbidity (NTU)	Temp-obs-pH (°C)	IB (%)	TDS (mg/L)	TSS (mg/L)	Total Alkalinity (mg/L)	Alkalinity-P (mg/L)	Alkalinity-OH (mg/L)	Alkalinity-Carb (mg/L)	Alkalinity-Bicrb (mg/L)
W7	6/15/2006															
W7	6/15/2006	7.86	193	100						114	53	95		<5	<6	116
W7	6/23/2006	7.78	246	122						176	328	130		<5	<6	159
W7	6/28/2006	7.9	213	107						120	103	106		<5	<6	129
W7	7/7/2006	7.91	205	110						184	3	120		<5	<6	146
W7	7/12/2006	7.77	238	110							<2	120		<5	<6	146
W7	7/20/2006	7.88	233	130							2	122		<5	<6	149
W7	7/26/2006															
W7	7/26/2006	7.87	259	128							9	121		<5	<6	147
W7	8/2/2006	7.79	256	128							4	125		<5	<6	152
W7	8/10/2006	7.8	259	126							<2	125		<5	<6	152
W7	8/25/2006															
W7	8/25/2006	7.92	261	129						180		131		<5	<6	160
W7	8/30/2006	7.79	258	132						200	<2	129		<5	<6	157
W7	9/6/2006	7.88	258	130							4	129		<5	<6	157
W7	9/13/2006	7.84	254	130							5	128		<5	<6	157
W7	9/20/2006	7.85	263	132							3	127		<5	<6	154
W7	9/28/2006	7.26	266	129						182		128		<5	<6	156
W7	10/4/2006	7.94	258	126							2	122		<5	<6	149
W7	10/12/2006	7.39	266	132						164	4	130		<5	<6	158
W7	6/5/2007	7.98	208		108		2.4			162	76	118		<5	<6	144
W7	6/5/2007	7.97	207		120		3.1			158	76	121		<5	<6	147
W7	6/5/2007	7.97	207		111		2.2			166	73	105		<5	<6	128
W7	6/20/2007	7.84	230	110			0.5			164	6	116		<5	<6	142
W7	7/18/2007	7.72	250	128	126		0.6			170	4	128		<5	<6	156
W7	7/18/2007	7.8	249		125		1			182	7	128		<5	<6	156
W7	7/18/2007	7.83	249		125		1.4			184	6	128		<5	<6	157
W7	8/24/2007															
W7	8/24/2007															
W7	8/24/2007															
W7	8/24/2007	8.04	246		122		<0.1			198	4	139		<5	<6	170
W7	8/24/2007	8.05	245		123		<0.1			192	4	136		<5	<6	166
W7	8/24/2007	8.04	244		128		<0.1			186	6	136		<5	<6	165
W7	9/18/2007	8	224	110			0.2			182	20	124		<5	<6	151
W7	10/30/2007	7.74	268		130		0.9			176	3	128		<5	<6	157
W7	10/30/2007	7.74	274		128		1.9			182	10	131		<5	<6	160
W7	10/30/2007	7.74	269		130		1.9			166	7	128		<5	<6	157
W7	10/30/2007	7.68	272				1.2			172	6	128		<5	<6	157
W7	4/22/2008	8.4	364	186			0.3			264	<2	187		<5	<6	218
W7	4/22/2008	8.41	362	193			0.3			274	<2	185		<5	<6	215
W7	4/22/2008	8.4	366	182			0.4			270	<2	186		<5	<6	216
W7	4/22/2008	8.4	367				0.5			262	<2	188		<5	<6	218
W7	6/3/2008	8.01	201		97		1.3			134	<2	94		<5	<6	100
W7	6/3/2008	8.01	203		96		1.3			132	19	95		<5	<6	100
W7	6/3/2008	8.03	205		101		1.1			146	26	95		<5	<6	100
W7	6/3/2008			92												
W7	6/17/2008	7.95	237				1			156	10	115		<5	<6	140
W7	8/6/2008	7.9	234		123		1.4			162	92	128		<5	<6	160
W7	8/6/2008	7.91	235		123		1.4			168	139	127		<5	<6	150
W7	8/6/2008	7.96	233		125		1.2			170	85	127		<5	<6	160
W7	8/6/2008			123												
W7	9/18/2008	7.89	170				1.8			170	28	82		<5	<6	100
W7	10/28/2008	7.84	217				0.6			192	4	108		<5	<6	130
W7	10/28/2008	7.83	217				0.7			188	6	108		<5	<6	130
W7	10/28/2008	7.85	218				0.8			168	7	108		<5	<6	130
W7	10/28/2008			123												
W7	4/30/2009	6.84	36	20			1.6			52	<2	12		<5	<6	20
W7	6/8/2009	7.9	208	93			1.4			156	32	95		<5	<6	100
W7	7/28/2009	8.07	270	137			0.2			184	4	128		<5	<6	160
W7	8/6/2009	8.35	260	121			0.2			202	2	159		<5	<6	190
W7	8/24/2009															
W7	8/25/2009															
W7	8/31/2009			110												
W7	10/7/2009															
W7	10/7/2009	7.87	249	123			0.2			180	7	116		<5	<6	140
W7	10/25/2009	8.1	266	126	141		0.7			130	<4	130	<0.5	<0.5	<0.5	160
W7	10/25/2009	8	264				0.3			110	<4					
W7	4/19/2010	7.81	167		80		1.2			142	<7	82		<5	<6	100
W7	4/27/2010	7.6	64	36.3	35		1.2			62	<4	32	<0.5	<0.5	<0.5	39
W7	4/29/2010	7.5	66	36.2	36.2		1.8			62	<4	31	<0.5	<0.5	<0.5	38
W7	5/1/2010	7.7	78	40.8	43.6		8.6			74	15	40	<0.5	<0.5	<0.5	49
W7	5/3/2010	7.7	85	44.9	46.2		7.9			80	12	42	<0.5	<0.5	<0.5	51
W7	5/5/2010	7.8	102	49.1	55.1		8.7			76	12	53	<0.5	<0.5	<0.5	64
W7	5/7/2010	7.8	113	56.9	56		4.1			62	18	58	<0.5	<0.5	<0.5	70
W7	5/9/2010	8	180	79.9	71		2.2			130	<4	86	<0.5	<0.5	<0.5	110
W7	5/10/2010	8.1	163	80.9	90.3		1			130	<4	83	<0.5	<0.5	<0.5	100
W7	5/12/2010															
W7	5/12/2010	8	166	81.6	84.6		1.2			100	<4	83	<0.5	<0.5	<0.5	100
W7	5/14/2010	8.1	149	72.6	71.4		7.7			130	15	73	<0.5	<0.5	<0.5	89
W7	5/16/2010	8.3	590	85.6	76.3		3.8			120	12	260	<0.5	<0.5	<0.5	320
W7	5/17/2010	8.2	160	80.4	75.6		4			130	11	80	<0.5	<0.5	<0.5	98
W7	5/19/2010	8.2	195	98.6	103		1.5			120	4	98	<0.5	<0.5	<0.5	120
W7	5/21/2010	8.1	191	91.5	95.6		6.5			120	22	96	<0.5	<0.5	<0.5	120
W7	5/23/2010	8.1	204	98.1	103		29.3			150	33	100	<0.5	<0.5	<0.5	130
W7	5/25/2010	7.9	211	125	124		85.5			140	140	100	<0.5	<0.5	<0.5	130
W7	5/27/2010	8	231	113	148		307			140	350	110	<0.5	<0.5	<0.5	140
W7	5/29/2010	8.2	232	111	129		170			160	200	110	<0.5	<0.5	<0.5	140
W7	5/31/2010	8.2	236	109	130		155			160	290	120	<0.5	<0.5	<0.5	140
W7	6/2/2010	8.2	243	113	135		68.2			140	81	120	<0.5	<0.5	<0.5	150
W7	6/4/2010	8.2	240	111	125		51.6			140	60	120	<0.5	<0.5	<0.5	150
W7	6/6/2010	8.2	250	128	133		45.2			170	39	130	<0.5	<0.5	<0.5	150
W7	6/14/2010	8.29	250	122	128		17			150	43	130	<0.5	<0.5	<0.5	160
W7	6/16/2010	8.3	259	120	128		6.4			150	17	130	<0.5	<0.5	<0.5	160
W7	6/18/2010	8.17	256	122	123		7.8			140	28	130	<0.5	<0.5	<0.5	160
W7	6/20/2010	8.2	240	112	118		18.9			140	33	120	<0.5	<0.5	<0.5	150
W7	6/22/2010	8.03	208	97.6	115		134			140	300	110	<0.5	<0.5	<0.5	130
W7	6/24/2010	8.03	214	99.7	116		24.5			130	64	110	<0.5	<0.5	<0.5	130
W7	6/26/2010	8.26	230	106	106		8.2			120	21	120	<0.5	<0.5	<0.5	140
W7	6/28/2010	8.03	248	114	107		3			150						

Table B.1: Raw water quality data from Minto Mine, 2005 - 2013.

Station Name	Sample Date	Lab pH (pH units)	Lab Conductance ($\mu\text{S}/\text{cm}$)	Dissolved Hardness (mg/L)	Total Hardness (mg/L)	Hardness-E (mg/L)	Turbidity (NTU)	Temp-obs-pH ($^{\circ}\text{C}$)	IB (%)	TDS (mg/L)	TSS (mg/L)	Total Alkalinity (mg/L)	Alkalinity-P (mg/L)	Alkalinity-OH (mg/L)	Alkalinity-Carb (mg/L)	Alkalinity-Bicrb (mg/L)
W7	8/2/2011	7.67	113	58.9	85.8					110	400	54	<0.5	<0.5	<0.5	66
W7	8/16/2011	7.9	191	97.6	96.8					150	22	94	<0.5	<0.5	<0.5	110
W7	8/19/2011	8.12	185	93	93.4					140	22	92	<0.5	<0.5	<0.5	110
W7	9/12/2011	8.03	217	118	119					170	1	110	<0.5	<0.5	<0.5	130
W7	10/6/2011	8.07	233	110	113					150	<4	120	<0.5	<0.5	<0.5	140
W7	11/22/2011	7.96	280	148	144					156	26.7	134	<0.50	<0.50	<0.50	163
W7	1/24/2012	8.13	349	169	158					226	<4.0	165	<0.50	<0.50	<0.50	201
W7	2/25/2012	7.99	339	165	160					216	<4.0	155	<0.50	<0.50	<0.50	189
W7	3/5/2012	8.17	343	161	159					176	3.2	154	<0.50	<0.50	<0.50	188
W7	4/24/2012	7.63	75	38.7	37					100	11.2	36.2	<0.50	<0.50	<0.50	44.1
W7	5/6/2012	6.05	93.2	46.1	44.8					80	2.4	27.3	<0.50	<0.50	<0.50	33.3
W7	5/6/2012	5.74	92.3	46.4	44.7					88	4.2	8.45	<0.50	<0.50	<0.50	10.3
W7	6/19/2012	8.12	178	91.8	105					128	165	87.4	<0.50	<0.50	<0.50	107
W7	7/17/2012	8.15	254	128	124					164	34.1	128	<0.50	<0.50	<0.50	156
W7	7/30/2012	8.2	272	135	128					180	9.2	138	<0.50	<0.50	<0.50	168
W7	8/8/2012	8.26	278	141	141					192	3.3	143	<0.50	<0.50	<0.50	175
W7	8/23/2012	8.25	285	142	151					200	1.5	147	<0.50	<0.50	<0.50	179
W7	9/13/2012	8.13	230	116	121					154	15.3	115	<0.50	<0.50	<0.50	140
W7	10/16/2012	8.17	261	129	143					166	9.9	132	<0.50	<0.50	<0.50	161
W7	11/2/2012	7.93	319	158	153					214	2.2	150	<0.50	<0.50	<0.50	183
W7	12/29/2012	8.13	444	223	206					262	<1.0	207	<0.50	<0.50	<0.50	253
W7	4/30/2013	8.27	387	192	198					246	5.8	187	<0.50	<0.50	<0.50	228
W7	5/14/2013	7.58	61.3	33.3	36.4					70	55.3	29.4	<0.50	<0.50	<0.50	35.9
W7	6/19/2013	8.08	238	113	114					152	11.2	113	<0.50	<0.50	<0.50	138
W7	6/19/2013	8.07	237	114	115					164	10.1	113	<0.50	<0.50	<0.50	138
W7	7/13/2013	8.1	263	132	137					156	5	127	<0.50	<0.50	<0.50	155
W7	8/21/2013	8.23	286	140	144					172	3.8	143	<0.50	<0.50	<0.50	175
W7	9/6/2013	8.02	280	138	154					280	11.8	140	<0.50	<0.50	<0.50	170
W7	10/21/2013	8.16	288	147	126					168	7.4	138	<0.50	<0.50	<0.50	168
W7	11/16/2013	8.24	324	153	164					164	1.5	153	<0.50	<0.50	<0.50	187
W7	12/7/2013	8.14	354	168	189					220	<1.0	166	<0.50	<0.50	<0.50	203
C4	5/6/2012	7.59	88.8	43.9	119					84	1260	40.1	<0.50	<0.50	<0.50	48.9
C4	8/1/2012	8.04	228	117	133					166	246	115	<0.50	<0.50	<0.50	140
C4	8/8/2012	8.14	248	125	142					170	253	126	<0.50	<0.50	<0.50	153
C4	8/25/2012	7.94	254	130	173					192	855	128	<0.50	<0.50	<0.50	156
C4	6/22/2013	7.97	253	126	222					204	886	120	<0.50	<0.50	<0.50	147
C4	7/19/2013	8.12	253	128	200					184	487	125	<0.50	<0.50	<0.50	152
C4	8/22/2013	7.98	245	123	199					182	784	118	<0.50	<0.50	<0.50	144
C4	9/6/2013	7.93	248	125	166					176	172	120	<0.50	<0.50	<0.50	146
C4	10/18/2013	8.18	260	129	142					214	16.3	126	<0.50	<0.50	<0.50	154
C4	10/18/2013	8.24	260	129	139					220	16.3	126	<0.50	<0.50	<0.50	154
C4	11/17/2013	7.9	477	258	264					272	22.4	244	<0.50	<0.50	<0.50	298
C10	5/12/2012	7.73	136	67.2	215					132	2210	65.1	<0.50	<0.50	<0.50	79.4
C10	7/30/2012	8.23	254	130	207					180	995	132	<0.50	<0.50	<0.50	161
C10	7/30/2012															
C10	8/10/2012	8.11	273	135	245					216	1320	146	<0.50	<0.50	<0.50	178
C10	8/27/2012	8.37	284	141	264					184	1650	154	2.03	<0.50	2.44	183
C10	6/22/2013	8.26	276	148	151					192	43.4	143	<0.50	<0.50	<0.50	175
C10	7/23/2013	8.19	251	125	156					174	199	133	<0.50	<0.50	<0.50	162
C10	8/22/2013	8.23	309	160	168					218	65.5	159	<0.50	<0.50	<0.50	194
C10	9/8/2013	7.94	287	150	163					186	25.4	147	<0.50	<0.50	<0.50	180
C10	9/8/2013	8.13	289	150	162					206	21.7	151	<0.50	<0.50	<0.50	184
C10	10/18/2013	8.25	263	136	160					212	61.2	136	<0.50	<0.50	<0.50	166

APPENDIX C
BOXPLOT OUTLIER EXAMINATION

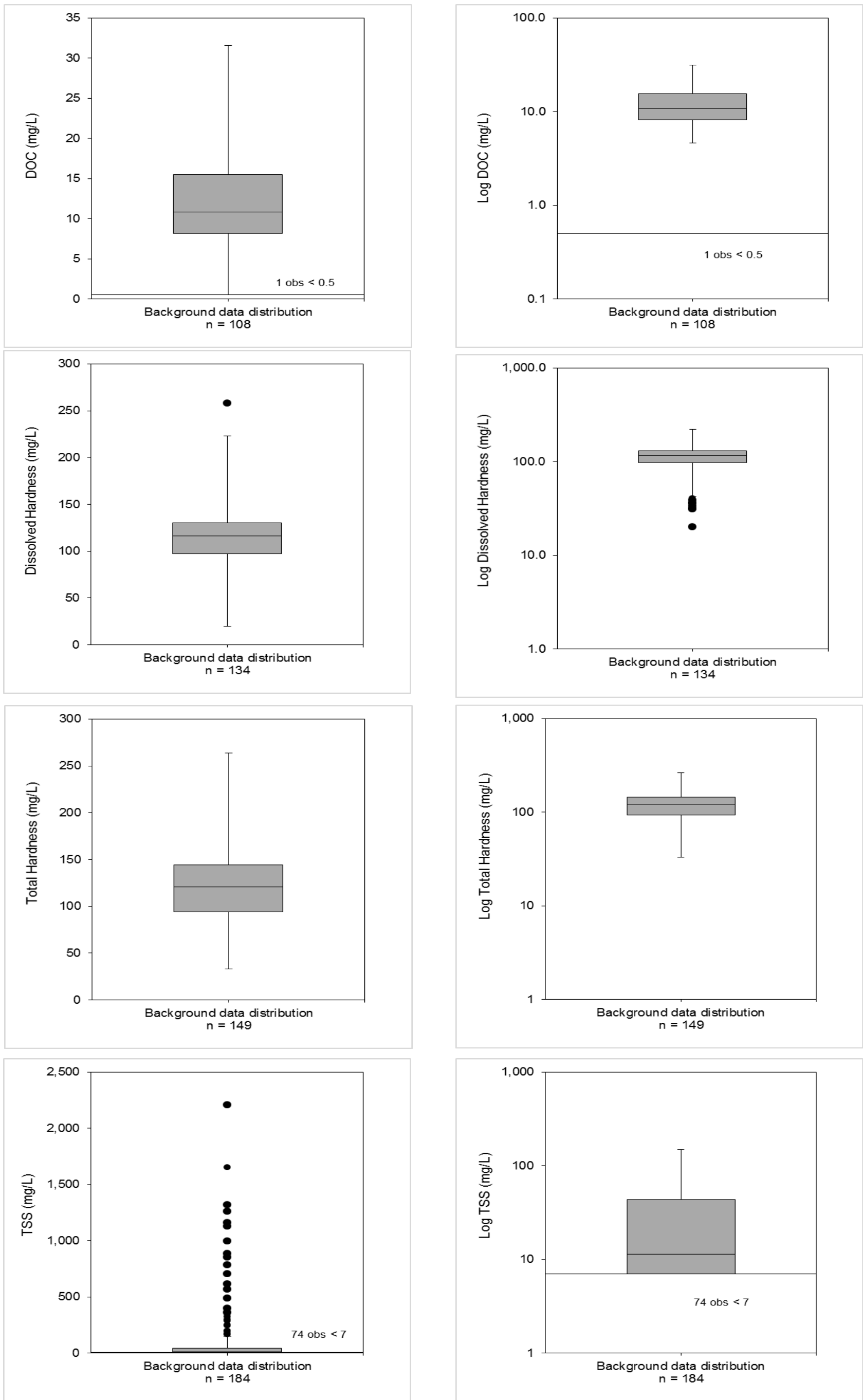


Figure C.1: Boxplots of analytes on non-transformed and log transformed scales. Black dots represent possible outliers. Line represents highest < MDL and any < MDL below this are represented as number of observations below this line.

NOTE: Possible outliers were only considered if they were detected on both non-transformed and log transformed scales

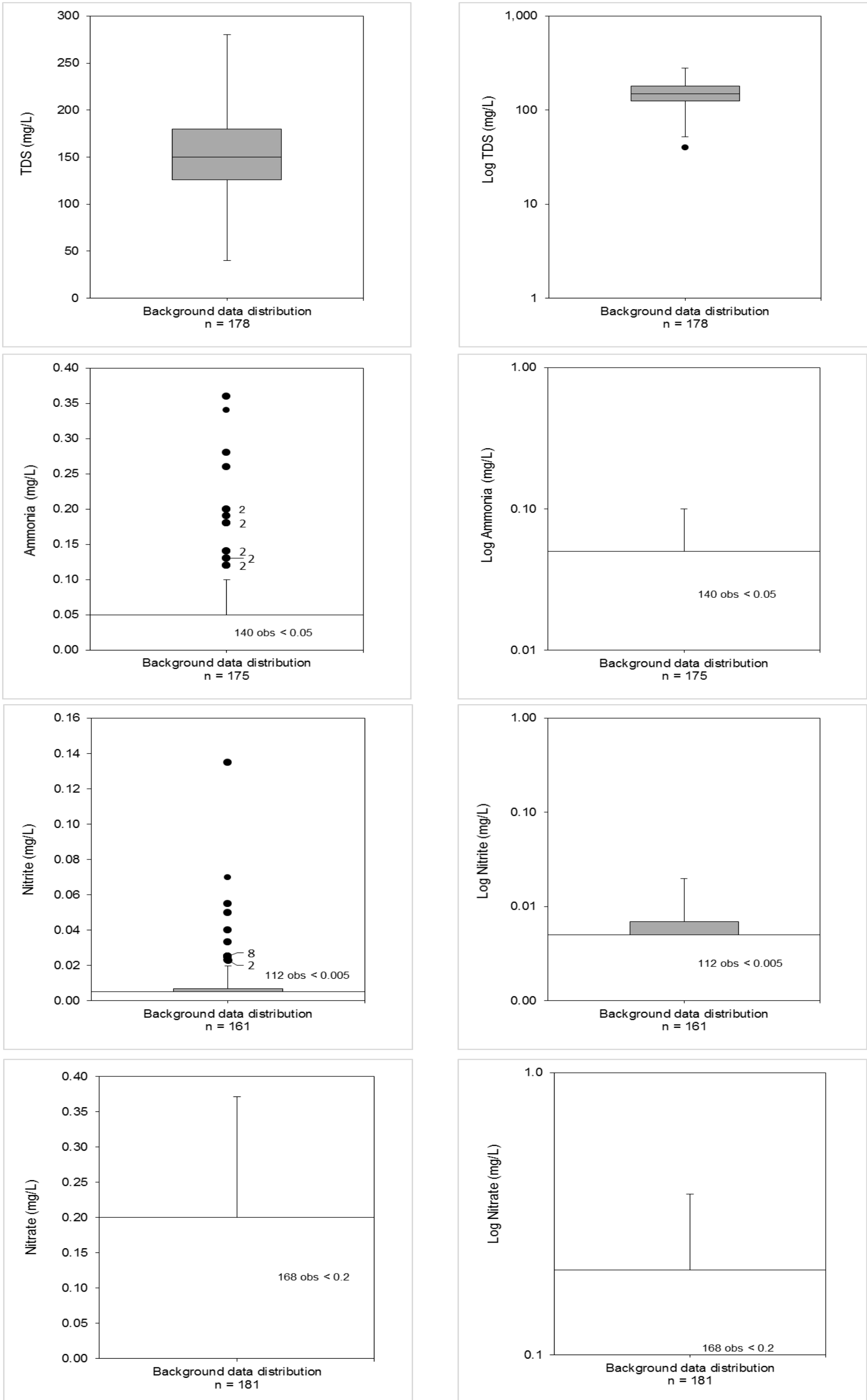


Figure C.1: Boxplots of analytes on non-transformed and log transformed scales. Black dots represent possible outliers. Line represents highest < MDL and any < MDL below this are represented as number of observations below this line.

NOTE: Possible outliers were only considered if they were detected on both non-transformed and log transformed scales

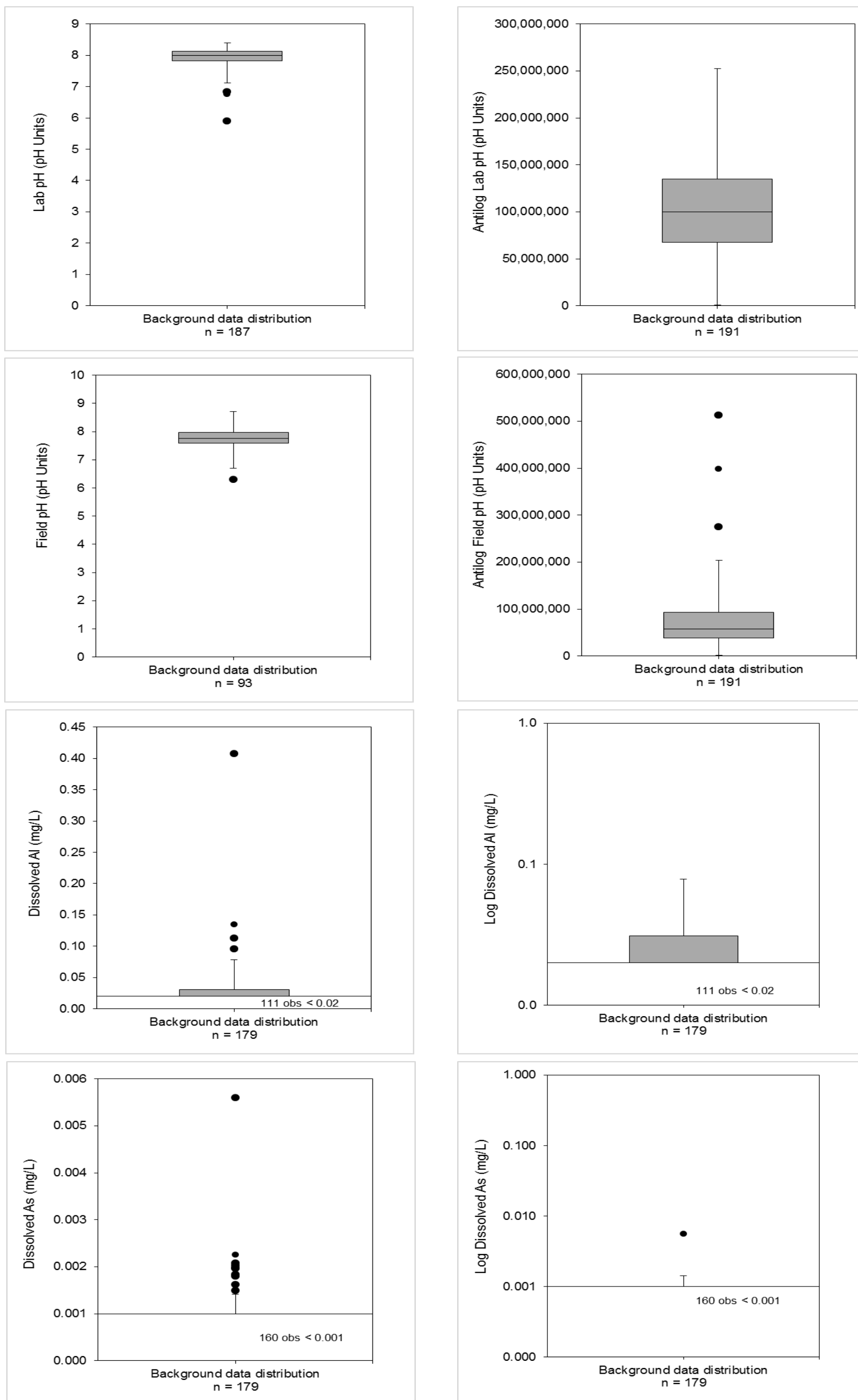


Figure C.1: Boxplots of analytes on non-transformed and log transformed scales. Black dots represent possible outliers. Line represents highest < MDL and any < MDL below this are represented as number of observations below this line.

NOTE: Possible outliers were only considered if they were detected on both non-transformed and log transformed scales

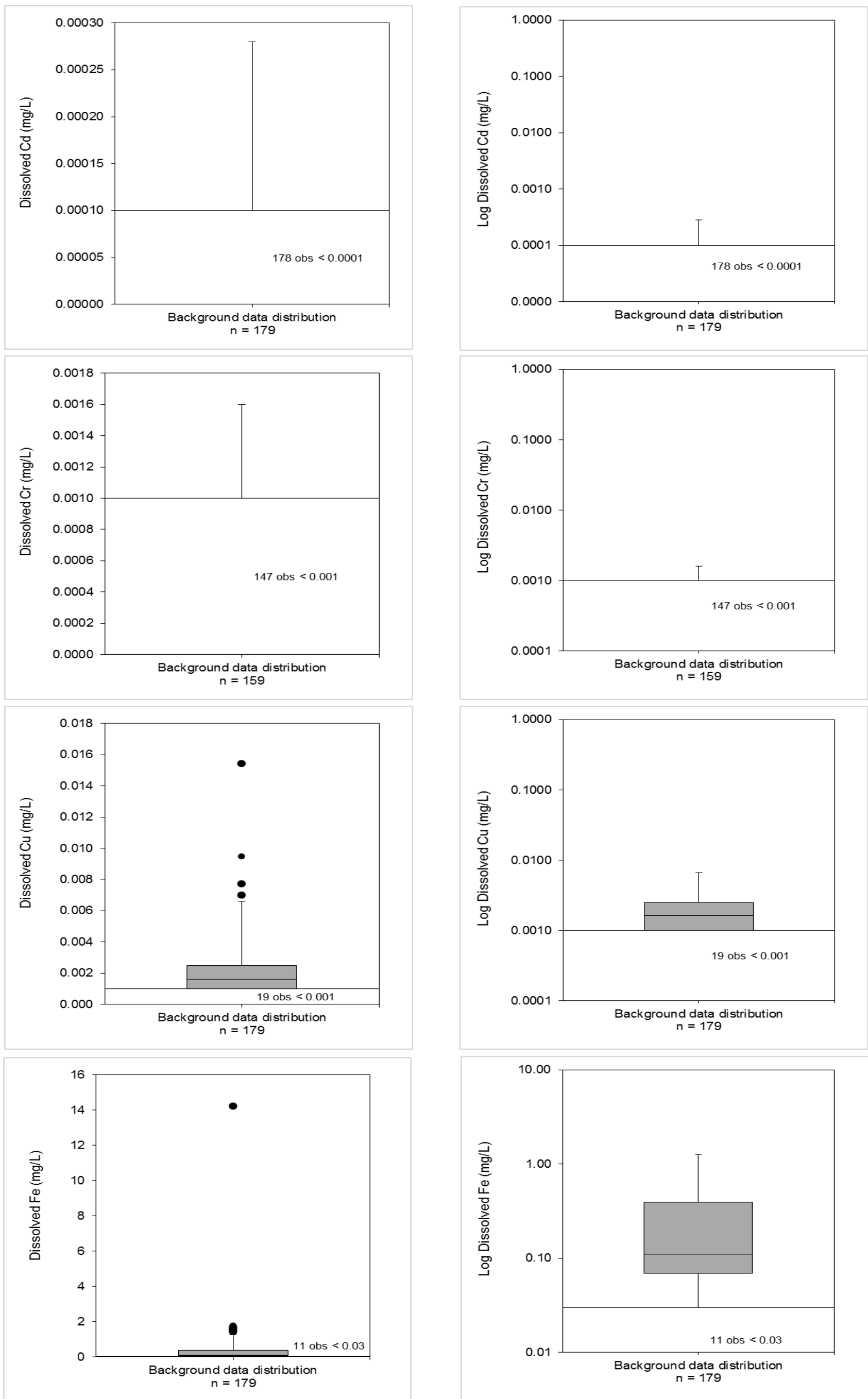


Figure C.1: Boxplots of analytes on non-transformed and log transformed scales. Black dots represent possible outliers. Line represents highest < MDL and any < MDL below this are represented as number of observations below this line.

NOTE: Possible outliers were only considered if they were detected on both non-transformed and log transformed scales

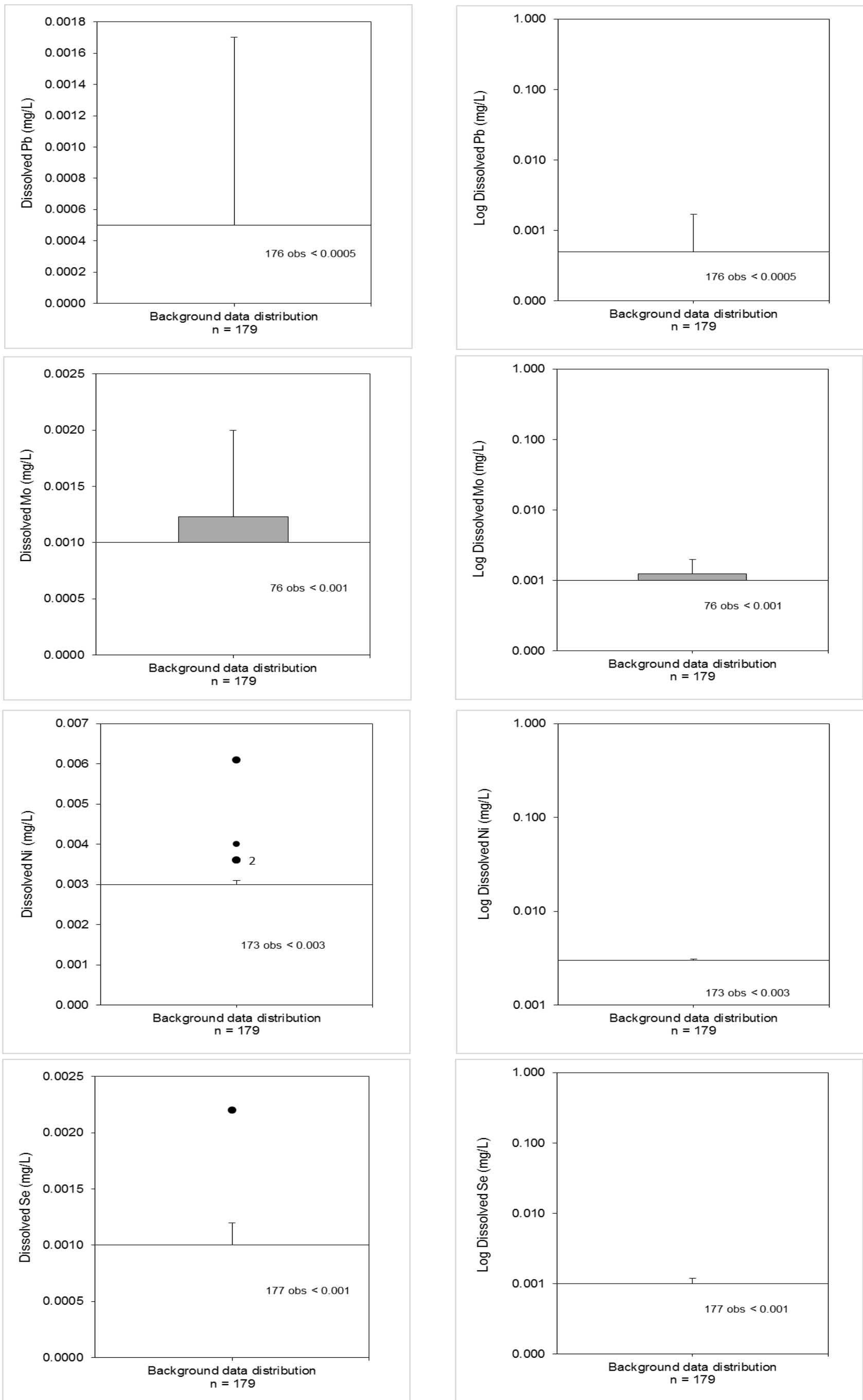


Figure C.1: Boxplots of analytes on non-transformed and log transformed scales. Black dots represent possible outliers. Line represents highest < MDL and any < MDL below this are represented as number of observations below this line.

NOTE: Possible outliers were only considered if they were detected on both non-transformed and log transformed scales

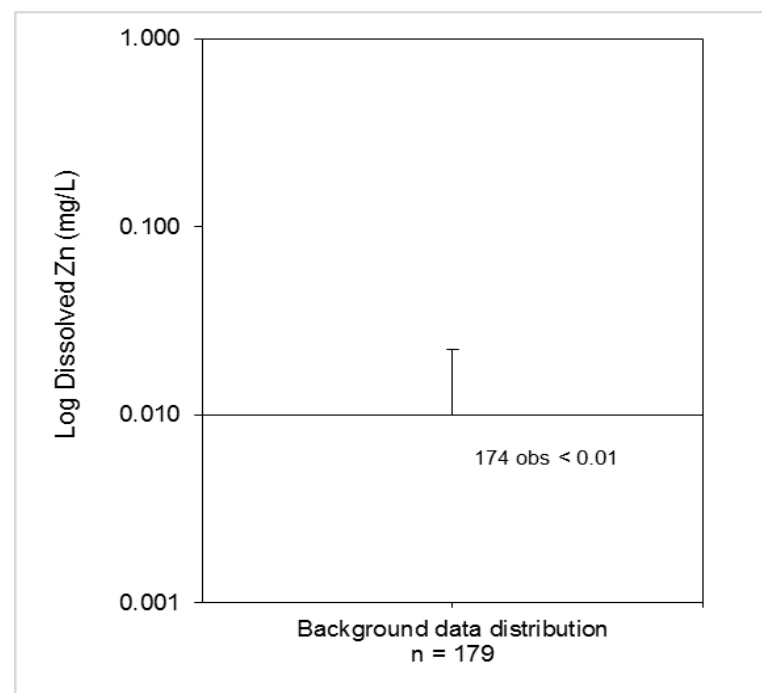
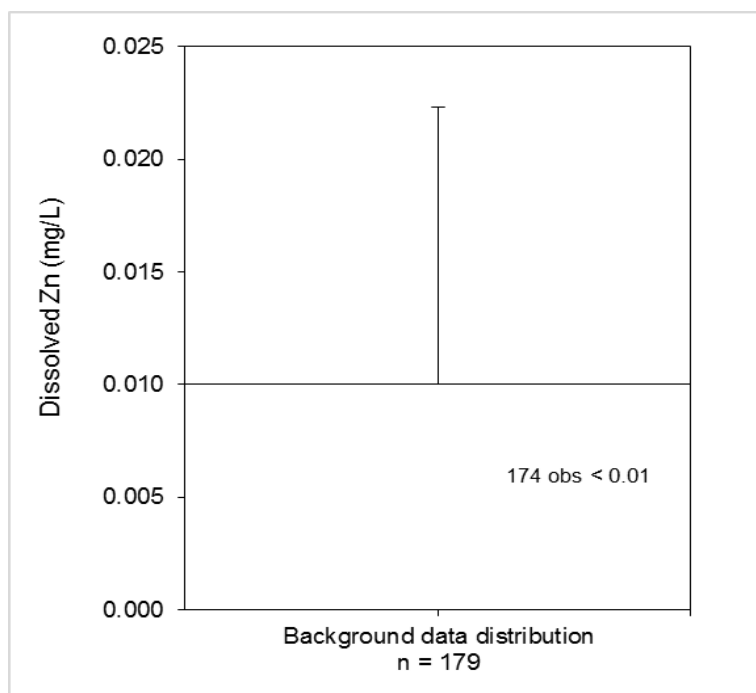
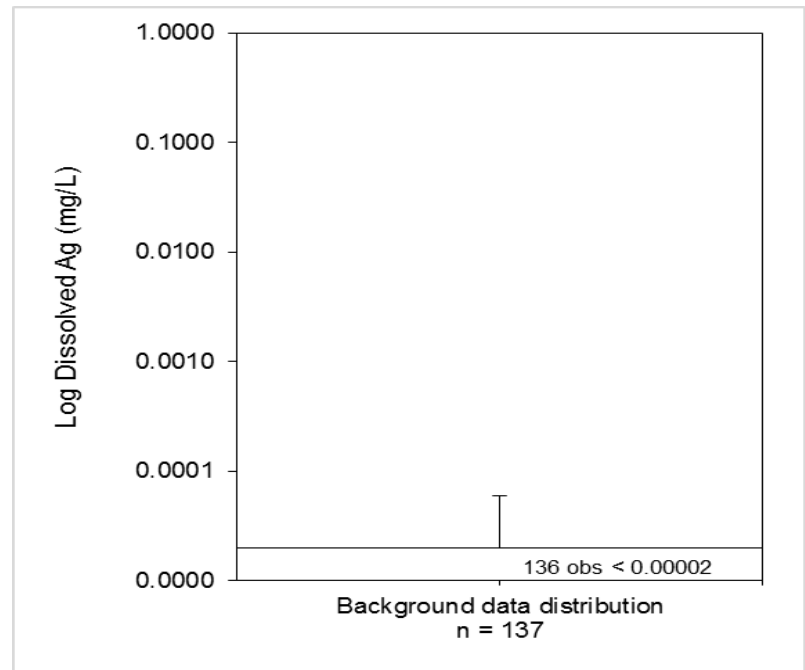
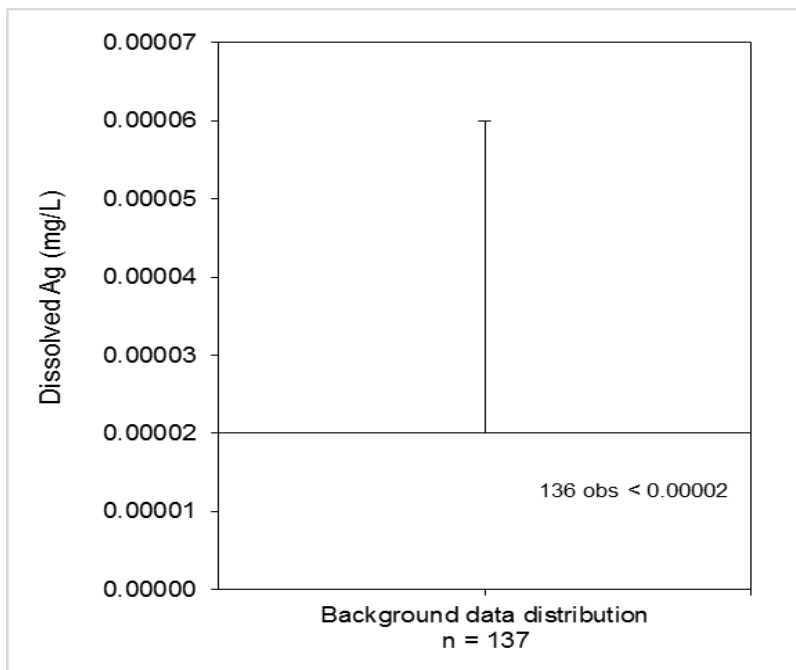


Figure C.1: Boxplots of analytes on non-transformed and log transformed scales. Black dots represent possible outliers. Line represents highest < MDL and any < MDL below this are represented as number of observations below this line.

NOTE: Possible outliers were only considered if they were detected on both non-transformed and log transformed scales

APPENDIX D

WATER QUALITY DATA SUMMARY CALCULATIONS

Table D.1: Comparisons of dissolved arsenic ratios, relative to other analytes. Highlighted cells represent the sample with the potential arsenic concentration outlier

Station	Date	Arsenic Relative to:																				
		DOC (mg/L)	Dissolved Hardness (mg/L)	Total Hardness (mg/L)	TSS (mg/L)	TDS (mg/L)	Ammonia (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Lab pH (pH Units)	Field pH (pH Units)	Dissolved Aluminum (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Chromium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)	Dissolved Lead (mg/L)	Dissolved Molybdenum (mg/L)	Dissolved Nickel (mg/L)	Dissolved Selenium (mg/L)	Dissolved Silver (mg/L)	Dissolved Zinc (mg/L)
C4	11/17/2013	0.00018	0.000022	0.000021	0.00025	0.000021	0.020	0.22	0.056	0.00071	0.00078	0.17	254	4.3	5.9	0.00039	56	5.1	0.92	23	559	2.2
Summary Statistics	Average	0.00013	0.0000059	0.0000051	0.00010	0.0000038	0.034	0.32	0.026	0.000072	0.000093	0.038	76	1.2	0.40	0.0044	7.0	0.75	0.45	5.0	73	0.27
	Minimum	0.0000057	0.00000078	0.0000010	0.00000047	0.00000064	0.0012	0.0020	0.00067	0.000012	0.000013	0.0019	1.3	0.077	0.020	0.00039	0.18	0.067	0.10	0.045	6.7	0.011
	Maximum	0.0079	0.000024	0.000021	0.0011	0.000021	0.60	1.2	0.24	0.00071	0.00078	0.24	450	4.5	5.9	0.042	56	5.1	2.0	39	559	2.2
	Median	0.000047	0.0000046	0.0000044	0.000036	0.0000031	0.022	0.20	0.0083	0.000058	0.000064	0.033	60	1.0	0.25	0.0029	5.0	0.50	0.40	2.5	58	0.19
	95th Percentile	0.00010	0.000016	0.000010	0.00037	0.000010	0.081	1.1	0.10	0.00018	0.00025	0.084	282	3.0	1.0	0.013	19	1.7	0.83	18	180	0.84
	Standard Deviation	0.00076	0.0000043	0.0000030	0.00016	0.0000026	0.058	0.32	0.044	0.000068	0.000096	0.032	89	0.87	0.51	0.0052	6.6	0.66	0.24	6.7	60	0.29

Table D.2: Background data for Option 1 with median and 95th Percentile values.

Station	Date	DOC (mg/L)	Dissolved Hardness (mg/L)	Total Hardness (mg/L)	TSS (mg/L)	TDS (mg/L)	Ammonia (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Lab pH (pH Units)	Field pH (pH Units)	Dissolved Aluminum (mg/L)	Dissolved Arsenic (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Chromium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)	Dissolved Lead (mg/L)	Dissolved Molybdenum (mg/L)	Dissolved Nickel (mg/L)	Dissolved Selenium (mg/L)	Dissolved Silver (mg/L)	Dissolved Zinc (mg/L)
W1	5/27/2005			97	27	137	0.039	0.0020	0.054	8.05		0.018	0.00051	0.000025	0.00050	0.0034	0.17	0.00025	0.00050	0.0015	0.00050	0.000010	0.0025
W1	6/30/2005				1.5	189	0.010	0.00050	0.063	8.17		0.0065	0.00048	0.000025	0.00025	0.0020	0.046	0.000025	0.0011	0.00096	0.00050	0.0000050	0.0005
W1	7/28/2005			157	1.5	189	0.010	0.00050	0.058	8.03		0.0072	0.00048	0.000025	0.00025	0.0021	0.056	0.000073	0.0013	0.0011	0.00050	0.0000050	0.0025
W1	8/29/2005			138	4.0	186	0.041	0.00050	0.022	8.28		0.011	0.00060	0.0000085	0.00050	0.0024	0.25	0.00025	0.0010	0.0014	0.00050	0.000010	0.0025
W1	9/28/2005			134	10	178	0.026	0.00050	0.048	7.59		0.014	0.00058	0.0000085	0.00050	0.0026	0.33	0.00025	0.00050	0.0016	0.00050	0.000010	0.0025
W1	10/15/2005			140	15	181	0.020	0.00050	0.13	8.13		0.014	0.00054	0.000025	0.00025	0.0028	0.27	0.000025	0.00089	0.0014	0.00050	0.0000050	0.0014
W2	5/27/2005			86	50	109	0.018	0.0010	0.045	8.05		0.014	0.00025	0.000025	0.00050	0.0033	0.16	0.00025	0.00050	0.0015	0.00050	0.000010	0.0025
W2	6/30/2005				1.5	190	0.010	0.00050	0.062	8.17		0.0073	0.00044	0.000025	0.00025	0.0021	0.039	0.000025	0.0011	0.0010	0.00050	0.0000050	0.0015
W2	7/28/2005			153	1.5	194	0.010	0.00050	0.012	8.01		0.0071	0.00044	0.000025	0.00025	0.0021	0.05	0.000025	0.0013	0.0011	0.00050	0.0000050	0.0011
W2	8/30/2005			138	3.5	193	0.029	0.00050	0.014	8.26		0.012	0.00058	0.0000085	0.00050	0.0024	0.23	0.00025	0.0010	0.0015	0.00050	0.000010	0.0025
W2	9/28/2005			134	9.0	170	0.010	0.0010	0.046	7.90		0.014	0.00059	0.0000085	0.00050	0.0025	0.34	0.00025	0.00050	0.0017	0.00050	0.000010	0.0025
W2	10/15/2005			137	5.5	179	0.010	0.00050	0.13	8.11		0.013	0.00053	0.000025	0.00025	0.0027	0.25	0.000025	0.00086	0.0014	0.00050	0.0000050	0.00050
W3	5/27/2005			94	8.5	141	0.010	0.00050	0.012	7.99		0.027	0.00025	0.000025	0.00050	0.0066	0.12	0.00025	0.00050	0.0014	0.00050	0.000010	0.0025
W3	6/30/2005				1.5	224	0.010	0.00050	0.052	8.22		0.0080	0.00034	0.000025	0.00025	0.0034	0.042	0.00024	0.0016	0.00078	0.00050	0.0000050	0.012
W3	7/29/2005			166	26	198	0.010	0.00050	0.028	8.06		0.011	0.00041	0.000025	0.00025	0.0048	0.13	0.000025	0.0016	0.0012	0.00050	0.0000050	0.0015
W3	8/29/2005			135	7.5	182	0.042	0.00050	0.0025	8.24		0.018	0.00025	0.0000085	0.00050	0.0050	0.31	0.00025	0.0013	0.0014	0.00050	0.000010	0.0025
W3	9/28/2005			129	8.0	174	0.010	0.00050	0.013	7.99		0.026	0.00025	0.0000085	0.00050	0.0057	0.42	0.00025	0.0011	0.0014	0.00050	0.000010	0.0025
W3	10/15/2005			134	1.5	176	0.023	0.00050	0.039	8.08		0.022	0.00043	0.000025	0.00025	0.0061	0.39	0.000025	0.0012	0.0012	0.00050	0.0000050	0.0018
W9	5/27/2005			49	1.5	104	0.010	0.00050	0.0025	7.56		0.072	0.00025	0.000025	0.00050	0.0035	0.25	0.00025	0.00050	0.0013	0.00050	0.000010	0.0025
W9	6/30/2005				1.5	126	0.020	0.00050	0.0025	7.63		0.035	0.00054	0.000025	0.00025	0.0018	0.53	0.000025	0.00037	0.0012	0.00050	0.0000050	0.00050
W9	7/29/2005			95	3.7	129	0.010	0.00050	0.0025	7.51		0.030	0.00057	0.000025	0.00025	0.0033	0.65	0.00019	0.0011	0.0013	0.00050	0.0000050	0.0040
W9	8/29/2005			74	1.5	126	0.026	0.0016	0.0025	7.84		0.045	0.00058	0.000022	0.00050	0.0017	0.67	0.00025	0.00050	0.0012	0.00050	0.000010	0.0025
W9	9/28/2005			68	1.5	118	0.010	0.00050	0.0025	7.62		0.058	0.00025	0.0000085	0.00050	0.0022	0.60	0.00025	0.00050	0.0011	0.00050	0.000010	0.0025
W9	10/15/2005			64	1.5	111	0.010	0.00050	0.0025	7.19		0.056	0.00039	0.000025	0.00025	0.0021	0.44	0.000025	0.00031	0.00096	0.00050	0.0000050	0.0017
W10	5/27/2005			46	1.5	115	0.019	0.00050	0.0094	7.47		0.14	0.00025	0.000025	0.00050	0.0095	0.061	0.00025	0.00050	0.0011	0.00050	0.000010	0.0055
W10	6/30/2005				6.0	116	0.036	0.00050	0.0025	7.31		0.11	0.00059	0.000025	0.00062	0.0047	0.40	0.00082	0.00014	0.0018	0.00050	0.0000050	0.022
W10	7/29/2005			55	4.2	105	0.010	0.00050	0.0025	7.34		0.068	0.00037	0.000025	0.00025	0.0044	0.099	0.00011	0.00014	0.0012	0.00050	0.0000050	0.0074
W10	8/29/2005			70	13	117	0.033	0.00050	0.0025	7.74		0.043	0.00025	0.0000085	0.00050	0.0040	0.081	0.00025	0.00050	0.0016	0.00050	0.000010	0.0052
W10	9/28/2005			101	15	141	0.010	0.00050	0.0025	7.77		0.030	0.00025	0.0000085	0.00050	0.0033	0.048	0.00025	0.00050	0.00050	0.00050	0.000010	0.0025
W10	10/15/2005			100	6.5	138	0.010	0.00050	0.0025	7.30		0.036	0.00030	0.000025	0.00025	0.0041	0.055	0.00003	0.00024	0.00073	0.00050	0.0000050	0.0015
W6	5/27/2005			65	14	103	0.010	0.0016	0.032	7.91		0.014	0.00025	0.000025	0.00050	0.0016	0.072	0.00025	0.00050	0.0015	0.00050	0.000010	0.0025
W6	6/30/2005				12	123	0.010	0.00050	0.0086	7.41		0.0056	0.00039	0.000025	0.00025	0.0010	0.015	0.000025	0.00045	0.00099	0.00050	0.0000050	0.021
W6	7/29/2005			171	22	198	0.010	0.00050	0.022	8.01		0.0070	0.00026	0.000025	0.00025	0.0025	0.062	0.000083	0.00082	0.00060	0.00050	0.0000050	0.0025
W6	8/30/2005			106	1.5	147	0.010	0.00050	0.0025	8.17		0.0067	0.00025	0.0000085	0.00050	0.0010	0.064	0.00025	0.00050	0.0011	0.00050	0.000010	0.0025
W6	9/28/2005			106	3.5	133	0.010	0.00050	0.0025	7.95		0.0067	0.00025	0.0000085	0.00050	0.0011	0.10	0.00025	0.00050	0.0012	0.00050	0.000010	0.0025
W6	10/15/2005			98	1.5	128	0.010	0.00050	0.0061	7.92		0.077	0.00042	0.000025	0.00025	0.0011	0.088	0.000025	0.00040	0.00118	0.00050	0.0000050	0.0015
W6	6/2/2006				115	96	0.021	0.00050	0.024	7.64		0.025	0.00044	0.000025	0.00025	0.0018	0.096	0.000025	0.00031	0.00182	0.00050	0.0000050	0.0030
W6	8/25/2006		120			160			0.015	8.01													
W6	9/6/2006		110		4.0				0.015	7.86		0.0080	0.00050	0.0000050	0.00060	0.0010	0.11	0.000050	0.00050	0.00060	0.00010		0.0020
W6	6/20/2007			81	16	130	0.025	0.025	0.10	7.77													
W6	9/18/2007			93	8.0	172	0.025	0.010	0.010	7.95													
W6	6/17/2008			86	17	120	0.025	0.070	0.010	7.82													
W6	9/18/2008	18			4.0	150	0.025	0.0050	0.0050	7.80		0.012	0.00040	0.0000050	0.0013	0.0020	0.090	0.000050	0.00027	0.0020	0.0012	0.0000050	0.0030
W6	7/17/2012	8.0	104	163	1130	122	0.14	0.0025	0.026	7.98	7.92	0.016	0.00053	0.0000050	0.00050	0.0011	0.068	0.00010	0.00050	0.0010	0.00012	0.000010	0.0025
W6	7/30/2012	8.1	101	145	614	124	0.070	0.0072	0.052	8.09	7.89	0.019	0.00059	0.0000050	0.00050	0.00089	0.081	0.00010	0.00050	0.00050	0.000050	0.000010	0.0025
W6	8/9/2012		112	136	566	144	0.025	0.0066	0.022	8.17	8.09	0.017	0.00081	0.0000050	0.00050	0.00083	0.085	0.00010	0.00050	0.0010	0.00010	0.000010	0.0025
W6	8/25/2012	7.7	103	161	1160	138	0.023	0.0025	0.045	8.00	7.76	0.014	0.00081	0.0000050	0.00050	0.0010	0.080	0.00010	0.00050	0.0010	0.000050	0.000010	0.0025
W6	9/13/2012	14	88	93	50	118	0.011	0.0025	0.034	8.04	7.95	0.017	0.00047	0.0000050	0.00050	0.0015	0.11	0.00010	0.00050	0.0014	0.000050	0.000010	0.0025
W6	10/13/2012	10		117	45	150	0.016	0.0025	0.042	7.92	8.30												

Table D.2: Background data for Option 1 with median and 95th Percentile values.

Station	Date	DOC (mg/L)	Dissolved Hardness (mg/L)	Total Hardness (mg/L)	TSS (mg/L)	TDS (mg/L)	Ammonia (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Lab pH (pH Units)	Field pH (pH Units)	Dissolved Aluminum (mg/L)	Dissolved Arsenic (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Chromium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)	Dissolved Lead (mg/L)	Dissolved Molybdenum (mg/L)	Dissolved Nickel (mg/L)	Dissolved Selenium (mg/L)	Dissolved Silver (mg/L)	Dissolved Zinc (mg/L)
W6	11/12/2012	8.7	153	155	2.2	162	0.025	0.0025	0.010	7.93	6.69	0.0062	0.00039	0.0000050	0.00050	0.0014	0.024	0.00010	0.00050	0.0014	0.00010	0.000010	0.0025
W6	5/14/2013	22	31	34	13	84	0.13	0.0025	0.010	7.48	7.60	0.059	0.00037	0.000012	0.00050	0.0035	0.18	0.00010	0.00050	0.0013	0.000050	0.000010	0.0025
W6	6/22/2013	7.8	95	115	172	118	0.024	0.013	0.028	8.07	7.61	0.0095	0.00053	0.0000050	0.00050	0.00096	0.072	0.00010	0.00050	0.0012	0.000050	0.000010	0.0025
W6	7/12/2013	8.3	88	95	25	136	0.012	0.0025	0.010	7.90	7.69	0.0066	0.00046	0.0000050	0.00050	0.00095	0.11	0.00010	0.00050	0.0011	0.000050	0.000010	0.0025
W6	8/22/2013	7.4	102	106	20	144	0.014	0.0025	0.010	8.04	7.81	0.0084	0.00052	0.0000050	0.00050	0.0012	0.10	0.00010	0.00050	0.0011	0.000050	0.000010	0.0025
W6	9/6/2013	6.4	101	114	5.2	130	0.0061	0.0025	0.030	7.95	7.60	0.0083	0.00056	0.0000050	0.00050	0.00089	0.11	0.00010	0.00050	0.0011	0.000050	0.000010	0.0025
W6	10/7/2013	8.2	107	106	74	176	0.044	0.0025	0.042	8.08	7.66	0.013	0.00051	0.0000050	0.00050	0.00097	0.15	0.00010	0.00050	0.0013	0.000050	0.000010	0.0025
W6	11/16/2013	8.8	119	123	33	120	0.015	0.0025	0.010	8.11	7.96	0.0057	0.00048	0.0000050	0.00050	0.00084	0.12	0.00010	0.00050	0.0010	0.000050	0.000010	0.0025
W6	12/7/2013	8.8	159	182	3.6	194	0.0076	0.0025	0.010	8.21	7.50	0.0041	0.00061	0.000011	0.00050	0.0016	0.014	0.00010	0.00050	0.0011	0.000050	0.000010	0.0025
W7	5/27/2005			77	31	116	0.010	0.0018	0.082	7.95		0.024	0.00025	0.000025	0.00050	0.0018	0.14	0.00025	0.00050	0.0016	0.00050	0.000010	0.0025
W7	6/30/2005				14	153	0.010	0.0017	0.17	7.87		0.0086	0.00042	0.000025	0.00025	0.0012	0.070	0.00025	0.0012	0.00093	0.00050	0.0000050	0.0064
W7	7/29/2005			167	20	197	0.010	0.00050	0.17	7.18		0.0096	0.00035	0.000025	0.00025	0.0040	0.11	0.00025	0.0013	0.00095	0.00050	0.0000050	0.0020
W7	8/30/2005			109	3.0	148	0.020	0.00050	0.023	8.19		0.016	0.00051	0.0000085	0.00050	0.0014	0.29	0.00025	0.0010	0.0015	0.00050	0.000010	0.0025
W7	9/28/2005			107	361	142	0.010	0.00050	0.059	8.02		0.019	0.00054	0.0000085	0.00050	0.0016	0.32	0.00025	0.00050	0.0018	0.00050	0.000010	0.0025
W7	10/15/2005			106	7.5	145	0.021	0.00050	0.10	6.75		0.016	0.00048	0.000025	0.00025	0.0013	0.25	0.00025	0.00093	0.0015	0.00050	0.0000050	0.00050
W7	6/2/2006				705	104	0.062	0.0015	0.045	7.61		0.071	0.00062	0.000025	0.00055	0.0021	0.55	0.00054	0.00070	0.0022	0.00050	0.0000050	0.00050
W7	6/8/2006																						
W7	6/15/2006		100		53	114	0.027		0.18	7.86		0.013	0.00040	0.0000050	0.00025	0.0010	0.090	0.00050	0.0010	0.0010	0.00020		0.00050
W7	6/23/2006		122		328	176	0.028		0.23	7.78		0.011	0.00050	0.0000050	0.00070	0.00050	0.090	0.00050	0.0010	0.0013	0.00030		0.0020
W7	6/28/2006		107		103	120	0.010		0.11	7.90		0.41	0.00080	0.000030	0.0015	0.0030	0.060	0.00050	0.00050	0.0036	0.00010		0.0050
W7	7/7/2006		110		3.0	184			0.21	7.91		0.0025	0.00060	0.0000050	0.0011	0.0010	0.060	0.00050	0.0020	0.0015	0.00010		0.0010
W7	7/12/2006		110		1.0		0.014		0.18	7.77		0.0060	0.00050	0.0000050	0.0010	0.0010	0.060	0.00050	0.0010	0.00070	0.00020		0.00050
W7	7/20/2006		130		2.0		0.012		0.19	7.88		0.0060	0.00040	0.0000050	0.00070	0.00050	0.11	0.00020	0.0010	0.00060	0.00010		0.00050
W7	7/26/2006		128		9.0		0.016		0.18	7.87		0.0080	0.00040	0.0000050	0.00025	0.0020	0.10	0.00050	0.00050	0.0021	0.00010		0.00050
W7	8/2/2006		128		4.0		0.015		0.15	7.79		0.0080	0.00010	0.0000050	0.00025	0.0010	0.070	0.00050	0.00050	0.00060	0.00010		0.00050
W7	8/10/2006		126		1.0		0.014		0.16	7.80		0.0090	0.00050	0.0000050	0.00070	0.0010	0.080	0.00050	0.0010	0.00060	0.00010		0.0010
W7	8/25/2006		129			180	0.027		0.12	7.92		0.012	0.00040	0.0000050	0.00060	0.0010	0.080	0.00050	0.0010	0.00090	0.00010		0.0030
W7	8/30/2006		132		1.0	200	0.012		0.11	7.79		0.013	0.00040	0.0000050	0.00080	0.0020	0.10	0.00050	0.0010	0.0012	0.00010		0.0050
W7	9/6/2006		130		4.0		0.011		0.080	7.88		0.0050	0.00050	0.0000050	0.00080	0.0020	0.10	0.00050	0.0010	0.0010	0.00010		0.0020
W7	9/13/2006		130		5.0		0.011		0.094	7.84		0.0080	0.00030	0.0000050	0.00090	0.0010	0.11	0.00050	0.0010	0.00090	0.00010		0.0010
W7	9/20/2006		132		3.0		0.0080		0.11	7.85		0.0070	0.00050	0.00028	0.00070	0.0010	0.090	0.00050	0.0010	0.00025	0.00020		0.00050
W7	9/28/2006		129			182	0.011		0.080	7.26		0.011	0.00040	0.0000050	0.00080	0.0010	0.080	0.00050	0.0010	0.00080	0.00010		0.0020
W7	10/4/2006		126		2.0		0.079		0.10	7.94		0.0025	0.00030	0.0000050	0.00025	0.00050	0.11	0.00050	0.0010	0.00070	0.00010		0.0010
W7	10/12/2006		132		4.0	164	0.024		0.12	7.39		0.0070	0.00040	0.0000050	0.00025	0.0010	0.090	0.00050	0.0010	0.00060	0.00030		0.0020
W7	6/5/2007			113	75	162	0.025	0.033	0.050	7.97													
W7	6/20/2007	8.2	110		6.0	164	0.025	0.025	0.30	7.84		0.014	0.00040	0.0000050	0.00060	0.0020	0.050	0.00050	0.0010	0.00025	0.00010		0.0040
W7	7/18/2007	14	128	125	5.7	179	0.025	0.025	0.30	7.78		0.011	0.00050	0.0000050	0.0010	0.0020	0.040	0.00050	0.0010	0.00070	0.00010		0.0060
W7	8/24/2007			124	4.7	192	0.025	0.025	0.20	8.04													
W7	9/18/2007	11	110		20	182	0.025	0.010	0.050	8.00		0.0070	0.00040	0.0000050	0.0016	0.0010	0.080	0.00050	0.0020	0.00080	0.00010		0.0020
W7	10/30/2007			129	6.5	174	0.025	0.14	0.010	7.73													
W7	4/22/2008		187		1.0	268	0.025	0.055	0.010	8.40		0.010	0.00027	0.000040	0.00097	0.0012	0.030	0.00067	0.0017	0.0010	0.00030		0.0017
W7	6/3/2008		92	98	15	137	0.025	0.040	0.037	8.02		0.0050	0.00010	0.000040	0.0013	0.00050	0.050	0.00050	0.0012	0.0010	0.00030	0.0000050	0.0020
W7	6/17/2008				10	156	0.025	0.050	0.14	7.95		0.020	0.00010	0.000040	0.0013	0.0010	0.070	0.00050	0.0015	0.0010	0.00220	0.0000050	0.0020
W7	8/6/2008	9.0	123	124	105	167	0.025	0.0050	0.14	7.92		0.014	0.00040	0.0000050	0.00060	0.0020	0.070	0.00050	0.0010	0.0010	0.00010	0.000060	0.0060
W7	9/18/2008	17			28	170	0.025	0.0050	0.030	7.89		0.070	0.00030	0.0000050	0.0016	0.0040	0.20	0.0017	0.00072	0.0010	0.00030	0.0000050	0.0030
W7	10/28/2008	11	123		5.7	183	0.025			7.84		0.0090	0.00050	0.0000050	0.00050	0.0010	0.078	0.00050	0.0011	0.0010	0.00030	0.0000050	0.0010
W7	4/30/2009	18	20		1.0	52				6.84	7.60	0.053	0.00010	0.000080	0.00060	0.0050	0.070	0.00010	0.00013	0.00050	0.00030	0.0000050	0.0090
W7	6/8/2009	9.2	93		32	156				7.90	7.74	0.013	0.00030	0.0000050	0.00020	0.0020	0.050	0.00050	0.0013	0.0010	0.00030	0.0000050	0.0020
W7	7/28/2009		137		4.0	184				8.07													

Table D.2: Background data for Option 1 with median and 95th Percentile values.

Station	Date	DOC (mg/L)	Dissolved Hardness (mg/L)	Total Hardness (mg/L)	TSS (mg/L)	TDS (mg/L)	Ammonia (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Lab pH (pH Units)	Field pH (pH Units)	Dissolved Aluminum (mg/L)	Dissolved Arsenic (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Chromium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)	Dissolved Lead (mg/L)	Dissolved Molybdenum (mg/L)	Dissolved Nickel (mg/L)	Dissolved Selenium (mg/L)	Dissolved Silver (mg/L)	Dissolved Zinc (mg/L)
W7	8/6/2009		121		2.0	202			0.18	8.35	7.50												
W7	8/25/2009	8.2									8.04												
W7	8/31/2009		110									0.010	0.00040	0.0000050	0.0012	0.0040	0.10	0.00040	0.0011	0.0010	0.00030	0.0000050	0.0010
W7	10/7/2009	7.8	125	141	3.7	140	0.010	0.0025	0.14	7.99	8.24	0.0070	0.00030	0.000040	0.00050	0.0012	0.046	0.00010	0.0010	0.00050	0.00020	0.000010	0.0025
W7	10/25/2009	8.7	126	141	2.0	120	0.010	0.0025	0.15	8.05	8.23	0.0070	0.00030	0.000040	0.00050	0.0012	0.046	0.00010	0.0010	0.00050	0.00020	0.000010	0.0025
W7	4/19/2010			80	3.5	142				7.81	7.31	0.019	0.00030	0.000020	0.00040	0.0060	0.090	0.00030	0.00080	0.00050	0.00030	0.0000050	0.0050
W7	4/27/2010	23	36	35	2.0	62	0.015	0.0025	0.010	7.60	7.65	0.075	0.00030	0.0000050	0.00050	0.0041	0.15	0.00010	0.00050	0.0010	0.000050	0.000010	0.0025
W7	4/29/2010	19	36	36	2.0	62	0.016	0.0050	0.020	7.50	7.72	0.065	0.00030	0.0000050	0.00050	0.0034	0.18	0.00010	0.00050	0.0010	0.000050	0.000010	0.0025
W7	5/1/2010	19	41	44	15	74	0.031	0.0080	0.070	7.70	7.15	0.053	0.00040	0.000020	0.00050	0.0032	0.26	0.00010	0.00050	0.0010	0.000050	0.000010	0.0025
W7	5/3/2010	22	45	46	12	80	0.016	0.0025	0.010	7.70	7.74	0.047	0.00040	0.0000050	0.00050	0.0027	0.38	0.00010	0.00050	0.0010	0.000050	0.000010	0.0025
W7	5/5/2010	15	49	55	12	76	0.0050	0.0025	0.010	7.80		0.038	0.00050	0.0000050	0.00050	0.0025	0.57	0.00010	0.00050	0.0010	0.000050	0.000010	0.0025
W7	5/7/2010	13	57	56	18	62	0.051	0.0070	0.10	7.80	7.95	0.028	0.00040	0.000010	0.00050	0.0026	0.36	0.00010	0.00050	0.0020	0.000050	0.000010	0.0025
W7	5/9/2010	13	80	71	2.0	130	0.0025	0.0025	0.070	8.00	8.03	0.023	0.00040	0.0000050	0.00050	0.0018	0.30	0.00010	0.00050	0.0010	0.000010	0.000010	0.0025
W7	5/10/2010	12	81	90	2.0	130	0.015	0.0060	0.13	8.10	8.06	0.021	0.00040	0.000020	0.00050	0.0022	0.28	0.00010	0.00050	0.0010	0.000010	0.000010	0.0025
W7	5/12/2010	10	82	85	2.0	100	0.025	0.0025	0.030	8.00		0.017	0.00040	0.0000050	0.00050	0.0016	0.17	0.00010	0.0010	0.0010	0.00010	0.000010	0.0025
W7	5/14/2010	9.2	73	71	15	130	0.034	0.0025	0.010	8.10	7.26	0.096	0.00040	0.000010	0.00050	0.0031	0.34	0.00010	0.00050	0.0020	0.00010	0.000010	0.0025
W7	5/16/2010	8.8	86	76	12	120	0.068	0.0025	0.030	8.30	7.32	0.012	0.00030	0.0000050	0.00050	0.0013	0.080	0.00010	0.0010	0.00050	0.00010	0.000010	0.0025
W7	5/17/2010	7.2	80	76	11	130	0.037	0.0025	0.010	8.20	7.52	0.018	0.00040	0.0000050	0.00050	0.0012	0.068	0.00010	0.0010	0.00050	0.00010	0.000010	0.0025
W7	5/19/2010	7.5	99	103	4.0	120	0.020	0.0025	0.060	8.20	7.62	0.016	0.00030	0.0000050	0.00050	0.0017	0.069	0.00010	0.0010	0.00050	0.00030	0.000010	0.0025
W7	5/21/2010	8.7	92	96	22	120	0.017	0.0025	0.050	8.10	8.02	0.013	0.00020	0.000050		0.0010	0.057	0.00010	0.0010	0.0010	0.00040		0.0050
W7	5/23/2010	8.2	98	103	33	150	0.013	0.0060	0.060	8.10	7.61	0.017	0.00020	0.000050		0.0010	0.069	0.00010	0.0010	0.0010	0.00040		0.0050
W7	5/25/2010	8.1	125	124	140	140	0.070	0.025	0.080	7.90	7.24	0.024	0.00050	0.000050		0.0030	0.062	0.00010	0.0020	0.0015	0.00050		0.0050
W7	5/27/2010	8.1	113	148	350	140	0.052	0.0025	0.13	8.00	7.53	0.028	0.00050	0.000050		0.0030	0.069	0.00010	0.0020	0.0015	0.00050		0.0050
W7	5/29/2010	6.3	111	129	200	160	0.10	0.011	0.22	8.20	7.73	0.017	0.00050	0.000050		0.0020	0.051	0.00010	0.0020	0.0010	0.00040		0.0050
W7	5/31/2010	7.2	109	130	290	160	0.025	0.023	0.12	8.20	7.83	0.020	0.00020	0.000050		0.0020	0.050	0.00010	0.0020	0.00050	0.00040		0.0050
W7	6/2/2010	4.9	113	135	81	140	0.0050	0.023	0.14	8.20	7.26	0.012	0.00040	0.000050		0.0010	0.030	0.00010	0.0020	0.00050	0.00040		0.0050
W7	6/4/2010	6.4	111	125	60	140	0.34	0.014	0.16	8.20	7.48	0.013	0.00040	0.000050		0.0010	0.030	0.00010	0.0020	0.00050	0.00040		0.0050
W7	6/6/2010		128	133	39	170	0.10	0.013	0.16	8.20		0.0050	0.00020	0.000050		0.0010	0.024	0.00010	0.0020	0.00050	0.00040		0.0050
W7	6/14/2010	5.9	122	128	43	150	0.016	0.0025	0.16	8.29		0.011	0.00020	0.000050		0.00050	0.025	0.00010	0.0020	0.00050	0.00040		0.0050
W7	6/16/2010	6.1	120	128	17	150	0.016	0.0025	0.17	8.30	6.78	0.0050	0.00020	0.000050		0.00050	0.026	0.00010	0.0020	0.00050	0.00040		0.0050
W7	6/18/2010	6.2	122	123	28	140		0.0025	0.15	8.17	7.03	0.0050	0.00020	0.000050		0.00050	0.023	0.00010	0.0020	0.00050	0.00040		0.0050
W7	6/20/2010	7.6	112	118	33	140		0.0080	0.13	8.20	7.10	0.014	0.00020	0.000050		0.0010	0.028	0.00010	0.0020	0.00050	0.00040		0.0050
W7	6/22/2010	10	98	115	300	140	0.014	0.0025	0.12	8.03	7.92	0.033	0.00050	0.000050		0.0020	0.082	0.00010	0.0010	0.0010	0.00040		0.0050
W7	6/24/2010	10	100	116	64	130	0.012	0.0070	0.070	8.03	7.95	0.018	0.00020	0.000050		0.0010	0.056	0.00010	0.0010	0.0010	0.00040		0.0050
W7	6/26/2010	9.3	106	106	21	120	0.0090	0.0025	0.10	8.26	8.03	0.012	0.00040	0.000050		0.0010	0.038	0.00010	0.0010	0.0040	0.00040		0.0050
W7	6/28/2010	8.7	114	107	9.0	150	0.022	0.0025	0.13	8.03	7.89	0.0050	0.00020	0.000050		0.0010	0.028	0.00010	0.0010	0.00050	0.00040		0.0050
W7	7/5/2010	16	93	106	53	150	0.027	0.0025	0.070	8.06	8.02	0.019	0.00020	0.000050		0.0020	0.10	0.00010	0.0010	0.0010	0.00040		0.0050
W7	8/5/2010	13	118	116		170					7.91	0.011	0.00040	0.000050		0.0020	0.11	0.00010	0.0010	0.0010	0.00040		0.0050
W7	9/12/2010	17	107	104	11	210	0.039	0.0025	0.030	7.98	8.02	0.016	0.00050	0.000050		0.0010	0.23	0.00010	0.0010	0.0020	0.00040		0.0050
W7	10/8/2010	13	111	126	3.0	150	0.069	0.0025	0.070	8.10	7.85	0.011	0.00040	0.0000050	0.00050	0.0012	0.13	0.00010	0.0010	0.0010	0.00010	0.000010	0.0025
W7	4/27/2011	23	43	43	0.5	72	0.010	0.0025	0.010	7.41		0.057	0.00030	0.000030	0.00050	0.0077	0.15	0.00010	0.00050	0.0010	0.000050	0.000010	0.0050
W7	5/2/2011	22	32	33	7.0	40		0.0025	0.010	7.11		0.076	0.00020	0.000040	0.00050	0.0070	0.17	0.00010	0.00050	0.0010	0.000050	0.000010	0.010
W7	6/1/2011	11	92	94	23	120	0.012			8.09		0.013	0.00030	0.0000050	0.00050	0.0016	0.099	0.00010	0.0010	0.0010	0.00010	0.000010	0.0025
W7	6/16/2011	13	97	108	85	130	0.013	0.0025	0.10	8.00		0.022	0.00040	0.0000050	0.00050	0.0019	0.21	0.00010	0.0010	0.0020	0.00010	0.000010	0.0025
W7	7/1/2011	21	77	88	150	120	0.016	0.0070	0.050	7.76		0.034	0.00070	0.000010	0.00050	0.0031	0.44	0.00010	0.00050	0.0020	0.00010	0.000010	0.0025
W7	8/2/2011	24	59	86	400	110		0.0025	0.060	7.67		0.051	0.00070	0.000020	0.00050	0.0041	0.61	0.00010	0.00050	0.0030	0.00010	0.000010	0.0025
W7	8/16/2011	18	98	97	22	150	0.015	0.0025	0.060	7.90		0.036	0.00070	0.0000050	0.00050	0.0019	0.59	0.00010	0.00050	0.0020	0.00010	0.000010	0.0025
W7	8/19/2011	19	93	93	22	140	0.0060	0.0025	0.040	8.12		0.033	0.00080	0.000010	0.00050	0.0020	0.56	0.00010	0.00050	0.0020	0.00010	0.000010	0.0025
W7	9/12/2011	13	118	119	1.0	170	0.025	0.0025	0.050	8.03	7.92	0.024	0.00070	0.000010	0.00050	0.0016	0.62	0.00010	0.00050	0.0020	0.00010	0.000010	0.0025

Table D.2: Background data for Option 1 with median and 95th Percentile values.

Station	Date	DOC (mg/L)	Dissolved Hardness (mg/L)	Total Hardness (mg/L)	TSS (mg/L)	TDS (mg/L)	Ammonia (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Lab pH (pH Units)	Field pH (pH Units)	Dissolved Aluminum (mg/L)	Dissolved Arsenic (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Chromium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)	Dissolved Lead (mg/L)	Dissolved Molybdenum (mg/L)	Dissolved Nickel (mg/L)	Dissolved Selenium (mg/L)	Dissolved Silver (mg/L)	Dissolved Zinc (mg/L)
W7	10/6/2011	12	110	113	2.0	150	0.019	0.0025	0.11	8.07	7.65	0.013	0.00060	0.000030	0.00050	0.0012	0.35	0.00010	0.0010	0.0010	0.00010	0.000010	0.0025
W7	11/22/2011	7.7	148	144	27	156	0.021	0.0025	0.14	7.96		0.0076	0.00040	0.0000050	0.00050	0.0011	0.17	0.00010	0.0013	0.0012	0.00016	0.000010	0.0025
W7	1/24/2012	5.3	169	158	2.0	226	0.0050	0.0025	0.32	8.13		0.0053	0.00041	0.000035	0.00050	0.0011	0.094	0.00010	0.0015	0.00050	0.00043	0.000010	0.0025
W7	2/25/2012	6.1	165	160	2.0	216	0.0060	0.0025	0.29	7.99	7.16	0.021	0.00033	0.000064	0.00050	0.015	0.049	0.00024	0.0014	0.00050	0.00034	0.000010	0.0083
W7	3/5/2012	5.2	161	159	3.2	176	0.0067	0.0025	0.20	8.17	6.72	0.0031	0.00039	0.0000050	0.00050	0.0012	0.012	0.00010	0.0011	0.00050	0.00031	0.000010	0.0025
W7	4/24/2012	14	39	37	11	100	0.0025	0.010	0.010	7.63	7.43	0.050	0.00048	0.000023	0.00050	0.0052	0.48	0.00010	0.00050	0.0012	0.000050	0.000010	0.0025
W7	5/6/2012	17	46	45	3.3	84	0.011	0.0025	0.010	5.90	7.10	0.037	0.00044	0.000015	0.00050	0.0029	0.44	0.00010	0.00050	0.0012	0.000050	0.000010	0.0025
W7	6/19/2012	16	92	105	165	128	0.18	0.015	0.083	8.12	7.59	0.027	0.00070	0.0000050	0.00050	0.0016	0.56	0.00010	0.0013	0.0020	0.00015	0.000010	0.0025
W7	7/17/2012	13	128	124	34	164	0.065	0.0025	0.089	8.15	7.76	0.020	0.00086	0.000012	0.00050	0.0013	0.97	0.00010	0.0015	0.0016	0.00013	0.000010	0.0025
W7	7/30/2012	13	135	128	9.2	180	0.13	0.0025	0.12	8.20	7.86	0.017	0.00095	0.0000050	0.00050	0.0012	0.96	0.00010	0.0015	0.0015	0.00016	0.000010	0.0025
W7	8/8/2012	13	141	141	3.3	192	0.014	0.0025	0.13	8.26	8.44	0.018	0.0010	0.0000050	0.00050	0.0011	1.1	0.00010	0.0016	0.0017	0.00014	0.000010	0.0025
W7	8/23/2012	10	142	151	1.5	200	0.049	0.025	0.21	8.25	7.79	0.018	0.00088	0.0000050	0.00050	0.0017	0.98	0.00010	0.0016	0.0016	0.00015	0.000010	0.0025
W7	9/13/2012	16	116	121	15	154	0.0087	0.0025	0.078	8.13	7.98	0.024	0.00074	0.0000050	0.00050	0.0024	0.73	0.00010	0.00050	0.0036	0.00014	0.000010	0.0025
W7	10/16/2012	13	129	143	10	166	0.028	0.0025	0.13	8.17	7.89	0.011	0.00060	0.0000050	0.00050	0.00094	0.60	0.00010	0.0011	0.0015	0.00014	0.000010	0.0025
W7	11/2/2012	8.2	158	153	2.2	214	0.026	0.0025	0.22	7.93		0.0095	0.00053	0.000031	0.00050	0.0024	0.18	0.00021	0.0013	0.0012	0.00018	0.000010	0.0025
W7	12/29/2012	10	223	206	0.50	262	0.025	0.0025	0.063	8.13	7.97	0.0061	0.00051	0.0000050	0.00050	0.0023	0.030	0.00010	0.0012	0.0011	0.00045	0.000010	0.0025
W7	4/30/2013	4.6	192	198	5.8	246	0.0082	0.0025	0.13	8.27	8.18	0.0031	0.00025	0.0000050	0.00050	0.0011	0.014	0.00010	0.0013	0.00050	0.00043	0.000010	0.0025
W7	5/14/2013	15	33	36	55	70	0.066	0.0025	0.010	7.58	8.20	0.044	0.00029	0.000010	0.00050	0.0037	0.31	0.00010	0.00050	0.0010	0.000050	0.000010	0.0025
W7	6/19/2013	11	114	115	11	158	0.046	0.0025	0.14	8.08	8.60	0.013	0.00052	0.0000050	0.00050	0.0012	0.29	0.00010	0.0016	0.0013	0.00015	0.000010	0.0025
W7	7/13/2013	10	132	137	5.0	156	0.023	0.0025	0.17	8.10	7.74	0.014	0.00053	0.0000050	0.00050	0.0012	0.42	0.00010	0.0015	0.0013	0.00015	0.000010	0.0025
W7	8/21/2013	10	140	144	3.8	172	0.051	0.0025	0.16	8.23	7.81	0.012	0.00056	0.0000050	0.00050	0.0010	0.30	0.00010	0.0015	0.0012	0.00015	0.000010	0.0025
W7	9/6/2013	11	138	154	12	280	0.017	0.0025	0.13	8.02	7.75	0.016	0.00081	0.0000050	0.00050	0.0011	0.66	0.00010	0.0013	0.0016	0.00017	0.000010	0.0025
W7	10/21/2013	12	147	126	7.4	168	0.048	0.0025	0.17	8.16	7.58	0.0093	0.00067	0.0000050	0.00050	0.0011	0.55	0.00010	0.0012	0.0012	0.00017	0.000010	0.0025
W7	11/16/2013	7.5	153	164	1.5	164	0.027	0.0025	0.26	8.24	7.69	0.0053	0.00048	0.0000050	0.00050	0.00080	0.17	0.00010	0.0016	0.00050	0.00024	0.000010	0.0025
W7	12/7/2013	7.3	168	189	0.50	220	0.025	0.0025	0.21	8.14	6.30	0.0035	0.00053	0.0000050	0.00050	0.00078	0.11	0.00010	0.0011	0.00050	0.00024	0.000010	0.0025
C4	5/6/2012	11	44	119	1,260	84	0.088	0.0025	0.029	7.59	7.51	0.062	0.00104	0.000029	0.00050	0.0031	1.1	0.00010	0.00050	0.0023	0.000050	0.000010	0.0025
C4	8/1/2012	16	117	133	246	166	0.089	0.018	0.074	8.04	7.75	0.059	0.00184	0.0000050	0.00050	0.0018	1.5	0.00010	0.0011	0.0031	0.00011	0.000010	0.0025
C4	8/8/2012		125	142	253	170	0.090	0.012	0.095	8.14	7.81	0.043	0.00203	0.0000050	0.00050	0.0013	1.6	0.00010	0.0011	0.0027	0.00011	0.000010	0.0025
C4	8/25/2012	0.25	130	173	855	192	0.0050	0.0025	0.010	7.94	7.81	0.040	0.0020	0.0000050	0.00050	0.0018	1.7	0.00010	0.0012	0.0029	0.000050	0.000010	0.0025
C4	6/22/2013	17	126	222	886	204	0.36	0.0066	0.37	7.97	7.68	0.034	0.0023	0.0000050	0.00050	0.0017	1.2	0.00010	0.0018	0.0027	0.00013	0.000010	0.0025
C4	7/19/2013		128	200	487	184	0.26	0.0069	0.082	8.12	8.20	0.032	0.0021	0.0000050	0.00050	0.0014	1.6	0.00010	0.0017	0.0025	0.00012	0.000010	0.0025
C4	8/22/2013	19	123	199	784	182	0.20	0.0084	0.086	7.98	7.88	0.046	0.0018	0.0000050	0.00050	0.0014	1.4	0.00010	0.0013	0.0027	0.00012	0.000010	0.0025
C4	9/6/2013	15	125	166	172	176	0.12	0.0025	0.070	7.93	7.69	0.041	0.0020	0.0000050	0.00050	0.0016	1.8	0.00010	0.0010	0.0028	0.000050	0.000010	0.0025
C4	10/18/2013	13	129	141	16	217	0.086	0.0025	0.067	8.21	7.16	0.024	0.0011	0.0000050	0.00050	0.0012	1.2	0.00010	0.00085	0.0024	0.000050	0.000010	0.0025
C4	11/17/2013	32	258	264	22	272	0.28	0.025	0.10	7.90	7.17	0.033	0.0056	0.000022	0.0013	0.00095	14	0.00010	0.0011	0.0061	0.00024	0.000010	0.0025
C10	5/12/2012	13	67	215	2,210	132	0.18	0.011	0.047	7.73	7.89	0.058	0.0012	0.000018	0.00050	0.0021	1.6	0.00025	0.00050	0.0019	0.00010	0.000010	0.0025
C10	7/30/2012	18	130	207	995	180	0.20	0.023	0.18	8.23		0.057	0.0014	0.0000050	0.00050	0.0020	1.2	0.00067	0.0014	0.0023	0.00014	0.000010	0.0025
C10	8/10/2012		135	245	1,320	216	0.12	0.011	0.18	8.11	8.71	0.051	0.0013	0.0000050	0.00050	0.0019	0.88	0.00010	0.0019	0.0022	0.00010	0.000010	0.0025
C10	8/27/2012	18	141	264	1,650	184	0.0025	0.0086	0.095	8.37	8.30	0.026	0.0015	0.0000050	0.00050	0.0015	1.0	0.00010	0.0011	0.0023	0.00012	0.000010	0.0025
C10	6/22/2013	15	148	151	43	192	0.19	0.020	0.15	8.26	8.29	0.079	0.0012	0.000019	0.00050	0.0031	0.80	0.00010	0.0012	0.0025	0.00011	0.000010	0.010
C10	7/23/2013		125	156	199	174	0.14	0.025	0.10	8.19	8.31	0.025	0.0012	0.0000050	0.00050	0.0014	0.54	0.00010	0.0010	0.0022	0.000050	0.000010	0.0025
C10	8/22/2013	17	160	168	66	218	0.056	0.0072	0.14	8.23	8.18	0.020	0.0014	0.0000050	0.00050	0.0013	0.99	0.00010	0.0015	0.0023	0.000050	0.000010	0.0025
C10	9/8/2013	16	150	163	24	196	0.051	0.0073	0.18	8.04	8.16	0.025	0.0016	0.0000075	0.0011	0.0013	1.3	0.00010	0.00050	0.0025	0.000050	0.000010	0.0025
C10	10/18/2013	14	136	160	61	212	0.10	0.0025	0.17	8.25	7.78	0.011	0.00089	0.0000050	0.00050	0.00091	0.76	0.00010	0.00050	0.0019	0.000050	0.000010	0.0025
Median:		11	117	121	11	150	0.021	0.0025	0.067	8.00	7.76	0.016	0.00044	0.0000085	0.00050	0.0016	0.11	0.00010	0.0010	0.0011	0.00020	0.000010	0.0025
95th Percentile:		22	162	200	772	217	0.15	0.025	0.21	8.26	8.30	0.071	0.0015	0.0000050	0.0011	0.0050	1.2	0.00025	0.0020	0.0027	0.00050	0.000010	0.0060

Table D.3: Background data for Option 2 with median and 95th Percentile values.

Year	Month	Day	DOC (mg/L)	Dissolved Hardness (mg/L)	Total Hardness (mg/L)	TSS (mg/L)	TDS (mg/L)	Ammonia (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Lab pH (pH Units)	Field pH (pH Units)	Dissolved Aluminum (mg/L)	Dissolved Arsenic (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Chromium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)	Dissolved Lead (mg/L)	Dissolved Molybdenum (mg/L)	Dissolved Nickel (mg/L)	Dissolved Selenium (mg/L)	Dissolved Silver (mg/L)	Dissolved Zinc (mg/L)	
2005	May	27			78	22	118	0.016	0.0012	0.038	7.92		0.028	0.00029	0.000025	0.00050	0.0034	0.15	0.00025	0.00050	0.0015	0.00050	0.000010	0.0025	
	June	30				5.4	160	0.015	0.00067	0.052	7.83		0.026	0.00046	0.000025	0.00030	0.0023	0.16	0.000064	0.00085	0.0011	0.00050	0.0000050	0.0091	
	July	28/29			138	11	173	0.010	0.00050	0.042	7.73		0.020	0.00041	0.000025	0.00025	0.0033	0.16	0.000075	0.0011	0.0011	0.00050	0.0000050	0.0030	
	August	29/30			110	4.9	157	0.029	0.00066	0.010	8.10		0.022	0.00043	0.000010	0.00050	0.0026	0.27	0.00025	0.00083	0.0014	0.00050	0.000010	0.0029	
	September	28			111	58	151	0.012	0.00057	0.025	7.83		0.024	0.00039	0.0000085	0.00050	0.0027	0.31	0.00025	0.00059	0.0013	0.00050	0.000010	0.0025	
	October	15			111	5.5	151	0.015	0.00050	0.060	7.64		0.033	0.00044	0.000025	0.00025	0.0029	0.25	0.000025	0.00069	0.0012	0.00050	0.0000050	0.0013	
2006	June	2				410	100	0.042	0.0010	0.035	7.63		0.048	0.00053	0.000025	0.00040	0.0019	0.32	0.000040	0.00050	0.0020	0.00050	0.0000050	0.0018	
		8																							
		15		100		53	114	0.027		0.18	7.86		0.013	0.00040	0.0000050	0.00025	0.0010	0.090	0.000050	0.0010	0.0010	0.00020		0.00050	
		23		122		328	176	0.028		0.23	7.78		0.011	0.00050	0.0000050	0.00070	0.00050	0.090	0.000050	0.0010	0.0013	0.00030		0.0020	
	July	28		107		103	120	0.010		0.11	7.90		0.41	0.00080	0.000030	0.0015	0.0030	0.060	0.00050	0.00050	0.0036	0.00010		0.0050	
		7		110		3.0	184			0.21	7.91		0.0025	0.00060	0.0000050	0.0011	0.0010	0.060	0.000050	0.0020	0.0015	0.00010		0.0010	
		12		110		1.0		0.014		0.18	7.77		0.0060	0.00050	0.0000050	0.0010	0.0010	0.060	0.000050	0.0010	0.00070	0.00020		0.00050	
		20		130		2.0		0.012		0.19	7.88		0.0060	0.00040	0.0000050	0.00070	0.00050	0.11	0.00020	0.0010	0.00060	0.00010		0.00050	
	August	26		128		9.0		0.016		0.18	7.87		0.0080	0.00040	0.0000050	0.00025	0.0020	0.10	0.000050	0.00050	0.0021	0.00010		0.00050	
		2		128		4.0		0.015		0.15	7.79		0.0080	0.00010	0.0000050	0.00025	0.0010	0.070	0.000050	0.00050	0.00060	0.00010		0.00050	
		10		126		1.0		0.014		0.16	7.80		0.0090	0.00050	0.0000050	0.00070	0.0010	0.080	0.000050	0.0010	0.00060	0.00010		0.0010	
		25		125			170	0.027		0.068	7.97		0.012	0.00040	0.0000050	0.00060	0.0010	0.080	0.000050	0.0010	0.00090	0.00010		0.0030	
	September	30		132		1.0	200	0.012		0.11	7.79		0.013	0.00040	0.0000050	0.00080	0.0020	0.10	0.000050	0.0010	0.0012	0.00010		0.0050	
		6		120		4.0		0.011		0.048	7.87		0.0065	0.00050	0.0000050	0.00070	0.0015	0.11	0.000050	0.00075	0.00080	0.00010		0.0020	
		13		130		5.0		0.011		0.094	7.84		0.0080	0.00030	0.0000050	0.00090	0.0010	0.11	0.000050	0.0010	0.00090	0.00010		0.0010	
		20		132		3.0		0.008		0.11	7.85		0.0070	0.00050	0.00028	0.00070	0.0010	0.090	0.000050	0.0010	0.00025	0.00020		0.00050	
	October	28		129			182	0.011		0.080	7.26		0.011	0.00040	0.0000050	0.00080	0.0010	0.080	0.000050	0.0010	0.00080	0.00010		0.0020	
		4		126		2.0		0.079		0.10	7.94		0.0025	0.00030	0.0000050	0.00025	0.00050	0.11	0.000050	0.0010	0.00070	0.00010		0.0010	
		12		132		4.0	164	0.024		0.12	7.39		0.0070	0.00040	0.0000050	0.00025	0.0010	0.090	0.000050	0.0010	0.00060	0.00030		0.0020	
2007	June	5			113	75	162	0.025	0.033	0.050	7.97														
		20	8.2	110	81	11	147	0.025	0.025	0.20	7.81		0.014	0.00040	0.0000050	0.00060	0.0020	0.050	0.000050	0.0010	0.00025	0.00010		0.0040	
	July	18	14	128	125	5.7	179	0.025	0.025	0.30	7.78		0.011	0.00050	0.0000050	0.0010	0.0020	0.040	0.000050	0.0010	0.00070	0.00010		0.0060	
	August	24			124	4.7	192	0.025	0.025	0.20	8.04														
	September	18	11	110	93	14	177	0.025	0.010	0.030	7.98		0.0070	0.00040	0.0000050	0.0016	0.0010	0.080	0.000050	0.0020	0.00080	0.00010		0.0020	
October	30			129	6.5	174	0.025	0.14	0.010	7.73															
2008	April	22		187		1.0	268	0.025	0.055	0.010	8.40		0.010	0.00027	0.000040	0.00097	0.0012	0.030	0.000067	0.0017	0.0010	0.00030		0.0017	
	June	3		92	98	15	137	0.025	0.040	0.037	8.02		0.0050	0.00010	0.000040	0.0013	0.00050	0.050	0.000050	0.0012	0.0010	0.00030	0.0000050	0.0020	
		17			86	14	138	0.025	0.060	0.075	7.89		0.020	0.00010	0.000040	0.0013	0.0010	0.070	0.000050	0.0015	0.0010	0.0022	0.0000050	0.0020	
	August	6	9.0	123	124	105	167	0.025	0.0050	0.14	7.92		0.014	0.00040	0.0000050	0.00060	0.0020	0.070	0.000050	0.0010	0.0010	0.00010	0.000060	0.0060	
	September	18	18			16	160	0.025	0.0050	0.018	7.85		0.041	0.00035	0.0000050	0.0015	0.0030	0.15	0.00088	0.00050	0.0015	0.00075	0.0000050	0.0030	
October	28	11	123		5.7	183	0.025			7.84		0.0090	0.00050	0.0000050	0.00050	0.0010	0.078	0.000050	0.0011	0.0010	0.00030	0.0000050	0.0010		
2009	April	30	18	20		1.0	52				6.84	7.60	0.053	0.00010	0.000080	0.00060	0.0050	0.070	0.00010	0.00013	0.00050	0.00030	0.0000050	0.0090	
	June	8	9.2	93		32	156				7.90	7.74	0.013	0.00030	0.0000050	0.00020	0.0020	0.050	0.000050	0.0013	0.0010	0.00030	0.0000050	0.0020	
	July	27		137		4.0	184				8.07														
	August	6		121		2.0	202				0.18	8.35	7.50												
		31		110										0.010	0.00040	0.0000050	0.0012	0.0040	0.10	0.00040	0.0011	0.0010	0.00030	0.0000050	0.0010
	October	7	7.8	125	141	3.7	140	0.010	0.0025	0.14	7.99	8.24	0.0070	0.00030	0.000040	0.00050	0.0012	0.046	0.00010	0.0010	0.00050	0.00020	0.000010	0.0025	
25		8.7	126	141	2.0	120	0.010	0.0025	0.15	8.05	8.23	0.0070	0.00030	0.000040	0.00050	0.0012	0.046	0.00010	0.0010	0.00050	0.00020	0.000010	0.0025		

Table D.3: Background data for Option 2 with median and 95th Percentile values.

Year	Month	Day	DOC (mg/L)	Dissolved Hardness (mg/L)	Total Hardness (mg/L)	TSS (mg/L)	TDS (mg/L)	Ammonia (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Lab pH (pH Units)	Field pH (pH Units)	Dissolved Aluminum (mg/L)	Dissolved Arsenic (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Chromium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)	Dissolved Lead (mg/L)	Dissolved Molybdenum (mg/L)	Dissolved Nickel (mg/L)	Dissolved Selenium (mg/L)	Dissolved Silver (mg/L)	Dissolved Zinc (mg/L)
2010	April	19			80	3.5	142				7.81	7.31	0.019	0.00030	0.000020	0.00040	0.0060	0.090	0.00030	0.00080	0.00050	0.00030	0.0000050	0.0050
		27/29	21	36	36	2.0	62	0.016	0.0038	0.015	7.55	7.69	0.070	0.00030	0.0000050	0.00050	0.0038	0.17	0.00010	0.00050	0.0010	0.000050	0.000010	0.0025
	May	1-7	17	48	50	14	73	0.026	0.0050	0.048	7.75	7.61	0.042	0.00043	0.000010	0.00050	0.0028	0.39	0.00010	0.00050	0.0013	0.000050	0.000010	0.0025
		9-14	11	79	79	5.3	123	0.019	0.0034	0.060	8.05	7.78	0.039	0.00040	0.000010	0.00050	0.0022	0.27	0.00010	0.00063	0.0013	0.00010	0.000010	0.0025
		16-21	8.1	89	88	12	123	0.036	0.0025	0.038	8.20	7.62	0.015	0.00030	0.000016	0.00050	0.0013	0.069	0.00010	0.0010	0.00063	0.00023	0.000010	0.0031
		23-29	7.7	112	126	181	148	0.059	0.011	0.12	8.05	7.53	0.022	0.00043	0.000050		0.0023	0.063	0.00010	0.0018	0.0013	0.00045		0.0050
	May/June	31-6	6.2	115	131	118	153	0.12	0.018	0.15	8.20	7.52	0.013	0.00030	0.000050		0.0013	0.034	0.00010	0.0020	0.00050	0.00040		0.0050
	June	14-20	6.5	119	124	30	145	0.016	0.0039	0.15	8.24	6.97	0.0088	0.00020	0.000050		0.00063	0.026	0.00010	0.0020	0.00050	0.00040		0.0050
		22-28	10	104	111	99	135	0.014	0.0036	0.11	8.09	7.95	0.017	0.00033	0.000050		0.0013	0.051	0.00010	0.0010	0.0016	0.00040		0.0050
	July	5	16	93	106	53	150	0.027	0.0025	0.070	8.06	8.02	0.019	0.00020	0.000050		0.0020	0.10	0.00010	0.0010	0.0010	0.00040		0.0050
August	5	13	118	116		170					7.91	0.011	0.00040	0.000050		0.0020	0.11	0.00010	0.0010	0.0010	0.00040		0.0050	
September	12	17	107	104	11	210	0.039	0.0025	0.030	7.98	8.02	0.016	0.00050	0.000050		0.0010	0.23	0.00010	0.0010	0.0020	0.00040		0.0050	
October	8	13	111	126	3.0	150	0.069	0.0025	0.070	8.10	7.85	0.011	0.00040	0.0000050	0.00050	0.0012	0.13	0.00010	0.0010	0.0010	0.00010	0.000010	0.0025	
2011	April	27	23	43	43	0.50	72	0.010	0.0025	0.010	7.41		0.057	0.00030	0.000030	0.00050	0.0077	0.15	0.00010	0.00050	0.0010	0.000050	0.000010	0.0050
	May	2	22	32	33	7.0	40		0.0025	0.010	7.11		0.076	0.00020	0.000040	0.00050	0.0070	0.17	0.00010	0.00050	0.0010	0.000050	0.000010	0.010
	June	1	11	92	94	23	120	0.012			8.09		0.013	0.00030	0.0000050	0.00050	0.0016	0.10	0.00010	0.0010	0.0010	0.00010	0.000010	0.0025
		16	13	97	108	85	130	0.013	0.0025	0.10	8.00		0.022	0.00040	0.0000050	0.00050	0.0019	0.21	0.00010	0.0010	0.0020	0.00010	0.000010	0.0025
	July	1	21	77	88	150	120	0.016	0.0070	0.050	7.76		0.034	0.00070	0.000010	0.00050	0.0031	0.44	0.00010	0.00050	0.0020	0.00010	0.000010	0.0025
	August	2	24	59	86	400	110		0.0025	0.060	7.67		0.051	0.00070	0.000020	0.00050	0.0041	0.61	0.00010	0.00050	0.0030	0.00010	0.000010	0.0025
		16/19	19	95	95	22	145	0.011	0.0025	0.050	8.01		0.035	0.00075	0.0000075	0.00050	0.0020	0.57	0.00010	0.00050	0.0020	0.00010	0.000010	0.0025
	September	12	13	118	119	1.0	170	0.025	0.0025	0.050	8.03	7.92	0.024	0.00070	0.000010	0.00050	0.0016	0.62	0.00010	0.00050	0.0020	0.00010	0.000010	0.0025
	October	6	12	110	113	2.0	150	0.019	0.0025	0.11	8.07	7.65	0.013	0.00060	0.000030	0.00050	0.0012	0.35	0.00010	0.0010	0.0010	0.00010	0.000010	0.0025
	November	22	7.7	148	144	27	156	0.021	0.0025	0.14	7.96		0.0076	0.00040	0.0000050	0.00050	0.0011	0.17	0.00010	0.0013	0.0012	0.00016	0.000010	0.0025
2012	January	24	5.3	169	158	2.0	226	0.0050	0.0025	0.32	8.13		0.0053	0.00041	0.000035	0.00050	0.0011	0.094	0.00010	0.0015	0.00050	0.00043	0.000010	0.0025
	February	25	6.1	165	160	2.0	216	0.0060	0.0025	0.29	7.99	7.16	0.021	0.00033	0.000064	0.00050	0.015	0.049	0.00024	0.0014	0.00050	0.00034	0.000010	0.0083
	March	5	5.2	161	159	3.2	176	0.0067	0.0025	0.20	8.17	6.72	0.0031	0.00039	0.0000050	0.00050	0.0012	0.012	0.00010	0.0011	0.00050	0.00031	0.000010	0.0025
	April	24	14	39	37	11	100	0.0025	0.010	0.010	7.63	7.43	0.050	0.00048	0.000023	0.00050	0.0052	0.48	0.00010	0.00050	0.0012	0.000050	0.000010	0.0025
	May	6/12	14	52	126	1158	100	0.093	0.0055	0.029	7.07	7.50	0.053	0.00089	0.000021	0.00050	0.0027	1.0	0.00015	0.00050	0.0018	0.000067	0.000010	0.0025
	June	19	16	92	105	165	128	0.18	0.015	0.083	8.12	7.59	0.027	0.00070	0.0000050	0.00050	0.0016	0.56	0.00010	0.0013	0.00200	0.00015	0.000010	0.0025
	July	17	11	116	144	582	143	0.10	0.0025	0.058	8.07	7.84	0.018	0.00070	0.0000085	0.00050	0.0012	0.52	0.00010	0.0010	0.0013	0.00013	0.000010	0.0025
		30	13	122	160	539	161	0.13	0.011	0.12	8.17	7.88	0.031	0.00099	0.0000050	0.00050	0.0014	0.73	0.00029	0.0011	0.0014	0.00012	0.000010	0.0025
	August	1	16	117	133	246	166	0.089	0.018	0.074	8.04	7.75	0.059	0.0018	0.0000050	0.00050	0.0018	1.5	0.00010	0.0011	0.0031	0.00011	0.000010	0.0025
		8-10	13	128	166	536	181	0.062	0.0081	0.11	8.17	8.26	0.032	0.0013	0.0000050	0.00050	0.0013	0.91	0.00010	0.0013	0.0019	0.00011	0.000010	0.0025
		23-27	9.0	129	187	917	179	0.020	0.010	0.090	8.14	7.92	0.024	0.0013	0.0000050	0.00050	0.0015	0.93	0.00010	0.0011	0.0020	0.000093	0.000010	0.0025
	September	13	15	102	107	33	136	0.010	0.0025	0.056	8.09	7.97	0.020	0.00061	0.0000050	0.00050	0.0019	0.42	0.00010	0.00050	0.0025	0.000095	0.000010	0.0025
October	13/16	11	129	130	27	158	0.022	0.0025	0.084	8.05	8.10	0.011	0.00060	0.0000050	0.00050	0.00094	0.60	0.00010	0.0011	0.0015	0.00014	0.000010	0.0025	
November	2	8.2	158	153	2.2	214	0.026	0.0025	0.22	7.93		0.0095	0.00053	0.000031	0.00050	0.0024	0.18	0.00021	0.0013	0.0012	0.00018	0.000010	0.0025	
	12	8.7	153	155	2.2	162	0.025	0.0025	0.010	7.93	6.69	0.0062	0.00039	0.0000050	0.00050	0.0014	0.024	0.00010	0.00050	0.0014	0.00010	0.000010	0.0025	
December	29	10	223	206	0.50	262	0.025	0.0025	0.063	8.13	7.97	0.0061	0.00051	0.0000050	0.00050	0.0023	0.030	0.00010	0.0012	0.0011	0.00045	0.000010	0.0025	
2013	April	30	4.6	192	198	5.8	246	0.0082	0.0025	0.13	8.27	8.18	0.0031	0.00025	0.0000050	0.00050	0.0011	0.014	0.00010	0.0013	0.00050	0.00043	0.000010	0.0025
	May	14	19	32	35	34	77	0.10	0.0025	0.010	7.53	7.90	0.051	0.00033	0.000011	0.00050	0.0036	0.245	0.00010	0.00050	0.0012	0.000050	0.000010	0.0025
	June	19/22	13	121	151	278	168	0.16	0.011	0.17	8.09	8.05	0.034	0.0011	0.0000085	0.00050	0.0017	0.590	0.00010	0.0013	0.0019	0.00011	0.000010	0.0045
	July	12/13	9.1	110	116	15	146	0.018	0.0025	0.090	8.00	7.72	0.010	0.00050	0.0000050	0.00050	0.0011	0.26	0.00010	0.0010	0.0012	0.00010	0.000010	0.0025
		19/23		127	178	343	179	0.20	0.016	0.091	8.16	8.26	0.028	0.0016	0.0000050	0.00050	0.0014	1.1	0.00010	0.0014	0.0024	0.000085	0.000010	0.0025
	August	21/22	13	131	154	218	179	0.080	0.0052	0.10	8.12	7.92	0.021	0.0011	0.0000050	0.00050	0.0012	0.71	0.00010	0.0012	0.0018	0.000093	0.000010	0.0025
	September	6/8	12	129	149	53	196	0.048	0.0037	0														

Table D.4: Background data for Option 3 with median and 95th Percentile values.

Year	Month	DOC (mg/L)	Dissolved Hardness (mg/L)	Total Hardness (mg/L)	TSS (mg/L)	TDS (mg/L)	Ammonia (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Lab pH (pH Units)	Field pH (pH Units)	Dissolved Aluminum (mg/L)
2005	May			74	19	118	0.017	0.0011	0.034	7.85		0.043
	June				5.4	160	0.015	0.00067	0.052	7.83		0.026
	July			138	11	173	0.010	0.00050	0.042	7.73		0.020
	August			110	4.9	157	0.029	0.00066	0.010	8.10		0.022
	September			111	58	151	0.012	0.00057	0.025	7.83		0.024
	October			111	5.5	151	0.015	0.00050	0.060	7.64		0.033
2006	June		110		206	112	0.026	0.0010	0.083	7.71		0.075
	July		120		3.8	184	0.014		0.19	7.86		0.0056
	August		124		2.0	175	0.017		0.075	7.92		0.011
	September		120		4.0	182	0.010		0.053	7.78		0.0079
	October		129		3.0	164	0.052		0.11	7.67		0.0048
2007	June	8.2	110	97	28	147	0.025	0.027	0.14	7.84		0.014
	July	14	128	125	5.7	179	0.025	0.025	0.30	7.78		0.011
	August			124	4.7	192	0.025	0.025	0.20	8.04		
	September	11	110	93	14	177	0.025	0.010	0.030	7.98		0.0070
	October			129	6.5	174	0.025	0.14	0.010	7.73		
2008	April		187		1.0	268	0.025	0.055	0.010	8.40		0.010
	June		92	92	15	133	0.025	0.058	0.049	7.90		0.013
	August	9.0	123	124	105	167	0.025	0.005	0.143	7.92		0.014
	September	18			16	160	0.025	0.005	0.018	7.85		0.041
	October	11	123		5.7	183	0.025			7.84		0.0090
2009	April	18	20		1.0	52				6.84	7.60	0.053
	June	9.2	93		32	156				7.90	7.74	0.013
	July		137		4.0	184				8.07		
	August	12	96		9.8	149			0.18	7.79	7.72	0.025
	October	8.3	125	141	2.8	130	0.010	0.0025	0.14	8.02	8.24	0.007
2010	April	21	36	50	2.5	89	0.016	0.0038	0.015	7.64	7.56	0.053
	May	11	83	88	67	119	0.034	0.0065	0.070	8.02	7.64	0.029
	June	7.6	113	121	63	143	0.059	0.0073	0.14	8.17	7.49	0.012
	July	16	93	106	53	150	0.027	0.0025	0.070	8.06	8.02	0.019
	August	13	118	116		170					7.91	0.011
	September	17	107	104	11	210	0.039	0.0025	0.030	7.98	8.02	0.016
	October	13	111	126	3.0	150	0.069	0.0025	0.070	8.10	7.85	0.011
2011	April	23	43	43	0.50	72	0.010	0.0025	0.010	7.41		0.057
	May	22	32	33	7.0	40		0.0025	0.010	7.11		0.076
	June	17	66	69	29	91	0.012	0.0025	0.040	7.65		0.042
	July	21	77	88	150	120	0.016	0.0070	0.050	7.76		0.034
	August	21	82	91	149	130	0.012	0.0036	0.053	7.86		0.039
	September	13	118	119	1.0	170	0.025	0.0025	0.050	8.03	7.92	0.024
	October	12	110	113	2.0	150	0.019	0.0025	0.11	8.07	7.65	0.013
	November	7.7	148	144	27	156	0.021	0.0025	0.14	7.96		0.0076
2012	January	5.3	169	158	2.0	226	0.0050	0.0025	0.32	8.13		0.0053
	February	6.1	165	160	2.0	216	0.0060	0.0025	0.29	7.99	7.16	0.021
	March	5.2	161	159	3.2	176	0.0067	0.0025	0.20	8.17	6.72	0.0031
	April	14	39	37	11.2	100	0.0025	0.010	0.010	7.63	7.43	0.050
	May	14	52	126	1158	100	0.093	0.0055	0.029	7.07	7.50	0.053
	June	16	92	105	165	128	0.18	0.015	0.083	8.12	7.59	0.027
	July	13	121	162	630	158	0.134	0.010	0.11	8.15	7.86	0.031
	August	11	128	175	700	178	0.045	0.0097	0.10	8.16	8.08	0.030
	September	15	102	107	33	136	0.0099	0.0025	0.056	8.09	7.97	0.020
	October	11	129	130	27	158	0.022	0.0025	0.084	8.05	8.10	0.011
	November	8.5	156	154	2.2	188	0.026	0.0025	0.11	7.93	6.69	0.0079
	December	10	223	206	0.50	262	0.025	0.0025	0.063	8.13	7.97	0.0061
2013	April	4.6	192	198	5.8	246	0.0082	0.0025	0.13	8.27	8.18	0.0031
	May	19	32	35	34	77	0.098	0.0025	0.010	7.53	7.90	0.051
	June	13	121	151	278	168	0.16	0.011	0.17	8.09	8.05	0.034
	July	9.1	118	147	179	163	0.11	0.0092	0.091	8.08	7.99	0.019
	August	13	131	154	218	179	0.080	0.0052	0.097	8.12	7.92	0.021
	September	12	129	149	53	196	0.048	0.0037	0.10	7.98	7.80	0.022
	October	12	130	133	40	193	0.069	0.0025	0.11	8.18	7.55	0.014
	November	16	177	184	19	185	0.11	0.010	0.12	8.08	7.61	0.015
	December	8.0	164	186	2.1	207	0.016	0.0025	0.11	8.18	6.90	0.0038
Median:		12	118	124	11	160	0.025	0.0025	0.075	7.96	7.80	0.019
95th Percentile:		21	181	185	278	226	0.12	0.040	0.22	8.18	8.13	0.053

Table D.4: Background data for Option 3 with median and 95th Percentile values.

Year	Month	Dissolved Arsenic (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Chromium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)	Dissolved Lead (mg/L)	Dissolved Molybdenum (mg/L)	Dissolved Nickel (mg/L)	Dissolved Selenium (mg/L)	Dissolved Silver (mg/L)	Dissolved Zinc (mg/L)
2005	May	0.00029	0.000025	0.00050	0.0042	0.14	0.00025	0.00050	0.0014	0.00050	0.000010	0.0029
	June	0.00046	0.000025	0.00030	0.0023	0.16	0.000064	0.00085	0.0011	0.00050	0.0000050	0.0091
	July	0.00041	0.000025	0.00025	0.0033	0.16	0.000075	0.0011	0.0011	0.00050	0.0000050	0.0030
	August	0.00043	0.000010	0.00050	0.0026	0.27	0.00025	0.00083	0.0014	0.00050	0.000010	0.0029
	September	0.00039	0.0000085	0.00050	0.0027	0.31	0.00025	0.00059	0.0013	0.00050	0.000010	0.0025
	October	0.00044	0.000025	0.00025	0.0029	0.25	0.000025	0.00069	0.0012	0.00050	0.0000050	0.0013
2006	June	0.00051	0.000021	0.00050	0.0017	0.15	0.000094	0.00055	0.0019	0.00039	0.0000050	0.0025
	July	0.00048	0.0000050	0.00076	0.0011	0.083	0.000088	0.0011	0.0012	0.00013		0.00063
	August	0.00035	0.0000050	0.00059	0.0013	0.083	0.000050	0.00088	0.00083	0.00010		0.0024
	September	0.00046	0.000039	0.00070	0.0011	0.10	0.000050	0.00075	0.00067	0.00011		0.0017
	October	0.00035	0.0000050	0.00025	0.00075	0.10	0.000050	0.0010	0.00065	0.00020		0.0015
2007	June	0.00040	0.0000050	0.00060	0.0020	0.050	0.000050	0.0010	0.00025	0.00010		0.0040
	July	0.00050	0.0000050	0.0010	0.0020	0.040	0.000050	0.0010	0.00070	0.00010		0.0060
	August											
	September	0.00040	0.0000050	0.0016	0.0010	0.080	0.000050	0.0020	0.00080	0.00010		0.0020
	October											
2008	April	0.00027	0.000040	0.00097	0.0012	0.030	0.000067	0.0017	0.0010	0.00030		0.0017
	June	0.00010	0.000040	0.0013	0.00075	0.060	0.000050	0.0014	0.0010	0.0013	0.0000050	0.0020
	August	0.00040	0.0000050	0.00060	0.0020	0.070	0.000050	0.0010	0.0010	0.00010	0.000060	0.0060
	September	0.00035	0.0000050	0.0015	0.0030	0.15	0.00088	0.00050	0.0015	0.00075	0.0000050	0.0030
	October	0.00050	0.0000050	0.00050	0.0010	0.078	0.000050	0.00108	0.0010	0.00030	0.0000050	0.0010
2009	April	0.00010	0.000080	0.00060	0.0050	0.070	0.00010	0.00013	0.00050	0.00030	0.0000050	0.0090
	June	0.00030	0.000005	0.00020	0.0020	0.050	0.000050	0.00127	0.0010	0.00030	0.0000050	0.0020
	July											
	August	0.00027	0.000030	0.00067	0.0037	0.073	0.00018	0.00083	0.00083	0.00030	0.0000050	0.0040
	October	0.00030	0.000040	0.00050	0.0012	0.046	0.00010	0.0010	0.00050	0.00020	0.000010	0.0025
2010	April	0.00030	0.000010	0.00047	0.0045	0.14	0.00017	0.00060	0.00083	0.00013	0.0000083	0.0033
	May	0.00038	0.000023	0.00050	0.0021	0.19	0.00010	0.0010	0.0011	0.00022	0.000010	0.0034
	June	0.00028	0.000050		0.00095	0.035	0.00010	0.0016	0.00091	0.00040		0.0050
	July	0.00020	0.000050		0.0020	0.10	0.00010	0.0010	0.0010	0.00040		0.0050
	August	0.00040	0.000050		0.0020	0.11	0.00010	0.0010	0.0010	0.00040		0.0050
	September	0.00050	0.000050		0.0010	0.23	0.00010	0.0010	0.0020	0.00040		0.0050
	October	0.00040	0.0000050	0.00050	0.0012	0.13	0.00010	0.0010	0.0010	0.00010	0.000010	0.0025
2011	April	0.00030	0.000030	0.00050	0.0077	0.15	0.00010	0.00050	0.0010	0.00005	0.000010	0.0050
	May	0.00020	0.000040	0.00050	0.0070	0.17	0.00010	0.00050	0.0010	0.00005	0.000010	0.010
	June	0.00030	0.000020	0.00050	0.0046	0.16	0.00010	0.00075	0.0013	0.000075	0.000010	0.005
	July	0.00070	0.000010	0.00050	0.0031	0.44	0.00010	0.00050	0.0020	0.00010	0.000010	0.0025
	August	0.00073	0.000011	0.00050	0.0028	0.55	0.00010	0.00050	0.0023	0.00010	0.000010	0.0025
	September	0.00070	0.000010	0.00050	0.0016	0.62	0.00010	0.00050	0.0020	0.00010	0.000010	0.0025
	October	0.00060	0.000030	0.00050	0.0012	0.35	0.00010	0.0010	0.0010	0.00010	0.000010	0.0025
	November	0.00040	0.0000050	0.00050	0.0011	0.17	0.00010	0.0013	0.0012	0.00016	0.000010	0.0025
2012	January	0.00041	0.000035	0.00050	0.0011	0.094	0.00010	0.0015	0.00050	0.00043	0.000010	0.0025
	February	0.00033	0.000064	0.00050	0.0154	0.049	0.00024	0.0014	0.00050	0.00034	0.000010	0.0083
	March	0.00039	0.0000050	0.00050	0.0012	0.012	0.00010	0.0011	0.00050	0.00031	0.000010	0.0025
	April	0.00048	0.000023	0.00050	0.0052	0.48	0.00010	0.00050	0.0012	0.000050	0.000010	0.0025
	May	0.00089	0.000021	0.00050	0.0027	1.0	0.00015	0.00050	0.0018	0.000067	0.000010	0.0025
	June	0.00070	0.0000050	0.00050	0.0016	0.56	0.00010	0.0013	0.002	0.00015	0.000010	0.0025
	July	0.00096	0.0000062	0.00050	0.0014	0.73	0.00029	0.0011	0.0015	0.00012	0.000010	0.0025
	August	0.00128	0.0000050	0.00050	0.0014	0.91	0.00010	0.0012	0.0020	0.00011	0.000010	0.0025
	September	0.00061	0.0000050	0.00050	0.0019	0.42	0.00010	0.00050	0.0025	0.000095	0.000010	0.0025
	October	0.00060	0.0000050	0.00050	0.00094	0.60	0.00010	0.0011	0.0015	0.00014	0.000010	0.0025
	November	0.00046	0.000018	0.00050	0.0019	0.10	0.00016	0.00090	0.0013	0.00014	0.000010	0.0025
	December	0.00051	0.0000050	0.00050	0.0023	0.030	0.00010	0.0012	0.0011	0.00045	0.000010	0.0025
2013	April	0.00025	0.0000050	0.00050	0.0011	0.014	0.00010	0.0013	0.00050	0.00043	0.000010	0.0025
	May	0.00033	0.000011	0.00050	0.0036	0.24	0.00010	0.00050	0.0012	0.00005	0.000010	0.0025
	June	0.0011	0.0000085	0.00050	0.0017	0.59	0.00010	0.0013	0.0019	0.00011	0.000010	0.0045
	July	0.0011	0.0000050	0.00050	0.0012	0.66	0.00010	0.0012	0.0018	0.000093	0.000010	0.0025
	August	0.0011	0.0000050	0.00050	0.0012	0.71	0.00010	0.0012	0.0018	0.000093	0.000010	0.0025
	September	0.0012	0.0000056	0.00065	0.0012	0.96	0.00010	0.00083	0.0020	0.000080	0.000010	0.0025
	October	0.00078	0.0000050	0.00050	0.0010	0.65	0.00010	0.00076	0.0017	0.000080	0.000010	0.0025
	November	0.0022	0.000011	0.00077	0.00086	4.8	0.00010	0.0011	0.0025	0.00018	0.000010	0.0025
	December	0.00057	0.0000080	0.00050	0.0012	0.062	0.00010	0.00080	0.00080	0.00015	0.000010	0.0025
Median:		0.00041	0.000010	0.00050	0.0017	0.15	0.00010	0.0010	0.0011	0.00015	0.000010	0.0025
95th Percentile:		0.0011	0.000050	0.0011	0.0054	0.91	0.00025	0.0015	0.0020	0.00050	0.000010	0.0084

Table D.5: Annual Medians for Option 3.

Year	Month	DOC (mg/L)	Dissolved Hardness (mg/L)	Total Hardness (mg/L)	TSS (mg/L)	TDS (mg/L)	Ammonia (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Lab pH (pH Units)	Field pH (pH Units)	Dissolved Aluminum (mg/L)
2005	May			74	19	118	0.017	0.0011	0.034	7.85		0.043
	June				5.4	160	0.015	0.00067	0.052	7.83		0.026
	July			138	11	173	0.010	0.00050	0.042	7.73		0.020
	August			110	4.9	157	0.029	0.00066	0.010	8.10		0.022
	September			111	58	151	0.012	0.00057	0.025	7.83		0.024
	October			111	5.5	151	0.015	0.00050	0.060	7.64		0.033
	Annual Median			111	8.4	154	0.015	0.00061	0.038	7.83		0.025
2006	June		110		206	112	0.026	0.0010	0.083	7.71		0.075
	July		120		3.8	184	0.014		0.19	7.86		0.0056
	August		124		2.0	175	0.017		0.075	7.92		0.011
	September		120		4.0	182	0.010		0.053	7.78		0.0079
	October		129		3.0	164	0.052		0.11	7.67		0.0048
	Annual Median		120		3.8	175	0.017	0.0010	0.083	7.78		0.0079
2007	June	8.2	110	97	28	147	0.025	0.027	0.14	7.84		0.014
	July	14	128	125	5.7	179	0.025	0.025	0.30	7.78		0.011
	August			124	4.7	192	0.025	0.025	0.20	8.04		
	September	11	110	93	14	177	0.025	0.010	0.030	7.98		0.0070
	October			129	6.5	174	0.025	0.14	0.010	7.73		
	Annual Median	11	110	124	6.5	177	0.025	0.025	0.14	7.84		0.011
2008	April		187		1.0	268	0.025	0.055	0.010	8.40		0.010
	June		92	92	15	133	0.025	0.058	0.049	7.90		0.013
	August	9.0	123	124	105	167	0.025	0.005	0.143	7.92		0.014
	September	18			16	160	0.025	0.005	0.018	7.85		0.041
	October	11	123		5.7	183	0.025			7.84		0.0090
	Annual Median	11	123	108	15	167	0.025	0.030	0.033	7.90		0.013
2009	April	18	20		1.0	52				6.84	7.60	0.053
	June	9.2	93		32	156				7.90	7.74	0.013
	July		137		4.0	184				8.07		
	August	12	96		9.8	149			0.18	7.79	7.72	0.025
	October	8.3	125	141	2.8	130	0.010	0.0025	0.14	8.02	8.24	0.007
	Annual Median	10	96	141	4.0	149	0.010	0.0025	0.16	7.90	7.73	0.019
2010	April	21	36	50	2.5	89	0.016	0.0038	0.015	7.64	7.56	0.053
	May	11	83	88	67	119	0.034	0.0065	0.070	8.02	7.64	0.029
	June	7.6	113	121	63	143	0.059	0.0073	0.14	8.17	7.49	0.012
	July	16	93	106	53	150	0.027	0.0025	0.070	8.06	8.02	0.019
	August	13	118	116		170					7.91	0.011
	September	17	107	104	11	210	0.039	0.0025	0.030	7.98	8.02	0.016
	October	13	111	126	3.0	150	0.069	0.0025	0.070	8.10	7.85	0.011
	Annual Median	13	107	106	32	150	0.037	0.0031	0.070	8.04	7.85	0.016
2011	April	23	43	43	0.50	72	0.010	0.0025	0.010	7.41		0.057
	May	22	32	33	7.0	40		0.0025	0.010	7.11		0.076
	June	17	66	69	29	91	0.012	0.0025	0.040	7.65		0.042
	July	21	77	88	150	120	0.016	0.0070	0.050	7.76		0.034
	August	21	82	91	149	130	0.012	0.0036	0.053	7.86		0.039
	September	13	118	119	1.0	170	0.025	0.0025	0.050	8.03	7.92	0.024
	October	12	110	113	2.0	150	0.019	0.0025	0.11	8.07	7.65	0.013
	November	7.7	148	144	27	156	0.021	0.0025	0.14	7.96		0.0076
	Annual Median	19	79	89	17	125	0.016	0.0025	0.050	7.81	7.79	0.036
2012	January	5.3	169	158	2.0	226	0.0050	0.0025	0.32	8.13		0.0053
	February	6.1	165	160	2.0	216	0.0060	0.0025	0.29	7.99	7.16	0.021
	March	5.2	161	159	3.2	176	0.0067	0.0025	0.20	8.17	6.72	0.0031
	April	14	39	37	11.2	100	0.0025	0.010	0.010	7.63	7.43	0.050
	May	14	52	126	1158	100	0.093	0.0055	0.029	7.07	7.50	0.053
	June	16	92	105	165	128	0.18	0.015	0.083	8.12	7.59	0.027
	July	13	121	162	630	158	0.134	0.010	0.11	8.15	7.86	0.031
	August	11	128	175	700	178	0.045	0.0097	0.10	8.16	8.08	0.030
	September	15	102	107	33	136	0.0099	0.0025	0.056	8.09	7.97	0.020
	October	11	129	130	27	158	0.022	0.0025	0.084	8.05	8.10	0.011
	November	8.5	156	154	2.2	188	0.026	0.0025	0.11	7.93	6.69	0.0079
	December	10	223	206	0.50	262	0.025	0.0025	0.063	8.13	7.97	0.0061
	Annual Median	11	128	156	19	167	0.024	0.0025	0.092	8.10	7.59	0.021
2013	April	4.6	192	198	5.8	246	0.0082	0.0025	0.13	8.27	8.18	0.0031
	May	19	32	35	34	77	0.098	0.0025	0.010	7.53	7.90	0.051
	June	13	121	151	278	168	0.16	0.011	0.17	8.09	8.05	0.034
	July	9.1	118	147	179	163	0.11	0.0092	0.091	8.08	7.99	0.019
	August	13	131	154	218	179	0.080	0.0052	0.097	8.12	7.92	0.021
	September	12	129	149	53	196	0.048	0.0037	0.10	7.98	7.80	0.022
	October	12	130	133	40	193	0.069	0.0025	0.11	8.18	7.55	0.014
	November	16	177	184	19	185	0.11	0.010	0.12	8.08	7.61	0.015
	December	8.0	164	186	2.1	207	0.016	0.0025	0.11	8.18	6.90	0.0038
	Annual Median	12	130	151	40	185	0.080	0.0037	0.11	8.09	7.90	0.019

Table D.5: Annual Medians for Option 3.

Year	Month	Dissolved Arsenic (mg/L)	Dissolved Cadmium (mg/L)	Dissolved Chromium (mg/L)	Dissolved Copper (mg/L)	Dissolved Iron (mg/L)	Dissolved Lead (mg/L)	Dissolved Molybdenum (mg/L)	Dissolved Nickel (mg/L)	Dissolved Selenium (mg/L)	Dissolved Silver (mg/L)	Dissolved Zinc (mg/L)
2005	May	0.00029	0.000025	0.00050	0.0042	0.14	0.00025	0.00050	0.0014	0.00050	0.000010	0.0029
	June	0.00046	0.000025	0.00030	0.0023	0.16	0.000064	0.00085	0.0011	0.00050	0.0000050	0.0091
	July	0.00041	0.000025	0.00025	0.0033	0.16	0.000075	0.0011	0.0011	0.00050	0.0000050	0.0030
	August	0.00043	0.000010	0.00050	0.0026	0.27	0.00025	0.00083	0.0014	0.00050	0.000010	0.0029
	September	0.00039	0.0000085	0.00050	0.0027	0.31	0.00025	0.00059	0.0013	0.00050	0.000010	0.0025
	October	0.00044	0.000025	0.00025	0.0029	0.25	0.000025	0.00069	0.0012	0.00050	0.0000050	0.0013
	Annual Median	0.00042	0.000025	0.00040	0.0028	0.21	0.00016	0.00076	0.0013	0.00050	0.0000075	0.0029
2006	June	0.00051	0.000021	0.00050	0.0017	0.15	0.000094	0.00055	0.0019	0.00039	0.0000050	0.0025
	July	0.00048	0.0000050	0.00076	0.0011	0.083	0.000088	0.0011	0.0012	0.00013		0.00063
	August	0.00035	0.0000050	0.00059	0.0013	0.083	0.000050	0.00088	0.00083	0.00010		0.0024
	September	0.00046	0.000039	0.00070	0.0011	0.10	0.000050	0.00075	0.00067	0.00011		0.0017
	October	0.00035	0.0000050	0.00025	0.00075	0.10	0.000050	0.0010	0.00065	0.00020		0.0015
	Annual Median	0.00046	0.0000050	0.00059	0.0011	0.10	0.000050	0.00088	0.00083	0.00013	0.0000050	0.0017
2007	June	0.00040	0.0000050	0.00060	0.0020	0.050	0.000050	0.0010	0.00025	0.00010		0.0040
	July	0.00050	0.0000050	0.0010	0.0020	0.040	0.000050	0.0010	0.00070	0.00010		0.0060
	August											
	September	0.00040	0.0000050	0.0016	0.0010	0.080	0.000050	0.0020	0.00080	0.00010		0.0020
	October											
	Annual Median	0.00040	0.0000050	0.0010	0.0020	0.050	0.000050	0.0010	0.00070	0.00010		0.0040
2008	April	0.00027	0.000040	0.00097	0.0012	0.030	0.000067	0.0017	0.0010	0.00030		0.0017
	June	0.00010	0.000040	0.0013	0.00075	0.060	0.000050	0.0014	0.0010	0.0013	0.0000050	0.0020
	August	0.00040	0.0000050	0.00060	0.0020	0.070	0.000050	0.0010	0.0010	0.00010	0.000060	0.0060
	September	0.00035	0.0000050	0.0015	0.0030	0.15	0.00088	0.00050	0.0015	0.00075	0.0000050	0.0030
	October	0.00050	0.0000050	0.00050	0.0010	0.078	0.000050	0.00108	0.0010	0.00030	0.0000050	0.0010
	Annual Median	0.00035	0.0000050	0.0010	0.0012	0.070	0.000050	0.0011	0.0010	0.00030	0.0000050	0.0020
2009	April	0.00010	0.000080	0.00060	0.0050	0.070	0.00010	0.00013	0.00050	0.00030	0.0000050	0.0090
	June	0.00030	0.000005	0.00020	0.0020	0.050	0.000050	0.00127	0.0010	0.00030	0.0000050	0.0020
	July											
	August	0.00027	0.000030	0.00067	0.0037	0.073	0.00018	0.00083	0.00083	0.00030	0.0000050	0.0040
	October	0.00030	0.000040	0.00050	0.0012	0.046	0.00010	0.0010	0.00050	0.00020	0.000010	0.0025
	Annual Median	0.00028	0.000035	0.00055	0.0028	0.060	0.00010	0.00092	0.00067	0.00030	0.0000050	0.0033
2010	April	0.00030	0.000010	0.00047	0.0045	0.14	0.00017	0.00060	0.00083	0.00013	0.0000083	0.0033
	May	0.00038	0.000023	0.00050	0.0021	0.19	0.00010	0.0010	0.0011	0.00022	0.000010	0.0034
	June	0.00028	0.000050		0.00095	0.035	0.00010	0.0016	0.00091	0.00040		0.0050
	July	0.00020	0.000050		0.0020	0.10	0.00010	0.0010	0.0010	0.00040		0.0050
	August	0.00040	0.000050		0.0020	0.11	0.00010	0.0010	0.0010	0.00040		0.0050
	September	0.00050	0.000050		0.0010	0.23	0.00010	0.0010	0.0020	0.00040		0.0050
	October	0.00040	0.0000050	0.00050	0.0012	0.13	0.00010	0.0010	0.0010	0.00010	0.000010	0.0025
	Annual Median	0.00038	0.000050	0.00050	0.0020	0.13	0.00010	0.0010	0.0010	0.00040	0.000010	0.0050
2011	April	0.00030	0.000030	0.00050	0.0077	0.15	0.00010	0.00050	0.0010	0.00005	0.000010	0.0050
	May	0.00020	0.000040	0.00050	0.0070	0.17	0.00010	0.00050	0.0010	0.00005	0.000010	0.010
	June	0.00030	0.000020	0.00050	0.0046	0.16	0.00010	0.00075	0.0013	0.000075	0.000010	0.005
	July	0.00070	0.000010	0.00050	0.0031	0.44	0.00010	0.00050	0.0020	0.00010	0.000010	0.0025
	August	0.00073	0.000011	0.00050	0.0028	0.55	0.00010	0.00050	0.0023	0.00010	0.000010	0.0025
	September	0.00070	0.000010	0.00050	0.0016	0.62	0.00010	0.00050	0.0020	0.00010	0.000010	0.0025
	October	0.00060	0.000030	0.00050	0.0012	0.35	0.00010	0.0010	0.0010	0.00010	0.000010	0.0025
	November	0.00040	0.0000050	0.00050	0.0011	0.17	0.00010	0.0013	0.0012	0.00016	0.000010	0.0025
Annual Median	0.00050	0.000016	0.00050	0.0029	0.26	0.00010	0.00050	0.0012	0.00010	0.000010	0.000010	
2012	January	0.00041	0.000035	0.00050	0.0011	0.094	0.00010	0.0015	0.00050	0.00043	0.000010	0.0025
	February	0.00033	0.000064	0.00050	0.0154	0.049	0.00024	0.0014	0.00050	0.00034	0.000010	0.0083
	March	0.00039	0.0000050	0.00050	0.0012	0.012	0.00010	0.0011	0.00050	0.00031	0.000010	0.0025
	April	0.00048	0.000023	0.00050	0.0052	0.48	0.00010	0.00050	0.0012	0.000050	0.000010	0.0025
	May	0.00089	0.000021	0.00050	0.0027	1.0	0.00015	0.00050	0.0018	0.000067	0.000010	0.0025
	June	0.00070	0.0000050	0.00050	0.0016	0.56	0.00010	0.0013	0.002	0.00015	0.000010	0.0025
	July	0.00096	0.0000062	0.00050	0.0014	0.73	0.00029	0.0011	0.0015	0.00012	0.000010	0.0025
	August	0.00128	0.0000050	0.00050	0.0014	0.91	0.00010	0.0012	0.0020	0.00011	0.000010	0.0025
	September	0.00061	0.0000050	0.00050	0.0019	0.42	0.00010	0.00050	0.0025	0.000095	0.000010	0.0025
	October	0.00060	0.0000050	0.00050	0.00094	0.60	0.00010	0.0011	0.0015	0.00014	0.000010	0.0025
	November	0.00046	0.000018	0.00050	0.0019	0.10	0.00016	0.00090	0.0013	0.00014	0.000010	0.0025
	December	0.00051	0.0000050	0.00050	0.0023	0.030	0.00010	0.0012	0.0011	0.00045	0.000010	0.0025
	Annual Median	0.00056	0.0000056	0.00050	0.0018	0.45	0.00010	0.0011	0.0014	0.00014	0.000010	0.0025
2013	April	0.00025	0.0000050	0.00050	0.0011	0.014	0.00010	0.0013	0.00050	0.00043	0.000010	0.0025
	May	0.00033	0.000011	0.00050	0.0036	0.24	0.00010	0.00050	0.0012	0.00005	0.000010	0.0025
	June	0.0011	0.0000085	0.00050	0.0017	0.59	0.00010	0.0013	0.0019	0.00011	0.000010	0.0045
	July	0.0011	0.0000050	0.00050	0.0012	0.66	0.00010	0.0012	0.0018	0.000093	0.000010	0.0025
	August	0.0011	0.0000050	0.00050	0.0012	0.71	0.00010	0.0012	0.0018	0.000093	0.000010	0.0025
	September	0.0012	0.0000056	0.00065	0.0012	0.96	0.00010	0.00083	0.0020	0.000080	0.000010	0.0025
	October	0.00078	0.0000050	0.00050	0.0010	0.65	0.00010	0.00076	0.0017	0.000080	0.000010	0.0025
	November	0.0022	0.000011	0.00077	0.00086	4.8	0.00010	0.0011	0.0025	0.00018	0.000010	0.0025
	December	0.00057	0.0000080	0.00050	0.0012	0.062	0.00010	0.00080	0.00080	0.00015	0.000010	0.0025
	Annual Median	0.0011	0.0000056	0.00050	0.0012	0.65	0.00010	0.0011	0.0018	0.000093	0.000010	0.0025

Table D.6: Background water quality summary statistics for Option 2 (Grouped by Week) representing lower Minto Creek (Minnow 2016) ¹

Analytes	Background Concentrations	
	Individual Data Point Evaluator (95 th percentile)	Central Tendency Evaluator (95 th percentile of annual medians)
Ammonia (mg/L)	0.12	0.058
Nitrite (mg/L)	0.038	0.034
Nitrate (mg/L)	0.22	0.14
Dissolved Aluminum (mg/L)	0.056	0.027
Dissolved Arsenic (mg/L)	0.0013	0.00077
Dissolved Cadmium (mg/L)	0.000050	0.000046
Dissolved Chromium (mg/L)	0.00130	0.00108
Dissolved Copper (mg/L)	0.0051	0.0025
Dissolved Iron (mg/L)	0.95	0.55
Dissolved Lead (mg/L)	0.000276	0.000138
Dissolved Molybdenum (mg/L)	0.00172	0.00114
Dissolved Nickel (mg/L)	0.0024	0.0017
Dissolved Selenium (mg/L)	0.00050	0.00046
Dissolved Silver (mg/L)	0.000010	0.000010
Dissolved Zinc (mg/L)	0.0060	0.0046

¹ For contaminants of potential concern (COPCs)