

MOUNT NANSEN SURFACE WATER QUALITY REVIEW

Prepared for
Assessment and Abandoned Mines
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ACRONYMS/ABREVIATIONS

ADT – Apparent Decreasing Trend

AIT – Apparent Increasing Trend

AMD – Acid Mine Drainage

AR – Appears Random

CCME – Canadian Council of Ministers of the Environment

DT – Decreasing Trend

EQS – Environmental Quality Standard

FAL – Fresh Water Aquatic Life

FFRE – Far Field Receiving Environment

IT – Increasing Trend

NST – No Significance Test

kg/d – kilograms per day

m³/s – cubic meters per second

mg/L – milligrams per litre

ND – not detected

NFRE – Near Field Receiving Environment

QA/QC – Quality Assurance / Quality Control

SS – Summary Statistics

TDS – Total Dissolved Solids

TNS – Trend is Not Significant

TSS – Total Suspended Solids

WQS – Water Quality Station

[] – concentration

EXECUTIVE SUMMARY

This report consists of a review of surface water quality samples collected between 2008 and 2014 at the Mount Nansen Mine Site. The objective of the surface water quality review was to identify areas of concern by determining if there are any increasing parameter concentration trends in the data or increases in 2014 concentrations compared with historical information. The Water Quality Stations (WQS) were grouped as Reference, Mine Source, Near Field Receiving Environment (NFRE) and Far Field Receiving Environment (FFRE).

Reference WQS areas of concern were identified at the following stations, mainly due to increasing concentration trends of Total Dissolved Solids (TDS) and Sulphate concentrations.

- Victoria Creek, north of confluence Back Creek (WQ-VC-U)
- Dome Creek, upstream of Mill Site (WQ-DC-DX)

TDS and Sulphate concentrations have increased in 2014 compared with previous years at WQ-VC-U. In addition, at WQ-DC-DX, increasing concentration trends of Total Aluminum, Total Arsenic, Total Copper, Total Iron and Total Lead have been observed.

Mine Source WQS areas of concern were identified at the following stations, mainly due to increasing trends of TDS and Sulphate concentrations.

- Seepage Pond Discharge (WQ-SEEP)
- Brown-McDade Pit Site – Top (WQ-PIT-1)
- Brown-McDade Pit Site – Middle (WQ-PIT-2)
- Brown-McDade Pit Site – Bottom (WQ-PIT-3)
- Mill Site Seep 03 (WQ-MS-S-03)

TDS, Sulphate, Cyanate, Total Arsenic, Dissolved Arsenic, Total Cadmium, Dissolved Iron, Total Manganese, Dissolved Manganese, and Dissolved Magnesium concentrations have increased in 2014 compared with previous years at WQ-SEEP. Total Arsenic, Dissolved Arsenic, and Dissolved Strontium concentrations have increased in 2014 compared with previous years at WQ-PIT-1. Total Arsenic and Dissolved Arsenic concentrations have increased in 2014 compared with previous years at WQ-PIT-2. In addition, at WQ-PIT-3 and WQ-MS-S-03, increasing trends in Total Arsenic and Total Iron concentrations have been observed. At WQ-MS-S-03, increasing trends in Dissolved Molybdenum and Total Silver concentrations have been observed.

Near Field Receiving Environment WQS areas of concern were identified at the following stations, mainly due to increasing trends of TDS and Sulphate concentrations.

- Dome Creek, downstream of Mill Site and Upstream of Tailings Pond (WQ-DC-D1b)
- Upper Dome Creek, downstream of Tailings Pond (WQ-DC-U)
- Dome Creek at road (WQ-DC-R)

TDS concentrations have increased in 2014 compared with previous years at all three above referenced WQS. Sulphate concentrations have increased in 2014 compared with previous years at WQ-DC-U and WQ-DC-R. At WQ-DC-U, Total Arsenic, Dissolved Arsenic, Total Cadmium, Total Manganese and Dissolved Manganese have increased in 2014 compared with

previous years. In addition, at WQ-DC-D1b, increasing concentration trends of Ammonia, Total Arsenic, Total Iron and Total Manganese were observed.

Far Field Receiving Environment WQS areas of concern were identified at the following stations, mainly due to increasing trends of TDS, Sulphate, Total Antimony and Dissolved Antimony concentrations.

- Victoria Creek, north of Mine Access Road (WQ-VC-R)

In addition, TDS, Sulphate, Total Antimony and Dissolved Antimony concentrations have increased in 2014 compared with previous years at this station.

Contaminant Mass Daily Loads in 2014 were calculated at selected WQS and included Dome Creek upstream of Mill Site (WQ-DC-DX) a Reference station, Seepage Pond Discharge (WQ-SEEP) a Mine Source station, Dome Creek at road (WQ-DC-R) a NFRE station, and Victoria Creek north of mine access road (WQ-VC-R) a FFRE station. The maximum daily loads of selected contaminants all occurred on 9 May 2014 at the WQ-VC-R station. The mass daily loads were as follows: Sulphate – 2646 kg/d, Arsenic – 1 kg/d, Iron – 432 kg/d, Manganese – 31 kg/d, Cadmium 0.04 kg/d and Zinc – 3 kg/d.

1.0 INTRODUCTION

The Mount Nansen mine site is within the Traditional Territory of the Little Salmon/Carmacks First Nation 60 km west of Carmacks, Yukon. The site (the Site) is an abandoned gold and silver mine and a source of various metals to the local downstream water receptors. In addition to the former mine facilities being a source of metals in surface water runoff, some of the background water sources contain elevated concentrations of metals. There are several placer mining operations, that are sources of contaminants, located upstream of the Site.

The operations on the Site have been managed by the Assessment and Abandoned Mines (AAM) branch of the Government of Yukon, Department of Energy, Mines and Resources since 2003.

Indigenous and Northern Affairs Canada (INAC) began a surface water quality sampling program at the Site in 1999 and in 2003 the Government of Yukon took over the sampling program (Gomm, 2013). A regular surface water quality monitoring program has been in place at the Site since 2008 to collect data to aid in the assessment of the impact of the mine on downstream receptors as well as to evaluate and select closure options. Several reports have been prepared regarding the Site's water quality. Artifex Engineering Hydrology Inc. (AEH) has been contracted by AAM to determine if there were any surface water trends or changes from historical normally observed concentrations in 2014, when compared with the surface water quality data from 2008 to 2013. The objective of the work is provided in Section 1.3.

This report was first emailed to AAM on 19 November 2015 as a draft for comment.

1.1 Historical Site Water Quality Assessment Reports

The following historical surface water quality reports were provided to AEH as background material. A brief discussion regarding the contents of the reports is provided below for the reader's reference.

SLR. 2015a. Mount Nansen 2013 Annual Surface Water Quality Review. 15 March 2015. The scope of work for the SLR report as taken directly from the report is provided as follows in italics.

Specifically, the Mount Nansen 2013 Annual Surface Water Quality Review consists of the following components:

- *A review of the Mount Nansen 2013 surface water quality data in comparison to the historical data set;*
- *Comments on how the current water quality results compare to the previous water licence Effluent Quality Standards (EQS) and the Canadian Council of Ministers of the Environment (CCME) Guidelines for the Protection of Aquatic Life and discuss possible effects on the aquatic environment;*
- *Comments on trends or changes from historical norms;*
- *Provision, where applicable, of explanations as to the implications of any trends or changes in water quality from historical norms; and,*
- *A final report documenting the review, any trends or changes, and how results compare to the EQS, CCME Guidelines, and explanation of implications on possible changes in site operations.*

SLR (2015a) provides the following discussion regarding the analysis of trends in the 2010 through 2013 data.

The minimum, median, maximum, upper and lower quartile concentrations, and the number of samples have been calculated for a suite of selected parameters for each station for 2013. As well for each station, the same statistics are calculated for each year (2010 to 2013) to support preparation of annual box-whisker plots and assessment of changes in water quality over time. The parameters selected include those with an associated EQS or CCME guideline, along with key indicator and modifying species including hardness, alkalinity and sulphate. For purposes of calculating the statistics, non-detect values were set to their detection limit. The selected parameters were compared to the EQS or the CCME guidelines where appropriate, and the number of exceedances also identified.

Trend analysis was also carried out (January 2010 to December 2013) to identify any key changes in water quality at mine source and receiving environment monitoring locations for key parameters of concern and indicator species, specifically sulphate, arsenic, cadmium, copper and zinc. This was accomplished through visual analysis of time series plots and comparison of annual box-and-whisker plots. Inter-station comparisons were also carried out within each catchment area for key parameters of concern to assess the influence of the mine site on downstream water quality.

SLR. 2015b. Mount Nansen Water Quality and Quantity Adaptive Management Plan Final. 25 May 2015. This document contains a description of the Adaptive Management Plan (AMP) that is currently in place for closure of the mine site. The report indicates that a design team is currently developing a remediation plan and it is anticipated that site works will begin in 2018. The AMP identifies 10 areas of the abandoned mine that may potentially develop a degradation of water quality being released. The document discusses these specific events and provides a discussion of the environmental consequences, monitoring and evaluation requirements, as well as a proposed response to mitigate further release of contaminants. The events are as follows:

1. *Degraded water quality in Dome Creek downstream of Mill Area,*
2. *Changes in water quality in the seepage pond,*
3. *Changes in seepage pond inflows/volume outside of historic norms,*
4. *Degraded water quality in Dome Creek downstream of Mine Facilities,*
5. *Degraded water quality in Victoria Creek at Mine Access Road,*
6. *Degraded water quality in Pony Creek downstream of Mine Area,*
7. *Changes in pit water level elevation outside of historic norms,*
8. *Changes in groundwater quality downgradient of the Brown-McDade Pit,*
9. *Degraded water quality in Brown-McDade Pit, and*
10. *Water level in tailings pond reaches maximum desired water level.*

Gomm Environmental Engineering Consulting. 2013. Mount Nansen Surface Water Quality Assessment – 2008/09 to 2011/12 Assessment of Current Surface Water Quality Conditions.

The scope of work for the Gomm Environmental report as taken directly from the report is provided as follows in italics. *Specifically the Mount Nansen Surface Water Quality Assessment consists of the following components:*

- *Review the Mount Nansen 2011/12 surface water quality data in comparison to 2008/09, 2009/10 and 2010/11;*

- *Comment on how the current and historical water quality results compare to the previous water licence Effluent Quality Standards (EQS) and the CCME Guidelines for the Protection of Aquatic Life and discuss the possible effects;*
- *Comment on any trends or changes from historical norms;*
- *Provide an explanation as to implications of any trends or changes from historical norms; and*
- *Prepare a final report documenting the review, any trends or changes from historical norms, how the results compare to the EQS, CCME Guidelines, and an explanation of the implications.*

1.2 Historical Laboratory Information

1.2.1 General

SLR (2015a) reported the following with respect to the historical laboratory analysis for site water samples.

A large amount of surface water quality data has been collected over the past ten years at the Mount Nansen site. Surface water quality sampling began in 1999 by the Department of Indian Affairs and Northern Development Canada (DIAND). The Government of Yukon took over the sampling program in 2003 under the Devolution Transfer Agreement, and in 2005 contracted this work to Environmental Dynamics Inc. (EDI). Since 2007, water quality samples have been consistently analyzed at suitable detection limits to allow comparison to CCME Guidelines for the Protection of Aquatic Life. From 2007 to March 2013, water quality samples were analyzed at Exova (formally known as BodyCote). In April 2013, laboratory analysis was switched to ALS Environmental.

1.2.2 Cyanide Chemistry

SLR (2015a) provides a discussion of the cyanide analyses program at the Site. This discussion can be summarized as follows from SLR (2015a):

Overall, it is apparent that the total cyanide results prior to April 2013 (reported as SAD cyanide) are highly questionable. Assessment of RPD's of replicate samples for the seepage confirm the highly variable nature of these results, possibly due to interferences in the analysis due to thiocyanate and nitrites/nitrates. Given the results of this assessment, the total cyanide values reported prior to April 2013 will not be carried forward as part of this Mount Nansen 2013 Annual Water Quality Assessment.

AEH do not dispute SLR's assessment of the historical cyanide laboratory analysis.

1.3 Objective of Current Assessment

Correspondence from AAM indicated the specific objective of the project is “*To determine through a review of the Mount Nansen 2008 to 2014 surface water quality data if there are any trends or changes from historical norms when compared to data from previous years, and to identify areas of possible concern.*” AAM and AEH personnel also discussed the project objectives during a project kick off meeting on 13 August 2015.

1.4 Scope of Work

The scope of work as defined in the contract between AAM and AEH was as follows:

Overall Responsibility

The Contractor shall determine if there were any surface water trends or changes from historical norms in 2014 at the Mount Nansen site when compared to the surface water quality data from 2008 to 2013, and identify areas of possible concern.

Tasks

The Contractor shall provide a review of the Mount Nansen 2014 surface water quality data in comparison to the 2008 to 2013 data. This will include the following tasks:

- *Submit to AAM, if necessary, any proposed changes to the analysis approach and report format;*
- *Tabulate Analytical Data – analytical data will be grouped into tables based on sample location. Parameters that exceed the previous water licence Effluent Quality Standards (EQS) and the CCME Guidelines for the protection of Aquatic Life will be identified;*
- *Calculate Water Quality Summary Statistics – statistics for each sampling station will be determined for each year and reported in tables using a similar presentation as in SLR (2015a);*
- *Prepare Water Quality Plots – Data plots will be prepared using the same format as SLR (2015a);*
- *Mass Load Assessment – complete mass load assessments for the same sample locations (Upper Dome, Seepage, Dome @ Road, Vic @ Road) for each sample event as per the methodology used in SLR (2015a);*
- *Data Analysis and Interpretation – The data plots and analysis completed in tasks 2 through 5 will be utilized to analyze and interpret the data;*
- *Prepare a draft report that presents and discusses the findings of the study for AAM's review; and*
- *Prepare a final report incorporating AAM's comments from the draft report.*

2.0 ASSESSMENT APPROACH AND METHODOLOGY

The methodology used by AEH to tabulate, summarize, analyze and interpret the water quality data is discussed below.

2.1 CCME Guidelines and EQS Water Licence Numerical Values

The Canadian Council of Ministers of the Environment (CCME) water quality website was accessed in September 2015 and the Guideline values for Freshwater Aquatic Life (FAL) determined. Effluent Quality Standards (EQS) values were taken from SLR (2015a) and were part of Water Licence QZ94-004 that was issued to B.Y.G. Natural Resources on 13 February 1996 by the Yukon Territory Water Board.

The CCME Guidelines for FAL and EQS values are presented in Tables 1a, 1b, 1c and 1d. Note that the CCME Guidelines for FAL do not contain a guideline value for Total Chromium, but do

contain values for Hexavalent Chromium as well as Trivalent Chromium. SLR (2015a) utilized the guideline for Trivalent Chromium. AEH have also adopted the Trivalent Chromium Guideline value of 0.0089 mg/L for comparison with the Total Chromium data.

2.2 Study Area Data Sources

The data sources available to AEH included Water Quality Station (WQS) field measurements and laboratory analytical data, Hydrometric Station flow data and observation information, as well as Meteorological Station Data.

2.2.1 Water Quality Stations

The location of the Mount Nansen WQS are presented on Figure 1, taken from SLR (2015a). The WQS are grouped into four general classifications as follows.

Reference WQS

Victoria Creek Reference (WQ-VC-REF)
Victoria Creek, north of confluence Back Creek (WQ-VC-U)
Dry Creek reference site (WQ-VC-U)
Dome Creek, upstream of Mill Site (WQ-DC-DX)
Dome Creek, upstream of Mill Site (WQ-DC-DX+105)
Pony Creek, upstream of pit and waste rock (WQ-PC-U)
Minnesota Creek (WQ-MN)

Mine Source WQS

Tailings Pond (WQ-TP)
Seepage Pond Discharge (WQ-SEEP)
Brown-McDade Pit Site – Top (WQ-PIT-1)
Brown-McDade Pit Site – Middle (WQ-PIT-2)
Brown-McDade Pit Site – Bottom (WQ-PIT-3)
Mill Site Seep 03 (WQ-MS-S-03)
Mill Site Seep 08 (WQ-MS-S-08)
Dam Seep (WQ-DAM-SEEP)
Adit Seep (WQ-ADIT-SEEP)
Seepage Pond surface (WQ-SP-1)
Seepage Pond bottom (WQ-SP-2)
Dome Creek Diversion Channel at Bridge (WQ-DC-B)
Ore Ramp into Pit Lake (WQ-ORE)
East toe of NW pile seep (WQ-NW-SEEP-01)
Dome East Slope Seep 1 (WQ-DESS-01)
Dome East Slope Seep 2 (WQ-DESS-02)
Dome East Slope Seep 3 (WQ-DESS-03)
Monitoring well along Dome Creek valley (CH-P-13-01)
Exploration trench 1 (WQ-ET-01)
Lysimeter 2 (WQ-L2)
Dome Creek downstream of tailings pond (WQ-DC-1)
Dome Creek north of tailings pond (WQ-DC-2)
Dome Creek upstream of tailings pond (WQ-DC-3)
Dome Creek upstream of tailings pond (WQ-DC-4)

Dome Creek downstream of Mill Site (WQ-DC-7)
Dome Creek downstream of Mill Site (WQ-DC-8)
Dome Creek downstream of Mill Site (WQ-DC-10)

Near Field Receiving Environment WQS

Dome Creek, downstream of Mill Site and Upstream of Tailings Pond (WQ-DC-D1)
Dome Creek, downstream of Mill Site and Upstream of Tailings Pond (WQ-DC-D1b)
Upper Dome Creek, downstream of Tailings Pond (WQ-DC-U)
Dome Creek upstream of Tailings Pond (WQ-DC-U1)
Dome Creek upstream of Tailings Pond (WQ-DC-U2)
Dome Creek at road (WQ-DC-R)
Pony Creek downstream of pit (WQ-PC-D)

Far Field Receiving Environment WQS

Back Creek, near confluence with Victoria Creek (WQ-BC)
Victoria Creek, north of Mine Access Road (WQ-VC-R)
Victoria Creek winter sampling location (WQ-VC-R+150)
Victoria Creek, downstream of Back Creek (WQ-VC-DBC)
Victoria Creek, upstream of Minnesota Creek (WQ-VC-UMN)
Pumphouse Well (WQ-PW)

The Quality Control samples are designated as follows:

Field Blank (Field)
Travel Blank (Travel)

Additional information regarding each WQS are provided below, including the range of sample dates, number of samples collected, number of replicate samples collected, trend analysis with each WQS set of samples grouped as one population (Appendix C), and trend analysis with each WQS set of samples grouped by year (Appendix D). The four WQS station types are discussed as follows:

- Reference (background) WQS are presented in Table 2. This data set is required to assess the background quality of the surface water in the area of the Site to determine which analytical parameters exceed the specified CCME-FAL Guidelines or EQS values. It is assumed the water samples collected at these WQS are not influenced by the historical presence of the Site. However, it is known that the stations are affected by upstream anthropogenic activities. Discussion of the extent of these operations is beyond the scope of this report.
- Mine Source WQS located immediately down gradient of specific mine infrastructure such as the tailings facility or waste rock piles are presented in Table 3. The sampling locations were selected to collect samples that best represent surface water leaving the former mine facilities.
- Near Field Receiving Environment WQS represent water samples collected within a few hundred meters downstream of the mine infrastructure that are sources of the released contaminants. These sample areas are not considered to be fish habitat (SLR 2015a). The stations are presented in Table 4.

- Far Field Receiving Environment WQS represent water samples collected at a distance from the mine infrastructure that are sources of the released contaminants and where the source water is well mixed with background surface water quality. These sample areas are considered to be potential fish habitat (SLR 2015a). The stations are presented in Table 5.

2.2.2 Hydrometric Stations

The locations of the Mount Nansen Water Hydrometric Stations are presented on Figure 1. The Hydrometric Station data was utilized to determine the stream or seep flow rate at selected WQS on the day of the sample collection. This flow rate was required to determine the mass load of contaminants at selected WQS that have historically been assessed as reported by SLR (2015a).

2.2.3 Meteorological Stations

The location of the Mount Nansen Meteorological Stations are presented on Figure 1. Data from the meteorological stations was not considered for the preparation of this report.

2.3 Data Tabulation and Comparison with CCME and EQS

The water quality data was imported to Excel spreadsheets from the Microsoft Access database that was provided by AAM on 8 May 2015. The water quality data for each sample location was grouped into one Excel spreadsheet in chronological order with the available CCME-FAL Guidelines and EQS values for each parameter presented on the far right of the spreadsheet. Replicate water samples were placed immediately to the right of the primary water sample in the spreadsheets to allow easy comparison of the data. A total of 39 spreadsheets were prepared and were grouped by the water quality stations as follows:

- Reference WQS (Table 2 – Appendix A Tables A1 – A7)
- Mine Source WQS (Table 3 – Appendix A Tables A8 – A24)
- Near-Field Receiving Environment WQS (Table 4 – Appendix A Tables A25 – A31)
- Far-Field Receiving Environment WQS and Quality Assurance Samples (Table 5 – Appendix A Tables A32 – A39)

Tables 2 through 5 each contain the Appendix A table number, the water quality identification code (WQID), the water quality station site name, the range of the sample dates, the number of water samples collected at each water quality site, the number of replicate samples collected at the water quality site, the number of analytical parameters that were evaluated for trend in Appendix C, and the number of analytical parameters that were evaluated for trend in Appendix D.

Water sample parameters that exceeded the CCME-FAL Guideline were bolded and underlined in tables A1 to A39, whereas parameters that exceeded the EQS values were highlighted. Total Phosphorus exceedances were not noted in Appendix A as the CCME FAL Guideline is dependent on water ranging from oligotrophic for low range concentrations and meso-eutrophic for high range concentrations. AEH are unaware of the classifications of the Site waters. However, exceedances of the Total Phosphorus CCME FAL Guidelines are discussed in Section 3.1 with respect to the Appendix B data summaries.

2.4 Statistical Summary of Water Quality Station Data

2.4.1 Selected WQS with All Years of Data Grouped as One Population

The Appendix A spreadsheets were used to create a separate spreadsheet that contained no replicate water samples or guidelines/standards, for each WQS dataset. An Excel spreadsheet was configured to calculate, for selected analytical parameters, the number of samples that exceeded the laboratory detection limit, and of the samples that exceeded the detection limit - the minimum, 25th percentile (lower quartile), median, 75th percentile (upper quartile), and maximum values. The selected parameters that were summarized generally included the same parameters that were summarized in similar tables of SLR (2015a). Parameters that were summarized in this document and not in SLR (2015a) included field pH and Total Phosphorus. Parameters that were summarized in SLR (2015a) and not in this document included Dissolved Cadmium, Dissolved Copper, Dissolved Iron, Dissolved Manganese, and Dissolved Zinc as these parameters do not have CCMC FAL Guidelines or EQS to compare the data against. However, for all these above listed parameters, the Sparkline plots were reviewed and any WQS parameters that appeared to have an increasing trend were graphed on a x-y plot and tested for statistical significance of trend.

The summary tables are presented in tables B1 through B37 in Appendix B. As stated above, the statistical summary tables included only samples that exceeded the laboratory detection limit. The analysis could therefore be considered to be conservative with respect to minimum, median and quartile values. That is, the true statistical summary values would be less than the values reported in the tables. The total number of samples submitted for laboratory analyses of each parameter and the number of samples that exceeded either the CCME Guideline for FAL or the EQS are also provided in the table. The tables provide a direct comparison of the number of samples analyzed with the number of samples that exceeded the laboratory detection limit as well as either the CCME FAL Guideline or EQS.

2.4.2 Selected WQS Data Grouped by Year

Box plots were created for all WQS parameters that were also completed by SLR (2015a). These parameters included, at selected WQS, Total Arsenic, Dissolved Arsenic, Total Cadmium, Total Iron, Dissolved Iron, Total Manganese, Dissolved Manganese, Total Zinc, Sulphate, Ammonia-N, Nitrite-N, WAD-Cyanide, Cyanate and Thiocyanate.

Box plots were also created for TDS concentrations at all WQS that had at least 10 samples collected as well as some 2014 data. Results of the analysis are presented in Appendix D.

The Box plot provides the WQS sample minimum, lower quartile, median, upper quartile, and maximum sample values for each year of data. The TDS concentration Box plots were plotted using MATLAB version R2015b. The software also plots data outliers. The default definition of an outlier in the software is any data that plots outside of 2.7 standard deviations from the sample median value. The data outliers using this definition are also presented on the Appendix D figures using a "+" symbol. Figure 1 of Appendix D provides annotation that describes the components of the Box plot. In addition, any year with less than 10 water samples analyzed for TDS is identified on figures of Appendix D.

2.5 Water Quality Station Data Trend Analysis

2.5.1 All Years of Data Grouped as One Population

Trend analysis was completed for selected parameters of all currently active WQS datasets (a WQS that contained 2014 data). The analysis considered all data for each WQS as a population (compared with grouping the data by year). Many of these stations also contained data from the first quarter of 2015.

The general methodology presented in SLR (2015b) Section 2.4 “Approach to Trend Analysis” was adopted to test the significance of the observed trend in data. The methodology is presented below from the SLR document.

Trend analysis plays a key part of the AMP protocol with several of the AMP Events having a statistically significant trend as one of the thresholds or triggers. To facilitate trend assessment a standardized approach was adopted using Microsoft Excel.

For the trend analysis and determination of a significant trend, the least squares method of linear regression is used to fit a trend line to the data. This can be done using the LINEST function in Excel. The F-statistic for this regression is calculated from the ratio of the variances. The F-statistic is used to test the null hypothesis that the data is a random scatter of points with a zero slope with non positive or negative trend. The calculated F-statistic is compared to critical values of F-statistic found in standard statistic tables. If the F-statistic is greater than the critical value, the null hypothesis fails and the linear model, and associated trend, is significant. Using a significance level of 0.05, if the calculated statistic is greater than the critical value, then we are 95% confident that the data is not a random scatter and the linear regression is justified.

The first step of the analysis was to prepare simple plots (sparkline plots) of parameter concentration versus time for each parameter at every WQS to identify parameter concentrations that appeared to be increasing with time. These plots are presented in Tables A1 through A37 of Appendix A. Note that non-detect (ND) parameter values plot simply as “zero” on the Sparkline plots. The Sparkline plots have a very small y-axis and no difference could be noted if the detection limit or zero values were plotted.

The second step of the analysis was to apply the following criteria to determine if an analytical parameter concentration at a WQS should be plotted, tested for trend, and tested for the significance of the trend:

- any parameter that appeared to have an increasing trend based on visual assessment of the parameter Sparkline concentration as plotted in Appendix A,
- all field and lab pH values as this could potentially indicate the development of acid mine drainage (AMD) conditions,
- all Total Suspended Solids (TSS) and Total Dissolved Solids (TDS) values as these parameters are general indicators of contaminant loads, and
- any parameter that had at least 10% of the samples that exceeded CCME-FAL Guidelines and/or the EQS.

A xy-plot of time (x) versus parameter concentration (y) was prepared for each WQS analytical parameter that met one of the above conditions. The plot was inspected to determine if the data

was linear in nature and it was assumed the data was normally distributed. The slope of the trend in the data was determined using the “Add Trendline” option in the Excel xy-plots. If a trend was indicated, the LINEST function was used to determine if the trend was significant at a confidence level of 95% (significance of 0.05) as discussed above and in SLR (2015b). A linear equation was fit to the data using Excel and the following regression “Summary Statistics” calculated including slope, intercept, standard error of slope (se-slope), standard error of intercept (se-intercept), correlation coefficient (r^2), standard error of the dependent variable (se-y), the F statistic, the degrees of freedom (df), sum of squares of the regression (ss reg), and sum of squares of the residuals (ss res). The Summary Statistics for each regression analysis were presented below the data plots in Appendix C. Available CCME FAL Guidelines and EQS values are presented in the figure captions of Appendix C. In addition, the CCME FAL Guideline or EQS values are plotted on the figures for the Victoria Creek reference site (WQ-VC-REF).

The Excel LINEST function will only work with numeric values. Less than detection limit symbols cannot be used within the Excel cells being tested. The sample dates with ND values were removed from the table for analysis if they met the following criteria:

- the ND values were approximately randomly distributed with time in the dataset, and
- the total number of ND values were less than 10% of the total sample size.

If the dataset did not meet both of the above criterion, no analysis for significance of trend was completed and it was noted below the xy-plot (see Appendix C) that the data was not suitable for significance of trend analysis.

If a trend could not be established to be significant then it was assumed to be random within an expected range of values equal to the observed minimum and maximum values of the dataset.

A summary of the parameters at each WQS that were tested for trend are presented in tables 6-9. The methodology of describing the trend in tables 6-9 was as follows:

- DT – decreasing trend that is statistically significant at the 95% confidence level (the F value of the analysis is highlighted in green in Appendix C). This would be considered to be a strong quality model.
- IT – increasing trend that is statistically significant at the 95% confidence level (the F value of the analysis is highlighted in green in Appendix C). This would be considered to be a strong quality model.
- TNS – trend is not significant at the 95% confidence level (the F value of the analysis is highlighted in red in Appendix C).
- NST – no significance test was completed as the selected criterion of greater than 10% of the samples had laboratory values of ND.
- ADT – apparent decreasing trend. Visual examination of the xy-plot indicated the parameter values were decreasing with time.
- AIT - apparent increasing trend. Visual examination of the xy-plot indicated the parameter values were increasing with time.
- AR – appears random. The data appears to be random with time.
- TNS-AR: The combination of these two acronyms indicates the trend failed the statistical significance test at 95% confidence level and visual examination of the xy-plot indicates the data is apparently random.
- NST-AR: The combination of these two acronyms indicates no statistical significance test was completed and the data appears to be random.

- IT-AR or DT-AR: The combination of either of these two acronyms indicates the statistical significance test indicated the trend was increasing or decreasing at the 95% confidence interval. However, visual examination of the xy-plot indicates the data can still be regarded as being random. This would be considered to be a weak quality model.

A summary of the WQS tested for trend and the corresponding Appendix C figure numbers are provided in Table C1 of Appendix C.

2.5.2 Selected Data Grouped by Year

The Box plots presented in Appendix D were utilized to assess the trend in data on an annual basis for TDS. The values of TDS provide a general indicator of the water quality at each WQS. The plots allow a quick comparison of yearly median, minimum, upper and lower quartile, as well as maximum values. The plots also provide any outliers of data defined as any value that is “+” or “-” 2.7 standard deviations from the WQS median value.

2.6 Detection and Treatment of Water Quality Parameter Outliers

Several methodologies were reviewed for detecting outliers in data utilizing Kleinbaum *et al.* (1998) and other statistical analysis references. Watt *et al.* (1989) indicate “the problem of how to treat outliers is subject to much controversy”. In the case of the WQS database, the underlying reason for identifying outliers in the data is to prevent the misinterpretation of the trend in water quality parameter concentrations at each WQS. The development of robust equations for the prediction of future water quality at the site is outside the current scope of work. Rather, an understanding of whether water quality parameters are generally increasing, decreasing, or expected to be random within a specified range at each location is desired.

A visual method of identifying possible outliers was adopted. The plots of selected parameter concentration versus date (Appendix C) were utilized to identify potential outliers. The leverage or influence each potential outlier had on the Summary Statistics listed in Section 2.5 was assessed by plotting the regression analysis and Summary Statistics (SS) with the outlier and without the outlier as shown in Appendix C. WQS parameters that have no apparent outliers have only one figure and SS, while WQS parameters that contain at least one apparent outlier have two figures and SS, before removal of the outlier and after removal.

2.7 Contaminant Daily Mass Load Assessment

The contaminant daily Mass Load Assessment (MLA) calculations were conducted for the same WQS as historically completed by SLR (2015a) as follows:

- Dome Creek upstream of Mill Site (WQ-DC-DX+105) – Reference WQS
- Seepage Pond Discharge (WQ-SEEP) – Mine Source WQS
- Dome Creek at road (WQ-DC-R) – Near Field Environment WQS
- Victoria Creek north of Mine Access road (WQ-VC-R) – Far Field Environment WQS

As per SLR (2015a), the key parameters assessed were sulphate, total arsenic, total cadmium, total iron, total manganese and total zinc (see Appendix E). All 2014 dates with measured flow rates and water quality samples were used to calculate the mass load at the WQS listed above. On some dates the hydrometric station was not suitable for measurement as it was frozen or contained a large amount of algae. Dates with flow and water quality data available for one or

more of the above mentioned stations were as follows: 14 April 2014, 9 May 2014, 21 May 2014, 24 June 2014, 15 July 2014, 11 August 2014, 16 September 2014, 14 October 2014, 13 November 2014, and 16 December 2014. Flow data was obtained from the EDI (2015) spreadsheet sent to AEH by AAM on 16 December 2015. Chemical data was taken from the Appendix A Excel spreadsheets.

The contaminant daily mass load was calculated with the stream flow rate on the day of sampling and parameter concentration “[]” using the following equation:

$$\text{Daily mass load (kg/d)} = \text{flow rate (m}^3/\text{s)} * \text{parameter [] (mg/L)} * \text{L/m}^3 * \text{s/d} * \text{mg/kg}$$

On 14 April 2014, 9 May 2014, and 16 December 2014, WQ-VC-R was not sampled. On these dates, samples were recovered at the Victoria Creek at road winter sampling location (WQ-VC-R+150). The laboratory analysis data for WQ-VC-R+150 were utilized for the MLA at WQ-VC-R on these dates.

The locations of these WQS are presented on Figure 1. As the figure shows, these WQS represent four separate areas of the Site and provide an indication of the daily mass of these contaminants that are present at each WQS during different times of the year.

2.8 Water Sample Quality Assurance and Quality Control

The water sample Quality Assurance and Quality Control (QA/QC) program conducted by AAM consisted of the following:

- Analyses of replicate water samples to assess the variation of analytical parameter concentrations due to field sampling procedures as well as laboratory analytical procedures. The AAM Access database did not indicate if the replicate samples were blind samples when submitted to the laboratory or if they were identified as being replicate samples.
- Analyses of water sample field blanks to determine if sampling procedures and/or sample bottles resulted in any parameters that exceeded laboratory detection limits.
- Analyses of water sample trip blanks to assess if water sample could potentially be introduced to contaminants during the sample bottle shipment to the laboratory or contamination at the laboratory.

The QA/QC data was reviewed by AEH to determine if the dataset potentially contained data that was not representative of the true water quality conditions at each WQS during the sampling date.

3.0 RESULTS AND DISCUSSION

3.1 CCME-FAL Guideline or EQS Exceedance and Statistical Summaries

The Appendix A Excel file provides 37 separate tables for each WQS containing data ranging from 2008 through first quarter 2015. Note that not all WQS contain 2014 and/or 2015 data. Analysis of WQS with no 2014 data was outside the scope of work. However, the data was still tabulated and exceedances flagged for potential future use. Table A38 contains the Field Blank

analytical data and Table A39 contains the Travel Blank analytical data. The results of the analysis are discussed below with respect to the 25th percentile, median, or 75th percentile parameter values that exceeded CCME FAL Guidelines or EQS values (parameter concentrations).

As discussed previously, the CCME FAL Guidelines provide a range of values for Total Phosphorus, dependent on the trophic state of the water body. The trophic state for the Site water bodies are not known and therefore exceedances of the minimum and maximum values are discussed.

In addition, as also discussed previously, the CCME FAL Guidelines provide a range of values for Total Cadmium, Total Copper, Total Lead, and Total Nickel as a function of the water hardness. For brevity, in the following sections the individual exceedances are discussed with respect to the minimum and maximum CCME FAL Guidelines for these parameters.

3.1.1 Reference Water Quality Stations

The Reference WQS parameters that exceeded either the CCME-FAL Guidelines or EQS are identified in tables A1 through A7 (Appendix A) and the statistical summary information is provided in tables B1 through B7 (Appendix B). Note that it is not possible to determine if the contaminant load identified in these Reference WQS is due only to upstream anthropogenic activities or if some of the contaminants are naturally occurring.

Tables A1 and B1 provide the summary of the Victoria Creek Reference (WQ-VC-REF) WQS data. The 25th percentile of Total Phosphorus; and the 75th percentile of Nitrite-N, Total Aluminum, Total Cadmium, Total Copper, Total Iron and Total Lead exceeded the minimum CCME FAL Guidelines. The 75th percentile for Total Phosphorus also exceeded the maximum CCME FAL Guideline. In addition, the 75th percentile of TSS exceeded the EQS.

Tables A2 and B2 provide the summary of the Victoria Creek North of Confluence with Back Creek (WQ-VC-U) WQS data. The 25th percentile of Total Phosphorus; and the 75th percentile of Nitrite-N, Total Phosphorus, Total Aluminum, Total Cadmium and Total Selenium exceeded the minimum CCME FAL Guidelines.

Tables A3 and B3 provide the summary of the Dry Creek Reference Site (WQ-DRY) WQS data. This station contains no 2014 data and will not be discussed further.

Tables A4 and B4 provide the summary of the Dome Creek Upstream of Mill Site (WQ-DC-DX) WQS data. The 25th percentile of Total Phosphorus; the median values of Total Aluminum, Total Copper and Total Iron; and the 75th percentile of Nitrite-N and Total Lead exceeded the minimum respective CCME FAL Guidelines. In addition, the 25th percentile for Total Iron and the 75th percentile for TSS, exceeded the EQS values.

Tables A5 and B5 provide the summary of the Dome Creek Upstream of Mill Site (WQ-DC-DX+105) WQS data. The 25th percentile of Nitrite-N, Total Arsenic, Total Iron and Total Zinc; and the 75th percentile of Total Aluminum, Total Copper, and Total Lead, exceeded the minimum respective CCME FAL Guidelines. The 75th percentile for Total Phosphorus and the 25th percentile for Total Cadmium also exceeded the maximum CCME FAL Guidelines. In addition, the 25th percentile for Total Zinc, and the 75th percentile of TSS, exceeded the EQS values.

Tables A6 and B6 provide the summary of the Pony Creek Upstream of Pit and Waste Rock (WQ-PC-U) WQS data. The 25th percentile of Total Phosphorus and the 75th percentile of Total Cadmium and Total Iron, exceeded the minimum CCME FAL Guidelines.

Tables A7 and B7 provide the summary of the Minnesota Creek (WQ-MN) WQS data. This station contains no 2014 data and will not be discussed further.

3.1.2 Mine Source Water Quality Stations

The Mine Source WQS parameters that exceeded either the CCME-FAL Guidelines or EQS are identified in tables A8 through A24 (Appendix A) and the statistical summary information is provided in tables B8 through B24 (Appendix B).

Tables A8 and B8 provide the summary of the Tailings Pond (WQ-TP) WQS data. The 25th percentile of Total Phosphorus, Total Arsenic, Total Iron, and Total Zinc; and the 75th percentile of Nitrite-N, CN-WAD, Total Aluminum, and Total Silver, exceeded the minimum CCME FAL Guidelines. The 25th percentile for Total Cadmium and Total Copper; and the Median value for Total Lead also exceeded the maximum CCME FAL Guidelines. In addition, the 25th percentile for Total Manganese and the 75th percentile for Total Zinc, exceeded the respective EQS values.

Tables A9 and B9 provide the summary of the Seepage Pond Discharge (WQ-SEEP) WQS data. The 25th percentile of Total Phosphorus, CN-WAD, Total Arsenic and Total Iron; and the median Nitrite-N value, exceeded the minimum CCME FAL Guidelines. The 25th percentile for Total Cadmium and Total Copper also exceeded the maximum CCME FAL Guidelines. In addition, the 25th percentile for Total Iron exceeded the EQS value.

Tables A10 and B10 provide the summary of the Top of Brown-McDade Pit (WQ-PIT-1) WQS data. The 25th percentile of Nitrite-N, Total Phosphorus, Total Arsenic and Total Zinc exceeded the minimum CCME FAL Guidelines. The 25th percentile for Total Cadmium and the Median value for Total Copper also exceeded the maximum CCME FAL Guidelines.

Tables A11 and B11 provide the summary of the Middle of Brown-McDade Pit (WQ-PIT-2) WQS data. The 25th percentile of Nitrite-N, Total Phosphorus, Total Arsenic and Total Zinc; and the 75th percentile for Total Lead exceeded the CCME FAL Guideline. The 25th percentile for Total Cadmium and the Median value for Total Copper also exceeded the maximum CCME FAL Guidelines. In addition, the 25th percentile for Total Zinc exceeded the EQS value.

Tables A12 and B12 provide the summary of the Bottom of Brown-McDade Pit (WQ-PIT-3) WQS data. The 25th percentile of Nitrite-N, Total Phosphorus, Total Arsenic and Total Zinc exceeded the minimum CCME FAL Guidelines. The 25th percentile for Total Cadmium and the median value for Total Copper also exceeded the maximum CCME FAL Guidelines. In addition, the 25th percentile for Total Zinc exceeded the EQS value.

Tables A13 and B13 provide the summary of the Mill Site Seep (WQ-MS-S-03) WQS data. The 25th percentile of Nitrite-N, Total Arsenic, Total Iron and Total Zinc; and the median values of Total Copper, exceeded the minimum CCME FAL Guideline. The 25th percentile for Total Cadmium; 75th percentile for Total Phosphorus, Total Copper and Total Lead, also exceeded the maximum CCME FAL Guidelines. In addition, the 25th percentile for Total Zinc and the median value for TSS, exceeded the EQS values.

Tables A14 and B14 provide the summary of the Mill Site Seep (WQ-MS-S-08) WQS data. The 25th percentile of Total Arsenic, Total Iron and Total Zinc; the median values of Total Aluminum and Total Silver; and the 75th percentile for Total Selenium exceeded the CCME FAL Guideline. The one sample that exceeded the detection limit for Total Phosphorus also exceeded the maximum CCME FAL Guideline. The 25th percentile for Total Cadmium and Total Lead; and median value for Total Copper, also exceeded the maximum CCME FAL Guidelines. In addition, the 25th percentile for Total Iron and Total Manganese, and median values for Total Zinc and TSS, exceeded the respective EQS values.

No discussion is provided for Tables A15 to A17 or B15 to B17 as these WQS have no 2014 or 2015 data.

Tables A18 and B18 provide the summary of the Dome Creek Diversion Channel at Bridge (WQ-DC-B) WQS data. The 25th percentile of Total Phosphorus, Total Aluminum, Total Arsenic, Total Cadmium and Total Iron; the median value of Total Copper; and the 75th percentile of Total Lead exceeded the minimum CCME FAL Guideline. The median value for Total Phosphorus and 75th percentile for Total Copper, also exceeded the maximum CCME FAL Guidelines. In addition, the 75th percentile for TSS exceeded the EQS.

Tables A19 and B19 provide the summary of the one sample collected at Ore Ramp into Pit Lake (WQ-ORE) WQS data. The sample Total Aluminum, Total Arsenic, Total Iron, Total Silver and Total Zinc values exceeded the minimum CCME FAL Guidelines. The sample Total Phosphorus, Total Cadmium, Total Copper, and Total Lead values exceeded the maximum CCME FAL Guidelines. In addition, the sample TSS and Total Manganese values exceeded the EQS.

Tables A20 and B20 provide the summary of the one sample collected at the East Toe of NW Pile Seep (WQ-NW-SEEP-01) WQS data. The sample Total Aluminum, Total Arsenic, Total Iron, Total Lead and Total Zinc values exceeded the minimum CCME FAL Guidelines. The sample Total Cadmium and Total Copper values exceeded the maximum CCME FAL Guidelines.

Tables A21 and B21 provide the summary of the Dome East Slope Seeps (WQ-DESS-01, WQ-DESS-02, WQ-DESS-03) WQS data. The 25th percentile of Total Cadmium; the median values of Total Aluminum, Total Copper, Total Iron and Total Zinc; and the 75th percentile of Total Lead exceeded the minimum CCME FAL Guidelines. The median value for Total Phosphorus, exceeded the maximum CCME FAL Guideline and the 75th percentile TSS exceeded the EQS.

Tables A22 and B22 provide the summary of the Monitoring Well along Dome Creek Valley (WQ-CH-P-13-01) WQS data. The 25th percentile of Total Zinc and the median value of Total Aluminum, exceeded the CCME FAL Guidelines. The 25th percentile value for Total Cadmium, exceeded the maximum CCME FAL Guideline.

Tables A23 and B23 provide the summary of the Exploration Trench (WQ-ET-01) and Lysimeter (WQ-L2) WQS data. The median values of Total Aluminum, Total Arsenic, Total Cadmium, and Total Copper exceeded the minimum CCME FAL Guidelines. The median value for Total Phosphorus, exceeded the maximum CCME FAL Guideline and the median TSS value exceeded the EQS.

Tables A24 and B24 provide the summary of the Dome Creek (WQ-DC-1, WQ-DC-2, WQ-DC-3, WQ-DC-4, WQ-DC-7, WQ-DC-8, WQ-DC-10) WQS data. The median values of Total

Phosphorus, CN-WAD, Total Arsenic and Total Iron; 75th percentile of Total Aluminum, Total Cadmium, Total Copper, and Total Zinc, exceeded the minimum CCME FAL Guidelines. The 75th percentile value for Total Lead exceeded the maximum CCME FAL Guideline and the 75th percentile TSS value exceeded the EQS.

3.1.3 Near-Field Receiving Environment Water Quality Stations

The Near-Field Receiving Environment WQS parameters that exceeded either the CCME-FAL or EQS are identified in tables A25 through A31 (Appendix A) and the statistical summary information is provided in tables B25 through B31 (Appendix B).

Tables A25 and B25 provide the summary of the Dome Creek Downstream of Mill Site and Upstream of Tailings Pond (WQ-DC-D1) WQS data. This station contains no 2014 data and will not be discussed further.

Tables A26 and B26 provide the summary of the Dome Creek Downstream of Mill Site and Upstream of Tailings Pond (WQ-DC-D1b) WQS data. The 25th percentile of Total Phosphorus, Total Arsenic, Total Iron, and Total Zinc; the median values of Nitrite-N and Total Copper; and the 75th percentile for Total Aluminum exceeded the CCME FAL Guideline. The 25th percentile value for Total Cadmium and 75th percentile value for Total Lead exceeded the maximum CCME FAL Guidelines. In addition, the 25th percentile for Total Manganese; and median value for Total Iron and Total Zinc, exceeded the respective EQS values.

Tables A27 and B27 provide the summary of the Upper Dome Creek Downstream of Tailings Pond (WQ-DC-U) WQS data. The 25th percentile of Total Phosphorus, Total Arsenic, Total Cadmium, Total Copper and Total Iron; the median values of Nitrite-N and Total Aluminum; and the 75th percentile for CN-WAD and Total Lead exceeded the CCME FAL Guideline. The 75th percentile for Total Cadmium and Total Copper, exceeded the maximum CCME FAL Guidelines. In addition, the 25th percentile for Total Manganese and the 75th percentile TSS exceeded the EQS values.

Tables A28 and B28 provide the summary of the Dome Creek Upstream of Tailings Pond (WQ-DC-U1) WQS data. This station contains no 2014 data and will not be discussed further.

Tables A29 and B29 provide the summary of the Dome Creek Upstream of Tailings Pond (WQ-DC-U2) WQS data. This station contains no 2014 data and will not be discussed further.

Tables A30 and B30 provide the summary of the Dome Creek at Road (WQ-DC-R) WQS data. The 25th percentile of Total Phosphorus, Total Aluminum, Total Arsenic, Total Cadmium and Total Iron; the median values of Total Copper and Total Lead; and the 75th percentile for Total Zinc exceeded the minimum CCME FAL Guidelines. The 75th percentile for Total Copper exceeded the maximum CCME FAL Guideline. In addition, the 25th percentile for Total Manganese and 75th percentile for TSS exceeded the EQS values.

Tables A31 and B31 provide the summary of the Pony Creek Downstream of Pit (WQ-PC-D) WQS data. The 25th percentile of Total Phosphorus, Total Cadmium, Total Copper and Total Zinc; the median values of Nitrite-N, Total Aluminum, Total Arsenic and Total Lead; and the 75th percentile for Total Lead exceeded the minimum respective CCME FAL Guideline. The 25th percentile for Total Cadmium and Total Copper exceeded the maximum CCME FAL Guideline.

3.1.4 Far-Field Receiving Environment Water Quality Stations

The Far-Field Receiving Environment WQS parameters that exceeded either the CCME-FAL or EQS are identified in tables A32 through A37 (Appendix A) and the statistical summary information is provided in tables B32 through B37 (Appendix B).

Tables A32 and B32 provide the summary of the Back Creek near Confluence with Victoria Creek (WQ-BC) WQS data. The 25th percentile of Total Phosphorus, Total Aluminum, Total Cadmium and Total Iron; the median values of Total Arsenic, Total Copper and Total Lead; and the 75th percentile for Nitrite-N, Total Silver and Total Zinc also exceeded the CCME FAL Guidelines. The median value for Total Phosphorus; and 75th percentile values for Total Cadmium, Total Copper, and Total Lead, exceeded the maximum CCME FAL Guidelines. In addition, the median TSS and Total Manganese, exceeded the EQS values.

Tables A33 and B33 provide the summary of the Victoria Creek North of Mine Access Road (WQ-VC-R) WQS data. The 25th percentile of Total Phosphorus; the median value of Total Copper; and 75th percentile for Total Aluminum, Total Copper and Total Lead exceeded the minimum CCME FAL Guidelines.

Tables A34 and B34 provide the summary of the Victoria Creek Winter Sampling Location (WQ-VC-R+150) WQS data. The 75th percentile for TSS exceeded the EQS.

Tables A35 and B35 provide the summary of the Victoria Creek Downstream of Back Creek (WQ-VC-DBC) WQS data. The 25th percentile of Total Phosphorus; and 75th percentile for Total Aluminum, Total Iron and Total Lead, exceeded the minimum CCME FAL Guidelines. The 75th percentile for Total Phosphorus also exceeded the maximum CCME FAL Guideline. In addition, the 75th percentile for TSS exceeded the EQS.

Tables A36 and B36 provide the summary of the Victoria Creek Upstream of Minnesota Creek (WQ-UMN) WQS data. The 75th percentile for Nitrite-N, Total Aluminum, Total Cadmium, Total Copper, Total Iron and Total Lead exceeded the minimum CCME FAL Guidelines.

Tables A37 and B37 provide the summary of the Pumphouse Well (WQ-PW) WQS data. The 25th percentile for Nitrite-N and Total Phosphorus exceeded the minimum CCME FAL Guidelines.

3.2 Water Quality Station Data Trend Analysis

See Section 2.5 for a discussion of the methodology used to summarize the results of the trend analysis that are provided in tables 6-9. The general results of the analysis for each type of WQS are presented below. Table C1 of Appendix C provides a summary of the Appendix C figure numbers that correspond to the WQS parameters tested for trend. Appendix C plots of concentration vs date and Appendix D box plots that summarized the data by year were utilized to determine if 2014 values had increased compared with other years of data.

Observations are discussed below with respect to increasing or decreasing pH values, observed long term increasing trends in analytical parameters, and increases in 2014 parameter concentrations compared with previous years of data. Increasing trends in analytical parameters are statistically significant as discussed in Section 2.5. See Section 2.5 for an explanation of the criteria that was used to decide if an analytical parameter for a WQS was tested for trend.

3.2.1 Reference Water Quality Stations

Table 6 summarizes the results of trend testing for selected parameters at 5 Reference WQS. In summary:

- WQ-VC-REF had a decreasing trend in pH and increasing trends in TSS, TDS, Sulphate, and Total Iron.
- WQ-VC-U had a decreasing trend in field pH, and increasing trends in lab pH, TDS, and Sulphate concentrations. In addition, analytical concentrations were higher in 2014 compared with previous years for TDS and Sulphate.
- WQ-DC-DX had a decreasing trend in lab pH, and increasing trends in TDS, Sulphate, Total Aluminum, Total Arsenic, Total Copper, Total Iron, and Total Lead.
- WQ-DC-DX+105 had an increasing trend in pH, TDS, Sulphate, and Dissolved Molybdenum concentrations. In addition, analytical concentrations were higher in 2014 compared with previous years for TDS.
- WQ-PC-U had a decreasing trend in field pH, and increasing trends in lab pH and TDS. In addition, analytical concentrations were higher in 2014 compared with previous years for TDS.

Note some parameters at the Reference WQS had an outlier on 30 June 2010, 30 May 2012, 29 May 2013 and 7 May 2013 as shown in the Appendix C figures. The June outliers may be attributed to low flow conditions or a high rainfall event, while the May outliers are attributed to spring freshet conditions. Outliers consisting of samples with parameter concentrations greater than 2.7 standard deviations from the WQS median value are plotted on the Appendix D Box plots.

3.2.2 Mine Source Water Quality Stations

Table 7 summarizes the results of trend testing for selected parameters at 6 Mine Source WQS. In summary:

- WQ-TP had a decreasing trend in pH and increasing trends in Total Manganese concentration.
- WQ-SEEP had an increasing trend in pH and increasing trends in TDS, Sulphate, Total Arsenic, Dissolved Arsenic, Dissolved Iron, Total Magnesium and Dissolved Magnesium. In addition, analytical concentrations were higher in 2014 compared with previous years for TDS, Sulphate, Cyanate, Total Arsenic, Dissolved Arsenic, Total Cadmium, Dissolved Iron, Total Manganese, Dissolved Manganese and Dissolved Magnesium.
- WQ-PIT-1 had a decreasing trend in field pH, and an increasing trend in lab pH, TDS, Sulphate, Total Arsenic, and Dissolved Strontium concentrations. In addition, analytical concentrations were higher in 2014 compared with previous years for Total Arsenic, Dissolved Arsenic and Dissolved Strontium.
- WQ-PIT-2 had an increasing trend in lab pH, TDS and Sulphate concentrations. In addition, analytical concentrations were higher in 2014 compared with previous years for Total Arsenic and Dissolved Arsenic.
- WQ-PIT-3 had a decreasing trend in field pH, and an increasing trend in lab pH, TDS, Sulphate, Total Arsenic, and Total Iron concentrations.

- WQ-MS-S-03 had a decreasing trend in field pH, and an increasing trend in lab pH, TDS, Sulphate, Total Arsenic, Total Iron, Dissolved Molybdenum and Total Silver concentrations.

Note some parameters at the Mine Source WQS had an outlier on 29 April 2009, 26 November 2009, 10 December 2009 and 7 March 2012 as shown in the Appendix C figures. The November and December outliers may be attributed to low flow conditions, while the April and March outliers are attributed to spring freshet conditions. Outliers consisting of samples with parameter concentrations greater than 2.7 standard deviations from the WQS median value are plotted on the Appendix D Box plots.

3.2.3 Near-Field Receiving Environment Water Quality Stations

Table 8 summarizes the results of trend testing for selected parameters at 4 NFRE WQS. In summary:

- WQ-DC-D1b had an increasing trend in lab pH, TDS, Sulphate, Ammonia, Total Arsenic, Total Iron and Total Manganese. In addition, analytical concentrations were higher in 2014 compared with previous years for TDS.
- WQ-DC-U had a decreasing trend in field pH and an increasing trend in lab pH, TSS, TDS, Sulphate, Total Aluminum, Total Arsenic, Total Cadmium and Total Manganese. In addition, analytical concentrations were higher in 2014 compared with previous years for TDS, Sulphate, Total Arsenic, Dissolved Arsenic, Total Cadmium, Total Manganese and Dissolved Manganese.
- WQ-DC-R had a decreasing trend in pH and an increasing trend in TSS, TDS, Sulphate, Total Arsenic and Total Iron. In addition, analytical concentrations were higher in 2014 compared with previous years for TDS and Sulphate.
- WQ-PC-D had a decreasing trend in field pH and an increasing trend in lab pH.

Note some parameters at the Near-Field Receiving Environment WQS had an outlier on 14 November 2013, 30 May 2012 and 12 August 2010 as shown in the Appendix C figures. The August and November outliers may be attributed to low flow conditions or a high rainfall event, while the May outliers are attributed to spring freshet conditions. Outliers consisting of samples with parameter concentrations greater than 2.7 standard deviations from the WQS median value are plotted on the Appendix D Box plots.

3.2.4 Far-Field Receiving Environment Water Quality Stations

Table 9 summarizes the results of trend testing for selected parameters at 6 FFRE surface WQS. In summary:

- WQ-BC had a decreasing trend in pH and an increasing trend in Total Aluminum, Total Arsenic, Total Cadmium, Total Chromium, Total Copper, Total Iron, Total Lead, Total Silver and Total Zinc. All listed parameters had statistically significant increasing trends. However, all data plots appeared to have a random plots, other than pH.
- WQ-VC-R had an increasing trend in field pH, TDS, Sulphate and Total Arsenic. In addition, analytical concentrations were higher in 2014 compared with previous years for TDS and Sulphate.
- WQ-VC-R+150 had an increasing trend in Total Antimony and Dissolved Antimony. In addition, the concentrations of these parameters were higher in 2014 than compared

with previous years. Note being this WQS is very close to WQ-VC-R, many of the parameters were not tested at each WQS.

- WQ-VC-DBC had a decreasing trend in field pH and increasing trends in lab pH and TDS. In addition, analytical concentrations were higher in 2014 compared with previous years for TDS.
- WQ-UMN had a decreasing trend in field pH and increasing trends in lab pH and TDS.
- WQ-PW had a decreasing trend in TDS. However, plot of the data appeared random.

Outliers consisting of samples with parameter concentrations greater than 2.7 standard deviations from the WQS median value are plotted on the Appendix D Box plots.

3.3 Contaminant Daily Mass Load Assessment

Results of the daily mass load assessments for the selected WQS are presented in Appendix E. The WQS assessed were as follows:

- Dome Creek Upstream of Mill Site (WQ-DC-DX+105) – Reference WQS
- Seepage Pond Discharge (WQ-SEEP) – Mine Source WQS
- Dome Creek at Road (WQ-DC-R) – Near Field Environment WQS
- Victoria Creek north of Mine Access Road (WQ-VC-R) – Far Field Environment WQS

Water samples were collected at each of the above WQS on the dates identified in the Appendix E tables. One exception was samples for Victoria Creek at Road were collected at WQ-VC-R+150 on 14 April 2014, 9 May 2014 and 16 December 2014. This is the winter sampling location.

Parameters assessed included sulphate (Table E1), total arsenic (Table E2), total iron (Table E3), total manganese (Table E4), total cadmium (Table E5), and total zinc (Table E6). Note one of each type of WQS has been assessed (Reference, Mine Source, etc.).

Review of the flow data indicates that the largest flow rate that was observed at all hydrometric stations was during the spring flow of 9 May 2014. On this date, the flow was 0.019 m³/s at WQ-DC-DX+105, 0.005 m³/s at WQ-SEEP, 0.152 m³/s at WQ-DC-R, and 3.204 m³/s at WQ-VC-R.

The lowest flow rates recorded at the selected stations was 0 m³/s at Upper Dome (WQ-DC-DX+105) in November. It is assumed the flow rates presented in Appendix E at WQ-DC-DX+105 that are labeled as NSM (not suitable for flow measurement) in April and July through October were also 0 m³/s flow rate. Flow rates of 0.001 m³/s were observed at WQ-DC-DX+105 (24 June and 16 December) and at WQ-SEEP (21 May). The lowest flow rate observed at WQ-DC-R was 0.014 m³/s on 24 June and at WQ-VC-R the lowest was 0.121 on 15 July.

As shown in Table E1, in 2014 the sulphate mass load was in general the least at the Reference WQS DC-DX+105 and increased in mass load as the water traveled down gradient to the FFRE WQS WQ-VC-R. On some sample dates the arsenic load was higher at WQ-DC-DX than at WQ-SEEP. The largest sulphate loads were observed on 9 May 2014 at WQ-DC-R (2233 kg/d) and at WQ-VC-R (2646 kg/d). The largest 2013 sulphate load reported in SLR (2015a) was 2324 kg/d at WQ-DC-DX on 24 September 2013.

As shown in Table E2, in 2014 the arsenic mass load was in general the least at the Reference WQS WQ-DC-DX+105 and increased in mass load as the water traveled down gradient to the FFRE WQS (WQ-VC-R). The largest total arsenic load observed was on 9 May 2014 at WQ-VC-R (1.207 kg/d). The largest 2013 arsenic load reported in SLR (2015a) was 0.45 kg/d at WQ-DC-R on 11 June 2013.

As shown in Table E3, in 2014 the iron mass load was in general the least at the Reference WQS WQ-DC-DX+105 and increased in mass load as the water traveled down gradient to the FFRE WQS WQ-VC-R. The largest total iron load observed was on 9 May 2014 at WQ-VC-R (432 kg/d). The largest 2013 iron load reported in SLR (2015a) was 66.6 kg/d at WQ-VC-R on 11 June 2013.

As shown in Table E4, in 2014 the manganese mass load was in general the least at the Reference WQS WQ-DC-DX+105 and increased in mass load as the water traveled down gradient to the FFRE WQS WQ-VC-R. The largest total manganese load observed was on 9 May at WQ-VC-R (31 kg/d). The largest 2013 manganese load reported in SLR (2015a) was 8.1 kg/d at WQ-VC-R on 24 September 2013.

As shown in Table E5, in 2014 the cadmium mass load was in general the least at the Mine Source WQS WQ-SEEP and was the highest in mass load at the FFRE WQS WQ-VC-R. The largest total cadmium load observed was on 9 May at WQ-VC-R (0.037 kg/d). The largest 2013 cadmium load reported in SLR (2015a) was 0.004 kg/d WQ-VC-R on 11 June 2013.

As shown in Table E6, in 2014 the zinc mass load was in general the least at the Mine Source WQS WQ-SEEP and was the highest in mass load at the FFRE WQS WQ-VC-R. The largest total cadmium load observed was on 9 May at WQ-VC-R (3.0 kg/d). The largest 2013 zinc load reported in SLR (2015a) was 0.64 kg/d at WQ-VC-R on 24 September 2013.

Note the WQ-DC-DX WQS is a Reference station and WQ-DC-R is a NFRE station.

3.4 Water Sample Quality Assurance and Quality Control

The number of replicate water samples collected for laboratory analyses at each WQS is provided in tables 2 through 5. The values of the replicate samples can be compared with the values of the original sample in tables A2, A3, A5 – A11, A14, A19, A26-A28, and A31-A36 of Appendix A. Review indicates all sample parameters were very similar for the original and replicate samples indicating the data appeared to be representative of the sampled conditions.

Table A38 provides the results of the 46 field blanks that were submitted for laboratory analyses. The number of samples where a parameter was marginally detected is summarized as follows calcium (1), chloride (5), sodium (3), sulphate (1), ammonia (3), nitrate (3), nitrite (2), total phosphorus (1), cyanide CN-WAD (1), CN-SAD (7), total aluminum (6), antimony (1), arsenic (3), barium (8), bismuth (1), boron (3), cadmium (2), calcium (5), chromium (2), cobalt (4), copper (10), iron (8), lead (3), magnesium (2), manganese (5), molybdenum (2), potassium (4), silicon (6), sodium (13), strontium (8), sulphur (1), tellurium (1), tin (2), titanium (4), vanadium (1), and zinc (13). The dissolved metals parameter with the most sample detected (13) was again zinc. The number of each parameter that exceeded the laboratory detection limits are presented on the last column of Table A38.

Table A39 provides the results of the 46 travel blanks that were submitted for laboratory analyses. The last column of Table A39 provides a summary of how many samples, for each

parameter, exceeded the laboratory detection limit. The parameters with the most exceedances of the laboratory detection limits was ammonia (16) followed by sodium (15).

4.0 CONCLUSIONS

4.1 Reference WQS

The water quality at the Reference WQS have been impacted by anthropogenic activities not related to the Site. The Reference WQS analytical parameters with median concentrations that exceeded a CCME FAL Guideline, at one or more WQS, included the following.

- Total Phosphorus
- Nitrite-N
- Total Aluminum
- Total Arsenic
- Total Cadmium
- Total Copper
- Total Iron
- Total Lead
- Total Selenium
- Total Zinc

The analytical parameters with median concentrations that exceeded the EQS, at one or more WQS, included the following:

- TSS
- Total Iron
- Total Zinc

A statistically significant (95% confidence) increasing trend was noted at one or more WQS for the following analytical parameters:

- TSS
- TDS
- Sulphate
- Total Aluminum
- Total Arsenic
- Total Copper
- Total Iron
- Total Lead
- Dissolved Molybdenum

Parameters with analytical concentrations that notably increased in 2014, compared with previous years, and the corresponding WQS were as follows:

- TDS (WQ-VC-U, WQ-DC-DX+105, WQ-PC-U)
- Sulphate (WQ-VC-U)

4.2 Mine Source WQS

The Mine Source WQS analytical parameters with median concentrations that exceeded a CCME FAL Guideline, at one or more WQS, included the following.

- Total Phosphorus
- Nitrite-N
- CN-WAD
- Total Aluminum
- Total Arsenic
- Total Cadmium
- Total Copper
- Total Iron
- Total Lead
- Total Silver
- Total Zinc

The analytical parameters with median concentrations that exceeded the EQS, at one or more WQS, included the following:

- TSS
- Total Iron
- Total Manganese
- Total Zinc

A statistically significant (95% confidence) increasing trend was noted at one or more WQS for the following analytical parameters:

- TDS
- Sulphate
- Total Arsenic
- Dissolved Arsenic
- Total Iron
- Dissolved Iron
- Total Lead
- Total Manganese
- Total Magnesium
- Dissolved Magnesium
- Dissolved Molybdenum
- Total Silver
- Dissolved Strontium

Parameters with analytical concentrations that notably increased in 2014, compared with previous years, and the corresponding WQS were as follows:

- TDS (WQ-SEEP)
- Sulphate (WQ-SEEP)
- Cyanate (WQ-SEEP)
- Total Arsenic (WQ-SEEP, WQ-PIT-1, WQ-PIT-2)

- Dissolved Arsenic (WQ-SEEP, WQ-PIT-1, WQ-PIT-2)
- Total Cadmium (WQ-SEEP)
- Dissolved Iron (WQ-SEEP)
- Total Manganese (WQ-SEEP)
- Dissolved Manganese (WQ-SEEP)
- Dissolved Magnesium (WQ-SEEP)
- Dissolved Strontium (WQ-SEEP)

4.3 Near Field Receiving Environment WQS

The NFRE analytical parameters with median concentrations that exceeded a CCME FAL Guideline, at one or more WQS, included the following.

- Total Phosphorus
- Nitrite-N
- Total Aluminum
- Total Arsenic
- Total Cadmium
- Total Copper
- Total Iron
- Total Lead
- Total Zinc

The analytical parameters with median concentrations that exceeded the EQS, at one or more WQS, included the following:

- TSS
- Total Iron
- Total Manganese
- Total Zinc

A statistically significant (95% confidence) increasing trend was noted at one or more WQS for the following analytical parameters:

- TDS
- Sulphate
- Ammonia
- Total Aluminum
- Total Arsenic
- Total Cadmium
- Total Iron
- Total Manganese

Parameters with analytical concentrations that notably increased in 2014, compared with previous years, and the corresponding WQS were as follows:

- TDS (WQ-DC-D1b, WQ-DC-U, WQ-DC-R)
- Sulphate (WQ-DC-U, WQ-DC-R)
- Total Arsenic (WQ-DC-U)

- Dissolved Arsenic (WQ-DC-U)
- Total Cadmium (WQ-DC-U)
- Total Manganese (WQ-DC-U)
- Dissolved Manganese (WQ-DC-U)

4.4 Far Field Receiving Environment WQS

The FFRE analytical parameters with median concentrations that exceeded a CCME FAL Guideline, at one or more WQS, included the following.

- Total Phosphorus
- Nitrite-N
- Total Aluminum
- Total Arsenic
- Total Cadmium
- Total Copper
- Total Iron
- Total Lead

The analytical parameters with median concentrations that exceeded the EQS, at one or more WQS, included the following:

- TSS
- Total Manganese

A statistically significant (95% confidence) increasing trend was noted at one or more WQS for the following analytical parameters:

- TDS
- Sulphate
- Total Aluminum
- Total Antimony
- Dissolved Antimony
- Total Arsenic
- Total Cadmium
- Total Chromium
- Total Copper
- Total Iron
- Total Lead
- Total Silver
- Total Zinc

Parameters with analytical concentrations that notably increased in 2014, compared with previous years, and the corresponding WQS were as follows:

- TDS (WQ-VC-R, WQ-VC-DBC)
- Sulphate (WQ-VC-R)
- Total Antimony (WQ-VC-R+150)
- Dissolved Antimony (WQ-VC-R+150)

4.5 Contaminant Daily Mass Load

The maximum daily loads of selected contaminants occurred on 9 May 2014 at the Victoria Creek north of mine access road WQ-VC-R WQS were as follows: Sulphate – 2646 kg/d, Arsenic – 1.2 kg/d, Iron – 432 kg/d, Manganese – 31 kg/d, Cadmium 0.04 kg/d and Zinc – 3.0 kg/d. Note the WQ-VC-R WQS is a FFRE station.

The maximum daily loads of contaminants reported by SLR (2015a) using 2013 data was as follows: Sulphate – 2324 kg/d at WQ-DC-DX on 24 September 2013, Arsenic – 0.45 kg/d at WQ-DC-R on 11 June 2013, Iron – 66.6 kg/d at WQ-VC-R on 11 June 2013, Manganese – 8.1 kg/d at WQ-VC-R on 24 September 2013, Cadmium 0.004 kg/d WQ-VC-R on 11 June 2013 and Zinc – 0.64 kg/d at WQ-VC-R on 24 September 2013. Note the WQ-DC-DX WQS is a Reference station and WQ-DC-R is a NFRE station.

5.0 SIGNATURE PAGE

I trust this document is sufficient for your current purposes. Please contact me at 250-516-3370 or rob@artifexeh.com with any questions or comments.

Prepared by:

FINAL REPORT SIGNED BY

Robert K. McLean, M.Sc, P.Eng.

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TABLES

Table 1a: CCME-FAL Guidelines and EQS Water Licence - Physical, routine, nutrients & cyanide

Sample ID	Units	CCME-FAL Guidelines ¹	EQS ²
<i>Field Physical Parameters</i>			
pH	pH units	6.5 - 9.0	--
Conductivity	µS/cm	--	--
Turbidity	NTU	--	--
Temperature	C	--	--
<i>Laboratory Physical Parameters</i>			
pH	pH units	6.5 - 9.0	6.0 to 8.5
Conductivity	µS/cm	--	--
<i>Routine Parameters</i>			
Total Suspended Sediment	mg/L	--	50
Total Dissolved Solids	mg/L	--	--
Hardness	mg/L	--	--
Alkalinity-Total	mg/L	--	--
Bicarbonate	mg/L	--	--
Carbonate	mg/L	--	--
Hydroxide	mg/L	--	--
Calcium	mg/L	--	--
Chloride	mg/L	120	
Fluoride	mg/L	0.12	
Magnesium	mg/L	--	--
Potassium	mg/L	--	--
Sodium	mg/L	--	--
Sulphate	mg/L	--	--
Turbidity	NTU	--	--
<i>Nutrients</i>			
Ammonia-N	mg/L	f(T,pH)	--
Nitrate-N	mg/L	2.9	--
Nitrite-N	mg/L	0.06	--
Total Phosphorus	mg/L	0.004 - 0.1 ³	--
<i>Cyanide Compounds</i>			
Cyanide - T	mg/L	--	0.3
Cyanate	mg/L	--	--
Thiocyanate	mg/L	--	--
CN-WAD	mg/L	0.005 (as free CN)	0.1
CN-SAD	mg/L	--	--

Note:

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards (EQS)

3 - trigger range guideline dependent on water type, Ultra-oligotrophic for low range (0.004 mg/L) and Hyper-eutrophic for high range (0.1 mg/L)

Table 1b: CCME-FAL Guidelines and EQS Water Licence -

Allowable Ammonia concentration as a function of pH and Temperature (mg/L)

		pH							
		6	6.5	7	7.5	8	8.5	9	10
Temp (°C)	0	231	73	23.1	7.32	2.33	0.749	0.25	0.042
	5	153	48.3	15.3	4.84	1.54	0.502	0.172	0.034
	10	102	32.4	10.3	3.26	1.04	0.343	0.121	0.029
	15	69.7	22	6.98	2.22	0.715	0.239	0.089	0.026
	20	48	15.2	4.82	1.54	0.499	0.171	0.067	0.024
	25	33.5	10.6	3.37	1.08	0.354	0.125	0.053	0.022
	30	23.7	7.5	2.39	0.767	0.256	0.094	0.043	0.021

Note: Ammonia table reproduced from CCME website

Table 1c: CCME-FAL Guidelines and EQS Water Licence - Total Metals

Sample ID	Units	CCME-FAL Guidelines ¹	EQS ²
<i>Total Metals</i>			
Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--
Antimony	mg/L	--	0.15
Arsenic	mg/L	0.005	--
Barium	mg/L	--	1
Beryllium	mg/L	--	--
Bismuth	mg/L	--	--
Boron	mg/L	1.5	--
Cadmium	mg/L	0.00004 for hardness >0 to <17mg/L, CWQG= $1/1000 \cdot 10^{(0.83(\log[\text{hardness}]) - 2.46)}$ for hardness >17to<280mg/L, 0.00037for hardness >280mg/L	0.02
Calcium	mg/L	--	--
Chromium - Trivalent ⁴	mg/L	0.0089	0.04
Cobalt	mg/L	--	--
Copper	mg/L	0.002 for hardness >0 to <82mg/L, CWQG= $1/1000 \cdot e^{(0.8545(\ln[\text{hardness}]) - 1.465)}$ for hardness >82to<180mg/L, 0.004 for hardness >180mg/L	0.2
Iron	mg/L	0.3	1
Lead	mg/L	0.001 for hardness >0 to <60mg/L, CWQG= $1/1000 \cdot e^{(1.273(\ln[\text{hardness}]) - 4.705)}$ for hardness >60to<180mg/L, 0.007 for hardness >180mg/L	0.1
Lithium	mg/L	--	--
Magnesium	mg/L	--	--
Manganese	mg/L	--	0.5
Mercury	mg/L	0.000026	--
Molybdenum	mg/L	0.073	--
Nickel	mg/L	0.025 for hardness >0 to <60mg/L, CWQG= $1/1000 \cdot e^{(0.76(\ln[\text{hardness}]) + 1.06)}$ for hardness >60to<180mg/L, 0.15 for hardness >180mg/L	0.3
Potassium	mg/L	--	--
Selenium	mg/L	0.001	--
Silicon	mg/L	--	--
Silver	mg/L	0.00025	0.1
Sodium	mg/L	--	--
Strontium	mg/L	--	--
Sulphur	mg/L	--	--
Tellurium	mg/L	--	--
Thallium	mg/L	0.0008	--
Thorium	mg/L	--	--
Tin	mg/L	--	--
Titanium	mg/L	--	--
Uranium	mg/L	0.015	--
Vanadium	mg/L	--	--
Zinc	mg/L	0.03	0.3
Zirconium	mg/L	--	--

Note:

- 1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)
- 2 - Water Licence Effluent Quality Standards (EQS)
- 3 - trigger range guideline dependent on water type, Ultra-oligotrophic for low range (0.004 mg/L) and Hyper-eutrophic for high range (0.1 mg/L)
- 4 - Guideline for Trivalent Chromium compared against Total Chromium samples as per SLR (2015)

Table 1d: CCME-FAL Guidelines and EQS Water Licence - Dissolved Metals

Sample ID	Units	CCME-FAL Guidelines ¹	EQS ²
<i>Dissolved Metals</i>			
Aluminum	mg/L	--	--
Antimony	mg/L	--	--
Arsenic	mg/L	--	0.15
Barium	mg/L	--	--
Beryllium	mg/L	--	--
Bismuth	mg/L	--	--
Boron	mg/L	--	--
Cadmium	mg/L	--	--
Chromium	mg/L	--	--
Cobalt	mg/L	--	--
Copper	mg/L	--	--
Iron	mg/L	--	--
Lead	mg/L	--	--
Lithium	mg/L	--	--
Magnesium	mg/L	--	--
Manganese	mg/L	--	--
Mercury	mg/L	--	--
Molybdenum	mg/L	--	--
Nickel	mg/L	--	--
Phosphorus	mg/L	--	--
Potassium	mg/L	--	--
Selenium	mg/L	--	--
Silicon	mg/L	--	--
Silver	mg/L	--	--
Strontium	mg/L	--	--
Sulphur	mg/L	--	--
Thallium	mg/L	--	--
Thorium	mg/L	--	--
Tin	mg/L	--	--
Titanium	mg/L	--	--
Uranium	mg/L	--	--
Vanadium	mg/L	--	--
Zinc	mg/L	--	--
Zirconium	mg/L	--	--

Note:

- 1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)
- 2 - Water Licence Effluent Quality Standards (EQS)
- 3 - trigger range guideline dependent on water type, Ultra-oligotrophic for low range (0.004 mg/L) and Hyper-eutrophic for high range (0.1 mg/L)

Table 2: Reference Water Quality Stations

Appendix Table# A/B	WQID	Water Quality Site	Sample Dates	Samples	Replicate	Trend Analysis (# Parameters)	
						Appendix	
						C	D
1	VC-REF	Victoria Creek Reference	May 2008 - Jan 2014	75	0	10	1
2	VC-U	Victoria Creek, north of confluence Back Creek	Apr 2008 - Mar 2015	123	4	8	1
3	DRY	Dry Creek reference site	May 2008 - Sep 2013	15	0	0	0
4	DC-DX	Dome Creek, upstream of Mill Site	May 2008 - Oct 2014	69	4	12	1
5	DC-DX+105	Dome Creek, upstream of Mill Site	Apr 2012 - Feb 2015	45	5	14	1
6	PC-U	Pony Creek, upstream of pit and waste rock	May 2008 - Oct 2014	74	5	7	1
7	MN	Minnesota Creek	Apr 2012 - Nov 2013	25	1	0	0

Table 3: Mine Source Water Quality Stations

Appendix Table# A/B	WQID	Water Quality Site	Sample Dates	Samples	Replicate	Trend Analysis (# Parameters)	
						Appendix	
						C	D
8	TP	Tailings Pond	May 2008 - Mar 2015	97	3	14	10
9	SEEP	Seepage Pond Discharge	May 2008 - Mar 2015	123	16	16	14
10	PIT1	Brown-McDade Pit Site - Top	Jun 2008 - Mar 2015	67	1	11	10
11	PIT2	Brown-McDade Pit Site - Middle	Jun 2008 - Mar 2015	67	0	9	9
12	PIT3	Brown-McDade Pit Site - Bottom	Jun 2008 - Mar 2015	67	0	13	10
13	MS-S-03	Mill Site Seep 03	Apr 2012 - Mar 2015	30	2	15	1
14	MS-S-08	Mill Site Seep 08	Nov 2012 - May 2014	4	0	0	0
15	DAM-SEEP	Dam Seep	Jul 2012	1	0	0	0
16	ADIT-SEEP	Adit Seep	Jun 2012 - Jun 2013	5	0	0	0
17	SP-1	Seepage Pond surface	Jun 2013	1	0	0	0
17	SP-2	Seepage Pond bottom	Jun 2013	9	0	0	0
18	DC-B	Dome Creek Diversion Channel at Bridge	Feb 2014 - Oct 2014	1	2	0	0
19	ORE	Ore Ramp into Pit Lake	May 2014	1	0	0	0
20	NW-SEEP-01	East toe of NW pile seep	May 2014	5	0	0	0
21	DESS-01	Dome East Slope Seep 1	Oct 2013 - May 2014	4	0	0	0
21	DESS-02	Dome East Slope Seep 2	Oct 2013 - May 2014	2	0	0	0
21	DESS-03	Dome East Slope Seep 3	Oct 2013 - May 2014	4	0	0	0
22	CH-P-13-01	Monitoring well along Dome Creek valley	Jun 2014 - Oct 2014	1	0	0	0
23	ET-01	Exploration trench 1	May 2015	1	0	0	0
23	L2	Lysimeter 2	May 2015	1	0	0	0
24	DC-1	Dome Creek downstream of tailings pond	Mar 2015	1	0	0	0
24	DC-2	Dome Creek North of tailings pond	Mar 2015	1	0	0	0
24	DC-3	Dome Creek upstream of tailings pond	Mar 2015	1	0	0	0
24	DC-4	Dome Creek upstream of tailings pond	Mar 2015	1	0	0	0
24	DC-7	Dome Creek downstream of Mill Site	Mar 2015	1	0	0	0
24	DC-8	Dome Creek downstream of Mill Site	Mar 2015	1	0	0	0
24	DC-10	Dome Creek downstream of Mill Site	Mar 2015	1	0	0	0

Table 4: Near-Field Receiving Environment Water Quality Stations

Appendix Table# A/B	WQID	Water Quality Site	Sample Dates	Samples	Replicate	Trend Analysis (# Parameters)	
						Appendix	
						C	D
25	DC-D1	Dome Creek, downstream of Mill Site and Upstream of Tailings Pond	Jun 2008 - May 2013	60	1	0	0
26	DC-D1b	Dome Creek, downstream of Mill Site and Upstream of Tailings Pond	May 2012 - Oct 2014	24	1	12	1
27	DC-U	Upper Dome Creek, downstream of Tailings Pond	May 2008 - Jan 2015	106	7	12	10
28	DC-U1	Dome Creek upstream of Tailings Pond	May 2012 - Nov 2013	20	0	0	0
29	DC-U2	Dome Creek upstream of Tailings Pond	May 2012 - Nov 2013	20	0	0	0
30	DC-R	Dome Creek at road	May 2008 - Oct 2014	77	5	10	10
31	PC-D	Pony Creek downstream of pit	May 2008 - Nov 2014	74	4	11	9

Table 5: Far-Field Receiving Environment Water Quality Stations and Field/Trip Blanks

Appendix Table# A/B	WQID	Water Quality Site	Sample Dates	Samples	Replicate	Trend Analysis (# Parameters)	
						Appendix	
						C	D
32	BC	Back Creek, near confluence with Victoria Creek	May 2008 - Oct 2014	74	1	13	1
33	VC-R	Victoria Creek, north of Mine Access Road	May 2008 - Nov 2014	92	6	11	11
34	VC-R+150	Victoria Creek winter sampling location	Dec 12 - Mar 2015	17	1	3	1
35	VC-DBC	Victoria Creek, downstream of Back Creek	Apr 2012 - Mar 2015	49	8	8	1
36	VC-UMN	Victoria Creek, upstream of Minnesota Creek	Apr 2012 - Mar 2015	48	6	8	1
37	PW	Pumphouse Well	Apr 2012 - Mar 2015	46	0	3	1
38	Field	Field Blank	Apr 2012 - Mar 2015	46	0	0	0
39	Travel	Travel Blank	Apr 2012 - Mar 2015	47	0	0	0

Table 6: Water Quality Station Parameter Concentration Trend Analysis - Reference Sites

Parameter	Water Quality Station				
	WQ-VC-REF	WQ-VC-U	WQ-DC-DX	WQ-DC-DX+105	WQ-PC-U
Samples	75	123	69	45	74
pH - field	DT	DT	TNS-AR	IT	DT
pH - lab	DT	IT	DT	IT	IT
TSS	IT	NST-AR	NST-AIT	NST-ADT	NST-AR
TDS	IT	IT	IT	IT	IT
Sulphate	IT	IT	IT	IT	DT
Ammonia	--	--	--	--	--
Nitrite	--	--	NST-ADT	NST-ADT	--
Cyanate	--	--	--	--	--
Total Aluminum	TNS-AR	DT	IT	DT	DT
Total Antimony	--	--	--	--	--
Dissolved Antimony	--	--	--	--	--
Total Arsenic	--	--	IT	DT	--
Dissolved Arsenic	--	--	--	--	--
Total Cadmium	DT	--	--	DT	--
Total Chromium	--	--	--	--	--
Total Copper	DT	DT	IT	NST-ADT	--
Total Iron	IT	DT	IT	DT	DT
Dissolved Iron	--	--	--	--	--
Total Lead	DT	--	IT	--	--
Total Manganese	--	--	--	NST-AR	--
Dissolved Manganese					
Total Magnesium	--	--	--	--	--
Dissolved Magnesium	--	--	--	--	--
Dissolved Molybdenum	--	--	--	IT	--
Total Selenium	--	--	--	--	--
Total Silver	--	--	--	--	--
Dissolved Strontium	--	--	--	--	--
Total Zinc	--	--	TNS-AR	DT	--

DT - decreasing trend that is statistically significant at 95% confidence level

IT - increasing trend that is statistically significant at 95% confidence level

TNS - trend is not significant at 95% confidence level

NST - No Significance Test completed (>10% of samples were ND)

ADT - Apparent Decreasing Trend

AIT - Apparent Increasing Trend

AR - Appears Random

bold - outlier has been removed from data before conducting trend analysis

-- Trend not tested (less than 10% of samples exceeded CCME or EQS and no visual indication of trend in data)

Note the field pH sample numbers are much less than the general sample number shown in the table

2014 increase in parameter concentration compared with previous years

Appendix D - increase in 2014 concentration compared with other years based on Appendix D plot

Table 7: Water Quality Station Parameter Concentration Trend Analysis - Mine Source

Parameter	Water Quality Station					
	WQ-TP	WQ-SEEP	WQ-PIT-1	WQ-PIT-2	WQ-PIT-3	WQ-MS-S-03
Samples	97	123	67	67	67	30
pH - field	DT	IT	DT	IT	DT	DT
pH - lab	DT	IT	IT	IT	IT	IT
TSS	NST-ADT	DT-AR	NST-AR	NST-AR	NST-AR	DT
TDS	DT	IT	IT	IT	IT	IT
Sulphate	DT	IT	IT	IT	IT	IT
Ammonia	DT-AR	DT	--	--	--	TNS-ADT
Nitrite	NST-AR	NST-ADT	--	--	NST-AR	--
Cyanate	--	Appendix D	--	--	--	--
Total Aluminum	DT	DT	--	--	DT	--
Total Antimony	--	--	--	--	--	--
Dissolved Antimony	--	--	--	--	--	--
Total Arsenic	--	IT	IT	Appendix D	IT	IT
Dissolved Arsenic	--	IT	Appendix D	Appendix D	--	--
Total Cadmium	DT	DT-AR	DT	DT	DT-AR	DT-AR
Total Chromium	--	--	--	--	--	--
Total Copper	DT	DT	DT	DT	DT	TNS-AR
Total Iron	DT	DT-AIT	--	--	IT	IT
Dissolved Iron	--	IT	--	--	--	--
Total Lead	--	--	--	--	--	IT-AR
Total Manganese	IT	AIT	DT	DT	DT	TNS-AR
Dissolved Manganese		Appendix D				
Total Magnesium	--	IT	--	--	--	--
Dissolved Magnesium	--	IT	--	--	--	--
Dissolved Molybdenum	--	--	--	--	--	IT
Total Selenium	--	--	--	--	--	--
Total Silver	DT	--	--	--	--	IT
Dissolved Strontium	--	--	IT	--	--	--
Total Zinc	DT	--	DT	DT	DT	DT

DT - decreasing trend that is statistically significant at 95% confidence level

IT - increasing trend that is statistically significant at 95% confidence level

TNS - trend is not significant at 95% confidence level

NST - No Significance Test completed (>10% of samples were ND)

ADT - Apparent Decreasing Trend

AIT - Apparent Increasing Trend

AR - Appears Random

bold - outlier has been removed from data before conducting trend analysis

-- Trend not tested (less than 10% of samples exceeded CCME or EQS and no visual indication of trend in data)

Note the field pH sample numbers are much less than the general sample number shown in the table

2014 increase in parameter concentration compared with previous years

Appendix D - increase in 2014 concentration compared with other years based on Appendix D plot

Table 8: Water Quality Station Parameter Concentration Trend Analysis - Near Field Environment

Parameter	Water Quality Station			
	WQ-DC-D1b	WQ-DC-U	WQ-DC-R	WQ-PC-D
Samples	24	106	77	74
pH - field	TNS-AR	DT	DT	DT
pH - lab	IT	IT	DT	IT
TSS	NST-AR	IT	IT	NST-ADT
TDS	IT	IT	IT	DT
Sulphate	IT	IT	IT	DT
Ammonia	IT	--	--	--
Nitrite	--	NST-AR	--	--
Cyanate	--	--	--	--
Total Aluminum	NST-AR	IT-AR	TNS-AR	DT
Total Antimony	--	--	--	--
Dissolved Antimony	--	--	--	--
Total Arsenic	IT	IT	IT-AR	DT
Dissolved Arsenic	--	Appendix D	--	--
Total Cadmium	DT	IT	--	--
Total Chromium	--	--	--	--
Total Copper	--	DT	DT	DT
Total Iron	IT	IT-AR	IT	DT
Dissolved Iron	--	--	--	--
Total Lead	--	--	--	--
Total Manganese	IT	IT	--	--
Dissolved Manganese	--	Appendix D	--	--
Total Magnesium	--	--	--	--
Dissolved Magnesium	--	--	--	--
Dissolved Molybdenum	--	--	--	--
Total Selenium	--	--	--	--
Total Silver	--	--	--	--
Dissolved Strontium	--	--	--	--
Total Zinc	DT	--	DT	DT

DT - decreasing trend that is statistically significant at 95% confidence level

IT - increasing trend that is statistically significant at 95% confidence level

TNS - trend is not significant at 95% confidence level

NST - No Significance Test completed (>10% of samples were ND)

ADT - Apparent Decreasing Trend

AIT - Apparent Increasing Trend

AR - Appears Random

bold - outlier has been removed from data before conducting trend analysis

-- Trend not tested (less than 10% of samples exceeded CCME or EQS and no visual indication of trend in data)

Note the field pH sample numbers are much less than the general sample number shown in the table

2014 increase in parameter concentration compared with previous years

Appendix D - increase in 2014 concentration compared with other years based on Appendix D plot

Table 9: Water Quality Station Parameter Concentration Trend Analysis - Far Field Environment

Parameter	Water Quality Station					
	WQ-BC	WQ-VC-R	WQ-VC-R+150	WQ-VC-DBC	WQ-UMN	WQ-PW
Samples	74	92	17	49	48	--
pH - field	DT	IT	--	DT	DT	--
pH - lab	DT	TNS-AR	--	IT	IT	--
TSS	NST-AR	NST-AR	--	NST-ADT	NST-ADT	--
TDS	DT-AR	IT	--	IT	IT-AR	DT-AR
Sulphate	--	IT	--	--	--	--
Ammonia	--	--	--	--	--	--
Nitrite	--	--	--	--	--	NST-ADT
Cyanate	--	--	--	--	--	--
Total Aluminum	IT-AR	TNS-AR	--	DT	DT	--
Total Antimony	--	--	IT	--	--	--
Dissolved Antimony	--	--	IT	--	--	--
Total Arsenic	IT-AR	IT-AR	--	DT	DT	--
Dissolved Arsenic	--	--	--	--	--	--
Total Cadmium	IT-AR	TNS-AR	--	--	--	--
Total Chromium	IT-AR	--	--	--	--	--
Total Copper	IT-AR	TNS-AR	--	DT	DT	--
Total Iron	IT-AR	TNS-AR	--	DT	DT	--
Dissolved Iron	--	--	--	--	--	--
Total Lead	IT-AR	TNS-AR	--	--	--	--
Total Manganese	--	--	--	--	--	--
Dissolved Manganese	--	--	--	--	--	--
Total Magnesium	--	--	--	--	--	--
Dissolved Magnesium	--	--	--	--	--	--
Dissolved Molybdenum	--	--	--	--	--	--
Total Selenium	--	--	--	--	--	--
Total Silver	IT-AR	--	--	--	--	--
Dissolved Strontium	--	--	--	--	--	--
Total Zinc	IT-AR	--	--	--	--	--

DT - decreasing trend that is statistically significant at 95% confidence level

IT - increasing trend that is statistically significant at 95% confidence level

TNS - trend is not significant at 95% confidence level

NST - No Significance Test completed (>10% of samples were ND)

ADT - Apparent Decreasing Trend

AIT - Apparent Increasing Trend

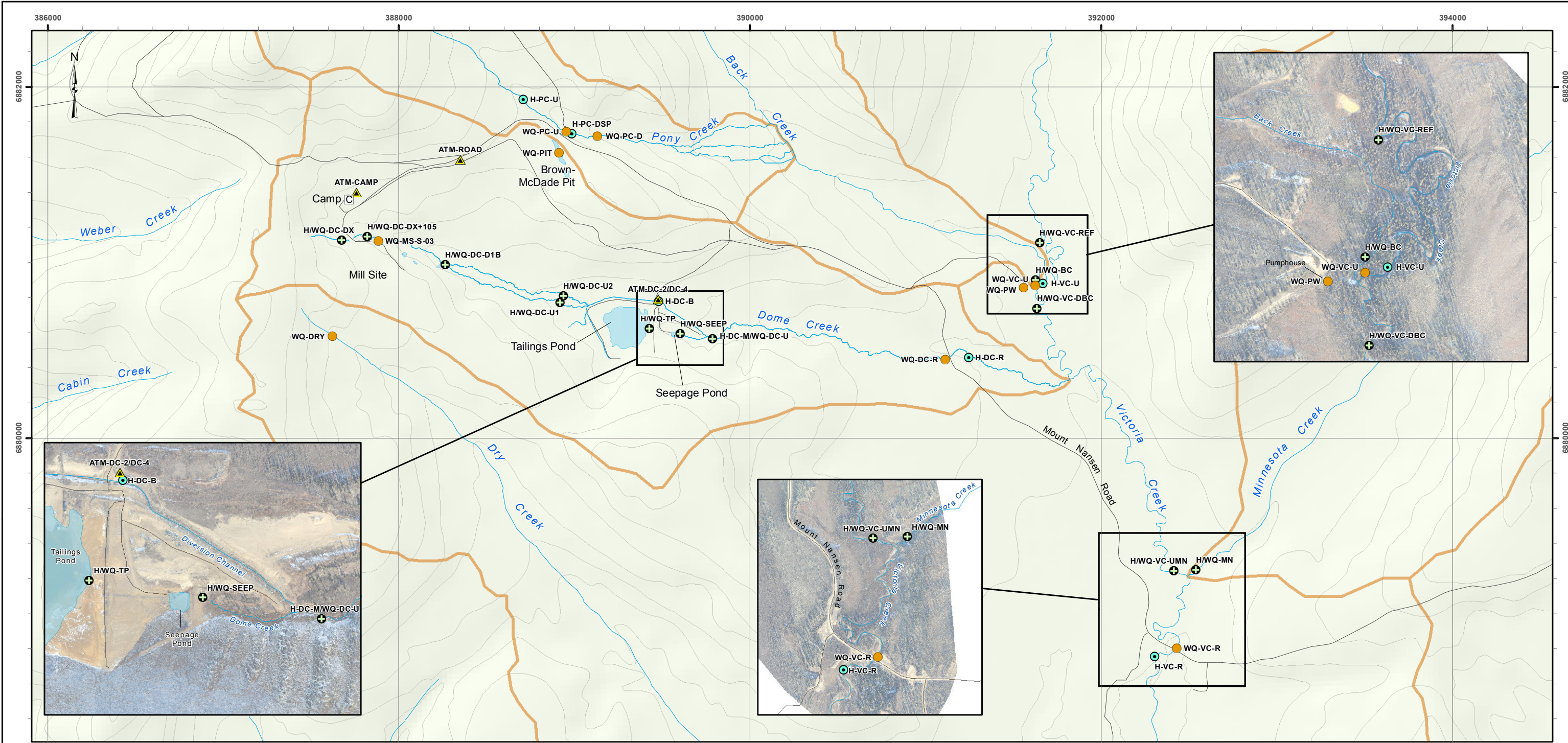
AR - Appears Random

bold - outlier has been removed from data before conducting trend analysis

-- Trend not tested (less than 10% of samples exceeded CCME or EQS and no visual indication of trend in data)

Note the field pH sample numbers are much less than the general sample number shown in the table

FIGURES



Mount Nansen Site: Hydrometric Stations and Water Quality Sites

Legend

- Atmospheric Station (label ex: ATM-DC-2)
- Hydrometric Station and Water Quality Site (label ex: H/WQ-VC-UMN)
- Hydrometric Station (label ex: H-VC-R)
- Water Quality Site (label ex: WQ-PC-U)
- Unpaved Road/Access
- Drainage Areas (Local)

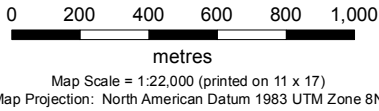
1:50,000 and 1:250,000 Topographic Spatial Data provided by Geomatics - Yukon Government via online source (Corporate Spatial Warehouse) www.geomatics.yukon.ca.

Digital Elevation Model provided by Geomatics - Yukon Government via online source (Corporate Spatial Warehouse) www.geomatics.yukon.ca.

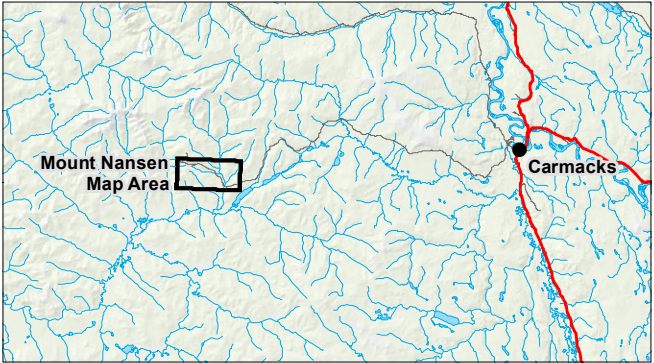
Watercourse, drainage areas and Mount Nansen Road layers digitized / modified by EDI (2011) using orthophotos provided by Yukon Government, Energy, Mines and Resources (2011).

Project data displayed is site specific. Data collected by EDI Environmental Dynamics Inc. (2013) was obtained using Garmin GPS technology.

This document is not an official land survey and the spatial data presented is subject to change.



Drawn: LG	Checked: MM	FIGURE 1	Date: 20/03/2014
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APPENDIX A

WATER QUALITY STATION ANALYTICAL RESULTS

CCME GUIDELINE AND EQS EXCEEDANCES

SEE EXCEL SPREADSHEET

APPENDIX B

STATISTICAL SUMMARY TABLES FOR ALL WATER QUALITY STATIONS

Table B1. Summary of Victoria Creek Reference (WQ-VC-REF) Water Quality (May 2008 - Jan 2014)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	31	31	1	5.8	7.3	7.5	7.7	7.9
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	74	74	0	6.9	7.4	7.7	7.8	8.2
Hardness (as CaCO ₃)	mg/L	--	--	74	74	--	23.0	68.0	85.0	101.3	135.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	75	75	--	15.0	60.0	73.0	92.0	116.0
Sulphate	mg/L	--	--	75	72	--	2.0	10.0	14.0	16.0	40.0
Total Suspended Solids	mg/L	--	50	75	33	10	1.0	5.2	11.3	84.5	984.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	75	19	0	0.006	0.010	0.030	0.050	0.280
Nitrate-N	mg/L	2.9	--	75	59	0	0.014	0.060	0.090	0.150	0.220
Nitrite-N	mg/L	0.06	--	75	10	2	0.003	0.030	0.040	0.063	0.170
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	75	20		0.006	0.015	0.036	0.179	0.811
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	15	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	75	6	--	0.20000	0.20000	0.20000	0.41250	0.90000
Thiocyanate	mg/L	--	--	75	27	--	0.10000	0.20000	0.40000	0.79000	1.70000
CN-WAD	mg/L	0.005	0.1	75	22	0	0.00200	0.00200	0.00200	0.00200	0.00400
CN-SAD	mg/L	--	--	60	37	--	0.00200	0.00200	0.00400	0.00700	0.11000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	75	75	26	0.00900	0.02400	0.06000	0.19100	13.70000
Total Antimony	mg/L	--	--	75	23	0	0.00010	0.00014	0.00020	0.00022	0.00050
Total Arsenic	mg/L	0.005	--	75	71	3	0.00020	0.00030	0.00045	0.00073	0.01400
Dissolved Arsenic	mg/L	--	0.15	75	63	0	0.00020	0.00030	0.00032	0.00040	0.00100
Total Barium	mg/L	--	1	75	75	0	0.03300	0.05400	0.06520	0.07510	0.38000
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	75	57	10	0.00001	0.00002	0.00002	0.00005	0.00068
Total Chromium	mg/L	0.0089 ⁵	0.04	75	35	0	0.00012	0.00048	0.00060	0.00294	0.01800
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	75	64	35	0.00075	0.00123	0.00200	0.00300	0.03000
Total Iron	mg/L	0.3	1	75	75	23	0.01300	0.05300	0.14000	0.40400	24.30000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	75	44	11	0.00007	0.00010	0.00030	0.00163	0.01400
Total Manganese	mg/L	--	0.5	75	75	1	0.00920	0.01750	0.02500	0.04200	0.71800
Total Molybdenum	mg/L	0.073	--	75	69	0	0.00006	0.00030	0.00040	0.00043	0.00100
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	75	26	0	0.00030	0.00058	0.00111	0.00268	0.01000
Total Selenium	mg/L	0.001	--	75	5	1	0.00010	0.00015	0.00040	0.00071	0.00100
Total Silver	mg/L	0.00025	0.1	75	21	2	0.00001	0.00002	0.00005	0.00011	0.00026
Total Thallium	mg/L	0.0008	--	75	12	0	0.00001	0.00002	0.00003	0.00004	0.00006
Total Zinc	mg/L	0.03	0.3	75	62	3	0.00100	0.00230	0.00500	0.01275	0.07700

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

5 - trivalent chromium guideline

Table B2. Summary of Victoria Creek North of Confluence With Back Creek (WQ-VC-U) Water Quality (Apr 2008 - Mar 2015)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	48	48	1	6.3	7.2	7.4	7.6	8.1
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	108	108	0	6.7	7.4	7.6	7.8	8.5
Hardness (as CaCO ₃)	mg/L	--	--	113	113	--	22.0	69.5	92.6	108.0	238.3
Total Alkalinity (as CaCO ₃)	mg/L	--	--	123	123	--	15.0	64.0	84.0	94.0	178.0
Sulphate	mg/L	--	--	102	102	--	2.1	11.0	15.3	18.0	82.8
Total Suspended Solids	mg/L	--	50	121	52	11	1.0	4.0	8.0	27.5	1100.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	121	32	0	0.006	0.010	0.020	0.040	0.540
Nitrate-N	mg/L	2.9	--	123	108	0	0.018	0.060	0.095	0.140	0.370
Nitrite-N	mg/L	0.06	--	123	17	6	0.020	0.035	0.040	0.090	0.990
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	95	28		0.005	0.013	0.024	0.087	0.939
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	29	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	123	5	--	0.20000	0.20000	0.20000	0.75000	0.90000
Thiocyanate	mg/L	--	--	123	44	--	0.10000	0.20000	0.40000	0.60000	1.90000
CN-WAD	mg/L	0.005	0.1	123	44	0	0.00200	0.00200	0.00200	0.00200	0.00400
CN-SAD	mg/L	--	--	94	45	--	0.00200	0.00200	0.00200	0.00500	0.10000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	123	98	35	0.00500	0.01500	0.04050	0.10550	15.90000
Total Antimony	mg/L	--	--	123	31	0	0.00010	0.00011	0.00013	0.00020	0.00100
Total Arsenic	mg/L	0.005	--	123	90	--	0.00020	0.00030	0.00040	0.00051	0.02570
Dissolved Arsenic	mg/L	--	0.15	123	86	0	0.00020	0.00026	0.00030	0.00040	0.00160
Total Barium	mg/L	--	1	123	98	0	0.03400	0.05800	0.06950	0.08025	0.41000
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	123	81	6	0.00001	0.00002	0.00003	0.00005	0.00336
Total Chromium	mg/L	0.0089 ⁵	0.04	123	49	0	0.00011	0.00019	0.00050	0.00090	0.02000
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	123	87	39	0.00097	0.00121	0.00200	0.00200	0.04000
Total Iron	mg/L	0.3	1	123	86	28	0.01000	0.03525	0.11100	0.27550	26.10000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	123	65	7	0.00006	0.00013	0.00020	0.00044	0.02220
Total Manganese	mg/L	--	0.5	123	96	1	0.01000	0.01910	0.03160	0.05320	0.54900
Total Molybdenum	mg/L	0.073	--	123	78	0	0.00020	0.00030	0.00039	0.00040	0.00100
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	123	26	0	0.00050	0.00061	0.00080	0.00104	0.01000
Total Selenium	mg/L	0.001	--	123	4	0	0.00020	0.00021	0.00027	0.00240	0.00310
Total Silver	mg/L	0.00025	0.1	123	25	0	0.00001	0.00002	0.00003	0.00007	0.00076
Total Thallium	mg/L	0.0008	--	123	8	0	0.00001	0.00001	0.00002	0.00007	0.00011
Total Zinc	mg/L	0.03	0.3	123	75	4	0.00100	0.00360	0.00700	0.01100	0.08500

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

5 - trivalent chromium guideline

Table B3. Summary of Dry Creek Reference Site (WQ-DRY) Water Quality (May 208 - Sep 2013)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	4	4	0	7.4	7.4	7.5	7.5	7.6
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	15	14	0	7.4	7.7	7.8	8.0	8.2
Hardness (as CaCO ₃)	mg/L	--	--	15	14	--	61.0	127.5	137.5	161.3	192.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	15	15	--	58.0	117.0	128.0	145.0	177.0
Sulphate	mg/L	--	--	15	15	--	7.3	11.0	14.0	24.0	29.8
Total Suspended Solids	mg/L	--	50	15	7	--	3.0	4.0	6.0	13.0	15.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	14	3	0	0.014	0.014	0.020	0.080	0.080
Nitrate-N	mg/L	2.9	--	15	4	0	0.030	0.100	0.357	0.525	0.565
Nitrite-N	mg/L	0.06	--	15	1	2	0.030	--	0.030	--	0.030
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	12	7		0.013	0.013	0.017	0.035	0.036
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	3	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	15	1	--	0.20000	--	0.20000	--	0.20000
Thiocyanate	mg/L	--	--	15	6	--	0.10000	0.25000	0.60000	0.97500	1.20000
CN-WAD	mg/L	0.005	0.1	12	6	0	0.00200	0.00200	0.00200	0.00250	0.00400
CN-SAD	mg/L	--	--	12	8	--	0.00100	0.00200	0.00300	0.00550	0.02000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	15	15	1	0.00600	0.01400	0.03200	0.06100	0.23400
Total Antimony	mg/L	--	--	15	15	0	0.00020	0.00030	0.00039	0.00040	0.00060
Total Arsenic	mg/L	0.005	--	15	15	0	0.00060	0.00070	0.00165	0.00220	0.00730
Dissolved Arsenic	mg/L	--	0.15	15	15	0	0.00040	0.00050	0.00060	0.00060	0.00070
Total Barium	mg/L	--	1	15	15	0	0.03200	0.05600	0.06750	0.07860	0.08900
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	15	4	0	0.00001	0.00001	0.00002	0.00003	0.00003
Total Chromium	mg/L	0.0089 ⁵	0.04	15	4	0	0.00014	0.00015	0.00094	0.00448	0.00540
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	15	12	1	0.00070	0.00100	0.00100	0.00200	0.00200
Total Iron	mg/L	0.3	1	15	12	9	0.01200	0.14950	0.47100	1.42150	2.94000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	15	6	0	0.00006	0.00009	0.00015	0.00058	0.00080
Total Manganese	mg/L	--	0.5	15	10	0	0.00052	0.00358	0.00727	0.03125	0.08610
Total Molybdenum	mg/L	0.073	--	15	3	0	0.00005	0.00005	0.00006	0.00008	0.00008
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	15	2	0	0.00060	--	0.00080	--	0.00100
Total Selenium	mg/L	0.001	--	15	0	0	0.00000	--	--	--	0.00000
Total Silver	mg/L	0.00025	0.1	15	2	0	0.00002	--	0.00002	--	0.00003
Total Thallium	mg/L	0.0008	--	15	2	0	0.00001	--	0.00001	--	0.00001
Total Zinc	mg/L	0.03	0.3	15	11	0	0.00300	0.00400	0.00600	0.00800	0.01000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B4. Summary of Dome Creek Upstream of Mill Site (WQ-DC-DX) Water Quality (May 2008 - Oct 2014)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	28	16	0	6.9	7.1	7.3	7.6	7.7
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	68	40	1	7.2	7.3	7.4	7.6	8.0
Hardness (as CaCO ₃)	mg/L	--	--	67	39	--	0.0	173.0	243.0	283.0	475.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	69	41	--	19.0	55.0	78.0	96.5	176.0
Sulphate	mg/L	--	--	69	39	--	15.0	108.0	156.0	191.0	276.0
Total Suspended Solids	mg/L	--	50	69	31	--	2.0	8.0	28.0	54.0	190.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	69	21	0	0.007	0.012	0.040	0.060	4.800
Nitrate-N	mg/L	2.9	--	69	20	0	0.010	0.030	0.040	0.098	0.140
Nitrite-N	mg/L	0.06	--	69	11	9	0.040	0.040	0.060	0.090	0.180
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	50	17		0.012	0.022	0.051	0.070	0.208
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	16	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	69	9	--	0.20000	0.20000	0.20000	0.30000	0.60000
Thiocyanate	mg/L	--	--	69	27	--	0.10000	0.20000	0.50000	1.20000	2.20000
CN-WAD	mg/L	0.005	0.1	69	30	0	0.00200	0.00200	0.00200	0.00200	0.00400
CN-SAD	mg/L	--	--	55	31	--	0.00200	0.00200	0.00400	0.01000	0.04200
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	68	68	54	0.01070	0.08675	0.17500	1.05250	27.00000
Total Antimony	mg/L	--	--	68	68	0	0.00040	0.00080	0.00110	0.00155	0.00900
Total Arsenic	mg/L	0.005	--	69	69	51	0.00180	0.00390	0.00730	0.02055	0.42400
Dissolved Arsenic	mg/L	--	0.15	68	68	0	0.00108	0.00200	0.00280	0.00435	0.01660
Total Barium	mg/L	--	1	69	69	0	0.01100	0.04100	0.04900	0.06545	0.61000
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	67	67	6	0.00001	0.00002	0.00004	0.00010	0.00143
Total Chromium	mg/L	0.0089 ⁵	0.04	69	51	0	0.00011	0.00050	0.00100	0.00260	0.03900
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	69	63	24	0.00097	0.00140	0.00217	0.00409	0.07000
Total Iron	mg/L	0.3	1	69	68	54	0.03000	0.27825	0.72000	2.61750	49.00000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	69	65	7	0.00010	0.00030	0.00090	0.00291	0.05900
Total Manganese	mg/L	--	0.5	69	68	6	0.00400	0.04280	0.10950	0.21275	3.44000
Total Molybdenum	mg/L	0.073	--	69	25	0	0.00002	0.00007	0.00010	0.00017	0.00030
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	69	47	0	0.00050	0.00080	0.00114	0.00200	0.02000
Total Selenium	mg/L	0.001	--	69	11	0	0.00012	0.00016	0.00030	0.00060	0.00100
Total Silver	mg/L	0.00025	0.1	69	36	5	0.00001	0.00002	0.00005	0.00013	0.00048
Total Thallium	mg/L	0.0008	--	69	31	0	0.00001	0.00002	0.00004	0.00010	0.00077
Total Zinc	mg/L	0.03	0.3	69	66	9	0.00100	0.00540	0.00900	0.01668	0.20000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B5. Summary of Dome Creek Upstream of Mill Site (WQ-DC-DX+105) Water Quality (Apr 2012 - Feb 2015)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	45	45	1	6.4	6.9	7.0	7.2	7.5
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	45	45	0	6.9	7.1	7.5	7.9	8.2
Hardness (as CaCO ₃)	mg/L	--	--	45	45	--	45.3	540.3	677.0	713.0	754.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	45	45	--	17.4	197.8	257.5	273.3	300.0
Sulphate	mg/L	--	--	45	45	--	25.7	334.8	398.0	434.0	469.0
Total Suspended Solids	mg/L	--	50	45	33	--	3.0	4.3	10.0	61.4	383.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	37	36	0	0.005	0.015	0.020	0.027	0.080
Nitrate-N	mg/L	2.9	--	43	8	0	0.005	0.022	0.036	0.062	0.070
Nitrite-N	mg/L	0.06	--	45	7	6	0.003	0.130	0.180	0.220	0.220
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	32	10		0.012	0.044	0.060	0.139	0.271
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	24	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	45	3	--	0.20000	0.20000	0.20000	0.28000	0.28000
Thiocyanate	mg/L	--	--	45	5	--	0.40000	0.45000	0.80000	1.02000	1.20000
CN-WAD	mg/L	0.005	0.1	45	1	1	0.00600	--	0.00600	--	0.00600
CN-SAD	mg/L	--	--	23	11	--	0.00400	0.00400	0.00800	0.01000	0.02400
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	45	45	18	0.00380	0.01855	0.05300	0.27500	11.40000
Total Antimony	mg/L	--	--	45	45	0	0.00244	0.00891	0.00999	0.01113	0.01800
Total Arsenic	mg/L	0.005	--	45	45	45	0.00861	0.02948	0.04170	0.05420	0.17600
Dissolved Arsenic	mg/L	--	0.15	45	45	0	0.00460	0.01013	0.01615	0.02715	0.03910
Total Barium	mg/L	--	1	45	45	0	0.01110	0.01248	0.01495	0.02253	0.16800
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	45	45	41	0.00107	0.00307	0.00413	0.00671	0.01200
Total Chromium	mg/L	0.0089 ⁵	0.04	45	30	0	0.00010	0.00015	0.00042	0.00128	0.01280
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	45	41	9	0.00040	0.00070	0.00100	0.00353	0.02790
Total Iron	mg/L	0.3	1	45	45	36	0.13700	0.32925	0.46550	0.91025	18.80000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	45	45	2	0.00005	0.00015	0.00049	0.00303	0.01560
Total Manganese	mg/L	--	0.5	45	45	40	0.04700	1.01000	1.12500	1.28000	1.63000
Total Molybdenum	mg/L	0.073	--	45	45	0	0.00007	0.00030	0.00037	0.00041	0.00053
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	45	45	0	0.00079	0.00156	0.00209	0.00361	0.00789
Total Selenium	mg/L	0.001	--	45	9	0	0.00010	0.00010	0.00012	0.00031	0.00050
Total Silver	mg/L	0.00025	0.1	45	21	3	0.00001	0.00002	0.00004	0.00021	0.00051
Total Thallium	mg/L	0.0008	--	45	45	0	0.00002	0.00009	0.00010	0.00011	0.00041
Total Zinc	mg/L	0.03	0.3	45	45	45	0.18500	0.62150	0.85250	1.09000	1.42000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B6. Summary of Pony Creek Upstream of Pit and Waste Rock (WQ-PC-U) Water Quality (May 2008 - Oct 2014)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	24	24	1	6.5	7.2	7.3	7.6	7.9
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	74	74	0	6.8	7.2	7.3	7.5	7.9
Hardness (as CaCO ₃)	mg/L	--	--	73	73	--	31.0	107.0	147.0	176.0	274.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	75	75	--	12.0	40.8	54.0	66.0	105.0
Sulphate	mg/L	--	--	73	73	--	12.6	61.1	88.0	113.5	176.0
Total Suspended Solids	mg/L	--	50	75	30	--	1.0	3.3	5.5	10.8	38.2
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	73	34	0	0.006	0.010	0.026	0.040	0.130
Nitrate-N	mg/L	2.9	--	75	34	1	0.008	0.019	0.032	0.100	1.820
Nitrite-N	mg/L	0.06	--	75	9	0	0.001	0.015	0.040	0.050	0.070
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	56	18	0	0.004	0.015	0.020	0.042	0.139
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	13	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	75	18	0	0.20000	0.20000	0.25000	0.32500	0.40000
Thiocyanate	mg/L	--	--	75	34	0	0.10000	0.20000	0.60000	1.02500	1.60000
CN-WAD	mg/L	0.005	0.1	75	31	0	0.00200	0.00200	0.00200	0.00200	0.00400
CN-SAD	mg/L	--	--	62	37	0	0.00200	0.00200	0.00200	0.00600	0.06600
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	75	74	13	0.01000	0.02100	0.03000	0.06100	5.44000
Total Antimony	mg/L	--	--	75	73	0	0.00028	0.00040	0.00040	0.00050	0.00202
Total Arsenic	mg/L	0.005	--	75	75	9	0.00040	0.00160	0.00210	0.00340	0.05120
Dissolved Arsenic	mg/L	--	0.15	75	75	0	0.00070	0.00150	0.00180	0.00220	0.00440
Total Barium	mg/L	--	1	75	75	0	0.02400	0.03800	0.04800	0.05800	0.16300
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	75	68	6	0.00001	0.00002	0.00003	0.00005	0.00058
Total Chromium	mg/L	0.0089 ⁵	0.04	75	28	0	0.00015	0.00024	0.00040	0.00060	0.00485
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	75	53	5	0.00060	0.00100	0.00118	0.00200	0.00824
Total Iron	mg/L	0.3	1	75	74	33	0.04200	0.10000	0.23200	0.44600	10.20000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	75	44	1	0.00005	0.00019	0.00022	0.00048	0.01260
Total Manganese	mg/L	--	0.5	75	69	5	0.00236	0.01410	0.05440	0.12800	3.91000
Total Molybdenum	mg/L	0.073	--	75	22	0	0.00003	0.00006	0.00007	0.00012	0.00047
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	75	30	0	0.00020	0.00050	0.00093	0.00100	0.00316
Total Selenium	mg/L	0.001	--	75	0	0	0.00000	--	--	--	0.00000
Total Silver	mg/L	0.00025	0.1	75	20	2	0.00001	0.00002	0.00003	0.00010	0.00079
Total Thallium	mg/L	0.0008	--	75	1	0	0.00008	--	0.00008	--	0.00008
Total Zinc	mg/L	0.03	0.3	75	70	1	0.00100	0.00400	0.00700	0.01008	0.04660

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B7. Water Quality Parameters in Minnesota Creek (WQ-MN)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	25	25	7	5.3	6.4	7.0	7.3	7.9
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	25	25	2	6.2	6.8	7.1	7.4	7.8
Hardness (as CaCO ₃)	mg/L	--	--	25	25	--	14.1	24.4	28.0	40.0	66.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	25	25	--	8.4	21.0	24.8	37.2	63.0
Sulphate	mg/L	--	--	25	25	--	0.6	2.0	3.0	3.7	5.3
Total Suspended Solids	mg/L	--	50	25	13	--	3.0	3.2	5.8	15.7	62.5
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	22	16	0	0.010	0.023	0.040	0.059	0.080
Nitrate-N	mg/L	2.9	--	25	14	0	0.015	0.027	0.030	0.043	0.065
Nitrite-N	mg/L	0.06	--	25	5	8	0.001	0.003	0.170	0.490	0.720
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	18	10		0.009	0.014	0.021	0.039	0.068
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	25	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	25	8	0	0.20000	0.20000	0.20000	0.27500	0.30000
Thiocyanate	mg/L	--	--	25	16	0	0.50000	0.60000	0.70000	0.90000	2.10000
CN-WAD	mg/L	0.005	0.1	25	1	0	0.00400	--	0.00400	--	0.00400
CN-SAD	mg/L	--	--	25	7	0	0.00400	0.00600	0.00800	0.01000	0.06200
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	25	25	20	0.02600	0.11900	0.14800	0.21850	1.13000
Total Antimony	mg/L	--	--	25	16	0	0.00010	0.00013	0.00016	0.00020	0.00031
Total Arsenic	mg/L	0.005	--	25	25	--	0.00080	0.00154	0.00194	0.00250	0.00480
Dissolved Arsenic	mg/L	--	0.15	25	25	0	0.00080	0.00130	0.00150	0.00229	0.00260
Total Barium	mg/L	--	1	25	25	0	0.04100	0.05035	0.06150	0.07905	0.08990
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	25	25	1	0.00001	0.00002	0.00003	0.00004	0.00010
Total Chromium	mg/L	0.0089 ⁵	0.04	25	24	0	0.00040	0.00062	0.00071	0.00080	0.00333
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	25	25	24	0.00194	0.00243	0.00300	0.00353	0.00751
Total Iron	mg/L	0.3	1	25	25	25	0.63900	1.42500	1.75000	2.97500	5.40000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	25	10	0	0.00006	0.00007	0.00020	0.00047	0.00084
Total Manganese	mg/L	--	0.5	25	25	1	0.06100	0.11400	0.18900	0.32500	0.66900
Total Molybdenum	mg/L	0.073	--	25	19	0	0.00016	0.00020	0.00024	0.00032	0.00084
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	25	25	0	0.00190	0.00200	0.00207	0.00239	0.00349
Total Selenium	mg/L	0.001	--	25	13	0	0.00011	0.00012	0.00016	0.00025	0.00040
Total Silver	mg/L	0.00025	0.1	25	8	0	0.00001	0.00001	0.00002	0.00002	0.00002
Total Thallium	mg/L	0.0008	--	25	2	0	0.00002	--	0.00002	--	0.00002
Total Zinc	mg/L	0.03	0.3	25	25	0	0.00200	0.00370	0.00400	0.00720	0.01300

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B8. Summary of Tailings Pond (WQ-TP) Water Quality (May 2008 - Mar 2015)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	42	29	--	6.7	7.3	7.7	8.0	8.5
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	97	96	0	7.0	7.7	7.9	8.0	8.3
Hardness (as CaCO ₃)	mg/L	--	--	97	93	--	74.1	704.0	881.0	1195.0	2120.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	97	97	--	9.8	72.0	89.0	158.0	384.0
Sulphate	mg/L	--	--	97	95	--	65.2	653.0	839.0	1070.0	1910.0
Total Suspended Solids	mg/L	--	50	97	76	4	1.0	5.0	8.0	16.9	656.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	89	84	16	0.006	0.090	0.311	0.742	8.600
Nitrate-N	mg/L	2.9	--	97	81	0	0.024	0.145	0.380	1.280	9.810
Nitrite-N	mg/L	0.06	--	97	31	15	0.001	0.012	0.060	0.120	0.800
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	71	34		0.011	0.016	0.025	0.032	0.813
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	27	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	97	48	--	0.20000	0.30000	0.40000	0.60000	1.80000
Thiocyanate	mg/L	--	--	97	50	--	0.10000	0.30000	0.40000	0.62500	1.70000
CN-WAD	mg/L	0.005	0.1	97	44	16	0.00200	0.00200	0.00400	0.00600	0.01400
CN-SAD	mg/L	--	--	70	64	--	0.00200	0.00800	0.02000	0.04500	0.20000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	97	94	39	0.00870	0.02438	0.05800	0.16800	13.40000
Total Antimony	mg/L	--	--	97	97	5	0.01430	0.04625	0.07080	0.11000	0.49000
Total Arsenic	mg/L	0.005	--	97	97	--	0.04130	0.11750	0.14400	0.18800	9.02000
Dissolved Arsenic	mg/L	--	0.15	97	97	1	0.01560	0.05880	0.08190	0.10350	3.04000
Total Barium	mg/L	--	1	97	97	0	0.00674	0.01280	0.01700	0.02300	0.40000
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	97	97	97	0.00052	0.00148	0.00272	0.00415	0.05080
Total Chromium	mg/L	0.0089 ⁵	0.04	97	67	0	0.00011	0.00029	0.00050	0.00080	0.03000
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	97	97	97	0.01630	0.02785	0.04070	0.06000	1.50000
Total Iron	mg/L	0.3	1	97	96	92	0.16000	0.34475	0.63200	1.05250	95.30000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	97	97	77	0.00196	0.00668	0.01590	0.03995	3.72000
Total Manganese	mg/L	--	0.5	97	95	78	0.06400	0.55300	1.35000	2.22000	17.40000
Total Molybdenum	mg/L	0.073	--	97	97	0	0.00033	0.00180	0.00230	0.00344	0.02000
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	97	95	0	0.00051	0.00183	0.00400	0.00500	0.02000
Total Selenium	mg/L	0.001	--	97	15	3	0.00010	0.00020	0.00040	0.00100	0.17000
Total Silver	mg/L	0.00025	0.1	97	96	49	0.00002	0.00013	0.00025	0.00065	0.06360
Total Thallium	mg/L	0.0008	--	97	97	1	0.00005	0.00022	0.00029	0.00037	0.00370
Total Zinc	mg/L	0.03	0.3	97	97	96	0.00030	0.10550	0.19600	0.34550	4.00000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B9. Summary of Seepage Pond Discharge (WQ-SEEP) Water Quality (May 2008 - Mar 2015)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	B9	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	47	29	2	6.7	6.8	6.9	7.1	7.9
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	123	122	2	6.3	7.0	7.1	7.4	8.0
Hardness (as CaCO ₃)	mg/L	--	--	113	113	--	387.0	693.5	778.0	869.0	1300.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	123	123	--	131.0	225.0	236.0	248.0	346.0
Sulphate	mg/L	--	--	123	121	--	289.0	567.0	653.0	743.0	1210.0
Total Suspended Solids	mg/L	--	50	122	121	--	6.0	22.0	28.0	34.0	94.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	114	115	56	2.200	4.100	4.810	6.100	17.000
Nitrate-N	mg/L	2.9	--	123	123	0	0.220	1.360	2.050	3.470	5.510
Nitrite-N	mg/L	0.06	--	123	101	72	0.010	0.039	0.150	0.290	0.780
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	93	60		0.010	0.016	0.023	0.031	0.103
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	23	29	0	0.01870	0.04070	0.05300	0.06700	0.10800
Cyanate	mg/L	--	--	123	90	--	0.20000	0.70000	1.25000	1.71750	6.57000
Thiocyanate	mg/L	--	--	123	123	--	0.80000	3.36000	4.70000	8.90000	131.00000
CN-WAD	mg/L	0.005	0.1	123	119	117	0.00500	0.01000	0.01200	0.01900	0.16400
CN-SAD	mg/L	--	--	100	94	--	0.07800	0.56000	1.10000	2.00000	10.00000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	123	122	12	0.01270	0.02050	0.02750	0.04040	1.29000
Total Antimony	mg/L	--	--	123	121	0	0.00045	0.00060	0.00070	0.00085	0.00670
Total Arsenic	mg/L	0.005	--	123	123	123	0.00800	0.02940	0.03660	0.04880	0.08530
Dissolved Arsenic	mg/L	--	0.15	123	123	0	0.00160	0.00280	0.00980	0.02910	0.06850
Total Barium	mg/L	--	1	123	123	0	0.04700	0.05800	0.06300	0.06800	0.10500
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	123	123	122	0.00033	0.00059	0.00069	0.00087	0.00155
Total Chromium	mg/L	0.0089 ⁵	0.04	123	117	1	0.00038	0.00060	0.00080	0.00110	0.06200
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	123	123	115	0.00219	0.00535	0.00632	0.00800	0.02440
Total Iron	mg/L	0.3	1	123	123	123	3.17000	8.99000	11.20000	13.90000	31.60000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	123	100	1	0.00006	0.00012	0.00020	0.00040	0.02440
Total Manganese	mg/L	--	0.5	120	120	120	3.60000	5.72000	6.54500	7.64250	15.50000
Total Molybdenum	mg/L	0.073	--	123	121	0	0.00080	0.00101	0.00117	0.00133	0.00300
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	123	120	0	0.00150	0.00300	0.00460	0.00558	0.03030
Total Selenium	mg/L	0.001	--	123	59	3	0.00017	0.00021	0.00028	0.00050	0.00360
Total Silver	mg/L	0.00025	0.1	123	97	1	0.00001	0.00003	0.00004	0.00006	0.00047
Total Thallium	mg/L	0.0008	--	123	60	0	0.00001	0.00001	0.00001	0.00001	0.00005
Total Zinc	mg/L	0.03	0.3	123	123	7	0.00120	0.00880	0.01200	0.01600	0.08570

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B10. Summary of Top of Brown-McDade Pit (WQ-PIT-1) Water Quality (Jun 08 - Mar 15)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	28	28	0	7.1	7.3	7.5	7.9	8.1
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	67	67	0	7.2	7.6	7.8	8.0	8.2
Hardness (as CaCO ₃)	mg/L	--	--	62	62	--	340.0	895.5	1115.0	1242.5	1410.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	67	67	--	69.0	149.0	179.0	200.0	248.0
Sulphate	mg/L	--	--	67	67	--	10.0	683.0	851.0	972.0	1190.0
Total Suspended Solids	mg/L	--	50	21	21	0	1.0	3.0	4.0	5.5	15.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	25	25	0	0.006	0.010	0.030	0.045	0.170
Nitrate-N	mg/L	2.9	--	63	50	0	0.062	0.334	0.850	1.538	4.010
Nitrite-N	mg/L	0.06	--	6	6	6	0.040	0.063	0.140	0.198	0.220
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	5	5	0	0.007	0.009	0.010	0.016	0.016
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	--	--	--	--	--	--	--	--
Cyanate	mg/L	--	--	--	--	--	--	--	--	--	--
Thiocyanate	mg/L	--	--	--	--	--	--	--	--	--	--
CN-WAD	mg/L	0.005	0.1	--	--	--	--	--	--	--	--
CN-SAD	mg/L	--	--	--	--	--	--	--	--	--	--
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	58	38	1	0.00460	0.00830	0.01380	0.02725	0.10800
Total Antimony	mg/L	--	--	67	38	0	0.00238	0.00370	0.00500	0.00780	0.00960
Total Arsenic	mg/L	0.005	--	67	38	63	0.00280	0.00750	0.00910	0.01050	0.01570
Dissolved Arsenic	mg/L	--	0.15	67	40	0	0.00220	0.00540	0.00740	0.00840	0.01070
Total Barium	mg/L	--	1	67	38	0	0.01100	0.01300	0.01500	0.01700	0.02710
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	67	58	67	0.00195	0.00453	0.00630	0.00930	0.01830
Total Chromium	mg/L	0.0089 ⁵	0.04	16	37	0	0.00012	0.00018	0.00050	0.00096	0.00220
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	67	38	44	0.00200	0.00350	0.00500	0.00900	0.05000
Total Iron	mg/L	0.3	1	66	39	0	0.01800	0.03200	0.05650	0.08625	0.20000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	67	43	0	0.00016	0.00050	0.00080	0.00190	0.00520
Total Manganese	mg/L	--	0.5	65	44	9	0.02100	0.11150	0.15400	0.22800	1.00000
Total Molybdenum	mg/L	0.073	--	54	56	0	0.00010	0.00015	0.00019	0.00020	0.00107
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	53	66	0	0.00040	0.00195	0.00300	0.00400	0.01200
Total Selenium	mg/L	0.001	--	9	67	0	0.00010	0.00013	0.00020	0.00050	0.00070
Total Silver	mg/L	0.00025	0.1	30	67	0	0.00001	0.00001	0.00002	0.00004	0.00018
Total Thallium	mg/L	0.0008	--	66	4	0	0.00004	0.00007	0.00009	0.00010	0.00013
Total Zinc	mg/L	0.03	0.3	67	27	67	0.21000	0.55800	0.77000	1.21000	1.90000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B11. Summary of Middle of Brown-McDade Pit (WQ-PIT-2) Water Quality (Jun 2008 - Mar 2015)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	29	28	0	6.8	7.0	7.3	7.6	8.0
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	67	67	0	7.0	7.5	7.7	8.0	8.2
Hardness (as CaCO ₃)	mg/L	--	--	62	62	--	644.0	1022.5	1150.0	1300.0	1740.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	67	67	--	105.0	162.0	183.0	201.0	234.0
Sulphate	mg/L	--	--	67	67	--	550.0	827.0	905.0	1050.0	1420.0
Total Suspended Solids	mg/L	--	50	66	19		2.0	3.3	4.0	4.0	9.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	63	26	0	0.005	0.010	0.020	0.053	0.180
Nitrate-N	mg/L	2.9	--	67	50	0	0.070	0.318	1.060	1.450	11.000
Nitrite-N	mg/L	0.06	--	67	8	7	0.040	0.083	0.140	0.460	1.180
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	53	4		0.007	0.008	0.014	0.021	0.022
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	--	--	--	--	--	--	--	--
Cyanate	mg/L	--	--	--	--	--	--	--	--	--	--
Thiocyanate	mg/L	--	--	--	--	--	--	--	--	--	--
CN-WAD	mg/L	0.005	0.1	--	--	--	--	--	--	--	--
CN-SAD	mg/L	--	--	--	--	--	--	--	--	--	--
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	58	54	1	0.00500	0.00700	0.01300	0.03095	0.10500
Total Antimony	mg/L	--	--	67	67	0	0.00092	0.00360	0.00450	0.00670	0.00860
Total Arsenic	mg/L	0.005	--	67	67	65	0.00470	0.00690	0.00900	0.01120	0.01640
Dissolved Arsenic	mg/L	--	0.15	67	67	0	0.00230	0.00520	0.00700	0.00860	0.01070
Total Barium	mg/L	--	1	67	67	0	0.01030	0.01300	0.01400	0.01600	0.03800
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	67	67	67	0.00198	0.00426	0.00649	0.00934	0.03530
Total Chromium	mg/L	0.0089 ⁵	0.04	16	21	0	0.00011	0.00020	0.00050	0.00060	0.00120
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	67	67	40	0.00200	0.00344	0.00600	0.00900	0.08500
Total Iron	mg/L	0.3	1	66	65	1	0.01600	0.03600	0.05500	0.08950	0.36500
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	67	67	0	0.00021	0.00050	0.00080	0.00180	0.00590
Total Manganese	mg/L	--	0.5	65	65	11	0.02340	0.10900	0.17000	0.26000	5.08000
Total Molybdenum	mg/L	0.073	--	54	49	0	0.00004	0.00013	0.00017	0.00020	0.00060
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	53	50	0	0.00040	0.00200	0.00400	0.00425	0.01100
Total Selenium	mg/L	0.001	--	9	7	0	0.00020	0.00026	0.00050	0.00070	0.00090
Total Silver	mg/L	0.00025	0.1	30	28	1	0.00001	0.00002	0.00002	0.00005	0.00030
Total Thallium	mg/L	0.0008	--	66	66	0	0.00006	0.00008	0.00009	0.00011	0.00018
Total Zinc	mg/L	0.03	0.3	67	67	67	0.20200	0.52900	0.84400	1.22000	3.09000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B12. Summary of Bottom of Brown-McDade Pit (WQ-PIT-3) Water Quality (Jun 2008 - Mar 2015)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	29	29	0	6.2	6.8	7.0	7.3	8.0
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	67	67	0	6.7	7.2	7.4	7.7	8.2
Hardness (as CaCO ₃)	mg/L	--	--	62	61	--	972.0	1245.0	1450.0	1685.0	2200.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	67	67	--	148.0	197.0	216.0	231.0	283.0
Sulphate	mg/L	--	--	67	67	--	0.8	982.0	1220.0	1470.0	1750.0
Total Suspended Solids	mg/L	--	50	66	44		2.0	4.0	6.0	11.8	374.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	63	41	5	0.005	0.020	0.050	0.165	0.440
Nitrate-N	mg/L	2.9	--	67	50	0	0.020	0.195	0.500	0.980	1.680
Nitrite-N	mg/L	0.06	--	67	8	8	0.090	0.133	0.235	0.410	0.460
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	53	10		0.005	0.011	0.017	0.023	0.024
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	--	--	--	--	--	--	--	--
Cyanate	mg/L	--	--	--	--	--	--	--	--	--	--
Thiocyanate	mg/L	--	--	--	--	--	--	--	--	--	--
CN-WAD	mg/L	0.005	0.1	--	--	--	--	--	--	--	--
CN-SAD	mg/L	--	--	--	--	--	--	--	--	--	--
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	58	53	7	0.00500	0.01145	0.02200	0.04750	0.86200
Total Antimony	mg/L	--	--	67	66	0	0.00060	0.00159	0.00275	0.00437	0.00800
Total Arsenic	mg/L	0.005	--	67	67	67	0.00510	0.00810	0.01090	0.01720	0.27000
Dissolved Arsenic	mg/L	--	0.15	67	66	0	0.00040	0.00528	0.00770	0.01015	0.24900
Total Barium	mg/L	--	1	67	67	0	0.00645	0.01100	0.01400	0.01700	0.03010
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	67	67	67	0.00195	0.00694	0.00977	0.01270	0.03390
Total Chromium	mg/L	0.0089 ⁵	0.04	16	16	0	0.00011	0.00050	0.00065	0.00081	0.00400
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	67	66	49	0.00190	0.00380	0.00700	0.01025	0.10300
Total Iron	mg/L	0.3	1	66	64	15	0.01400	0.05000	0.09100	0.29350	8.09000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	67	65	5	0.00016	0.00052	0.00120	0.00290	0.03410
Total Manganese	mg/L	--	0.5	65	66	49	0.02580	0.40300	1.42000	3.00500	9.77000
Total Molybdenum	mg/L	0.073	--	54	21	0	0.00002	0.00010	0.00019	0.00020	0.00040
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	53	54	0	0.00006	0.00019	0.00450	0.00600	0.01300
Total Selenium	mg/L	0.001	--	9	12	2	0.00010	0.00020	0.00040	0.00088	0.00180
Total Silver	mg/L	0.00025	0.1	30	30	1	0.00001	0.00002	0.00004	0.00008	0.00064
Total Thallium	mg/L	0.0008	--	66	66	0	0.00004	0.00009	0.00011	0.00012	0.00027
Total Zinc	mg/L	0.03	0.3	67	67	67	0.20600	0.80000	1.11000	1.47000	2.96000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B13. Summary of Mill Site Seep (WQ-MS-S-03) Water Quality (Apr 2012 - Mar 2015)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	29	29	0	6.3	6.9	7.2	7.4	7.8
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	32	32	0	6.9	7.3	7.5	7.8	8.1
Hardness (as CaCO ₃)	mg/L	--	--	30	32	--	564.0	687.0	716.0	734.0	861.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	30	32	--	229.0	256.5	266.0	273.5	291.0
Sulphate	mg/L	--	--	30	32	--	338.0	429.0	447.5	467.8	502.0
Total Suspended Solids	mg/L	--	50	30	29	10	3.0	7.0	19.0	74.9	212.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	29	25	0	0.007	0.034	0.047	0.058	0.180
Nitrate-N	mg/L	2.9	--	28	2	0	0.040	--	0.045	--	0.050
Nitrite-N	mg/L	0.06	--	30	4	4	0.140	0.145	0.200	0.263	0.270
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	22	5		0.033	0.037	0.090	0.146	0.160
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	16	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	30	2	0	0.20000	--	1.02500	--	1.85000
Thiocyanate	mg/L	--	--	30	3	0	0.30000	0.30000	0.40000	0.80000	0.80000
CN-WAD	mg/L	0.005	0.1	30	0	0	--	--	--	--	--
CN-SAD	mg/L	--	--	13	6	0	0.00400	0.00400	0.00400	0.00500	0.00800
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	30	31	14	0.00420	0.02500	0.09300	0.34700	1.79000
Total Antimony	mg/L	--	--	30	32	0	0.00645	0.01385	0.01600	0.01888	0.03830
Total Arsenic	mg/L	0.005	--	30	32	30	0.01640	0.06945	0.10200	0.20550	0.68600
Dissolved Arsenic	mg/L	--	0.15	30	32	0	0.01200	0.03518	0.05385	0.07590	0.12300
Total Barium	mg/L	--	1	30	32	0	0.01000	0.01530	0.01940	0.02730	0.06260
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	30	32	30	0.00209	0.00346	0.00566	0.01058	0.02990
Total Chromium	mg/L	0.0089 ⁵	0.04	30	21	0	0.00011	0.00017	0.00044	0.00103	0.00250
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	30	29	11	0.00055	0.00157	0.00300	0.00865	0.02340
Total Iron	mg/L	0.3	1	30	32	30	0.32700	1.15500	2.67500	4.37250	22.30000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	30	32	13	0.00058	0.00187	0.00545	0.02170	0.12900
Total Manganese	mg/L	--	0.5	30	32	30	0.27700	1.33000	1.42000	1.67750	3.04000
Total Molybdenum	mg/L	0.073	--	30	30	0	0.00020	0.00030	0.00036	0.00039	0.00052
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	30	32	0	0.00166	0.00203	0.00260	0.00404	0.00510
Total Selenium	mg/L	0.001	--	30	5	1	0.00010	0.00015	0.00050	0.00080	0.00110
Total Silver	mg/L	0.00025	0.1	30	24	5	0.00001	0.00005	0.00012	0.00039	0.00173
Total Thallium	mg/L	0.0008	--	30	32	0	0.00002	0.00010	0.00012	0.00014	0.00021
Total Zinc	mg/L	0.03	0.3	30	32	30	0.22600	0.88525	1.23000	1.49750	2.45000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B14. Summary of Mill Site Seep (WQ-MS-S-08) Water Quality (Nov 2012 - May 2014)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	4	4	1	5.6	6.0	7.2	7.8	7.9
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	4	4	0	6.6	6.9	7.8	8.1	8.1
Hardness (as CaCO ₃)	mg/L	--	--	4	4	--	882.0	899.3	1055.5	1167.5	1170.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	4	4	--	292.0	297.5	314.5	319.5	321.0
Sulphate	mg/L	--	--	4	4	--	515.0	554.5	760.5	880.3	891.0
Total Suspended Solids	mg/L	--	50	4	4	2	13.3	17.0	69.1	289.3	349.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	4	4	0	0.033	0.046	0.113	0.148	0.151
Nitrate-N	mg/L	2.9	--	4	3	0	0.127	0.127	0.152	0.210	0.210
Nitrite-N	mg/L	0.06	--	4	0	0	0.000	--	--	--	0.000
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	3	1	0	0.185	--	0.185	--	0.185
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	3	1	0	0.00770	--	0.00770	--	0.00770
Cyanate	mg/L	--	--	4	0	0	0.00000	--	--	--	0.00000
Thiocyanate	mg/L	--	--	4	0	0	0.00000	--	--	--	0.00000
CN-WAD	mg/L	0.005	0.1	4	1	1	0.00620	--	0.00620	--	0.00620
CN-SAD	mg/L	--	--	1	1	0	0.01000	--	0.01000	--	0.01000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	4	4	3	0.06740	0.09480	0.26300	3.20725	4.16000
Total Antimony	mg/L	--	--	4	4	0	0.00401	0.00413	0.02660	0.10443	0.12300
Total Arsenic	mg/L	0.005	--	4	4	4	0.11100	0.19950	0.52900	0.66350	0.68700
Dissolved Arsenic	mg/L	--	0.15	4	4	2	0.05850	0.06608	0.23040	0.50775	0.55300
Total Barium	mg/L	--	1	4	4	0	0.01430	0.01478	0.02260	0.08600	0.10500
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	4	4	4	0.00089	0.00093	0.00832	0.02640	0.03000
Total Chromium	mg/L	0.0089 ⁵	0.04	4	3	0	0.00022	0.00022	0.00064	0.00687	0.00687
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	4	4	2	0.00124	0.00183	0.01335	0.08228	0.10200
Total Iron	mg/L	0.3	1	4	4	4	1.06000	2.12500	6.24000	11.31500	12.70000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	4	4	4	0.00633	0.01355	0.04350	0.44045	0.57000
Total Manganese	mg/L	--	0.5	4	4	0	0.30100	0.75825	2.52500	2.93500	2.94000
Total Molybdenum	mg/L	0.073	--	4	4	0	0.00023	0.00024	0.00036	0.00086	0.00099
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	4	4	0	0.00143	0.00155	0.00252	0.00712	0.00845
Total Selenium	mg/L	0.001	--	4	4	2	0.00010	0.00010	0.00060	0.00251	0.00298
Total Silver	mg/L	0.00025	0.1	4	4	2	0.00006	0.00008	0.00134	0.01129	0.01420
Total Thallium	mg/L	0.0008	--	4	4	0	0.00006	0.00007	0.00023	0.00047	0.00050
Total Zinc	mg/L	0.03	0.3	4	4	4	0.09740	0.10605	0.80600	2.02750	2.21000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B15. Summary of Dam Seep (WQ-DAM-SEEP) Water Quality (Jul 2012)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	1	0	0	0.0	--	--	--	0.0
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	1	1	0	7.5	--	7.5	--	7.5
Hardness (as CaCO ₃)	mg/L	--	--	1	1	--	1040.0	--	1040.0	--	1040.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	1	1	--	275.0	--	275.0	--	275.0
Sulphate	mg/L	--	--	1	1	--	947.0	--	947.0	--	947.0
Total Suspended Solids	mg/L	--	50	1	1	1	63.0	--	63.0	--	63.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	1	1	0	7.000	--	7.000	--	7.000
Nitrate-N	mg/L	2.9	--	1	1	0	10.900	--	10.900	--	10.900
Nitrite-N	mg/L	0.06	--	1	1	1	0.130	--	0.130	--	0.130
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	1	1	0	0.029	--	0.029	--	0.029
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	0	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	1	1	0	2.30000	--	2.30000	--	2.30000
Thiocyanate	mg/L	--	--	1	1	0	4.20000	--	4.20000	--	4.20000
CN-WAD	mg/L	0.005	0.1	1	1	1	0.01000	--	0.01000	--	0.01000
CN-SAD	mg/L	--	--	1	1	0	1.30000	--	1.30000	--	1.30000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	1	0	0	0.00000	--	--	--	0.00000
Total Antimony	mg/L	--	--	1	1	0	0.00060	--	0.00060	--	0.00060
Total Arsenic	mg/L	0.005	--	1	1	1	0.02390	--	0.02390	--	0.02390
Dissolved Arsenic	mg/L	--	0.15	1	1	0	0.02610	--	0.02610	--	0.02610
Total Barium	mg/L	--	1	1	1	0	0.07800	--	0.07800	--	0.07800
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	1	1	1	0.00076	--	0.00076	--	0.00076
Total Chromium	mg/L	0.0089 ⁵	0.04	1	1	0	0.00200	--	0.00200	--	0.00200
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	1	1	1	0.02200	--	0.02200	--	0.02200
Total Iron	mg/L	0.3	1	1	1	1	14.60000	--	14.60000	--	14.60000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	1	1	0	0.00020	--	0.00020	--	0.00020
Total Manganese	mg/L	--	0.5	1	1	1	9.16000	--	9.16000	--	9.16000
Total Molybdenum	mg/L	0.073	--	1	0	0	0.00000	--	--	--	0.00000
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	1	1	0	0.00610	--	0.00610	--	0.00610
Total Selenium	mg/L	0.001	--	1	1	1	0.00100	--	0.00100	--	0.00100
Total Silver	mg/L	0.00025	0.1	1	1	0	0.00003	--	0.00003	--	0.00003
Total Thallium	mg/L	0.0008	--	1	0	0	0.00000	--	--	--	0.00000
Total Zinc	mg/L	0.03	0.3	1	1	0	0.01000	--	0.01000	--	0.01000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B16. Summary of Adit Seep (WQ-ADIT-SEEP) Water Quality (Sep 2012 - Jun 13)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	5	5	0	6.9	7.0	7.5	7.7	7.8
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	5	5	0	7.1	7.3	7.4	7.7	7.8
Hardness (as CaCO ₃)	mg/L	--	--	5	5	0	37.1	40.2	52.9	130.7	170.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	5	5	0	15.2	19.4	24.4	52.0	66.0
Sulphate	mg/L	--	--	5	5	0	13.1	15.9	25.3	85.1	114.0
Total Suspended Solids	mg/L	--	50	5	2	0	3.3	--	11.7	--	20.1
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	5	3	0	0.006	0.006	0.008	0.020	0.020
Nitrate-N	mg/L	2.9	--	5	1	0	0.006	--	0.006	--	0.006
Nitrite-N	mg/L	0.06	--	5	0	0	0.000	--	--	--	0.000
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	4	0		0.000	--	--	--	0.000
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	4	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	5	0	0	0.00000	--	--	--	0.00000
Thiocyanate	mg/L	--	--	5	2	0	0.54000	--	0.81500	--	1.09000
CN-WAD	mg/L	0.005	0.1	5	0	0	0.00000	--	--	--	0.00000
CN-SAD	mg/L	--	--	1	1	0	0.07400	--	0.07400	--	0.07400
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	5	5	3	0.02600	0.03545	0.13800	0.23000	0.29300
Total Antimony	mg/L	--	--	5	5	0	0.00038	0.00039	0.00040	0.00063	0.00075
Total Arsenic	mg/L	0.005	--	5	5	0	0.00188	0.00189	0.00248	0.00298	0.00318
Dissolved Arsenic	mg/L	--	0.15	5	5	0	0.00160	0.00163	0.00188	0.00228	0.00246
Total Barium	mg/L	--	1	5	5	0	0.02560	0.02600	0.02740	0.04015	0.04740
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	5	5	0	0.00004	0.00005	0.00009	0.00013	0.00016
Total Chromium	mg/L	0.0089 ⁵	0.04	5	4	0	0.00026	0.00028	0.00035	0.00097	0.00117
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	5	5	4	0.00150	0.00187	0.00262	0.00371	0.00420
Total Iron	mg/L	0.3	1	5	5	0	0.06000	0.06750	0.21500	0.29600	0.29700
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	5	5	0	0.00020	0.00025	0.00036	0.00050	0.00056
Total Manganese	mg/L	--	0.5	5	5	0	0.00140	0.00320	0.00650	0.01131	0.01420
Total Molybdenum	mg/L	0.073	--	5	5	0	0.00006	0.00006	0.00007	0.00020	0.00030
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	5	5	0	0.00030	0.00041	0.00061	0.00088	0.00101
Total Selenium	mg/L	0.001	--	5	0	0	0.00000	--	--	--	0.00000
Total Silver	mg/L	0.00025	0.1	5	4	0	0.00001	0.00002	0.00002	0.00003	0.00004
Total Thallium	mg/L	0.0008	--	5	0	0	0.00000	--	--	--	0.00000
Total Zinc	mg/L	0.03	0.3	5	5	0	0.00610	0.00695	0.00870	0.01390	0.01620

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B17. Summary of Seepage Pond Surface (WQ-SP-1) and Seepage Pond Bottom (WQ-SP-2) Water Quality (June 2013)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	2	2	0	6.8	--	7.0	--	7.2
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	2	2	0	7.6	--	7.7	--	7.9
Hardness (as CaCO ₃)	mg/L	--	--	2	2	0	508.0	--	631.0	--	754.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	2	2	0	161.0	--	190.5	--	220.0
Sulphate	mg/L	--	--	2	2	0	381.0	--	510.0	--	639.0
Total Suspended Solids	mg/L	--	50	2	2	0	9.3	--	17.7	--	26.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	2	2	1	1.930	--	4.510	--	7.090
Nitrate-N	mg/L	2.9	--	2	2	0	1.680	--	1.795	--	1.910
Nitrite-N	mg/L	0.06	--	2	2	1	0.046	--	0.057	--	0.068
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	2	0	0	0.000	--	--	--	0.000
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	2	2	0	0.03930	--	0.04465	--	0.05000
Cyanate	mg/L	--	--	2	1	0	0.42000	--	0.42000	--	0.42000
Thiocyanate	mg/L	--	--	2	1	0	1.80000	--	1.80000	--	1.80000
CN-WAD	mg/L	0.005	0.1	2	1	1	0.00640	--	0.00640	--	0.00640
CN-SAD	mg/L	--	--	0	0	0	0.00000	--	--	--	0.00000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	2	2	1	0.11000	--	0.11200	--	0.11400
Total Antimony	mg/L	--	--	2	2	0	0.00055	--	0.00068	--	0.00080
Total Arsenic	mg/L	0.005	--	2	2	2	0.01030	--	0.02175	--	0.03320
Dissolved Arsenic	mg/L	--	0.15	2	2	0	0.00288	--	0.00380	--	0.00471
Total Barium	mg/L	--	1	2	2	0	0.06760	--	0.06785	--	0.06810
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	2	2	2	0.00044	--	0.00048	--	0.00051
Total Chromium	mg/L	0.0089 ⁵	0.04	2	0	0	0.00000	--	--	--	0.00000
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	2	2	2	0.00690	--	0.00827	--	0.00963
Total Iron	mg/L	0.3	1	2	2	2	3.71000	--	6.21500	--	8.72000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	2	2	2	0.00089	--	0.00113	--	0.00137
Total Manganese	mg/L	--	0.5	2	2	2	2.49000	--	3.97500	--	5.46000
Total Molybdenum	mg/L	0.073	--	2	0	0	0.00000	--	--	--	0.00000
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	2	2	0	0.00232	--	0.00254	--	0.00276
Total Selenium	mg/L	0.001	--	2	2	0	0.00015	--	0.00018	--	0.00021
Total Silver	mg/L	0.00025	0.1	2	2	0	0.00006	--	0.00007	--	0.00008
Total Thallium	mg/L	0.0008	--	2	2	0	0.00002	--	0.00002	--	0.00002
Total Zinc	mg/L	0.03	0.3	2	2	0	0.01420	--	0.01450	--	0.01480

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B18. Summary of Dome Creek Diversion Channel at Bridge (WQ-DC-B) Water Quality (Feb 2014 - Oct 2014)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	9	9	0	6.9	7.2	7.6	7.8	7.9
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	9	9	0	7.5	7.7	7.8	8.2	8.3
Hardness (as CaCO ₃)	mg/L	--	--	9	9	--	222.0	482.5	792.0	900.5	1340.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	9	9	--	65.1	81.3	198.0	219.0	284.0
Sulphate	mg/L	--	--	9	9	--	154.0	282.0	535.0	663.5	1120.0
Total Suspended Solids	mg/L	--	50	9	9	4	5.3	22.7	43.3	124.7	901.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	9	9	0	0.058	0.077	0.138	0.149	0.472
Nitrate-N	mg/L	2.9	--	9	9	0	0.016	0.036	0.067	0.137	0.214
Nitrite-N	mg/L	0.06	--	9	2	0	0.001	--	0.002	--	0.002
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	9	3	0	0.051	0.051	0.142	0.622	0.622
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	9	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	9	0	0	0.00000	--	--	--	0.00000
Thiocyanate	mg/L	--	--	9	0	0	0.00000	--	--	--	0.00000
CN-WAD	mg/L	0.005	0.1	9	0	0	0.00000	--	--	--	0.00000
CN-SAD	mg/L	--	--	0	0	0	0.00000	--	--	--	0.00000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	9	9	7	0.00820	0.25600	0.65200	2.44500	6.05000
Total Antimony	mg/L	--	--	9	9	0	0.00123	0.00161	0.00180	0.00229	0.00255
Total Arsenic	mg/L	0.005	--	9	9	8	0.00159	0.00890	0.01410	0.02025	0.03450
Dissolved Arsenic	mg/L	--	0.15	9	9	0	0.00079	0.00325	0.00474	0.00558	0.00601
Total Barium	mg/L	--	1	9	9	0	0.03940	0.06255	0.07160	0.08065	0.12100
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	9	9	1	0.00007	0.00010	0.00016	0.00022	0.00049
Total Chromium	mg/L	0.0089 ⁵	0.04	9	8	0	0.00032	0.00083	0.00154	0.00416	0.00849
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	9	9	3	0.00093	0.00145	0.00335	0.00655	0.01090
Total Iron	mg/L	0.3	1	9	9	9	2.30000	2.49500	3.46000	5.84000	11.70000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	9	8	2	0.00010	0.00048	0.00095	0.00658	0.00896
Total Manganese	mg/L	--	0.5	9	9	7	0.33200	0.42700	0.67400	0.97900	2.22000
Total Molybdenum	mg/L	0.073	--	9	9	0	0.00028	0.00029	0.00037	0.00049	0.00055
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	9	9	0	0.00087	0.00140	0.00170	0.00369	0.00776
Total Selenium	mg/L	0.001	--	9	7	0	0.00010	0.00011	0.00012	0.00018	0.00020
Total Silver	mg/L	0.00025	0.1	9	7	1	0.00002	0.00002	0.00003	0.00015	0.00028
Total Thallium	mg/L	0.0008	--	9	5	0	0.00002	0.00002	0.00004	0.00006	0.00007
Total Zinc	mg/L	0.03	0.3	9	9	3	0.00830	0.01180	0.02310	0.04185	0.09330

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B19. Summary of Ore Ramp into Pit Lake (WQ-ORE) Water Quality (May 2014)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	1	1	0	7.2	--	7.2	--	7.2
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	1	1	0	7.2	--	7.2	--	7.2
Hardness (as CaCO ₃)	mg/L	--	--	1	1	0	446.0	--	446.0	--	446.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	1	1	0	47.7	--	47.7	--	47.7
Sulphate	mg/L	--	--	1	1	0	373.0	--	373.0	--	373.0
Total Suspended Solids	mg/L	--	50	1	1	1	130.0	--	130.0	--	130.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	1	0	0	0.000	--	--	--	0.000
Nitrate-N	mg/L	2.9	--	1	1	0	1.070	--	1.070	--	1.070
Nitrite-N	mg/L	0.06	--	1	0	0	0.000	--	--	--	0.000
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	1	1	0	0.180	--	0.180	--	0.180
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	1	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	1	0	0	0.00000	--	--	--	0.00000
Thiocyanate	mg/L	--	--	1	0	0	0.00000	--	--	--	0.00000
CN-WAD	mg/L	0.005	0.1	1	0	0	0.00000	--	--	--	0.00000
CN-SAD	mg/L	--	--	1	0	0	0.00000	--	--	--	0.00000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	1	1	1	3.22000	--	3.22000	--	3.22000
Total Antimony	mg/L	--	--	1	1	0	0.05150	--	0.05150	--	0.05150
Total Arsenic	mg/L	0.005	--	1	1	1	2.68000	--	2.68000	--	2.68000
Dissolved Arsenic	mg/L	--	0.15	1	1	1	0.36600	--	0.36600	--	0.36600
Total Barium	mg/L	--	1	1	1	0	0.07820	--	0.07820	--	0.07820
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	1	1	1	0.00879	--	0.00879	--	0.00879
Total Chromium	mg/L	0.0089 ⁵	0.04	1	1	0	0.00153	--	0.00153	--	0.00153
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	1	1	1	0.06040	--	0.06040	--	0.06040
Total Iron	mg/L	0.3	1	1	1	1	17.50000	--	17.50000	--	17.50000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	1	1	1	0.66100	--	0.66100	--	0.66100
Total Manganese	mg/L	--	0.5	1	1	1	0.61300	--	0.61300	--	0.61300
Total Molybdenum	mg/L	0.073	--	1	1	0	0.00032	--	0.00032	--	0.00032
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	1	1	0	0.00117	--	0.00117	--	0.00117
Total Selenium	mg/L	0.001	--	1	1	0	0.00026	--	0.00026	--	0.00026
Total Silver	mg/L	0.00025	0.1	1	1	1	0.00698	--	0.00698	--	0.00698
Total Thallium	mg/L	0.0008	--	1	1	0	0.00053	--	0.00053	--	0.00053
Total Zinc	mg/L	0.03	0.3	1	1	1	0.663	--	0.663	--	0.663

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B20. Summary of East toe of NW pile seep (WQ-NW-SEEP-01) Water Quality (May 2014)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	1	1	0	7.6	--	7.6	--	7.6
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	1	1	0	7.4	--	7.4	--	7.4
Hardness (as CaCO ₃)	mg/L	--	--	1	1		322.0	--	322.0	--	322.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	1	1	0	45.0	--	45.0	--	45.0
Sulphate	mg/L	--	--	1	1	0	281.0	--	281.0	--	281.0
Total Suspended Solids	mg/L	--	50	1	1	0	9.3	--	9.3	--	9.3
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	1	1	0	0.015	--	0.015	--	0.015
Nitrate-N	mg/L	2.9	--	1	0	0	0.000	--	--	--	0.000
Nitrite-N	mg/L	0.06	--	1	0	0	0.000	--	--	--	0.000
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	1	0	0	0.000	--	--	--	0.000
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	1	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	1	0	0	0.00000	--	--	--	0.00000
Thiocyanate	mg/L	--	--	1	0	0	0.00000	--	--	--	0.00000
CN-WAD	mg/L	0.005	0.1	1	0	0	0.00000	--	--	--	0.00000
CN-SAD	mg/L	--	--	0	0	0	0.00000	--	--	--	0.00000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	1	1	1	0.14400	--	0.14400	--	0.14400
Total Antimony	mg/L	--	--	1	1	0	0.00272	--	0.00272	--	0.00272
Total Arsenic	mg/L	0.005	--	1	1	1	0.01430	--	0.01430	--	0.01430
Dissolved Arsenic	mg/L	--	0.15	1	1	0	0.00600	--	0.00600	--	0.00600
Total Barium	mg/L	--	1	1	1	0	0.01840	--	0.01840	--	0.01840
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	1	1	1	0.00159	--	0.00159	--	0.00159
Total Chromium	mg/L	0.0089 ⁵	0.04	1	1	0	0.00018	--	0.00018	--	0.00018
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	1	1	1	0.00569	--	0.00569	--	0.00569
Total Iron	mg/L	0.3	1	1	1	0	0.40000	--	0.40000	--	0.40000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	1	1	0	0.00690	--	0.00690	--	0.00690
Total Manganese	mg/L	--	0.5	1	1	0	0.25500	--	0.25500	--	0.25500
Total Molybdenum	mg/L	0.073	--	1	1	0	0.00009	--	0.00009	--	0.00009
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	1	0	0	0.00000	--	--	--	0.00000
Total Selenium	mg/L	0.001	--	1	1	0	0.00015	--	0.00015	--	0.00015
Total Silver	mg/L	0.00025	0.1	1	1	0	0.00017	--	0.00017	--	0.00017
Total Thallium	mg/L	0.0008	--	1	1	0	0.00003	--	0.00003	--	0.00003
Total Zinc	mg/L	0.03	0.3	1	1	1	0.06800	--	0.06800	--	0.06800

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B21. Summary of Dome East Slope seeps (WQ-DESS-01, WQ-DESS-02, WQ-DESS-03) Water Quality (Oct 2013 - May 2014)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	10	10	3	5.7	6.1	7.1	7.5	8.0
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	11	11	7	5.5	5.8	6.2	7.9	8.1
Hardness (as CaCO ₃)	mg/L	--	--	11	11	--	21.4	286.0	553.0	984.0	1240.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	11	11	--	1.4	2.1	4.0	110.0	134.0
Sulphate	mg/L	--	--	11	11	--	4.9	289.0	534.0	862.0	1070.0
Total Suspended Solids	mg/L	--	50	11	8	3	4.0	7.3	20.1	115.2	315.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	11	11	0	0.005	0.006	0.008	0.015	0.038
Nitrate-N	mg/L	2.9	--	11	10	1	0.006	0.066	0.221	5.115	13.200
Nitrite-N	mg/L	0.06	--	11	0	0	0.000	--	--	--	0.000
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	11	2	0	0.244	--	0.493	--	0.741
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	11	1	0	0.01350	--	0.01350	--	0.01350
Cyanate	mg/L	--	--	11	1	0	0.35000	--	0.35000	--	0.35000
Thiocyanate	mg/L	--	--	11	2	0	0.72000	--	0.99500	--	1.27000
CN-WAD	mg/L	0.005	0.1	11	0	0	0.00000	--	--	--	0.00000
CN-SAD	mg/L	--	--	0	0	0	0.00000	--	--	--	0.00000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	11	11	8	0.01570	0.02000	0.27400	0.60200	7.84000
Total Antimony	mg/L	--	--	11	10	0	0.00013	0.00014	0.00023	0.00058	0.00260
Total Arsenic	mg/L	0.005	--	11	11	2	0.00052	0.00127	0.00200	0.00335	0.12900
Dissolved Arsenic	mg/L	--	0.15	11	11	0	0.00046	0.00075	0.00120	0.00257	0.00312
Total Barium	mg/L	--	1	11	11	0	0.01610	0.02310	0.03180	0.03920	0.11500
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	11	11	6	0.00002	0.00006	0.00122	0.00582	0.01200
Total Chromium	mg/L	0.0089 ⁵	0.04	11	9	0	0.00011	0.00020	0.00031	0.00305	0.00932
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	11	9	4	0.00142	0.00165	0.00321	0.00594	0.01930
Total Iron	mg/L	0.3	1	11	10	6	0.01400	0.04750	0.40800	3.34825	15.10000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	11	7	1	0.00006	0.00006	0.00016	0.00392	0.03650
Total Manganese	mg/L	--	0.5	11	11	2	0.00113	0.00192	0.17100	0.39800	0.61200
Total Molybdenum	mg/L	0.073	--	11	5	0	0.00016	0.00016	0.00022	0.00051	0.00070
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	11	8	0	0.00116	0.00206	0.00542	0.00723	0.01130
Total Selenium	mg/L	0.001	--	11	4	0	0.00025	0.00026	0.00035	0.00043	0.00044
Total Silver	mg/L	0.00025	0.1	11	5	1	0.00001	0.00002	0.00003	0.00050	0.00071
Total Thallium	mg/L	0.0008	--	11	4	0	0.00001	0.00001	0.00007	0.00018	0.00020
Total Zinc	mg/L	0.03	0.3	11	11	6	0.00390	0.00820	0.11300	1.94000	4.45000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B22. Summary of Monitoring Well Along Dome Creek Valley (WQ-CH-P-13-01) Water Quality (Jun 2014 - Oct 2014)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	4	4	2	6.2	6.2	6.8	7.4	7.4
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	4	4	2	5.8	5.9	6.6	7.0	7.1
Hardness (as CaCO ₃)	mg/L	--	--	4	4	--	779.0	809.0	974.5	1117.5	1140.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	4	4	--	2.5	3.5	6.8	10.6	11.8
Sulphate	mg/L	--	--	4	4	--	830.0	843.0	927.5	1053.3	1080.0
Total Suspended Solids	mg/L	--	50	4	2	0	10.7	--	15.0	--	19.3
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	4	3	0	0.005	0.005	0.008	0.010	0.010
Nitrate-N	mg/L	2.9	--	4	4	0	0.147	0.156	0.246	0.321	0.326
Nitrite-N	mg/L	0.06	--	4	0	0	0.000	--	--	--	0.000
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	4	0	0	0.000	--	--	--	0.000
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	4	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	4	0	0	0.00000	--	--	--	0.00000
Thiocyanate	mg/L	--	--	4	0	0	0.00000	--	--	--	0.00000
CN-WAD	mg/L	0.005	0.1	4	0	0	0.00000	--	--	--	0.00000
CN-SAD	mg/L	--	--	0	0	0	0.00000	--	--	--	0.00000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	4	4	4	0.11000	0.11750	0.17350	0.25050	0.26500
Total Antimony	mg/L	--	--	4	4	0	0.00011	0.00011	0.00014	0.00017	0.00018
Total Arsenic	mg/L	0.005	--	4	4	0	0.00040	0.00042	0.00064	0.00101	0.00108
Dissolved Arsenic	mg/L	--	0.15	4	4	0	0.00041	0.00041	0.00043	0.00054	0.00057
Total Barium	mg/L	--	1	4	4	0	0.00850	0.00870	0.01025	0.01533	0.01670
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	4	4	4	0.00663	0.00736	0.01103	0.01438	0.01500
Total Chromium	mg/L	0.0089 ⁵	0.04	4	4	0	0.00017	0.00019	0.00024	0.00031	0.00033
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	4	4	0	0.00083	0.00088	0.00114	0.00155	0.00166
Total Iron	mg/L	0.3	1	4	4	0	0.02700	0.03050	0.07150	0.18225	0.20900
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	4	2	0	0.00015	--	0.00017	--	0.00019
Total Manganese	mg/L	--	0.5	4	4	2	0.18300	0.23450	0.54350	0.82850	0.87200
Total Molybdenum	mg/L	0.073	--	4	1	0	0.00007	--	0.00007	--	0.00007
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	4	4	0	0.00550	0.00594	0.00790	0.00964	0.01000
Total Selenium	mg/L	0.001	--	4	1	0	0.00012	--	0.00012	--	0.00012
Total Silver	mg/L	0.00025	0.1	4	2	0	0.00001	--	0.00001	--	0.00001
Total Thallium	mg/L	0.0008	--	4	0	0	0.00000	--	--	--	0.00000
Total Zinc	mg/L	0.03	0.3	4	4	4	2.48000	2.68000	3.63000	4.66250	4.89000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B23. Summary of Exploration Trench (WQ-ET-01) and Lysimeter (WQ-L2) Water Quality (May 2014)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	2	2	0	6.6	--	7.1	--	7.6
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	2	2	0	7.7	--	7.7	--	7.8
Hardness (as CaCO ₃)	mg/L	--	--	2	2	--	32.4	--	190.2	--	348.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	2	2	--	30.2	--	50.2	--	70.1
Sulphate	mg/L	--	--	2	2	--	4.5	--	119.2	--	234.0
Total Suspended Solids	mg/L	--	50	2	1	1	85.4	--	85.4	--	85.4
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	2	1	0	0.012	--	0.012	--	0.012
Nitrate-N	mg/L	2.9	--	2	2	0	0.019	--	0.073	--	0.128
Nitrite-N	mg/L	0.06	--	2	2	0	0.001	--	0.003	--	0.005
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	2	1	0	0.109	--	0.109	--	0.109
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	2	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	2	1	0	0.30000	--	0.30000	--	0.30000
Thiocyanate	mg/L	--	--	2	0	0	0.00000	--	--	--	0.00000
CN-WAD	mg/L	0.005	0.1	2	0	0	0.00000	--	--	--	0.00000
CN-SAD	mg/L	--	--	0	0	0	0.00000	--	--	--	0.00000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	2	2	1	0.02430	--	1.13215	--	2.24000
Total Antimony	mg/L	--	--	2	2	0	0.00098	--	0.00137	--	0.00176
Total Arsenic	mg/L	0.005	--	2	2	2	0.00585	--	0.01823	--	0.03060
Dissolved Arsenic	mg/L	--	0.15	2	2	0	0.00311	--	0.00422	--	0.00533
Total Barium	mg/L	--	1	2	2	0	0.00399	--	0.02400	--	0.04400
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	2	2	1	0.00007	--	0.00034	--	0.00061
Total Chromium	mg/L	0.0089 ⁵	0.04	2	1	0	0.00249	--	0.00249	--	0.00249
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	2	2	1	0.00109	--	0.00374	--	0.00639
Total Iron	mg/L	0.3	1	2	2	1	0.03300	--	2.10150	--	4.17000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	2	2	1	0.00088	--	0.00249	--	0.00410
Total Manganese	mg/L	--	0.5	2	2	0	0.00595	--	0.06748	--	0.12900
Total Molybdenum	mg/L	0.073	--	2	2	0	0.00007	--	0.00011	--	0.00015
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	2	1	0	0.00167	--	0.00167	--	0.00167
Total Selenium	mg/L	0.001	--	2	0	0	0.00000	--	--	--	0.00000
Total Silver	mg/L	0.00025	0.1	2	2	0	0.00002	--	0.00006	--	0.00011
Total Thallium	mg/L	0.0008	--	2	2	0	0.00001	--	0.00006	--	0.00012
Total Zinc	mg/L	0.03	0.3	2	2	0	0.01310	--	0.01805	--	0.02300

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B24. Summary of Dome Creek (WQ-DC-1, WQ-DC-2, WQ-DC-3, WQ-DC-4, WQ-DC-7, WQ-DC-8, WQ-DC-10) Water Quality (Mar 2015)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	7	6	0	7.2	7.3	7.5	7.7	8.0
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	7	7	0	7.6	7.7	8.0	8.2	8.3
Hardness (as CaCO ₃)	mg/L	--	--	7	7	--	744.0	1010.0	1280.0	1730.0	2500.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	7	7	--	241.0	278.0	408.0	436.0	573.0
Sulphate	mg/L	--	--	7	7	--	429.0	671.0	840.0	1340.0	1910.0
Total Suspended Solids	mg/L	--	50	7	4	1	5.3	7.2	19.4	60.0	71.3
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	7	7	0	0.006	0.012	0.107	1.030	5.900
Nitrate-N	mg/L	2.9	--	2	2	0	0.010	--	0.037	--	0.064
Nitrite-N	mg/L	0.06	--	7	1	0	0.008	--	0.008	--	0.008
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	7	1	0	0.078	--	0.078	--	0.078
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	7	1	0	0.05580	--	0.05580	--	0.05580
Cyanate	mg/L	--	--	7	0	0	0.00000	--	--	--	0.00000
Thiocyanate	mg/L	--	--	7	2	0	0.62000	--	1.79000	--	2.96000
CN-WAD	mg/L	0.005	0.1	7	1	1	0.01830	--	0.01830	--	0.01830
CN-SAD	mg/L	--	--	0	0	0	0.00000	--	--	--	0.00000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	7	6	2	0.00540	0.00638	0.00970	0.18600	0.23700
Total Antimony	mg/L	--	--	7	7	0	0.00036	0.00046	0.00115	0.00830	0.01560
Total Arsenic	mg/L	0.005	--	7	7	5	0.00277	0.00331	0.00732	0.03980	0.10800
Dissolved Arsenic	mg/L	--	0.15	7	7	0	0.00273	0.00314	0.00598	0.03080	0.05030
Total Barium	mg/L	--	1	7	7	0	0.02060	0.04640	0.06160	0.07770	0.08330
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	7	7	2	0.00002	0.00004	0.00024	0.00044	0.00338
Total Chromium	mg/L	0.0089 ⁵	0.04	7	5	0	0.00025	0.00035	0.00046	0.00079	0.00090
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	7	3	1	0.00100	0.00100	0.00193	0.00726	0.00726
Total Iron	mg/L	0.3	1	7	7	4	0.01500	0.06400	2.31000	5.07000	7.85000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	7	4	0	0.00006	0.00007	0.00021	0.00745	0.00983
Total Manganese	mg/L	--	0.5	7	7	0	0.03760	0.18300	1.39000	5.12000	8.79000
Total Molybdenum	mg/L	0.073	--	7	7	0	0.00016	0.00025	0.00047	0.00079	0.00092
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	7	5	0	0.00093	0.00132	0.00227	0.00319	0.00408
Total Selenium	mg/L	0.001	--	7	1	0	0.00019	--	0.00019	--	0.00019
Total Silver	mg/L	0.00025	0.1	7	2	0	0.00001	--	0.00004	--	0.00008
Total Thallium	mg/L	0.0008	--	7	1	0	0.00009	--	0.00009	--	0.00009
Total Zinc	mg/L	0.03	0.3	7	7	3	0.00980	0.01020	0.02840	0.11000	1.11000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B25. Summary of Dome Creek Downstream of Mill Site and Upstream of Tailings Pond (WQ-DC-D1) Water Quality (Jun 2008 - May 2013)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	14	15	0	7.2	7.7	8.0	8.1	8.2
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	60	60	0	7.4	7.8	8.0	8.0	8.2
Hardness (as CaCO ₃)	mg/L	--	--	60	59	--	0.7	548.0	608.0	688.0	799.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	60	60	--	55.0	201.3	231.0	251.8	266.0
Sulphate	mg/L	--	--	60	58	--	75.0	322.5	380.5	420.0	484.0
Total Suspended Solids	mg/L	--	50	60	28	3	1.0	3.3	5.5	13.3	1440.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	60	14	0	0.006	0.010	0.020	0.030	0.050
Nitrate-N	mg/L	2.9	--	60	44	0	0.010	0.030	0.040	0.120	0.340
Nitrite-N	mg/L	0.06	--	60	18	16	0.002	0.115	0.155	0.213	0.300
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	44	14		0.006	0.012	0.017	0.029	0.061
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	0	0	--	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	60	3	0	0.20000	0.20000	0.20000	0.70000	0.70000
Thiocyanate	mg/L	--	--	60	21	0	0.10000	0.25000	0.70000	0.80000	1.30000
CN-WAD	mg/L	0.005	0.1	60	29	0	0.00200	0.00200	0.00200	0.00200	0.00400
CN-SAD	mg/L	--	--	59	36	0	0.00200	0.00200	0.00300	0.00800	0.21000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	60	55	11	0.00500	0.01500	0.02800	0.08500	13.80000
Total Antimony	mg/L	--	--	60	60	0	0.00300	0.00705	0.00865	0.00960	0.01130
Total Arsenic	mg/L	0.005	--	60	60	60	0.00730	0.01140	0.01290	0.01718	0.09690
Dissolved Arsenic	mg/L	--	0.15	60	60	0	0.00600	0.00778	0.00895	0.01020	0.01440
Total Barium	mg/L	--	1	60	60	0	0.01100	0.01800	0.02060	0.02300	0.25700
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	60	60	58	0.00015	0.00126	0.00282	0.00432	0.00663
Total Chromium	mg/L	0.0089 ⁵	0.04	60	19	0	0.00040	0.00050	0.00060	0.00145	0.03170
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	60	38	9	0.00060	0.00100	0.00200	0.00300	0.03950
Total Iron	mg/L	0.3	1	60	58	15	0.03100	0.08875	0.14300	0.34250	22.00000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	60	51	3	0.00010	0.00030	0.00060	0.00160	0.02180
Total Manganese	mg/L	--	0.5	60	59	15	0.00600	0.14700	0.29300	0.52500	1.87000
Total Molybdenum	mg/L	0.073	--	60	47	0	0.00010	0.00020	0.00020	0.00028	0.00120
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	60	57	0	0.00100	0.00200	0.00260	0.00400	0.01520
Total Selenium	mg/L	0.001	--	60	8	0	0.00010	0.00030	0.00040	0.00128	0.00330
Total Silver	mg/L	0.00025	0.1	60	18	3	0.00001	0.00002	0.00002	0.00007	0.00042
Total Thallium	mg/L	0.0008	--	60	50	0	0.00002	0.00004	0.00005	0.00007	0.00027
Total Zinc	mg/L	0.03	0.3	60	60	59	0.00030	0.34225	0.58500	0.94625	1.40000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B26. Summary of Dome Creek Downstream of Mill Site and Upstream of Tailings Pond (WQ-DC-D1b) Water Quality (May 2012 - Oct 2014)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	24	24	0	6.9	7.7	7.9	8.0	8.2
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	24	24	0	7.4	7.8	8.0	8.1	8.3
Hardness (as CaCO ₃)	mg/L	--	--	24	24	--	255.0	786.3	832.5	942.0	1080.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	24	24	--	78.6	220.8	255.0	269.5	299.0
Sulphate	mg/L	--	--	24	24	--	177.0	521.0	585.0	645.5	760.0
Total Suspended Solids	mg/L	--	50	24	18	4	4.0	6.5	12.1	44.3	218.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	23	23	0	0.060	0.080	0.115	0.171	0.239
Nitrate-N	mg/L	2.9	--	24	17	0	0.012	0.083	0.100	0.151	0.240
Nitrite-N	mg/L	0.06	--	24	1	1	0.240	--	0.240	--	0.240
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	18	5		0.016	0.022	0.060	0.090	0.110
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	14	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	24	1	0	0.29000	--	0.29000	--	0.29000
Thiocyanate	mg/L	--	--	24	0	0	0.00000	--	--	--	0.00000
CN-WAD	mg/L	0.005	0.1	24	0	0	0.00000	--	--	--	0.00000
CN-SAD	mg/L	--	--	9	5	0	0.00400	0.00400	0.00600	0.00600	0.00600
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	24	24	12	0.00800	0.01575	0.08425	0.55100	2.99000
Total Antimony	mg/L	--	--	24	24	0	0.00598	0.00799	0.01155	0.01313	0.02760
Total Arsenic	mg/L	0.005	--	24	24	24	0.01450	0.01795	0.02970	0.04228	0.29300
Dissolved Arsenic	mg/L	--	0.15	24	24	0	0.00820	0.01120	0.01200	0.01690	0.02460
Total Barium	mg/L	--	1	24	24	0	0.01820	0.02070	0.02455	0.03128	0.08850
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	24	24	23	0.00033	0.00087	0.00188	0.00247	0.00801
Total Chromium	mg/L	0.0089 ⁵	0.04	24	17	0	0.00015	0.00031	0.00060	0.00130	0.00510
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	24	23	6	0.00080	0.00100	0.00215	0.00400	0.01010
Total Iron	mg/L	0.3	1	24	24	24	0.43400	0.57375	1.00300	2.29000	8.22000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	24	24	6	0.00010	0.00065	0.00424	0.01174	0.07210
Total Manganese	mg/L	--	0.5	24	24	20	0.35700	0.57450	0.74900	0.86600	1.82000
Total Molybdenum	mg/L	0.073	--	24	23	0	0.00010	0.00020	0.00024	0.00029	0.00046
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	24	24	0	0.00062	0.00086	0.00124	0.00194	0.00500
Total Selenium	mg/L	0.001	--	24	8	0	0.00010	0.00011	0.00021	0.00060	0.00070
Total Silver	mg/L	0.00025	0.1	24	16	0	0.00002	0.00004	0.00007	0.00023	0.00097
Total Thallium	mg/L	0.0008	--	24	24	0	0.00003	0.00003	0.00005	0.00006	0.00011
Total Zinc	mg/L	0.03	0.3	24	24	24	0.12800	0.24975	0.39250	0.48100	1.39000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B27. Summary of Upper Dome Creek Downstream of Tailings Pond (WQ-DC-U) Water Quality (May 2008 - Jan 2015)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	46	15	0	6.5	7.8	7.9	8.0	820.0
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	106	74	0	6.9	7.6	7.9	8.0	8.3
Hardness (as CaCO ₃)	mg/L	--	--	106	70	--	1.9	471.5	563.5	660.5	816.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	106	75	--	41.0	138.0	172.0	210.0	261.0
Sulphate	mg/L	--	--	106	73	--	104.0	354.0	403.0	487.5	614.0
Total Suspended Solids	mg/L	--	50	106	73	37	4.0	11.0	25.0	110.0	570.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	106	71	0	0.116	0.500	0.710	1.900	5.600
Nitrate-N	mg/L	2.9	--	106	75	0	0.040	0.290	0.510	0.980	4.980
Nitrite-N	mg/L	0.06	--	106	30	15	0.006	0.019	0.085	0.170	0.400
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	78	43		0.012	0.021	0.032	0.120	0.734
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	24	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	106	61	0	0.20000	0.30000	0.40000	0.80000	3.00000
Thiocyanate	mg/L	--	--	106	69	0	0.20000	0.50000	0.70000	1.50000	5.90000
CN-WAD	mg/L	0.005	0.1	106	65	39	0.00200	0.00400	0.00400	0.00700	0.30000
CN-SAD	mg/L	--	--	80	74	0	0.00600	0.02550	0.06200	0.18000	2.00000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	106	73	71	0.01100	0.06900	0.25100	0.87850	14.30000
Total Antimony	mg/L	--	--	106	73	0	0.00040	0.00135	0.00220	0.00280	0.02570
Total Arsenic	mg/L	0.005	--	106	75	106	0.00670	0.01380	0.02090	0.02980	0.08420
Dissolved Arsenic	mg/L	--	0.15	106	73	0	0.00040	0.00135	0.00210	0.00270	0.02480
Total Barium	mg/L	--	1	106	75	0	0.02800	0.04700	0.05500	0.07300	0.31000
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	106	74	34	0.00007	0.00014	0.00026	0.00041	0.00197
Total Chromium	mg/L	0.0089 ⁵	0.04	106	72	0	0.00040	0.00073	0.00110	0.00213	0.02500
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	106	73	59	0.00100	0.00300	0.00400	0.00700	0.04000
Total Iron	mg/L	0.3	1	106	75	106	0.70000	1.84000	3.56000	5.64000	18.70000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	106	69	6	0.00010	0.00035	0.00080	0.00255	0.01500
Total Manganese	mg/L	--	0.5	106	75	104	0.32800	0.98200	1.34000	1.97000	7.58000
Total Molybdenum	mg/L	0.073	--	106	59	0	0.00020	0.00040	0.00054	0.00090	0.00140
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	106	72	0	0.00050	0.00200	0.00300	0.00490	0.02000
Total Selenium	mg/L	0.001	--	106	22	2	0.00020	0.00028	0.00030	0.00063	0.00200
Total Silver	mg/L	0.00025	0.1	106	42	4	0.00001	0.00002	0.00003	0.00008	0.00037
Total Thallium	mg/L	0.0008	--	106	27	0	0.00001	0.00001	0.00002	0.00007	0.00022
Total Zinc	mg/L	0.03	0.3	106	74	0	0.00050	0.00100	0.00180	0.00558	0.06220

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B28. Summary of Dome Creek Upstream of Tailings Pond (WQ-DC-U1) Water Quality (May 2012 - Nov 2013)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	20	20	1	5.5	7.5	7.7	7.9	8.2
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	20	20	0	7.1	7.6	7.8	7.8	8.0
Hardness (as CaCO ₃)	mg/L	--	--	20	20	--	358.0	483.5	622.0	772.0	878.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	20	20	--	91.2	141.0	182.5	200.3	221.0
Sulphate	mg/L	--	--	20	20	--	255.0	355.8	424.5	567.8	617.0
Total Suspended Solids	mg/L	--	50	20	13	3	4.0	6.0	20.0	52.0	384.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	18	12	0	0.010	0.013	0.025	0.038	0.060
Nitrate-N	mg/L	2.9	--	20	9	0	0.006	0.025	0.092	0.171	0.290
Nitrite-N	mg/L	0.06	--	20	5	2	0.001	0.002	0.051	0.175	0.200
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	13	5		0.026	0.027	0.090	0.122	0.122
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	8	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	20	4	0	0.20000	0.20000	0.23500	0.33000	0.35000
Thiocyanate	mg/L	--	--	20	7	0	0.30000	0.40000	0.40000	0.40000	0.80000
CN-WAD	mg/L	0.005	0.1	20	0	0	0.00000	--	--	--	0.00000
CN-SAD	mg/L	--	--	12	6	0	0.00400	0.00550	0.00700	0.02450	0.03800
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	20	20	9	0.02800	0.03968	0.08550	0.40900	6.13000
Total Antimony	mg/L	--	--	20	20	0	0.00180	0.00235	0.00300	0.00438	0.00510
Total Arsenic	mg/L	0.005	--	20	20	20	0.00533	0.00677	0.00828	0.01050	0.04250
Dissolved Arsenic	mg/L	--	0.15	20	20	0	0.00170	0.00527	0.00658	0.00880	0.01180
Total Barium	mg/L	--	1	20	20	0	0.01780	0.02548	0.03165	0.04550	0.12800
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	20	18	0	0.00001	0.00002	0.00002	0.00006	0.00022
Total Chromium	mg/L	0.0089 ⁵	0.04	20	16	0	0.00016	0.00031	0.00070	0.00180	0.01010
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	20	20	3	0.00080	0.00102	0.00132	0.00288	0.01600
Total Iron	mg/L	0.3	1	20	20	20	0.40500	0.56400	0.75000	1.40250	2.81000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	20	13	0	0.00005	0.00010	0.00030	0.00085	0.00440
Total Manganese	mg/L	--	0.5	20	20	0	0.07380	0.08908	0.13200	0.25050	1.13000
Total Molybdenum	mg/L	0.073	--	20	19	0	0.00020	0.00028	0.00031	0.00035	0.00050
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	20	19	0	0.00040	0.00063	0.00097	0.00230	0.00700
Total Selenium	mg/L	0.001	--	20	6	0	0.00010	0.00010	0.00015	0.00023	0.00030
Total Silver	mg/L	0.00025	0.1	20	6	0	0.00001	0.00001	0.00002	0.00003	0.00004
Total Thallium	mg/L	0.0008	--	20	3	0	0.00002	0.00002	0.00003	0.00007	0.00007
Total Zinc	mg/L	0.03	0.3	20	20	0	0.00700	0.01013	0.01270	0.01898	0.05300

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B29. Summary of Dome Creek Upstream of Tailings Pond (WQ-DC-U2) Water Quality (May 2012 - Nov 2013)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	20	20	0	7.0	7.4	7.7	7.8	8.0
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	20	20	0	7.3	7.6	7.7	7.9	8.0
Hardness (as CaCO ₃)	mg/L	--	--	20	20	--	339.0	506.3	571.0	686.8	881.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	20	20	--	83.9	141.3	173.0	206.3	237.0
Sulphate	mg/L	--	--	20	20	--	224.0	361.8	401.5	461.0	630.0
Total Suspended Solids	mg/L	--	50	20	20	18	8.0	75.3	227.5	358.8	721.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	20	17	0	0.057	0.097	0.121	0.177	0.250
Nitrate-N	mg/L	2.9	--	20	14	0	0.009	0.047	0.099	0.149	0.182
Nitrite-N	mg/L	0.06	--	18	5	4	0.002	0.007	0.100	0.130	0.130
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	14	13		0.028	0.086	0.170	0.361	1.400
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	9	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	20	9	0	0.20000	0.25000	0.40000	0.53000	0.80000
Thiocyanate	mg/L	--	--	20	4	0	0.30000	0.30000	0.40000	0.65000	0.70000
CN-WAD	mg/L	0.005	0.1	20	0	0	0.00000	--	--	--	0.00000
CN-SAD	mg/L	--	--	11	7	0	0.00400	0.00400	0.00400	0.00800	0.02400
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	20	20	19	0.09130	0.88625	2.28000	3.93500	15.20000
Total Antimony	mg/L	--	--	20	20	0	0.00180	0.00344	0.00390	0.00437	0.00853
Total Arsenic	mg/L	0.005	--	20	20	20	0.00472	0.01553	0.02410	0.03355	0.07680
Dissolved Arsenic	mg/L	--	0.15	20	20	0	0.00330	0.00440	0.00528	0.00610	0.00753
Total Barium	mg/L	--	1	20	20	0	0.03800	0.06098	0.11400	0.14000	0.31100
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	20	20	13	0.00006	0.00031	0.00049	0.00053	0.00178
Total Chromium	mg/L	0.0089 ⁵	0.04	20	20	0	0.00028	0.00151	0.00341	0.00710	0.02940
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	20	20	15	0.00102	0.00368	0.00840	0.01075	0.03400
Total Iron	mg/L	0.3	1	20	20	20	0.92200	2.82250	6.27000	7.57250	25.40000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	20	20	5	0.00011	0.00142	0.00321	0.00650	0.02030
Total Manganese	mg/L	--	0.5	20	20	16	0.33200	0.54875	0.65100	0.73975	0.84700
Total Molybdenum	mg/L	0.073	--	20	19	0	0.00020	0.00027	0.00032	0.00060	0.00100
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	20	19	0	0.00076	0.00200	0.00430	0.00700	0.02080
Total Selenium	mg/L	0.001	--	20	12	1	0.00011	0.00027	0.00030	0.00068	0.00120
Total Silver	mg/L	0.00025	0.1	20	12	2	0.00001	0.00005	0.00009	0.00012	0.00035
Total Thallium	mg/L	0.0008	--	20	17	0	0.00001	0.00002	0.00006	0.00007	0.00026
Total Zinc	mg/L	0.03	0.3	20	20	20	0.02470	0.05533	0.08390	0.09198	0.23600

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B30. Summary Dome Creek at Road (WQ-DC-R) Water Quality (May 2008 - Oct 2014)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	29	16	1	6.4	7.2	7.6	7.6	8.0
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	77	76	0	7.3	7.6	7.8	7.9	8.2
Hardness (as CaCO ₃)	mg/L	--	--	77	75	--	1.6	372.0	467.0	578.0	776.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	77	77	--	46.0	115.0	149.0	174.5	208.0
Sulphate	mg/L	--	--	77	75	--	21.0	263.0	325.0	394.0	587.0
Total Suspended Solids	mg/L	--	50	77	72	24	4.0	10.2	25.5	61.5	458.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	75	74	1	0.080	0.360	0.585	0.765	26.000
Nitrate-N	mg/L	2.9	--	77	76	0	0.050	0.269	0.400	0.567	1.140
Nitrite-N	mg/L	0.06	--	77	42	8	0.003	0.011	0.020	0.043	0.200
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	55	39		0.006	0.025	0.038	0.076	0.490
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	12	5	0	0.00520	0.00520	0.00680	0.01365	0.02000
Cyanate	mg/L	--	--	77	59	0	0.20000	0.30000	0.40000	0.60000	1.56000
Thiocyanate	mg/L	--	--	77	55	0	0.10000	0.30000	0.50000	0.80000	2.30000
CN-WAD	mg/L	0.005	0.1	77	48	7	0.00200	0.00200	0.00400	0.00400	0.01000
CN-SAD	mg/L	--	--	64	61	0	0.00200	0.01000	0.02400	0.05100	0.42000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	76	75	64	0.03520	0.14500	0.24300	0.84000	11.60000
Total Antimony	mg/L	--	--	76	75	0	0.00068	0.00160	0.00210	0.00260	0.01910
Total Arsenic	mg/L	0.005	--	76	76	76	0.00770	0.02113	0.03000	0.03903	0.08800
Dissolved Arsenic	mg/L	--	0.15	76	77	0	0.00310	0.00650	0.00880	0.01310	0.02110
Total Barium	mg/L	--	1	76	76	0	0.02600	0.05000	0.05950	0.07500	0.23000
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	76	75	5	0.00006	0.00010	0.00016	0.00024	0.00116
Total Chromium	mg/L	0.0089 ⁵	0.04	76	72	1	0.00029	0.00070	0.00100	0.00208	0.14800
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	76	75	35	0.00100	0.00200	0.00300	0.00500	0.02000
Total Iron	mg/L	0.3	1	76	76	76	0.50000	2.11000	3.76000	4.53000	22.00000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	76	75	6	0.00020	0.00070	0.00150	0.00320	0.03360
Total Manganese	mg/L	--	0.5	76	76	0	0.22900	0.76525	1.04000	1.47750	3.78000
Total Molybdenum	mg/L	0.073	--	76	63	0	0.00020	0.00032	0.00042	0.00060	0.00220
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	76	71	0	0.00060	0.00181	0.00200	0.00300	0.06240
Total Selenium	mg/L	0.001	--	76	25	0	0.00010	0.00012	0.00016	0.00040	0.00090
Total Silver	mg/L	0.00025	0.1	76	47	1	0.00001	0.00002	0.00004	0.00009	0.00072
Total Thallium	mg/L	0.0008	--	76	28	0	0.00001	0.00002	0.00002	0.00005	0.00024
Total Zinc	mg/L	0.03	0.3	76	76	21	0.00110	0.01250	0.01900	0.04018	0.16000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B31. Summary of Pony Creek Downstream of Pit (WQ-PC-D) Water Quality (May 2008 - Nov 2014)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	28	27	0	6.8	7.1	7.3	7.5	7.8
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	73	72	0	6.8	7.1	7.3	7.5	7.9
Hardness (as CaCO ₃)	mg/L	--	--	73	71	--	34.0	120.0	158.0	222.0	380.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	73	73	--	13.0	42.0	63.0	85.1	200.0
Sulphate	mg/L	--	--	73	71	--	15.8	73.9	97.5	120.0	187.0
Total Suspended Solids	mg/L	--	50	73	49	9	1.0	6.4	12.0	41.0	88.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	70	24	0	0.005	0.010	0.020	0.038	0.100
Nitrate-N	mg/L	2.9	--	73	48	0	0.005	0.030	0.078	0.140	0.446
Nitrite-N	mg/L	0.06	--	73	11	6	0.002	0.020	0.070	0.140	0.170
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	56	26	0	0.006	0.018	0.025	0.037	0.101
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	13	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	73	9	0	0.20000	0.20000	0.20000	0.30000	0.40000
Thiocyanate	mg/L	--	--	73	27	0	0.20000	0.30000	0.60000	0.80000	1.70000
CN-WAD	mg/L	0.005	0.1	73	31	0	0.00200	0.00200	0.00200	0.00200	0.00400
CN-SAD	mg/L	--	--	61	40	0	0.00200	0.00200	0.00200	0.00750	0.05400
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	74	74	40	0.01300	0.03998	0.10085	0.22775	1.59000
Total Antimony	mg/L	--	--	74	74	0	0.00040	0.00120	0.00175	0.00460	0.02420
Total Arsenic	mg/L	0.005	--	74	74	48	0.00280	0.00440	0.00595	0.01165	0.52400
Dissolved Arsenic	mg/L	--	0.15	73	73	0	0.00140	0.00316	0.00394	0.00455	0.00632
Total Barium	mg/L	--	1	74	74	0	0.02000	0.02875	0.03550	0.04000	0.06500
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	74	74	0	0.00017	0.00057	0.00105	0.00274	0.00789
Total Chromium	mg/L	0.0089 ⁵	0.04	74	43	0	0.00018	0.00031	0.00054	0.00080	0.00650
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	74	74	71	0.00300	0.00644	0.01000	0.01718	0.13500
Total Iron	mg/L	0.3	1	74	73	25	0.01000	0.05450	0.18800	0.46850	8.48000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	74	74	0	0.00030	0.00080	0.00215	0.00688	0.17800
Total Manganese	mg/L	--	0.5	74	73	5	0.00282	0.02700	0.04600	0.17200	1.08000
Total Molybdenum	mg/L	0.073	--	74	32	5	0.00003	0.00007	0.00009	0.00010	0.00020
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	74	50	0	0.00040	0.00070	0.00100	0.00193	0.00300
Total Selenium	mg/L	0.001	--	74	4	0	0.00010	0.00010	0.00016	0.00035	0.00040
Total Silver	mg/L	0.00025	0.1	74	58	4	0.00001	0.00002	0.00004	0.00011	0.00287
Total Thallium	mg/L	0.0008	--	74	17	0	0.00001	0.00001	0.00002	0.00003	0.00011
Total Zinc	mg/L	0.03	0.3	74	74	65	0.00060	0.05455	0.09500	0.22525	0.73100

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B32. Summary of Back Creek Near Confluence With Victoria Creek (WQ-BC) Water Quality (May 2008 - Oct 2014)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	30	29	0	7.1	7.6	7.9	8.1	8.4
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	74	73	0	7.1	7.6	7.9	8.0	8.2
Hardness (as CaCO ₃)	mg/L	--	--	74	72	--	30.0	110.0	139.5	163.0	199.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	74	74	--	21.0	66.5	87.0	103.8	135.0
Sulphate	mg/L	--	--	74	72	--	9.4	38.9	54.4	61.6	79.6
Total Suspended Solids	mg/L	--	50	74	63	34	1.0	9.3	61.0	368.0	25900.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	70	44	0	0.006	0.018	0.030	0.058	0.160
Nitrate-N	mg/L	2.9	--	74	48	0	0.010	0.030	0.051	0.090	0.330
Nitrite-N	mg/L	0.06	--	74	12	4	0.001	0.002	0.030	0.068	0.130
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	74	44	0	0.010	0.028	0.255	0.527	18.700
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	16	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	74	20	0	0.20000	0.20000	0.25000	0.33000	1.40000
Thiocyanate	mg/L	--	--	74	50	0	0.10000	0.40000	0.65000	1.12500	2.20000
CN-WAD	mg/L	0.005	0.1	74	32	0	0.00200	0.00200	0.00200	0.00200	0.00400
CN-SAD	mg/L	--	--	58	38	0	0.00200	0.00200	0.00200	0.00550	0.15000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	74	73	61	0.01930	0.16950	0.74500	7.86500	588.00000
Total Antimony	mg/L	--	--	74	70	0	0.00012	0.00030	0.00043	0.00123	0.02000
Total Arsenic	mg/L	0.005	--	74	74	53	0.00050	0.00423	0.00755	0.04420	3.53000
Dissolved Arsenic	mg/L	--	0.15	74	74	0	0.00037	0.00235	0.00280	0.00343	0.05400
Total Barium	mg/L	--	1	74	74	4	0.05100	0.06150	0.07350	0.21275	11.20000
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	74	73	38	0.00006	0.00012	0.00021	0.00118	0.10900
Total Chromium	mg/L	0.0089 ⁵	0.04	74	62	7	0.00018	0.00071	0.00205	0.01123	0.97900
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	74	72	42	0.00100	0.00200	0.00375	0.01950	1.50000
Total Iron	mg/L	0.3	1	74	74	70	0.09500	0.57225	1.33000	13.02500	1110.00000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	74	73	33	0.00008	0.00085	0.00350	0.04790	6.18000
Total Manganese	mg/L	--	0.5	74	74	54	0.02330	0.44475	0.69050	1.20250	48.40000
Total Molybdenum	mg/L	0.073	--	74	63	0	0.00035	0.00070	0.00090	0.00116	0.05000
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	74	69	3	0.00056	0.00100	0.00200	0.00774	0.71200
Total Selenium	mg/L	0.001	--	74	11	3	0.00011	0.00012	0.00024	0.00100	0.00800
Total Silver	mg/L	0.00025	0.1	74	51	18	0.00001	0.00002	0.00010	0.00070	0.03220
Total Thallium	mg/L	0.0008	--	74	37	5	0.00001	0.00003	0.00016	0.00036	0.00990
Total Zinc	mg/L	0.03	0.3	74	70	27	0.00050	0.00753	0.01750	0.09963	10.30000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B33. Summary of Victoria Creek North of Mine Access Road (WQ-VC-R) Water Quality (May 2008 - Nov 2014)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	60	31	1	6.1	7.3	7.5	7.9	8.2
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	91	91	0	6.9	7.4	7.7	7.9	8.2
Hardness (as CaCO ₃)	mg/L	--	--	92	85	--	27.0	76.5	100.0	113.0	214.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	92	92	--	17.0	58.3	74.0	86.8	134.0
Sulphate	mg/L	--	--	92	91	--	6.2	21.9	26.0	31.6	119.0
Total Suspended Solids	mg/L	--	50	92	62	13	1.0	4.0	7.5	28.3	1240.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	88	37	0	0.005	0.010	0.017	0.023	0.060
Nitrate-N	mg/L	2.9	--	92	76	0	0.020	0.063	0.095	0.130	0.240
Nitrite-N	mg/L	0.06	--	92	17	6	0.001	0.006	0.030	0.045	0.060
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	68	25	0	0.010	0.019	0.027	0.086	1.300
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	14	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	92	9	0	0.20000	0.20000	0.20000	0.30000	0.47000
Thiocyanate	mg/L	--	--	92	50	0	0.10000	0.30000	0.50000	0.92500	3.90000
CN-WAD	mg/L	0.005	0.1	92	41	0	0.00200	0.00200	0.00200	0.00200	0.00400
CN-SAD	mg/L	--	--	78	50	0	0.00200	0.00200	0.00200	0.00800	0.14000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	92	91	44	0.01500	0.04400	0.09100	0.39800	50.70000
Total Antimony	mg/L	--	--	92	80	0	0.00019	0.00020	0.00030	0.00040	0.00910
Total Arsenic	mg/L	0.005	--	92	90	16	0.00060	0.00130	0.00181	0.00312	0.41900
Dissolved Arsenic	mg/L	--	0.15	92	90	0	0.00030	0.00099	0.00120	0.00150	0.00500
Total Barium	mg/L	--	1	92	92	0	0.01700	0.05530	0.06495	0.07400	0.90600
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	92	89	11	0.00001	0.00002	0.00004	0.00010	0.00868
Total Chromium	mg/L	0.0089 ⁵	0.04	92	57	1	0.00019	0.00050	0.00080	0.00253	0.04000
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	92	87	37	0.00100	0.00200	0.00200	0.00400	0.06000
Total Iron	mg/L	0.3	1	92	90	53	0.02600	0.17000	0.38550	0.80375	96.40000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	92	83	11	0.00006	0.00020	0.00060	0.00190	0.49400
Total Manganese	mg/L	--	0.5	92	91	3	0.01300	0.03900	0.06220	0.10000	3.43000
Total Molybdenum	mg/L	0.073	--	92	72	0	0.00020	0.00030	0.00040	0.00041	0.00400
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	92	59	0	0.00020	0.00070	0.00100	0.00190	0.04000
Total Selenium	mg/L	0.001	--	92	8	1	0.00010	0.00020	0.00030	0.00068	0.00120
Total Silver	mg/L	0.00025	0.1	92	38	3	0.00001	0.00002	0.00004	0.00010	0.00352
Total Thallium	mg/L	0.0008	--	92	18	2	0.00001	0.00002	0.00005	0.00015	0.00100
Total Zinc	mg/L	0.03	0.3	92	82	7	0.00050	0.00400	0.00765	0.01300	0.89000

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B34. Summary of Victoria Creek Winter Sampling Location (WQ-VC-R+150) Water Quality (Dec 2012 - Mar 2015)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	16	16	0	6.5	6.7	7.0	7.2	8.0
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	17	17	0	7.3	7.4	7.8	7.9	8.0
Hardness (as CaCO ₃)	mg/L	--	--	17	17	--	36.7	117.5	128.0	137.5	205.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	17	17	--	23.9	90.3	99.1	103.5	111.0
Sulphate	mg/L	--	--	17	17	--	9.6	26.7	31.8	33.9	105.0
Total Suspended Solids	mg/L	--	50	17	4	1	3.5	3.6	10.6	51.5	62.9
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	13	3	0	0.012	0.012	0.013	0.046	0.046
Nitrate-N	mg/L	2.9	--	17	17	0	0.022	0.109	0.148	0.178	0.220
Nitrite-N	mg/L	0.06	--	17	2	0	0.001	--	0.016	--	0.030
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	13	1		0.073	--	0.073	--	0.073
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	13	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	17	2	--	0.21000	--	0.22000	--	0.23000
Thiocyanate	mg/L	--	--	17	1	--	0.92000	--	0.92000	--	0.92000
CN-WAD	mg/L	0.005	0.1	17	0	0	0.00000	--	--	--	0.00000
CN-SAD	mg/L	--	--	4	3	--	0.00400	0.00400	0.00600	0.01000	0.01000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	17	17	2	0.00690	0.00980	0.01800	0.04055	0.88800
Total Antimony	mg/L	--	--	17	17	0	0.00020	0.00024	0.00034	0.00045	0.00050
Total Arsenic	mg/L	0.005	--	17	17	0	0.00072	0.00097	0.00106	0.00142	0.00436
Dissolved Arsenic	mg/L	--	0.15	17	17	0	0.00070	0.00087	0.00099	0.00111	0.00312
Total Barium	mg/L	--	1	17	17	0	0.04730	0.07360	0.08090	0.08275	0.09120
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	17	17	2	0.00001	0.00002	0.00003	0.00004	0.00013
Total Chromium	mg/L	0.0089 ⁵	0.04	17	11	0	0.00010	0.00010	0.00015	0.00021	0.00123
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	17	17	2	0.00094	0.00108	0.00120	0.00138	0.00511
Total Iron	mg/L	0.3	1	17	15	2	0.01200	0.02100	0.04600	0.09500	1.56000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	17	9	2	0.00006	0.00009	0.00013	0.00114	0.00299
Total Manganese	mg/L	--	0.5	17	17	0	0.00265	0.00422	0.02950	0.08770	0.29300
Total Molybdenum	mg/L	0.073	--	17	17	0	0.00025	0.00036	0.00040	0.00042	0.00047
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	17	7	0	0.00020	0.00040	0.00050	0.00148	0.00149
Total Selenium	mg/L	0.001	--	17	1	0	0.00011	--	0.00011	--	0.00011
Total Silver	mg/L	0.00025	0.1	17	3	0	0.00004	0.00004	0.00004	0.00024	0.00024
Total Thallium	mg/L	0.0008	--	17	2	0	0.00002	--	0.00002	--	0.00002
Total Zinc	mg/L	0.03	0.3	17	8	0	0.00110	0.00148	0.00275	0.00998	0.01310

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

5 - trivalent chromium guideline

Table B35. Summary of Victoria Creek Downstream of Back Creek (WQ-VC-DBC) Water Quality (Apr 2012 - Mar 2015)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	49	48	1	5.6	7.1	7.4	7.6	8.3
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	49	49	0	6.8	7.4	7.7	7.9	8.2
Hardness (as CaCO ₃)	mg/L	--	--	49	49	--	27.0	70.0	96.1	115.5	139.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	49	49	--	22.5	62.0	83.5	94.4	114.0
Sulphate	mg/L	--	--	49	49	--	4.1	13.1	17.5	19.7	25.6
Total Suspended Solids	mg/L	--	50	49	28	8	4.0	6.0	11.0	73.1	374.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	42	14	0	0.005	0.007	0.018	0.040	0.990
Nitrate-N	mg/L	2.9	--	49	43	0	0.017	0.060	0.100	0.150	0.630
Nitrite-N	mg/L	0.06	--	49	6	2	0.002	0.023	0.055	0.200	0.500
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	37	9	0	0.011	0.029	0.090	0.170	0.471
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	27	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	49	3	0	0.20000	0.20000	0.22000	0.33000	0.33000
Thiocyanate	mg/L	--	--	49	11	0	0.30000	0.40000	0.50000	0.95000	2.00000
CN-WAD	mg/L	0.005	0.1	49	2	0	0.00400	--	0.00400	--	0.00400
CN-SAD	mg/L	--	--	22	10	0	0.00400	0.00400	0.00900	0.03050	0.05800
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	49	48	23	0.00780	0.01950	0.08065	0.44300	6.08000
Total Antimony	mg/L	--	--	49	33	0	0.00010	0.00011	0.00014	0.00022	0.00107
Total Arsenic	mg/L	0.005	--	49	49	10	0.00020	0.00033	0.00059	0.00193	0.02990
Dissolved Arsenic	mg/L	--	0.15	49	49	0	0.00020	0.00029	0.00045	0.00068	0.00120
Total Barium	mg/L	--	1	49	49	0	0.04500	0.06260	0.07290	0.08300	0.18000
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	49	49	8	0.00001	0.00003	0.00005	0.00008	0.00067
Total Chromium	mg/L	0.0089 ⁵	0.04	49	38	0	0.00011	0.00018	0.00037	0.00135	0.00775
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	49	48	20	0.00090	0.00115	0.00144	0.00304	0.01630
Total Iron	mg/L	0.3	1	49	49	21	0.01100	0.03850	0.15400	0.65250	13.50000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	49	35	9	0.00005	0.00017	0.00069	0.00401	0.02620
Total Manganese	mg/L	--	0.5	49	49	1	0.02580	0.04935	0.07440	0.10750	5.63000
Total Molybdenum	mg/L	0.073	--	49	47	0	0.00020	0.00034	0.00040	0.00043	0.00073
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	49	26	0	0.00040	0.00061	0.00082	0.00200	0.00616
Total Selenium	mg/L	0.001	--	49	5	0	0.00010	0.00015	0.00030	0.00073	0.00100
Total Silver	mg/L	0.00025	0.1	49	14	0	0.00001	0.00002	0.00003	0.00011	0.00023
Total Thallium	mg/L	0.0008	--	49	12	0	0.00001	0.00001	0.00002	0.00005	0.00010
Total Zinc	mg/L	0.03	0.3	49	31	1	0.00080	0.00200	0.00420	0.01300	0.06460

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B36. Summary of Victoria Creek Upstream of Minnesota Creek (WQ-UMN) Water Quality (Apr 2012 - Mar 2015)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	48	48	1	6.3	7.1	7.5	7.7	8.1
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	48	48	0	6.8	7.5	7.7	7.9	8.1
Hardness (as CaCO ₃)	mg/L	--	--	48	48	--	35.5	86.8	117.0	135.5	248.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	48	48	--	24.9	64.7	87.1	96.3	115.0
Sulphate	mg/L	--	--	48	48	--	10.7	25.3	29.9	37.0	145.0
Total Suspended Solids	mg/L	--	50	48	22	4	3.0	5.5	13.4	37.7	195.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	39	24	0	0.005	0.011	0.017	0.029	0.120
Nitrate-N	mg/L	2.9	--	48	41	0	0.029	0.070	0.122	0.141	0.280
Nitrite-N	mg/L	0.06	--	48	9	2	0.001	0.001	0.002	0.100	0.170
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	37	8		0.007	0.028	0.059	0.077	0.183
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	28	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	48	4	0	0.20000	0.22250	0.34500	0.43000	0.44000
Thiocyanate	mg/L	--	--	48	10	0	0.30000	0.47500	0.60000	0.65000	0.87000
CN-WAD	mg/L	0.005	0.1	48	0	0	0.00000	--	--	--	0.00000
CN-SAD	mg/L	--	--	19	9	0	0.00400	0.00500	0.00600	0.01000	0.03000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	48	48	23	0.00640	0.02245	0.04970	0.23550	3.27000
Total Antimony	mg/L	--	--	48	45	0	0.00010	0.00021	0.00030	0.00040	0.00062
Total Arsenic	mg/L	0.005	--	48	48	8	0.00056	0.00095	0.00163	0.00335	0.01050
Dissolved Arsenic	mg/L	--	0.15	48	48	0	0.00054	0.00080	0.00098	0.00138	0.00520
Total Barium	mg/L	--	1	48	48	0	0.04370	0.05843	0.06880	0.07763	0.10400
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	48	47	4	0.00001	0.00003	0.00004	0.00008	0.00026
Total Chromium	mg/L	0.0089 ⁵	0.04	48	35	0	0.00011	0.00015	0.00027	0.00090	0.00470
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	48	47	16	0.00091	0.00118	0.00149	0.00300	0.00933
Total Iron	mg/L	0.3	1	48	47	20	0.01000	0.06200	0.18600	0.48400	4.84000
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	48	41	5	0.00005	0.00010	0.00032	0.00152	0.00784
Total Manganese	mg/L	--	0.5	48	48	0	0.00250	0.04653	0.08415	0.11275	0.42000
Total Molybdenum	mg/L	0.073	--	48	46	0	0.00026	0.00030	0.00038	0.00041	0.00067
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	48	27	0	0.00030	0.00054	0.00070	0.00100	0.00350
Total Selenium	mg/L	0.001	--	48	4	0	0.00010	0.00010	0.00016	0.00043	0.00050
Total Silver	mg/L	0.00025	0.1	48	12	0	0.00001	0.00002	0.00003	0.00006	0.00011
Total Thallium	mg/L	0.0008	--	48	10	0	0.00001	0.00001	0.00002	0.00003	0.00005
Total Zinc	mg/L	0.03	0.3	48	32	0	0.00120	0.00343	0.00505	0.00965	0.02670

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

Table B37. Summary of Pumphouse Well (WQ-PW) Water Quality (Apr 2012 - Mar 2015)

Sample ID	Units	CCME Aquatic Life Guidelines ¹	Water License Standards ²	Samples Analyzed	Exceeded		Samples Exceeding Detection Limit				
					Detection Limit	CCME ¹ or EQS ²	Minimum	25th Percentile	Median	75th Percentile	Maximum
General Parameters											
pH (field)	units	6.5 - 9.0	6.0 to 8.5	46	45	5	5.8	7.1	7.5	7.8	70.7
pH (lab)	units	6.5 - 9.0	6.0 to 8.5	46	46	0	6.7	7.6	7.7	7.9	8.3
Hardness (as CaCO ₃)	mg/L	--	--	46	46	--	173.0	191.0	196.0	207.3	222.0
Total Alkalinity (as CaCO ₃)	mg/L	--	--	46	43	--	154.0	164.0	170.0	175.0	197.0
Sulphate	mg/L	--	--	46	46	--	29.0	31.8	33.9	38.9	43.2
Total Suspended Solids	mg/L	--	50	19	1	0	2.0	--	2.0	--	2.0
Nutrients											
Ammonia-N	mg/L	f(T,pH) see table Appendix A	--	12	2	0	0.040	--	0.045	--	0.050
Nitrate-N	mg/L	2.9	--	46	44	0	0.116	0.129	0.140	0.150	0.280
Nitrite-N	mg/L	0.06	--	46	8	7	0.030	0.093	0.140	0.140	0.180
Total Phosphorus	mg/L	0.004 - 0.1 ³	--	8	6	0	0.007	0.008	0.011	0.021	0.049
Cyanide Compounds											
Cyanide - T	mg/L	5	0.3	0	0	0	0.00000	--	--	--	0.00000
Cyanate	mg/L	--	--	19	0	0	0.00000	--	--	--	0.00000
Thiocyanate	mg/L	--	--	19	0	0	0.00000	--	--	--	0.00000
CN-WAD	mg/L	0.005	0.1	19	0	0	0.00000	--	--	--	0.00000
CN-SAD	mg/L	--	--	19	5	0	0.00400	0.00500	0.00600	0.01400	0.02000
Metals											
Total Aluminum	mg/L	0.1 if pH>6.5, 0.005 if <6.5	--	46	5	0	0.00100	0.00100	0.00200	0.00700	0.01100
Total Antimony	mg/L	--	--	46	1	0	0.00020	--	0.00020	--	0.00020
Total Arsenic	mg/L	0.005	--	46	44	0	0.00020	0.00037	0.00039	0.00040	0.00070
Dissolved Arsenic	mg/L	--	0.15	19	19	0	0.00030	0.00040	0.00040	0.00040	0.00070
Total Barium	mg/L	--	1	46	46	0	0.07800	0.08245	0.08500	0.09093	0.09790
Total Cadmium	mg/L	0.00004 - 0.00037 ⁴	0.02	46	12	0	0.00002	0.00002	0.00002	0.00003	0.00004
Total Chromium	mg/L	0.0089 ⁵	0.04	46	4	0	0.00040	0.00040	0.00050	0.00060	0.00060
Total Copper	mg/L	0.002 - 0.004 ⁴	0.2	46	10	0	0.00020	0.00020	0.00025	0.00070	0.00200
Total Iron	mg/L	0.3	1	46	8	0	0.00200	0.00225	0.00300	0.00375	0.01300
Total Lead	mg/L	0.001 - 0.007 ⁴	0.1	46	46	0	0.00050	0.00060	0.00068	0.00071	0.00120
Total Manganese	mg/L	--	0.5	46	6	0	0.00030	0.00038	0.00100	0.00163	0.00290
Total Molybdenum	mg/L	0.073	--	46	18	0	0.00080	0.00100	0.00105	0.00109	0.00116
Total Nickel	mg/L	0.025 - 0.15 ⁴	0.3	46	1	0	0.00040	--	0.00040	--	0.00040
Total Selenium	mg/L	0.001	--	46	1	0	0.00010	--	0.00010	--	0.00010
Total Silver	mg/L	0.00025	0.1	46	1	0	0.00001	--	0.00001	--	0.00001
Total Thallium	mg/L	0.0008	--	46	0	0	0.00000	--	--	--	0.00000
Total Zinc	mg/L	0.03	0.3	46	19	0	0.00080	0.00110	0.00210	0.00300	0.00600

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

3 - guideline dependent on water type - oligotrophic for low range and meso-eutrophic for high range

4 - dependent on water hardness (see CCME for guidance)

APPENDIX C

WATER QUALITY STATION SAMPLE PARAMETER
TREND ANALYSIS WITH EACH WQS PARAMETER AS ONE POPULATION

Notes on Appendix C:

This appendix contains plots of parameter concentration (mg/L or pH units) versus date for WQS data that met one of the following criteria:

- any parameter that appeared to have an increasing trend based on visual assessment of the parameter sparkline concentration as plotted in Appendix A,
- all field and lab pH values,
- all TSS and TDS values, and
- any parameter that had at least 10% of the samples that exceeded CCME-FAL and/or the EQS.

A linear regression was tested for trend at a confidence level of 95%. This is equivalent to the F statistic of the regression being greater than 0.05. Trend tests with a F statistic greater than 0.05 were highlighted in green (pass) and tests with a F value less than 0.05 were highlighted with red (fail).

Each trend test contained the following statistical values

Slope – slope of the linear regression (positive value indicates increasing trend of the parameter concentration, negative value a decreasing trend).

se (slope) – standard error of the slope of the line.

se (intercept) – standard error of the intercept of the line.

r^2 – correlation coefficient

se(y) – standard error of the y estimate

F – the statistical “F” statistic

df – degrees of freedom of the regression analysis

ss reg – sum of squares of the regression equation

ss resid – sum of squares of the regression equation residuals

Outliers were assessed based on the xy-plots, removed and another regression analysis completed. This is briefly discussed in the figure captions of this appendix.

Where available, the CCME-FAL Guideline and/or the EQS is presented on the figure for WQS WQ-VC-REF. All other WQS CCME-FAL Guideline and/or EQS values are provided in each figure caption.

Table C1: Summary of Water Quality Station Test for Trend Figure Numbers

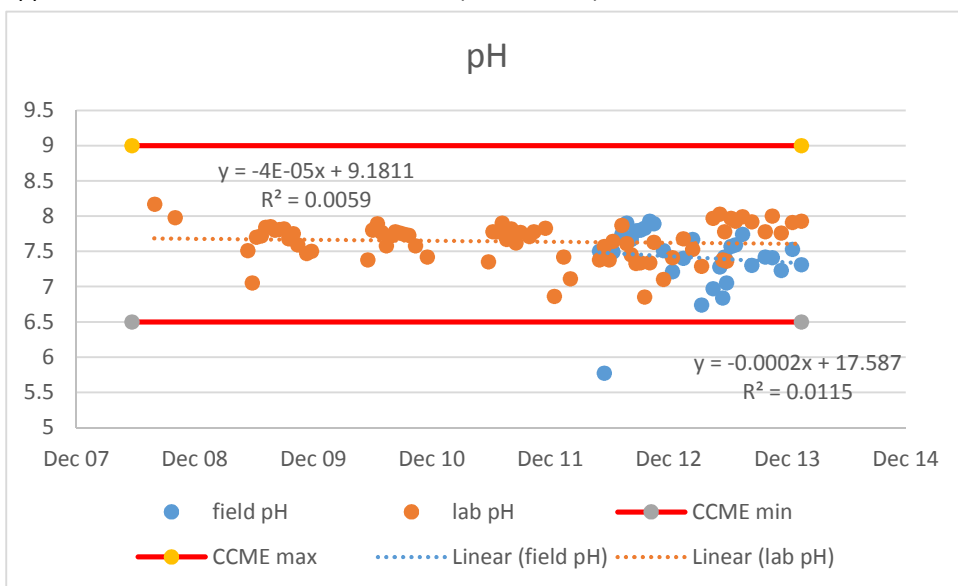
Water Quality Station Name	Code	Figure Numbers
Reference WQS		
Victoria Creek Reference Site	WQ-VC-REF	1 - 12
Victoria Creek north of confluence with Back Creek	WQ-VC-U	13 - 21
Dome Creek upstream of Mill Site	WQ-DC-DX	22 - 37
Dome Creek Upstream of Mill Site winter sampling location	WQ-DC-DX+105	38 - 52
Pony Creek upstream of Pit and Waste Rock	WQ-PC-U	53 – 60
Mine Source WQS		
Tailings Pond	WQ-TP	61 – 80
Seepage Pond discharge	WQ-SEEP	81 – 97
Top of Brown-McDade Pit	WQ-PIT-1	98 – 107
Middle of Brown-McDade Pit	WQ-PIT-2	108 – 115
Bottom of Brown-McDade Pit	WQ-PIT-3	116 – 127
Mill Site Seep 3	WQ-MS-S-03	128 – 141
Near-Field Receiving Environment WQS		
Dome Creek downstream of Mill Site and upstream of Tailings Pond	WQ-DC-D1b	142 – 154
Upper Dome Creek downstream of Tailings Pond	WQ-DC-U	155 – 165
Dome Creek at Road	WQ-DC-R	166 – 174
Pony Creek downstream of Pit	WQ-PC-D	175 – 185
Far-Field Receiving Environment WQS		
Back Creek near confluence with Victoria Creek	WQ-BC	186 – 197
Victoria Creek North of Mine Access Road	WQ-VC-R	198 – 207
Victoria Creek winter sampling location	WQ-VC-R+150	208 – 210
Victoria Creek downstream of Back Creek	WQ-VC-DBC	211 – 216
Victoria Creek upstream of Minnesota Creek	WQ-UMN	217 – 223
Pumphouse Well	WQ-PW	224 – 225

Note: Only stations that contained 2014 data and more than 10 samples were tested for trend

Trend not tested at the following WQS as there was no 2014 data (WQ-DRY, WQ-MN, WQ-DC-D1, WQ-DC-U1, and WQ-DC-U2)

Trend not tested at the following WQS as there was less than 10 samples collected (WQ-MS-08, WQ-DAM-SEEP, WQ-ADIT-SEEP, WQ-SP-1, WQ-SP-2, WQ-DC-B, WQ-ORE, WQ-NW-SEEP-01, WQ-DESS-01, WQ-DESS-02, WQ-DESS-03, WQ-CH-P-13-01, WQ-ET-01, WQ-L2, WQ-DC-1, 2, 3, 4, 7, 8, and 10)

Appendix C. Victoria Creek reference site (WQ-VC-REF)



field pH

-0.0002462	17.58746	slope	intercept
0.0004247	17.54711	se (slope)	se (intercept)
0.0114503	0.435417	r2	se (y)
0.335904	29	F	df
0.0636834	5.498058	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

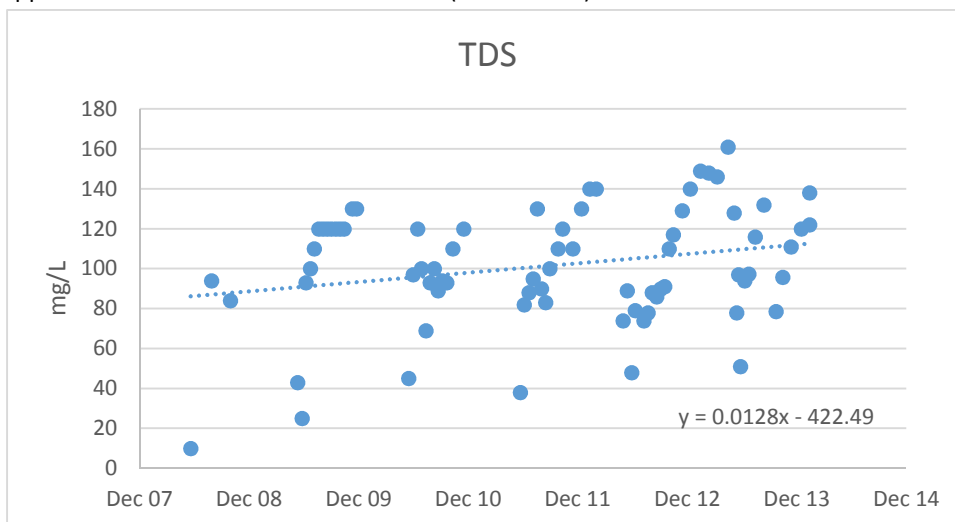
lab pH

-3.773E-05	9.181077	slope	intercept
5.823E-05	2.374731	se (slope)	se (intercept)
0.0058788	0.272037	r2	se (y)
0.4198624	71	F	df
0.0310715	5.254285	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 1: WQ-VC-REF field and lab pH values both showing statistically significant decreasing pH trend. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

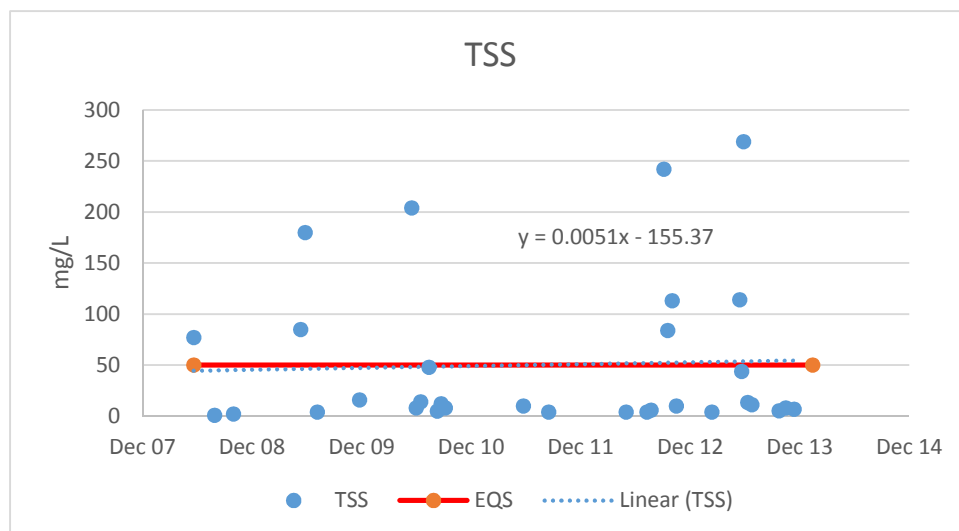
Appendix C. Victoria Creek reference site (WQ-VC-REF)



0.005868	239.2631	se (slope)	se (intercept)
0.061627	28.74421	r2	se (y)
4.794203	73	F	df
3961.113	60314.77	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 2: WQ-VC-REF TDS concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

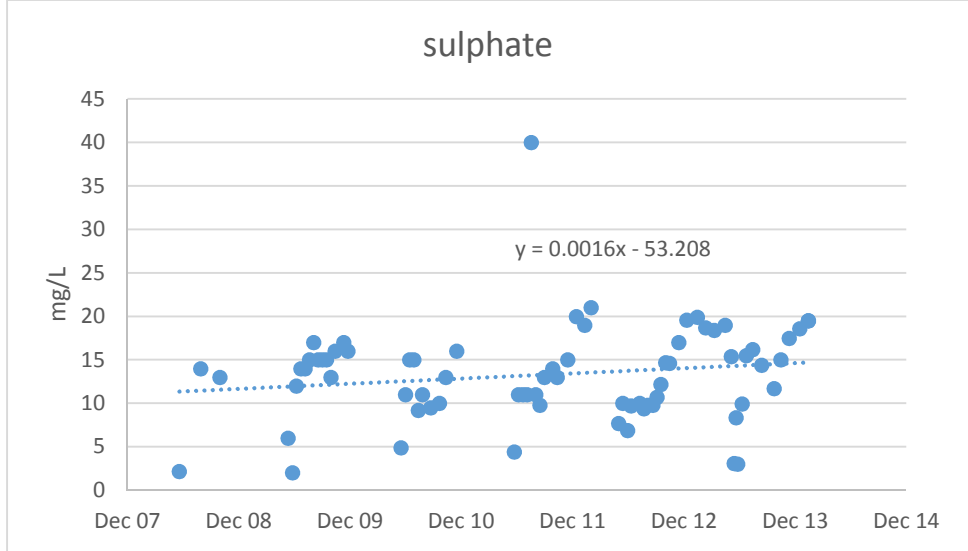


0.021615	881.0667	se (slope)	se (intercept)
0.001817	76.30718	r2	se (y)
0.054617	30	F	df
318.0204	174683.6	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 3: WQ-VC-REF TSS concentration showing statistically significant increasing trend. TSS EQS 50 mg/L.

Appendix C. Victoria Creek reference site (WQ-VC-REF)

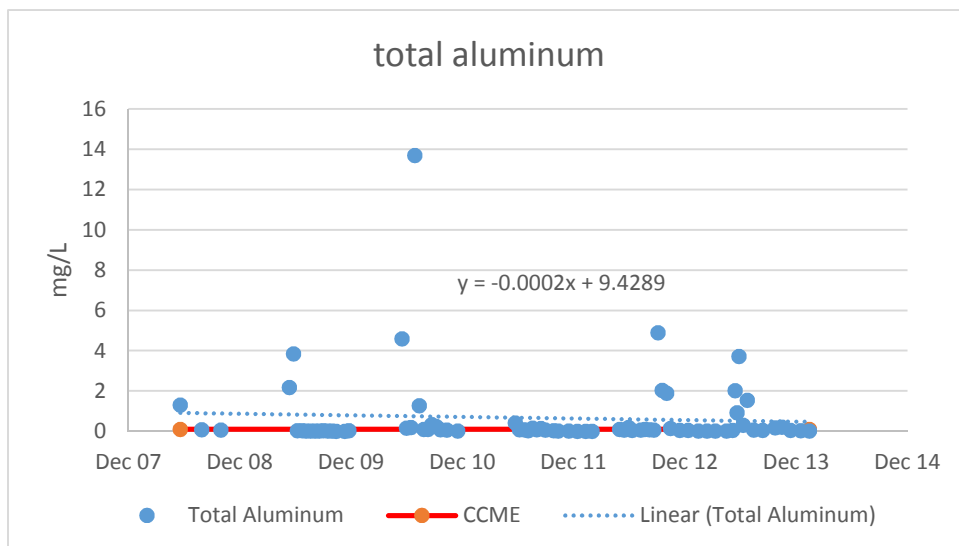


0.001126	45.92217	se (slope)	se (intercept)
0.028687	5.485656	r2	se (y)
2.09692	71	F	df
63.10141	2136.562	ss reg	ss resid

CONCLUSION: F > 0.05 therefore trend is statistically significant at 95% confidence level

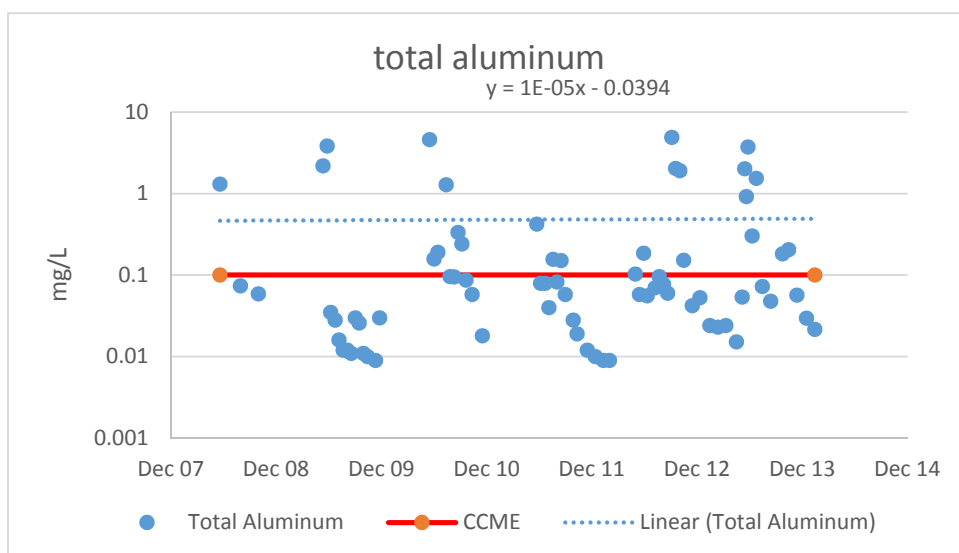
Figure 4: WQ-VC-REF sulphate concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

Appendix C. Victoria Creek reference site (WQ-VC-REF)



0.00038	15.4773	se (slope)	se (intercept)
0.005073	1.859387	r2	se (y)
0.372234	73	F	df
1.286933	252.3845	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level
 Figure 5: WQ-VC-REF total aluminum concentration showing statistically significant decreasing trend.
 With potential outlier (30 June 2010) trend is statistically significant. Total aluminum CCME Guideline is 0.1 mg/L at pH>6.5.

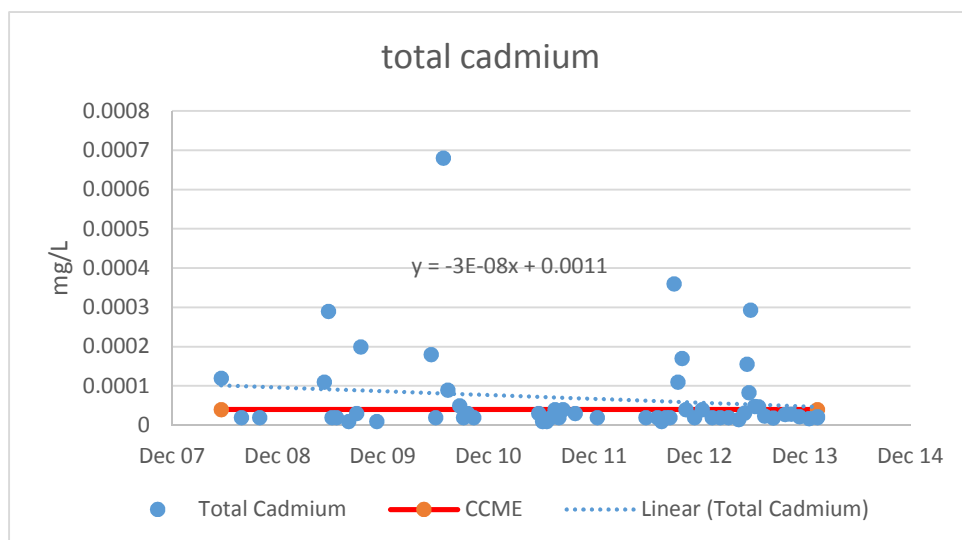


0.000217	8.865471	se (slope)	se (intercept)
6.23E-06	1.061098	r2	se (y)
0.000449	72	F	df
0.000505	81.06695	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend is NOT statistically significant at 95% confidence level

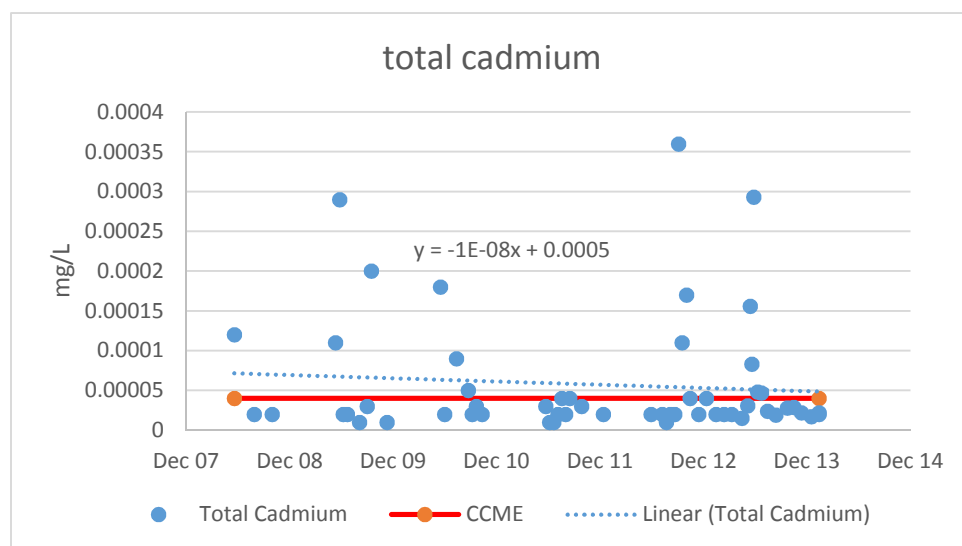
Figure 6: WQ-VC-REF total aluminum concentration showing that without outlier trend is no longer significant.

Appendix C. Victoria Creek reference site (WQ-VC-REF)



2.51556E-08	0.001028	se (slope)	se (intercept)
0.019391457	0.000112	r2	se (y)
1.087620664	55	F	df
1.36497E-08	6.9E-07	ss reg	ss resid

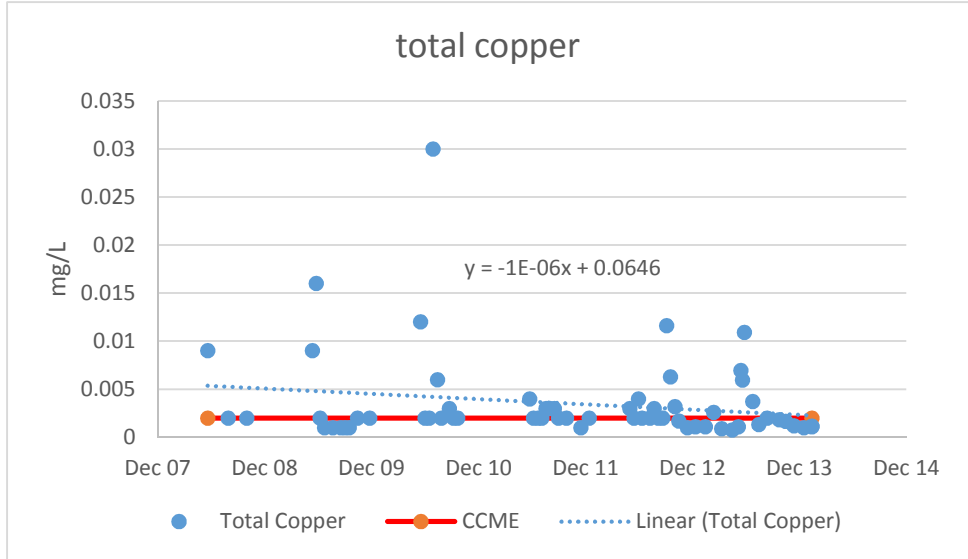
CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level
 Figure 7: WQ-VC-REF total cadmium concentration showing statistically significant decreasing trend.
 With potential outlier (30 June 2010) trend is significant. Total cadmium CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.



1.74167E-08	0.000712	se (slope)	se (intercept)
0.00739347	7.71E-05	r2	se (y)
0.402221174	54	F	df
2.39017E-09	3.21E-07	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level
 Figure 8: WQ-VC-REF total cadmium concentration showing statistically significant decreasing trend.
 Without outlier trend is still significant and model has improved.

Appendix C. Victoria Creek reference site (WQ-VC-REF)

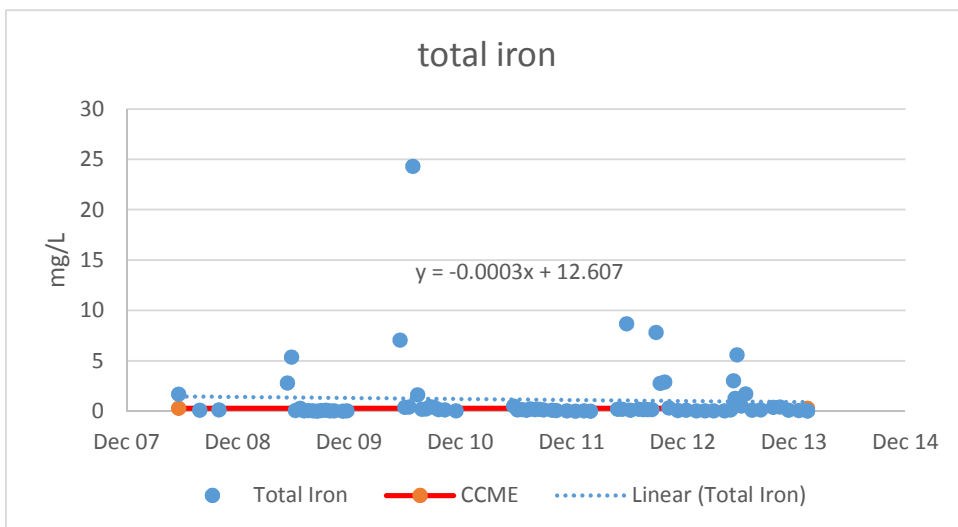


9.82911E-07	0.04012	se (slope)	se (intercept)
0.036057158	0.004511	r2	se (y)
2.319166328	62	F	df
4.71861E-05	0.001261	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

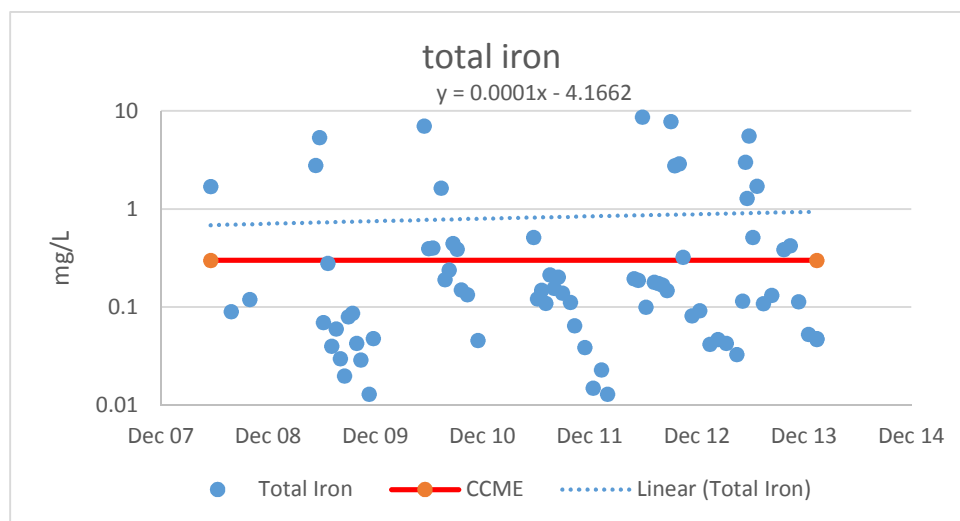
Figure 9: WQ-VC-REF total copper concentration showing statistically significant decreasing trend. Total copper CCME Guideline is a function of water hardness, maximum value of 0.004 mg/L and minimum value of 0.002 mg/L. EQS is 0.2 mg/L.

Appendix C. Victoria Creek reference site (WQ-VC-REF)



0.000669	27.26214	se (slope)	se (intercept)
0.002417	3.275176	r2	se (y)
0.17684	73	F	df
1.896925	783.0547	ss reg	ss resid

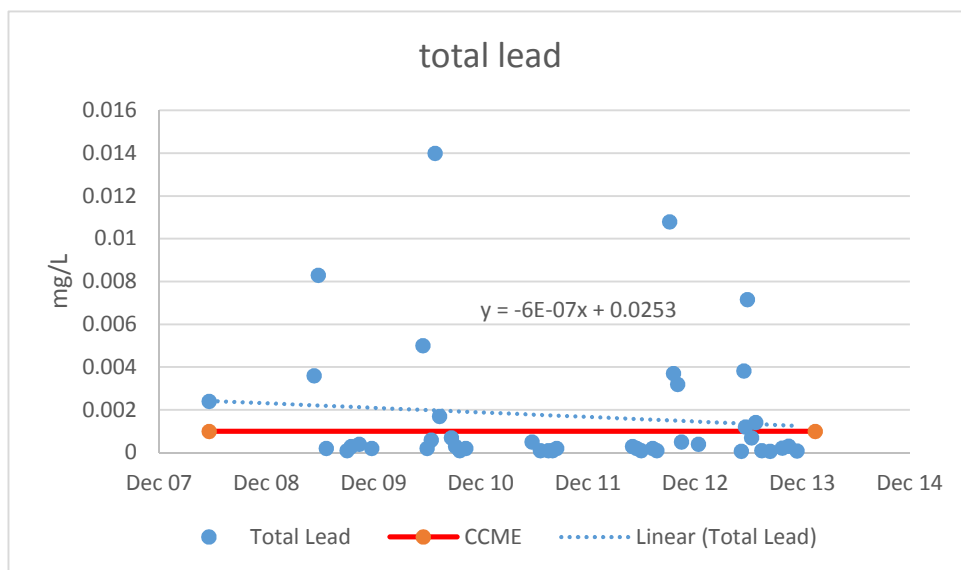
CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level
 Figure 10: WQ-VC-REF total iron concentration showing statistically significant decreasing trend. With potential outlier (30 June 2010) trend is negative. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.



0.000375	15.28958	se (slope)	se (intercept)
0.001481	1.829992	r2	se (y)
0.10682	72	F	df
0.357726	241.1188	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level
 Figure 11: WQ-VC-REF total iron concentration showing statistically significant increasing trend. Without outlier trend is positive and model has improved.

Appendix C. Victoria Creek reference site (WQ-VC-REF)

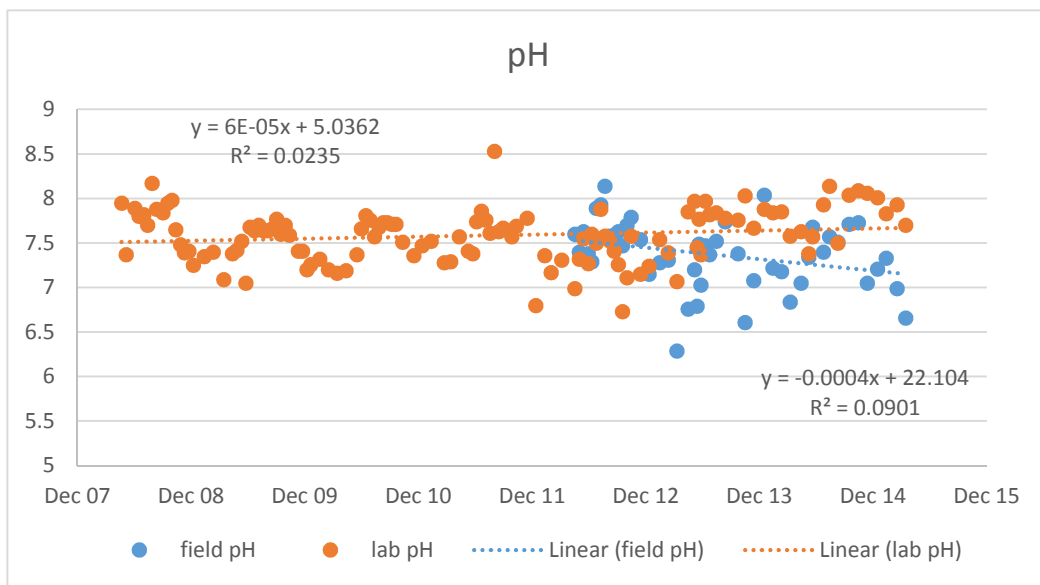


8.4842E-07	0.034622	se (slope)	se (intercept)
0.011216023	0.003095	r2	se (y)
0.465073211	41	F	df
4.45488E-06	0.000393	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 12: WQ-VC-REF total lead concentration showing statistically significant decreasing trend. Total lead CCME Guideline is a function of water hardness, maximum value of 0.007 mg/L and EQS is 0.1 mg/L.

Appendix C. Victoria Creek north of confluence with Back Creek (WQ-VC-U)



field pH

-0.00035533	22.10364597	slope	intercept
0.0001665	6.90618671	se (slope)	se (intercept)
0.090090654	0.366343428	r2	se (y)
4.554486795	46	F	df
0.611246321	6.173545346	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

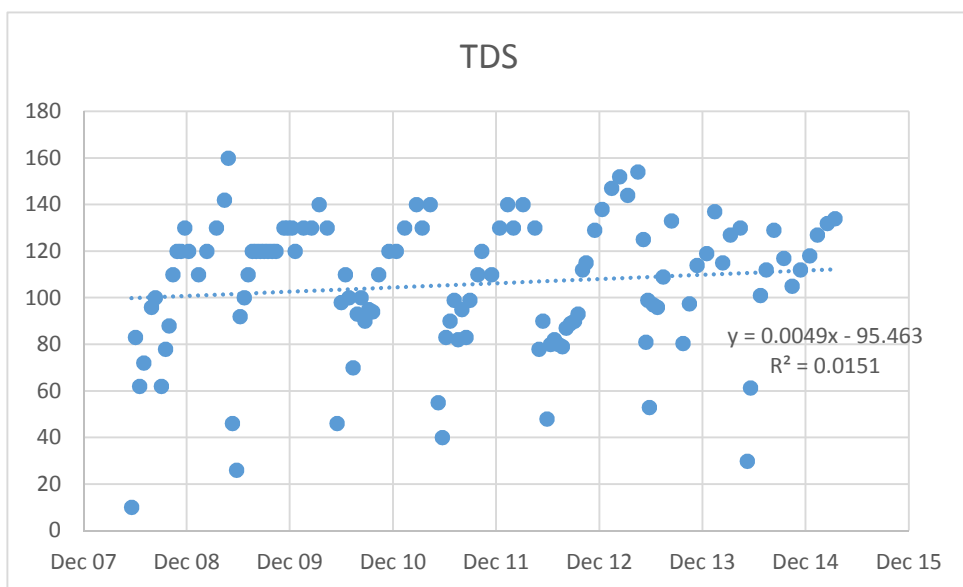
lab pH

6.26112E-05	5.03623502	slope	intercept
3.68792E-05	1.501892614	se (slope)	se (intercept)
0.023455832	0.292381013	r2	se (y)
2.882306689	120	F	df
0.246398762	10.25839878	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 13: WQ-VC-U pH field data showing statistically significant decreasing trend and lab pH values showing statistically significant increasing trend. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

Appendix C. Victoria Creek north of confluence with Back Creek (WQ-VC-U)



0.00367	149.5158	se (slope)	se (intercept)
0.015092	28.49504	r2	se (y)
1.808154	118	F	df
1468.161	95812.11	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 14: WQ-VC-U TDS concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

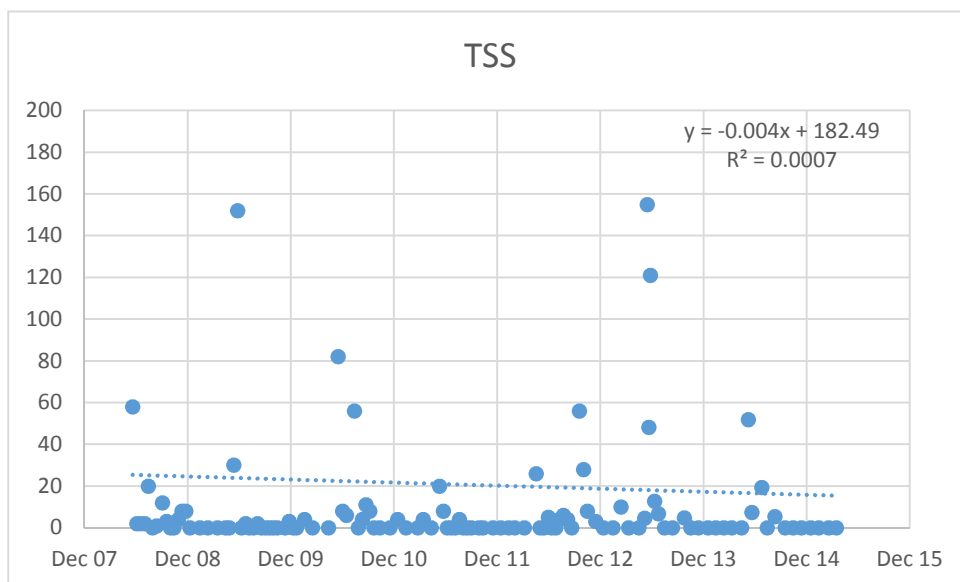
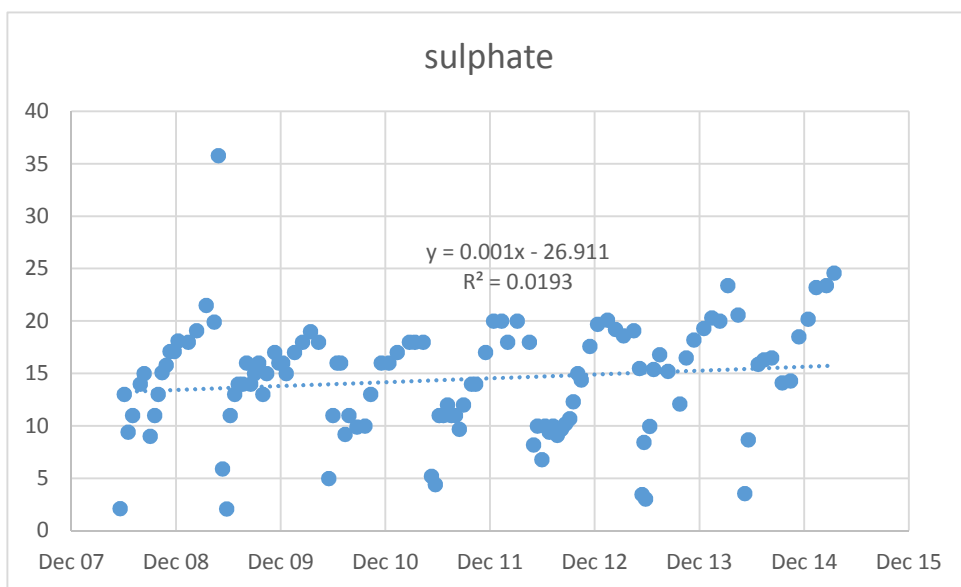


Figure 15: WQ-VC-U TSS concentration showing apparent decreasing trend. Greater than 10% of samples are ND, trend analysis is not appropriate. TSS EQS 50 mg/L.

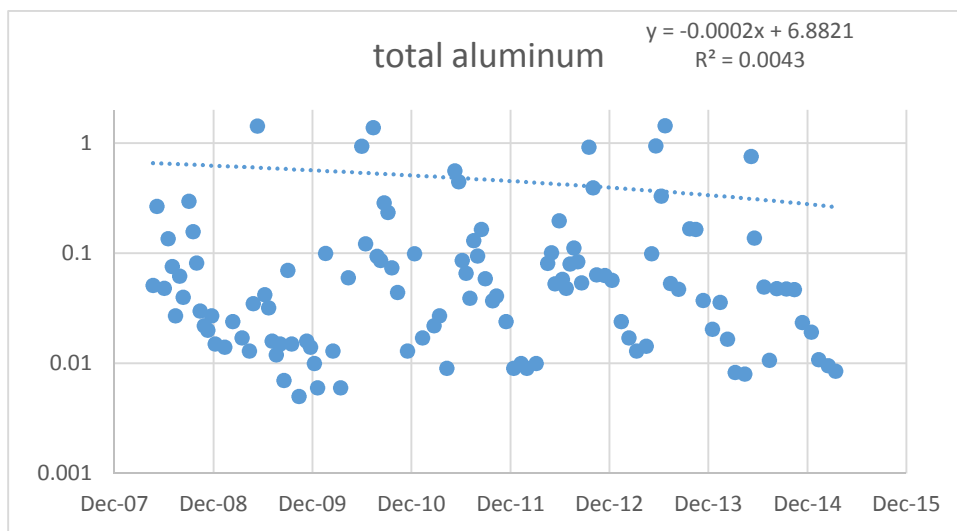
Appendix C. Victoria Creek north of confluence with Back Creek (WQ-VC-U)



0.000671	27.3227	se (slope)	se (intercept)
0.019338	5.197413	r2	se (y)
2.287432	116	F	df
61.79063	3133.52	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 16: WQ-VC-U sulphate concentration showing statistically significant increasing trend. No CCME Guideline or EQS available. Highest concentration observed on 29 April 2009.

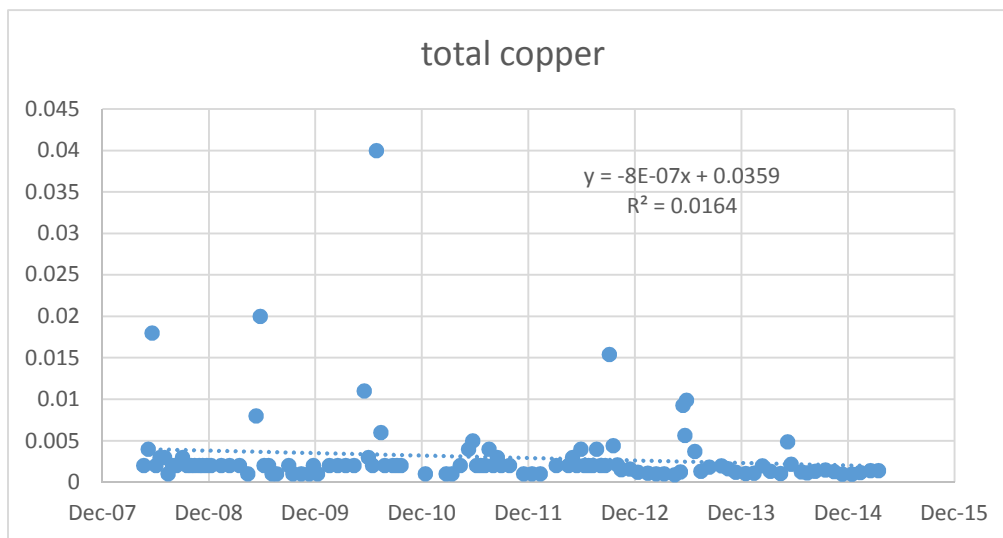


0.000218	8.865578	se (slope)	se (intercept)
0.004331	1.738014	r2	se (y)
0.521934	120	F	df
1.576604	362.4832	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 17: WQ-VC-U total aluminum concentration showing statistically significant decreasing trend. Total aluminum CCME Guideline is 0.1 mg/L at pH>6.5.

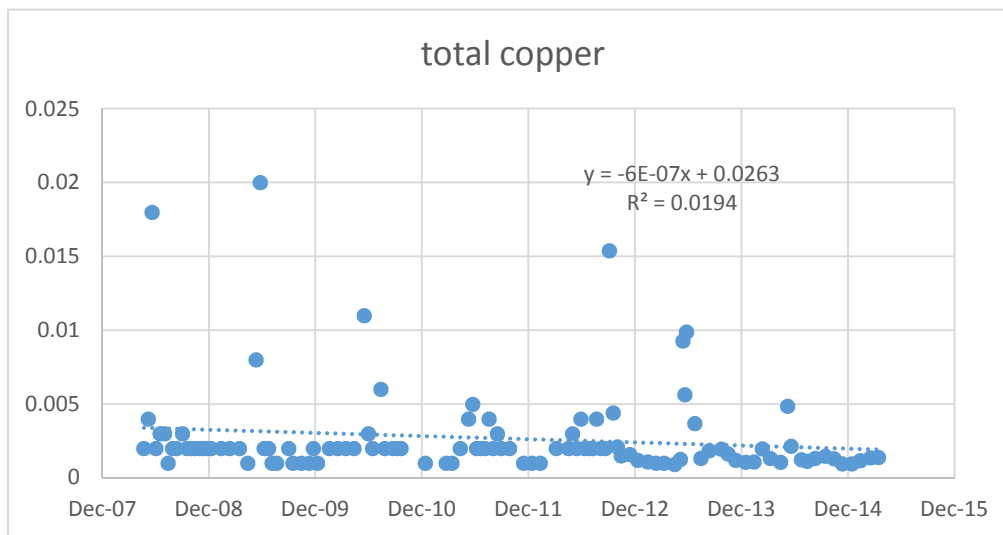
Appendix C. Victoria Creek north of confluence with Back Creek (WQ-VC-U)



5.98885E-07	0.024401	se (slope)	se (intercept)
0.016413674	0.004679	r2	se (y)
1.818946025	109	F	df
3.98138E-05	0.002386	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 18: WQ-VC-U total copper concentration showing statistically significant decreasing trend with potential outlier (30 June 2010). Total copper CCME Guideline is a function of water hardness, maximum value of 0.004 mg/L and EQS is 0.2 mg/L.

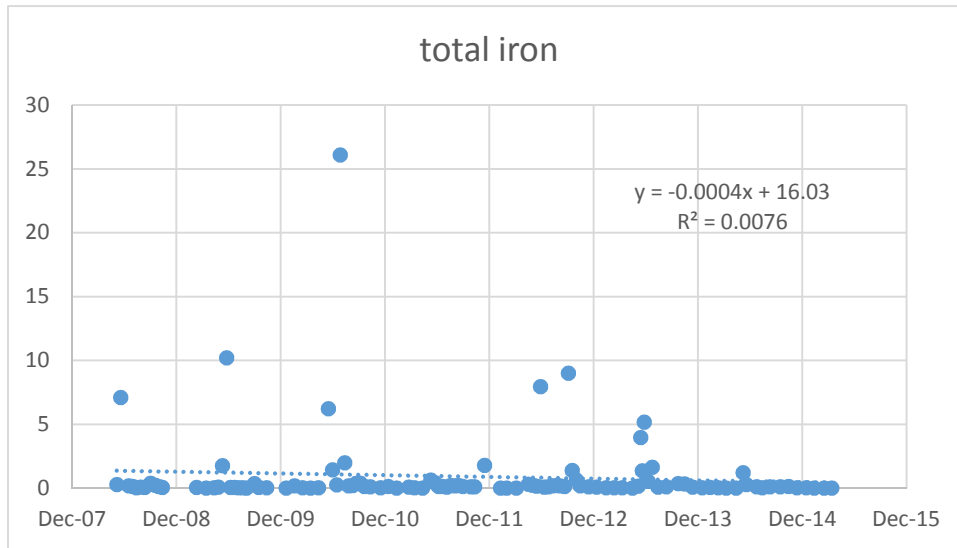


3.95237E-07	0.016105	se (slope)	se (intercept)
0.019416214	0.003084	r2	se (y)
2.13847215	108	F	df
2.03384E-05	0.001027	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 19: WQ-VC-U total copper concentration showing statistically significant decreasing trend. With outlier removed there is very little change in the rate of decrease but model improves.

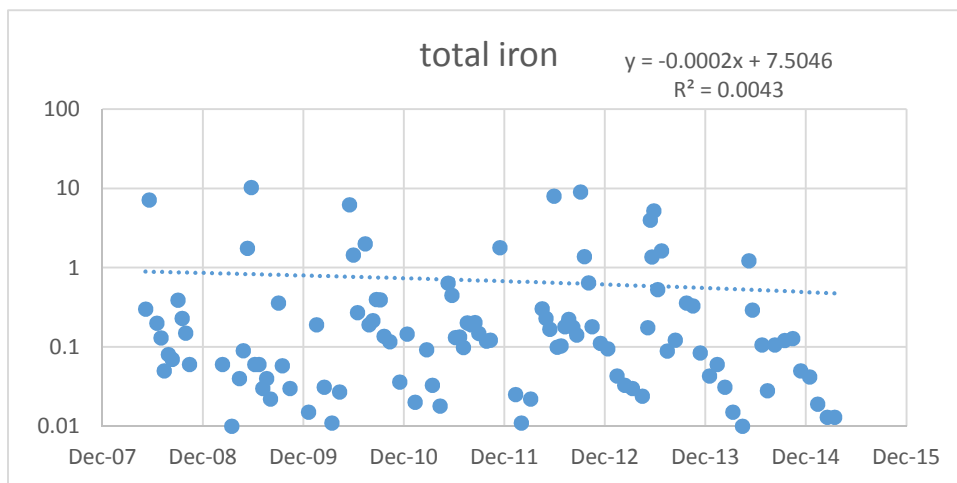
Appendix C. Victoria Creek north of confluence with Back Creek (WQ-VC-U)



0.000409	16.66984	se (slope)	se (intercept)
0.007552	3.018954	r2	se (y)
0.821828	108	F	df
7.490212	984.3212	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 20: WQ-VC-U total iron concentration showing statistically significant decreasing trend. With potential outlier (30 June 2010) trend is negative. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

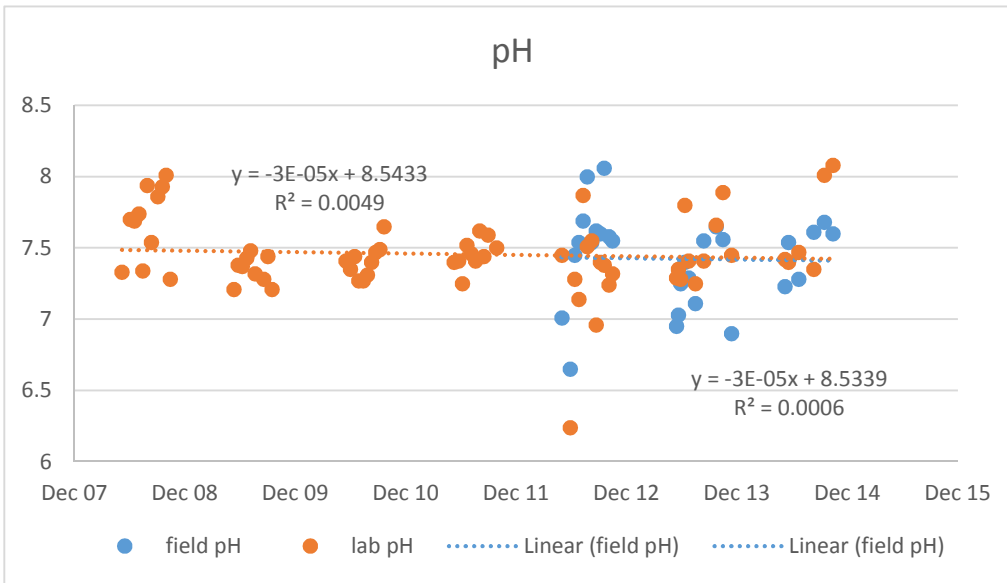


0.000245	10.01154	se (slope)	se (intercept)
0.004314	1.809718	r2	se (y)
0.463619	107	F	df
1.518391	350.4336	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 21: WQ-VC-U total iron concentration showing statistically significant decreasing trend. With outlier removed there is very little difference in the rate of decrease but model improves.

Appendix C. Dome Creek upstream of Mill Site (WQ-DC-DX)



field pH

-2.67655E-05	8.533906	slope	intercept
0.000218481	9.046167	se (slope)	se (intercept)
0.000576895	0.328356	r2	se (y)
0.015007936	26	F	df
0.001618125	2.803268	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend IS NOT statistically significant at 95% confidence level

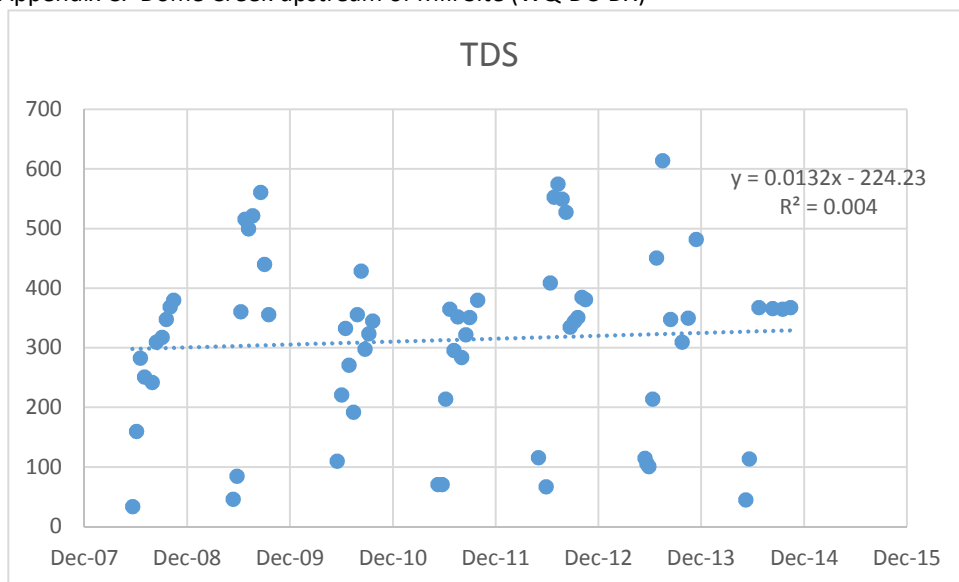
lab pH

-2.67262E-05	8.543344	slope	intercept
4.70862E-05	1.916171	se (slope)	se (intercept)
0.004857688	0.272185	r2	se (y)
0.322172434	66	F	df
0.023867994	4.889579	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 22: WQ-DC-DX lab pH values show statistically significant decreasing pH trend. Field pH values do not exhibit a statistically significant trend. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

Appendix C. Dome Creek upstream of Mill Site (WQ-DC-DX)



0.025934	1055.791	se (slope)	se (intercept)
0.00397	147.3451	r2	se (y)
0.259098	65	F	df
5625.169	1411187	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 23: WQ-DC-DX TDS concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

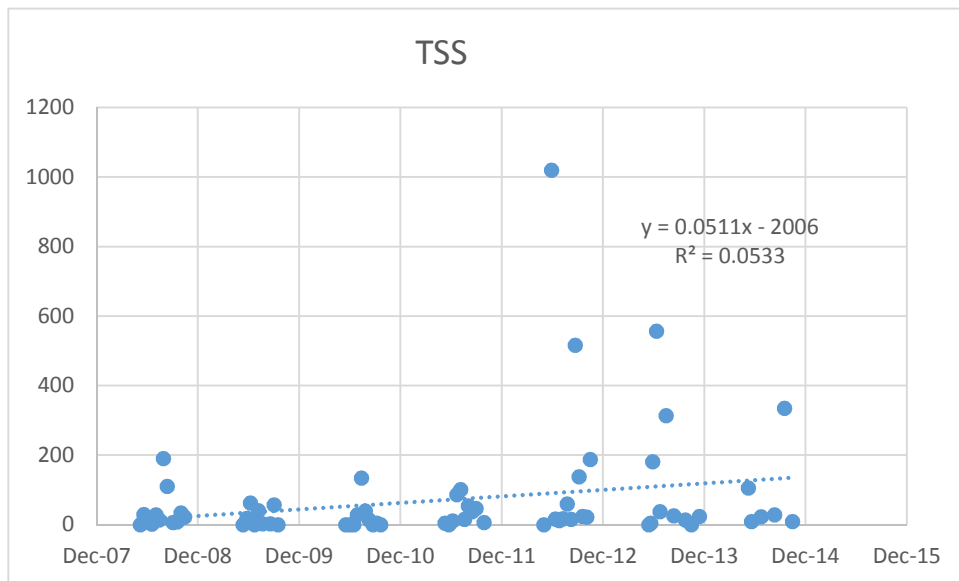
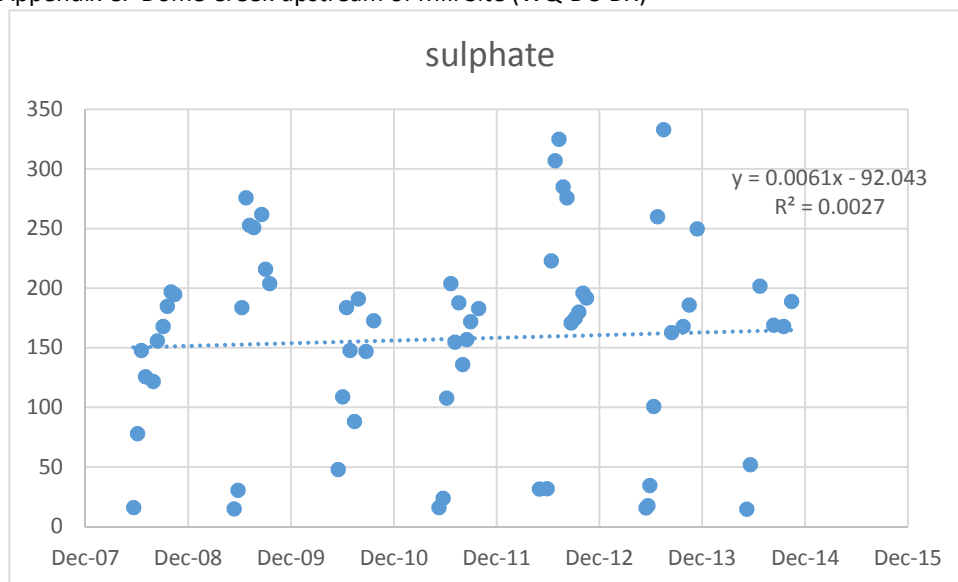


Figure 24: WQ-DC-DX TSS concentration showing apparent increasing trend. Greater than 10% of samples are ND, trend analysis is not appropriate. TSS EQS 50 mg/L.

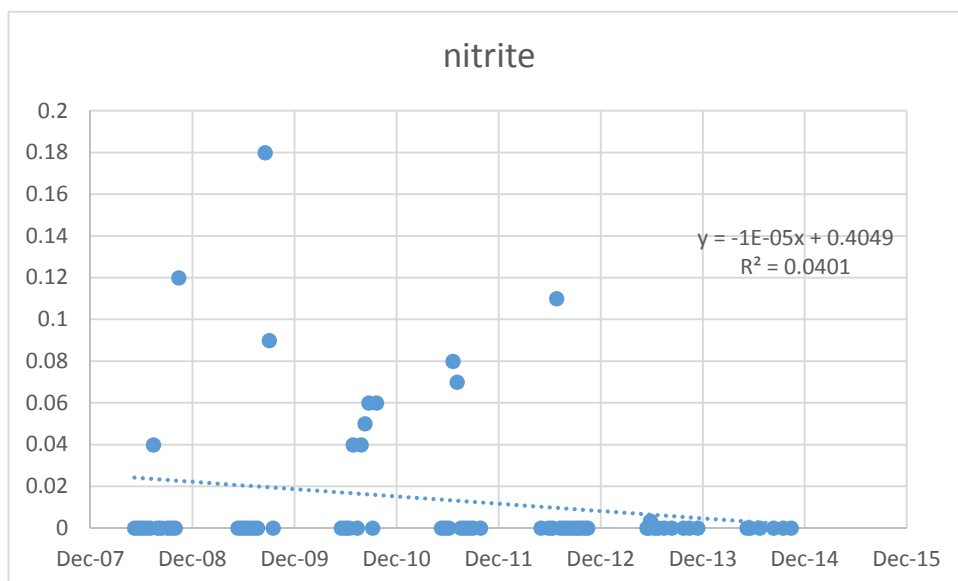
Appendix C. Dome Creek upstream of Mill Site (WQ-DC-DX)



0.006127	-92.043	slope	intercept
0.014858	605.0311	se (slope)	se (intercept)
0.002692	84.19248	r2	se (y)
0.170041	63	F	df
1205.316	446567.5	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

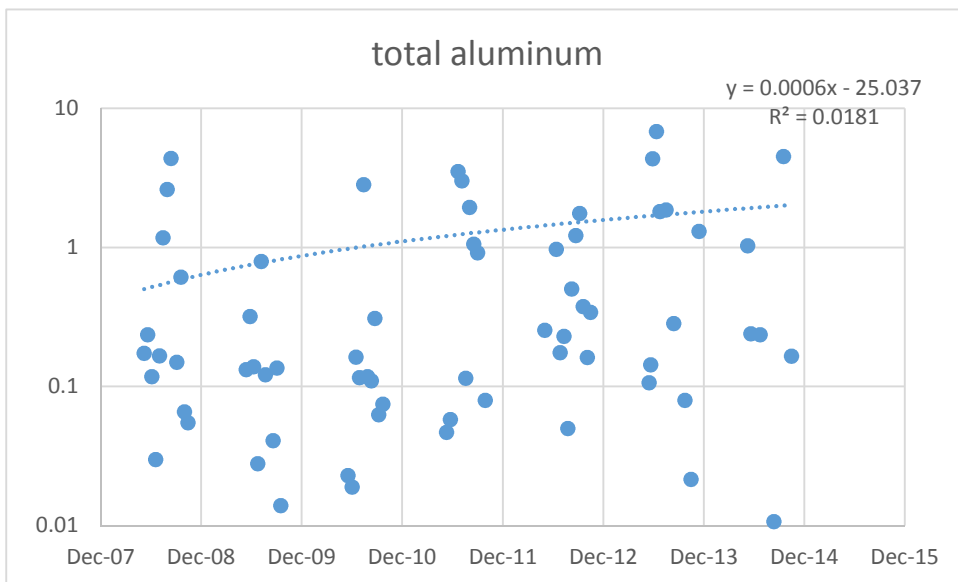
Figure 25: WQ-DC-DX sulphate concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.



Greater than 10% of samples are ND, trend analysis is not appropriate

Figure 26: WQ-DC-DX nitrite concentration has been mostly less than the detection limit in 2012, 2013 and 2014. Nitrite CCME Guideline is 0.06 mg/L.

Appendix C. Dome Creek upstream of Mill Site (WQ-DC-DX)



0.000585	23.80025	se (slope)	se (intercept)
0.018098	3.441734	r2	se (y)
1.216498	66	F	df
14.41007	781.8052	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 27: WQ-DC-DX total aluminum concentration showing statistically significant increasing trend. Total aluminum CCME Guideline is 0.1 mg/L at pH>6.5.

Appendix C. Dome Creek upstream of Mill Site (WQ-DC-DX)

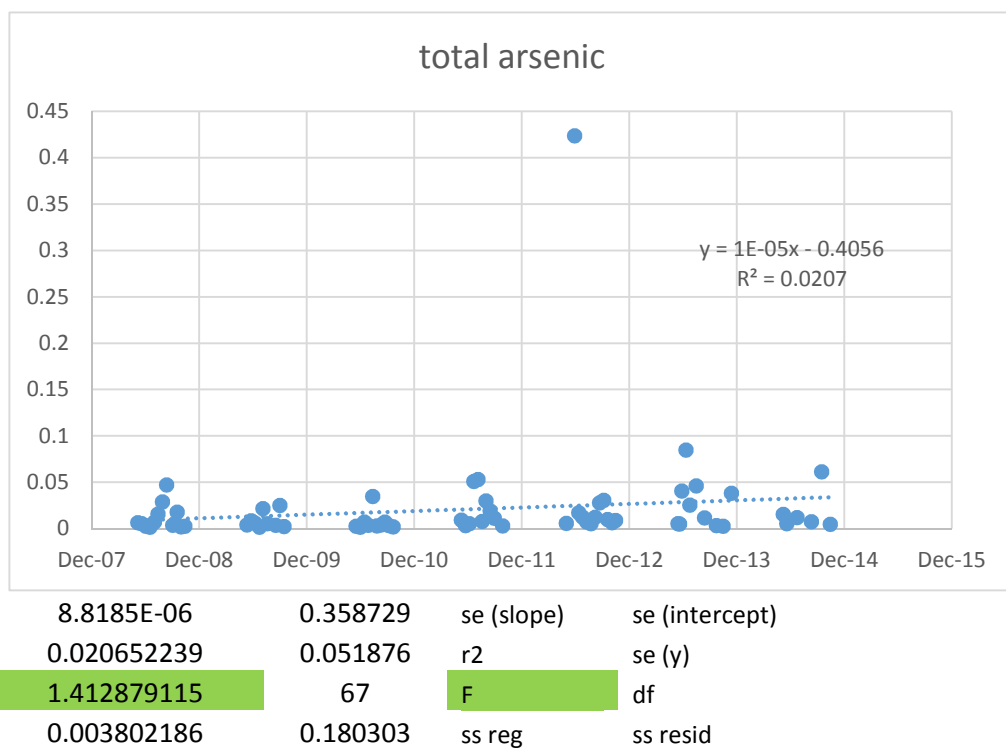
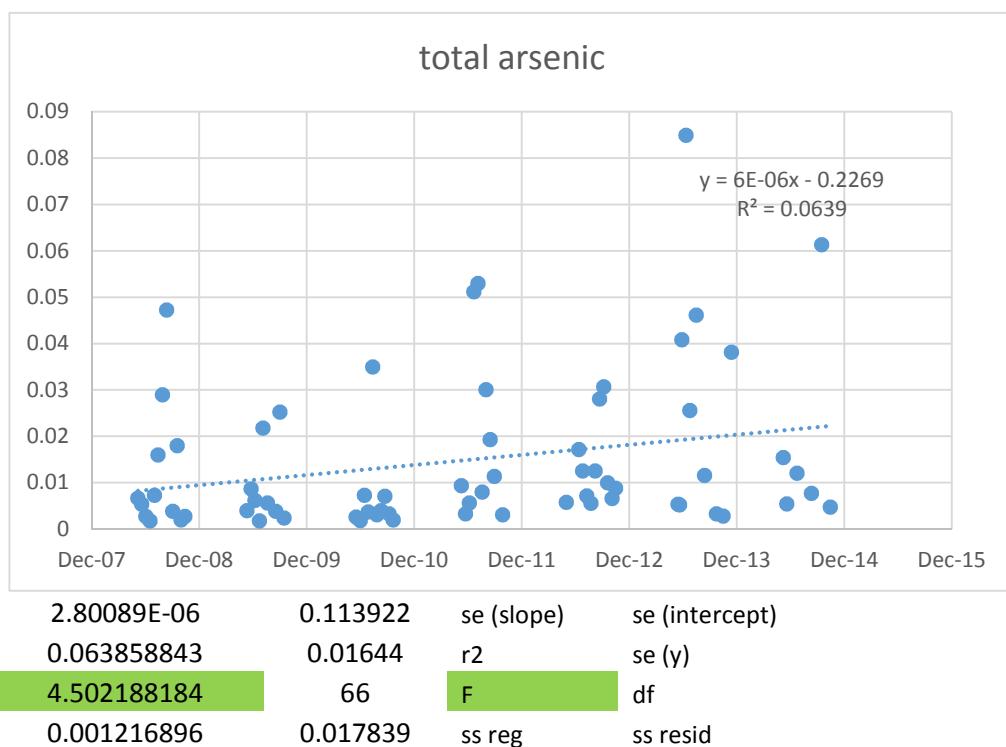


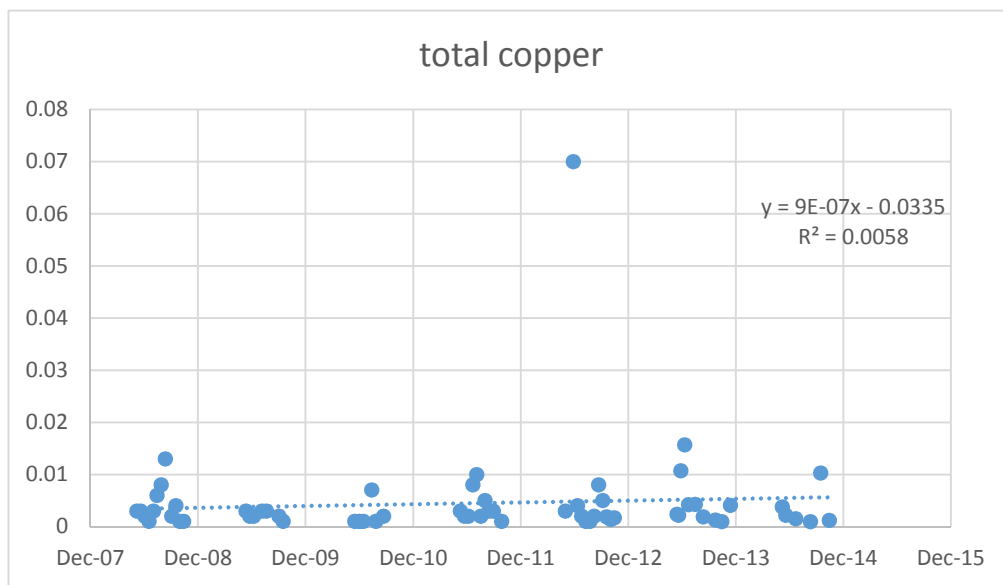
Figure 28: WQ-DC-DX total arsenic concentration showing statistically significant increasing trend. With potential outlier (30 May 2012) trend is increasing. Total arsenic CCME Guideline is 0.005 mg/L.



CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 29: WQ-DC-DX total arsenic concentration. With outlier removed trend is still increasing but at a reduced rate and model strength improved compared with model with outlier.

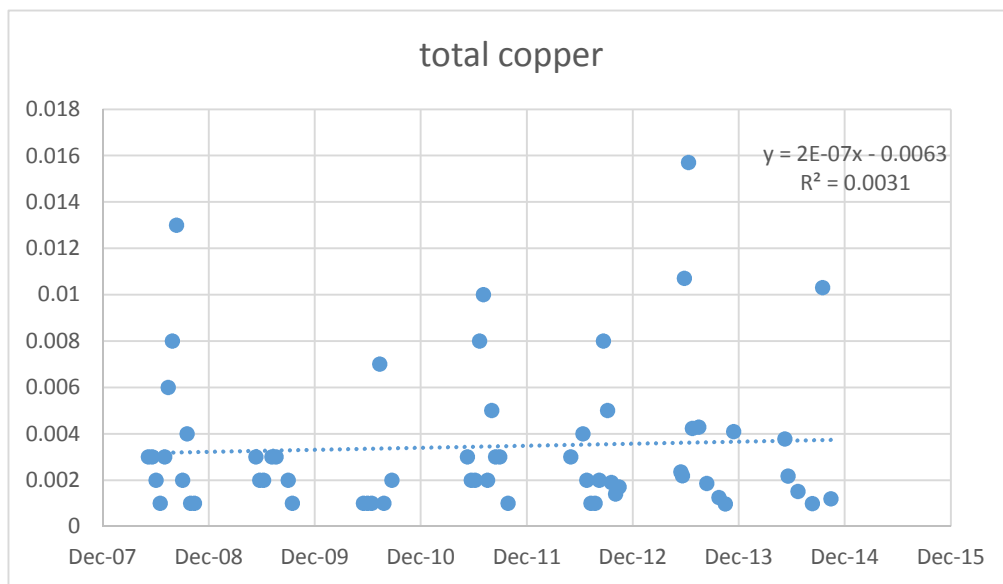
Appendix C. Dome Creek upstream of Mill Site (WQ-DC-DX)



1.55723E-06	0.063406	se (slope)	se (intercept)
0.005849961	0.008996	r2	se (y)
0.358947479	61	F	df
2.90458E-05	0.004936	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

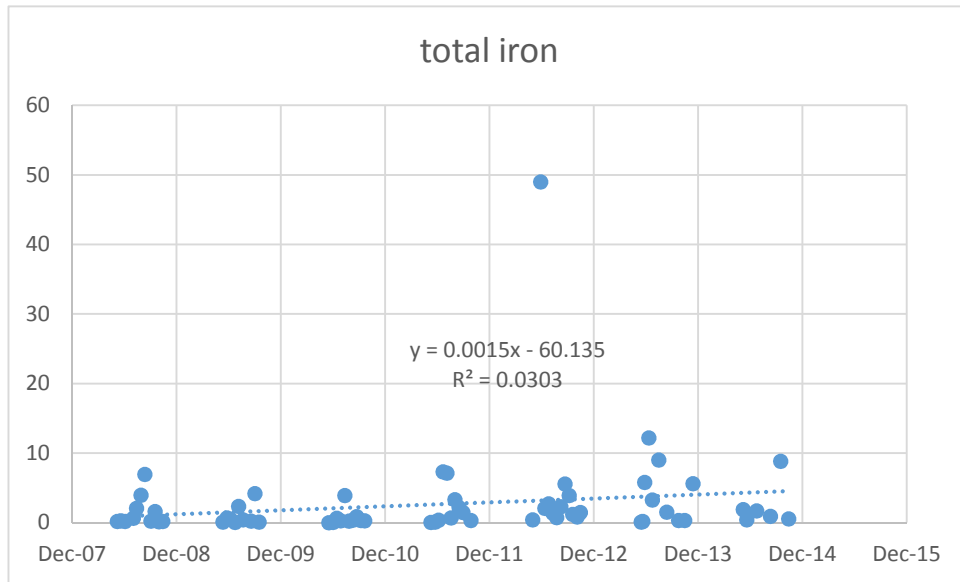
Figure 30: WQ-DC-DX total copper concentration showing statistically significant increasing trend with potential outlier (30 May 2012). Total copper CCME Guideline is a function of water hardness, maximum value of 0.004 mg/L and EQS is 0.2 mg/L.



5.50239E-07	0.022401	se (slope)	se (intercept)
0.003134717	0.003173	r2	se (y)
0.188674465	60	F	df
1.89912E-06	0.000604	ss reg	ss resid

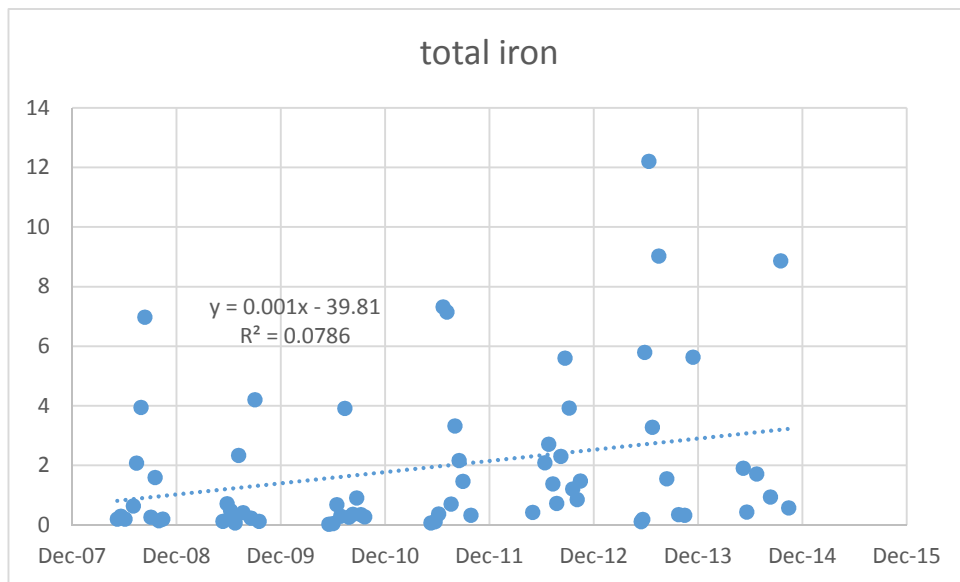
Figure 31: WQ-DC-DX with outlier removed model strength improves.

Appendix C. Dome Creek upstream of Mill Site (WQ-DC-DX)



0.001074	43.69934	se (slope)	se (intercept)
0.030334	6.213026	r2	se (y)
2.064677	66	F	df
79.70002	2547.711	ss reg	ss resid

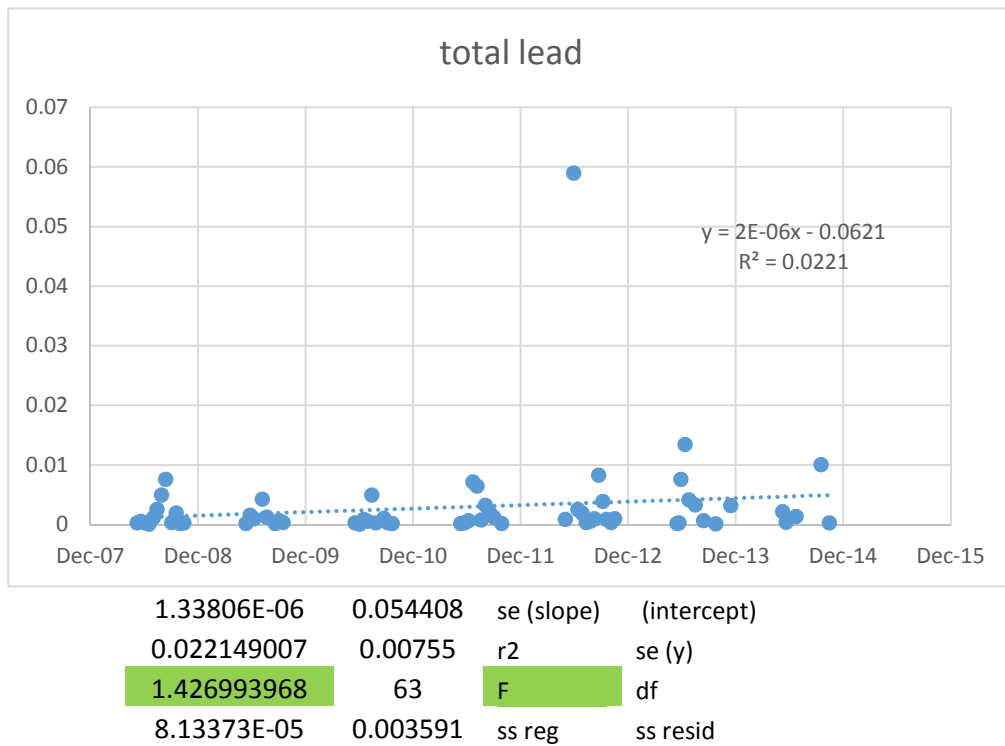
CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level
 Figure 32: WQ-DC-DX total iron concentration showing statistically significant increasing trend with potential outlier (30 May 2012). Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.



0.000436	17.73364	se (slope)	se (intercept)
0.078644	2.516395	r2	se (y)
5.548186	65	F	df
35.13247	411.5959	ss reg	ss resid

Figure 33: WQ-DC-DX with outlier removed model strength improves.

Appendix C. Dome Creek upstream of Mill Site (WQ-DC-DX)



CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 34: WQ-DC-DX total lead concentration showing statistically significant increasing trend with potential outlier (30 May 2012). Total lead CCME Guideline is a function of water hardness, maximum value of 0.007 mg/L and EQS is 0.1 mg/L.

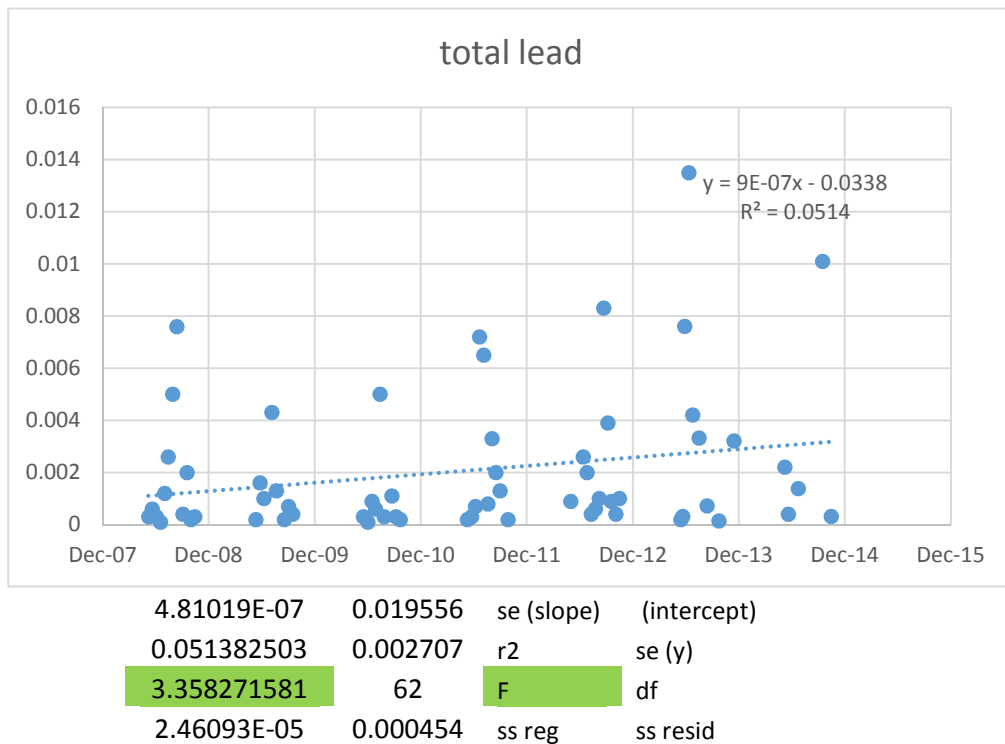
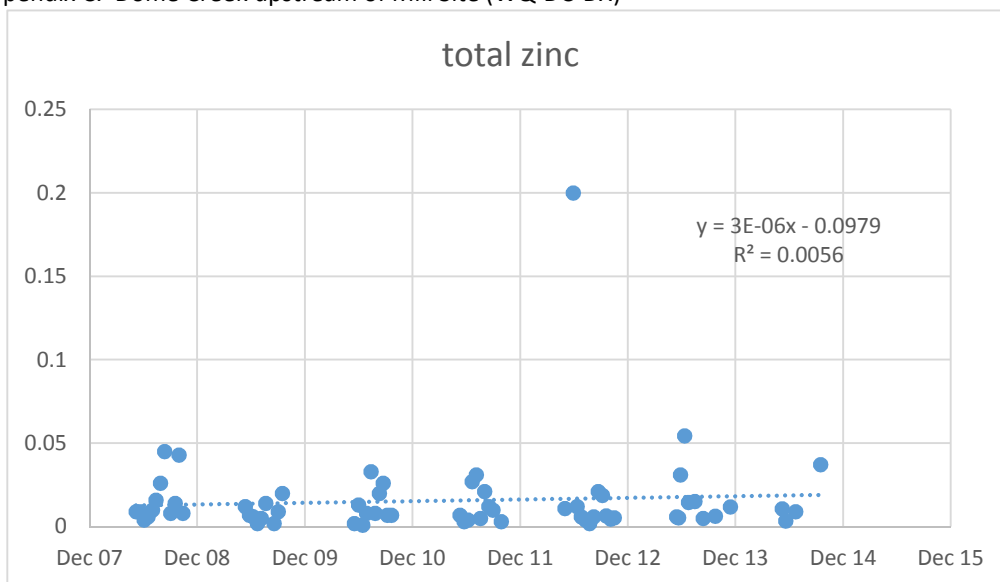


Figure 35: WQ-DC-DX with outlier removed model strength improves.

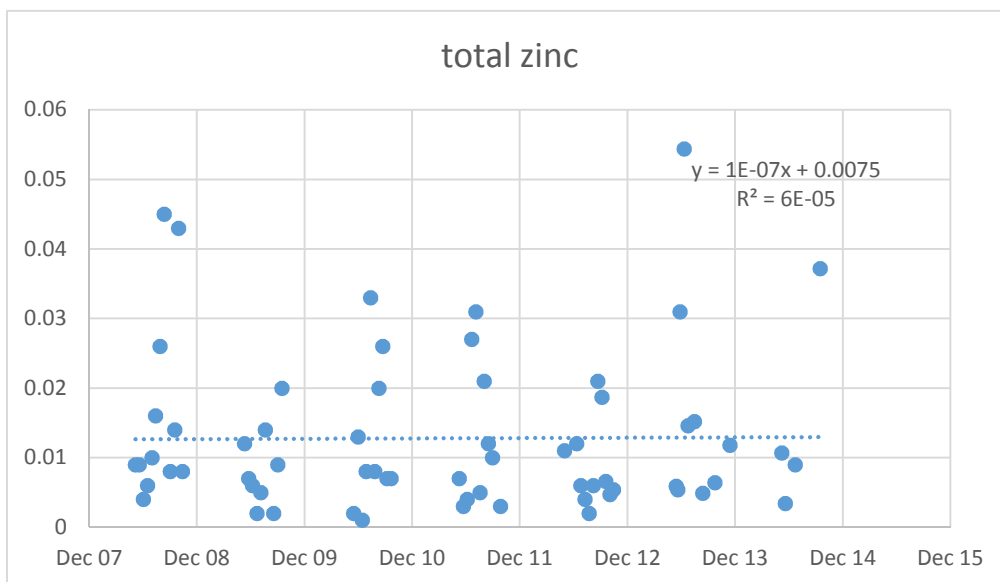
Appendix C. Dome Creek upstream of Mill Site (WQ-DC-DX)



4.65829E-06	0.189258	se (slope)	se (intercept)
0.005592077	0.025792	r2	se (y)
0.359905523	64	F	df
0.000239416	0.042574	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 36: WQ-DC-DX total zinc concentration showing statistically significant increasing trend with potential outlier (30 May 2012). Total zinc CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

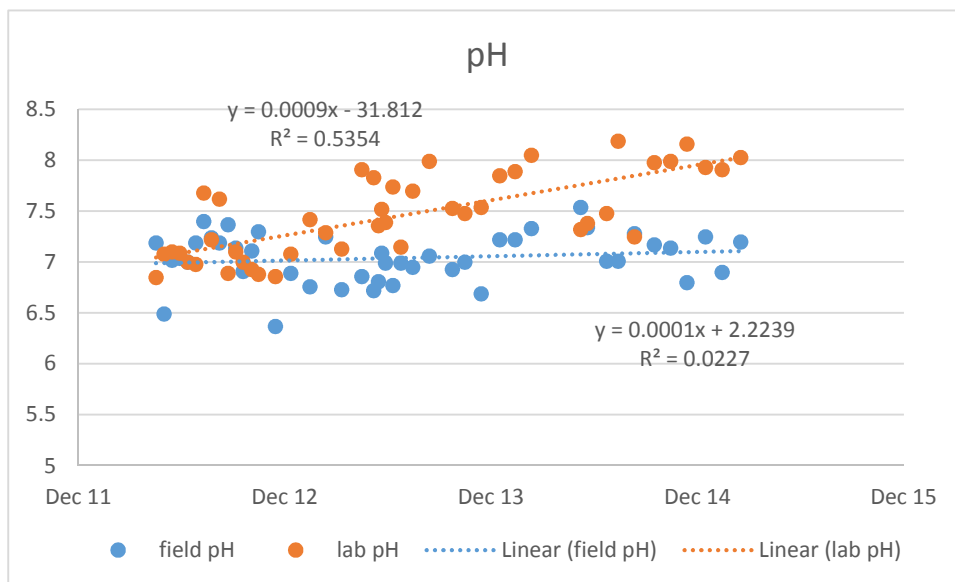


2.07845E-06	0.08443	se (slope)	se (intercept)
6.14949E-05	0.011471	r2	se (y)
0.003874417	63	F	df
5.09855E-07	0.00829	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend is NOT statistically significant at 95% confidence level

Figure 37: WQ-DC-DX with outlier removed trend is not significant.

Appendix C. Dome Creek upstream of Mill Site (WQ-DC-DX+105)



field pH

0.000116	2.223928	slope	intercept
0.000116	4.824114	se (slope)	se (intercept)
0.022667	0.241909	r2	se (y)
0.997276	43	F	df
0.058361	2.516359	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

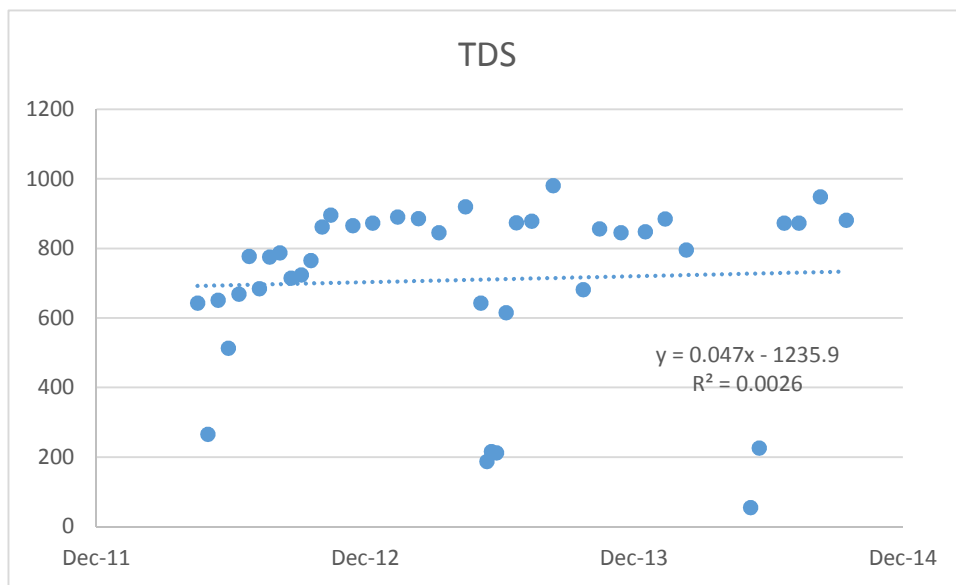
lab pH

0.000947	-31.8124	slope	intercept
0.000135	5.579157	se (slope)	se (intercept)
0.53541	0.279771	r2	se (y)
49.55479	43	F	df
3.87875	3.365694	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 38: WQ-DC-DX+105 field and lab pH values both showing statistically significant increasing pH trend. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

Appendix C. Dome Creek upstream of Mill Site (WQ-DC-DX+105)



0.111973	4641.777	se (slope)	se (intercept)
0.021461	232.7656	r2	se (y)
0.943047	43	F	df
51094.11	2329732	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 39: WQ-DC-DX+105 TDS concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

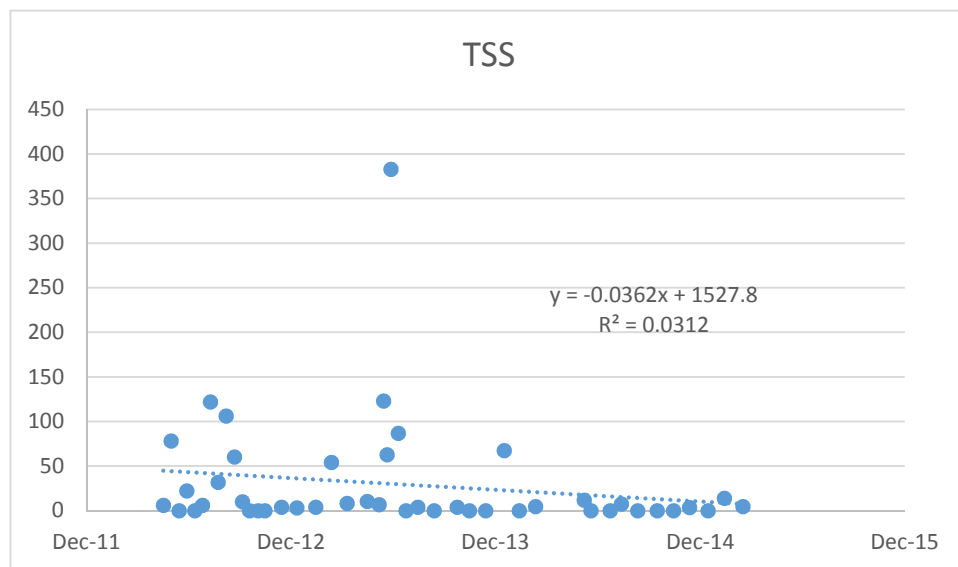
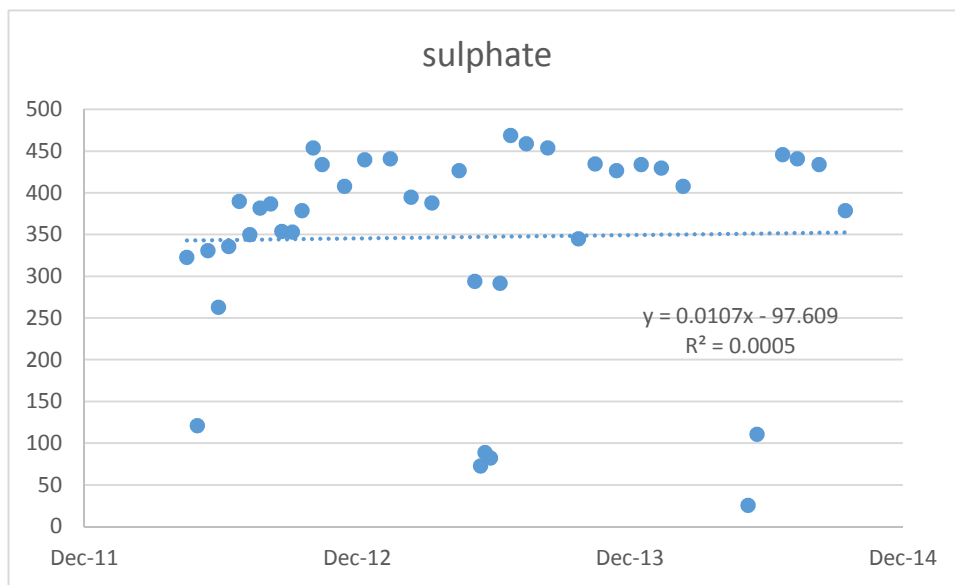


Figure 40: WQ-DC-DX+105 TSS concentration showing apparent decreasing trend. Greater than 10% of samples are ND, trend analysis is not appropriate. TSS EQS 50 mg/L.

Appendix C. Dome Creek upstream of Mill Site (WQ-DC-DX+105)



0.056973	2361.786	se (slope)	se (intercept)
0.018769	118.4336	r2	se (y)
0.822523	43	F	df
11537.13	603140.5	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 41: WQ-DC-DX+105 sulphate concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

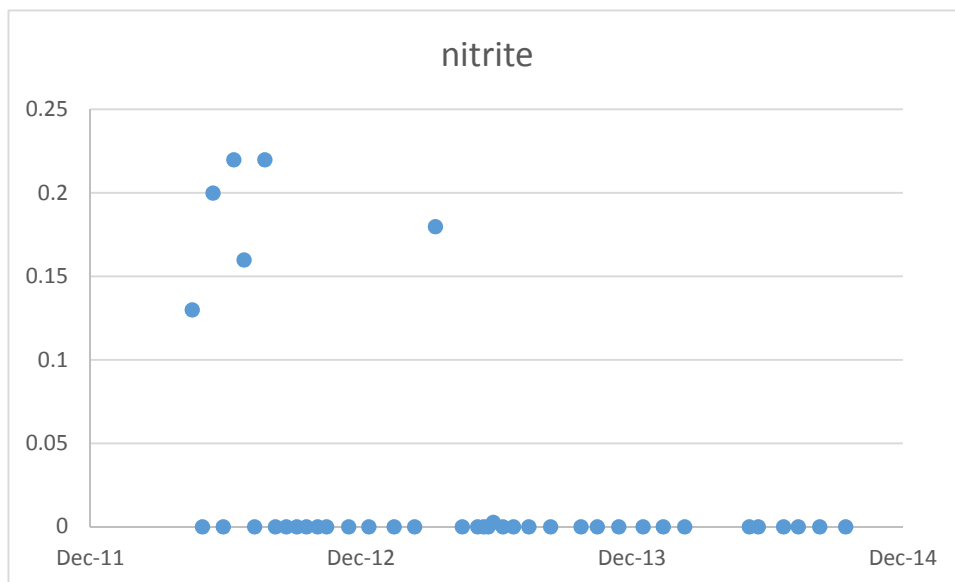
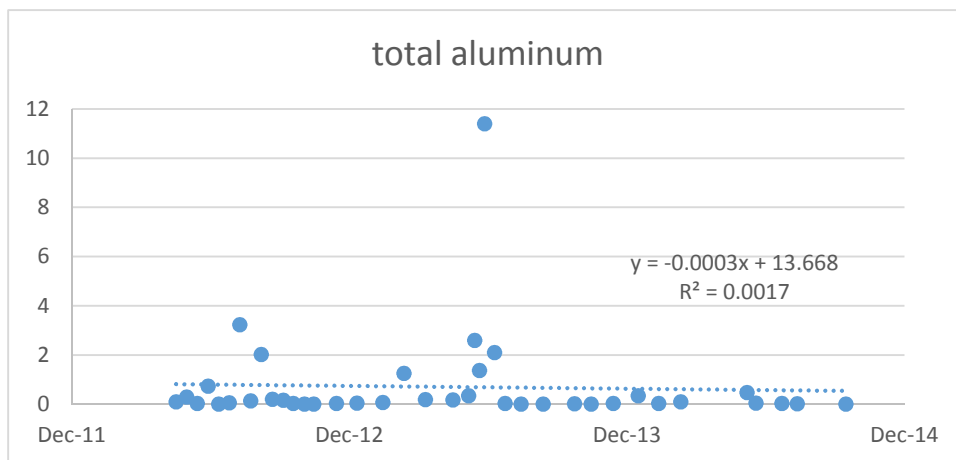


Figure 42: WQ-DC-DX+105 nitrite concentration. Greater than 10% of samples are ND, trend analysis is not appropriate.

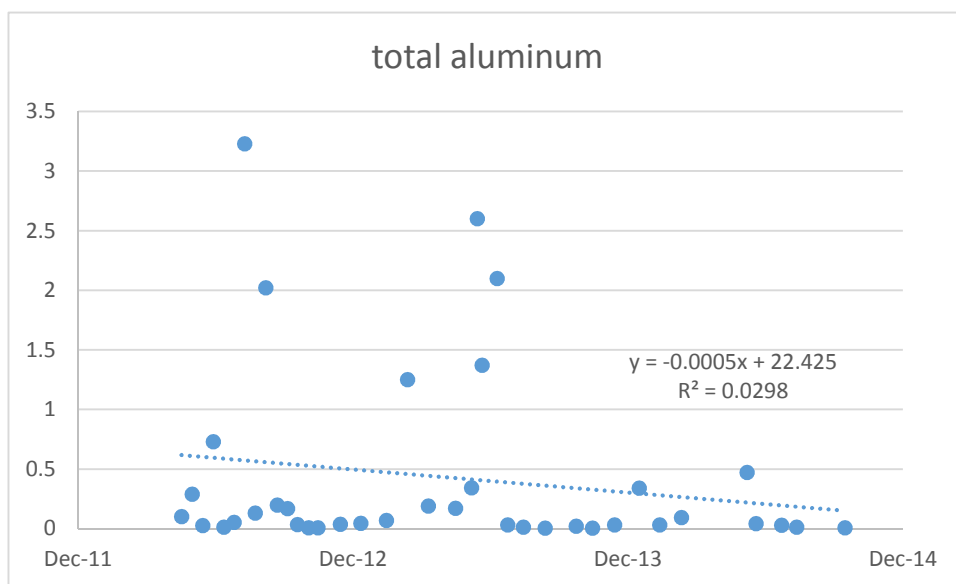
Appendix C. Dome Creek upstream of Mill Site (WQ-DC-DX+105)



0.000899	37.27943	se (slope)	se (intercept)
0.011379	1.832271	r2	se (y)
0.483435	42	F	df
1.622995	141.0031	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 43: WQ-DC-DX+105 total aluminum concentration showing statistically significant decreasing trend. With potential outlier (29 May 2013) trend is statistically significant. Total aluminum CCME Guideline is 0.1 mg/L at pH>6.5.

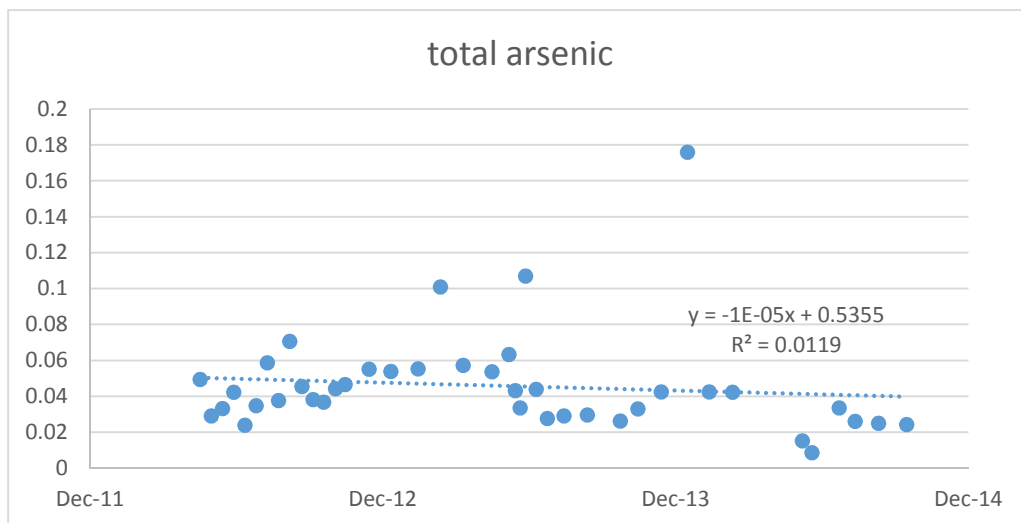


0.000365	15.13807	se (slope)	se (intercept)
0.056129	0.743982	r2	se (y)
2.438155	41	F	df
1.349541	22.69388	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 44: WQ-DC-DX+105 with outlier removed the rate of decrease increased and the model quality has improved.

Appendix C. Dome Creek upstream of Mill Site (WQ-DC-DX+105)

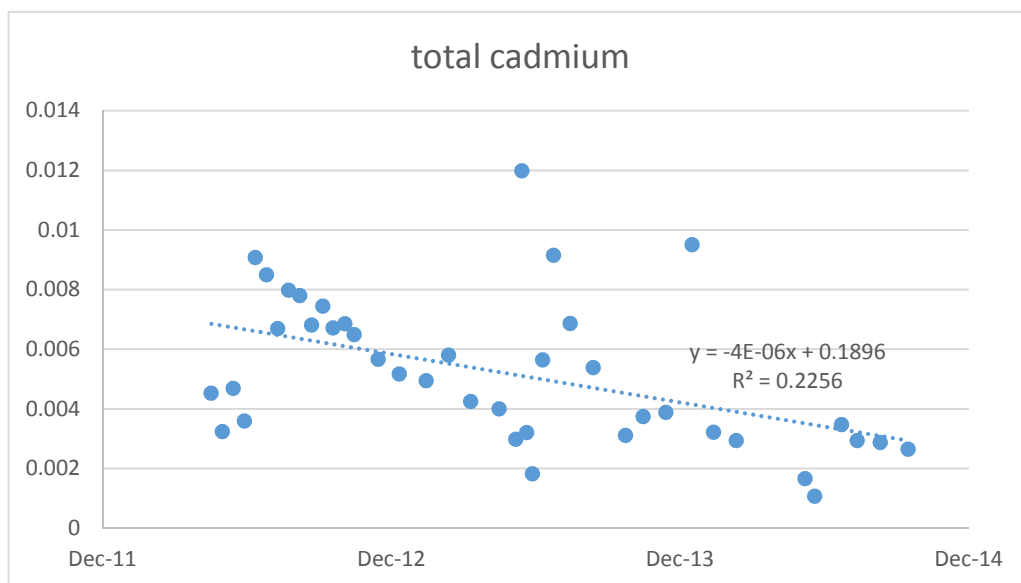


1.30969E-05	0.542924	se (slope)	se (intercept)
0.012232002	0.027225	r2	se (y)
0.532489512	43	F	df
0.000394691	0.031872	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 45: WQ-DC-DX+105 total arsenic concentration showing statistically significant decreasing trend.

Total arsenic CCME Guideline is 0.005 mg/L.



1.0004E-06	0.041471	se (slope)	se (intercept)
0.268122112	0.00208	r2	se (y)
15.75297055	43	F	df
6.81261E-05	0.000186	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 46: WQ-DC-DX+105 total cadmium concentration showing statistically significant decreasing

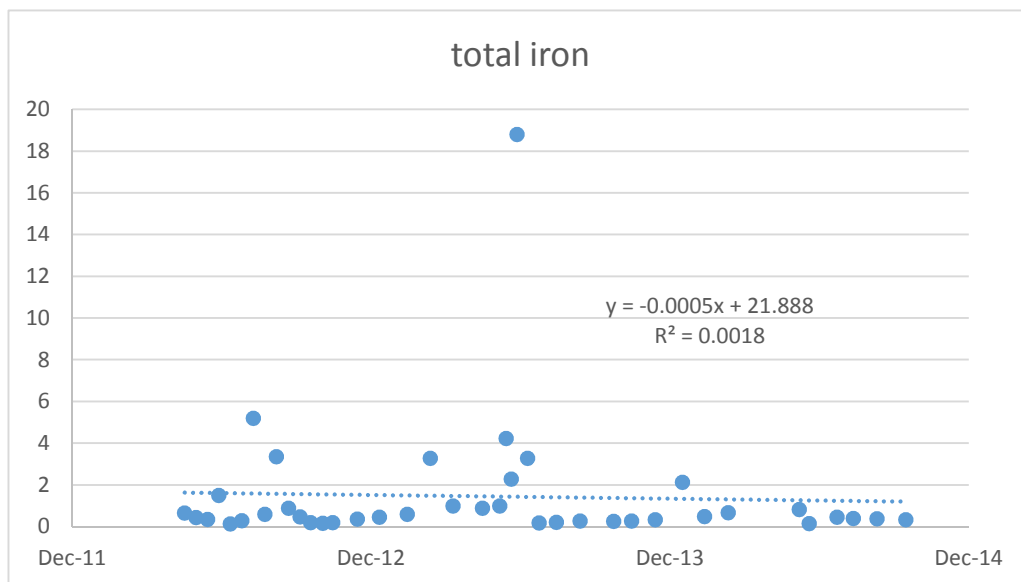
trend. Total cadmium CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.

total copper

$y = -3E-06x + 0.1124$
 $R^2 = 0.0146$

31

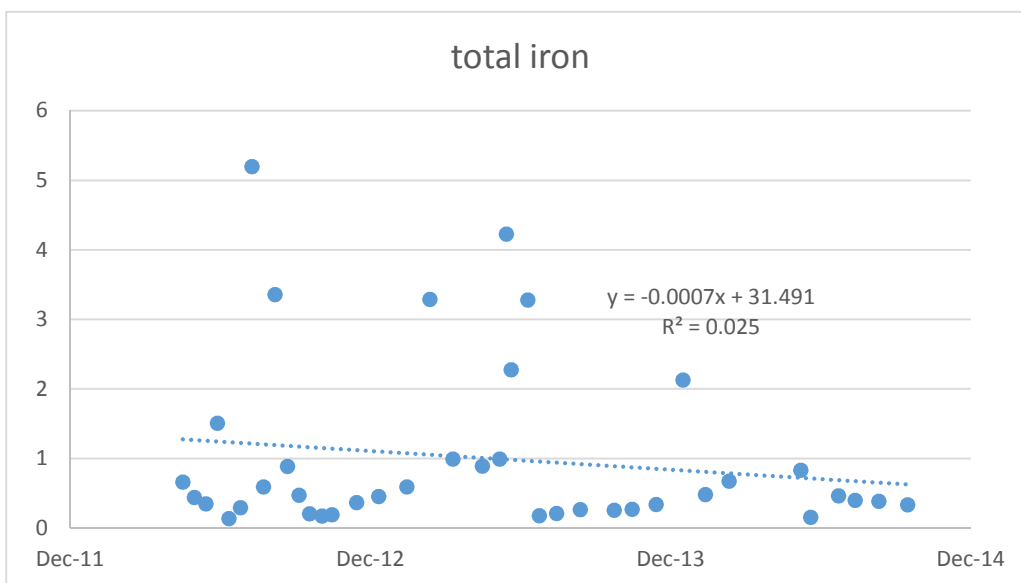
Appendix C. Dome Creek upstream of Mill Site (WQ-DC-DX+105)



0.001406867	58.32062	se (slope)	se (intercept)
0.008695382	2.924534	r2	se (y)
0.377181166	43	F	df
3.225992666	367.7747	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 48: WQ-DC-DX+105 total iron concentration showing statistically significant decreasing trend with potential outlier (29 May 2013). Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

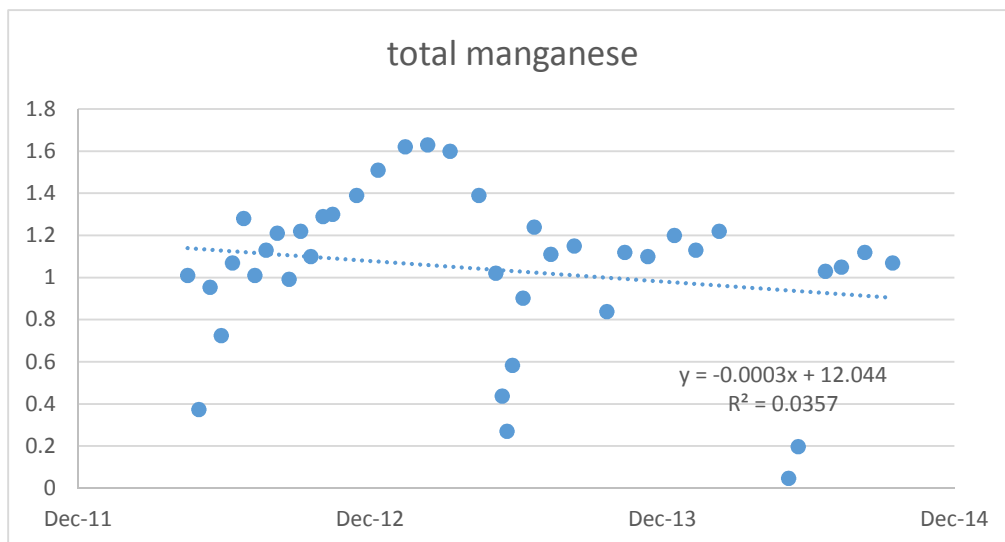


0.000561747	23.28719	se (slope)	se (intercept)
0.039670784	1.16761	r2	se (y)
1.735001789	42	F	df
2.365349135	57.25911	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 49: WQ-DC-DX+105 total iron concentration with outlier removed trend model quality has improved.

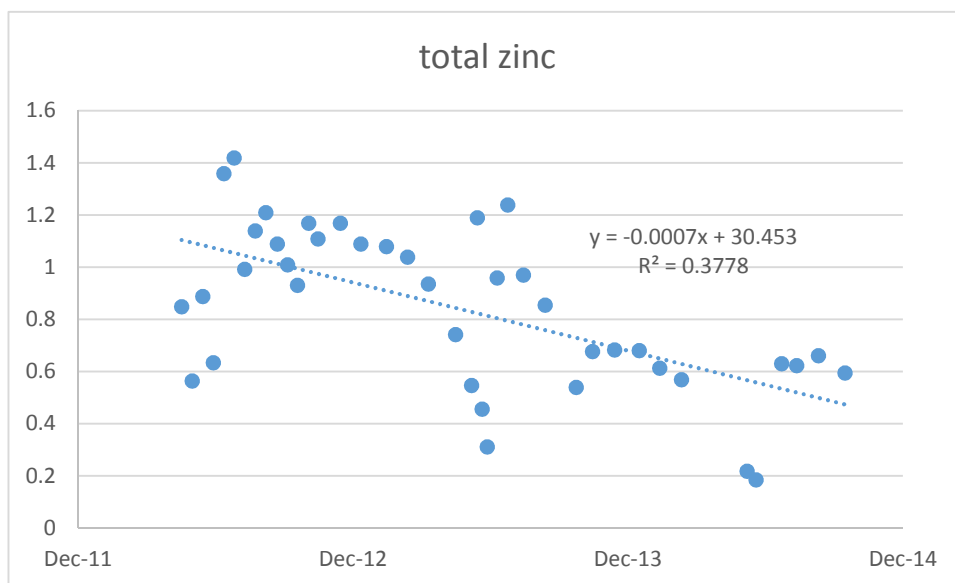
Appendix C. Dome Creek upstream of Mill Site (WQ-DC-DX+105)



0.000173136	7.177237	se (slope)	se (intercept)
0.000531898	0.359908	r2	se (y)
0.022883781	43	F	df
0.002964227	5.56996	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend IS NOT statistically significant at 95% confidence level

Figure 50: WQ-DC-DX+105 total manganese concentration showing apparent decreasing trend but is not statistically significant. Total manganese EQS is 0.5 mg/L.

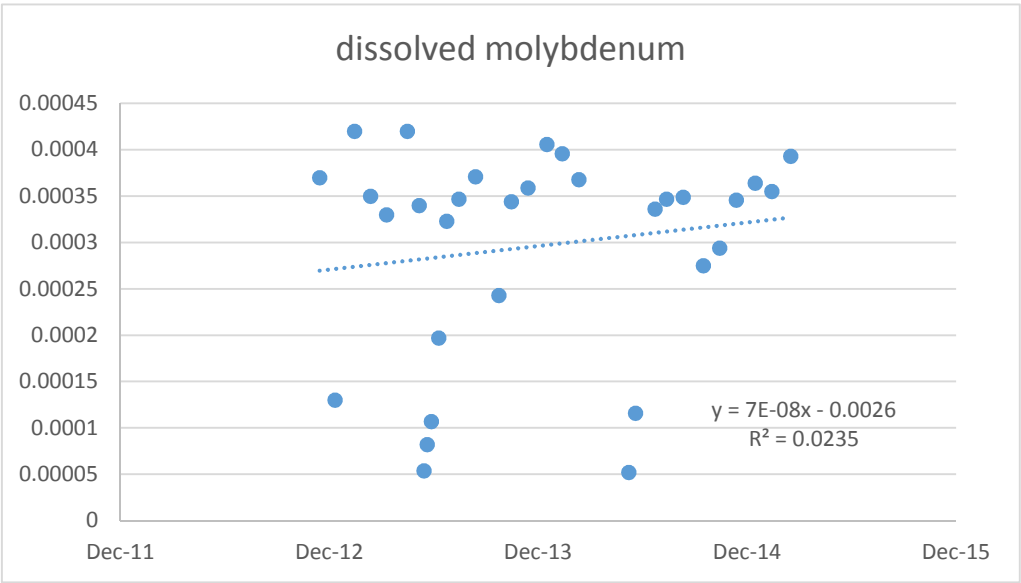


0.000121	5.017865	se (slope)	se (intercept)
0.262733	0.251625	r2	se (y)
15.32352	43	F	df
0.970209	2.722547	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 51: WQ-DC-DX+105 total zinc concentration showing statistically significant decreasing trend. Total zinc CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

Appendix C. Dome Creek upstream of Mill Site (WQ-DC-DX+105)

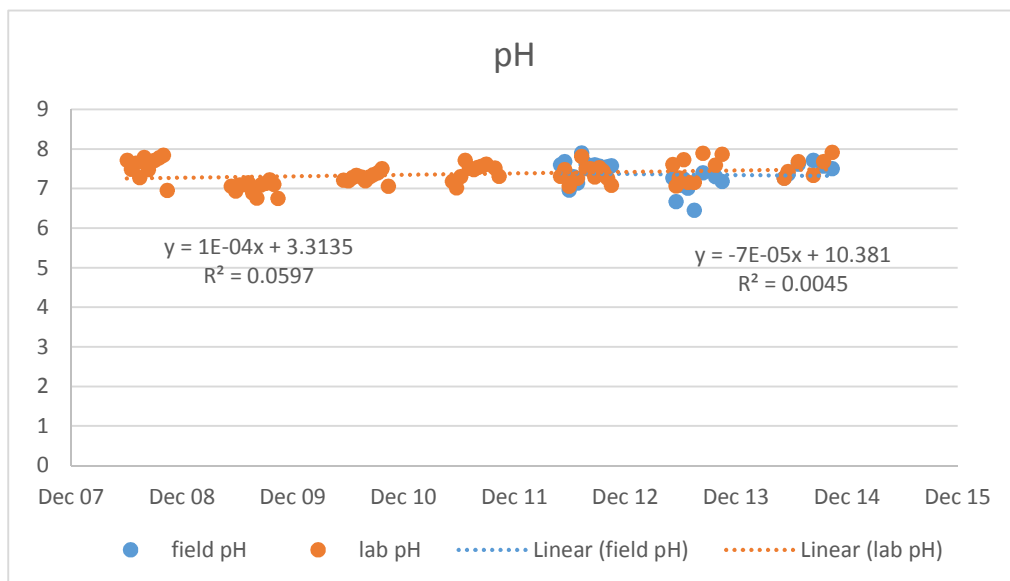


8.34562E-08	0.003473	se (slope)	se (intercept)
0.023520568	0.000114	r2	se (y)
0.698526217	29	F	df
9.04126E-09	3.75E-07	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 52: WQ-DC-DX+105 dissolved molybdenum concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

Appendix C. Pony Creek upstream of Pit and Waste Rock (WQ-PC-U)



field pH

-7.30447E-05	10.38107	slope	intercept
0.000212641	8.800055	se (slope)	se (intercept)
0.004517985	0.325159	r2	se (y)
0.118000735	26	F	df
0.012476012	2.748935	ss reg	ss resid

CONCLUSION: F > 0.05 therefore trend is statistically significant at 95% confidence level

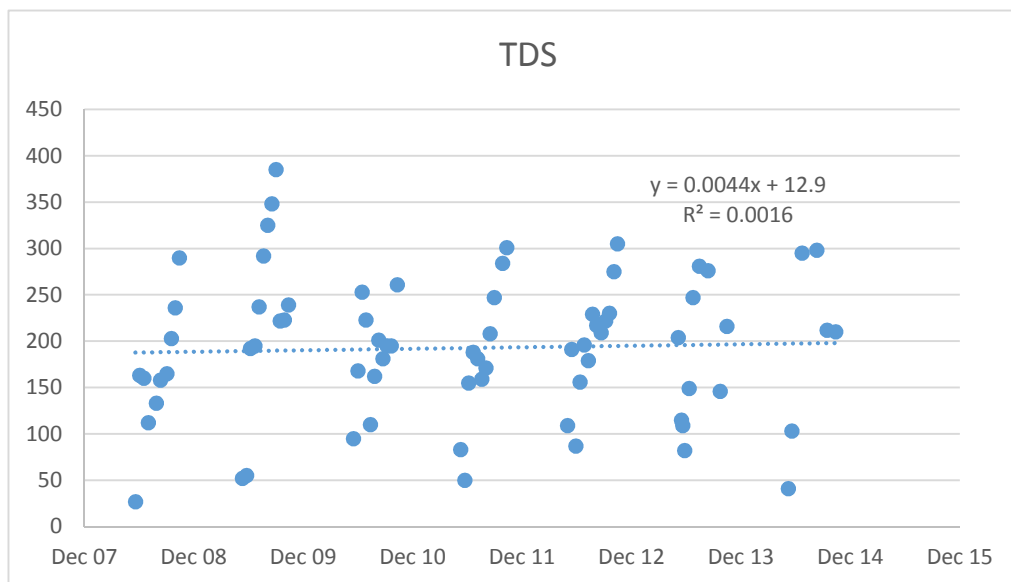
lab pH

9.96052E-05	3.313533	slope	intercept
4.72397E-05	1.921488	se (slope)	se (intercept)
0.059718506	0.269912	r2	se (y)
4.44579143	70	F	df
0.323887961	5.09969	ss reg	ss resid

CONCLUSION: F > 0.05 therefore trend is statistically significant at 95% confidence level

Figure 53: WQ-PC-U field pH showing decreasing trend and lab pH values showing statistically significant increasing pH trend. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

Appendix C. Pony Creek upstream of Pit and Waste Rock (WQ-PC-U)



0.013265

539.6704

se (slope)

se (intercept)

0.001563

76.55948

r2

se (y)

0.111111

71

F

df

651.2638

416156.1

ss reg

ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 54: WQ-PC-U TDS concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

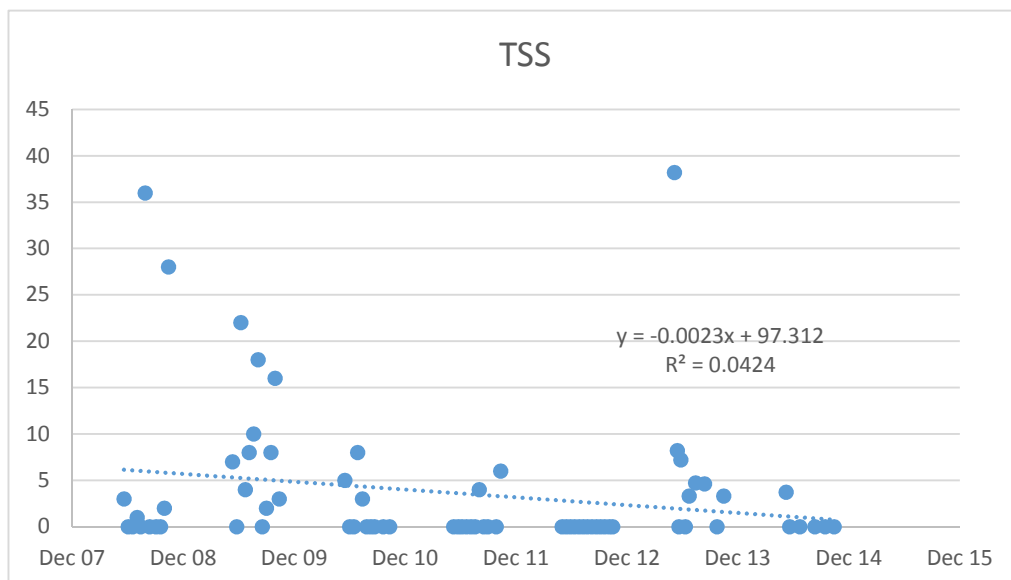
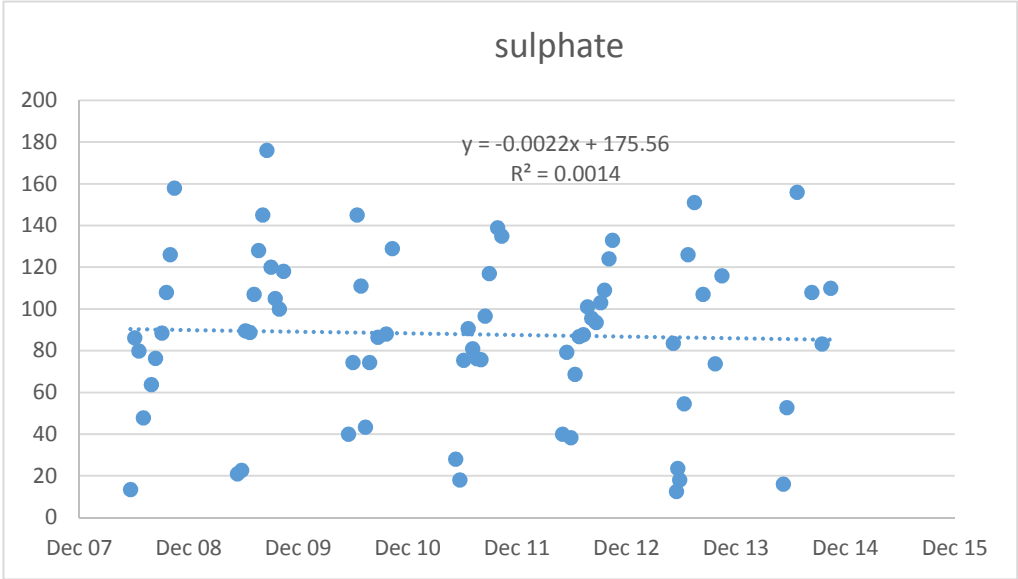


Figure 55: WQ-PC-U TSS concentration appears to have a decreasing trend. Greater than 10% of samples are ND, trend analysis is not appropriate. TSS EQS 50 mg/L.

Appendix C. Pony Creek upstream of Pit and Waste Rock (WQ-PC-U)

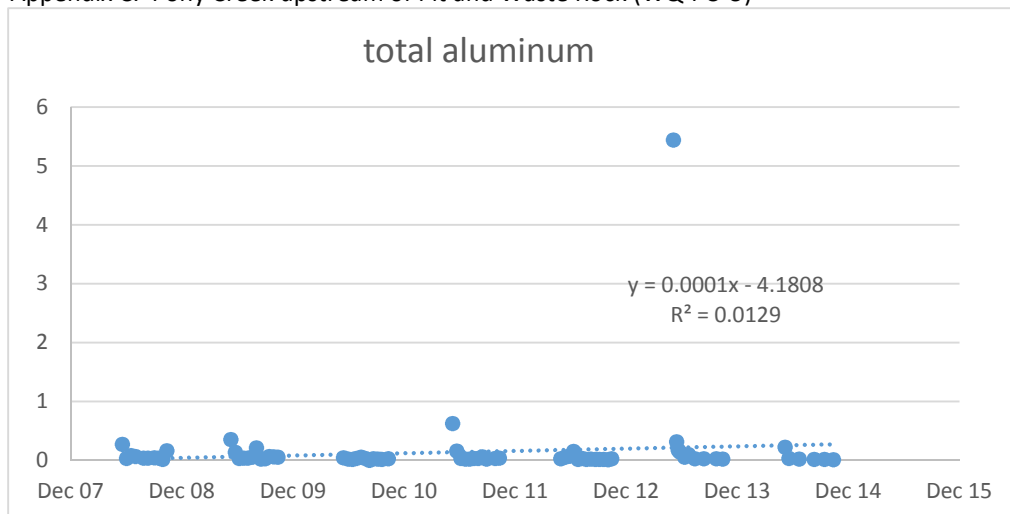


0.006854	278.8943	se (slope)	se (intercept)
0.001428	39.47237	r2	se (y)
0.098685	69	F	df
153.7575	107506.7	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 56: WQ-PC-U sulphate concentration showing statistically significant decreasing trend. No CCME Guideline or EQS available.

Appendix C. Pony Creek upstream of Pit and Waste Rock (WQ-PC-U)



0.013265

539.6704

se (slope)

se (intercept)

0.001563

76.55948

r2

se (y)

0.111111

71

F

df

651.2638

416156.1

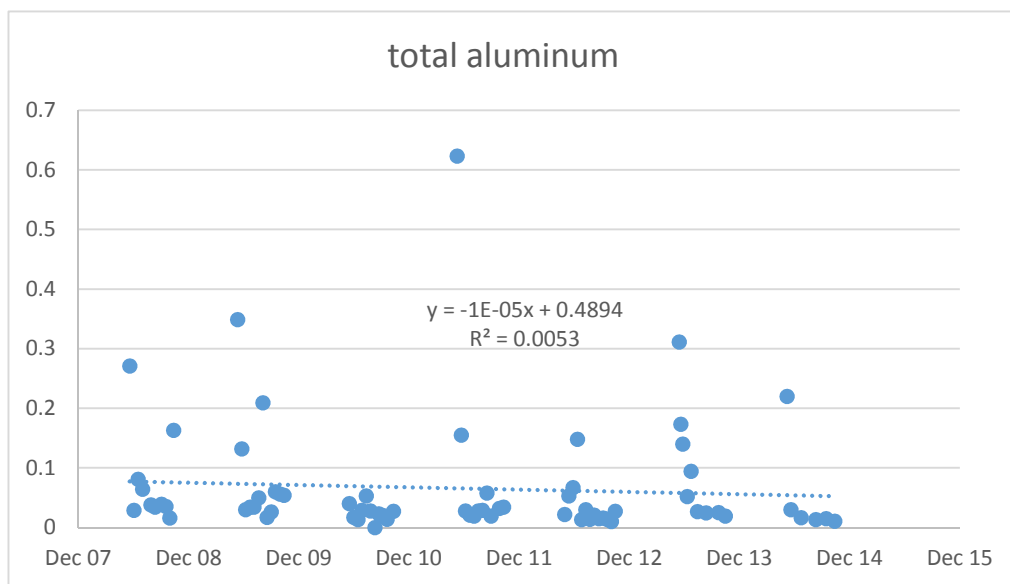
ss reg

ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 57: WQ-PC-U total aluminum concentration showing statistically significant increasing trend.

With potential outlier (7 May 2013) trend is statistically significant. Total aluminum CCME Guideline is 0.1 mg/L at pH>6.5.



0.013465

547.6944

se (slope)

se (intercept)

0.001416

77.09822

r2

se (y)

0.099247

70

F

df

589.9393

416089.5

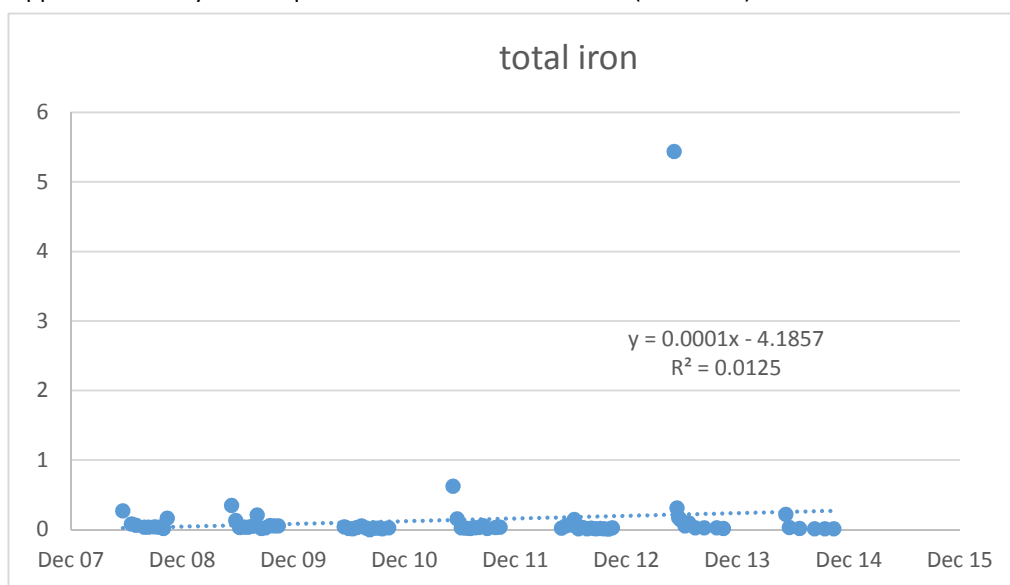
ss reg

ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 58: WQ-PC-U total aluminum concentration without outlier trend is decreasing.

Appendix C. Pony Creek upstream of Pit and Waste Rock (WQ-PC-U)



0.000245

9.962022

se (slope)

se (intercept)

0.023196

1.387659

r2

se (y)

1.662247

70

F

df

3.200818

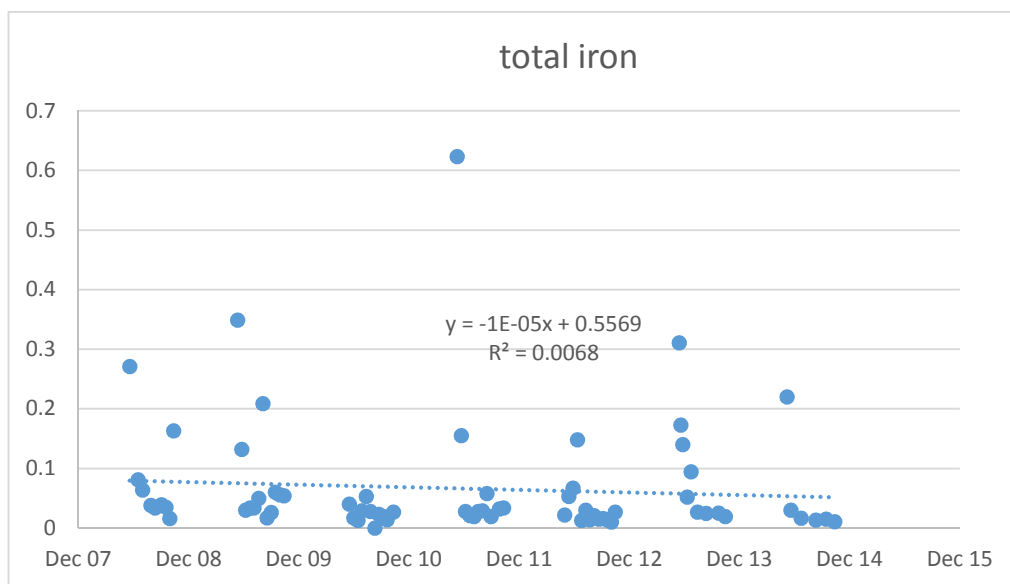
134.7918

ss reg

ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 59: WQ-PC-U total iron concentration showing statistically significant increasing trend with potential outlier (7 May 2013). Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.



0.000221

8.976298

se (slope)

se (intercept)

0.053323

1.240759

r2

se (y)

3.886566

69

F

df

5.983304

106.2244

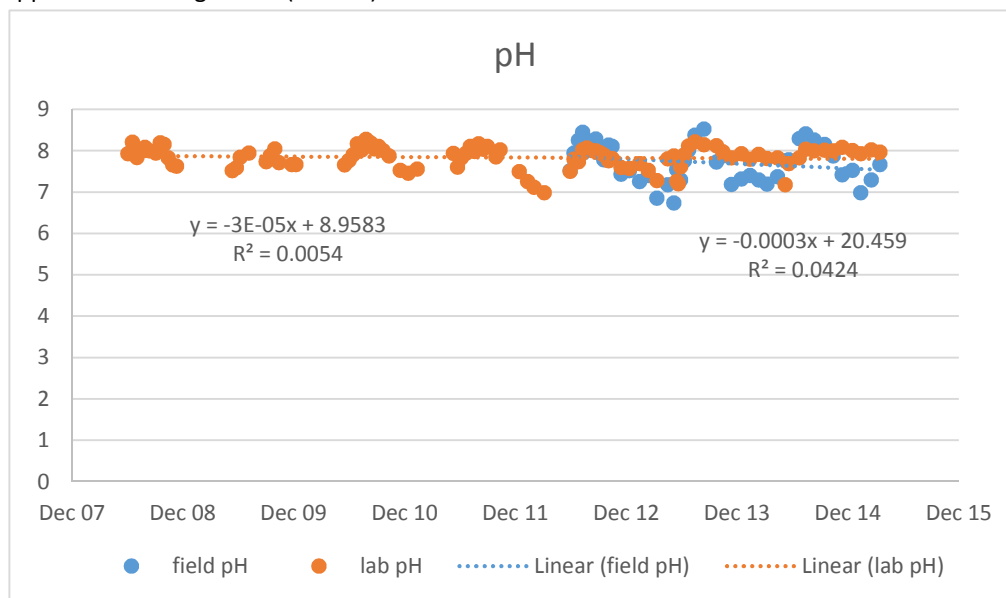
ss reg

ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 60: WQ-PC-U total iron concentration showing statistically significant decreasing trend with outlier removed. Model has improved with outlier removed.

Appendix C. Tailings Pond (WQ-TP)



field pH

-0.000306856	20.45895	slope	intercept
0.000222265	9.225868	se (slope)	se (intercept)
0.042444416	0.455174	r2	se (y)
1.906009329	43	F	df
0.394893412	8.908884	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

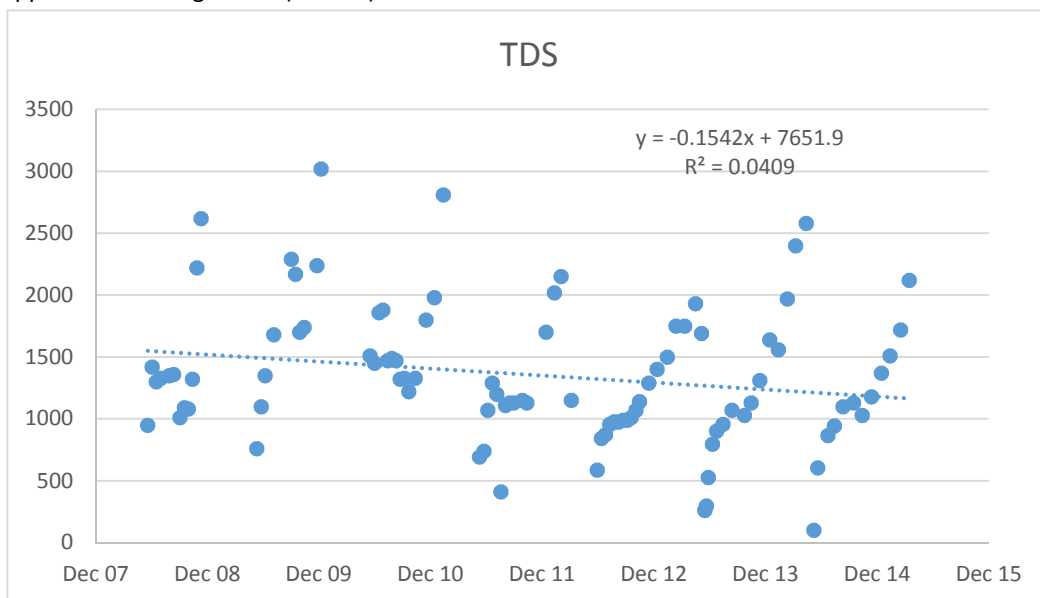
lab pH

-2.73314E-05	8.958263	slope	intercept
3.81736E-05	1.559927	se (slope)	se (intercept)
0.005423862	0.267921	r2	se (y)
0.512623422	94	F	df
0.03679692	6.747469	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 61: WQ-VC-TP field and lab pH values both showing statistically significant decreasing pH trend. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

Appendix C. Tailings Pond (WQ-TP)



0.076973987	3145.42445	se (slope)	se (intercept)
0.040924732	540.988193	r2	se (y)
4.011077033	94	F	df
1173914.796	27510813.2	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 62: WQ-TP TDS concentration showing statistically significant decreasing trend. No CCME Guideline or EQS available.

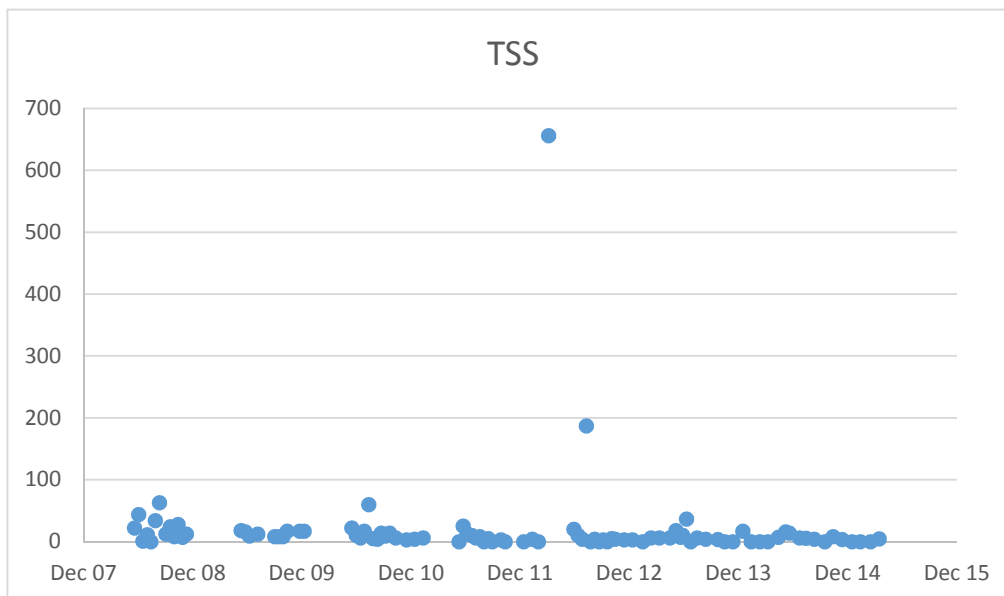
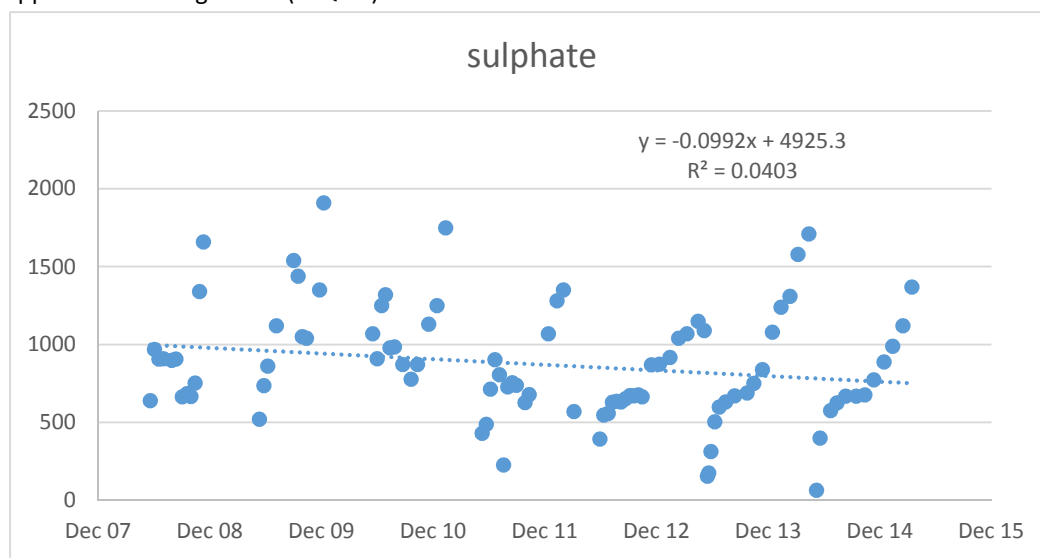


Figure 63: WQ-TP TSS concentration greater than 10% of samples are ND, trend analysis is not appropriate. TSS EQS 50 mg/L.

Appendix C. Tailings Pond (WQ-TP)

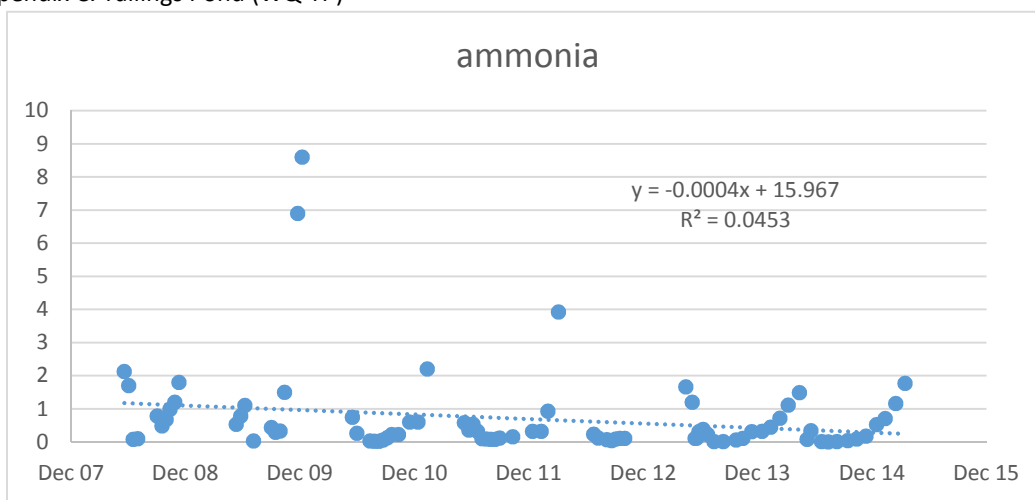


0.050490228	2063.68462	se (slope)	se (intercept)
0.040268205	353.419703	r2	se (y)
3.860114727	92	F	df
482149.5087	11491304.8	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 64: WQ-TP sulphate concentration showing statistically significant decreasing trend. No CCME Guideline or EQS available.

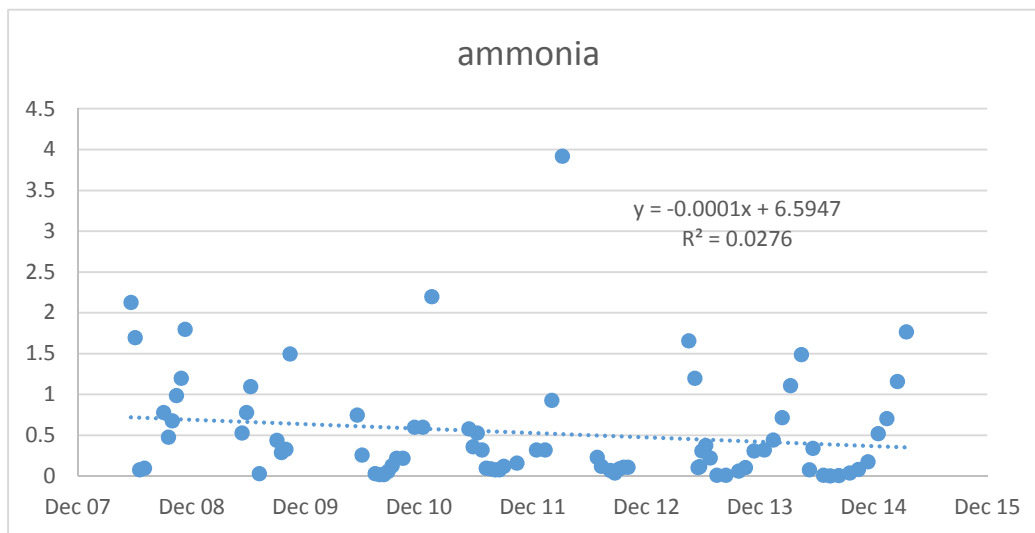
Appendix C. Tailings Pond (WQ-TP)



0.000191738	7.83579162	se (slope)	se (intercept)
0.045293393	1.28404912	r2	se (y)
3.795376974	80	F	df
6.257749742	131.902571	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 65: WQ-TP ammonia concentration showing statistically significant decreasing trend with two potential outliers (26 Nov 2009 and 10 Dec 2009). Ammonia CCME Guideline is 0.7 mg/L at Temperature of 15C and pH of 8. Water temperatures commonly exceed 15C in the summer at this WQS.



9.97026E-05	4.07633068	se (slope)	se (intercept)
0.02762438	0.65994941	r2	se (y)
2.215914954	78	F	df
0.965104578	33.9715913	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 66: WQ-TP ammonia concentration still has a decreasing trend value with the two outliers removed. Although the model indicates the ammonia concentrations are decreasing in time there still appears to be annual cyclic concentration variations.

Appendix C. Tailings Pond (WQ-TP)

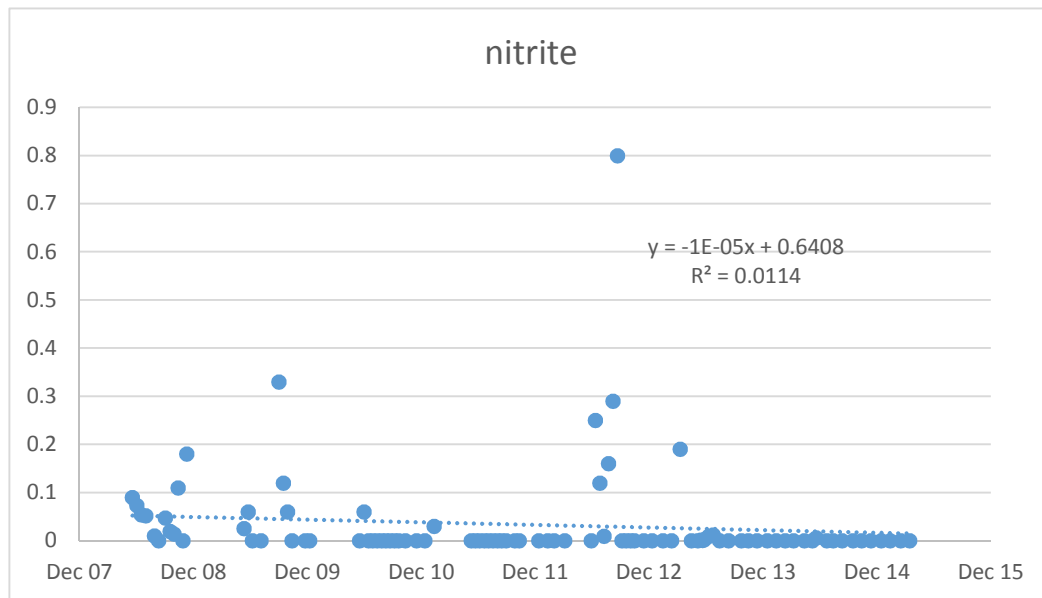
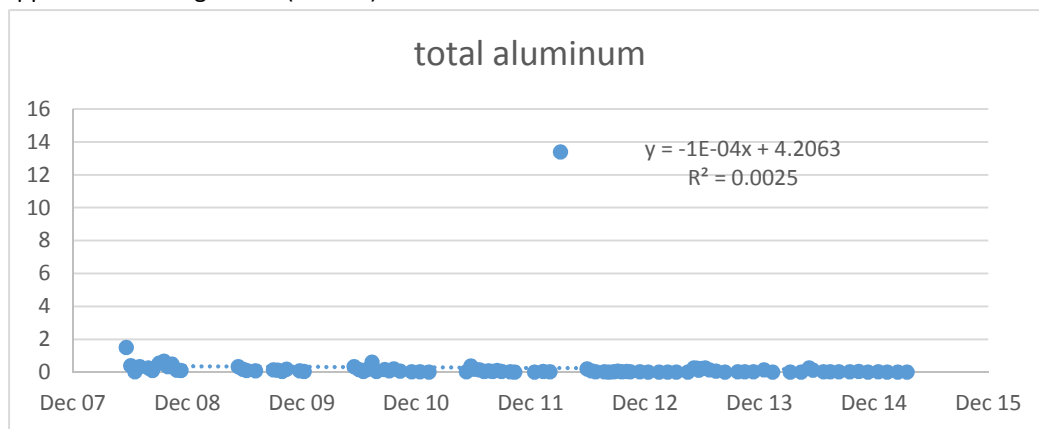


Figure 67: WQ-TP nitrite concentrations appear to have a decreasing trend. Greater than 10% of samples are ND, trend analysis is not appropriate. Nitrite CCME Guideline is 0.06 mg/L.

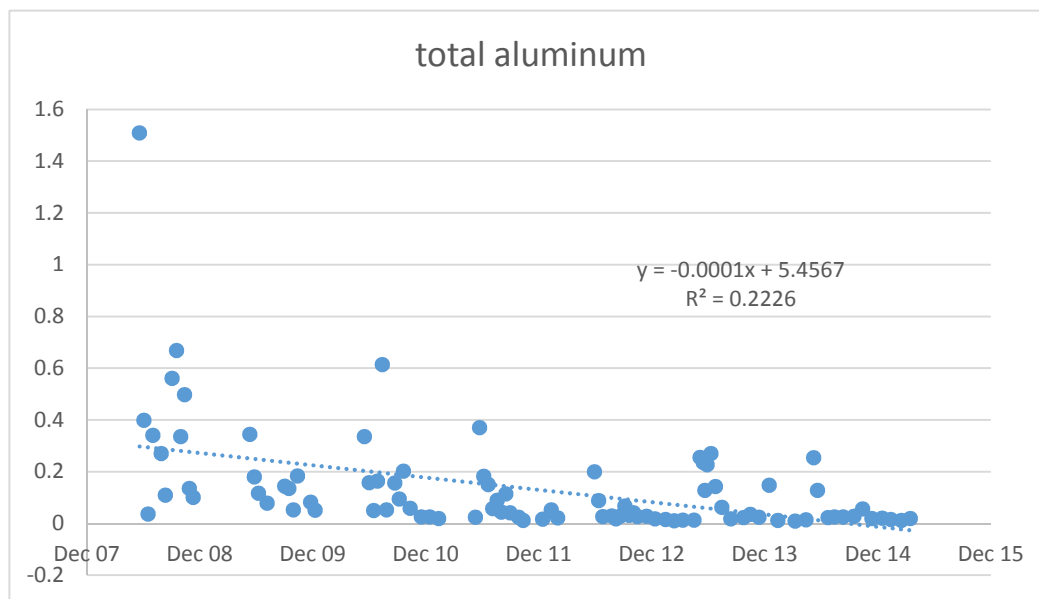
Appendix C. Tailings Pond (WQ-TP)



0.000200555	8.19406932	se (slope)	se (intercept)
0.002520961	1.39592873	r2	se (y)
0.229987227	91	F	df
0.448157025	177.324149	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 68: WQ-TP total aluminum concentration showing statistically significant decreasing trend. With potential outlier (7 March 2012) trend is statistically significant. Total aluminum CCME Guideline is 0.1 mg/L at pH>6.5.

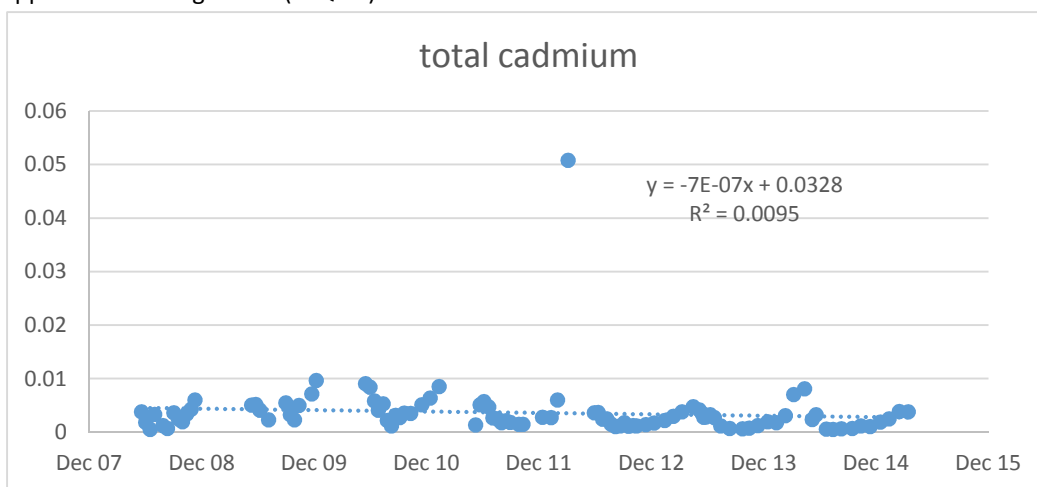


2.56676E-05	1.04866529	se (slope)	se (intercept)
0.222565338	0.17862573	r2	se (y)
25.76535554	90	F	df
0.822099134	2.87164374	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 69: WQ-TP total aluminum concentration showing that without outlier model has improved.

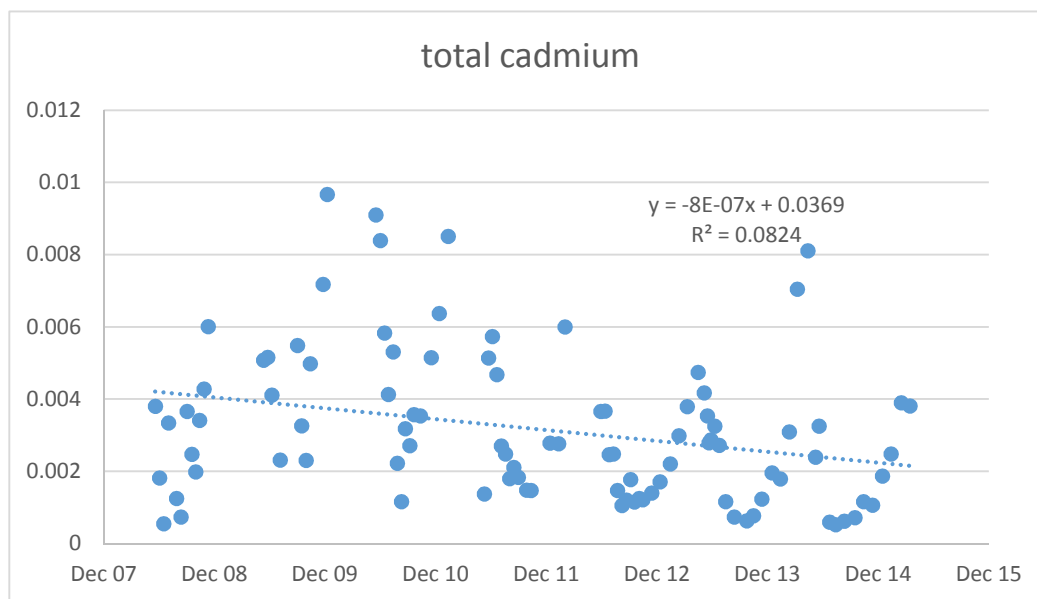
Appendix C. Tailings Pond (WQ-TP)



7.52653E-07	0.03075601	se (slope)	se (intercept)
0.009457674	0.00528979	r2	se (y)
0.897509703	94	F	df
2.5114E-05	0.0026303	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 70: WQ-TP total cadmium concentration showing statistically significant decreasing trend. With potential outlier (7 March 2012) trend is significant. Total cadmium CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.

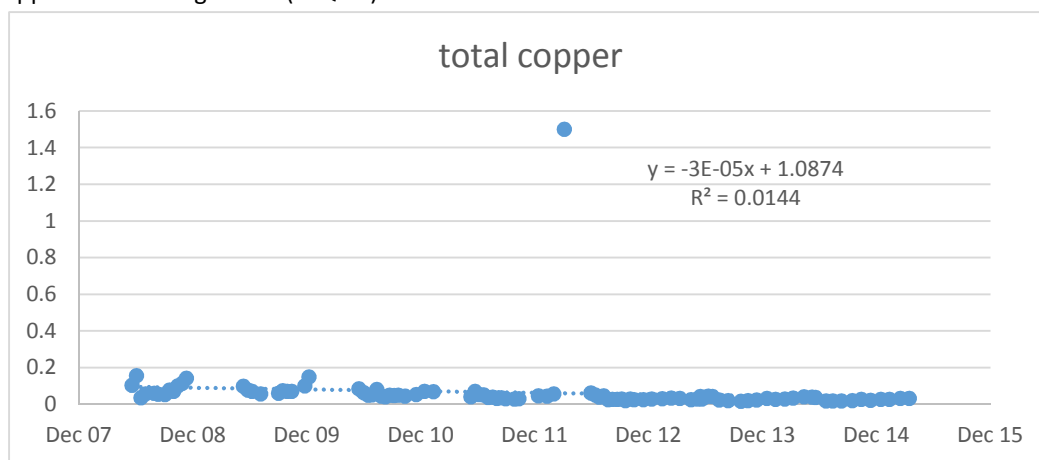


2.86217E-07	0.01169549	se (slope)	se (intercept)
0.082357629	0.0020113	r2	se (y)
8.346671532	93	F	df
3.37651E-05	0.00037622	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 71: WQ-TP total cadmium concentration showing statistically significant decreasing trend. Without outlier trend is still significant and model has improved.

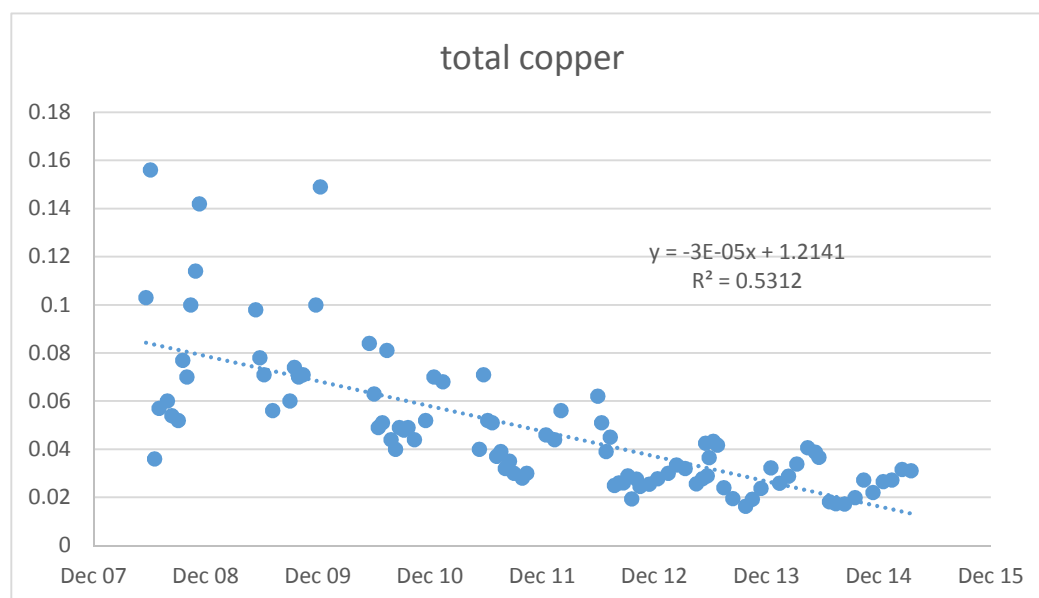
Appendix C. Tailings Pond (WQ-TP)



2.14204E-05	0.87531307	se (slope)	se (intercept)
0.014357385	0.15054694	r2	se (y)
1.369253114	94	F	df
0.031033276	2.13045192	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 72: WQ-TP total copper concentration showing statistically significant decreasing trend with potential outlier . Total copper CCME Guideline is a function of water hardness, maximum value of 0.004 mg/L and minimum value of 0.002 mg/L. EQS is 0.2 mg/L.

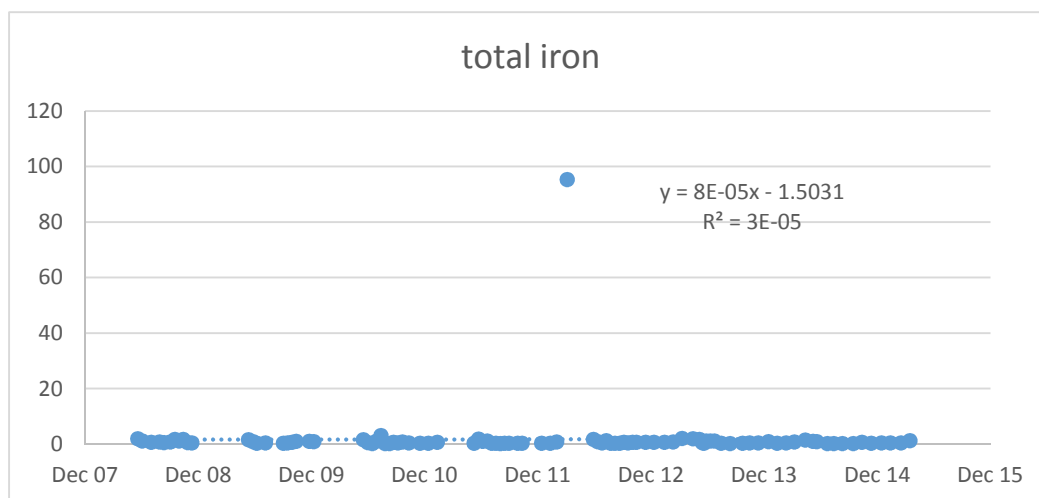


2.77991E-06	0.1135934	se (slope)	se (intercept)
0.531187903	0.01953496	r2	se (y)
105.3737205	93	F	df
0.040212139	0.03549015	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 73: WQ-TP total copper concentration with outlier removed decreasing trend is still statistically significant and model has improved.

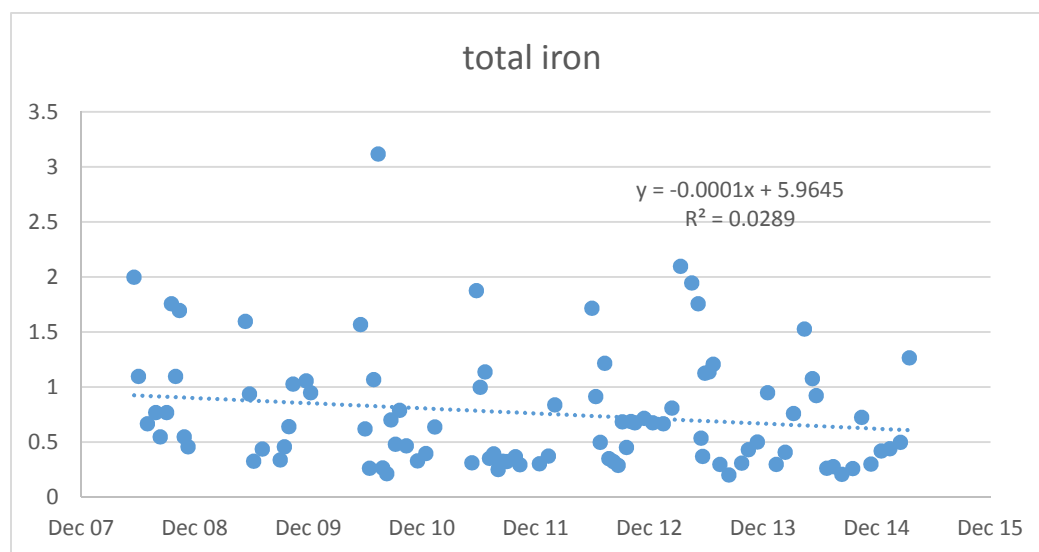
Appendix C. Tailings Pond (WQ-TP)



0.001411892	57.7130214	se (slope)	se (intercept)
3.43395E-05	9.76594351	r2	se (y)
0.003193681	93	F	df
0.304593049	8869.74969	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend IS NOT statistically significant at 95% confidence level

Figure 74: WQ-TP total iron concentration trend is not statistically significant with potential outlier (7 March 2012). Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.



7.69621E-05	3.14585059	se (slope)	se (intercept)
0.028869881	0.53227894	r2	se (y)
2.734987819	92	F	df
0.774879134	26.0655202	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 75: WQ-TP total iron concentration showing statistically significant decreasing trend with outlier removed. Model has improved with removal of outlier.

Appendix C. Tailings Pond (WQ-TP)

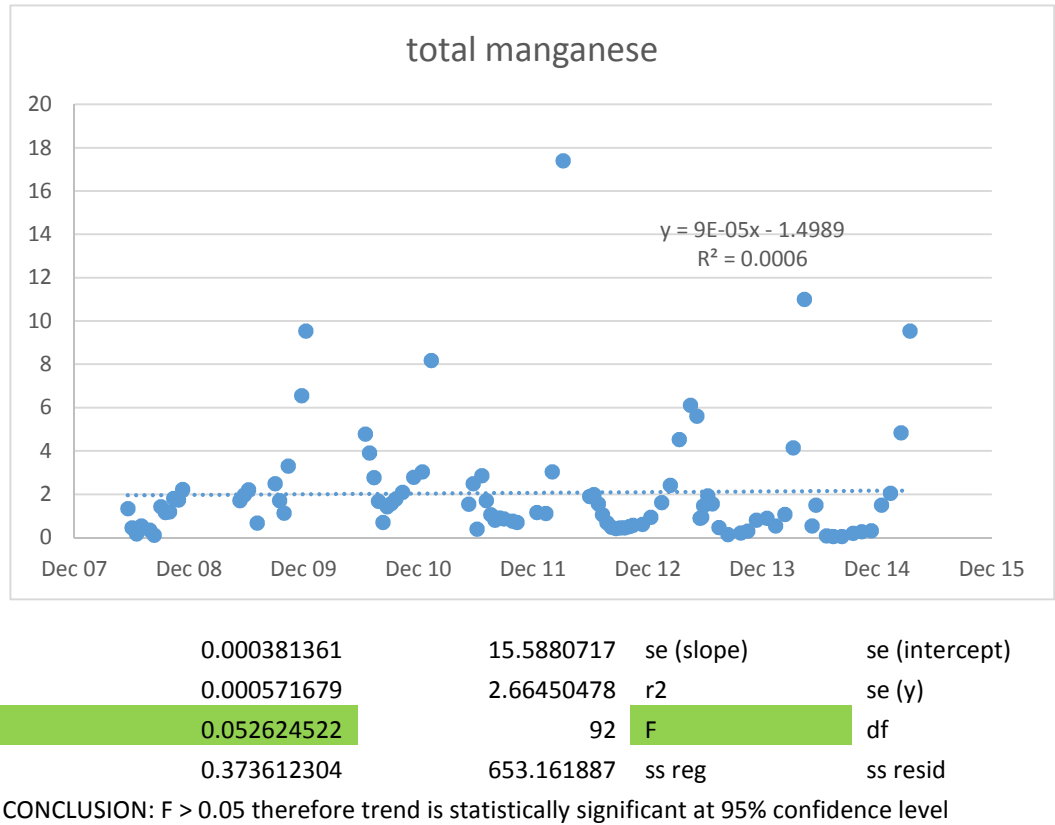
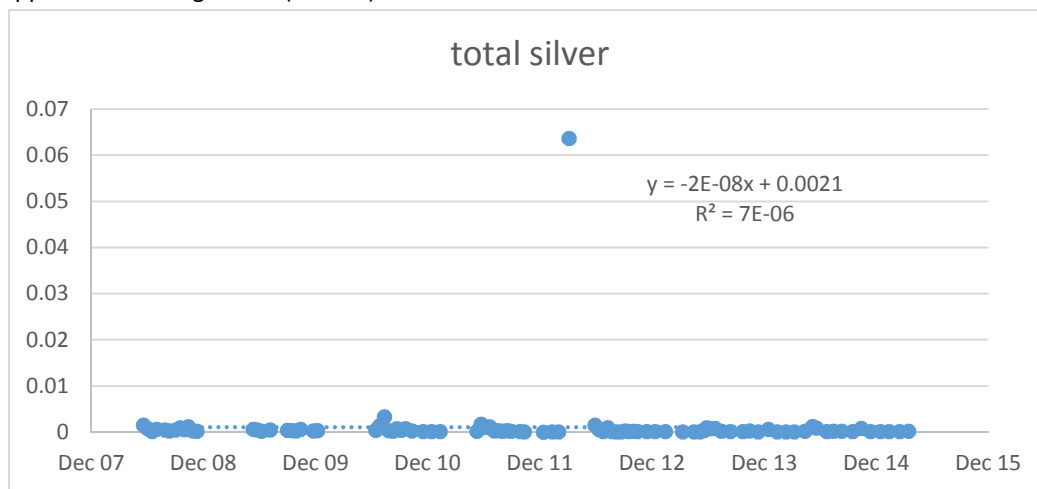


Figure 76: WQ-TP total manganese concentration showing statistically significant increasing trend. Total manganese EQS is 0.5 mg/L.

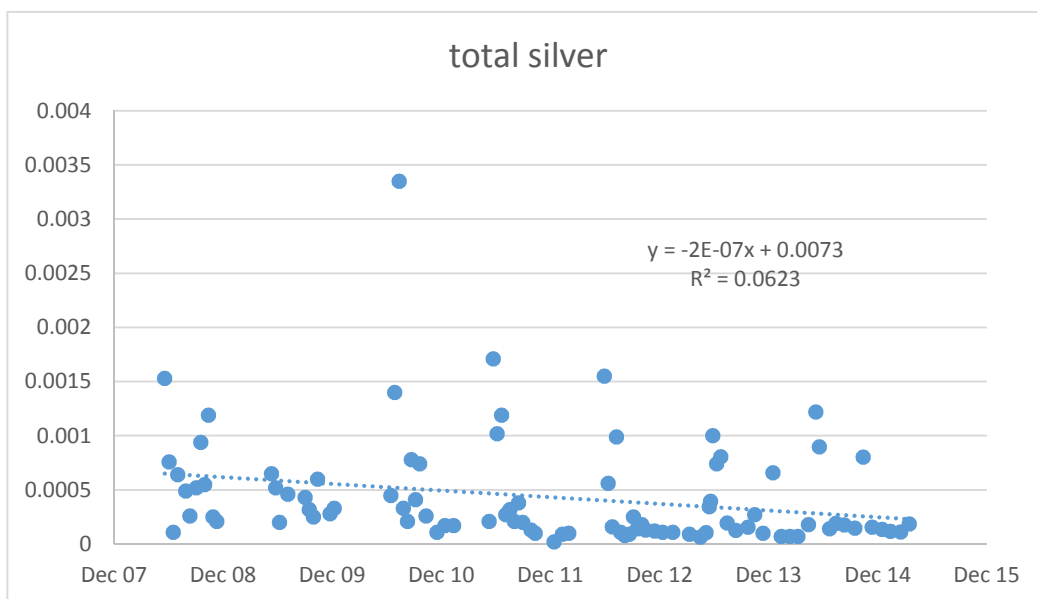
Appendix C. Tailings Pond (WQ-TP)



9.47184E-07	0.03871151	se (slope)	se (intercept)
6.70576E-06	0.00660403	r2	se (y)
0.000610228	91	F	df
2.6614E-08	0.0039688	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend IS NOT statistically significant at 95% confidence level

Figure 77: WQ-TP total silver concentration trend is not statistically significant with potential outlier (7 March 2012). Total silver CCME Guideline is 0.00025 mg/L and EQS is 0.1 mg/L.

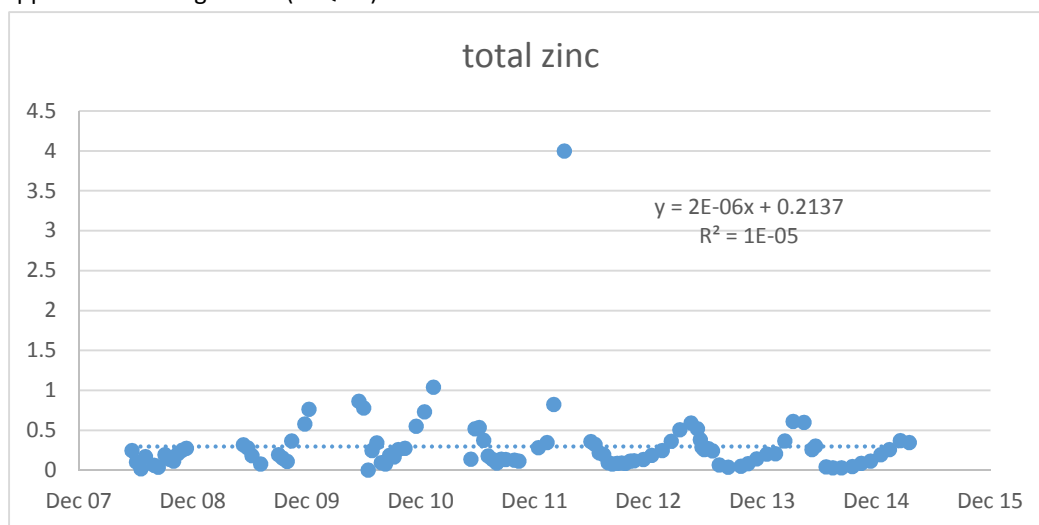


6.87578E-08	0.00281006	se (slope)	se (intercept)
0.062257338	0.00047934	r2	se (y)
5.975157831	90	F	df
1.37287E-06	2.0679E-05	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 78: WQ-TP total silver concentration showing statistically significant decreasing trend with outlier removed. Model quality has improved with removal of outlier.

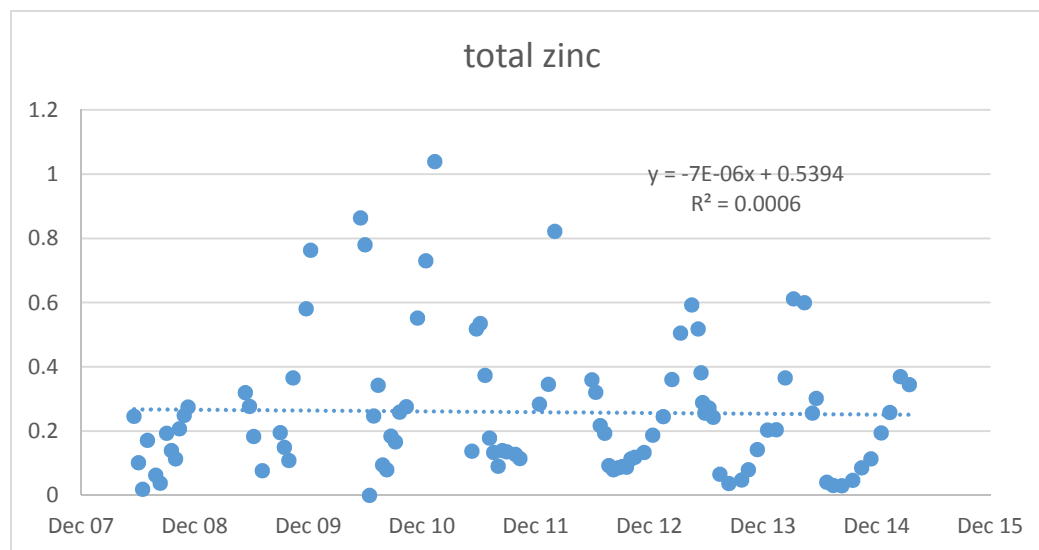
Appendix C. Tailings Pond (WQ-TP)



6.23396E-05	2.54741406	se (slope)	se (intercept)
1.165E-05	0.43813512	r2	se (y)
0.001095113	94	F	df
0.000210221	18.0444643	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend IS NOT statistically significant at 95% confidence level

Figure 79: WQ-TP total zinc concentration trend is not statistically significant with potential outlier (7 March 2012). Total zinc CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

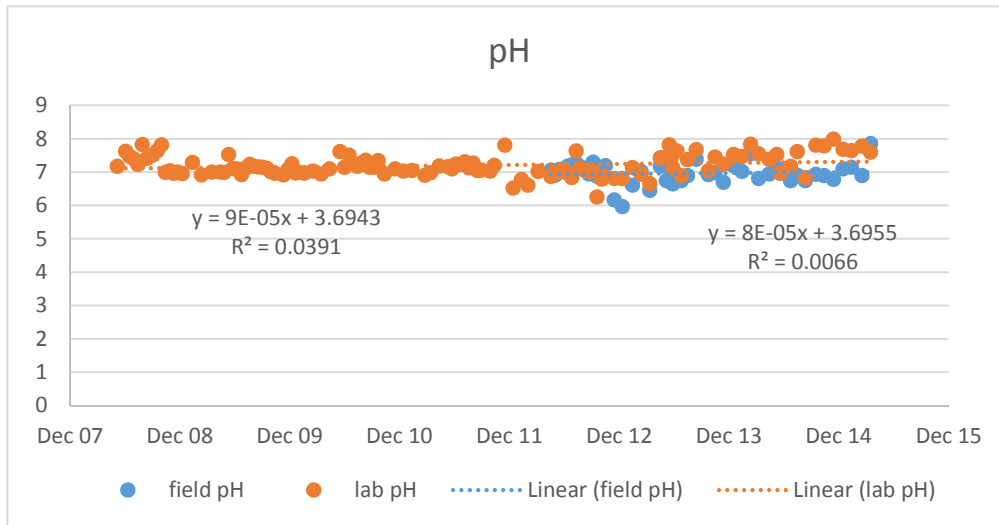


3.02173E-05	1.23474917	se (slope)	se (intercept)
0.000554243	0.21234307	r2	se (y)
0.051573215	93	F	df
0.002325415	4.19333077	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend IS NOT statistically significant at 95% confidence level

Figure 80: WQ-TP total zinc concentration showing statistically significant decreasing trend with outlier removed. Model quality has improved with removal of outlier.

Appendix C. Seepage Pond discharge (WQ-SEEP)



field pH

7.88572E-05	3.695454	slope	intercept
0.000142455	5.908865	se (slope)	se (intercept)
0.006617334	0.313101	r2	se (y)
0.306425076	46	F	df
0.030039553	4.509485	ss reg	ss resid

CONCLUSION: F > 0.05 therefore trend is statistically significant at 95% confidence level

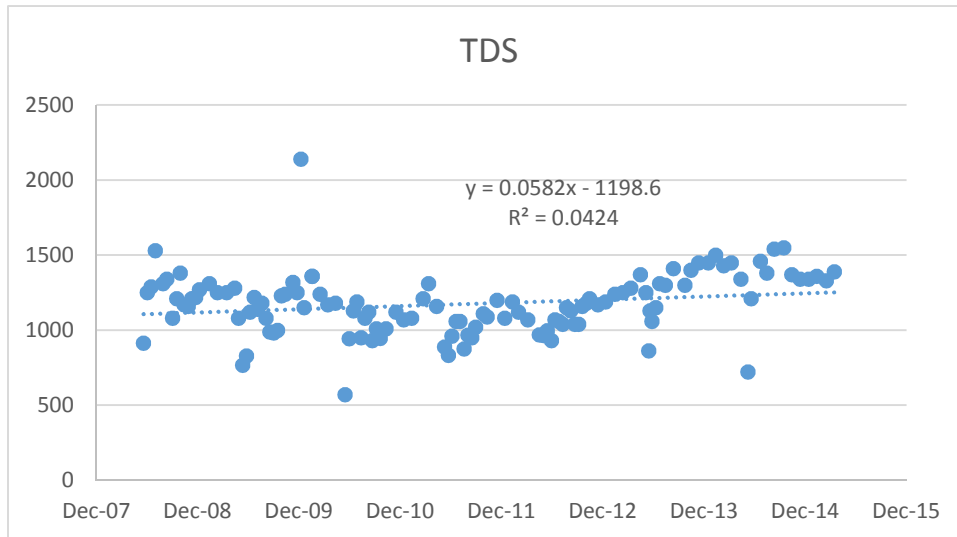
lab pH

8.62535E-05	3.694254	slope	intercept
3.90217E-05	1.589343	se (slope)	se (intercept)
0.039122706	0.306719	r2	se (y)
4.885873252	120	F	df
0.459646928	11.28921	ss reg	ss resid

CONCLUSION: F > 0.05 therefore trend is statistically significant at 95% confidence level

Figure 81: WQ-VC-SEEP field and lab pH values both showing statistically significant increasing pH trend. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

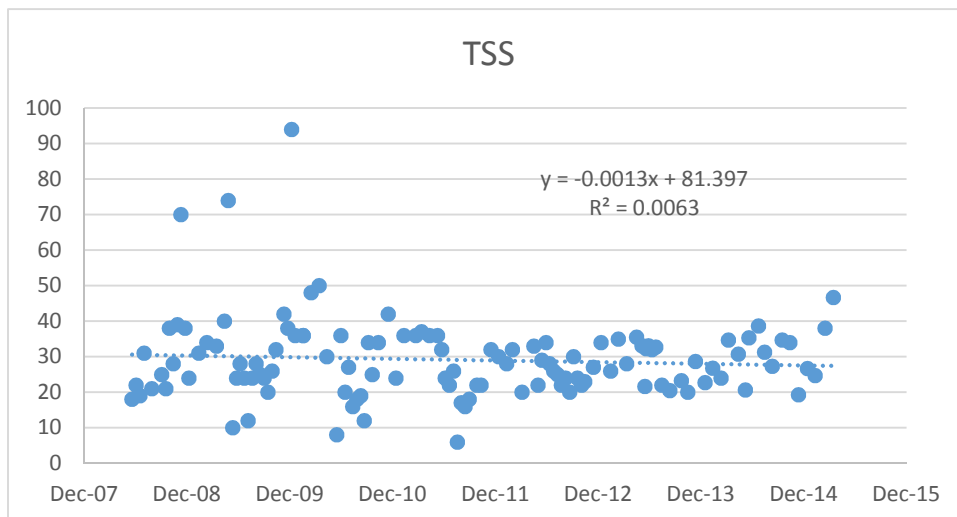
Appendix C. Seepage Pond discharge (WQ-SEEP)



0.025354	1032.89	se (slope)	se (intercept)
0.04245	197.3392	r2	se (y)
5.275484	119	F	df
205441.9	4634188	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 82: WQ-SEEP TDS concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

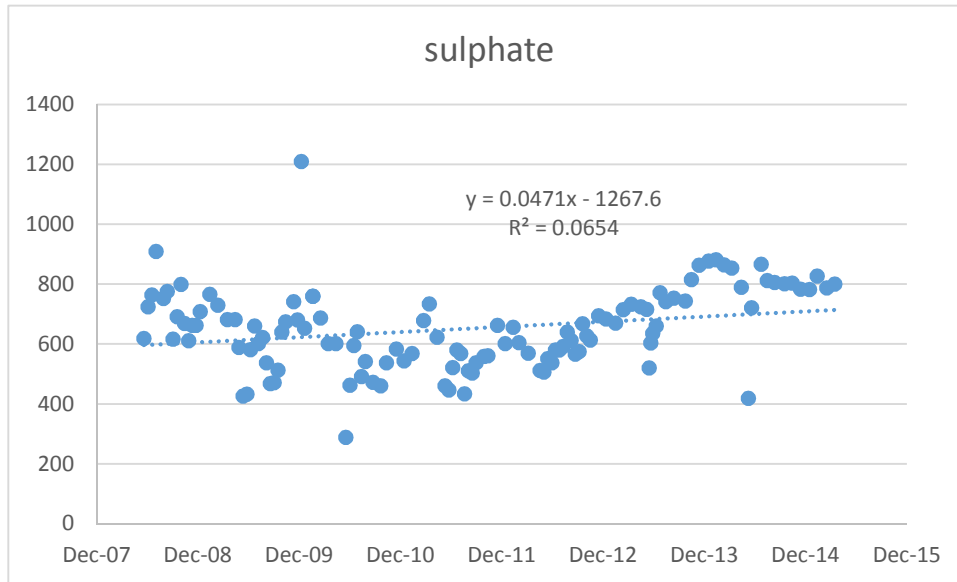


0.001488	60.6474	se (slope)	se (intercept)
0.00625	11.47598	r2	se (y)
0.742147	118	F	df
97.73932	15540.37	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 83: WQ-SEEP TSS concentration showing statistically significant decreasing trend. TSS EQS 50 mg/L.

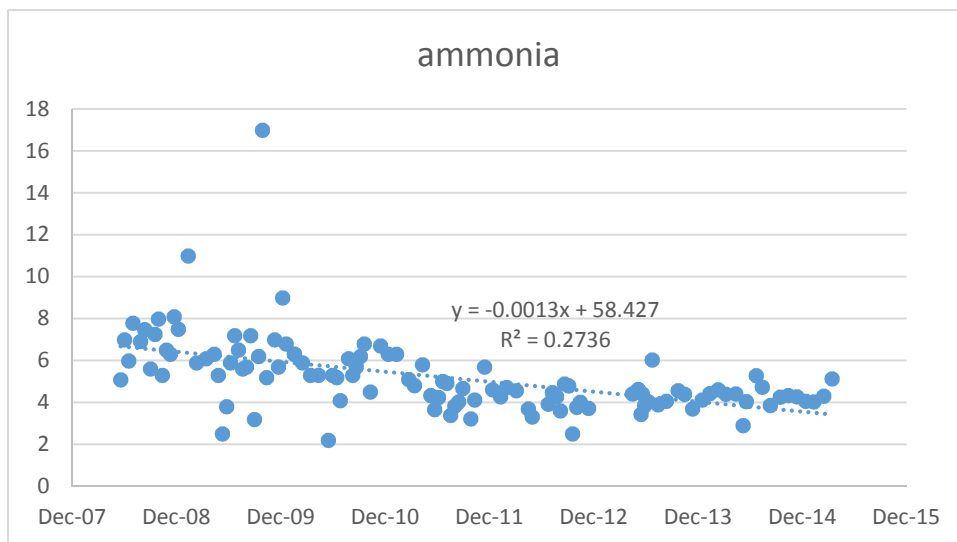
Appendix C. Seepage Pond discharge (WQ-SEEP)



0.016459	670.6159	se (slope)	se (intercept)
0.065382	127.891	r2	se (y)
8.184803	117	F	df
133871.5	1913664	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 84: WQ-SEEP sulphate concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.



0.000202	8.23023	se (slope)	se (intercept)
0.273557	1.549542	r2	se (y)
41.79932	111	F	df
100.3635	266.5198	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 85: WQ-SEEP ammonia concentration showing statistically significant decreasing trend. Ammonia CCME Guideline is 10.3 mg/L at Temperature of 10C and pH of 7. Maximum water temperature observed at this WQS was 11C.

Appendix C. Seepage Pond discharge (WQ-SEEP)

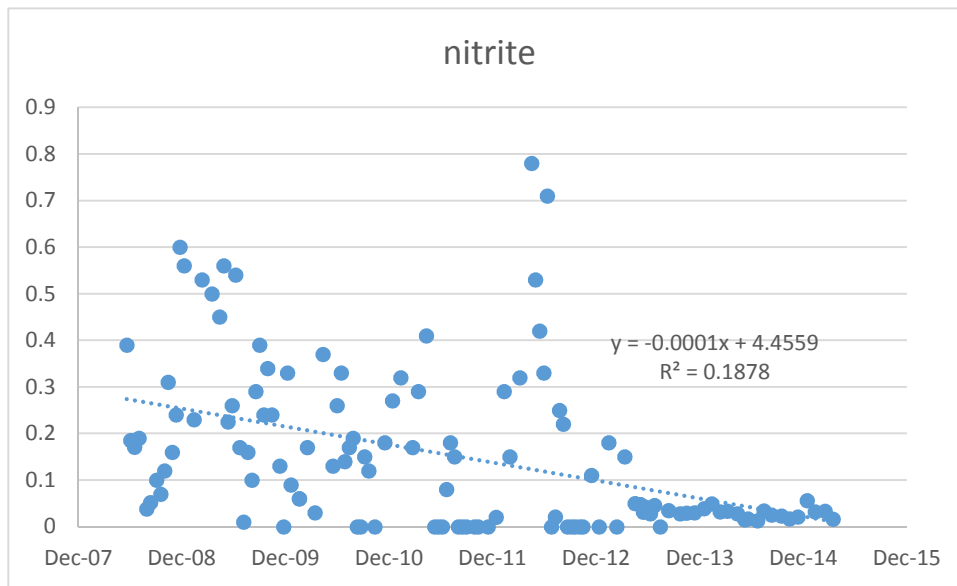
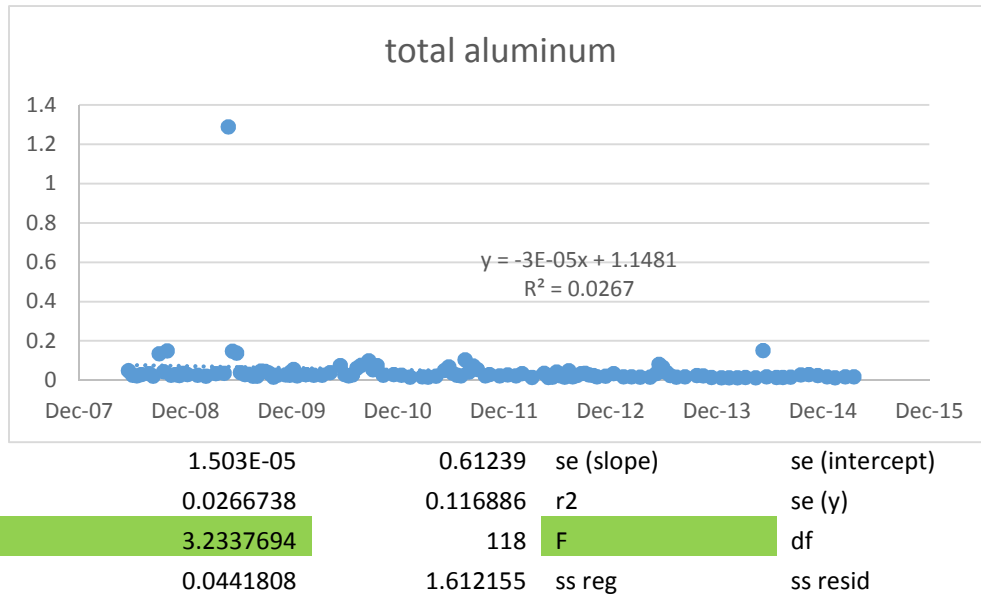


Figure 86: WQ-SEEP nitrite concentration appears to have a decreasing trend. Greater than 10% of samples are ND, trend analysis is not appropriate. Nitrite CCME Guideline is 0.06 mg/L.

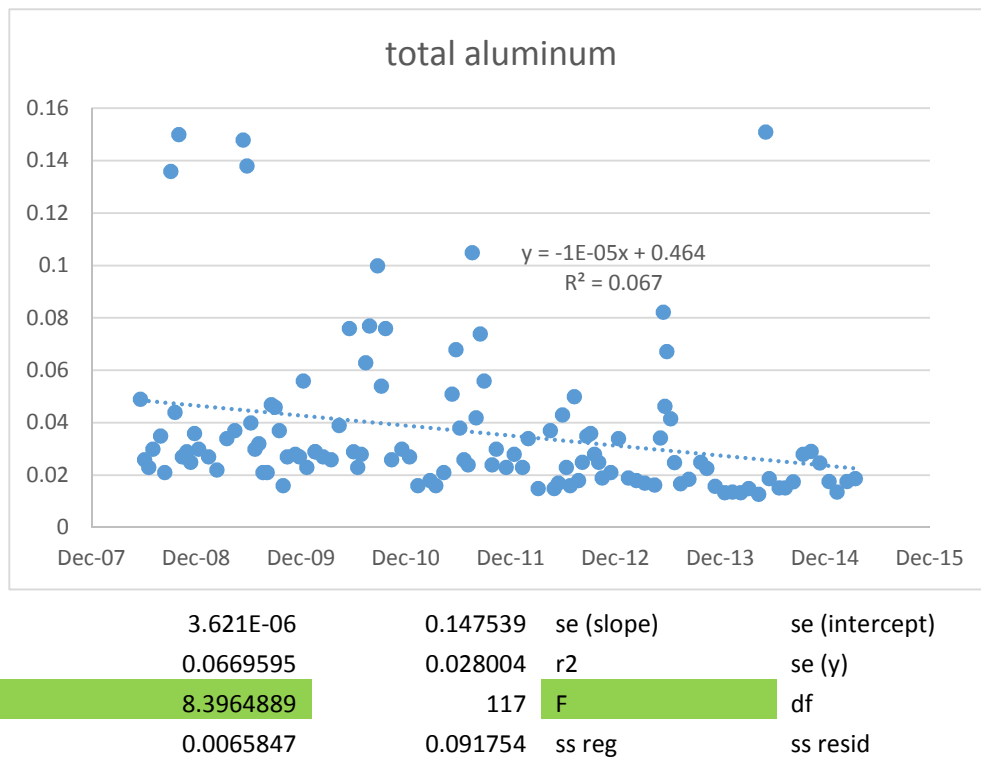
Appendix C. Seepage Pond discharge (WQ-SEEP)



CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 87: WQ-SEEP total aluminum concentration showing statistically significant decreasing trend.

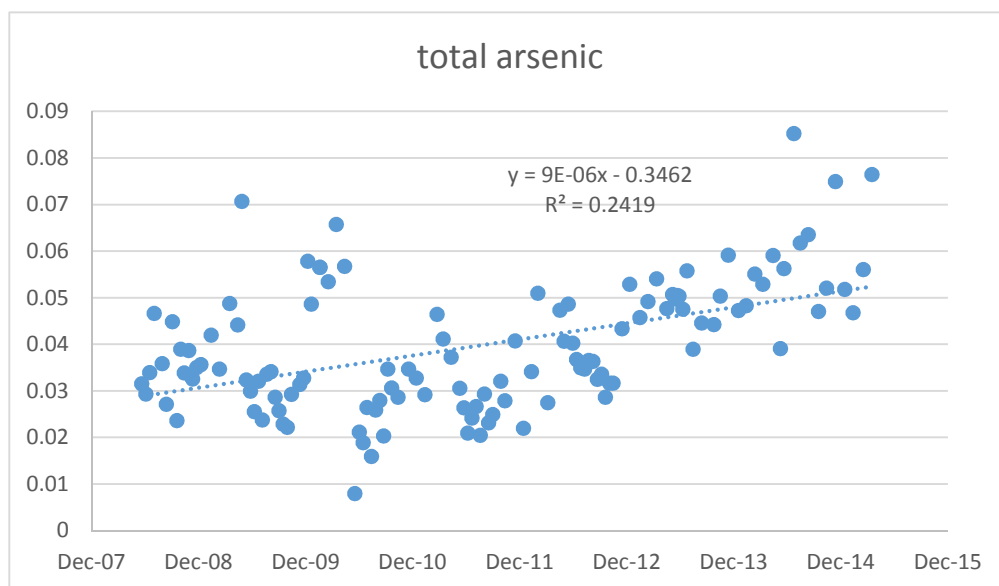
With potential outlier (29 April 2009) trend is statistically significant. Total aluminum CCME Guideline is 0.1 mg/L at pH>6.5.



CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 88: WQ-SEEP total aluminum concentration shows that without outlier trend is still decreasing and statistically significant. Model strength has improved with outlier removed.

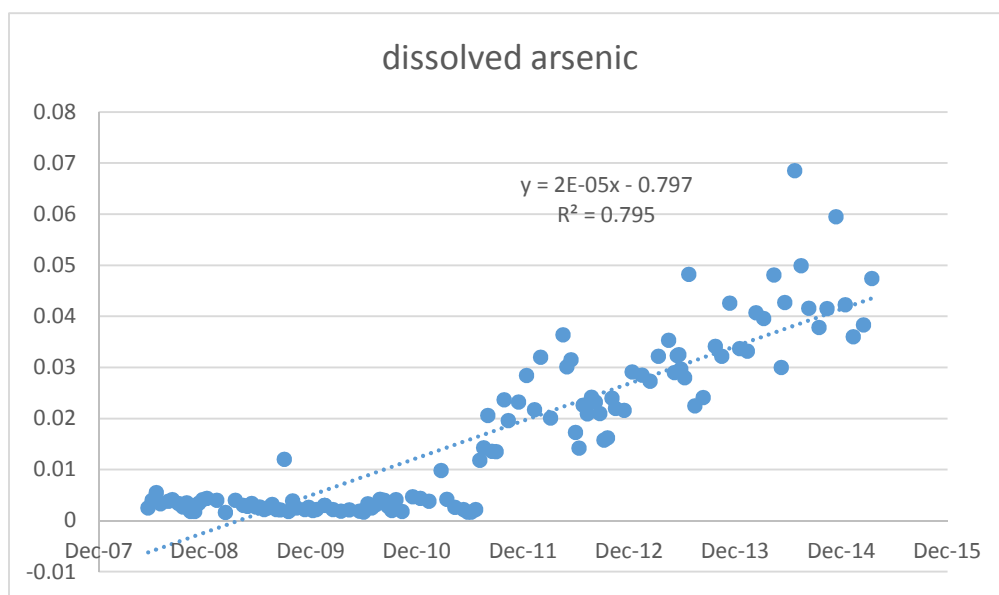
Appendix C. Seepage Pond discharge (WQ-SEEP)



1.53716E-06	0.062622	se (slope)	se (intercept)
0.241916303	0.011964	r2	se (y)
37.97475151	119	F	df
0.00543585	0.017034	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 89: WQ-SEEP total arsenic concentration show statistically significant increasing trend. Total arsenic CCME Guideline is 0.005 mg/L.

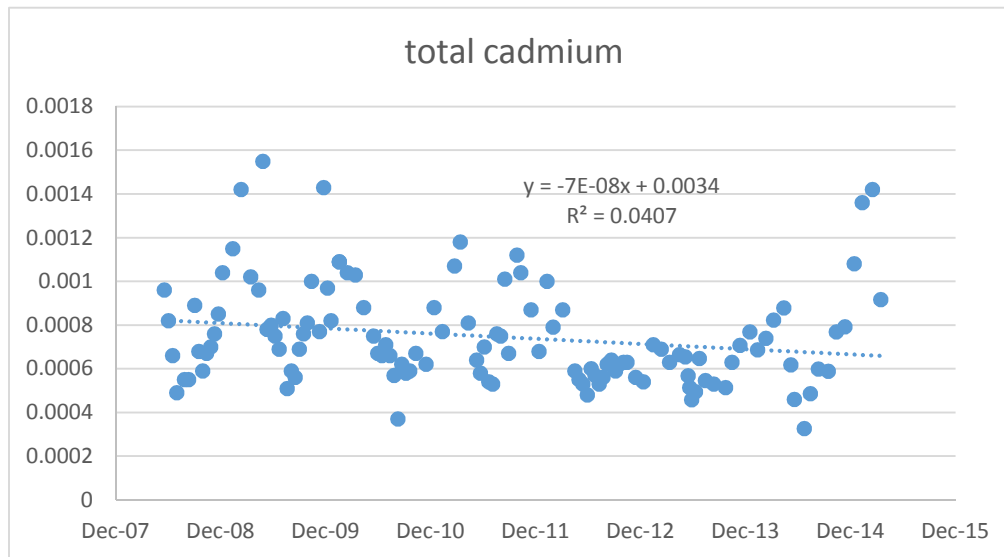


9.29978E-07	0.037886	se (slope)	se (intercept)
0.794958835	0.007238	r2	se (y)
461.3712637	119	F	df
0.024172876	0.006235	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 90: WQ-SEEP dissolved arsenic concentration shows statistically significant increasing trend. No CCME Guideline or EQS available.

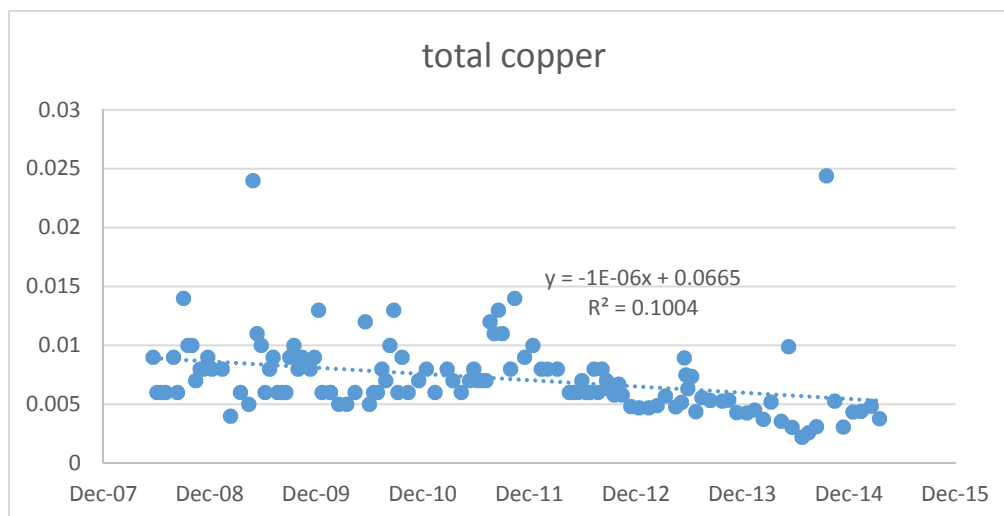
Appendix C. Seepage Pond discharge (WQ-SEEP)



2.90103E-08	0.001182	se (slope)	se (intercept)
0.040675234	0.000226	r2	se (y)
5.045583102	119	F	df
2.57247E-07	6.07E-06	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 91: WQ-SEEP total cadmium concentration show statistically significant decreasing trend. Total cadmium CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.

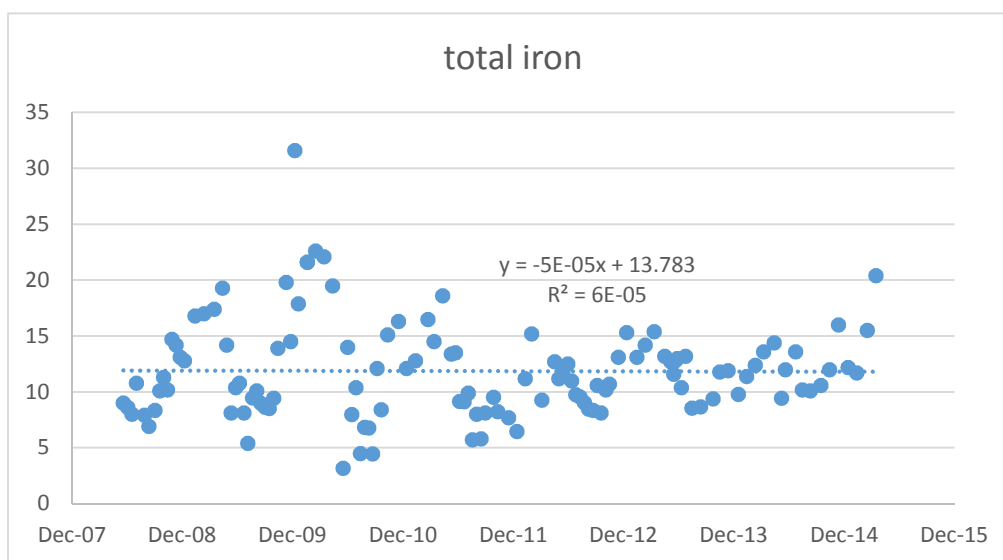


3.98873E-07	0.01625	se (slope)	se (intercept)
0.100352168	0.003105	r2	se (y)
13.27398076	119	F	df
0.000127939	0.001147	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 92: WQ-SEEP total copper concentration showing statistically significant decreasing trend. Total copper CCME Guideline is a function of water hardness, maximum value of 0.004 mg/L and minimum value of 0.002 mg/L. EQS is 0.2 mg/L.

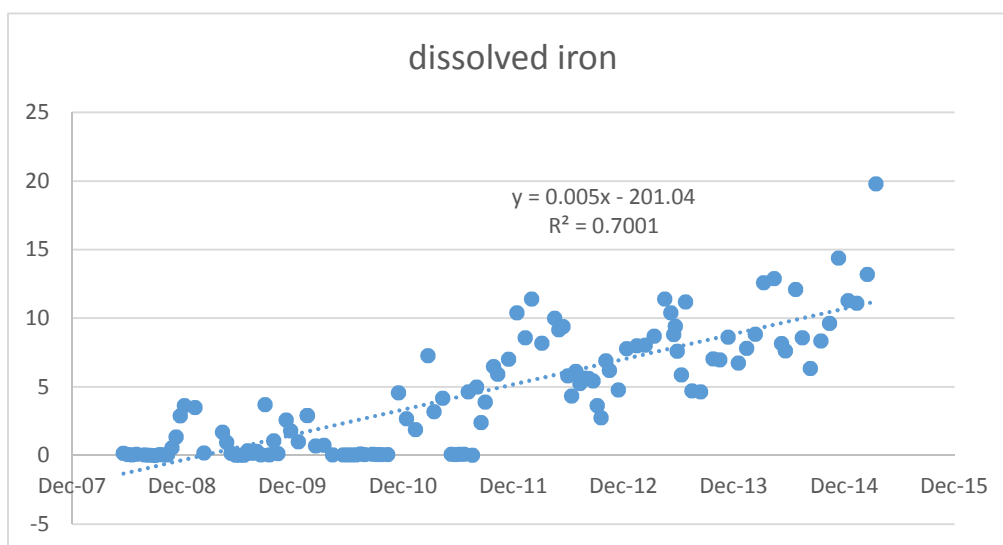
Appendix C. Seepage Pond discharge (WQ-SEEP)



0.000550803	22.43899	se (slope)	se (intercept)
6.0908E-05	4.287089	r2	se (y)
0.007248493	119	F	df
0.133220994	2187.116	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 93: WQ-SEEP total iron concentration showing statistically significant decreasing trend. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

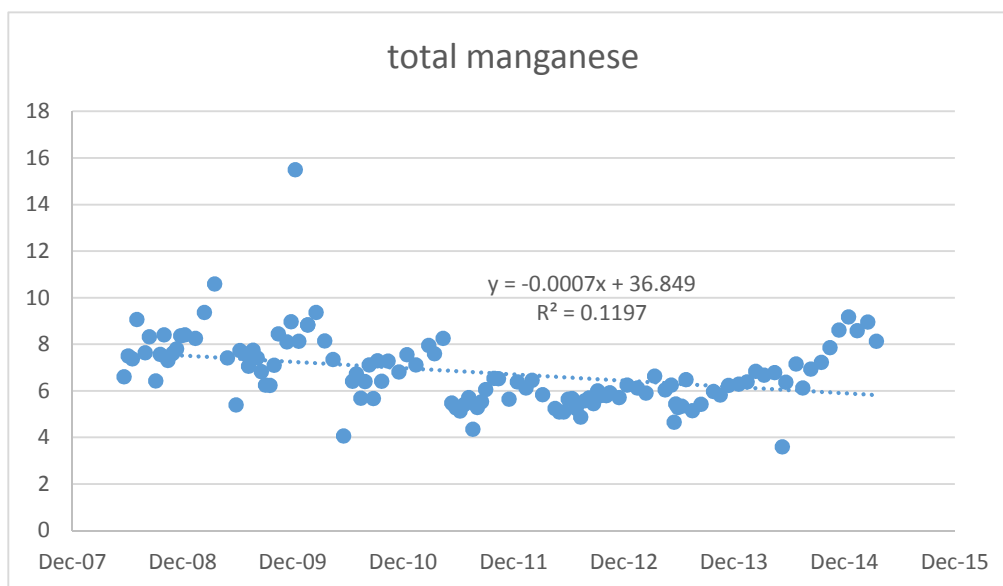


0.000306584	12.49439	se (slope)	se (intercept)
0.700075748	2.362967	r2	se (y)
270.7643218	116	F	df
1511.842784	647.6989	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 94: WQ-SEEP dissolved iron concentration showing statistically significant increasing trend.

Appendix C. Seepage Pond discharge (WQ-SEEP)

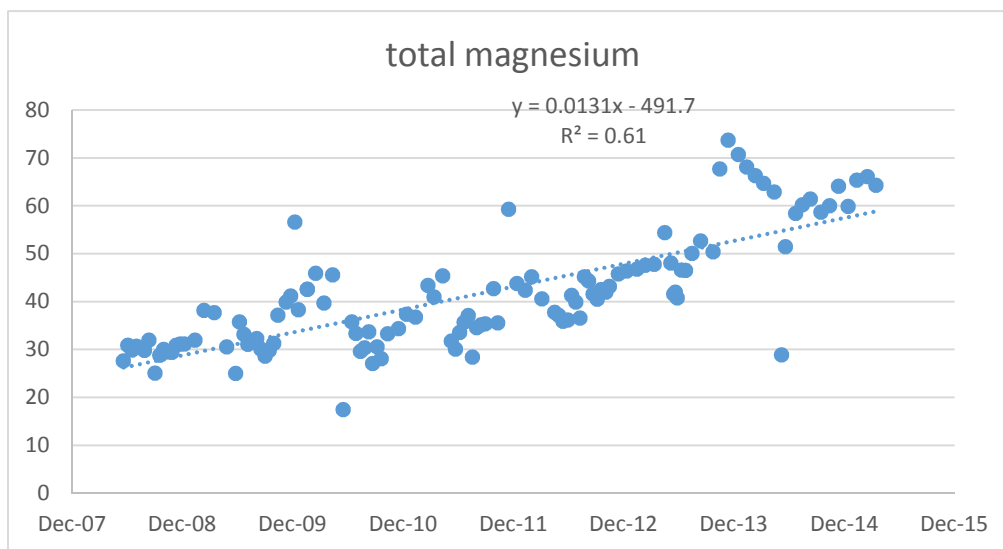


0.000185627	7.565341	se (slope)	se (intercept)
0.119662797	1.4271	r2	se (y)
15.76769039	116	F	df
32.11270709	236.2473	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 95: WQ-SEEP total manganese concentration shows statistically significant decreasing trend.

Total manganese EQS is 0.5 mg/L.

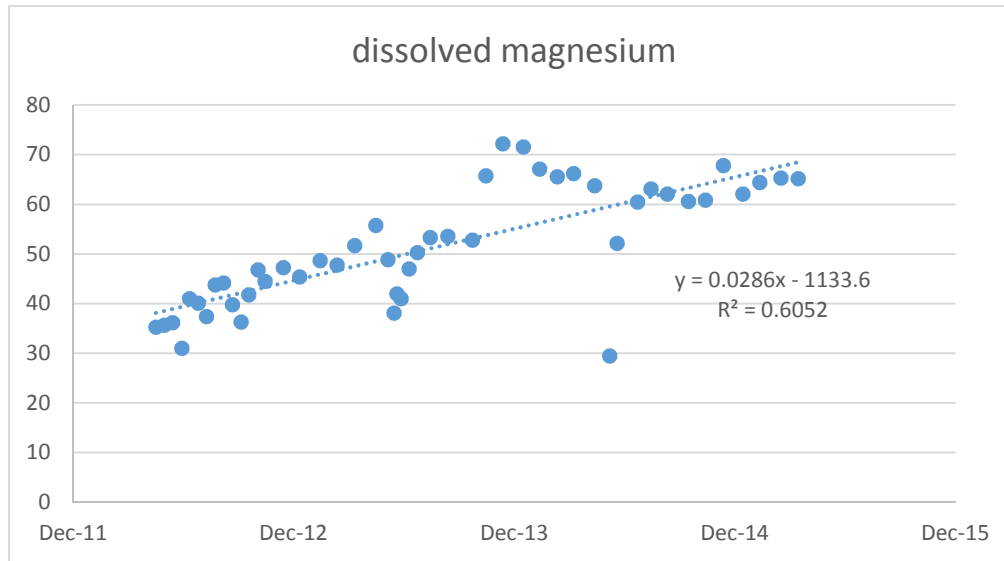


0.000971255	39.58416	se (slope)	se (intercept)
0.610015876	7.467021	r2	se (y)
181.4480059	116	F	df
10116.88672	6467.742	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 96: WQ-SEEP total magnesium concentration shows statistically significant increasing trend. No CCME Guideline or EQS available.

Appendix C. Seepage Pond discharge (WQ-SEEP)

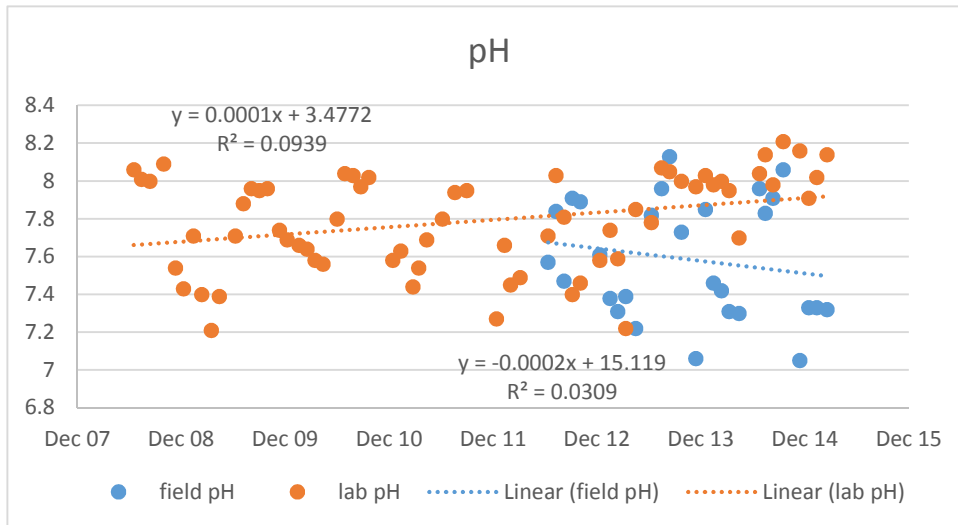


0.003402453	141.1293	se (slope)	se (intercept)
0.605151872	7.47821	r2	se (y)
70.50048913	46	F	df
3942.643118	2572.487	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 97: WQ-SEEP dissolved magnesium concentration shows statistically significant increasing trend.
No CCME Guideline or EQS available.

Appendix C. Top of Brown-McDade Pit (WQ-PIT-1)



field pH

-0.00018	15.11883	slope	intercept
0.000199	8.269323	se (slope)	se (intercept)
0.030927	0.313949	r2	se (y)
0.829754	26	F	df
0.081784	2.562659	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

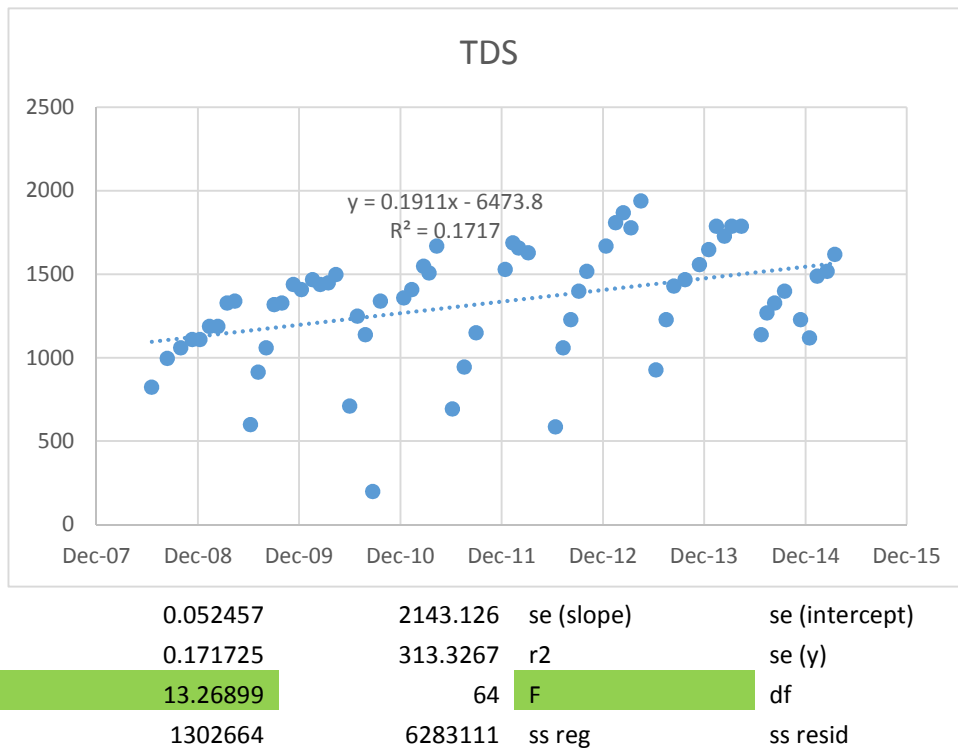
lab pH

0.000106	3.477206	slope	intercept
4.1E-05	1.673849	se (slope)	se (intercept)
0.093919	0.244397	r2	se (y)
6.633876	64	F	df
0.396241	3.822718	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 98: WQ-PIT-1 field values show statistically significant decreasing pH trend and lab pH values show statistically significant increasing pH trend. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

Appendix C. Top of Brown-McDade Pit (WQ-PIT-1)



CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 99: WQ-PIT-1 TDS concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

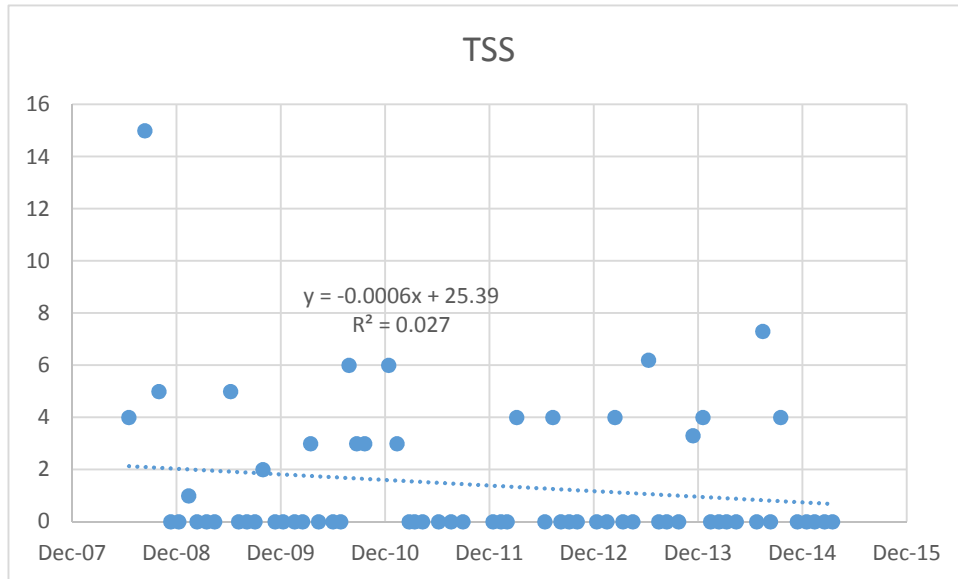
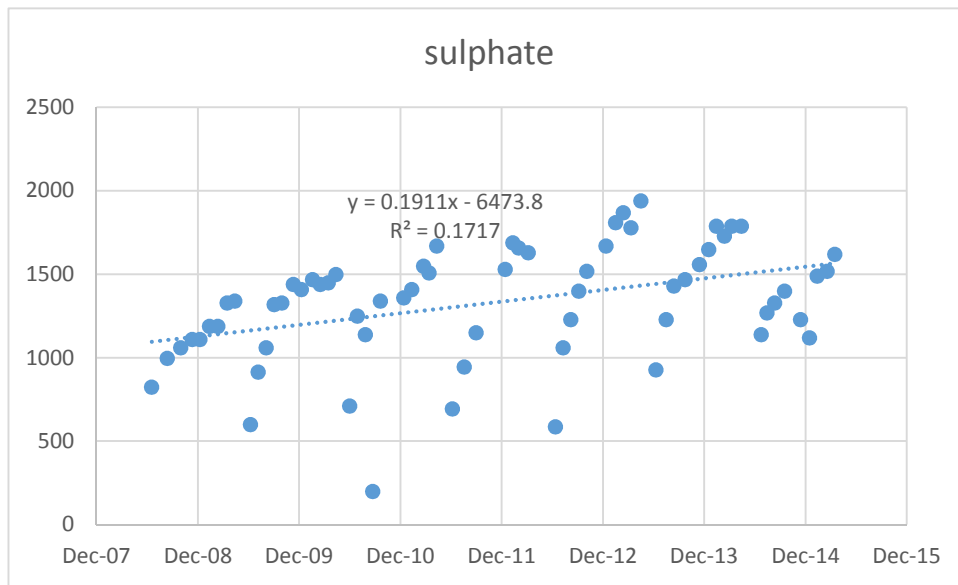


Figure 100: WQ-PIT-1 TSS concentration showing apparent decreasing trend. Greater than 10% of samples are ND, trend analysis is not appropriate. TSS EQS 50 mg/L.

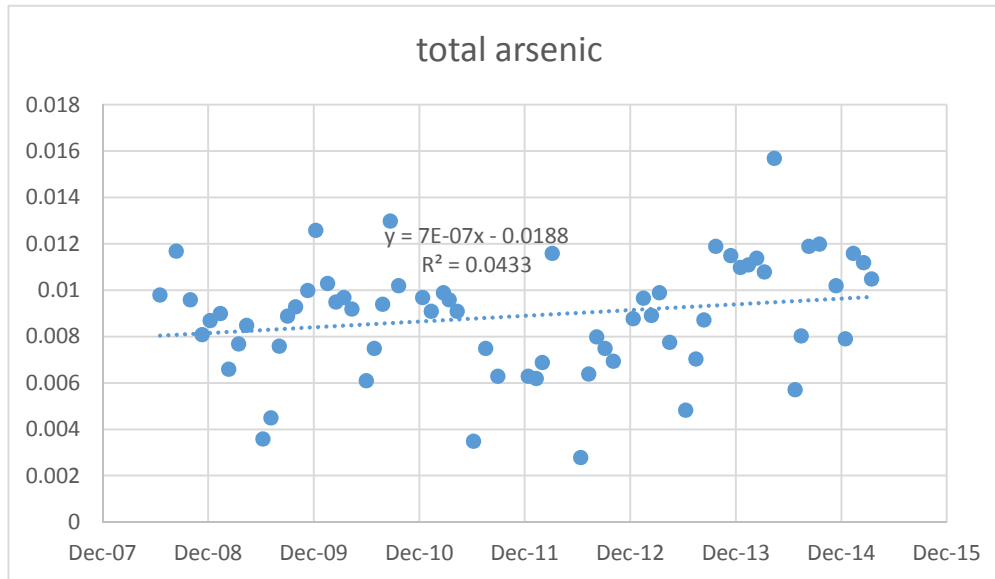
Appendix C. Top of Brown-McDade Pit (WQ-PIT-1)



0.033314	1361.038	se (slope)	se (intercept)
0.21292	198.9848	r2	se (y)
17.31319	64	F	df
685515	2534078	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 101: WQ-PIT-1 sulphate concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

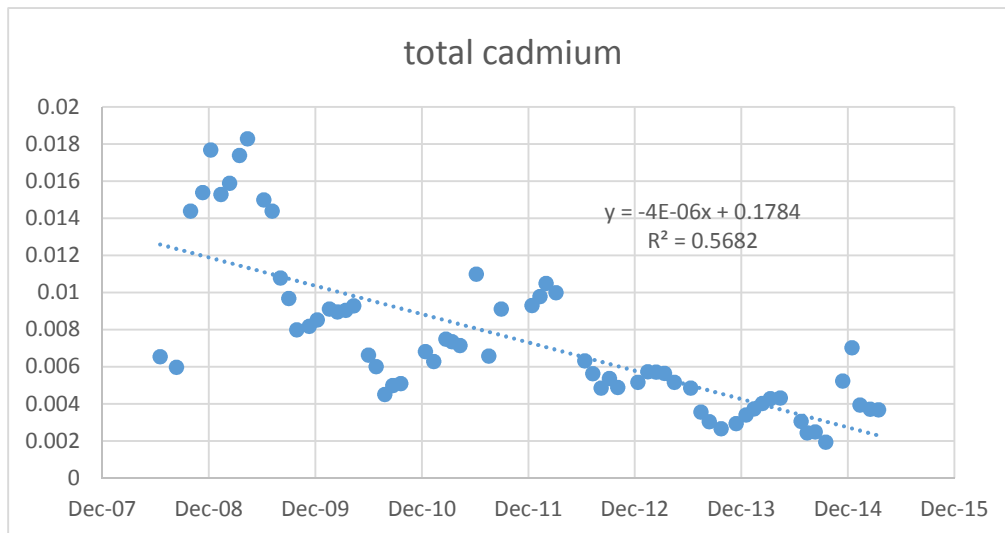


3.98621E-07	0.016286	se (slope)	se (intercept)
0.043334274	0.002381	r2	se (y)
2.899020477	64	F	df
1.64348E-05	0.000363	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 102: WP-PIT-1 total arsenic concentration showing statistically significant increasing trend. Total arsenic CCME Guideline is 0.005 mg/L.

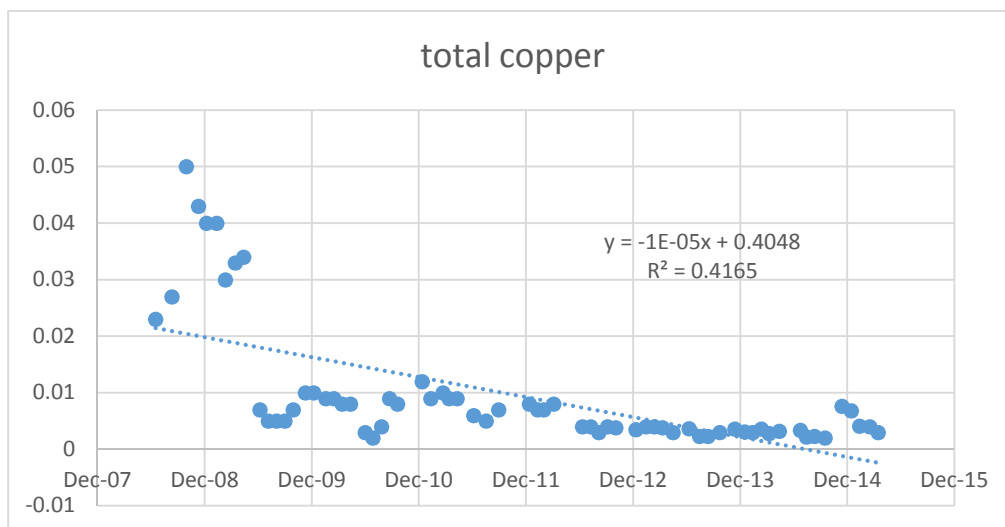
Appendix C. Top of Brown-McDade Pit (WQ-PIT-1)



4.56156E-07	0.018636	se (slope)	se (intercept)
0.568190709	0.002725	r2	se (y)
84.21357802	64	F	df
0.000625176	0.000475	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 103: WP-PIT-1 total cadmium concentration showing statistically significant decreasing trend. Total cadmium CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.

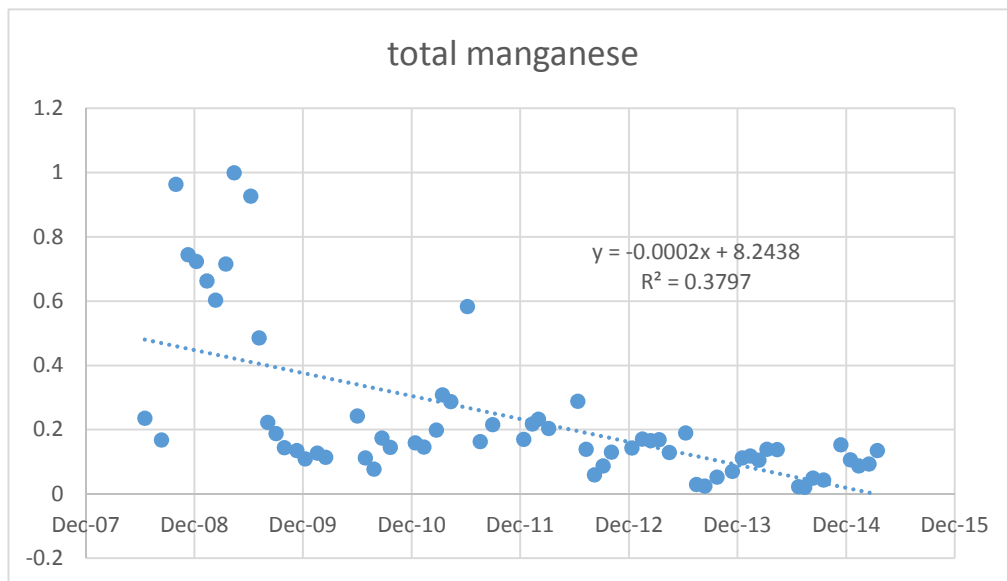


1.43191E-06	0.058501	se (slope)	se (intercept)
0.416454625	0.008553	r2	se (y)
45.67441914	64	F	df
0.003341176	0.004682	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 104: WP-PIT-1 total copper concentration showing statistically significant decreasing trend. Total copper CCME Guideline is a function of water hardness, maximum value of 0.004 mg/L and EQS is 0.2 mg/L.

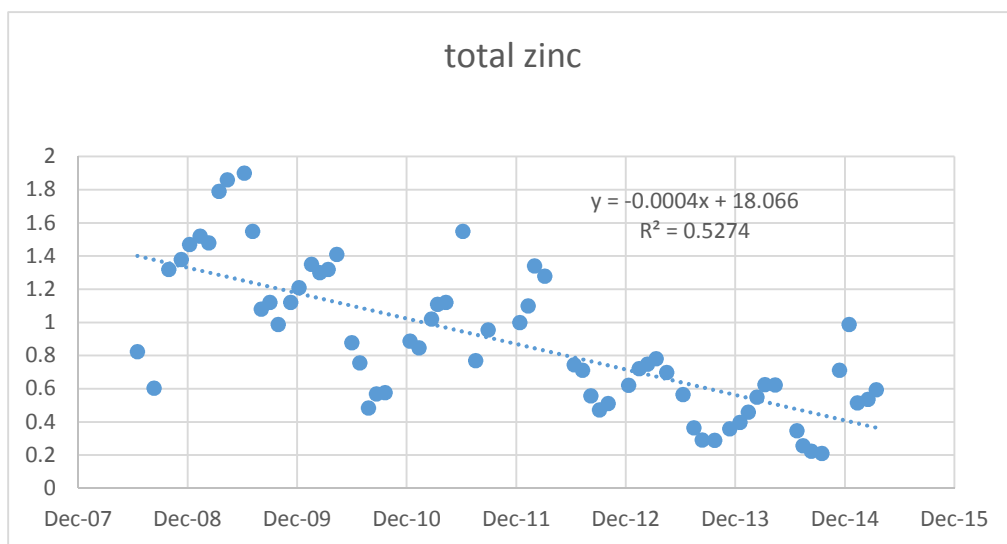
Appendix C. Top of Brown-McDade Pit (WQ-PIT-1)



3.18064E-05	1.300035	se (slope)	se (intercept)
0.379704451	0.188121	r2	se (y)
37.9523535	62	F	df
1.343108147	2.194138	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 105: WP-PIT-1 total manganese concentration showing statistically significant decreasing trend. Total manganese EQS is 0.5 mg/L.

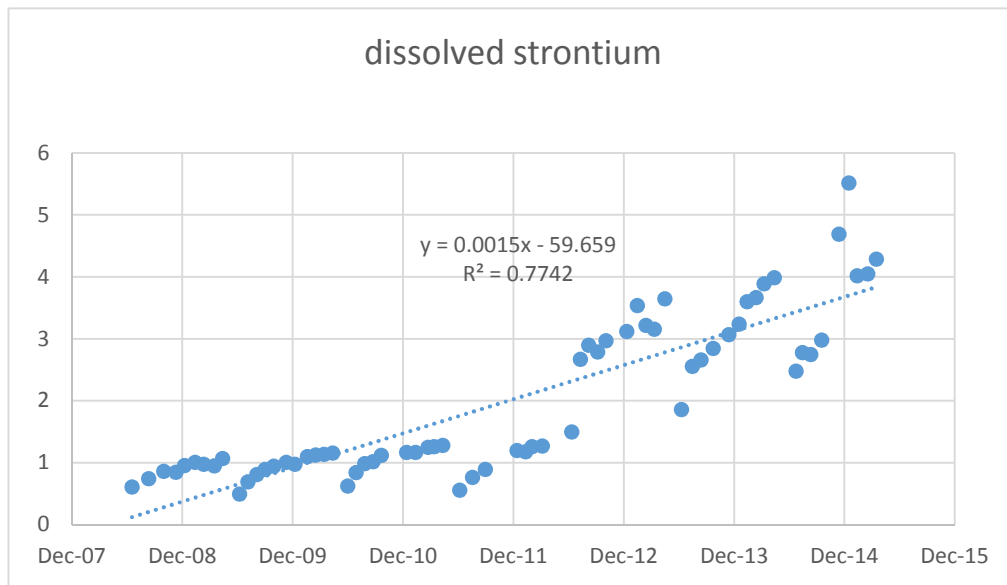


4.9773E-05	2.033485	se (slope)	se (intercept)
0.527390626	0.297297	r2	se (y)
71.41838878	64	F	df
6.312356521	5.656678	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 106: WP-PIT-1 total zinc concentration showing statistically significant decreasing trend. Total zinc CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

Appendix C. Top of Brown-McDade Pit (WQ-PIT-1)

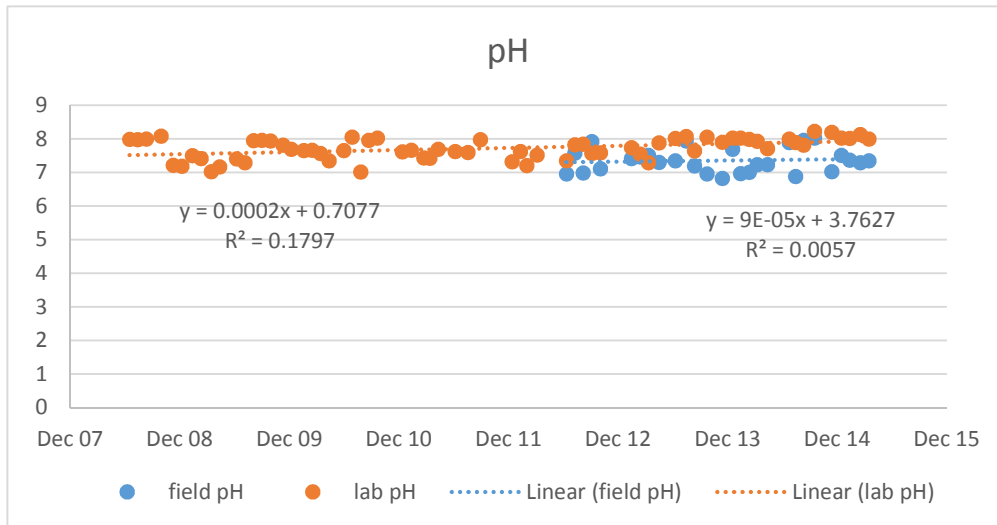


0.000101855	4.161302	se (slope)	se (intercept)
0.774241029	0.608386	r2	se (y)
219.4881813	64	F	df
81.23983203	23.68852	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 107: WP-PIT-1 dissolved strontium concentration showing statistically significant increasing trend.
No CCME Guideline or EQS available.

Appendix C. Middle of Brown-McDade Pit (WQ-PIT-2) Water Quality (Jun 2008 - Mar 2015)



field pH

8.65438E-05	3.762662	slope	intercept
0.00022416	9.322446	se (slope)	se (intercept)
0.005700349	0.364638	r2	se (y)
0.149058761	26	F	df
0.019819034	3.456992	ss reg	ss resid

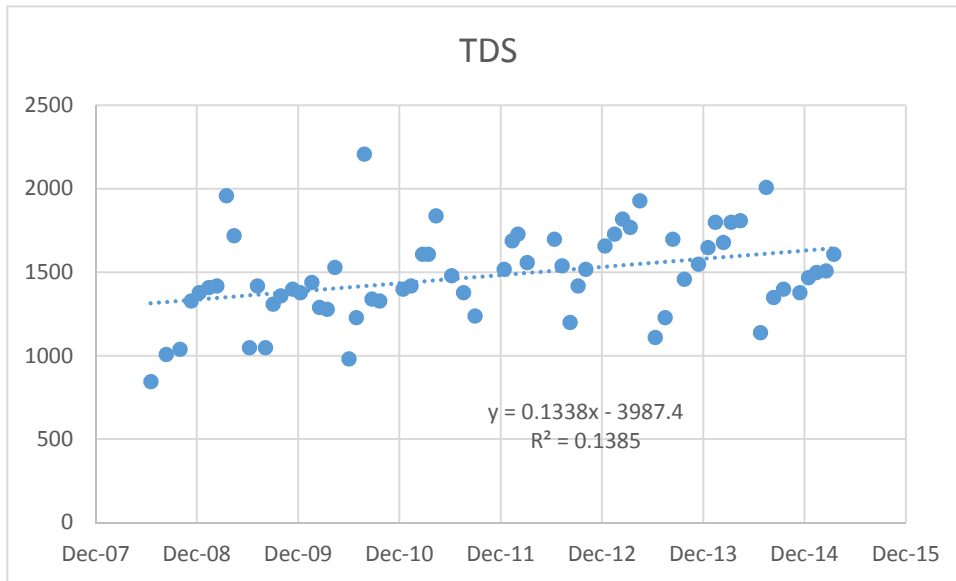
CONCLUSION: F > 0.05 therefore trend is statistically significant at 95% confidence level

lab pH

0.000171927	0.707742	slope	intercept
4.59111E-05	1.874596	se (slope)	se (intercept)
0.179733128	0.27897	r2	se (y)
14.02338752	64	F	df
1.091357256	4.980741	ss reg	ss resid

CONCLUSION: F > 0.05 therefore trend is statistically significant at 95% confidence level

Figure 108: WQ-VC-PIT-2 field and lab pH values both showing statistically significant increasing pH trend. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.



0.041729	1704.849	se (slope)	se (intercept)
0.138466	249.2503	r2	se (y)
10.28613	64	F	df
639033.1	3976045	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 109: WP-PIT-2 TDS concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

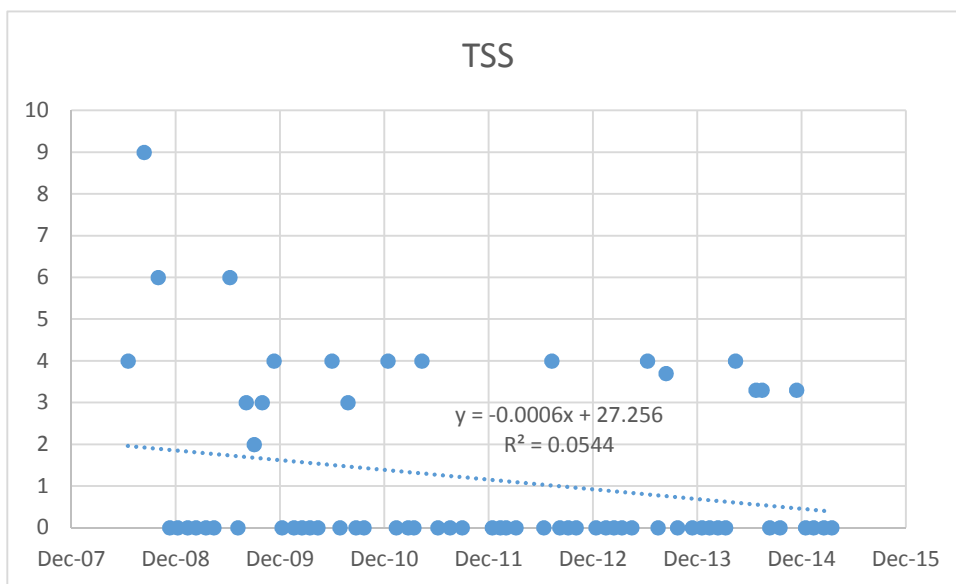
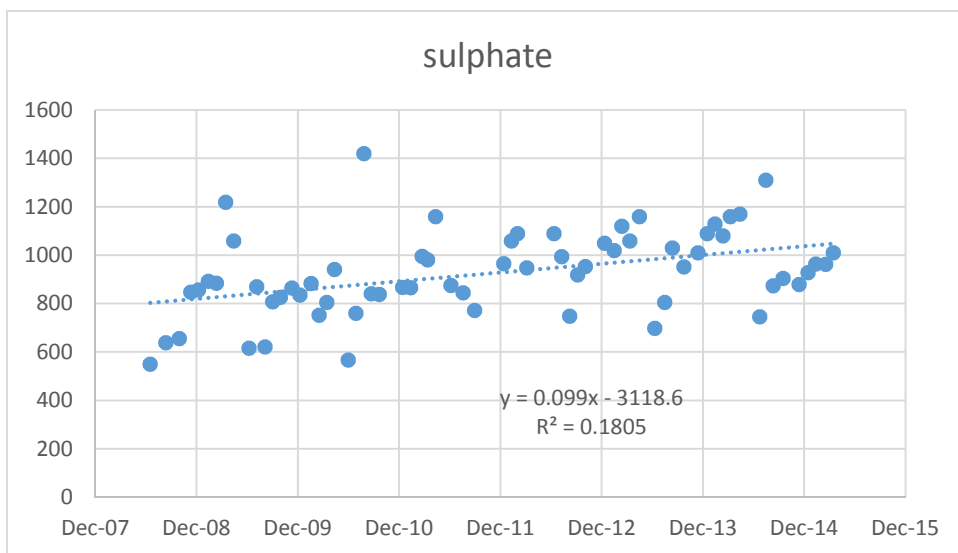


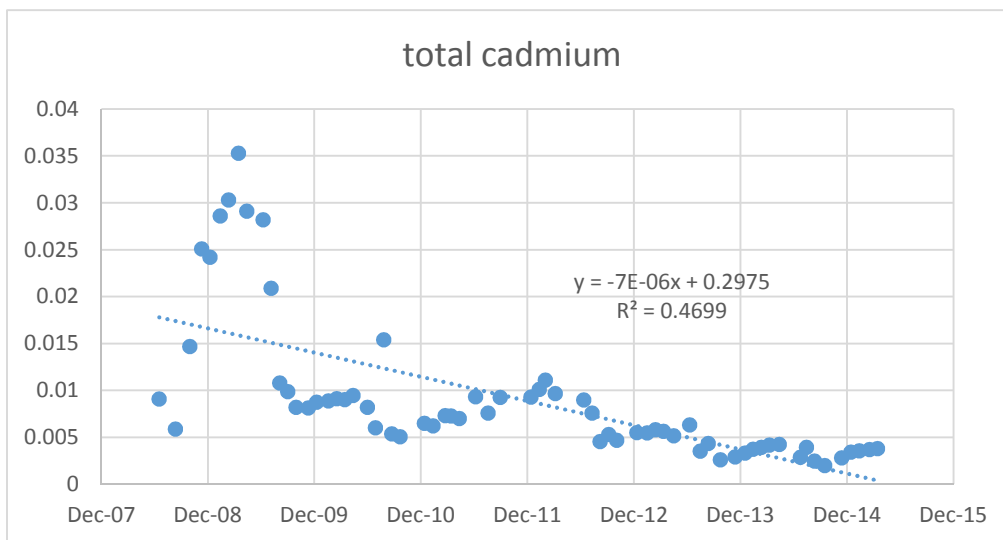
Figure 110: WQ-PIT-2 TSS concentration showing apparent decreasing trend. Greater than 10% of samples are ND, trend analysis is not appropriate. TSS EQS 50 mg/L.



0.02637	1077.351	se (slope)	se (intercept)
0.180522	157.5096	r2	se (y)
14.09854	64	F	df
349774.3	1587793	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

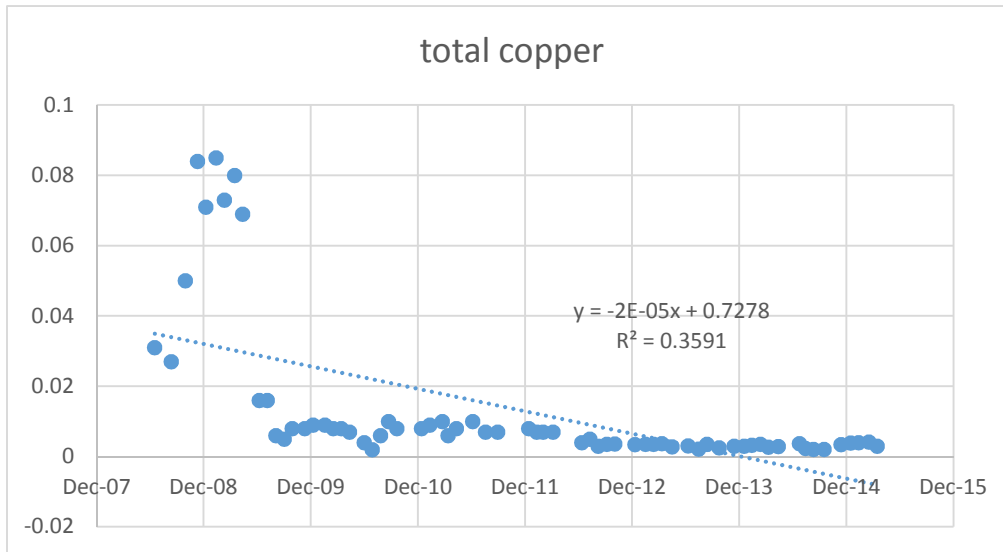
Figure 111: WP-PIT-2 sulphate concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.



9.37292E-07	0.038293	se (slope)	se (intercept)
0.469884953	0.005599	r2	se (y)
56.7285105	64	F	df
0.001778054	0.002006	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

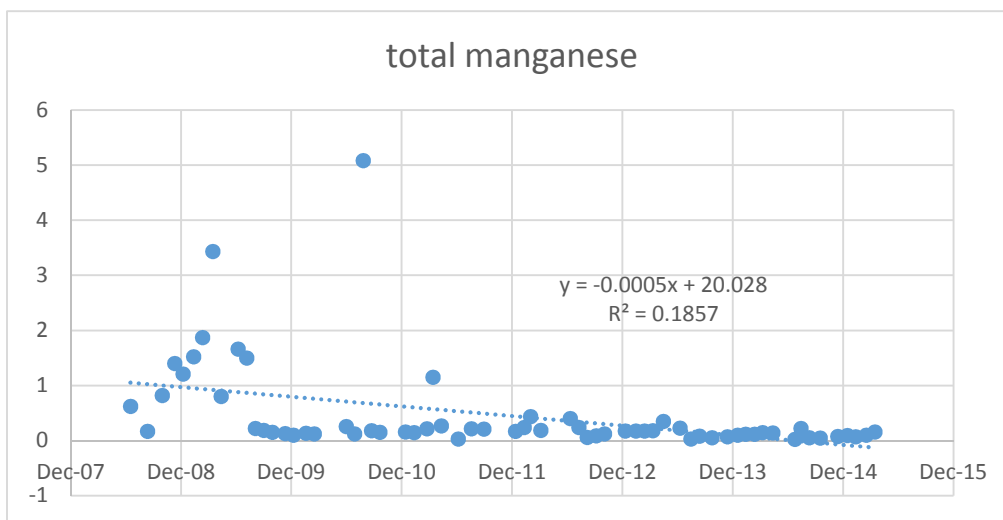
Figure 112: WP-PIT-2 total cadmium concentration showing statistically significant decreasing trend. Total cadmium CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.



2.92056E-06	0.11932	se (slope)	se (intercept)
0.359057555	0.017445	r2	se (y)
35.8529595	64	F	df
0.010910638	0.019476	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

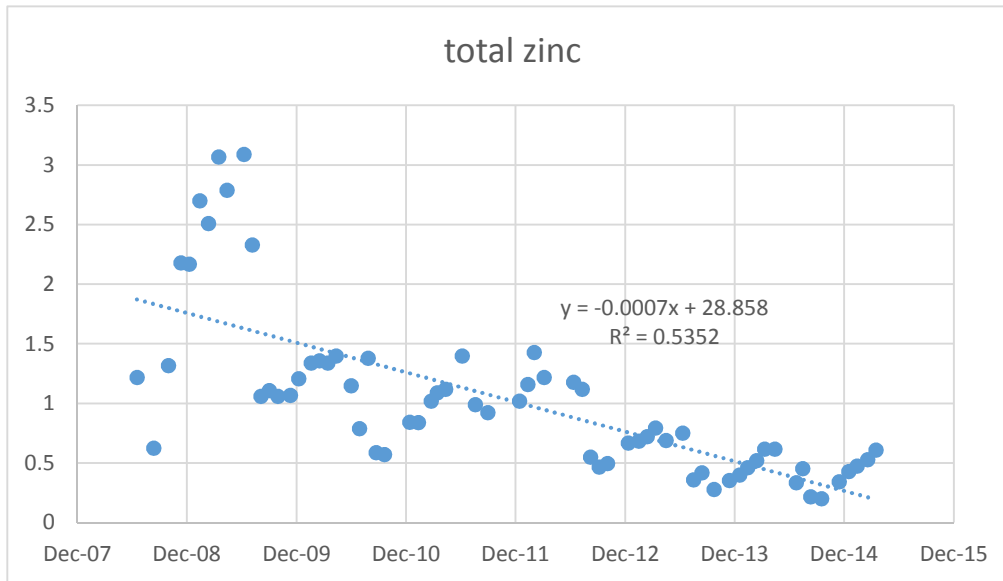
Figure 113: WP-PIT-2 total copper concentration showing statistically significant decreasing trend. Total copper CCME Guideline is a function of water hardness, maximum value of 0.004 mg/L and EQS is 0.2 mg/L.



0.000127391	5.206902	se (slope)	se (intercept)
0.185664324	0.753461	r2	se (y)
14.13567945	62	F	df
8.024866341	35.19758	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 114: WP-PIT-2 total manganese concentration showing statistically significant decreasing trend. Total manganese EQS is 0.5 mg/L.

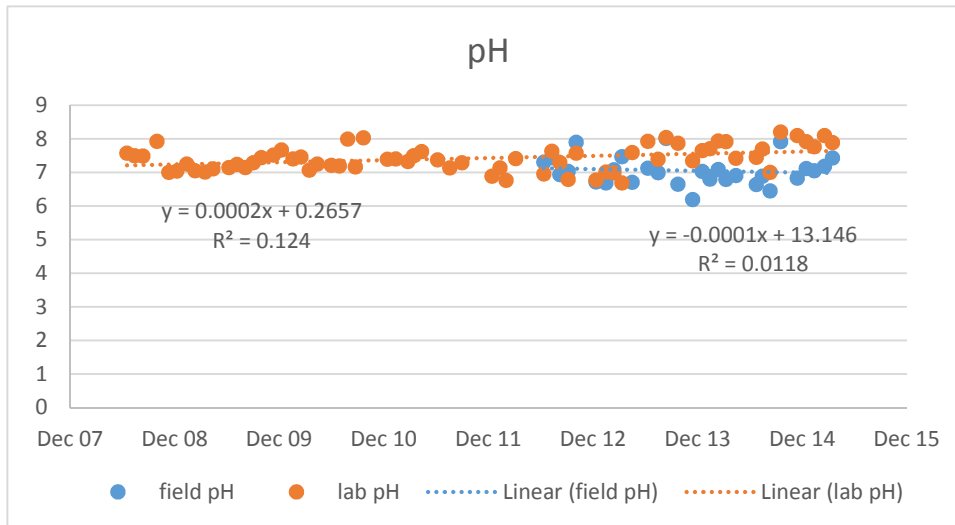


7.93519E-05	3.241935	se (slope)	se (intercept)
0.53516784	0.473974	r2	se (y)
73.68410519	64	F	df
16.55320236	14.37766	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 115: WP-PIT-2 total zinc concentration showing statistically significant decreasing trend. Total zinc CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

Appendix C. Bottom of Brown-McDade Pit (WQ-PIT-3)



field pH

-0.00015	13.14615	slope	intercept
0.000258	10.71358	se (slope)	se (intercept)
0.01182	0.427527	r2	se (y)
0.32295	27	F	df
0.059029	4.935047	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

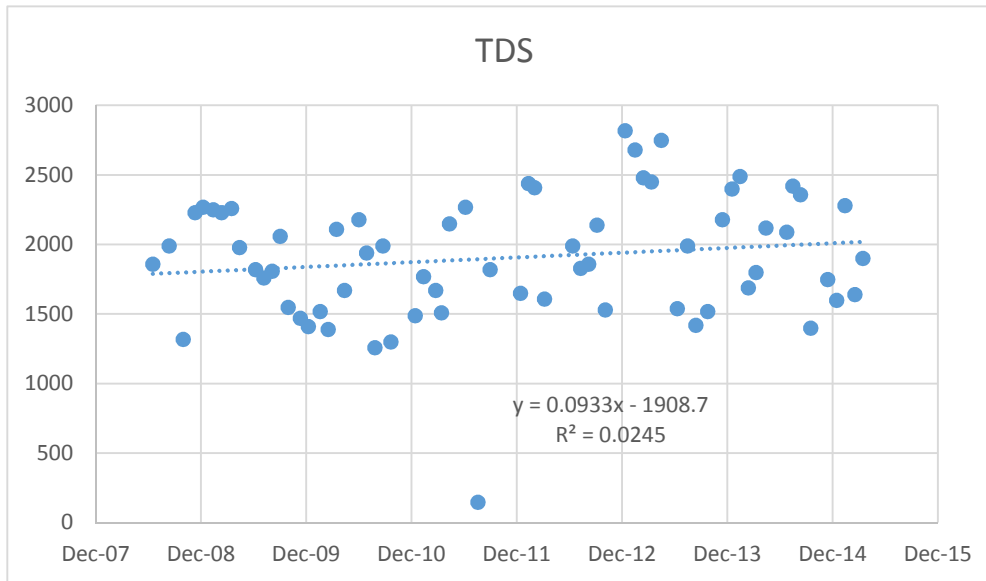
lab pH

0.000175	0.265687	slope	intercept
5.78E-05	2.36147	se (slope)	se (intercept)
0.124025	0.352239	r2	se (y)
9.202997	65	F	df
1.141835	8.064685	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 116: WQ-PIT-3 field pH shows statistically significant decreasing trend and lab pH values show statistically significant increasing pH trend. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

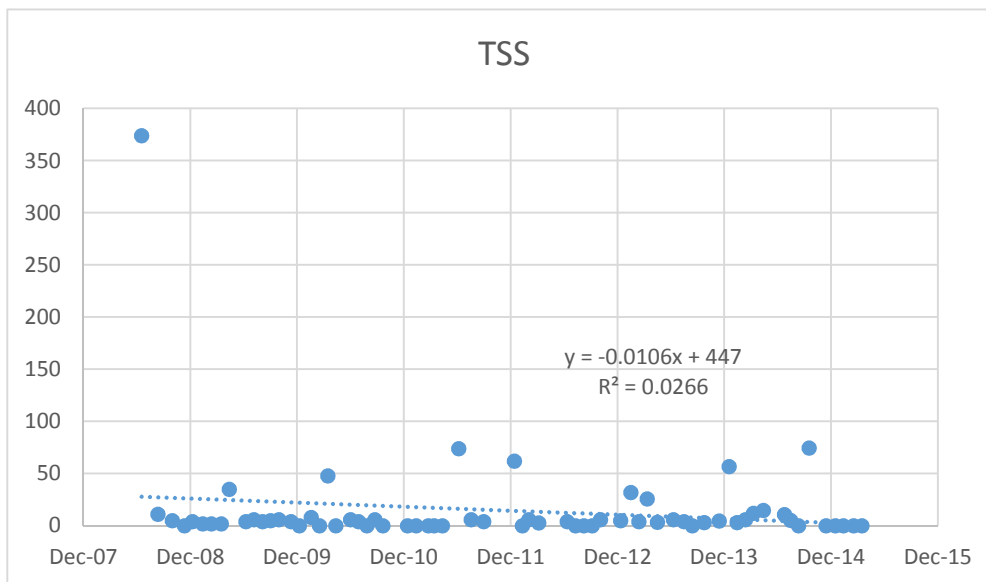
Appendix C. Bottom of Brown-McDade Pit (WQ-PIT-3)



0.073663	3009.52118	se (slope)	se (intercept)
0.024477	439.994409	r2	se (y)
1.605805	64	F	df
310875.9	12390085.1	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

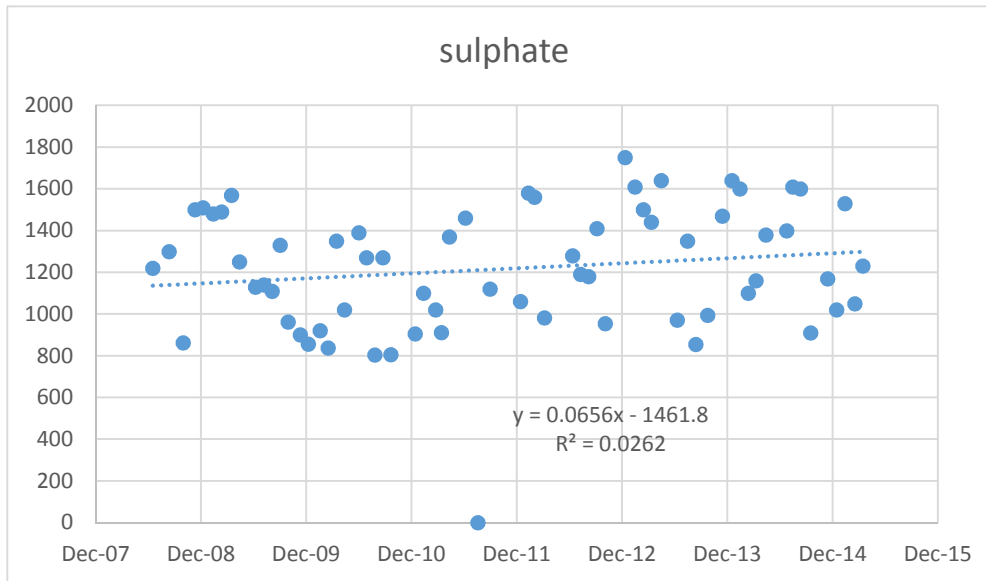
Figure 117: WP-PIT-3 TDS concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.



Greater than 10% of samples are ND, trend analysis is not appropriate

Figure 118: WQ-PIT-3 TSS concentration showing apparent decreasing trend. Greater than 10% of samples are ND, trend analysis is not appropriate. TSS EQS 50 mg/L.

Appendix C. Bottom of Brown-McDade Pit (WQ-PIT-3)



0.049968	2041.46007	se (slope)	se (intercept)
0.026214	298.463099	r2	se (y)
1.72289	64	F	df
153475.4	5701134.16	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 119: WQ-PIT-3 sulphate concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

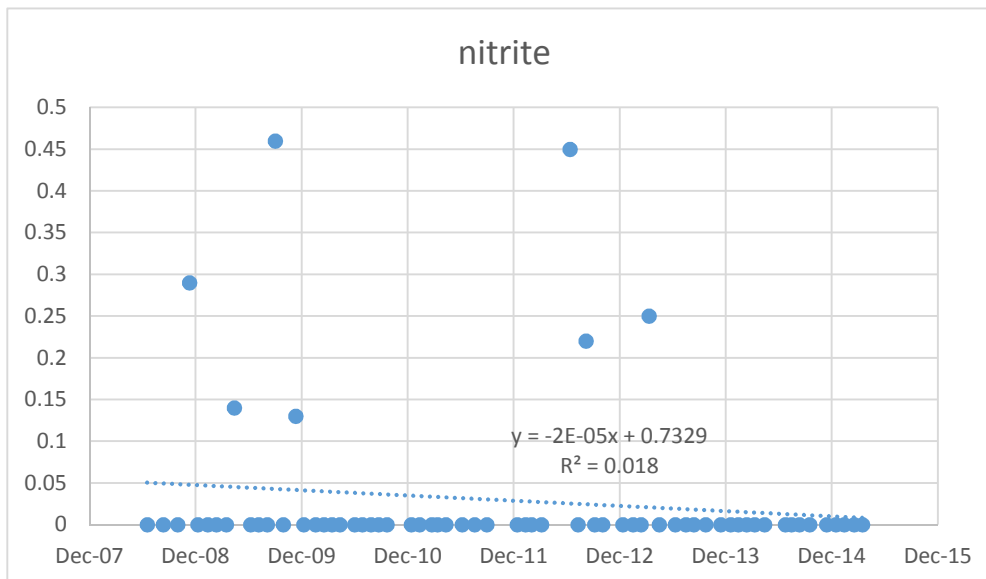


Figure 120: WQ-PIT-3 nitrite concentration. Greater than 10% of samples are ND, trend analysis is not appropriate. Nitrite CCME Guideline is 0.06 mg/L.

Appendix C. Bottom of Brown-McDade Pit (WQ-PIT-3)

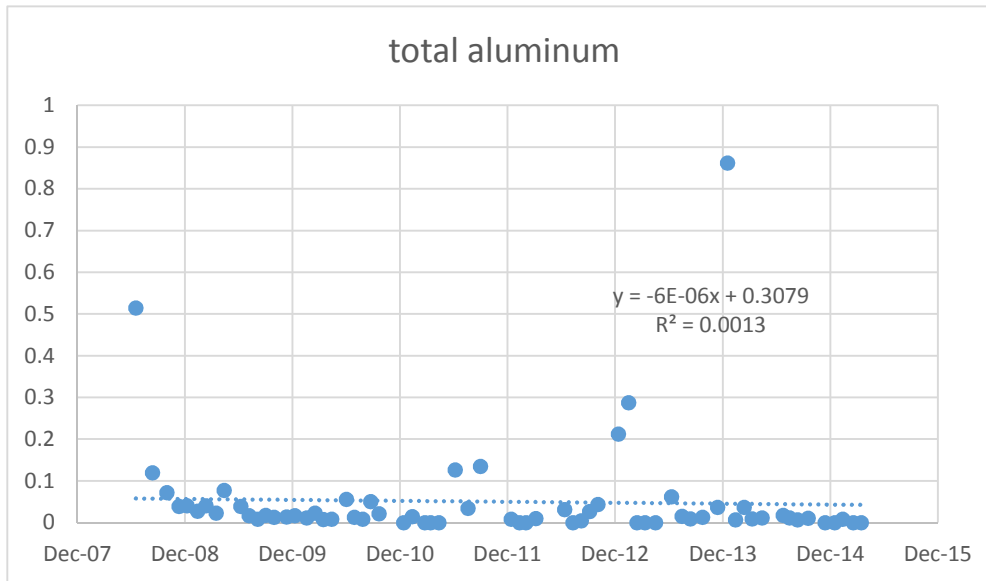
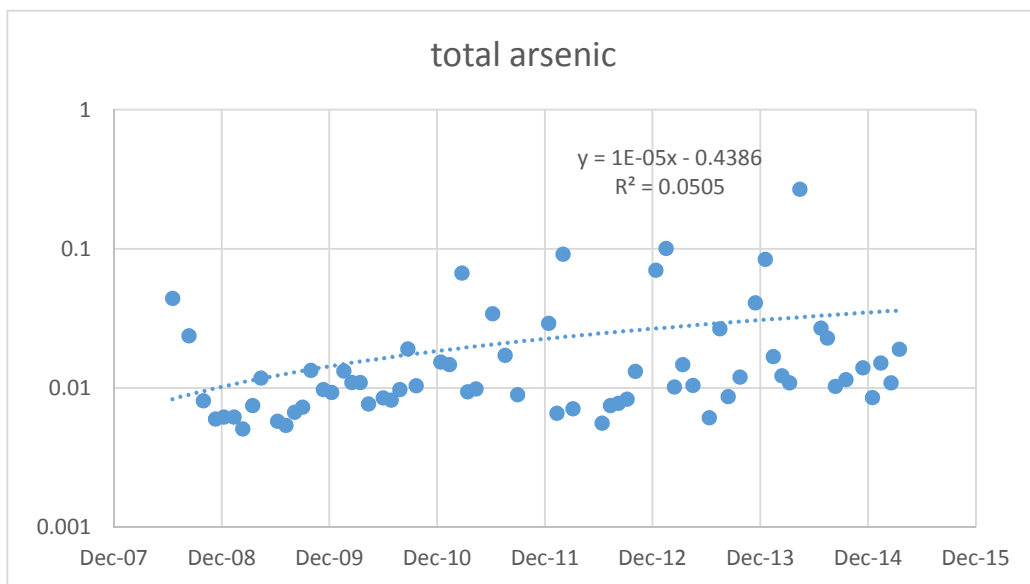


Figure 121: WQ-PIT-3 total aluminum. Greater than 10% of samples are ND, trend analysis is not appropriate. Total aluminum CCME Guideline is 0.1 mg/L at pH>6.5.

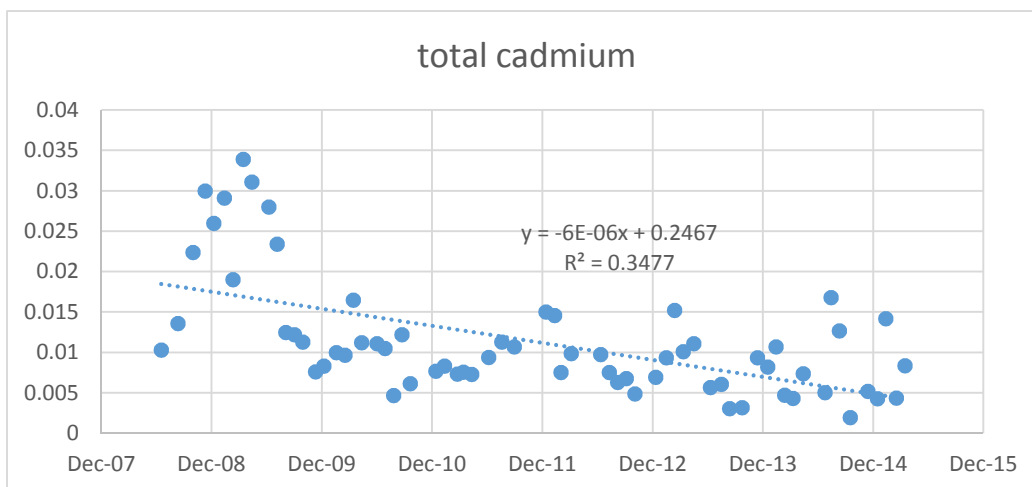


6.11477E-06	0.24981997	se (slope)	se (intercept)
0.050502619	0.03652388	r2	se (y)
3.404082716	64	F	df
0.004541025	0.0853756	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 122: WP-PIT-3 total arsenic concentration showing statistically significant increasing trend. Total arsenic CCME Guideline is 0.005 mg/L.

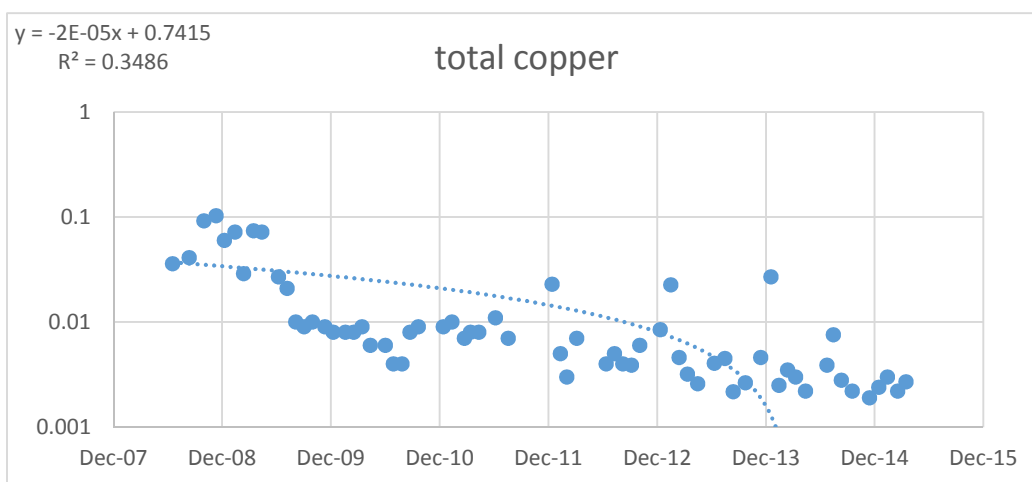
Appendix C. Bottom of Brown-McDade Pit (WQ-PIT-3)



9.86371E-07	0.04029834	se (slope)	se (intercept)
0.34772321	0.00589165	r2	se (y)
34.11785569	64	F	df
0.001184283	0.00222154	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 123: WQ-PIT-3 total cadmium concentration showing statistically significant decreasing trend. Total cadmium CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.

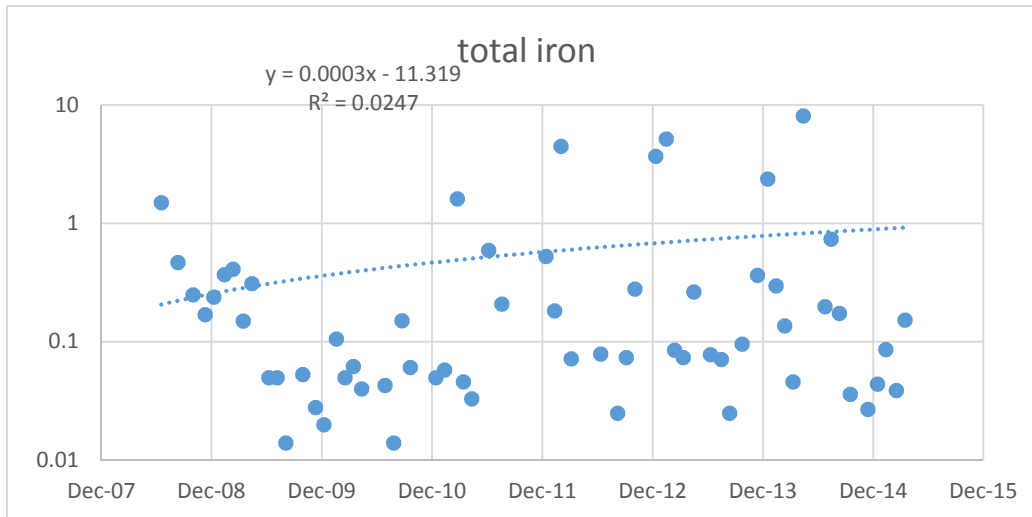


3.06259E-06	0.12512568	se (slope)	se (intercept)
0.348562062	0.01829202	r2	se (y)
33.70913574	63	F	df
0.011279009	0.02107967	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 124: WQ-PIT-3 total copper concentration showing statistically significant decreasing trend. Total copper CCME Guideline is a function of water hardness, maximum value of 0.004 mg/L and minimum value of 0.002 mg/L. EQS is 0.2 mg/L.

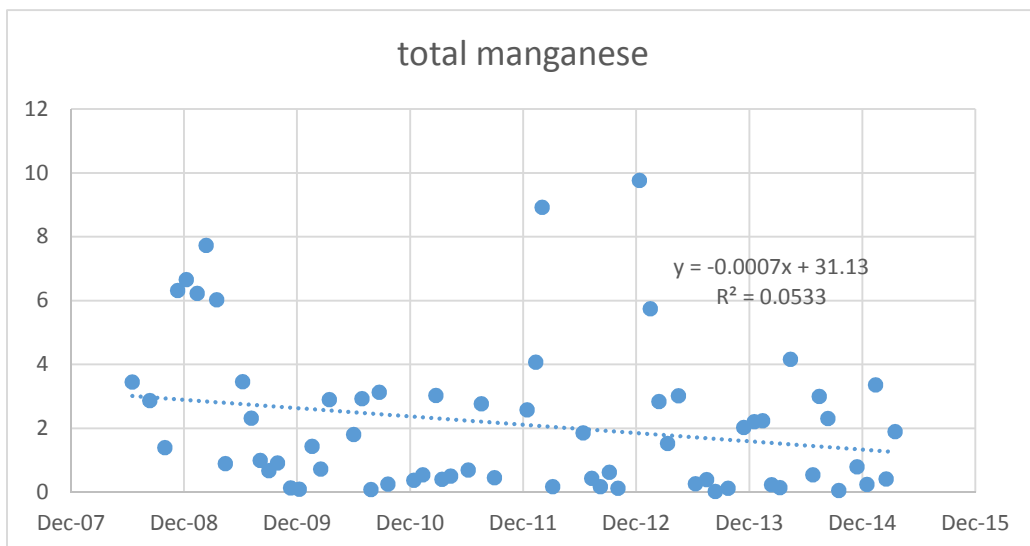
Appendix C. Bottom of Brown-McDade Pit (WQ-PIT-3)



0.000236156	9.65250672	se (slope)	se (intercept)
0.02466859	1.39111173	r2	se (y)
1.517551264	60	F	df
2.936752816	116.11151	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 125: WQ-PIT-3 total iron concentration showing statistically significant increasing trend. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.



0.000376957	15.4039524	se (slope)	se (intercept)
0.053270247	2.24128	r2	se (y)
3.544861227	63	F	df
17.80702918	316.470171	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 126: WQ-PIT-3 total manganese concentration showing statistically significant decreasing trend. Total manganese EQS is 0.5 mg/L.

Appendix C. Bottom of Brown-McDade Pit (WQ-PIT-3)

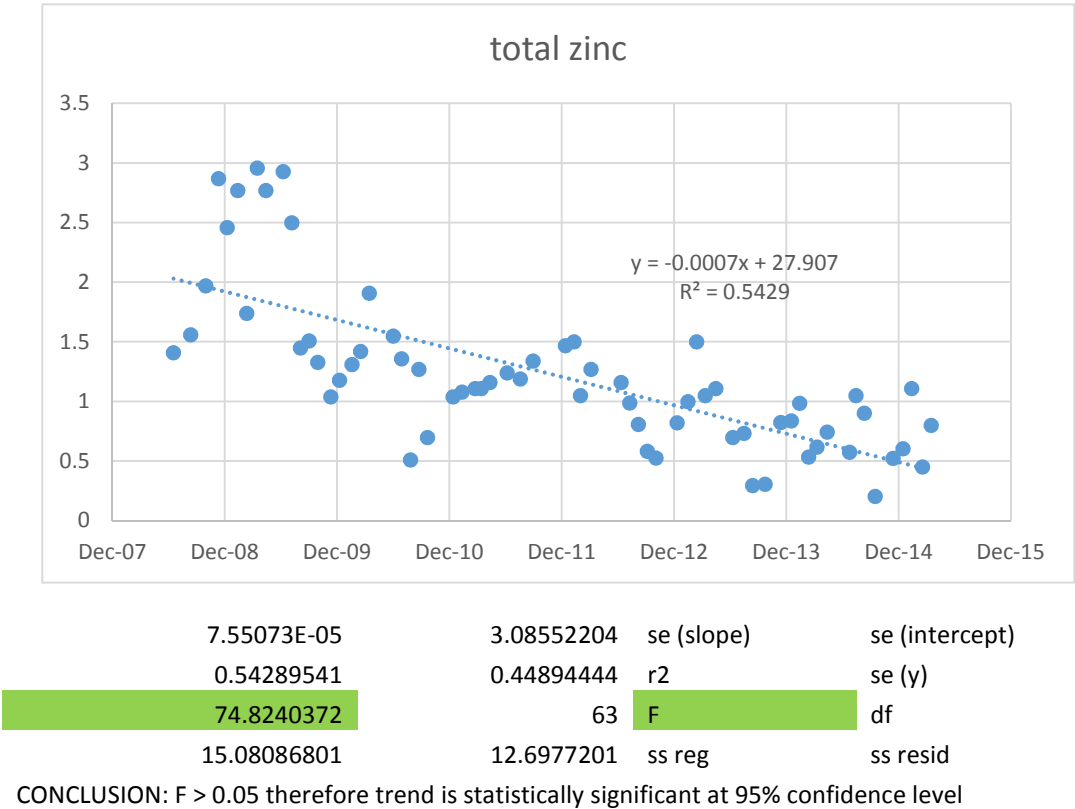
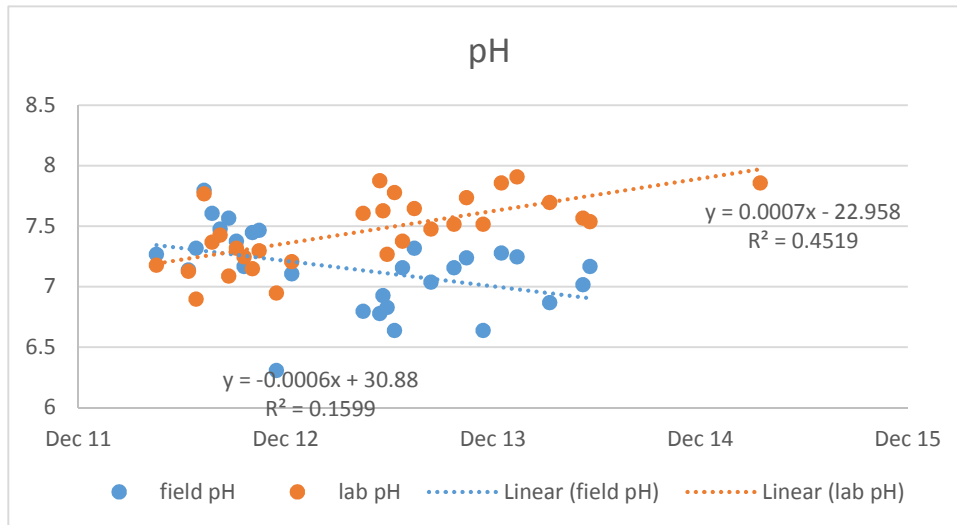


Figure 127: WQ-PIT-3 total manganese concentration showing statistically significant decreasing trend. Total manganese EQS is 0.5 mg/L.

Appendix C. Mill Site seep (WQ-MS-S-03)



field pH

-0.00057	30.87958	slope	intercept
0.000253	10.46863	se (slope)	se (intercept)
0.159933	0.306398	r2	se (y)
5.140311	27	F	df
0.482571	2.534753	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

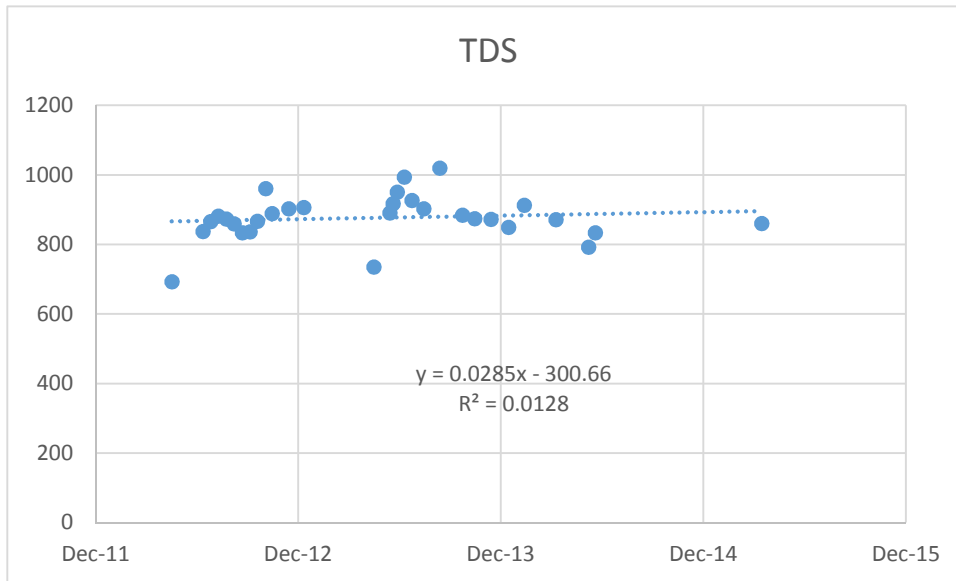
lab pH

0.000735	-22.9579	slope	intercept
0.000153	6.331393	se (slope)	se (intercept)
0.451945	0.214176	r2	se (y)
23.08978	28	F	df
1.059156	1.284394	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 128: WQ-MS-S-03 field pH shows statistically significant decreasing trend and lab pH values show statistically significant increasing pH trend. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

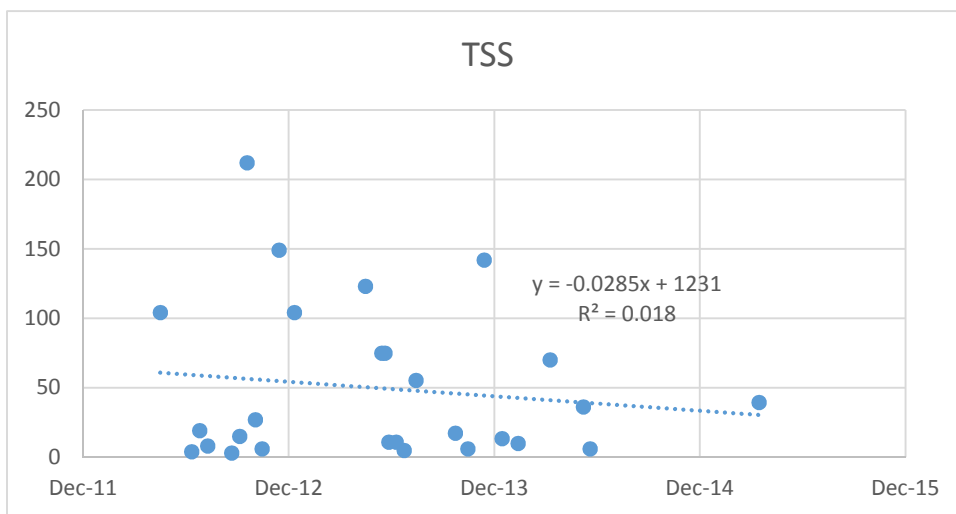
Appendix C. Mill Site seep (WQ-MS-S-03)



0.047223	1954.538	se (slope)	se (intercept)
0.012798	66.11729	r2	se (y)
0.36299	28	F	df
1586.811	122401.9	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 129: WQ-MS-S-03 TDS concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

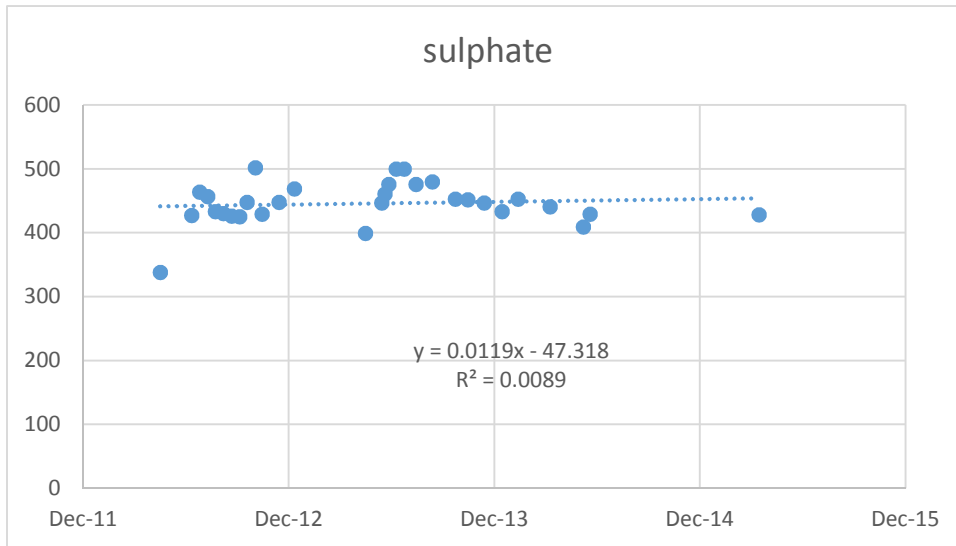


0.042158	1745.573	se (slope)	se (intercept)
0.017986	56.54643	r2	se (y)
0.457885	25	F	df
1464.088	79937.48	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

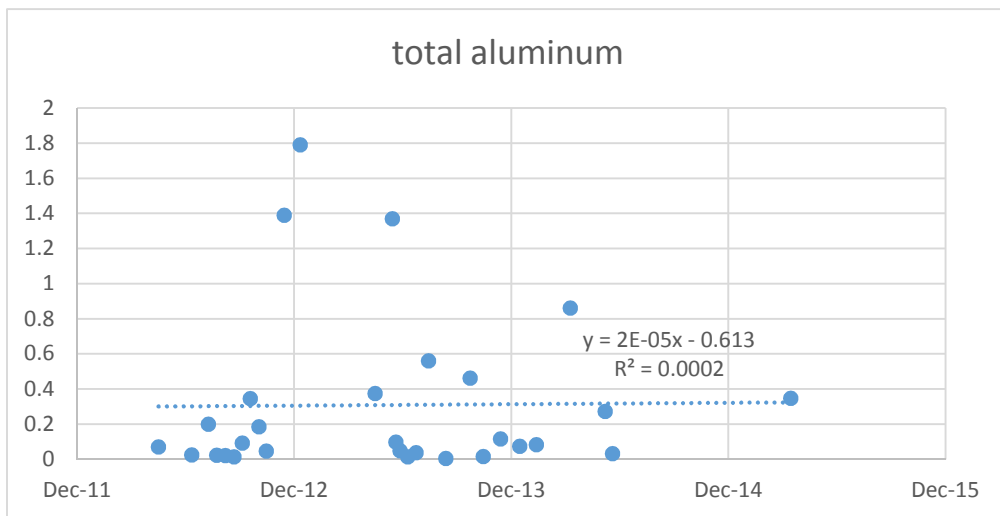
Figure 130: WQ-MS-S-03 TSS concentration showing statistically significant decreasing trend. TSS EQS 50 mg/L.

Appendix C. Mill Site seep (WQ-MS-S-03)



0.023747	982.8904	se (slope)	se (intercept)
0.008917	33.2488	r2	se (y)
0.251918	28	F	df
278.4915	30953.51	ss reg	ss resid

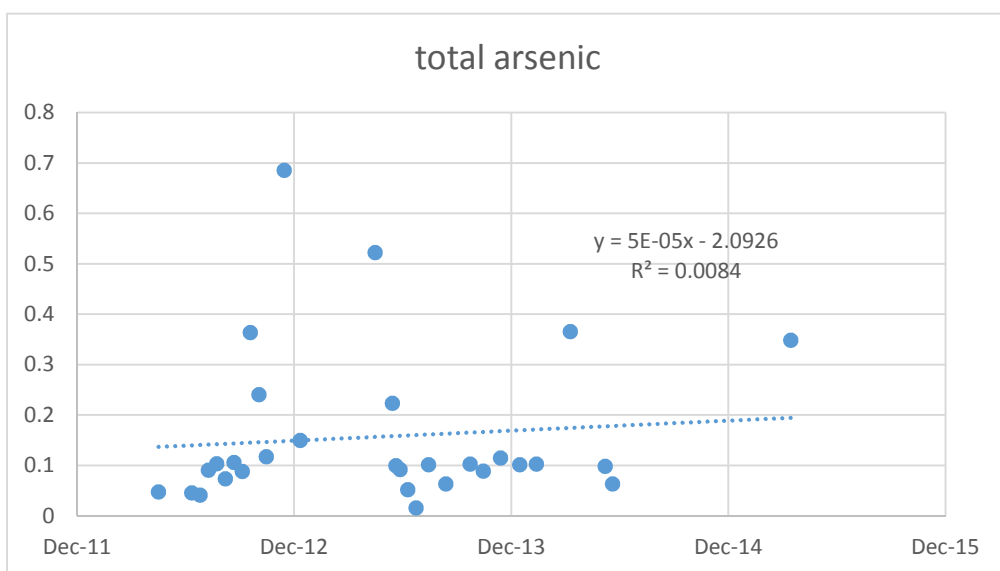
CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level
 Figure 131: WQ-MS-S-03 sulphate concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.



0.000347738	14.39629	se (slope)	se (intercept)
0.000152046	0.47504	r2	se (y)
0.004105869	27	F	df
0.000926543	6.092905	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend IS NOT statistically significant at 95% confidence level
 Figure 132: WQ-MS-S-03 total aluminum trend is not statistically significant. Total aluminum CCME Guideline is 0.1 mg/L at pH>6.5.

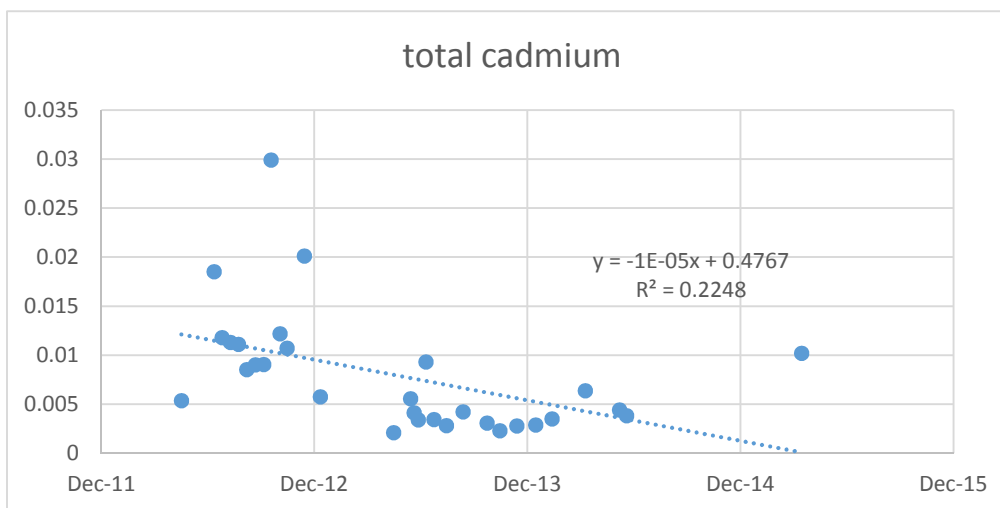
Appendix C. Mill Site seep (WQ-MS-S-03)



0.000111358	4.609036	se (slope)	se (intercept)
0.00843929	0.155913	r2	se (y)
0.238311309	28	F	df
0.00579304	0.680644	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 133: WQ-MS-S-03 total arsenic concentration showing statistically significant increasing trend. Total arsenic CCME Guideline is 0.005 mg/L.

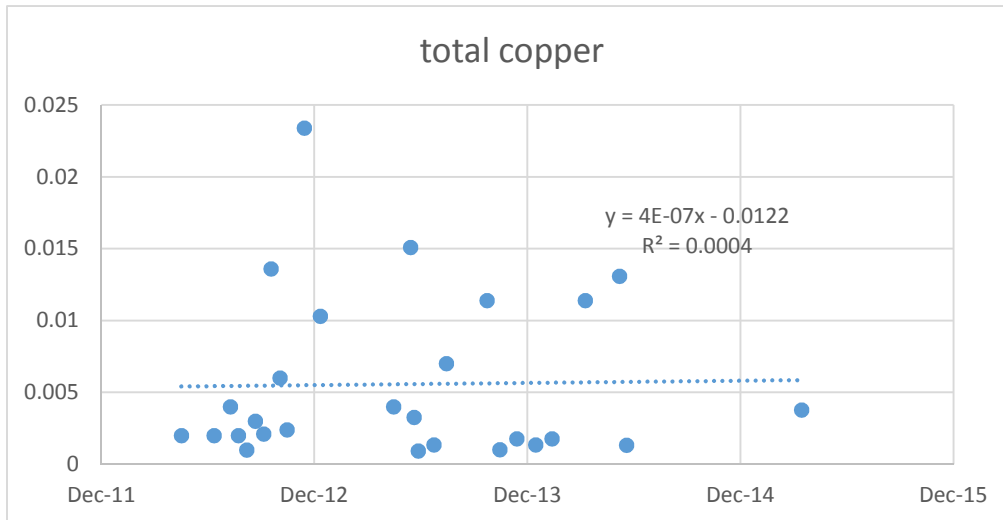


3.97453E-06	0.164503	se (slope)	se (intercept)
0.224840822	0.005565	r2	se (y)
8.121613225	28	F	df
0.000251497	0.000867	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 134: WQ-MS-S-03 total cadmium concentration showing statistically significant increasing trend. Total cadmium CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.

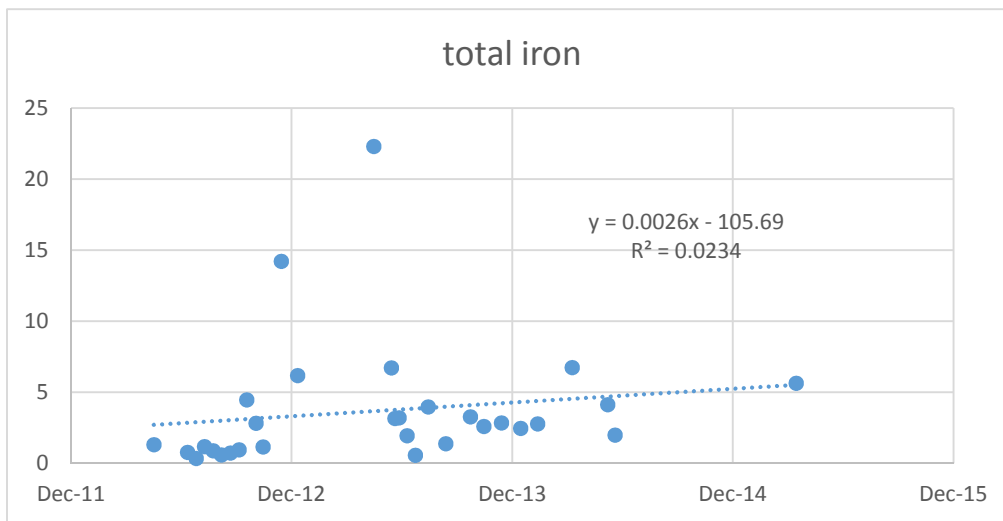
Appendix C. Mill Site seep (WQ-MS-S-03)



4.27688E-06	0.17704	se (slope)	se (intercept)
0.000400724	0.005823	r2	se (y)
0.010022111	25	F	df
3.39862E-07	0.000848	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend IS NOT statistically significant at 95% confidence level

Figure 135: WQ-MS-S-03 total copper concentration trend is not statistically significant. Total copper CCME Guideline is a function of water hardness, maximum value of 0.004 mg/L and minimum value of 0.002 mg/L. EQS is 0.2 mg/L.

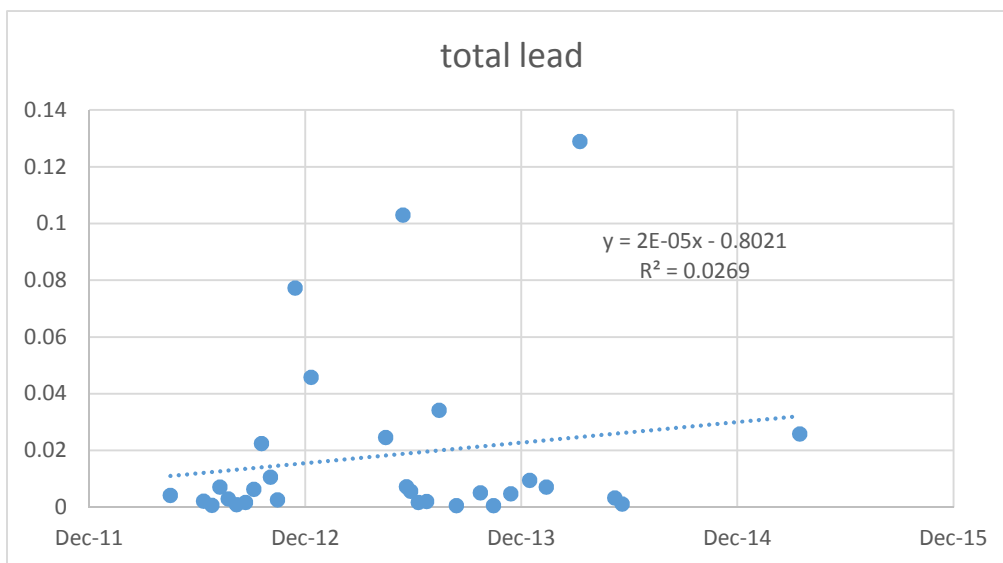


0.00322687	133.5582	se (slope)	se (intercept)
0.023398895	4.517948	r2	se (y)
0.670866594	28	F	df
13.6936339	571.532	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 136: WQ-MS-S-03 total iron concentration showing statistically significant increasing trend. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

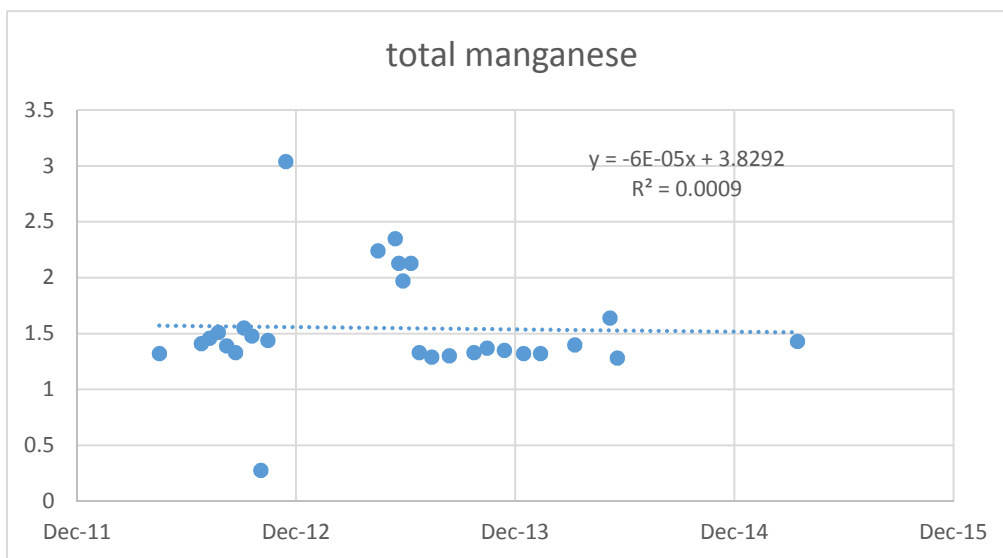
Appendix C. Mill Site seep (WQ-MS-S-03)



2.25525E-05	0.933433	se (slope)	se (intercept)
0.026851451	0.031576	r2	se (y)
0.77258566	28	F	df
0.00077029	0.027917	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 137: WQ-MS-S-03 total lead concentration showing statistically significant increasing trend. Total lead CCME Guideline is a function of water hardness, maximum value of 0.007 mg/L and EQS is 0.1 mg/L.



0.000368946	15.27636	se (slope)	se (intercept)
0.000855824	0.499868	r2	se (y)
0.022270476	26	F	df
0.005564671	6.496558	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend IS NOT statistically significant at 95% confidence level

Figure 138: WQ-MS-S-03 total manganese concentration trend is not statistically significant. Total manganese EQS is 0.5 mg/L.

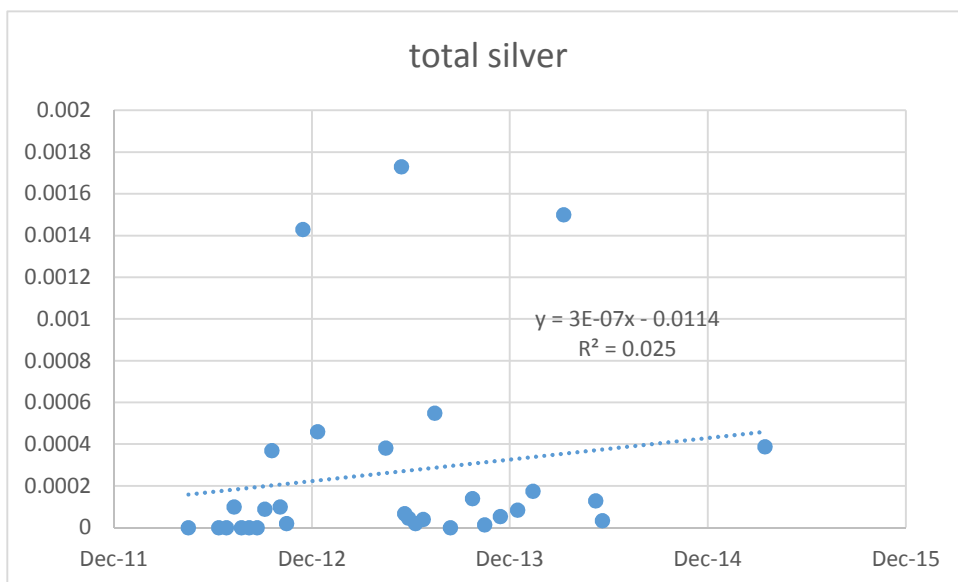
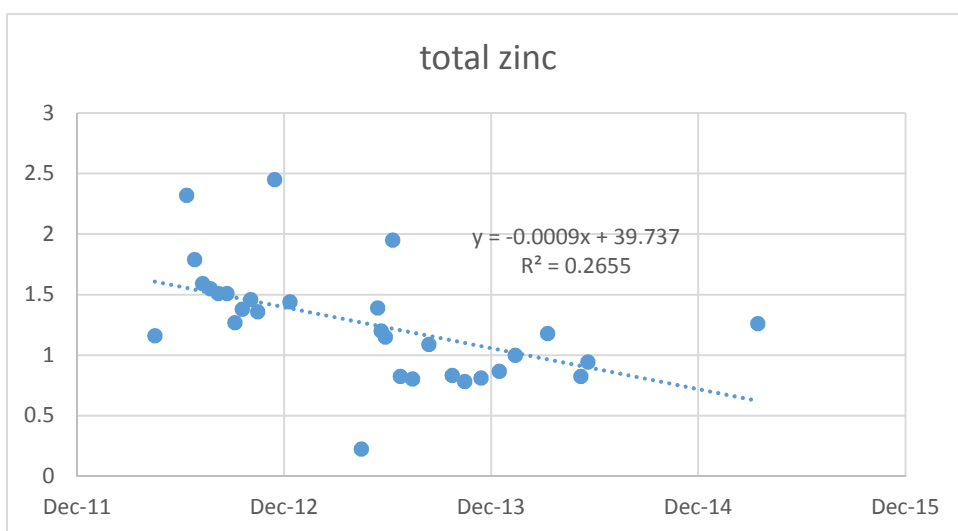


Figure 139: WQ-MS-S-03 total silver concentrations greater than 10% of samples are ND, trend analysis is not appropriate. Total silver CCME Guideline is 0.00025 mg/L and EQS is 0.1 mg/L.

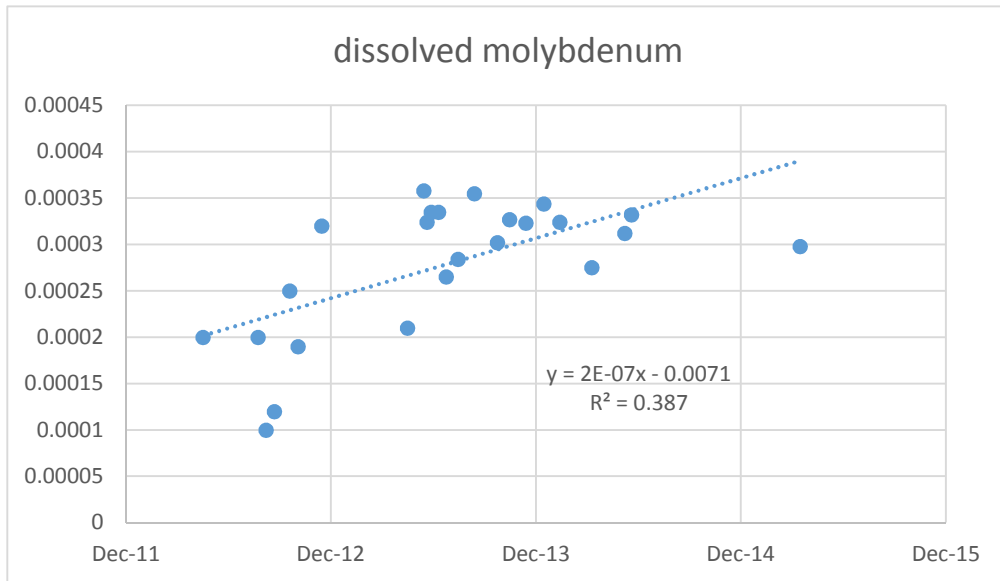


0.000292	12.09299	se (slope)	se (intercept)
0.26551	0.409076	r2	se (y)
10.12167	28	F	df
1.693795	4.685617	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 140: WQ-MS-S-03 total zinc concentration showing statistically significant decreasing trend. Total zinc CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

Appendix C. Mill Site seep (WQ-MS-S-03)



4.75222E-08

0.00197 se (slope)

se (intercept)

0.386965689

5.8E-05

r2

se (y)

13.88706149

22

F

df

4.6757E-08

7.41E-08

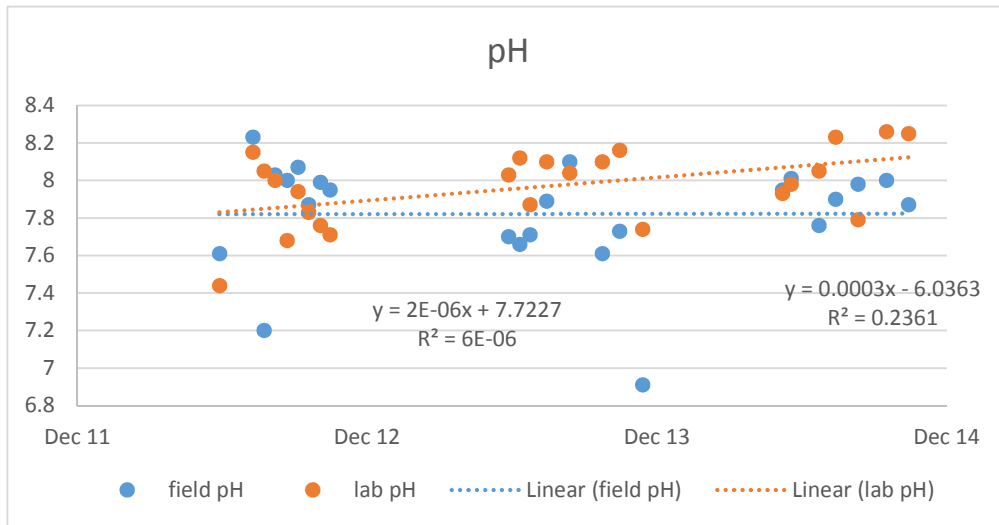
ss reg

ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 141: WQ-MS-S-03 dissolved molybdenum concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

Appendix C. Dome Creek DStream of Mill Site and UStream of Tailings Pond (WQ-DC-D1b)



field pH

2.39611E-06	7.722732	slope	intercept
0.000208515	8.645967	se (slope)	se (intercept)
6.00222E-06	0.295649	r2	se (y)
0.00013205	22	F	df
1.15422E-05	1.922984	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend IS NOT statistically significant at 95% confidence level

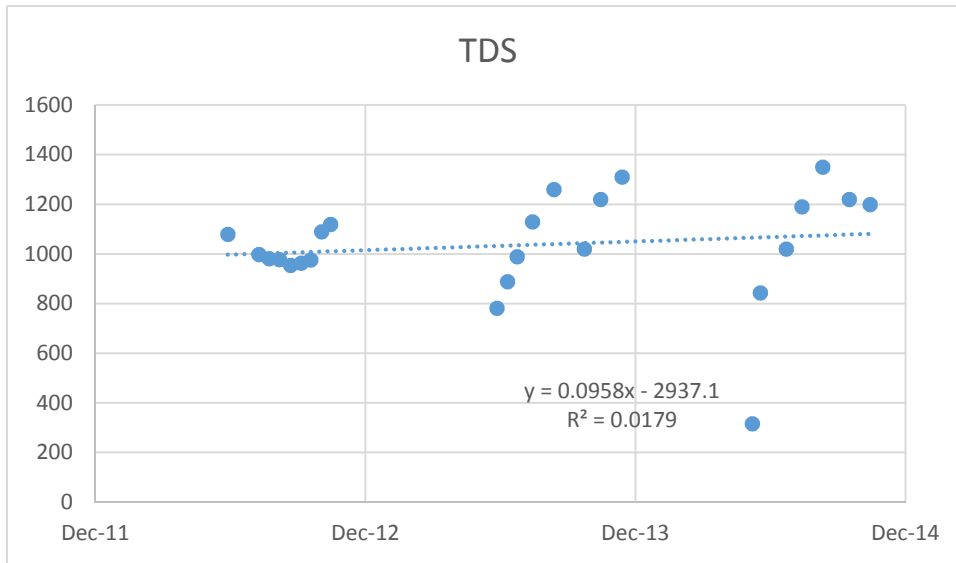
lab pH

0.000337728	-6.0363	slope	intercept
0.000129506	5.369904	se (slope)	se (intercept)
0.236129804	0.183624	r2	se (y)
6.800704775	22	F	df
0.229304669	0.741791	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 142: WQ-DC-D1b field pH trend is not statistically significant and lab pH values show statistically significant increasing pH trend. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

Appendix C. Dome Creek DStream of Mill Site and UStream of Tailings Pond (WQ-DC-D1b)



0.151151	6267.415	se (slope)	se (intercept)
0.017946	214.3144	r2	se (y)
0.402031	22	F	df
18465.56	1010475	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 143: WQ-DC-D1b TDS concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

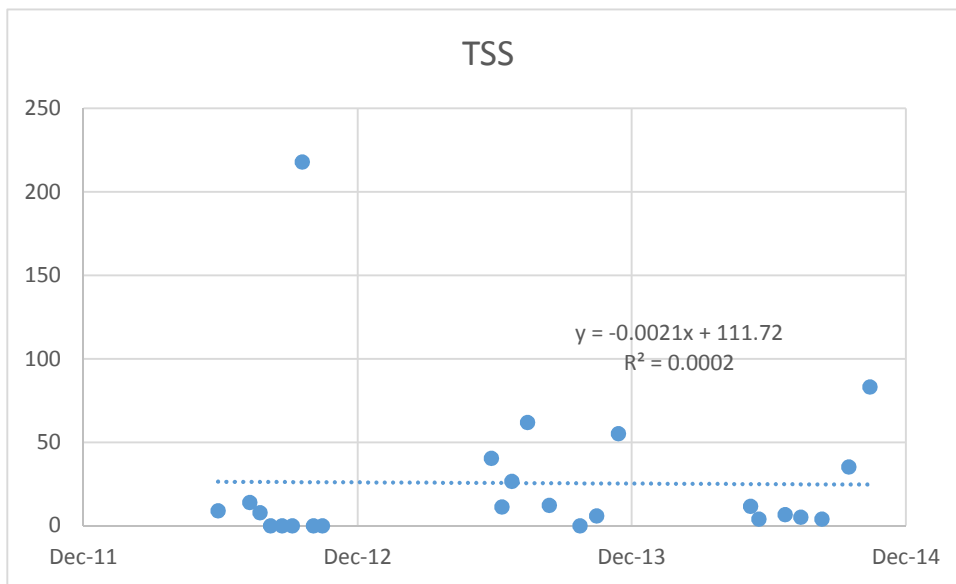
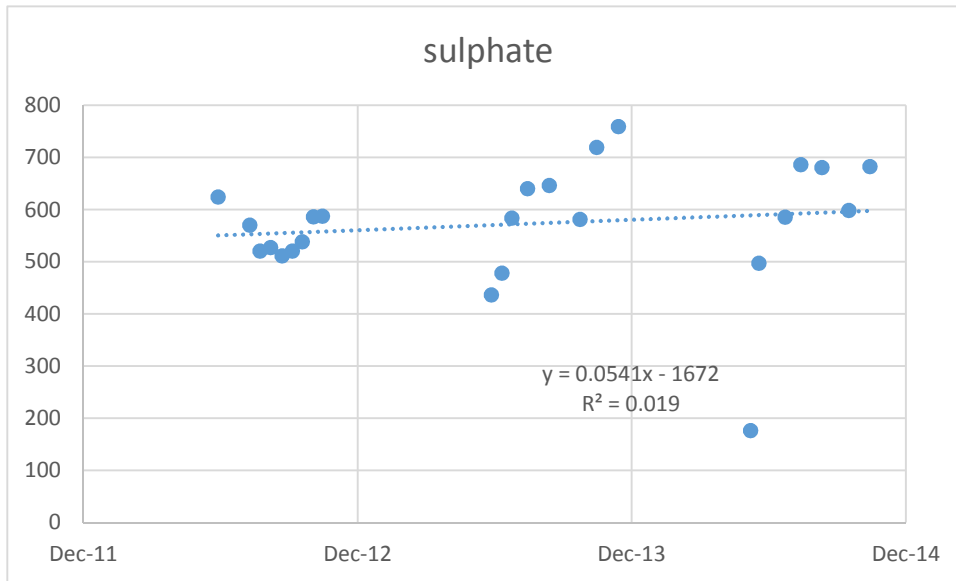


Figure 144: WQ-DC-D1b TSS concentration showing apparent decreasing trend. Greater than 10% of samples are ND, trend analysis is not appropriate. TSS EQS 50 mg/L.

Appendix C. Dome Creek DStream of Mill Site and UStream of Tailings Pond (WQ-DC-D1b)



0.082879	3436.544	se (slope)	se (intercept)
0.01903	117.5127	r2	se (y)
0.426789	22	F	df
5893.632	303803.3	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 145: WQ-DC-D1b sulphate concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

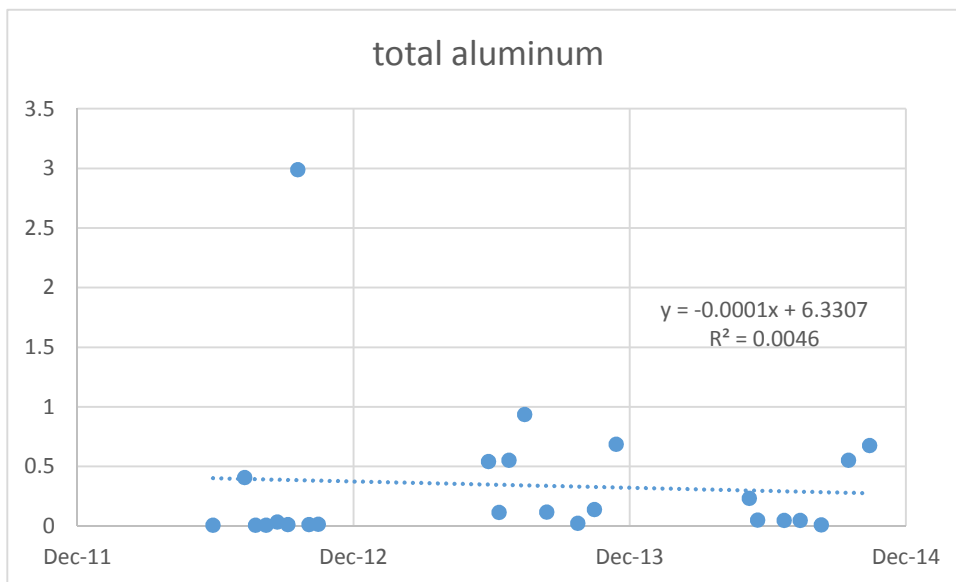
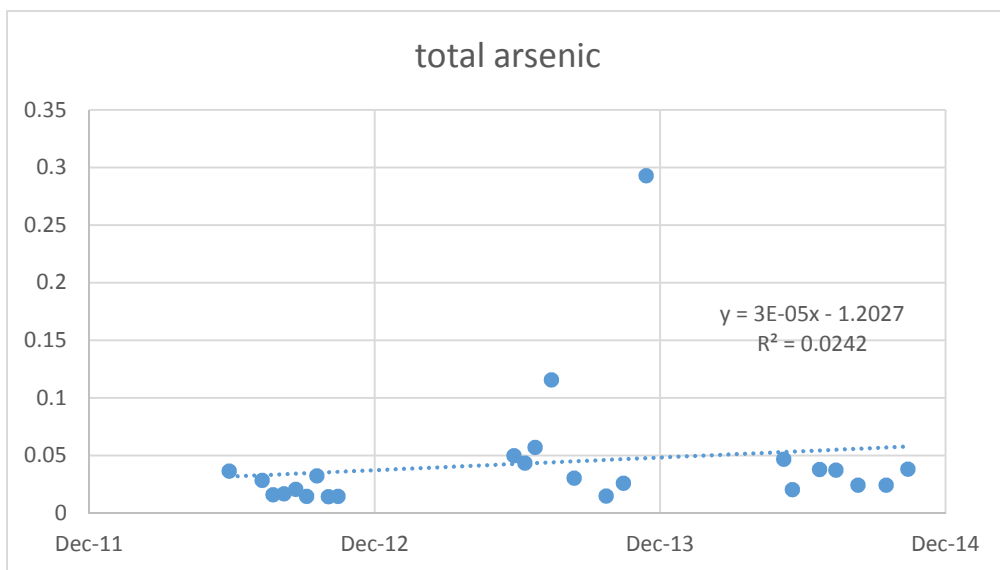
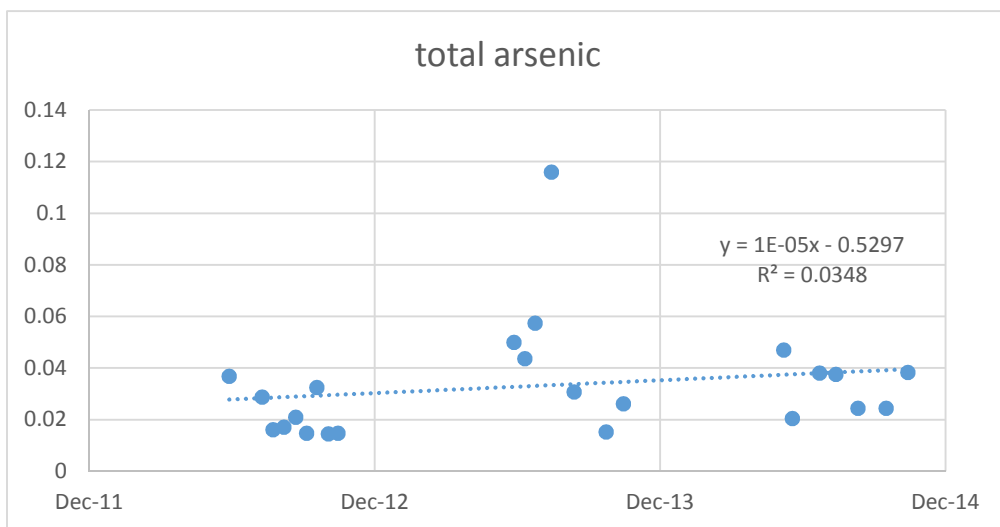


Figure 146: WQ-DC-D1b total aluminum concentration showing decreasing trend. Greater than 10% of samples are ND, trend analysis is not appropriate. Total aluminum CCME Guideline is 0.1 mg/L at pH>6.5.



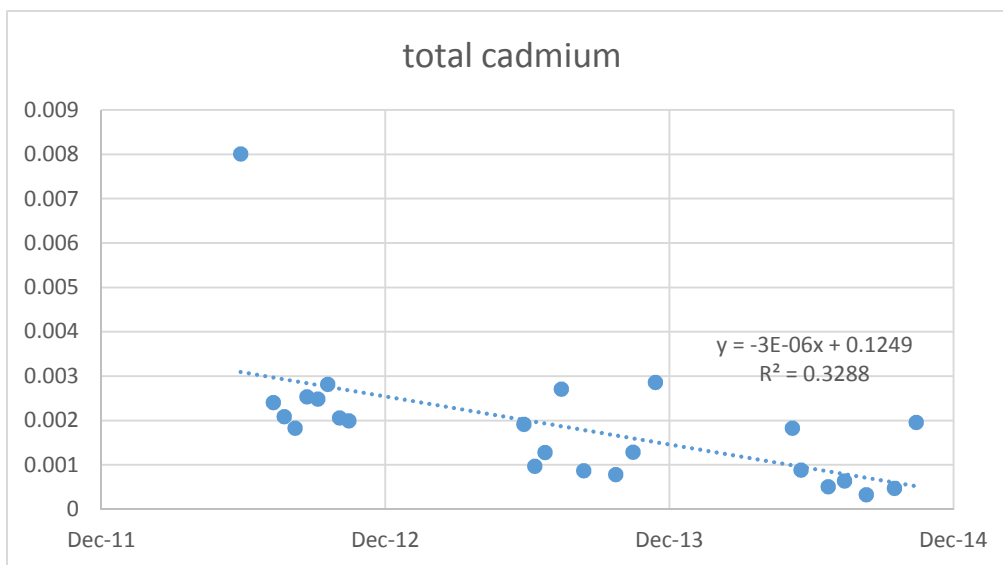
4.07333E-05	1.688985	se (slope)	se (intercept)
0.024170282	0.057755	r2	se (y)
0.544917013	22	F	df
0.00181764	0.073384	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level
 Figure 147: WQ-DC-D1b total arsenic concentration showing statistically significant increasing trend with potential outlier (14 Nov 2013). Total arsenic CCME Guideline is 0.005 mg/L.



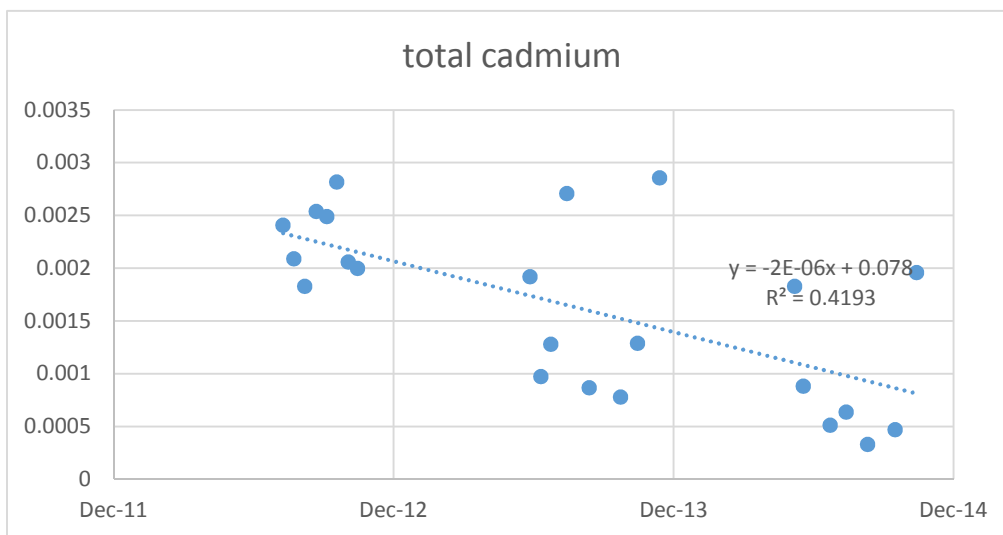
1.56008E-05	0.646791	se (slope)	se (intercept)
0.034818052	0.022025	r2	se (y)
0.757555701	21	F	df
0.000367489	0.010187	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level
 Figure 148: WQ-DC-D1b total arsenic concentration showing statistically significant increasing trend. With outlier removed model has improved.



9.03931E-07	0.037481	se (slope)	se (intercept)
0.32878425	0.001282	r2	se (y)
10.77634648	22	F	df
1.77019E-05	3.61E-05	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level
 Figure 149: WQ-DC-D1b total cadmium concentration showing statistically significant decreasing trend with potential outlier (30 May 2012).

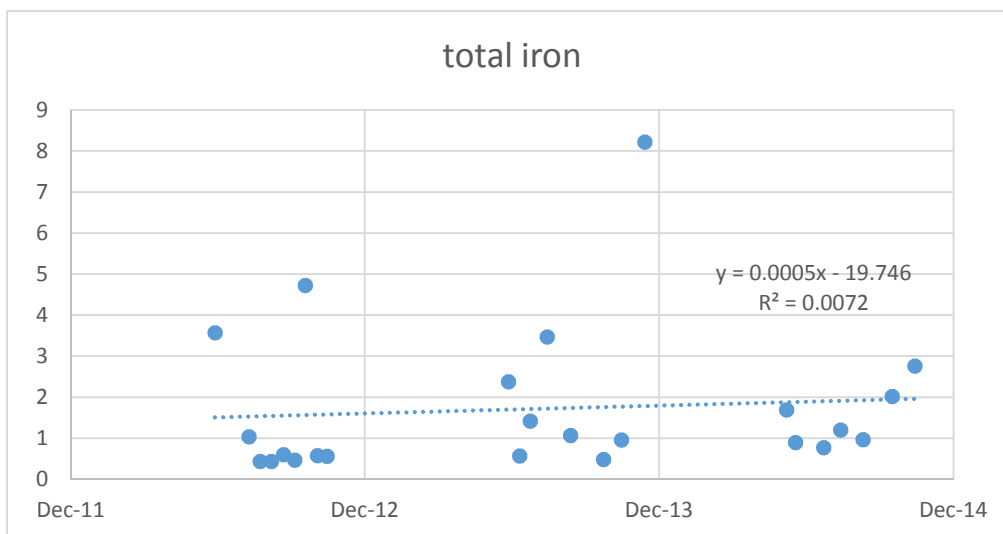


4.72685E-07	0.019608	se (slope)	se (intercept)
0.419296115	0.000641	r2	se (y)
15.16300933	21	F	df
6.23264E-06	8.63E-06	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 150: WQ-DC-D1b total cadmium concentration showing statistically significant decreasing trend. With outlier removed model has improved.

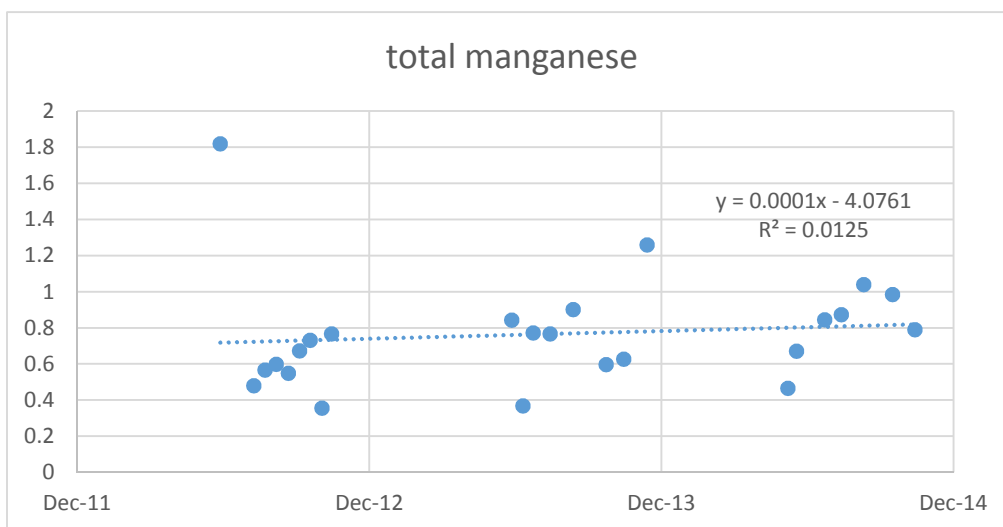
Appendix C. Dome Creek DStream of Mill Site and UStream of Tailings Pond (WQ-DC-D1b)



0.001297317	53.79256	se (slope)	se (intercept)
0.007187346	1.839438	r2	se (y)
0.159266309	22	F	df
0.538882843	74.43773	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 151: WQ-DC-D1b total iron concentration showing statistically significant increasing trend. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

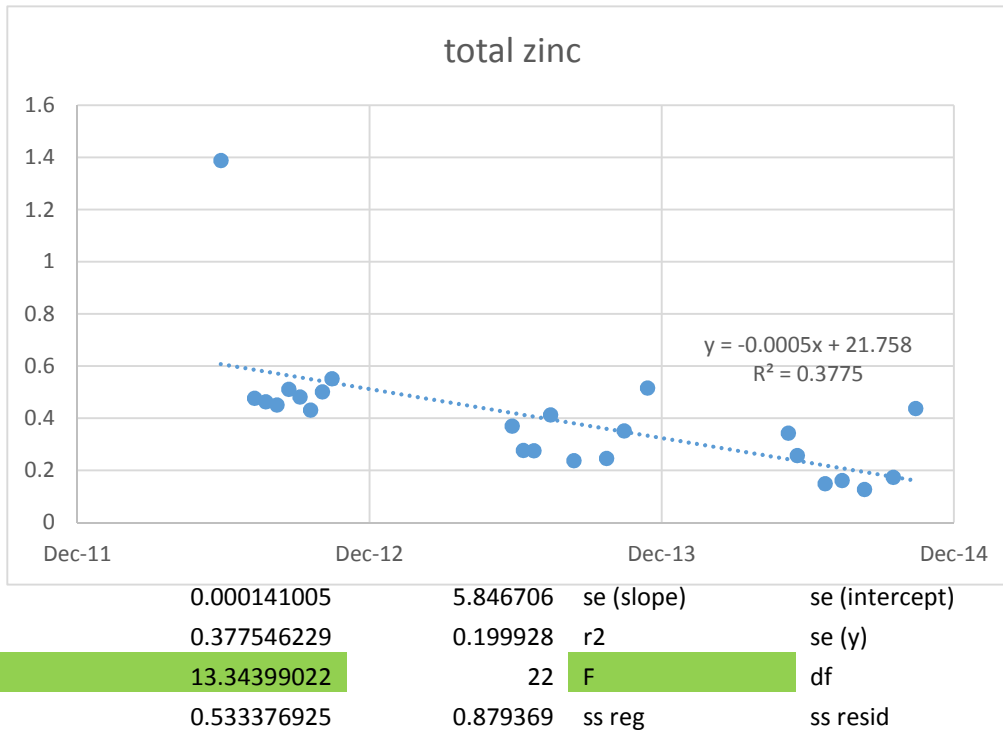


0.000221592	9.188206	se (slope)	se (intercept)
0.012460999	0.314191	r2	se (y)
0.277601169	22	F	df
0.027403664	2.171751	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

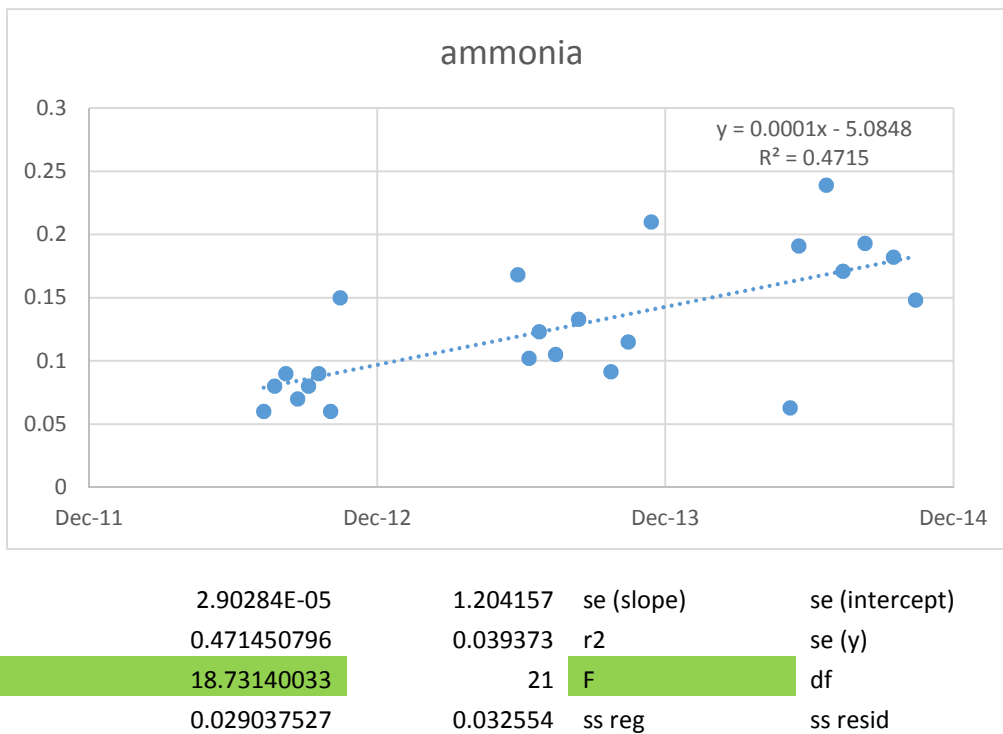
Figure 152: WQ-DC-D1b total manganese concentration showing statistically significant increasing trend. Total manganese EQS is 0.5 mg/L.

Appendix C. Dome Creek DStream of Mill Site and UStream of Tailings Pond (WQ-DC-D1b)



CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

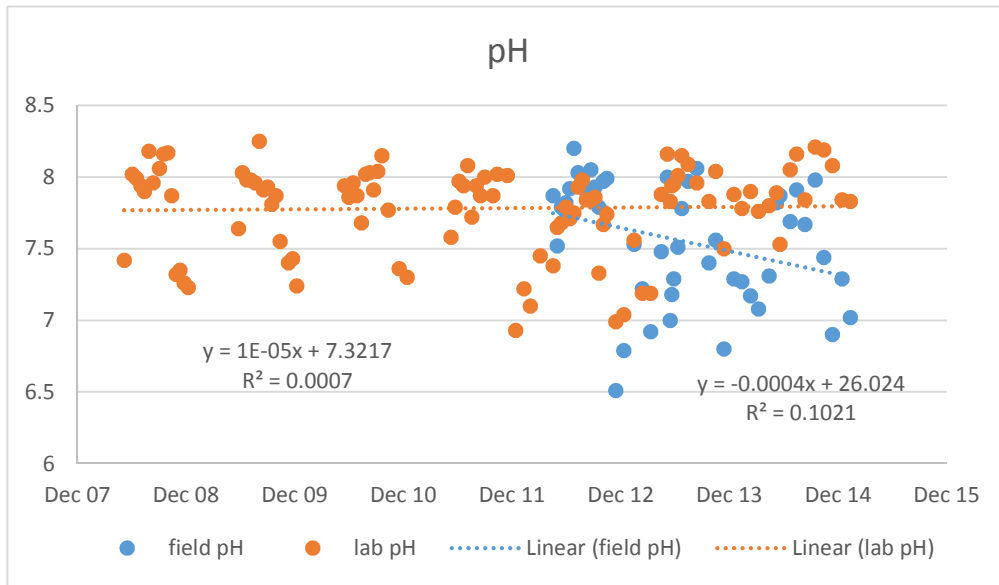
Figure 153: WQ-DC-D1b total zinc concentration showing statistically significant decreasing trend. Total zinc CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.



CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 154: WQ-DC-D1b ammonia concentration showing statistically significant increasing trend. CCME Guideline is 1.0 mg/L at pH = 8 and T = 10C.

Appendix C. Upper Dome Creek downstream of Tailings Pond (WQ-DC-U)



field pH

-0.00044558	26.02409	slope	intercept
0.000199237	8.25898	se (slope)	se (intercept)
0.10207072	0.40387	r2	se (y)
5.001631858	44	F	df
0.815820202	7.176875	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

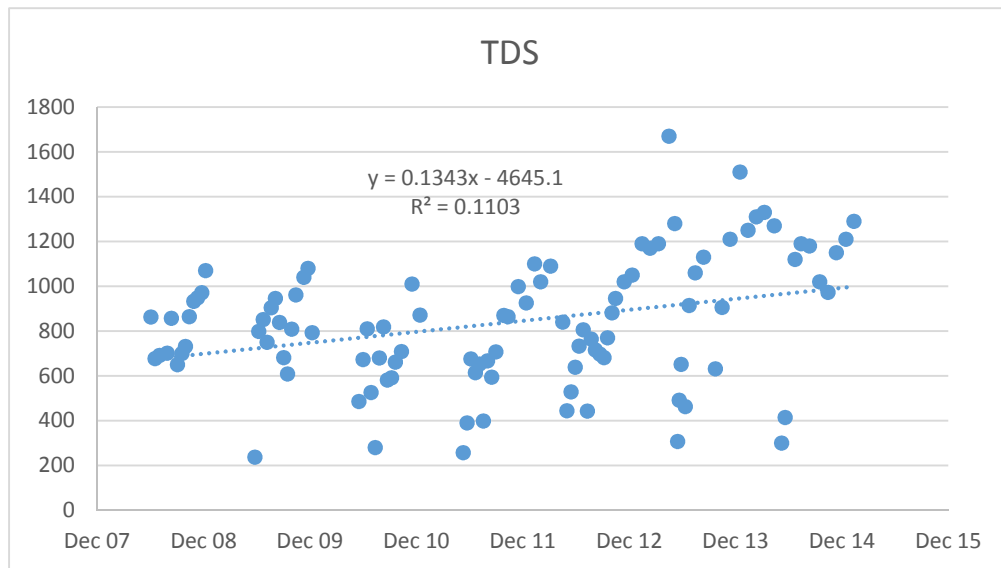
lab pH

1.13031E-05	7.321665	slope	intercept
4.24121E-05	1.729789	se (slope)	se (intercept)
0.000695849	0.30627	r2	se (y)
0.071026054	102	F	df
0.006662339	9.567737	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 155: WQ-DC-U field pH values shows statistically significant decreasing pH trend and lab pH increasing trend over different sampling date ranges. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

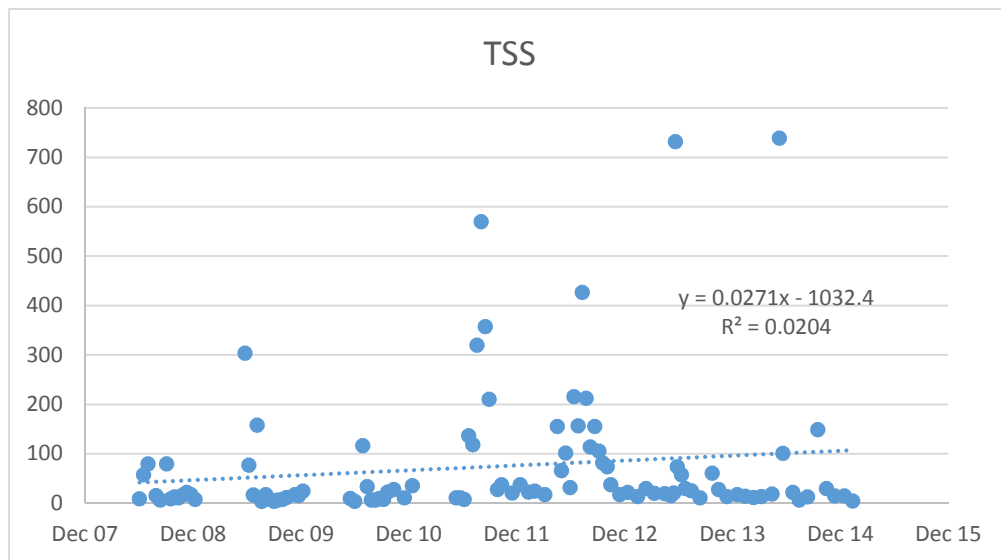
Appendix C. Upper Dome Creek downstream of Tailings Pond (WQ-DC-U)



0.038148202	1556.749	se (slope)	se (intercept)
0.110294262	268.0226	r2	se (y)
12.39671248	100	F	df
890531.9556	7183614	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 156: WQ-DC-U TDS concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

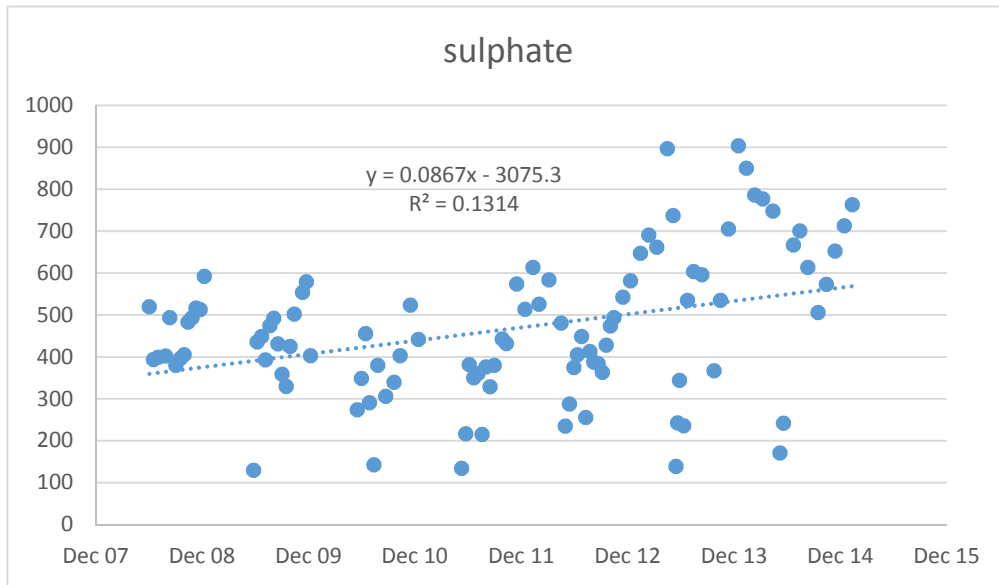


0.018885366	770.7586	se (slope)	se (intercept)
0.020427178	132.4028	r2	se (y)
2.064461768	99	F	df
36191.03621	1735519	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 157: WQ-DC-U TSS concentration showing statistically significant increasing trend. TSS EQS 50 mg/L.

Appendix C. Upper Dome Creek downstream of Tailings Pond (WQ-DC-U)



0.022531885	919.6556	se (slope)	se (intercept)
0.13135469	157.8151	r2	se (y)
14.81935088	98	F	df
369085.0045	2440750	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 158: WQ-DC-U sulphate concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

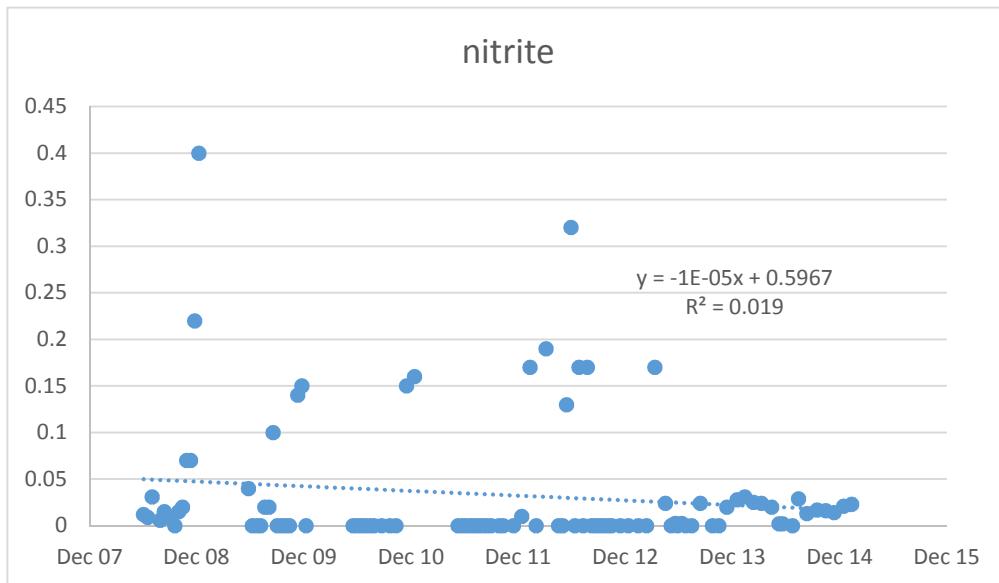
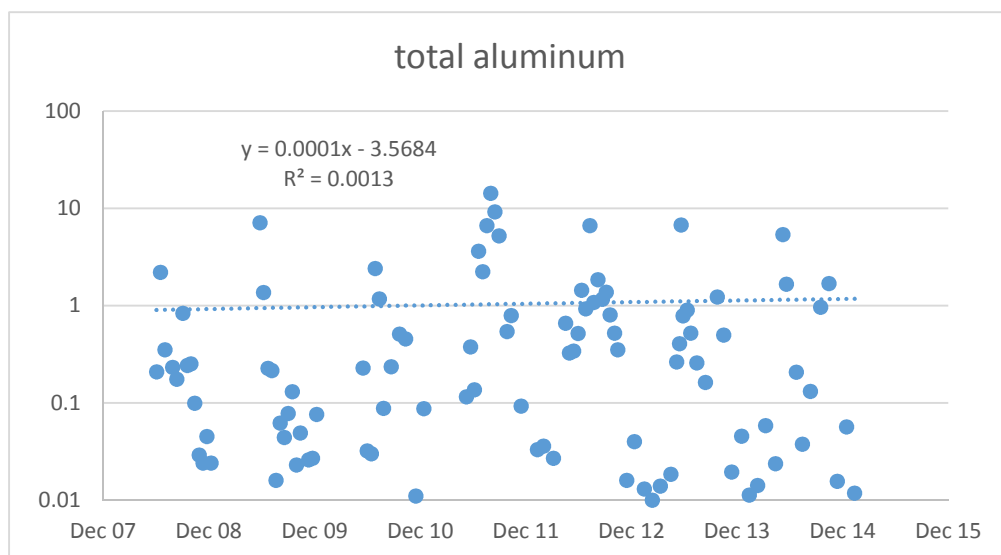


Figure 159: WQ-DC-U nitrite concentration apparent decreasing trend. Greater than 10% of samples are ND, trend analysis is not appropriate.

Appendix C. Upper Dome Creek downstream of Tailings Pond (WQ-DC-U)

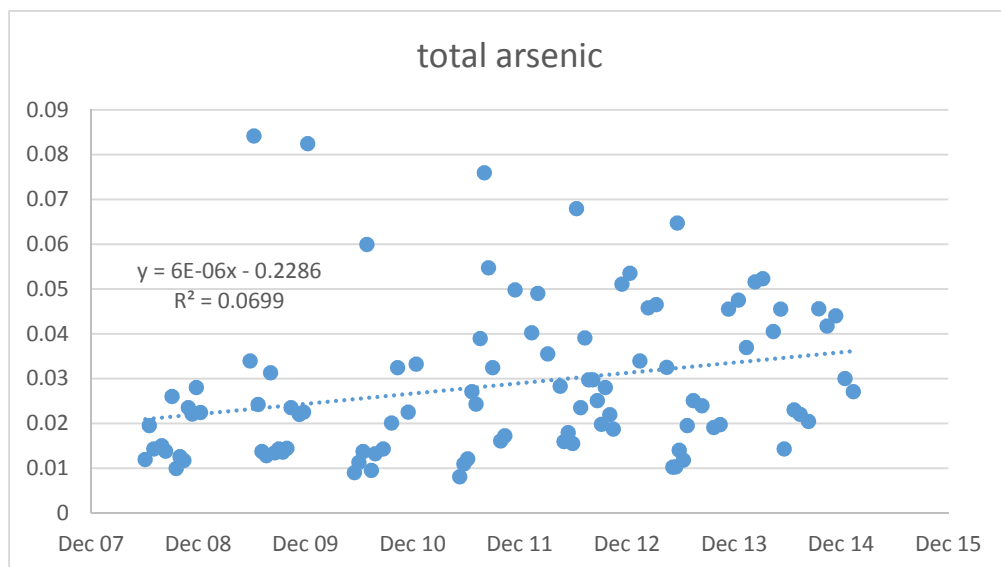


0.000317076	12.94143	se (slope)	se (intercept)
0.001304995	2.220668	r2	se (y)
0.126749901	97	F	df
0.625050137	478.3425	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 160: WQ-DC-U total aluminum concentration showing statistically significant increasing trend.

Total aluminum CCME Guideline is 0.1 mg/L at pH>6.5.



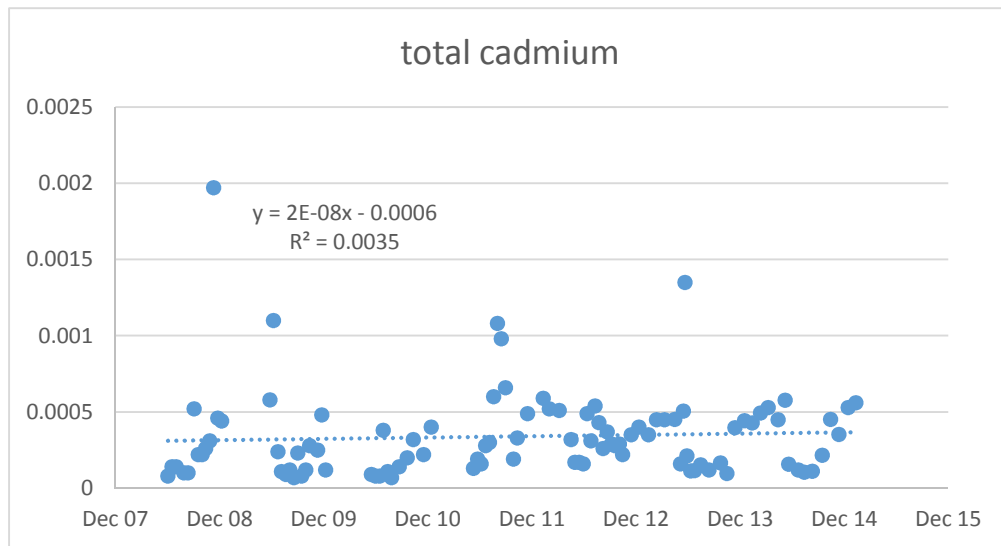
2.334E-06	0.095262	se (slope)	se (intercept)
0.069885067	0.016346	r2	se (y)
7.28818696	97	F	df
0.001947433	0.025919	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 161: WQ-DC-U total arsenic concentration showing statistically significant increasing trend. Total

arsenic CCME Guideline is 0.005 mg/L.

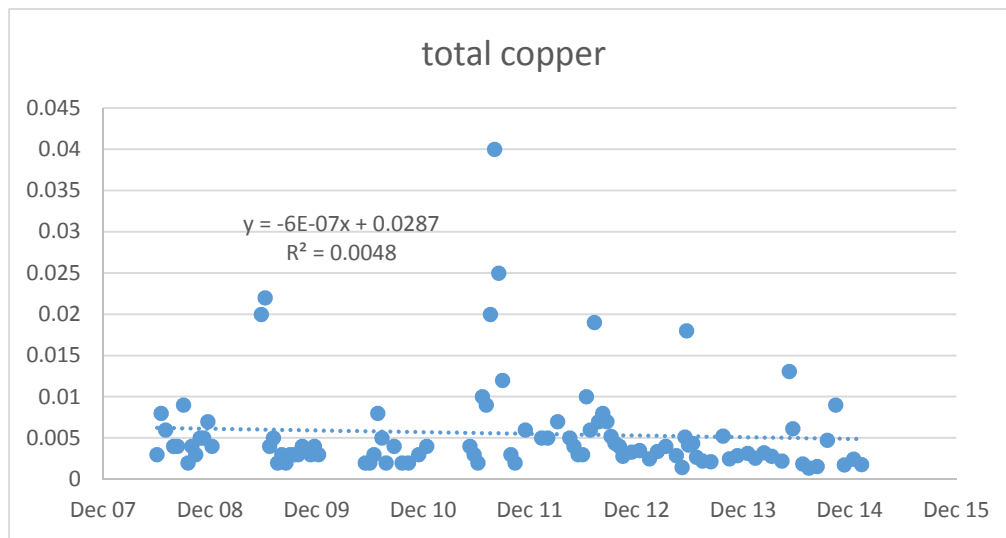
Appendix C. Upper Dome Creek downstream of Tailings Pond (WQ-DC-U)



4.08352E-08	0.001667	se (slope)	se (intercept)
0.003458497	0.000286	r2	se (y)
0.336638448	97	F	df
2.75344E-08	7.93E-06	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 162: WQ-DC-U total cadmium concentration showing statistically significant increasing trend. Total cadmium CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.

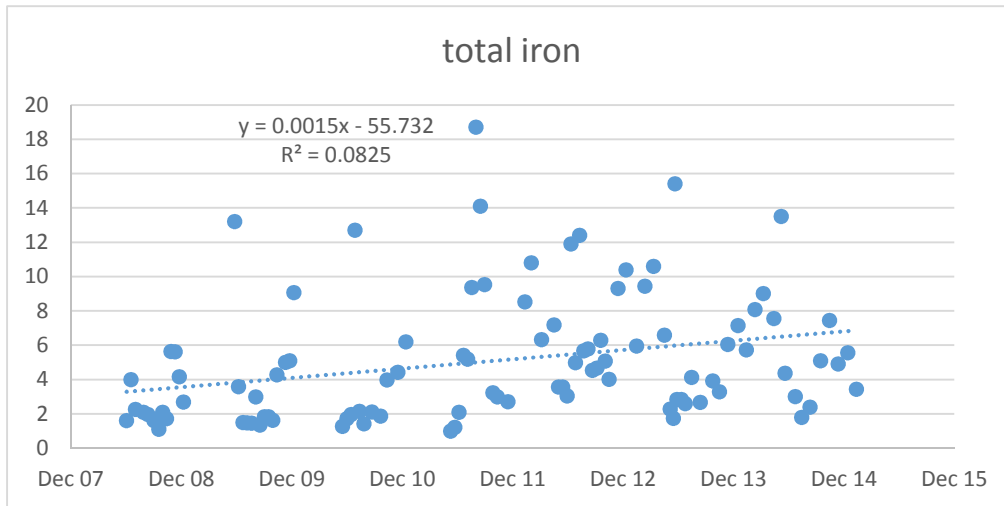


8.273E-07	0.033766	se (slope)	se (intercept)
0.004817413	0.005794	r2	se (y)
0.469551049	97	F	df
1.57634E-05	0.003256	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 163: WQ-DC-U total copper concentration showing statistically significant decreasing trend. Total copper CCME Guideline is a function of water hardness, maximum value of 0.004 mg/L and minimum value of 0.002 mg/L. EQS is 0.2 mg/L.

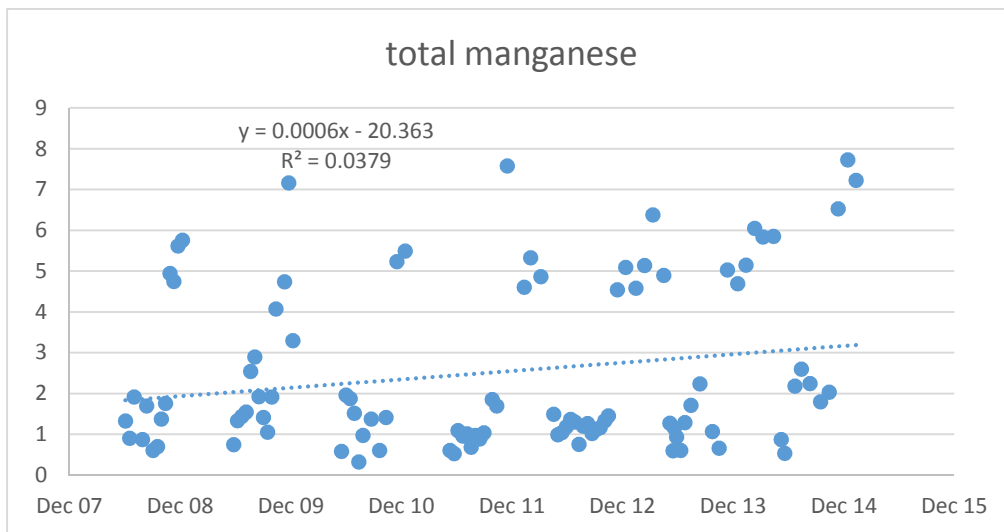
Appendix C. Upper Dome Creek downstream of Tailings Pond (WQ-DC-U)



0.000504579	20.59439	se (slope)	se (intercept)
0.082512681	3.533868	r2	se (y)
8.72353211	97	F	df
108.9414093	1211.358	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 164: WQ-DC-U total iron concentration showing statistically significant increasing trend. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

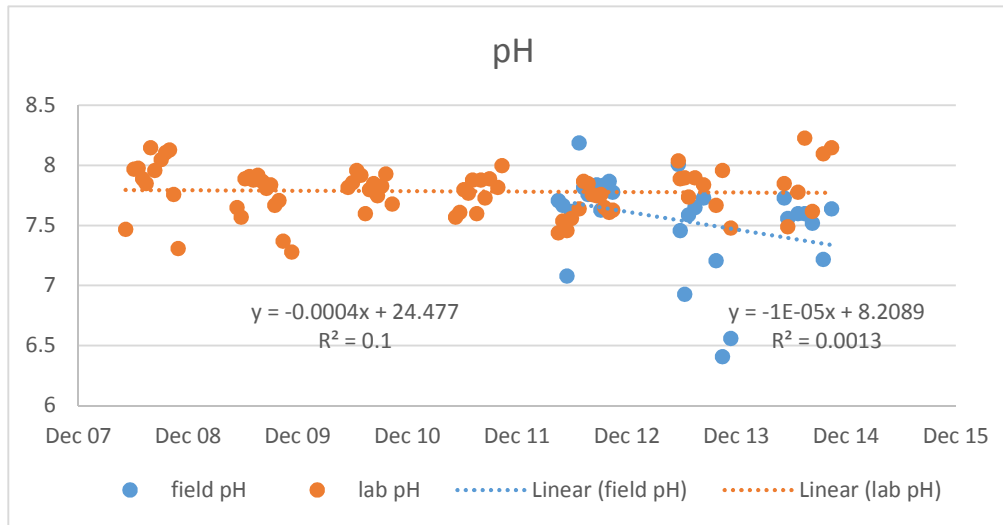


0.000286619	11.69835	se (slope)	se (intercept)
0.037947731	2.007363	r2	se (y)
3.826122598	97	F	df
15.41738397	390.8621	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 165: WQ-DC-U total manganese concentration showing statistically significant increasing trend. Total manganese EQS is 0.5 mg/L.

Appendix C. Dome Creek at Road (WQ-DC-R)



field pH

-0.000408793	24.47704	slope	intercept
0.000236031	9.772868	se (slope)	se (intercept)
0.099989391	0.381453	r2	se (y)
2.99964638	27	F	df
0.436468174	3.928677	ss reg	ss resid

CONCLUSION: F > 0.05 therefore trend is statistically significant at 95% confidence level

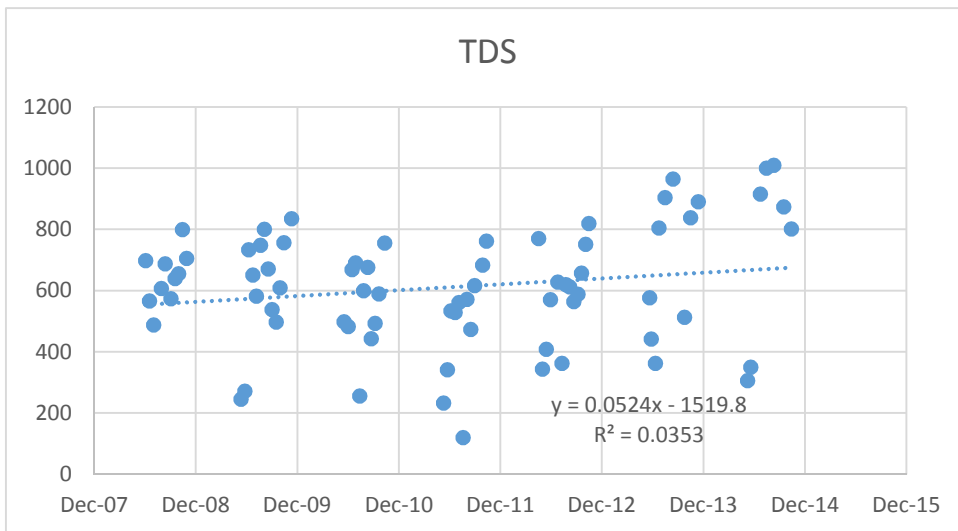
lab pH

-1.04117E-05	8.208929	slope	intercept
3.32853E-05	1.353353	se (slope)	se (intercept)
0.001320493	0.201357	r2	se (y)
0.097845665	74	F	df
0.003967113	3.0003	ss reg	ss resid

CONCLUSION: F > 0.05 therefore trend is statistically significant at 95% confidence level

Figure 166: WQ-DC-R field and lab pH values both showing statistically significant decreasing pH trend. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

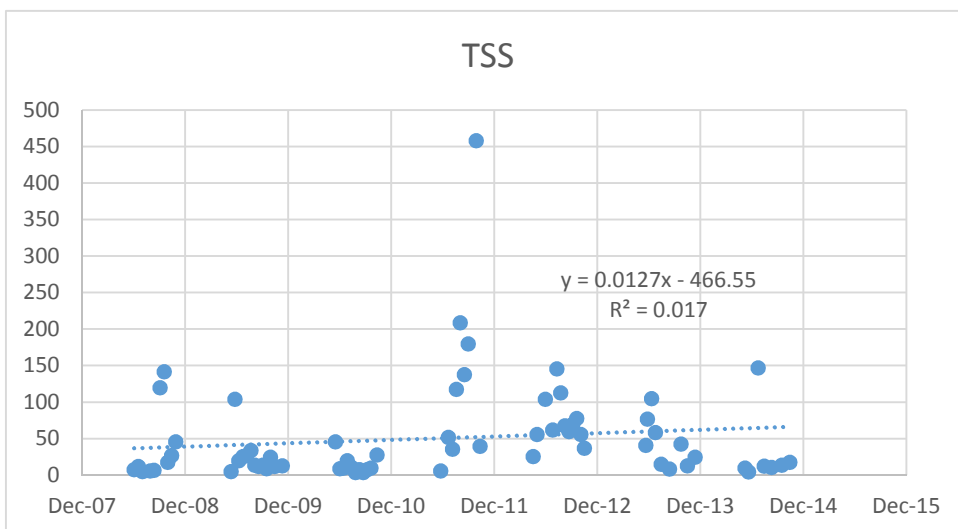
Appendix C. Dome Creek at Road (WQ-DC-R)



0.03225062	1312.185	se (slope)	se (intercept)
0.035323312	189.0499	r2	se (y)
2.636405053	72	F	df
94224.80792	2573272	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 167: WQ-DC-R TDS concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

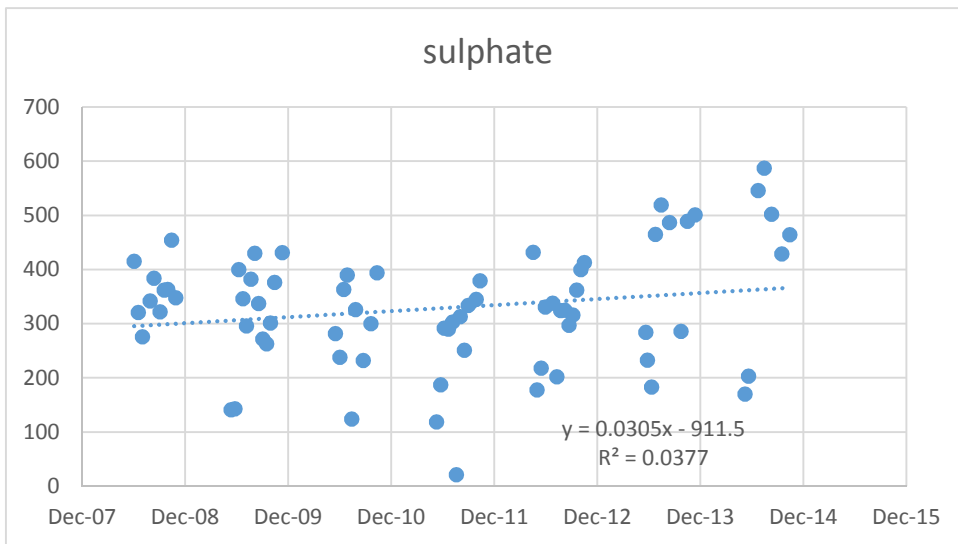


0.011630236	473.1417	se (slope)	se (intercept)
0.017013534	68.04159	r2	se (y)
1.19425231	69	F	df
5528.979033	319446.4	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 168: WQ-DC-R TSS concentration showing statistically significant increasing trend. TSS EQS 50 mg/L.

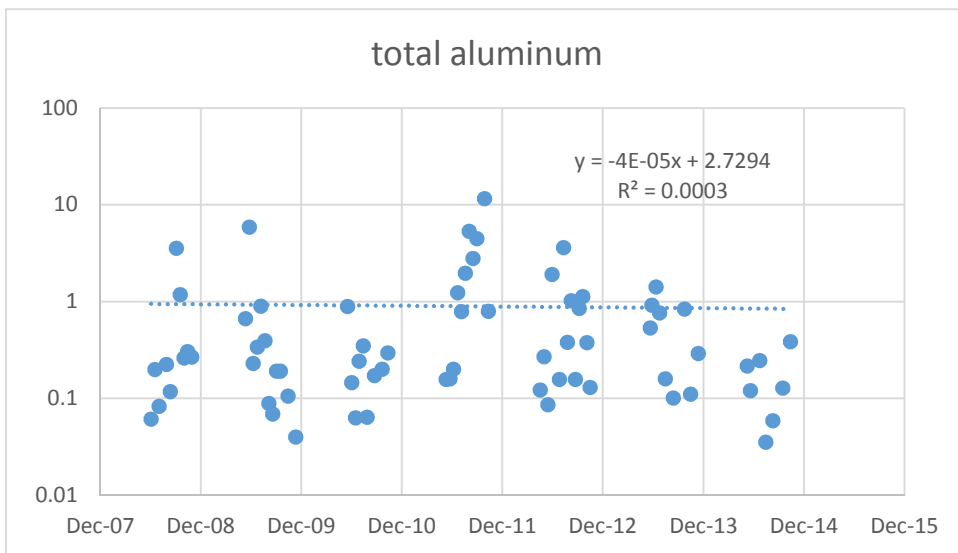
Appendix C. Dome Creek at Road (WQ-DC-R)



0.018343152	746.1913	se (slope)	se (intercept)
0.052348906	109.1924	r2	se (y)
3.922089401	71	F	df
46762.99071	846531.5	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 169: WQ-DC-R sulphate concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

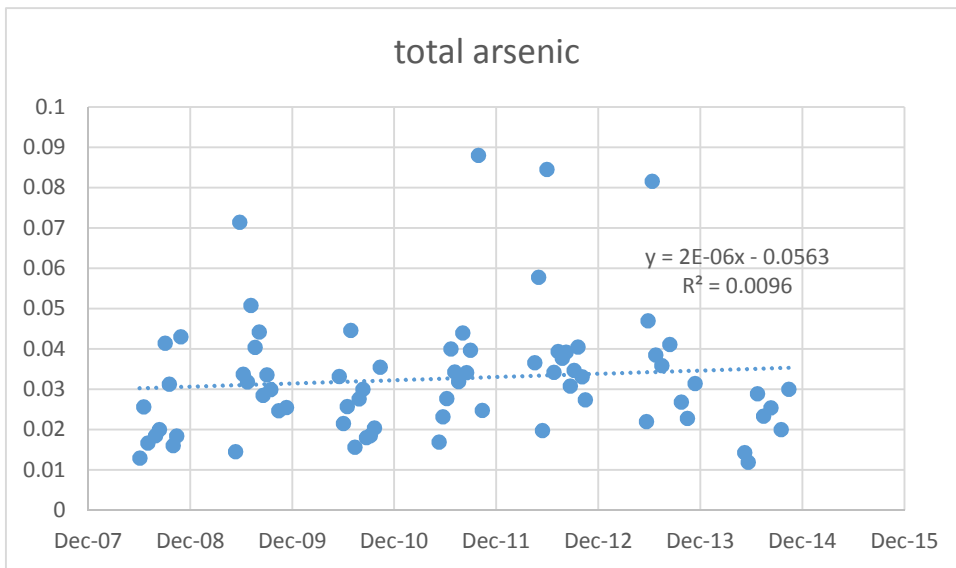


0.000297365	12.09911	se (slope)	se (intercept)
8.15399E-05	1.761408	r2	se (y)
0.005708257	70	F	df
0.017710192	217.179	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend is not statistically significant at 95% confidence level

Figure 170: WQ-DC-R total aluminum concentration does not have a statistically significant trend. Total aluminum CCME Guideline is 0.1 mg/L at pH>6.5.

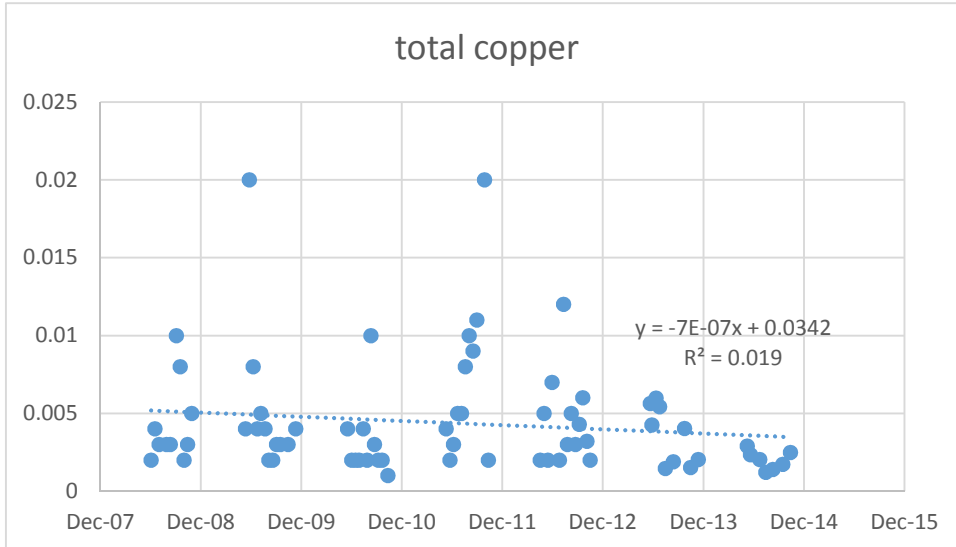
Appendix C. Dome Creek at Road (WQ-DC-R)



2.60734E-06	0.106068	se (slope)	se (intercept)
0.016771096	0.015475	r2	se (y)
1.228115796	72	F	df
0.000294092	0.017242	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 171: WQ-DC-R total arsenic concentration showing statistically significant increasing trend. Total arsenic CCME Guideline is 0.005 mg/L.

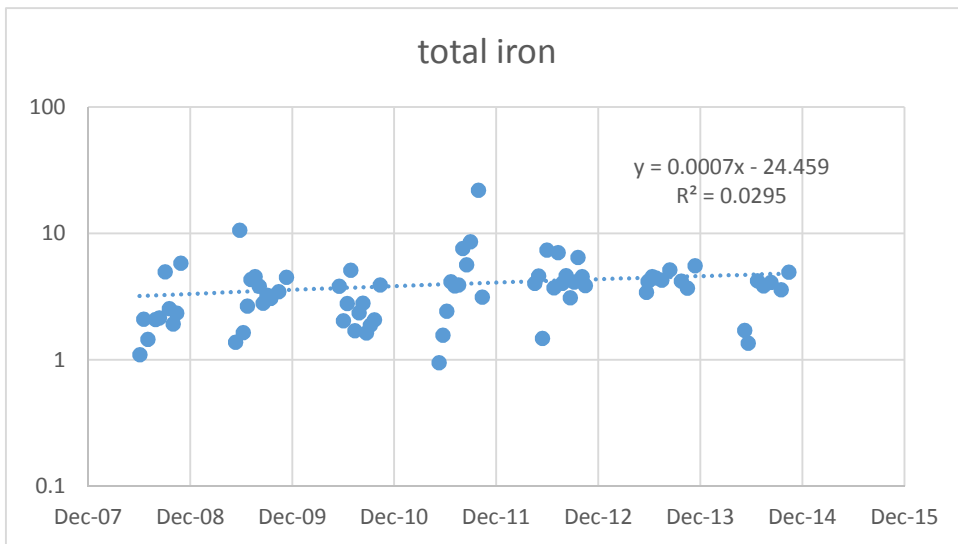


6.08651E-07	0.02476	se (slope)	se (intercept)
0.019323587	0.003612	r2	se (y)
1.418712913	72	F	df
1.85131E-05	0.00094	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 172: WQ-DC-R total copper concentration showing statistically significant decreasing trend. Total copper CCME Guideline is a function of water hardness, maximum value of 0.004 mg/L and minimum value of 0.002 mg/L. EQS is 0.2 mg/L.

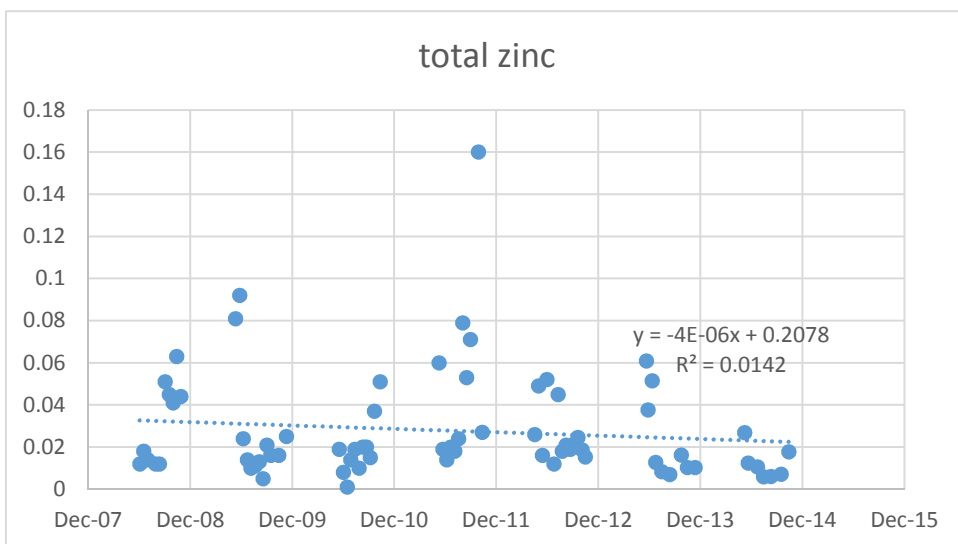
Appendix C. Dome Creek at Road (WQ-DC-R)



0.000467043	18.99949	se (slope)	se (intercept)
0.037447463	2.771923	r2	se (y)
2.801111907	72	F	df
21.52249722	553.216	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 173: WQ-DC-R total iron concentration showing statistically significant increasing trend. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

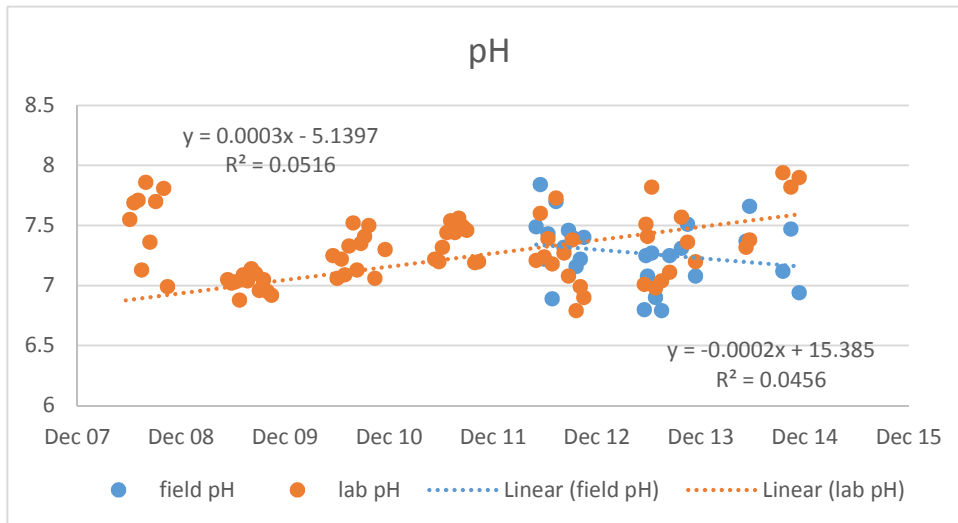


4.28047E-06	0.174131	se (slope)	se (intercept)
0.017826905	0.025405	r2	se (y)
1.306833929	72	F	df
0.000843437	0.046469	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 174: WQ-DC-R total zinc concentration showing statistically significant decreasing trend. Total zinc CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

Appendix C. Pony Creek downstream of Pit (WQ-PC-D)



field pH

-0.0002	15.38542	slope	intercept
0.000179	7.42457	se (slope)	se (intercept)
0.045597	0.267298	r2	se (y)
1.194379	25	F	df
0.085336	1.786205	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

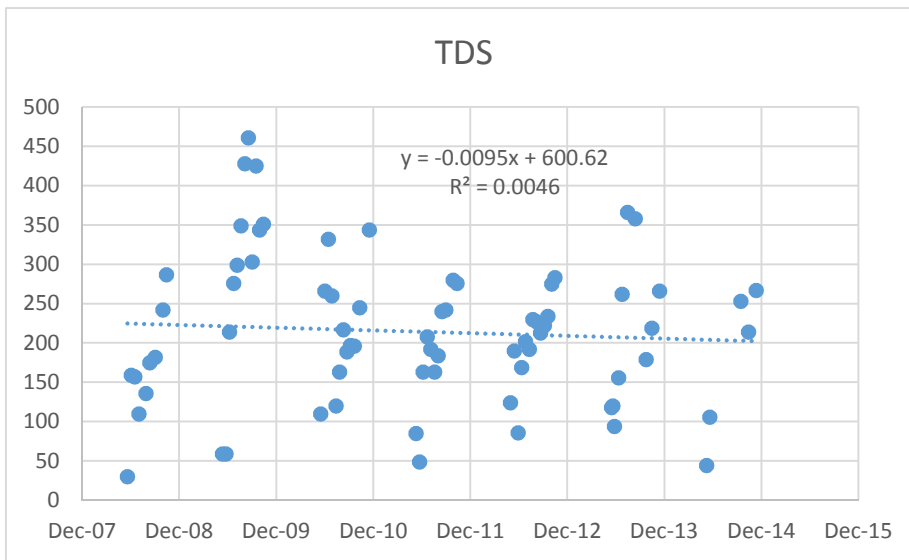
lab pH

6.59E-05	4.619719	slope	intercept
4.96E-05	2.017126	se (slope)	se (intercept)
0.024992	0.277619	r2	se (y)
1.76868	69	F	df
0.136317	5.318007	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 175: WQ-PC-D field pH values shows statistically significant decreasing pH trend and lab pH increasing trend over different sampling date ranges. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

Appendix C. Pony Creek downstream of Pit (WQ-PC-D)



0.01677	682.2542	se (slope)	se (intercept)
0.004559	94.34946	r2	se (y)
0.320558	70	F	df
2853.548	623127.4	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 176: WQ-PC-D TDS concentration showing statistically significant decreasing trend. No CCME Guideline or EQS available.

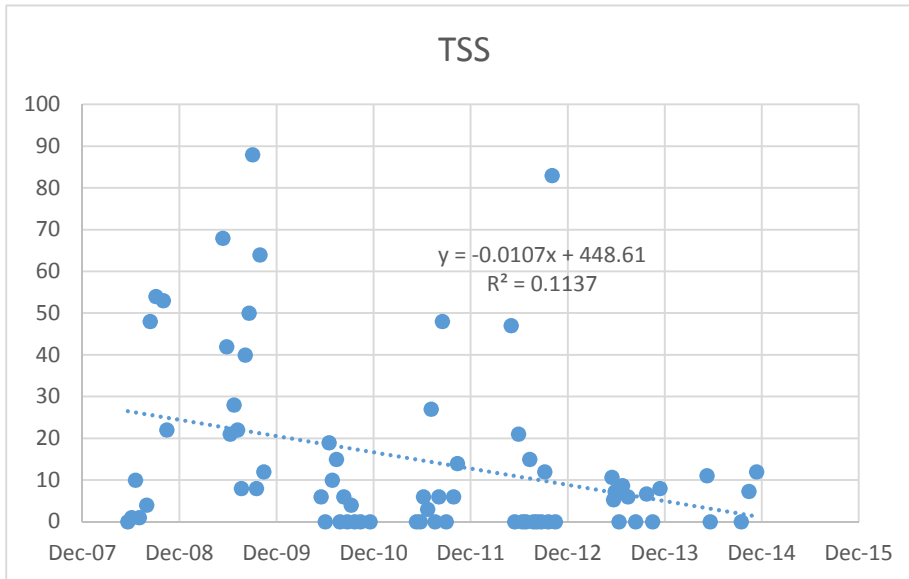
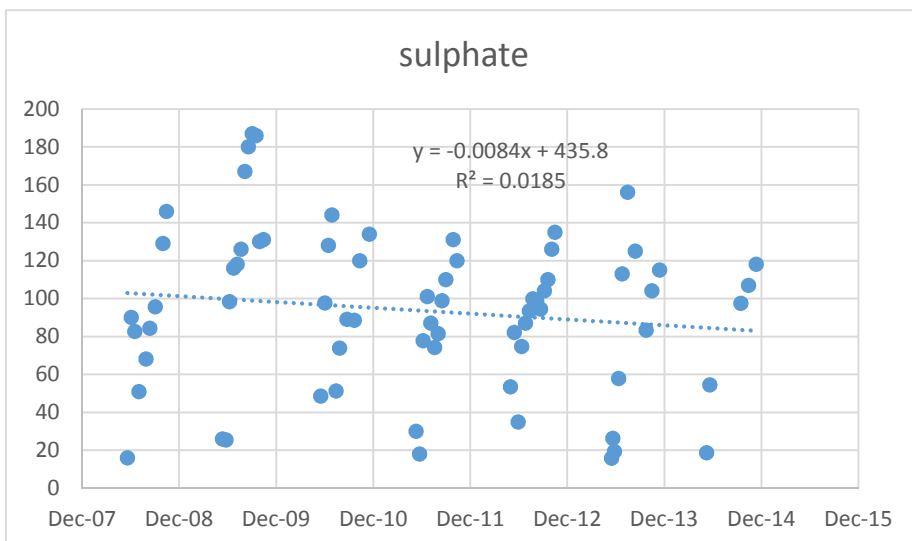


Figure 177: WQ-PC-D TSS concentration showing apparent decreasing trend. Greater than 10% of samples are ND, trend analysis is not appropriate. TSS EQS 50 mg/L.

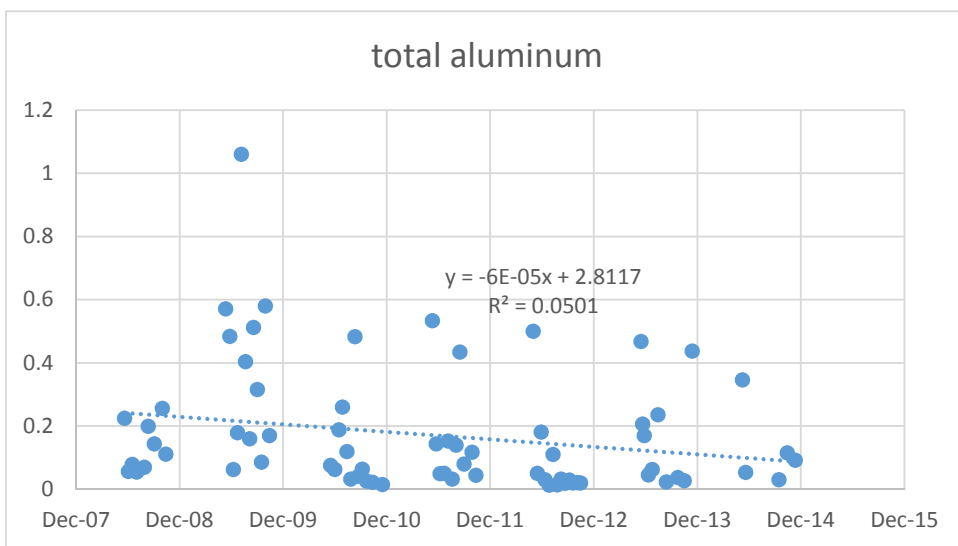
Appendix C. Pony Creek downstream of Pit (WQ-PC-D)



0.007424	302.0831	se (slope)	se (intercept)
0.01851	41.67341	r2	se (y)
1.282449	68	F	df
2227.195	118093.8	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 178: WQ-PC-D sulphate concentration showing statistically significant decreasing trend. No CCME Guideline or EQS available.

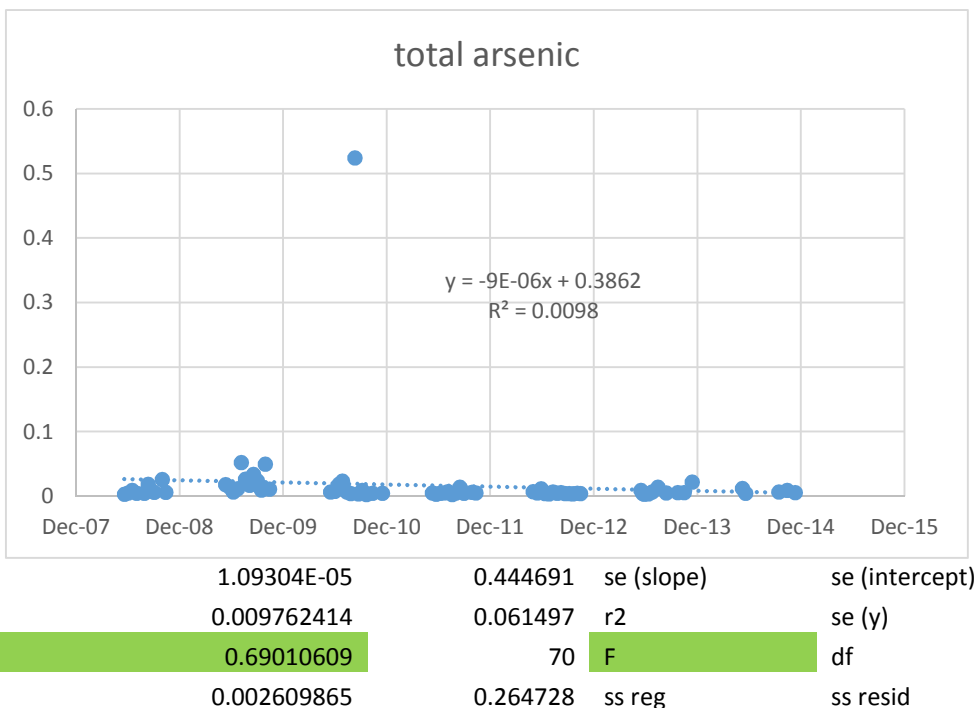


3.37891E-05	1.374664	se (slope)	se (intercept)
0.050081913	0.190103	r2	se (y)
3.69056446	70	F	df
0.133374277	2.529748	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

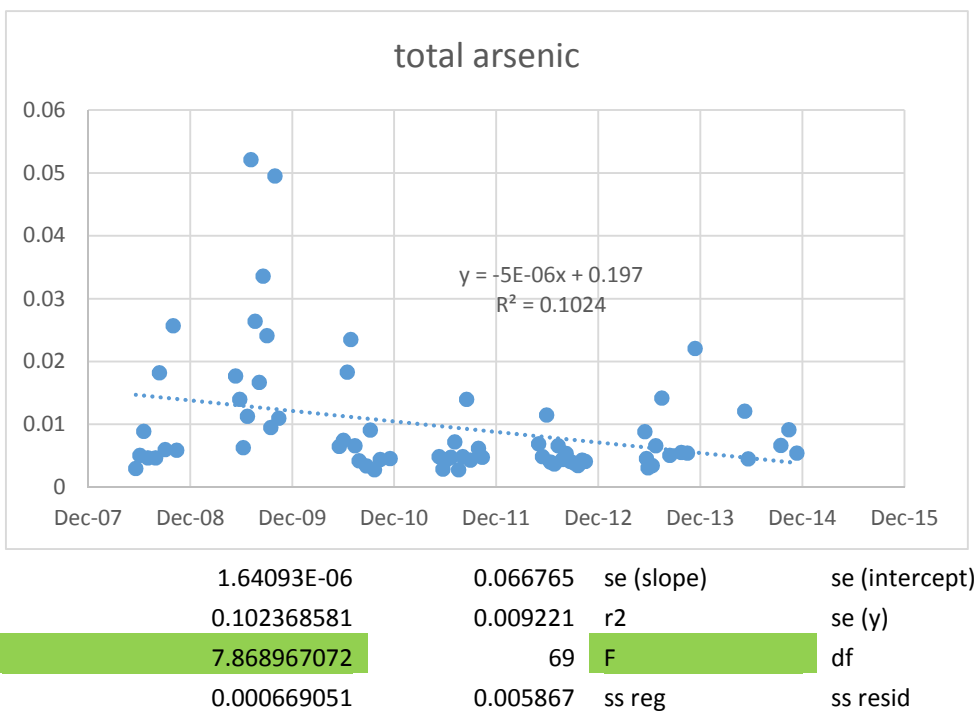
Figure 179: WQ-PC-D total aluminum concentration showing statistically significant decreasing trend. Total aluminum CCME Guideline is 0.1 mg/L at pH>6.5.

Appendix C. Pony Creek downstream of Pit (WQ-PC-D)



CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

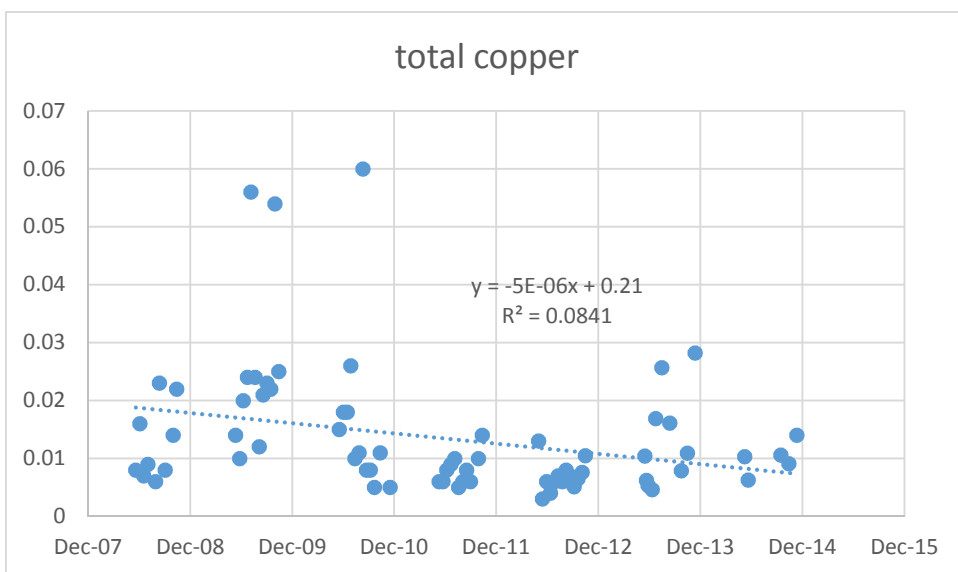
Figure 180: WQ-PC-D total arsenic concentration showing statistically significant decreasing trend. With potential outlier (12 August 2010) trend is significant. Total arsenic CCME Guideline is 0.005 mg/L.



CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 181: WQ-PC-D total arsenic concentration showing statistically significant decreasing trend. With outlier removed model has improved.

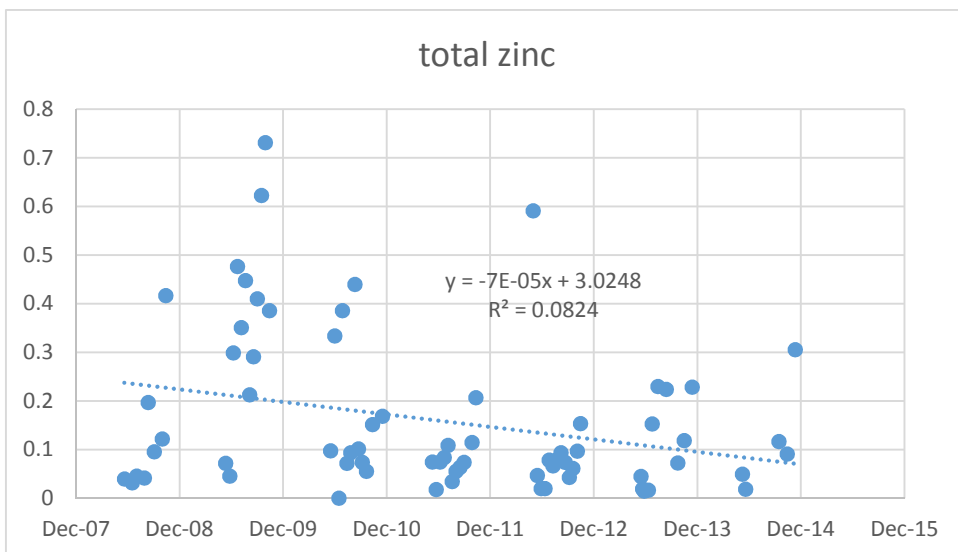
Appendix C. Pony Creek downstream of Pit (WQ-PC-D)



1.90559E-06	0.077526	se (slope)	se (intercept)
0.084101888	0.010721	r2	se (y)
6.427715106	70	F	df
0.000738823	0.008046	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 182: WQ-PC-D total copper concentration showing statistically significant decreasing trend. Total copper CCME Guideline is a function of water hardness, maximum value of 0.004 mg/L and minimum value of 0.002 mg/L. EQS is 0.2 mg/L.

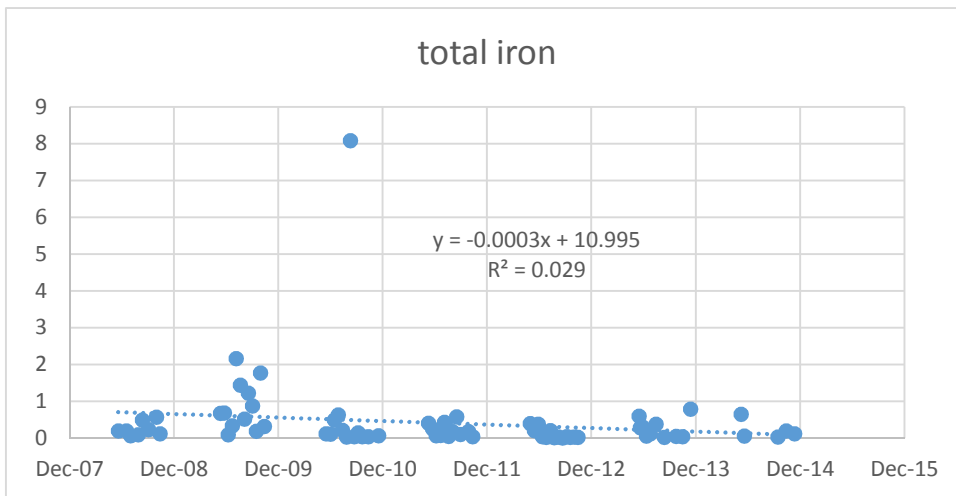


2.82804E-05	1.150975	se (slope)	se (intercept)
0.082402173	0.156142	r2	se (y)
6.196341948	69	F	df
0.15106806	1.682234	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 183: WQ-PC-D total zinc concentration showing statistically significant decreasing trend. Total zinc CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

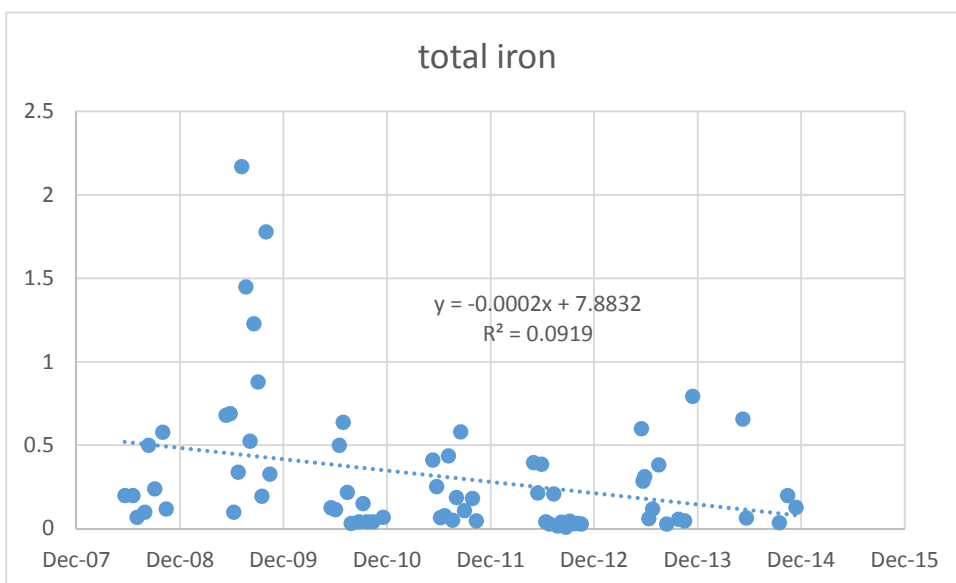
Appendix C. Pony Creek downstream of Pit (WQ-PC-D)



0.000181104	7.370676	se (slope)	se (intercept)
0.028952937	0.999908	r2	se (y)
2.057318028	69	F	df
2.056937845	68.98725	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 184: WQ-PC-D total iron concentration showing statistically significant decreasing trend. With potential outlier (12 August 2010) trend is negative. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

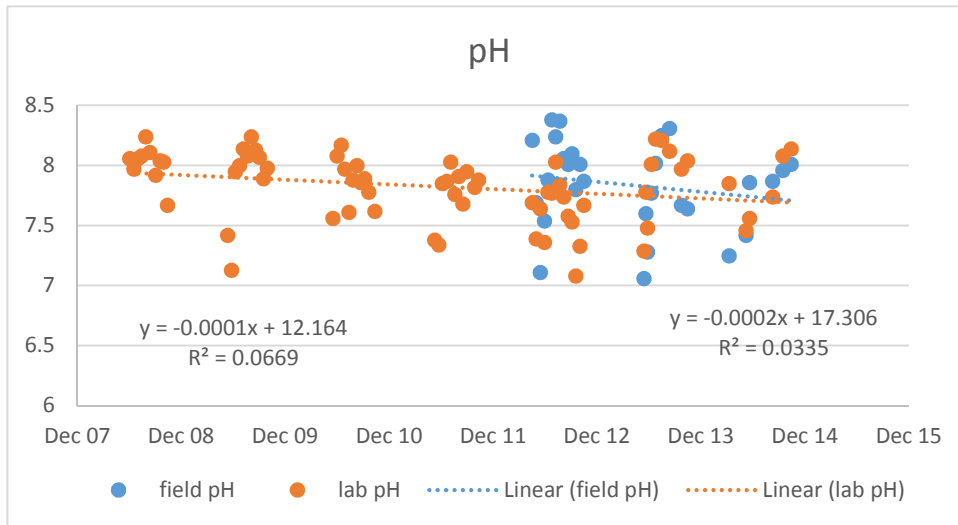


7.09049E-05	2.886035	se (slope)	se (intercept)
0.091865984	0.390926	r2	se (y)
6.878816147	68	F	df
1.05124332	10.39198	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 185: WQ-PC-D total iron concentration showing statistically significant decreasing trend. Without outlier model has improved.

Appendix C. Back Creek near confluence with Victoria Creek (WQ-BC)



field pH

-0.00023	17.30595	slope	intercept
0.000236	9.782498	se (slope)	se (intercept)
0.033546	0.365694	r2	se (y)
0.937194	27	F	df
0.125333	3.61077	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

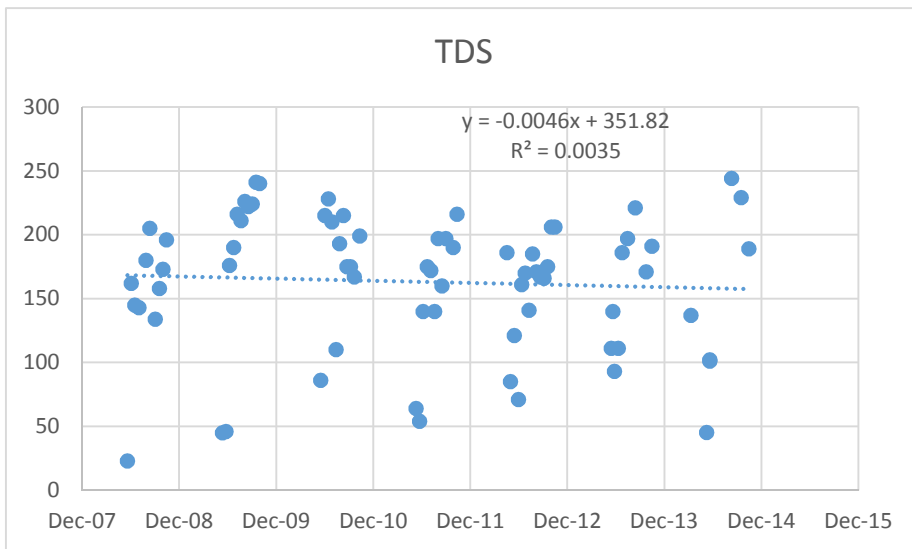
lab pH

-0.00011	12.16445	slope	intercept
4.76E-05	1.936424	se (slope)	se (intercept)
0.066924	0.270151	r2	se (y)
5.020694	70	F	df
0.366417	5.108694	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 186: WQ-BC field and lab pH values both showing statistically significant decreasing pH trend. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

Appendix C. Back Creek near confluence with Victoria Creek (WQ-BC)



0.009273	377.4049	se (slope)	se (intercept)
0.003507	53.69231	r2	se (y)
0.249865	71	F	df
720.3262	204683.4	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 187: WQ-BC TDS concentration showing statistically significant decreasing trend. No CCME Guideline or EQS available.

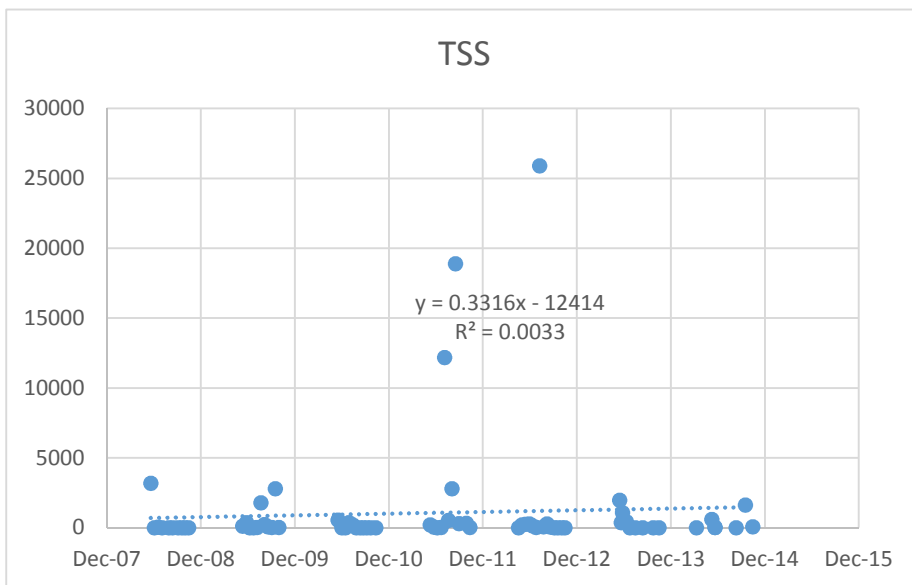
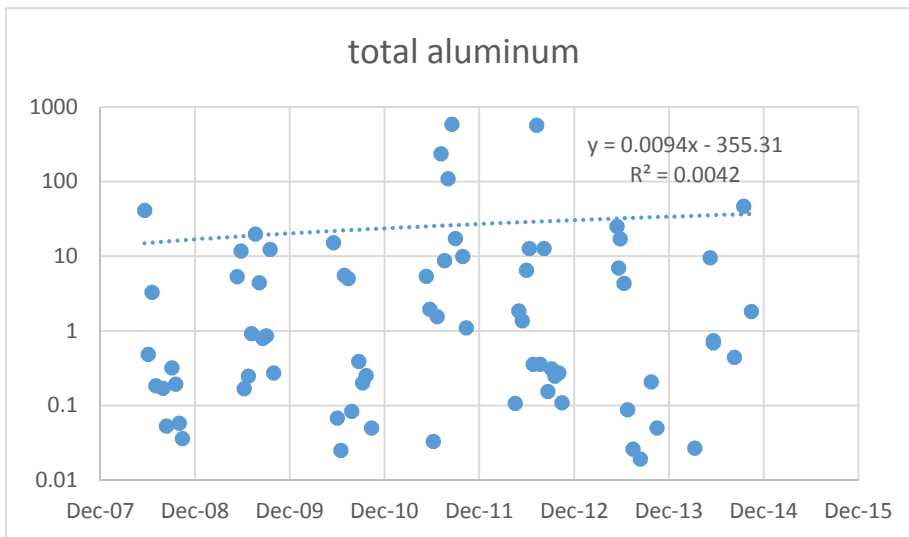


Figure 188: WQ-BC TSS concentration. Greater than 10% of samples are ND, trend analysis is not appropriate.

Appendix C. Back Creek near confluence with Victoria Creek (WQ-BC)

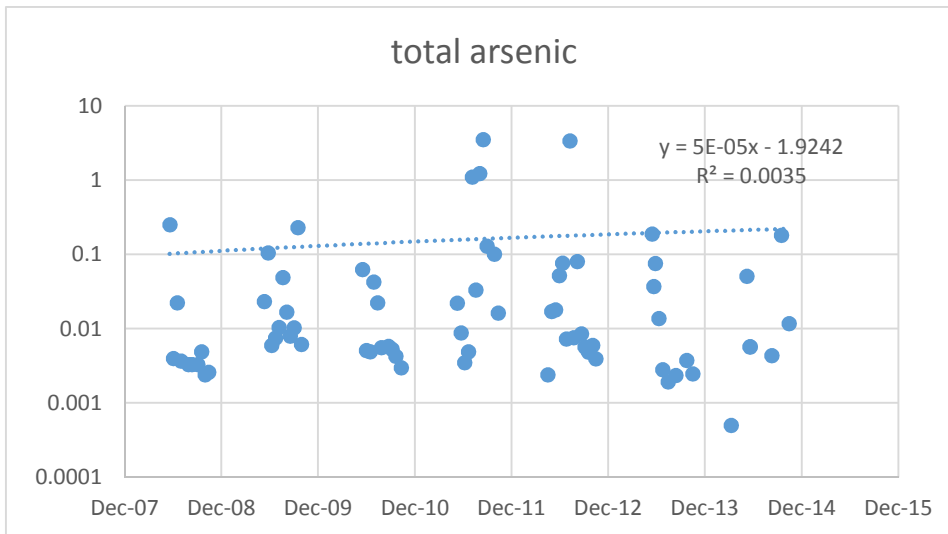


0.017231	701.3759	se (slope)	se (intercept)
0.004193	99.64271	r2	se (y)
0.294747	70	F	df
2926.445	695006.9	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 189: WQ-BC total aluminum concentration showing statistically significant increasing trend.

Several potential outlier are present in 2011 and 2012. Total aluminum CCME Guideline is 0.1 mg/L at pH>6.5.



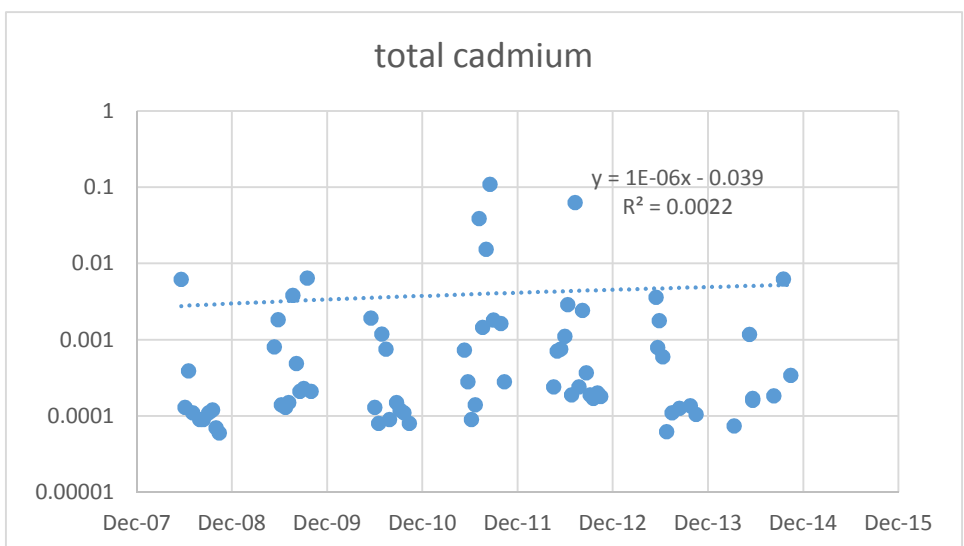
0.000103795	4.224971	se (slope)	se (intercept)
0.00346153	0.600231	r2	se (y)
0.243148769	70	F	df
0.087600971	25.21941	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 190: WQ-BC total arsenic concentration showing statistically significant increasing trend. Several

potential outlier are present in 2011 and 2012. Total arsenic CCME Guideline is 0.005 mg/L.

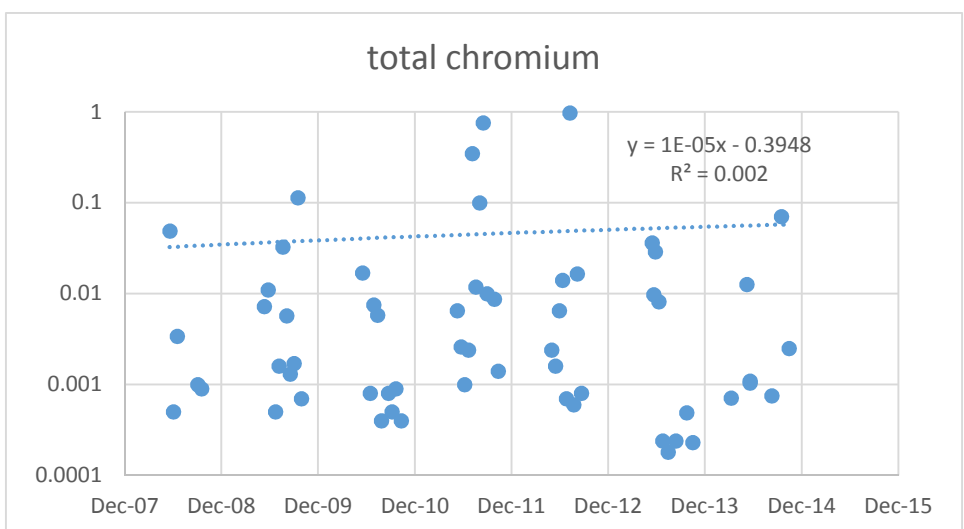
Appendix C. Back Creek near confluence with Victoria Creek (WQ-BC)



2.6638E-06	0.10843	se (slope)	se (intercept)
0.00224134	0.015404	r2	se (y)
0.15724625	70	F	df
3.73138E-05	0.016611	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 191: WQ-BC total cadmium concentration showing statistically significant increasing trend. Several potential outlier are present in 2011 and 2012. Total cadmium CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.

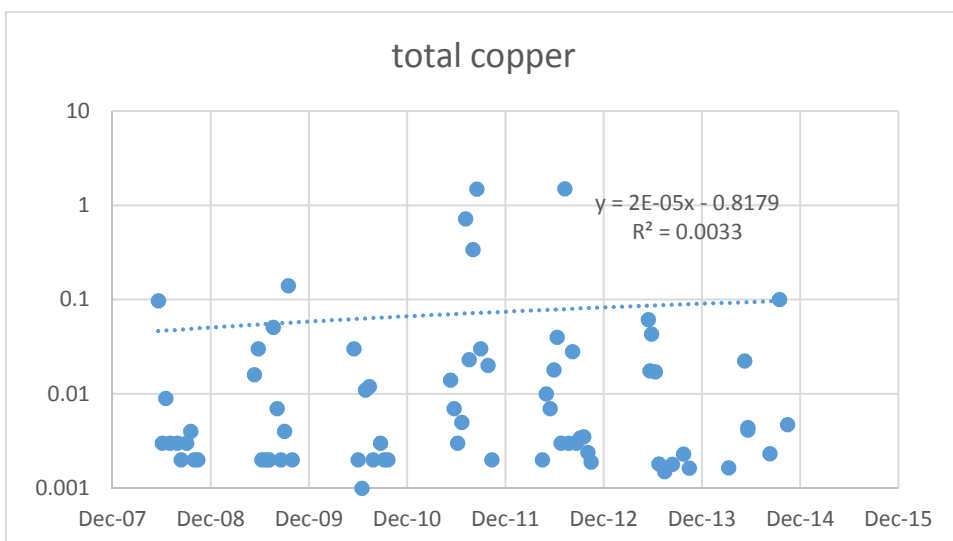


3.20564E-05	1.306948	se (slope)	se (intercept)
0.001951498	0.164571	r2	se (y)
0.113408192	58	F	df
0.003071506	1.570851	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 192: WQ-BC total chromium concentration showing statistically significant increasing trend. Several potential outlier are present in 2011 and 2012. Total chromium CCME Guideline is 0.0089 mg/L and EQS is 0.04 mg/L.

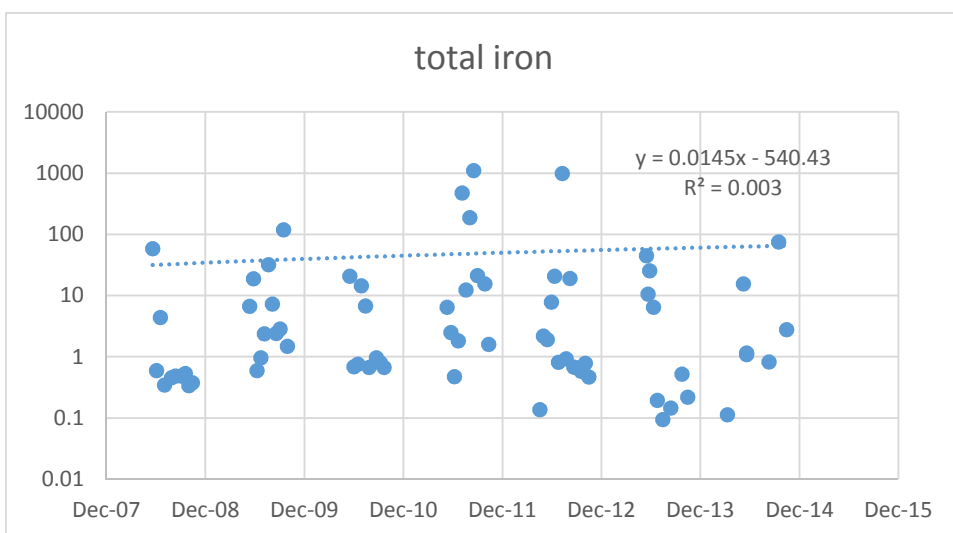
.Appendix C. Back Creek near confluence with Victoria Creek (WQ-BC)



4.55979E-05	1.856222	se (slope)	se (intercept)
0.00331101	0.263465	r2	se (y)
0.229218669	69	F	df
0.015910969	4.789561	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 193: WQ-BC total copper concentration showing statistically significant increasing trend. Several potential outliers are present in 2011 and 2012. Total copper CCME Guideline is a function of water hardness, maximum value of 0.004 mg/L and minimum value of 0.002 mg/L. EQS is 0.2 mg/L.

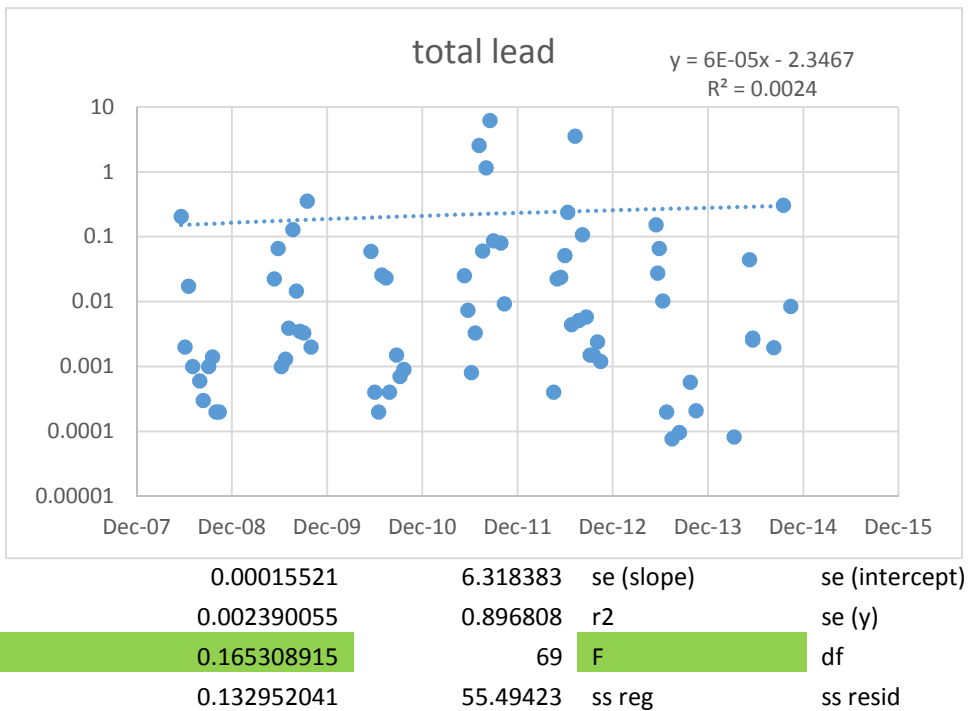


0.031929247	1299.791	se (slope)	se (intercept)
0.002959573	184.4875	r2	se (y)
0.204816696	69	F	df
6971.068846	2348460	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 194: WQ-BC total iron concentration showing statistically significant increasing trend. Several potential outliers are present in 2011 and 2012. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

Appendix C. Back Creek near confluence with Victoria Creek (WQ-BC)



CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 195: WQ-BC total lead concentration showing statistically significant increasing trend. Several potential outliers are present in 2011 and 2012. Total lead CCME Guideline is a function of water hardness, maximum value of 0.007 mg/L and EQS is 0.1 mg/L.

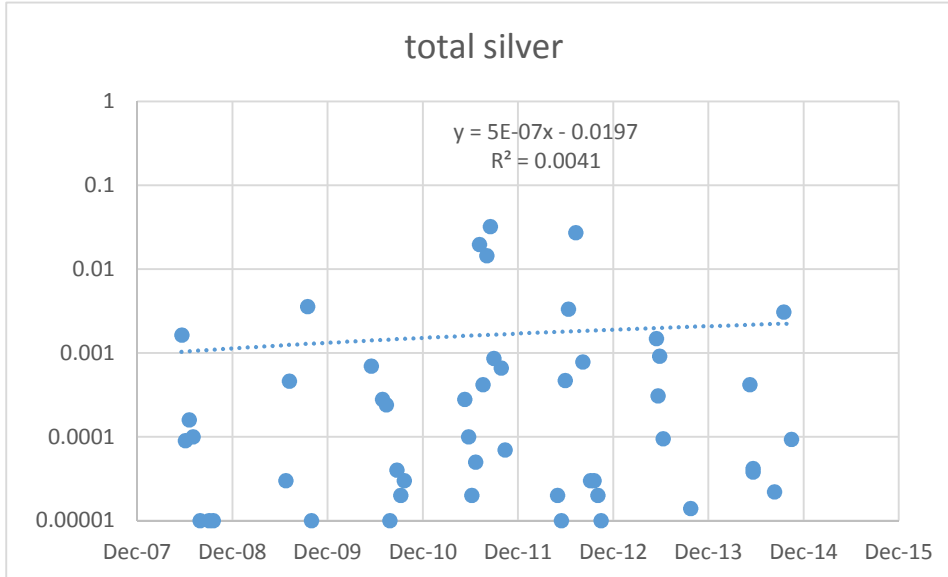


Figure 196: WQ-BC total silver concentration showing apparent increasing trend. Greater than 10% of samples are ND, trend analysis is not appropriate. Several potential outliers are present in 2011 and 2012.

Appendix C. Back Creek near confluence with Victoria Creek (WQ-BC)

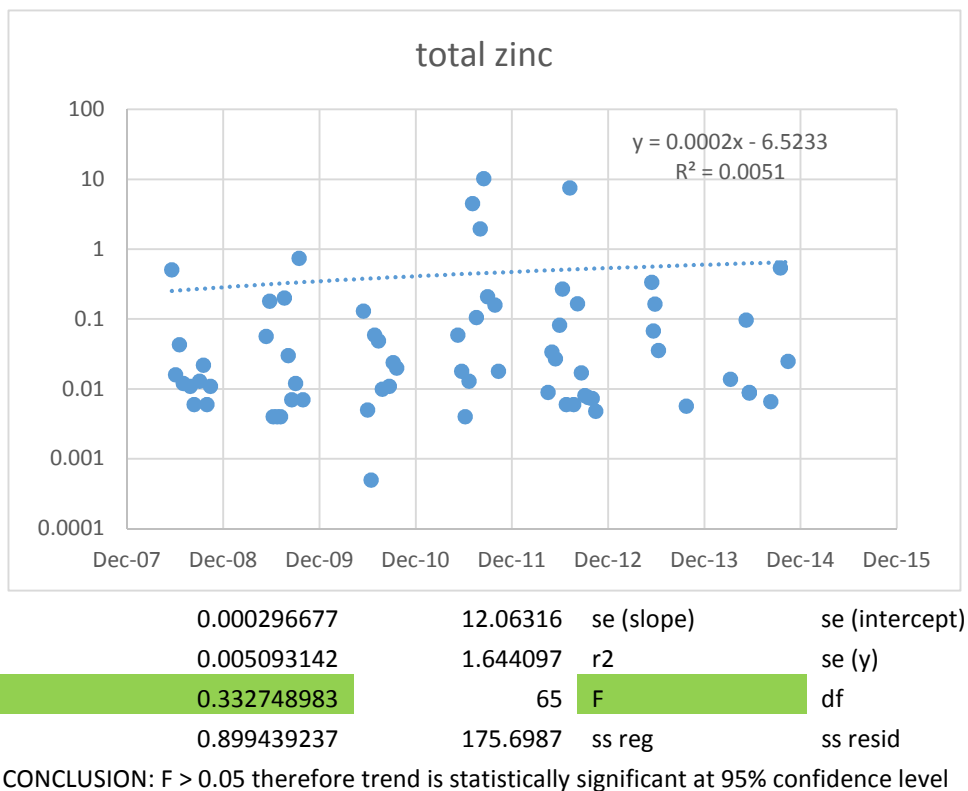
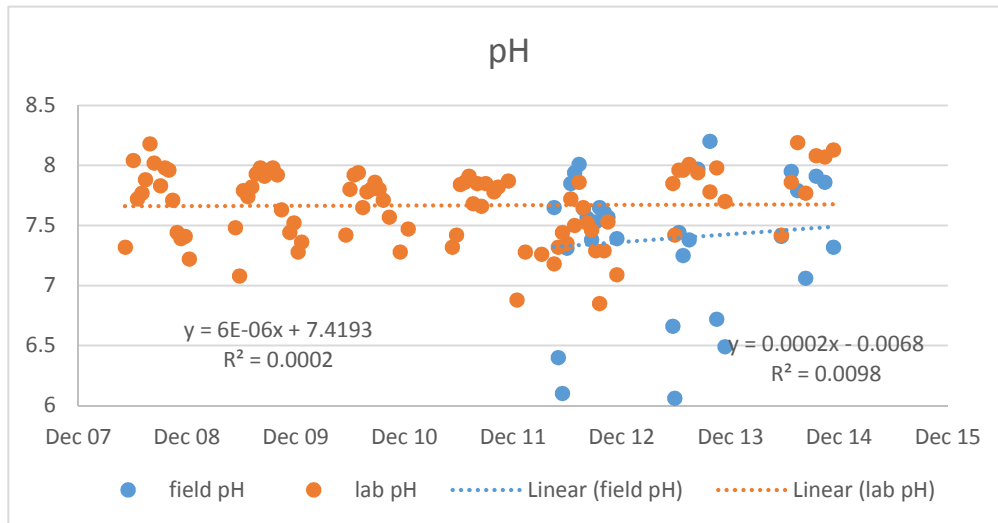


Figure 197: WQ-BC total zinc concentration showing statistically significant increasing trend. Several potential outliers are present in 2011 and 2012. Total zinc CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

Appendix C. Victoria Creek North of Mine Access Road (WQ-VC-R)



field pH

0.000178672	-0.00681	slope	intercept
0.000333807	13.81777	se (slope)	se (intercept)
0.009782636	0.570464	r2	se (y)
0.286499163	29	F	df
0.093235085	9.437436	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

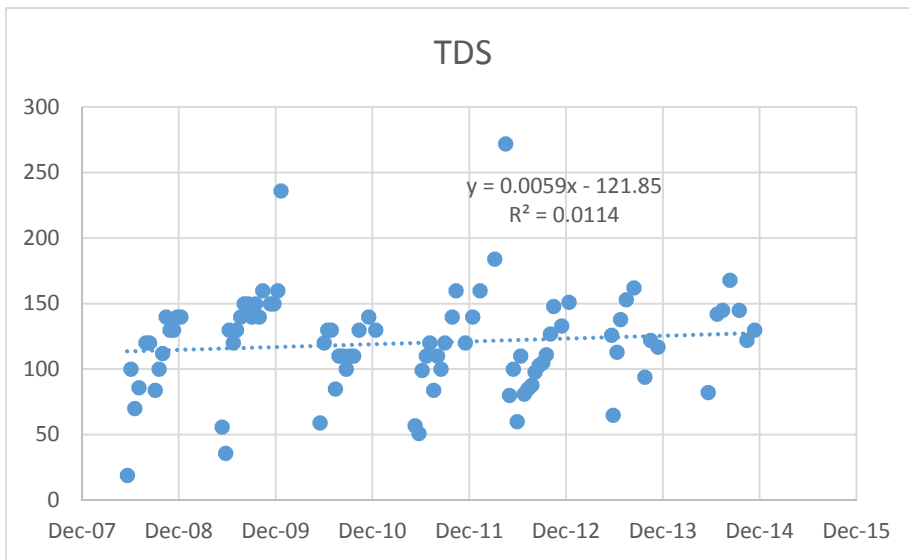
lab pH

6.12682E-06	7.419296	slope	intercept
4.67694E-05	1.900456	se (slope)	se (intercept)
0.000194975	0.298903	r2	se (y)
0.017161112	88	F	df
0.001533225	7.862182	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend is NOT statistically significant at 95% confidence level

Figure 198: WQ-VC-R field pH shows statistically significant increasing trend and lab pH values are not a significant trend. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

Appendix C. Victoria Creek North of Mine Access Road (WQ-VC-R)



0.005909	240.2189	se (slope)	se (intercept)
0.011375	37.47117	r2	se (y)
1.01248	88	F	df
1421.612	123559.8	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 199: WQ-VC-R TDS concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

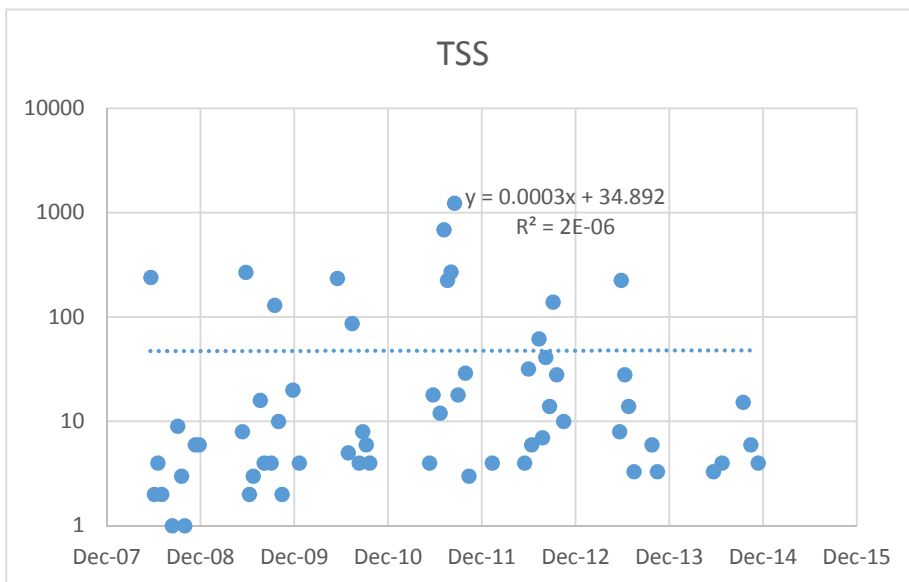
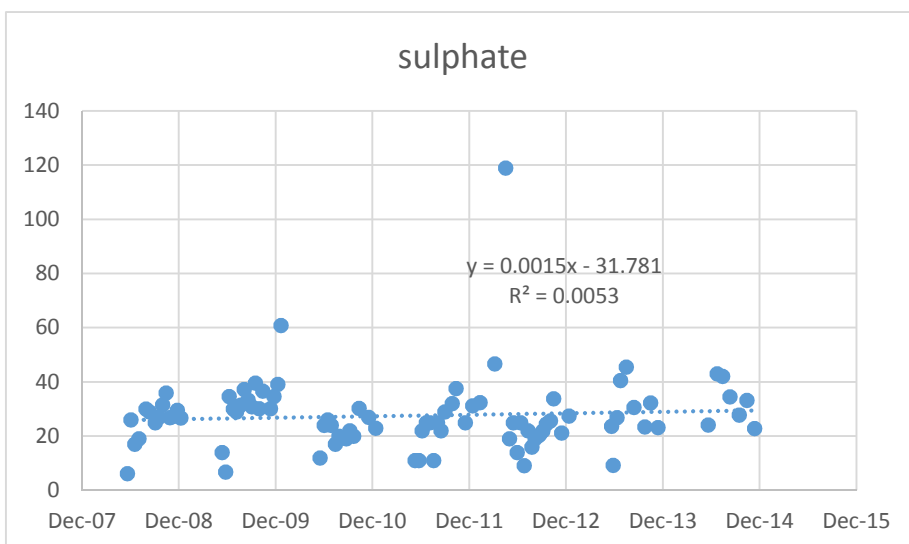


Figure 200: WQ-VC-R TSS concentration showing apparent increasing trend. Greater than 10% of samples are ND, trend analysis is not appropriate. TSS EQS 50 mg/L.

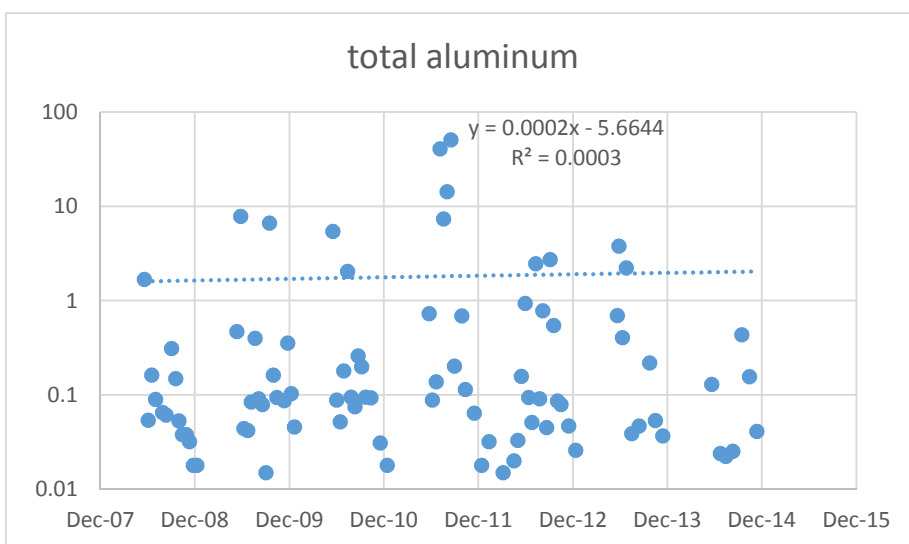
Appendix C. Victoria Creek North of Mine Access Road (WQ-VC-R)



0.002137	86.89565	se (slope)	se (intercept)
0.005332	13.54347	r2	se (y)
0.466356	87	F	df
85.54168	15958.04	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 201: WQ-VC-R sulphate concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

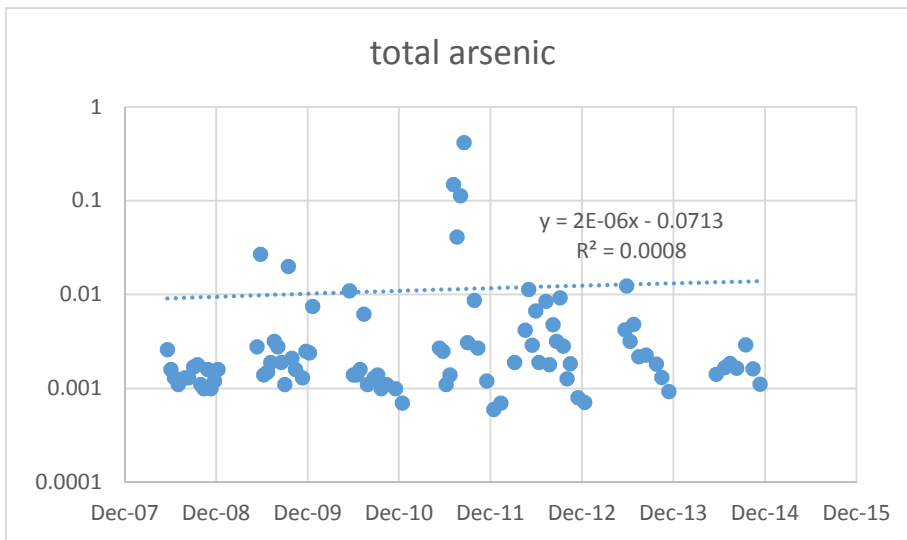


0.001119	45.47546	se (slope)	se (intercept)
0.000309	7.093582	r2	se (y)
0.026906	87	F	df
1.353872	4377.745	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend is NOT statistically significant at 95% confidence level

Figure 202: WQ-VC-R total aluminum concentration trend is not statistically significant. Total aluminum CCME Guideline is 0.1 mg/L at pH>6.5.

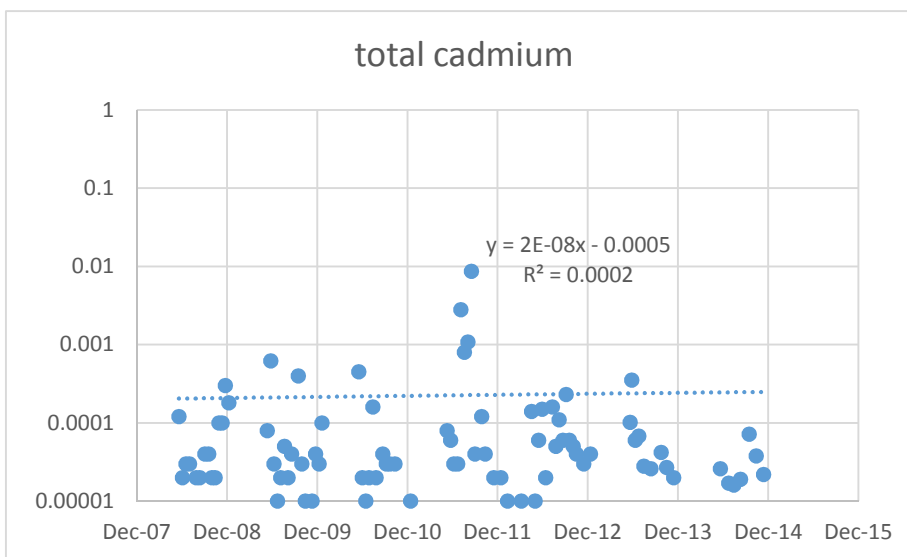
Appendix C. Victoria Creek North of Mine Access Road (WQ-VC-R)



7.7E-06	0.312974	se (slope)	se (intercept)
0.000808	0.048669	r2	se (y)
0.069511	86	F	df
0.000165	0.203703	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 203: WQ-VC-R total arsenic concentration showing statistically significant increasing trend. Total arsenic CCME Guideline is 0.005 mg/L.

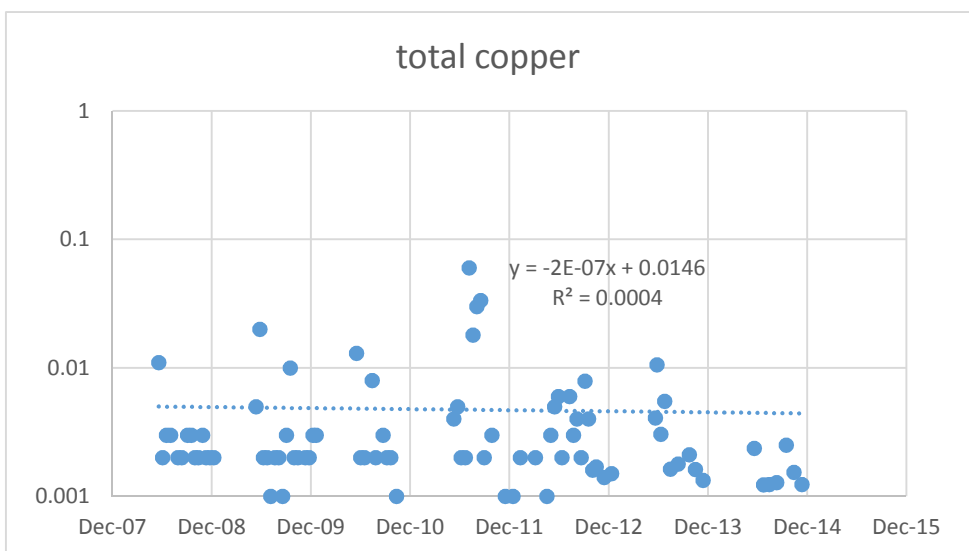


1.57E-07	0.006383	se (slope)	se (intercept)
0.000172	0.000988	r2	se (y)
0.014475	84	F	df
1.41E-08	8.19E-05	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend is NOT statistically significant at 95% confidence level

Figure 204: WQ-VC-R total cadmium concentration does not have a statistically significant trend. Total cadmium CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.

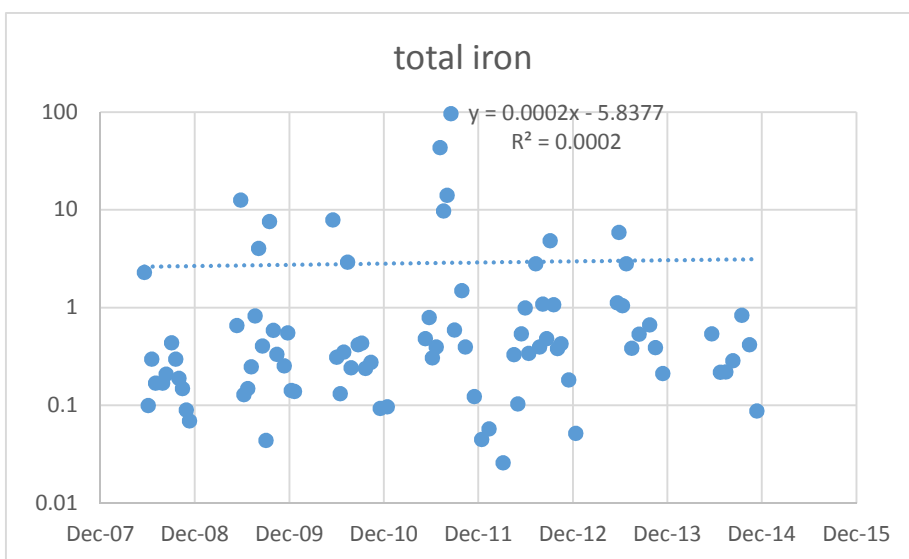
Appendix C. Victoria Creek North of Mine Access Road (WQ-VC-R)



1.31119E-06	0.053306	se (slope)	se (intercept)
0.000415582	0.008273	r2	se (y)
0.034091898	82	F	df
2.33314E-06	0.005612	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend is NOT statistically significant at 95% confidence level

Figure 205: WQ-VC-R total copper concentration does not show a statistically significant trend. Total copper CCME Guideline is a function of water hardness, maximum value of 0.004 mg/L and minimum value of 0.002 mg/L. EQS is 0.2 mg/L.



0.001861	75.68221	se (slope)	se (intercept)
0.000157	11.53826	r2	se (y)
0.013183	84	F	df
1.755055	11183.04	ss reg	ss resid

CONCLUSION: $F < 0.05$ therefore trend is NOT statistically significant at 95% confidence level

Figure 206: WQ-VC-R total iron concentration does not have a statistically significant trend. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

Appendix C. Victoria Creek North of Mine Access Road (WQ-VC-R)

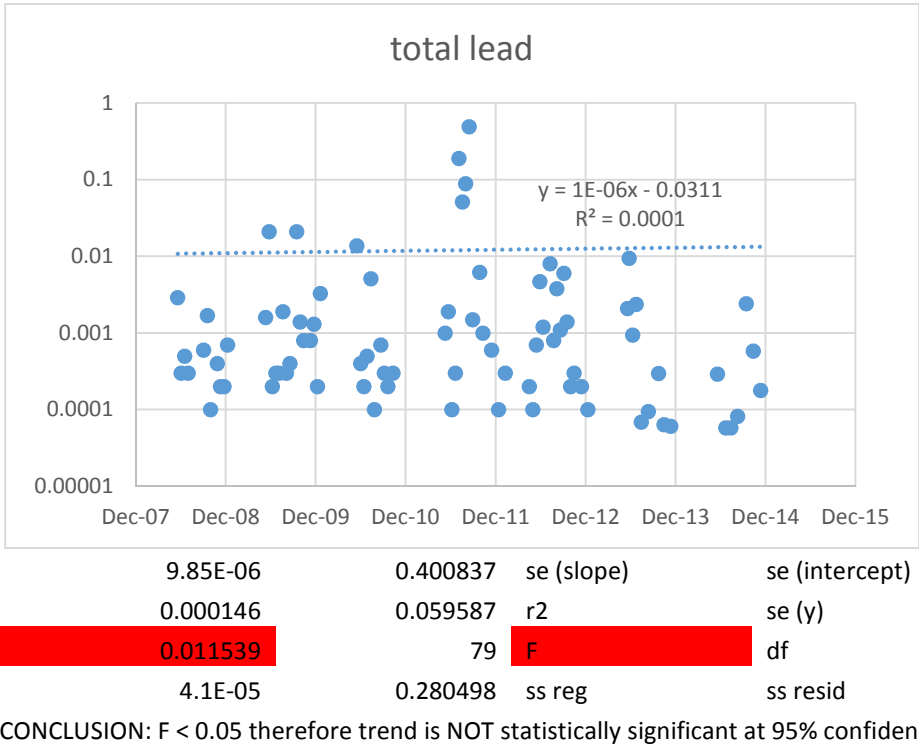
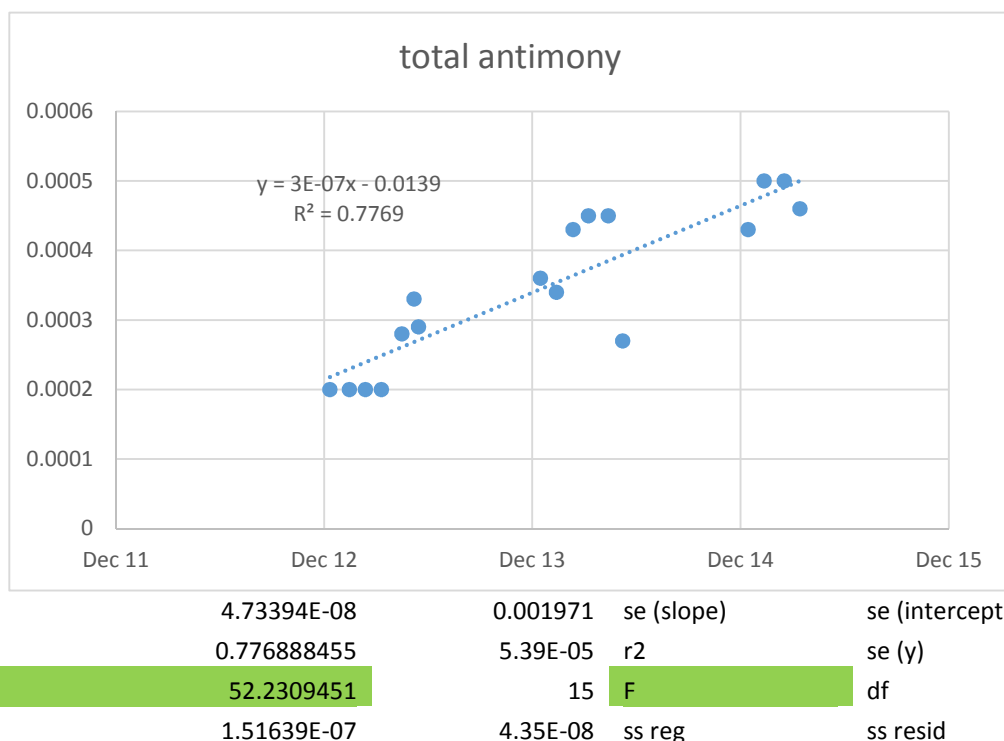
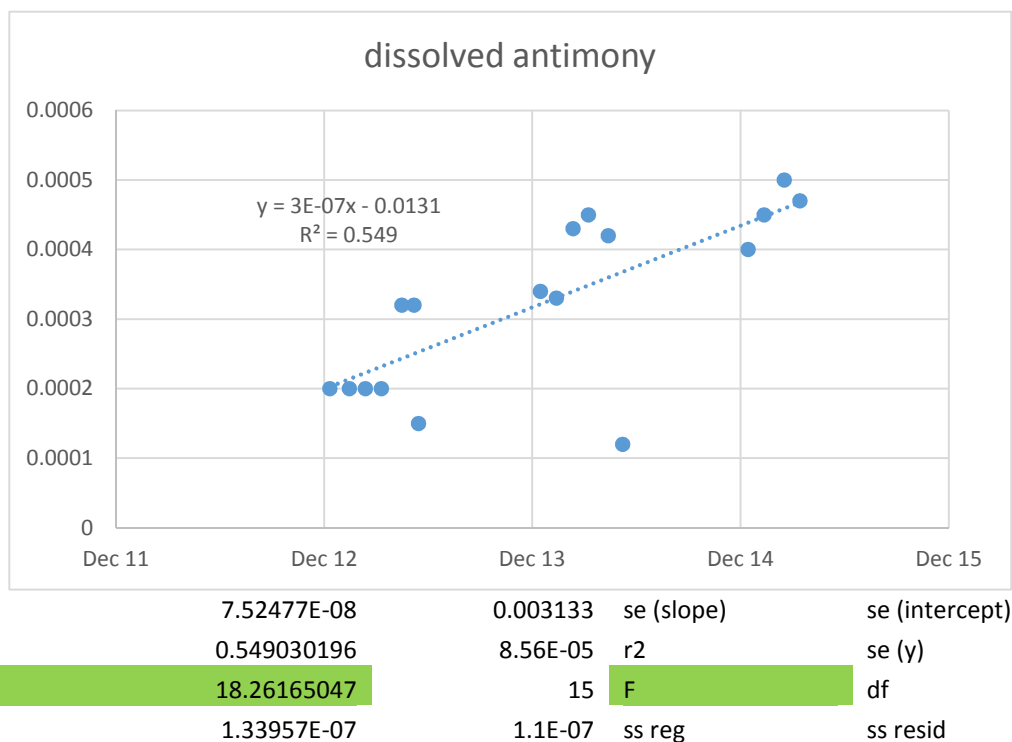


Figure 207: WQ-VC-R total lead concentration does not show a statistically significant trend. Total lead CCME Guideline is a function of water hardness, maximum value of 0.007 mg/L and EQS is 0.1 mg/L.

Appendix C. Victoria Creek winter sampling location (WQ-VC-R+150)

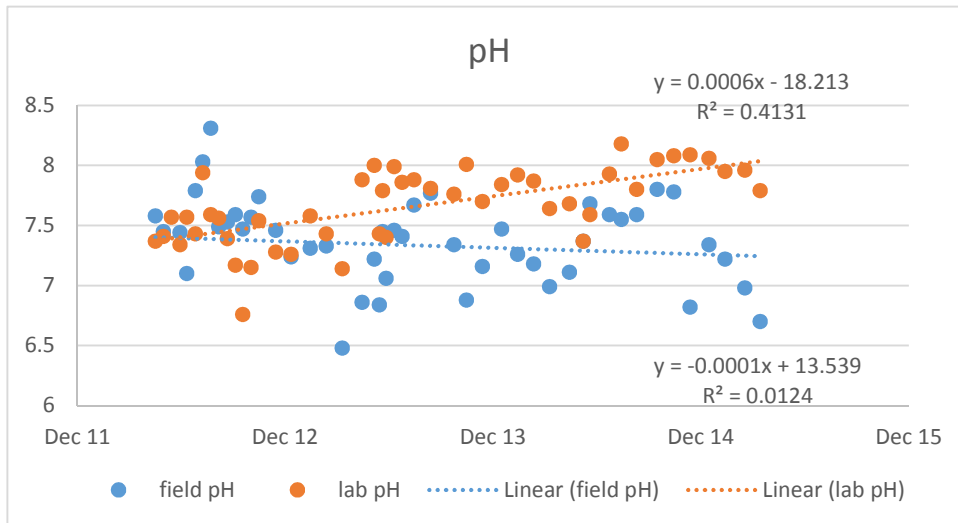


CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level
 Figure 208: WQ-VC-R+150 total antimony concentration shows a statistically significant increasing trend.
 The EQS for total antimony is 0.15 mg/L.



CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level
 Figure 209: WQ-VC-R+150 dissolved antimony concentration shows a statistically significant increasing trend. No CCME Guideline or EQS available.

Appendix C. Victoria Creek downstream of Back Creek (WQ-VC-DBC)



field pH

-0.00015	13.53904	slope	intercept
0.000197	8.170135	se (slope)	se (intercept)
0.012382	0.433327	r2	se (y)
0.576694	46	F	df
0.108287	8.637511	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

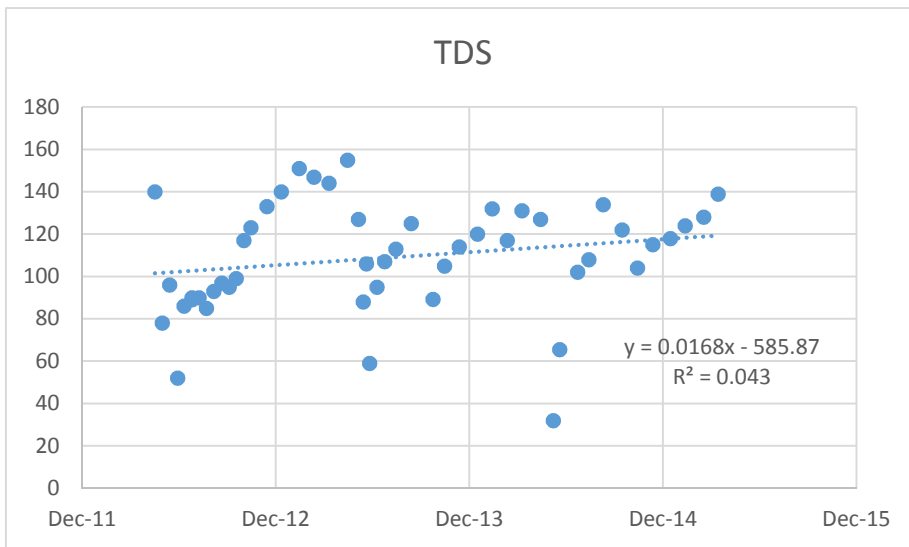
lab pH

0.000624	-18.2132	slope	intercept
0.00011	4.547306	se (slope)	se (intercept)
0.413125	0.241179	r2	se (y)
32.3813	46	F	df
1.883541	2.675707	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 210: WQ-VC-DBC field pH values shows statistically significant decreasing pH trend and lab pH increasing trend over different sampling date ranges. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

Appendix C. Victoria Creek downstream of Back Creek (WQ-VC-DBC)



0.011535	478.3811	se (slope)	se (intercept)
0.042979	25.76547	r2	se (y)
2.110722	47	F	df
1401.223	31201.4	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 211: WQ-VC-DBC TDS concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

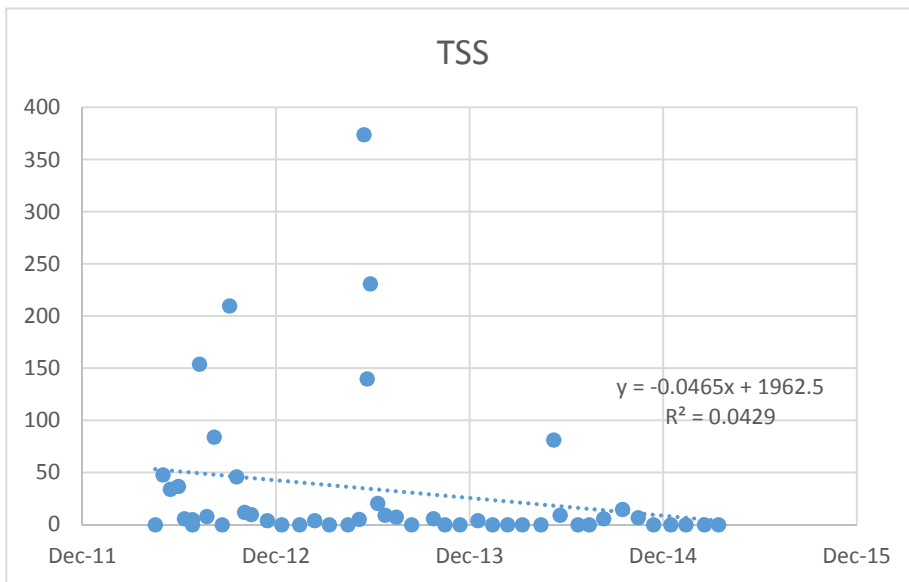
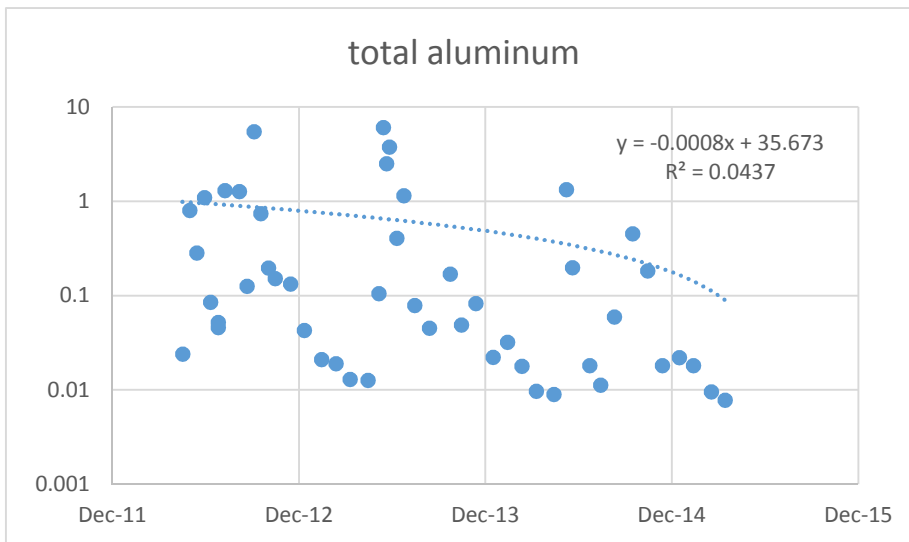


Figure 212: WQ-VC-DBC TSS concentration showing apparent decreasing trend. Greater than 10% of samples are ND, trend analysis is not appropriate. TSS EQS 50 mg/L.

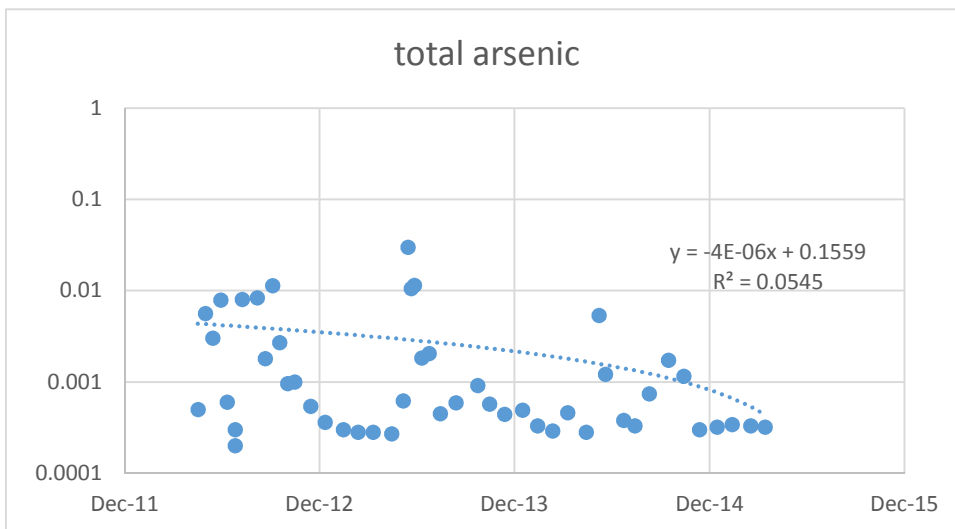
Appendix C. Victoria Creek downstream of Back Creek (WQ-VC-DBC)



0.000584	24.20475	se (slope)	se (intercept)
0.043658	1.28648	r2	se (y)
2.099934	46	F	df
3.475453	76.13137	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 213: WQ-VC-DBC total aluminum concentration showing statistically significant decreasing trend. Total aluminum CCME Guideline is 0.1 mg/L at pH>6.5.

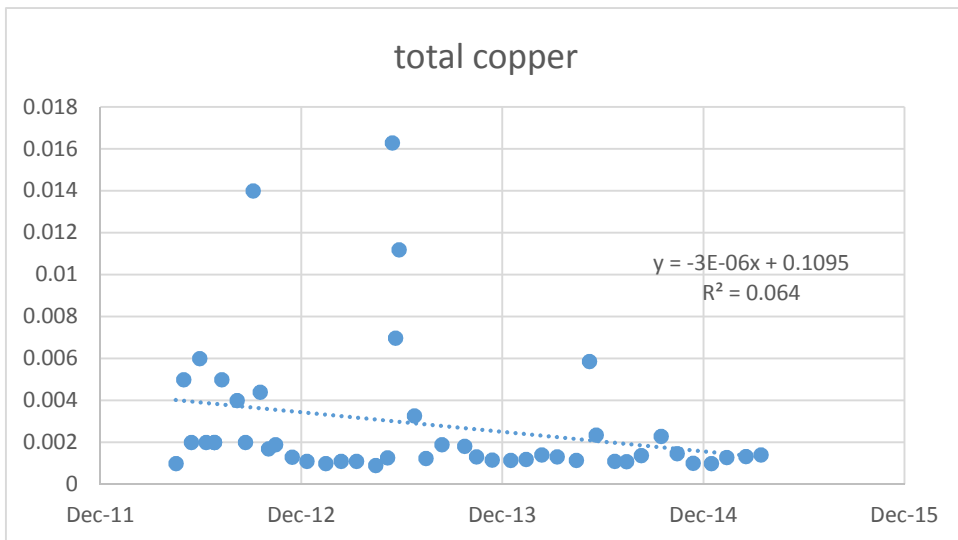


2.2692E-06	0.094122	se (slope)	se (intercept)
0.054463862	0.005003	r2	se (y)
2.649647714	46	F	df
6.63091E-05	0.001151	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 214: WQ-VC-DBC total arsenic concentration showing statistically significant decreasing trend. Total arsenic CCME Guideline is 0.005 mg/L.

Appendix C. Victoria Creek downstream of Back Creek (WQ-VC-DBC)

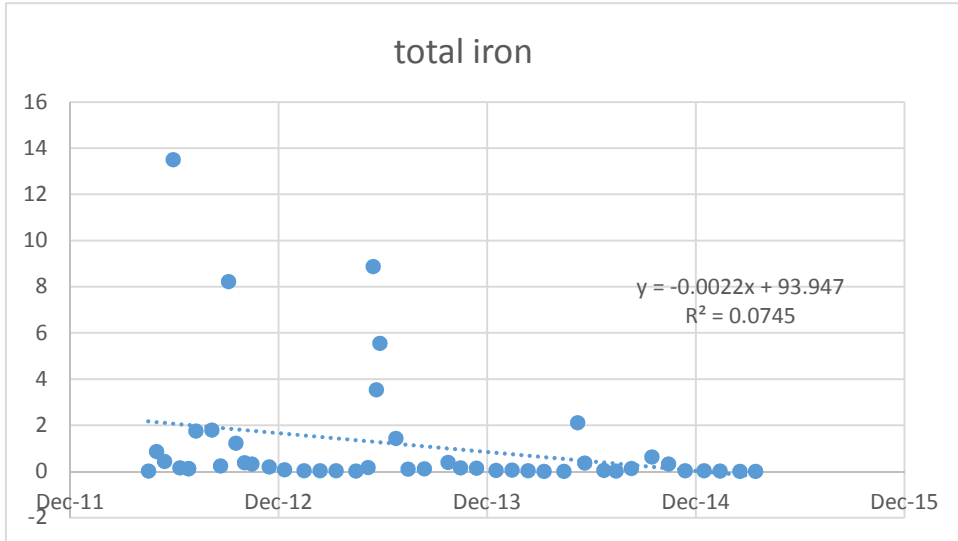


1.46599E-06	0.060807	se (slope)	se (intercept)
0.063971063	0.003231	r2	se (y)
3.075436794	45	F	df
3.2111E-05	0.00047	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 215: WQ-VC-DBC total copper concentration showing statistically significant decreasing trend.

Total copper CCME Guideline is a function of water hardness, maximum value of 0.004 mg/L and minimum value of 0.002 mg/L. EQS is 0.2 mg/L.

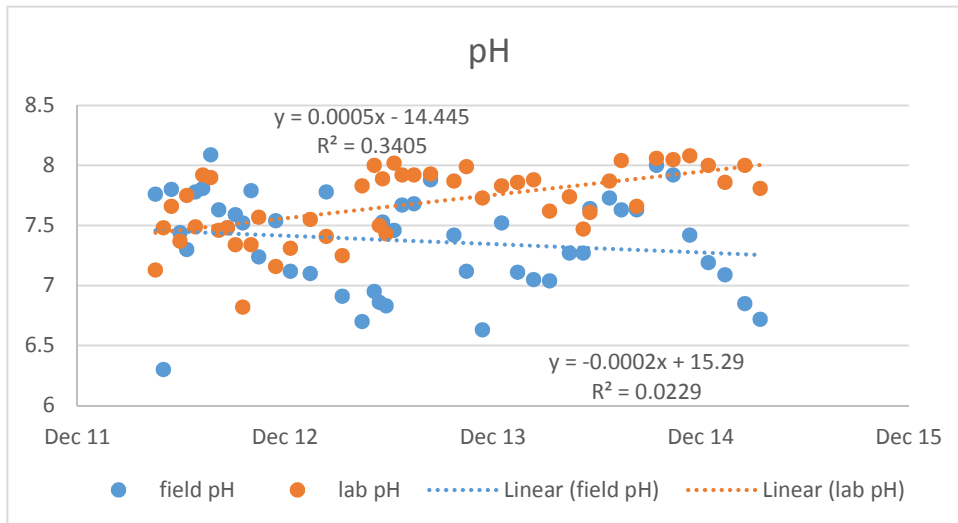


0.001175558	48.76081	se (slope)	se (intercept)
0.074496274	2.591124	r2	se (y)
3.62217056	45	F	df
24.31896801	302.1265	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 216: WQ-VC-DBC total iron concentration showing statistically significant decreasing trend. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

Appendix C. Victoria Creek upstream of Minnesota Creek (WQ-UMN)



field pH

-0.00019	15.28975	slope	intercept
0.000184	7.624646	se (slope)	se (intercept)
0.022915	0.404259	r2	se (y)
1.078798	46	F	df
0.176303	7.517578	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

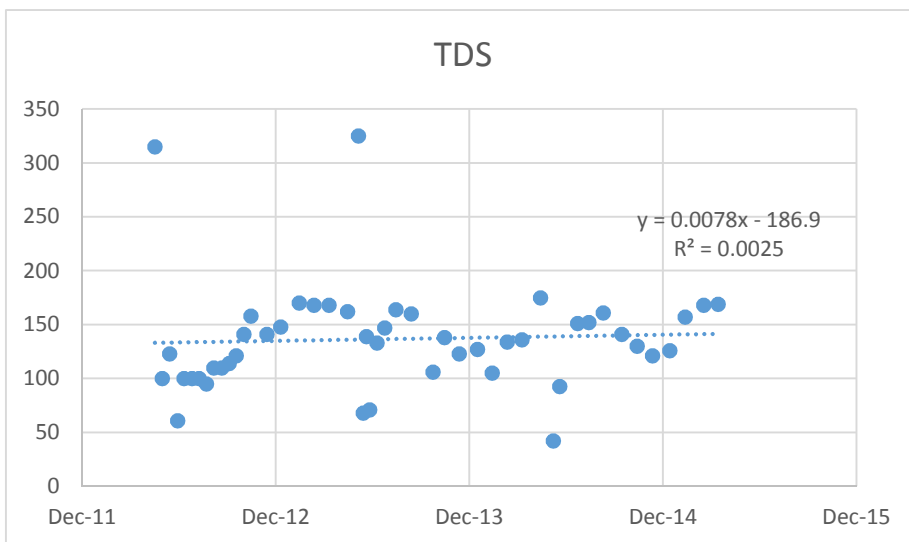
lab pH

0.000534	-14.4445	slope	intercept
0.000109	4.540668	se (slope)	se (intercept)
0.340527	0.240747	r2	se (y)
23.7527	46	F	df
1.376681	2.66611	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 217: WQ-UMN field pH values shows statistically significant decreasing pH trend and lab pH increasing trend over different sampling date ranges. pH CCME Guideline minimum 6.5 and maximum 9.0. EQS minimum 6.0 and maximum 8.5.

Appendix C. Victoria Creek upstream of Minnesota Creek (WQ-UMN)



0.02278	944.878	se (slope)	se (intercept)
0.002545	50.09751	r2	se (y)
0.117376	46	F	df
294.5865	115449	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 218: WQ-UMN TDS concentration showing statistically significant increasing trend. No CCME Guideline or EQS available.

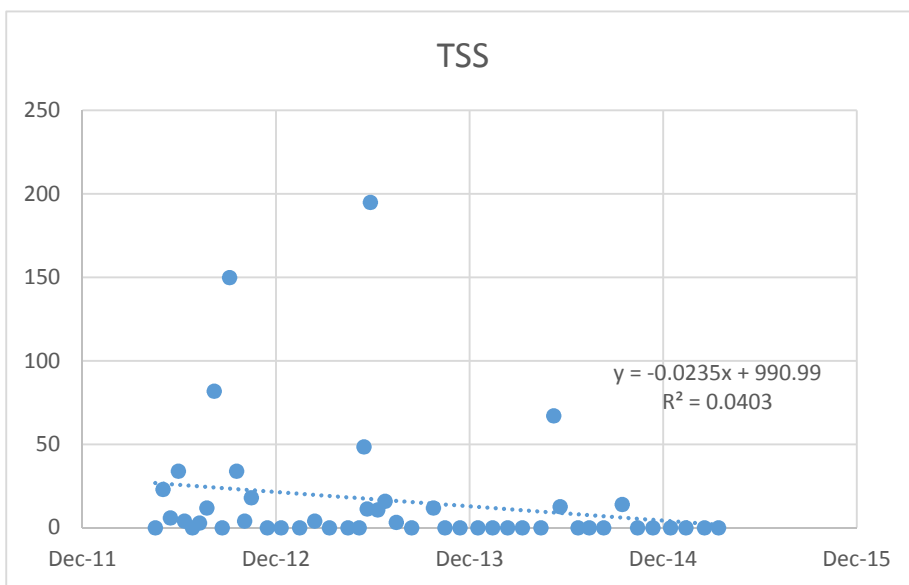
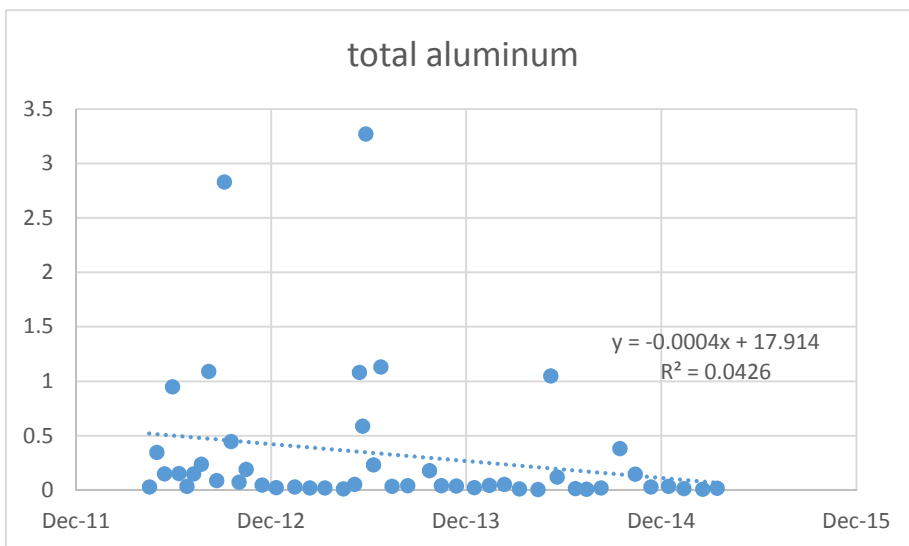


Figure 219: WQ-UMN TSS concentration showing apparent decreasing trend. Greater than 10% of samples are ND, trend analysis is not appropriate. TSS EQS 50 mg/L.

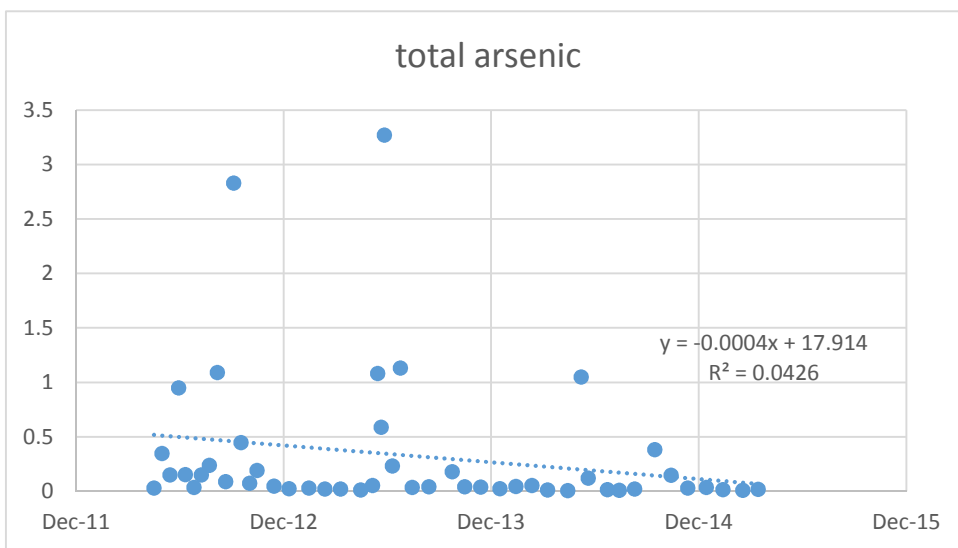
Appendix C. Victoria Creek upstream of Minnesota Creek (WQ-UMN)



0.000296	12.2912	se (slope)	se (intercept)
0.042626	0.651681	r2	se (y)
2.048098	46	F	df
0.869802	19.53563	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 220: WQ-UMN total aluminum concentration showing statistically significant decreasing trend. Total aluminum CCME Guideline is 0.1 mg/L at pH>6.5.

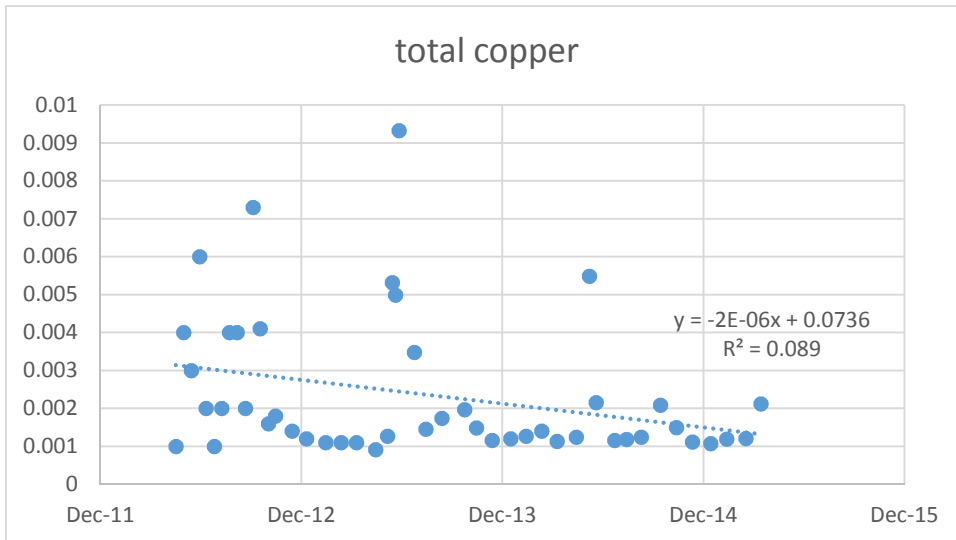


9.73227E-07	0.040368	se (slope)	se (intercept)
0.121866352	0.00214	r2	se (y)
6.383825764	46	F	df
2.92439E-05	0.000211	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 221: WQ-UMN total arsenic concentration showing statistically significant decreasing trend. Total arsenic CCME Guideline is 0.005 mg/L.

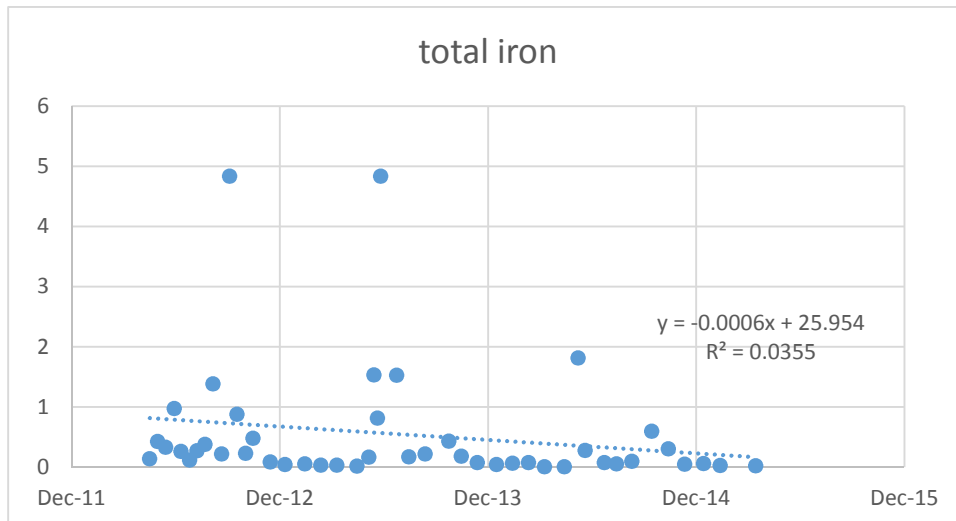
Appendix C. Victoria Creek upstream of Minnesota Creek (WQ-UMN)



8.1967E-07	0.033999	se (slope)	se (intercept)
0.088969062	0.001802	r2	se (y)
4.394590375	45	F	df
1.42747E-05	0.000146	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 222: WQ-UMN total copper concentration showing statistically significant decreasing trend. Total copper CCME Guideline is a function of water hardness, maximum value of 0.004 mg/L and minimum value of 0.002 mg/L. EQS is 0.2 mg/L.

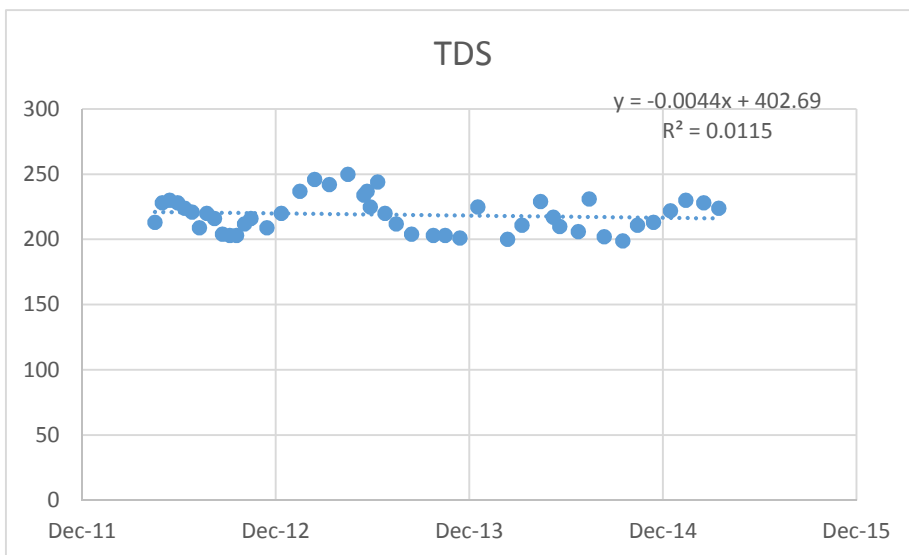


0.000481456	19.96443	se (slope)	se (intercept)
0.035513521	1.021113	r2	se (y)
1.62013148	44	F	df
1.689266495	45.87759	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 223: WQ-UMN total iron concentration showing statistically significant decreasing trend. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

Appendix C. Pumphouse Well (WQ-PW)



0.006193	256.8769	se (slope)	se (intercept)
0.011494	13.57441	r2	se (y)
0.511618	44	F	df
94.27312	8107.64	ss reg	ss resid

CONCLUSION: $F > 0.05$ therefore trend is statistically significant at 95% confidence level

Figure 224: WQ-PW TDS concentration showing statistically significant decreasing trend. No CCME Guideline or EQS available.

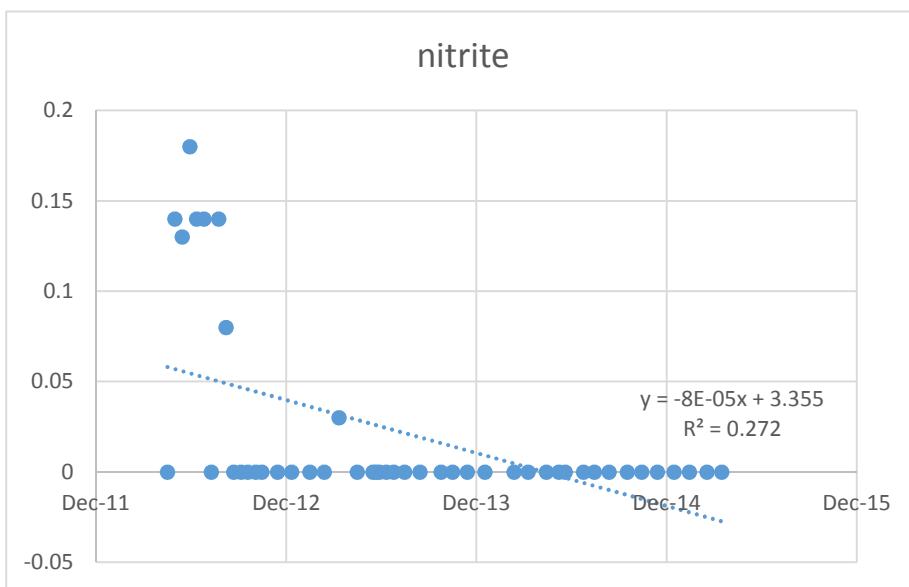


Figure 225: WQ-PW nitrite concentrations, greater than 10% of samples are ND, trend analysis is not appropriate

APPENDIX D

WATER QUALITY STATION TREND ANALYSIS WITH DATA GROUPED BY YEAR

Table D1: Water Quality Station Annual Statistical Summary Figure Numbers

Water Quality Station Name	Code	Figure Numbers
Reference WQS		
Victoria Creek Reference Site	WQ-VC-REF	1
Victoria Creek north of confluence with Back Creek	WQ-VC-U	2
Dome Creek upstream of Mill Site	WQ-DC-DX	3
Dome Creek Upstream of Mill Site winter sampling location	WQ-DC-DX+105	4
Pony Creek upstream of Pit and Waste Rock	WQ-PC-U	5
Mine Source WQS		
Tailings Pond	WQ-TP	6 - 15
Seepage Pond discharge	WQ-SEEP	16 - 29
Top of Brown-McDade Pit	WQ-PIT-1	30 – 39
Middle of Brown-McDade Pit	WQ-PIT-2	40 - 48
Bottom of Brown-McDade Pit	WQ-PIT-3	49 - 58
Mill Site seep	WQ-MS-S-03	59
Near-Field Receiving Environment WQS		
Dome Creek downstream of Mill Site and upstream of Tailings Pond	WQ-DC-D1b	60
Upper Dome Creek downstream of Tailings Pond	WQ-DC-U	61 - 70
Dome Creek at Road	WQ-DC-R	71 - 80
Pony Creek downstream of Pit	WQ-PC-D	81 - 89
Far-Field Receiving Environment WQS		
Back Creek near confluence with Victoria Creek	WQ-BC	90
Victoria Creek North of Mine Access Road	WQ-VC-R	91 - 101
Victoria Creek winter sampling location	WQ-VC-R+150	102
Victoria Creek downstream of Back Creek	WQ-VC-DBC	103
Victoria Creek upstream of Minnesota Creek	WQ-UMN	104
Pumphouse Well	WQ-PW	105

Note: Only stations that contained 2014 data and more than 10 samples were plotted with the annual statistical data.

Annual statistical summary plots were not made for the following WQS as there was no 2014 data (WQ-DRY, WQ-MN, WQ-DC-D1, WQ-DC-U1, and WQ-DC-U2).

Annual statistical summary plots were not made for the following WQS as there was less than 10 samples collected (WQ-MS-08, WQ-DAM-SEEP, WQ-ADIT-SEEP, WQ-SP-1, WQ-SP-2, WQ-DC-B, WQ-ORE, WQ-NW-SEEP-01, WQ-DESS-01, WQ-DESS-02, WQ-DESS-03, WQ-CH-P-13-01, WQ-ET-01, WQ-L2, WQ-DC-1, 2, 3, 4, 7, 8, and 10)

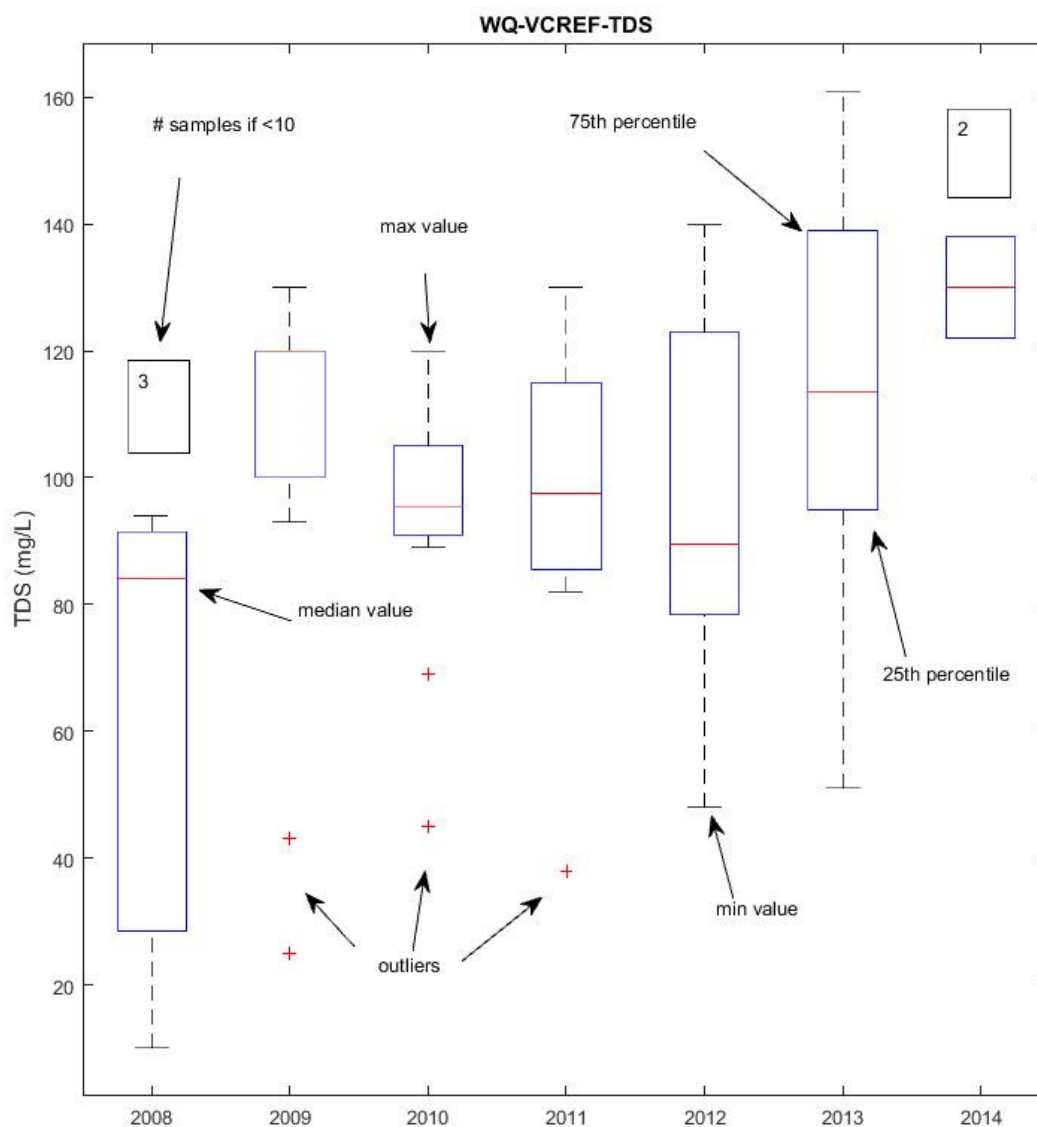


Figure 1: Victoria Creek Reference WQS -Total Dissolved Solids Sample Annual Statistical Summary with Legend. Years with less than 10 years of data noted in box above boxplot. No CCME Guideline or EQS available.

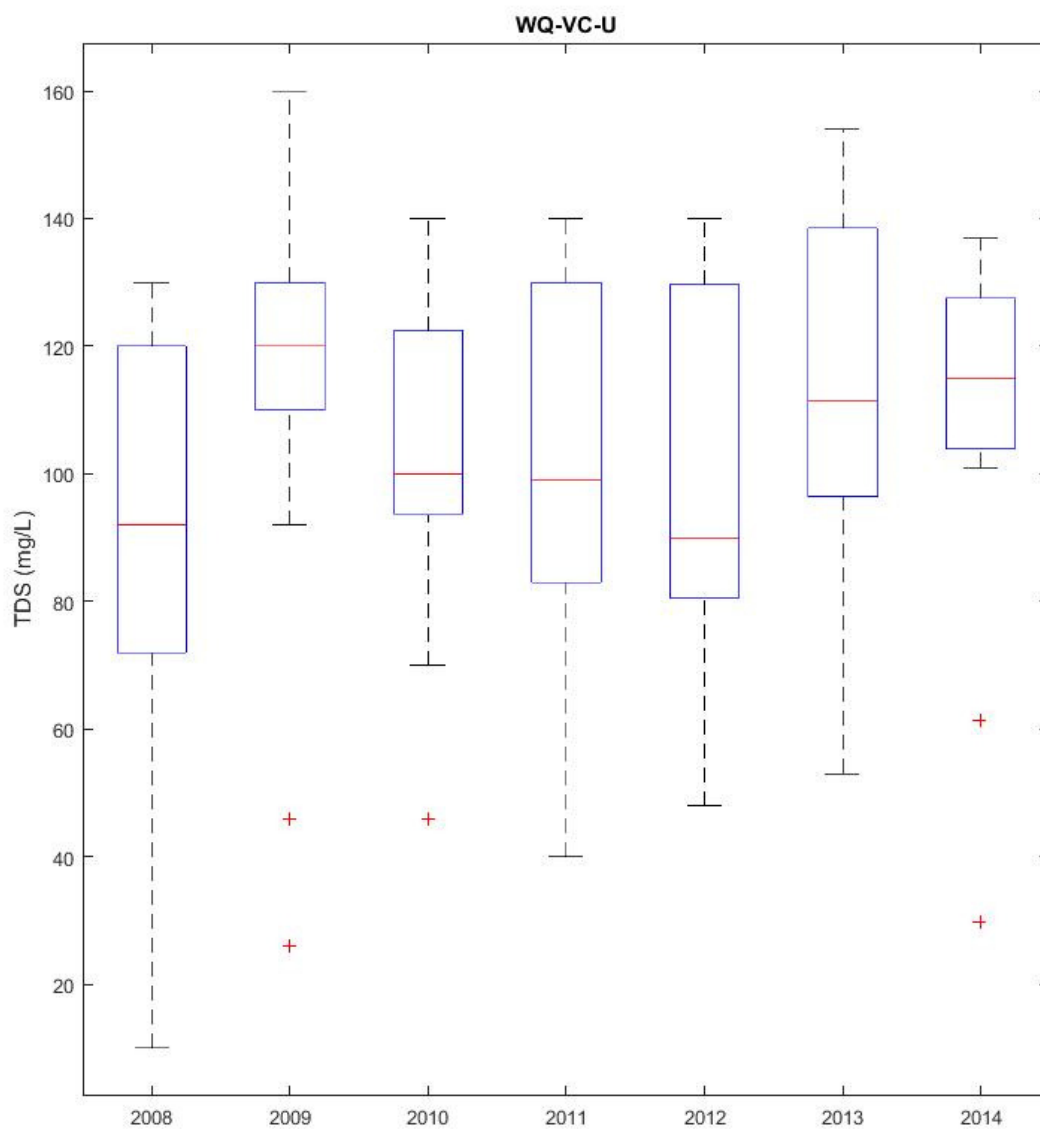


Figure 2: Victoria Creek North of Confluence Back Creek WQS – Total Dissolved Solids annual statistical summary. No CCME Guideline or EQS available.

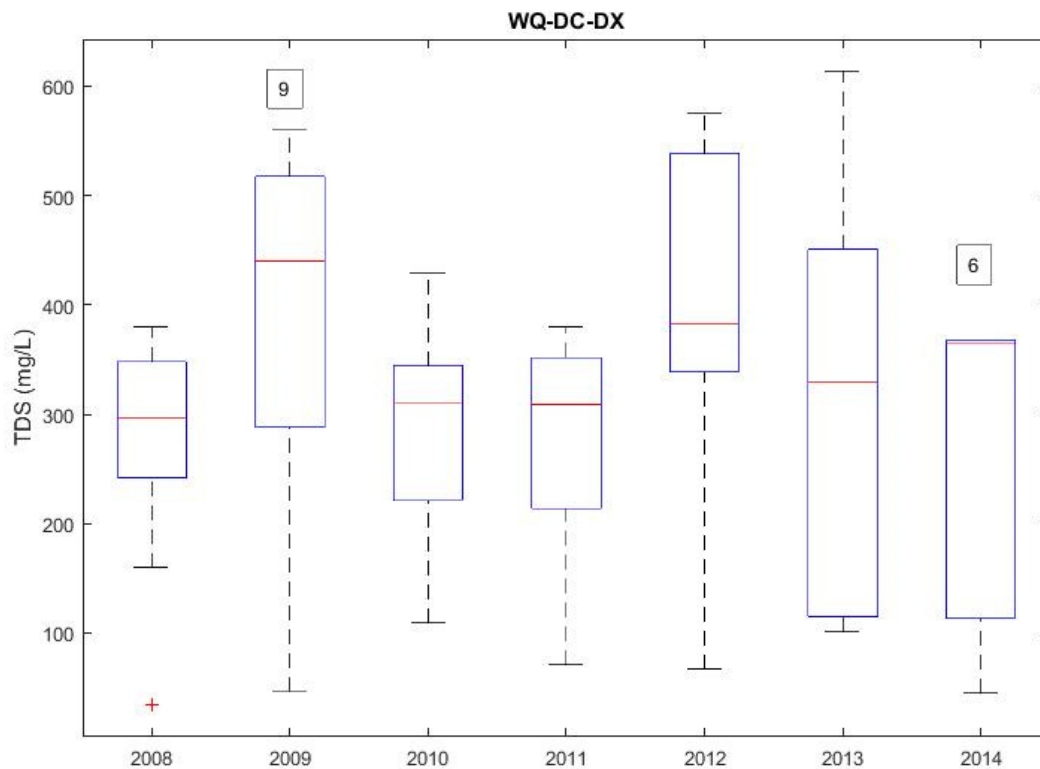


Figure 3: Dome Creek Upstream of Mill Site WQS – Total Dissolved Solids Sample Annual Statistical Summary. Years with less than 10 years of data noted in box above boxplot. No CCME Guideline or EQS available.

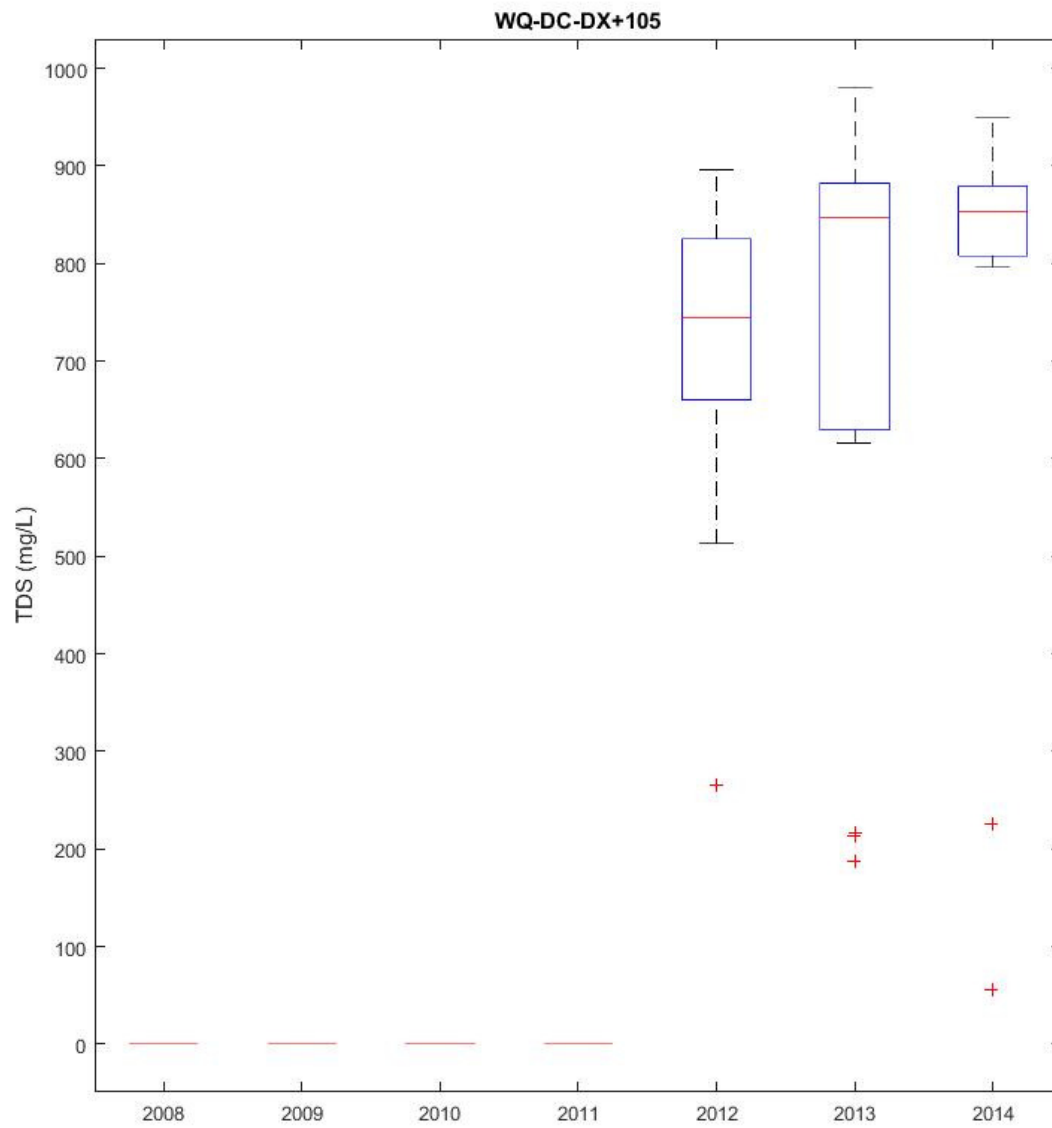


Figure 4: Dome Creek Upstream of Mill Site Winter Sampling WQS – Total Dissolved Solids annual statistical summary. No CCME Guideline or EQS available.

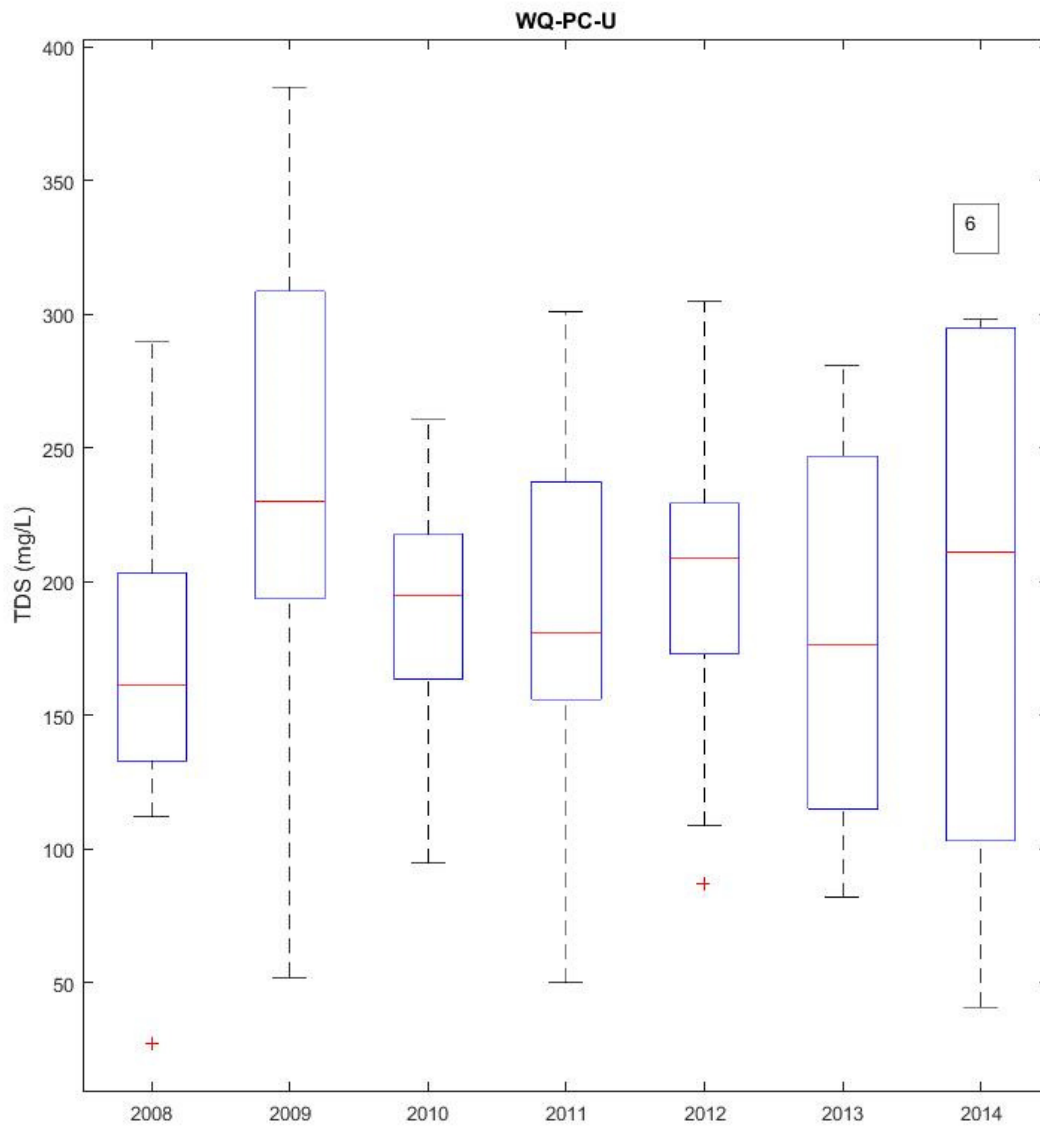


Figure 5: Pony Creek Upstream of Pit and Waste Rock WQS – Total Dissolved Solids annual statistical summary. Years with less than 10 years of data noted in box above boxplot. No CCME Guideline or EQS available.

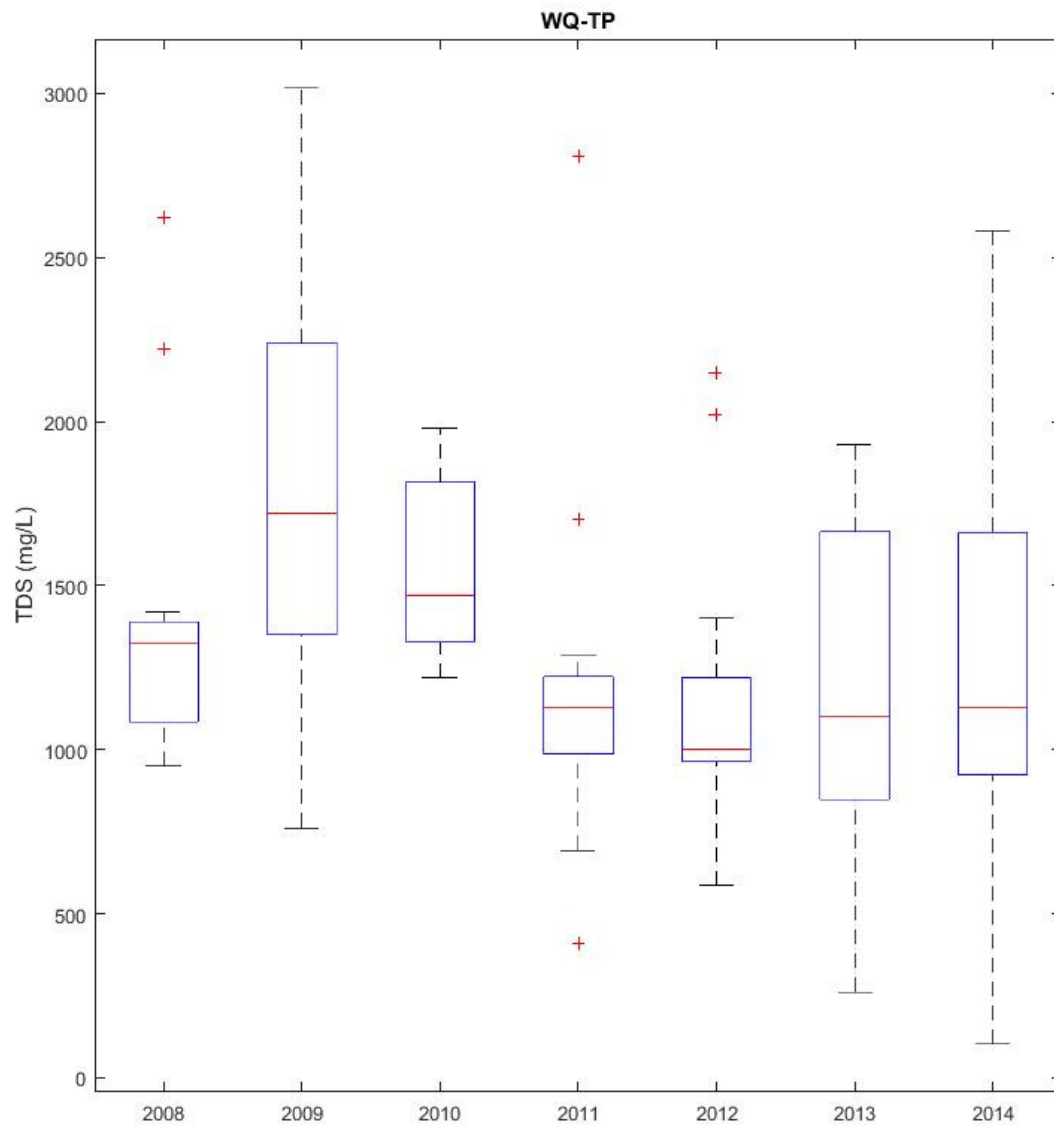


Figure 6: Tailings Pond WQS – Total Dissolved Solids annual statistical summary. No CCME Guideline or EQS available.

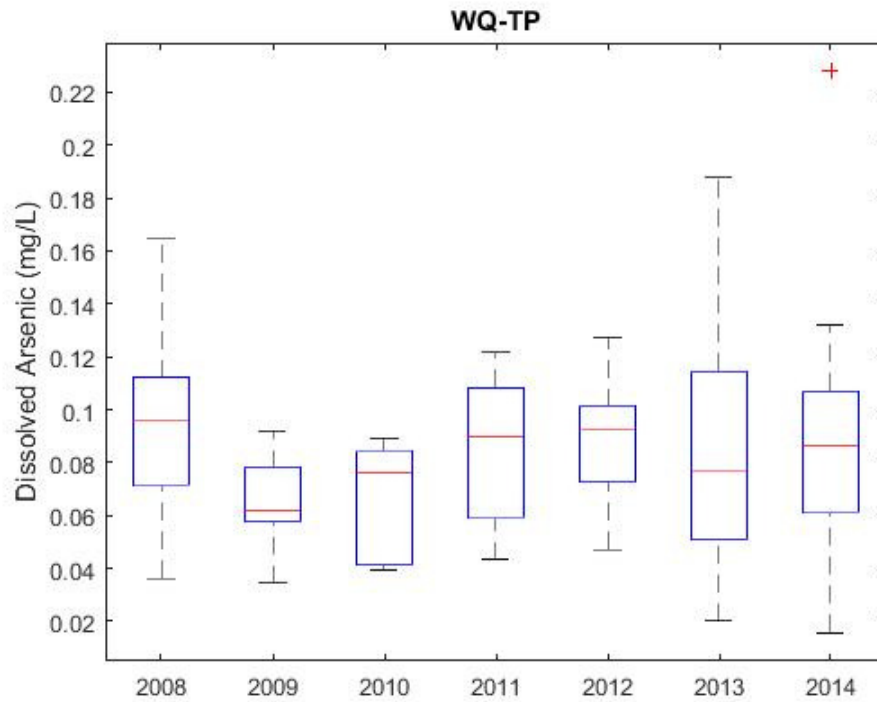


Figure 7: Tailings Pond WQS – dissolved arsenic annual statistical summary. Dissolved arsenic EQS is 0.15 mg/L.

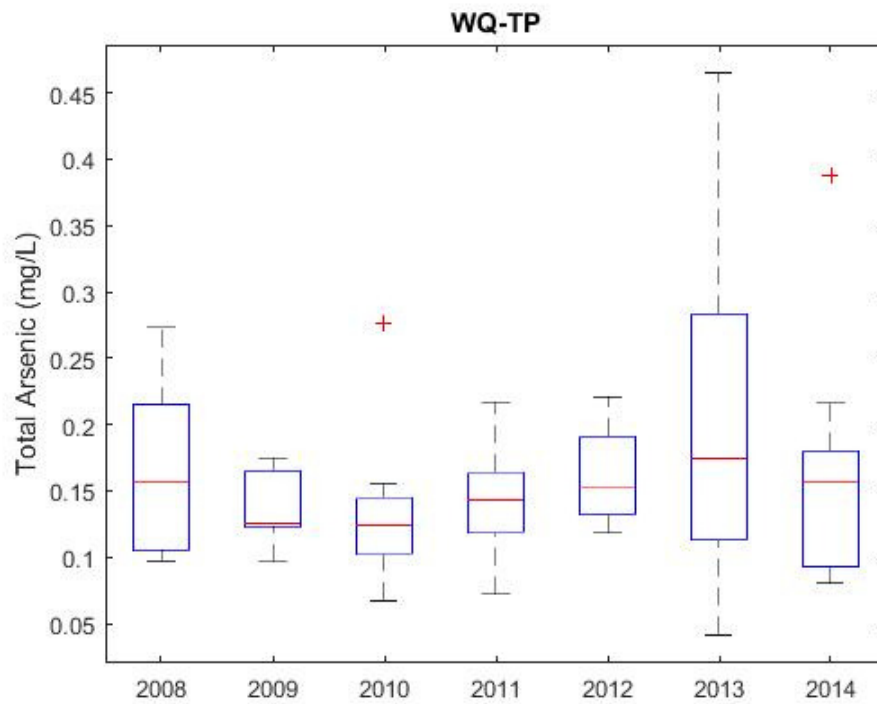


Figure 8: Tailings Pond WQS – total arsenic annual statistical summary. CCME Guideline is 0.005 mg/L.

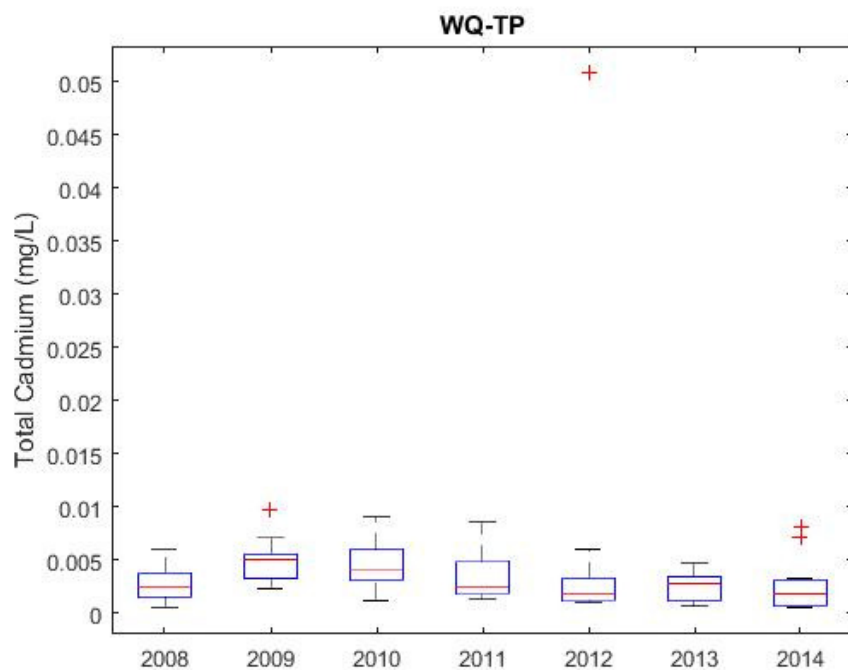


Figure 9: Tailings Pond WQS – total cadmium annual statistical summary. CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.

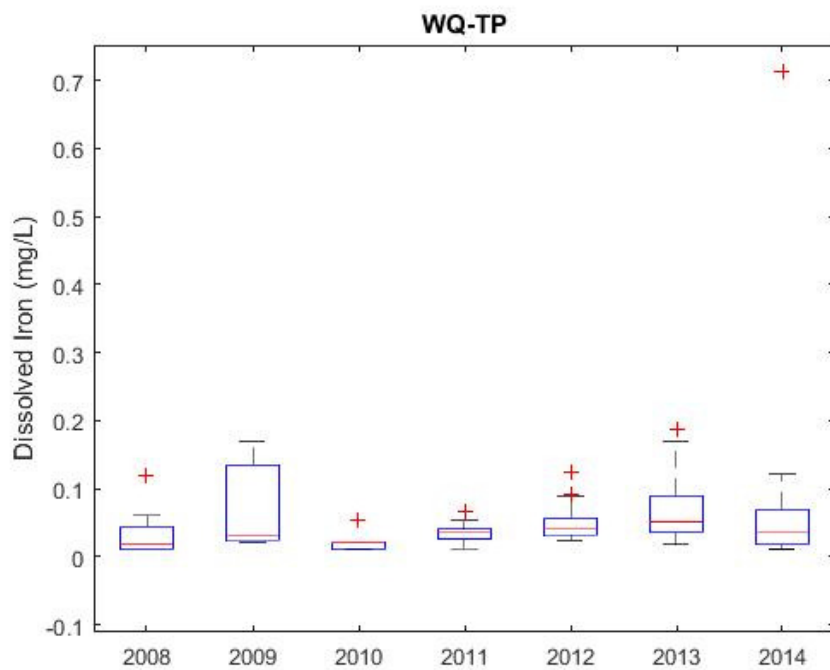


Figure 10: Tailings Pond WQS – dissolved iron annual statistical summary. No CCME Guideline or EQS available.

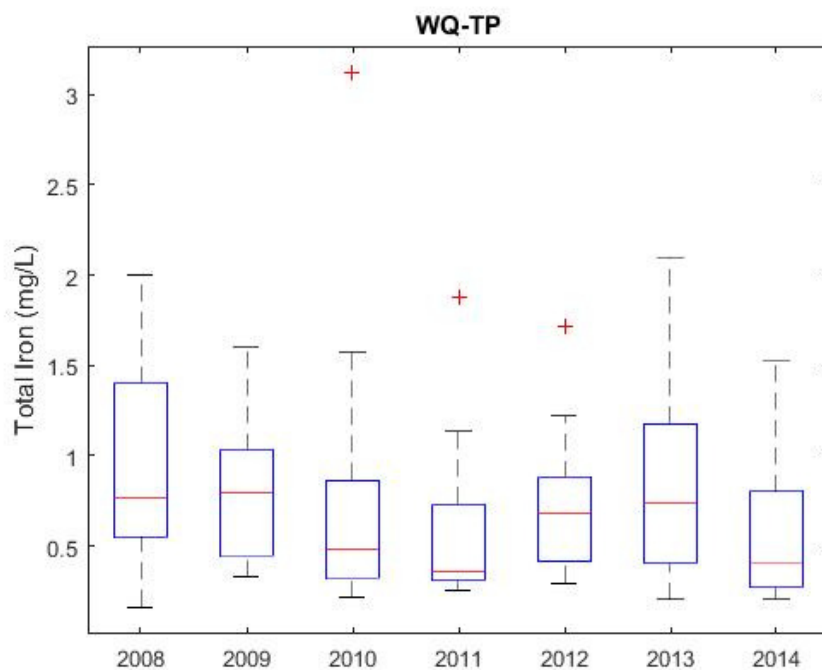


Figure 11: Tailings Pond WQS – total iron annual statistical summary. CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

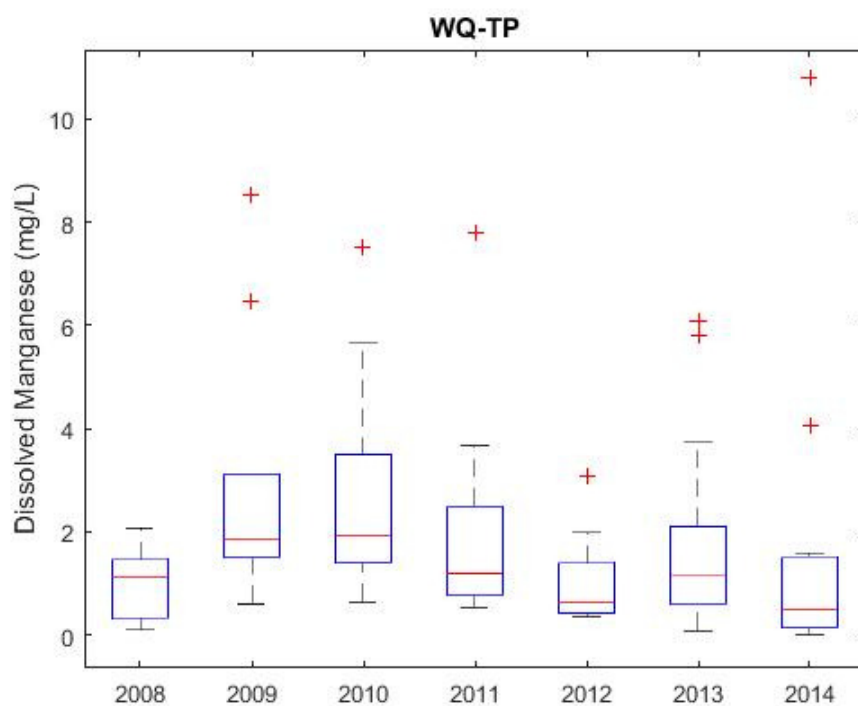


Figure 12: Tailings Pond WQS – dissolved manganese annual statistical summary. No CCME Guideline or EQS available.

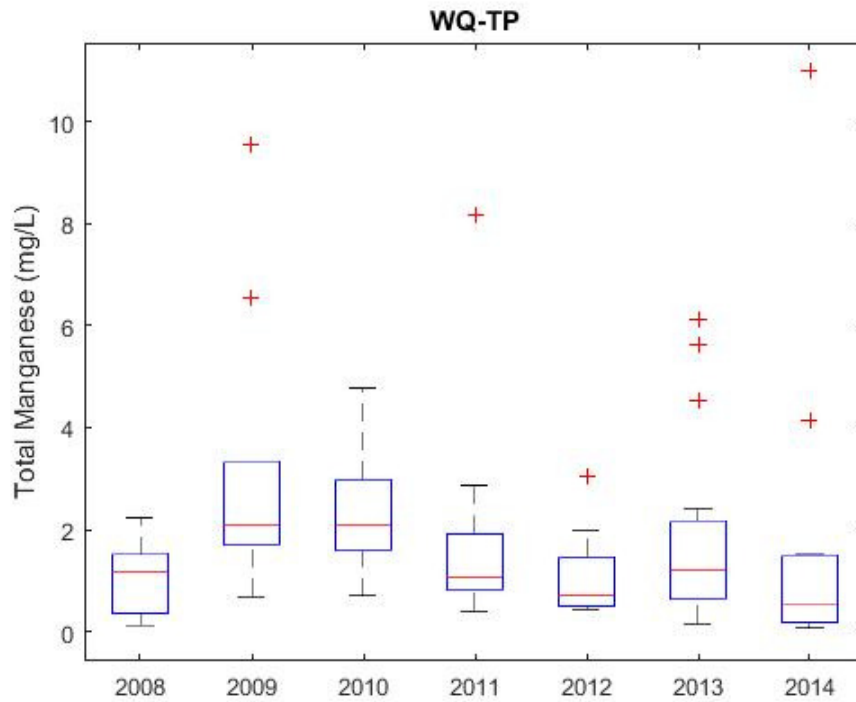


Figure 13: Tailings Pond WQS – total manganese annual statistical summary. EQS is 0.5 mg/L.

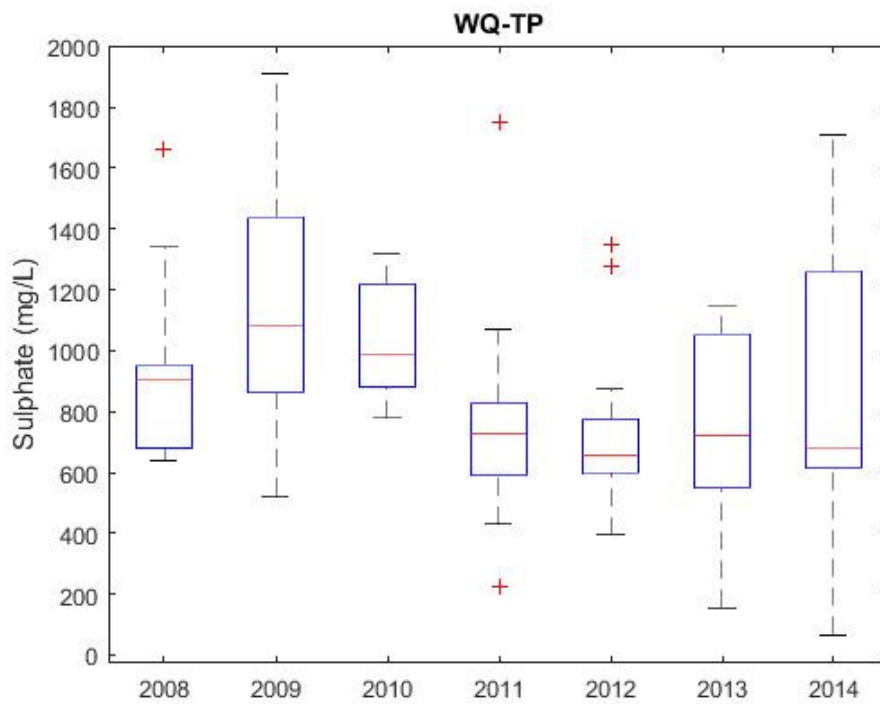


Figure 14: Tailings Pond WQS – sulphate annual statistical summary. No CCME Guideline or EQS.

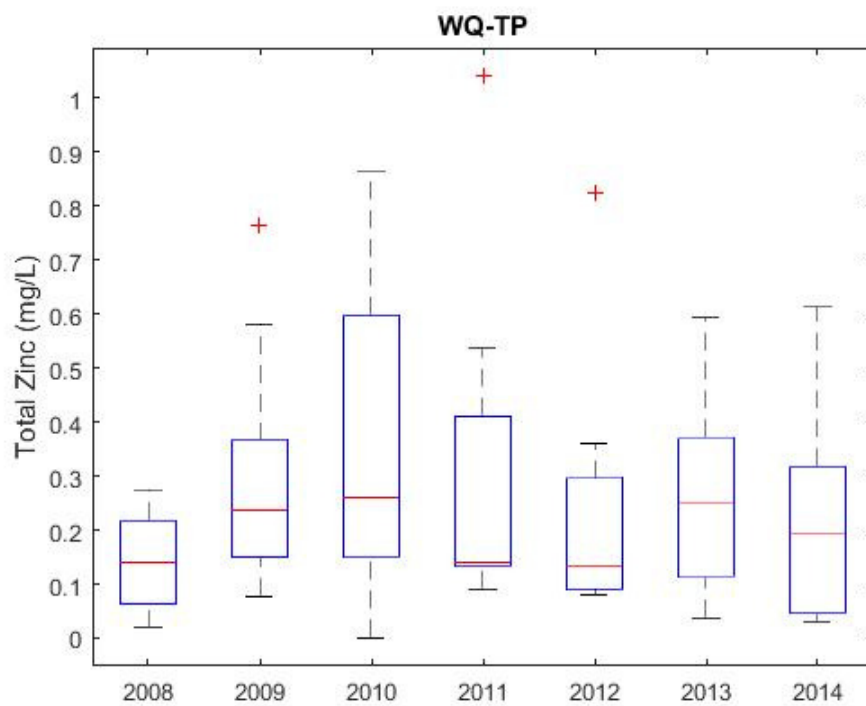


Figure 15: Tailings Pond WQS – total zinc annual statistical summary. Total zinc CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

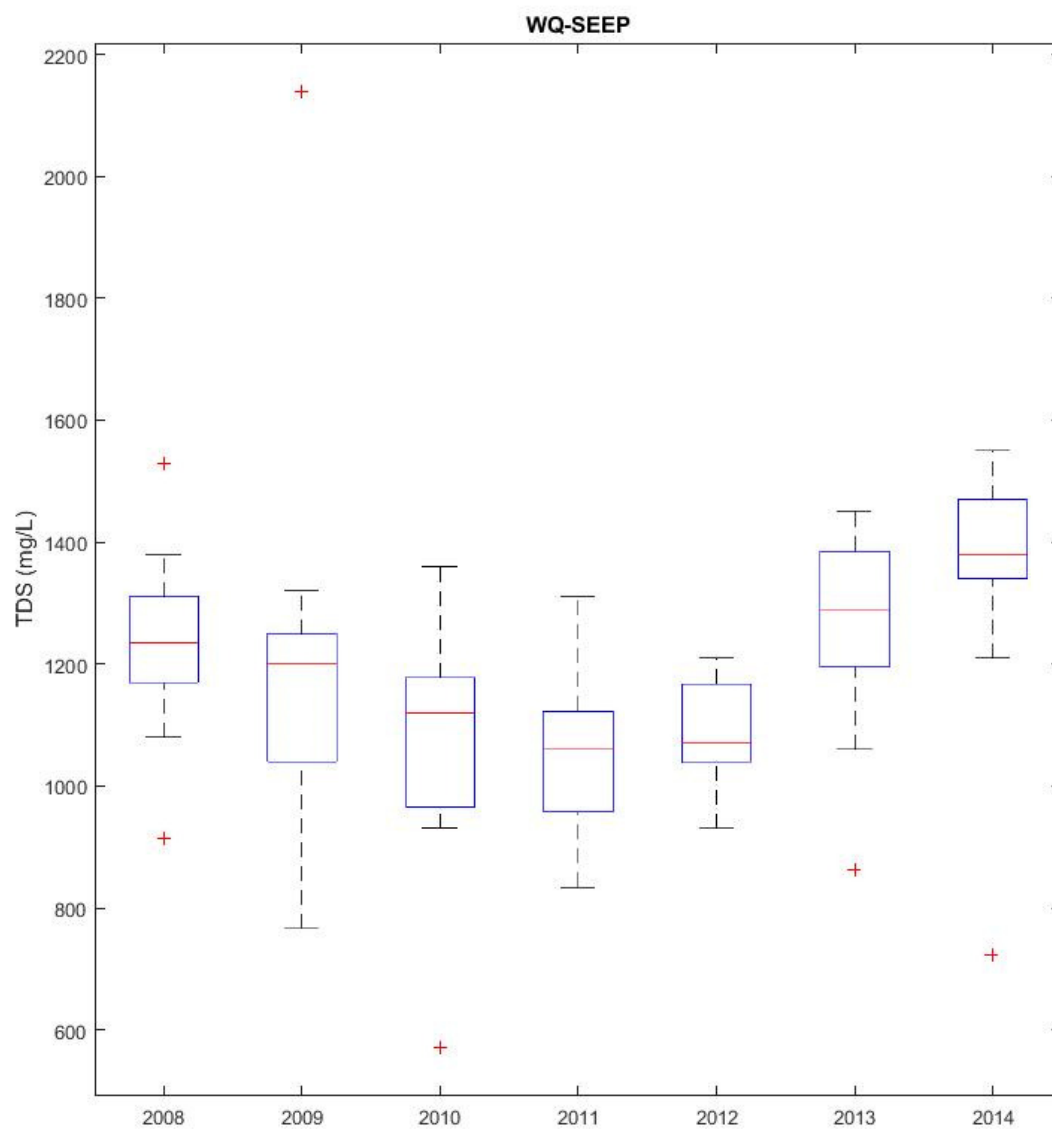


Figure 16: Seepage Pond Discharge WQS – Total Dissolved Solids annual statistical summary. No CCME Guideline or EQS available.

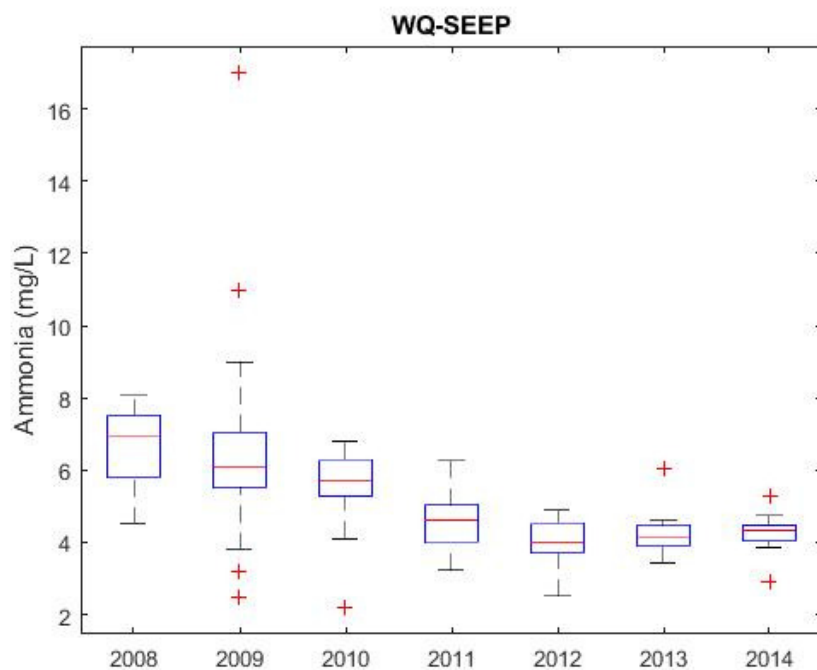


Figure 17: Seepage Pond Discharge WQS – Ammonia annual statistical summary. Ammonia CCME Guideline is 10.3 mg/L at Temperature of 10C and pH of 7. Maximum water temperature observed at this WQS was 11C.

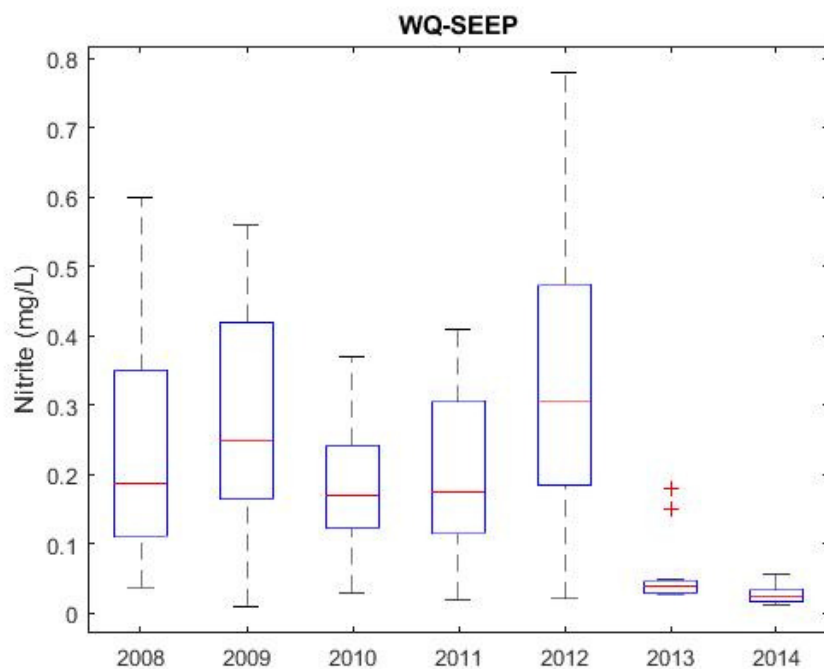


Figure 18: Seepage Pond Discharge WQS – Nitrite annual statistical summary. Nitrite CCME Guideline is 0.06 mg/L.

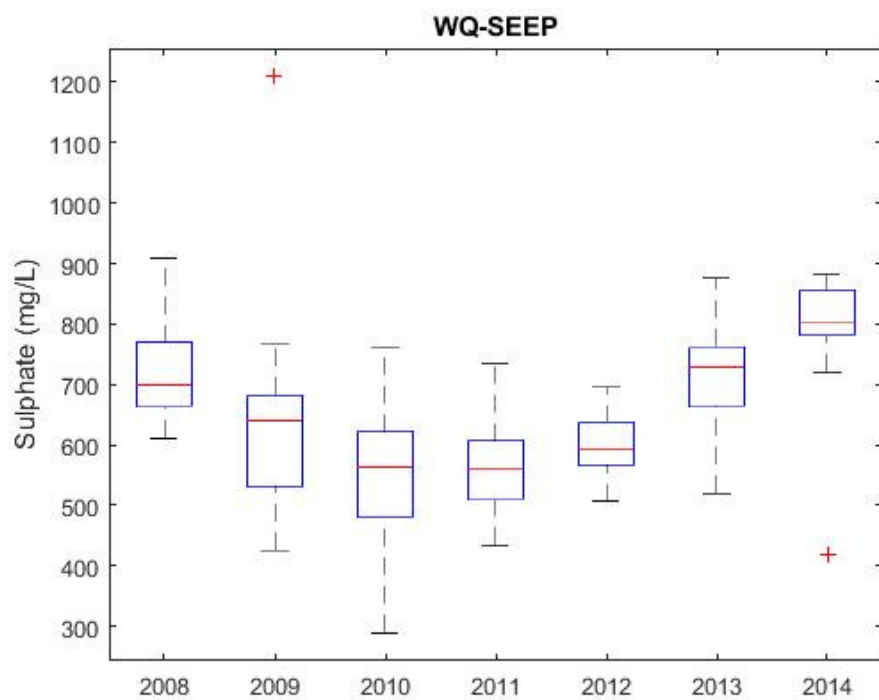


Figure 19: Seepage Pond Discharge WQS – Sulphate annual statistical summary. No CCME Guideline or EQS available.

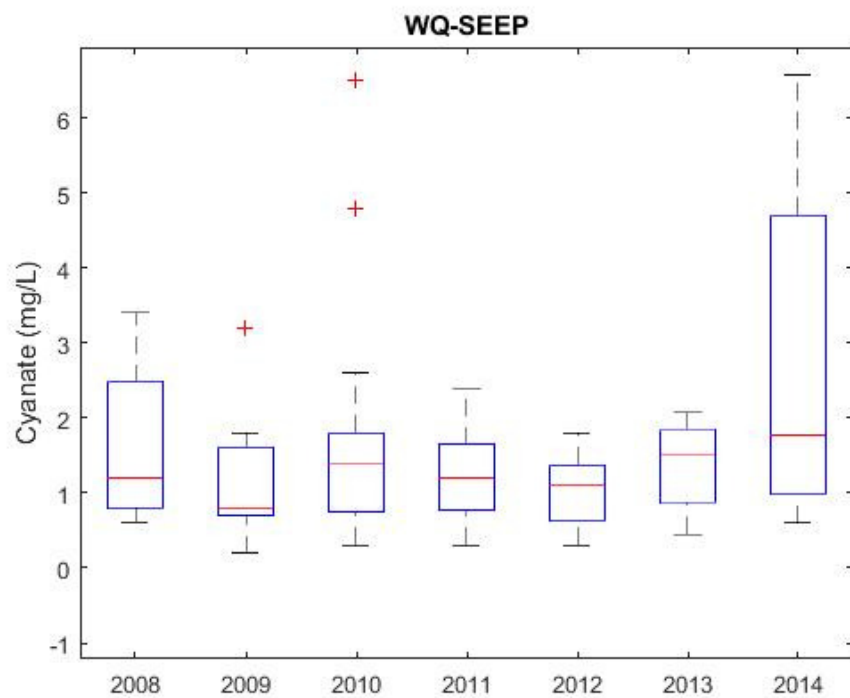


Figure 20: Seepage Pond Discharge WQS – Cyanate annual statistical summary. No CCME Guideline or EQS available.

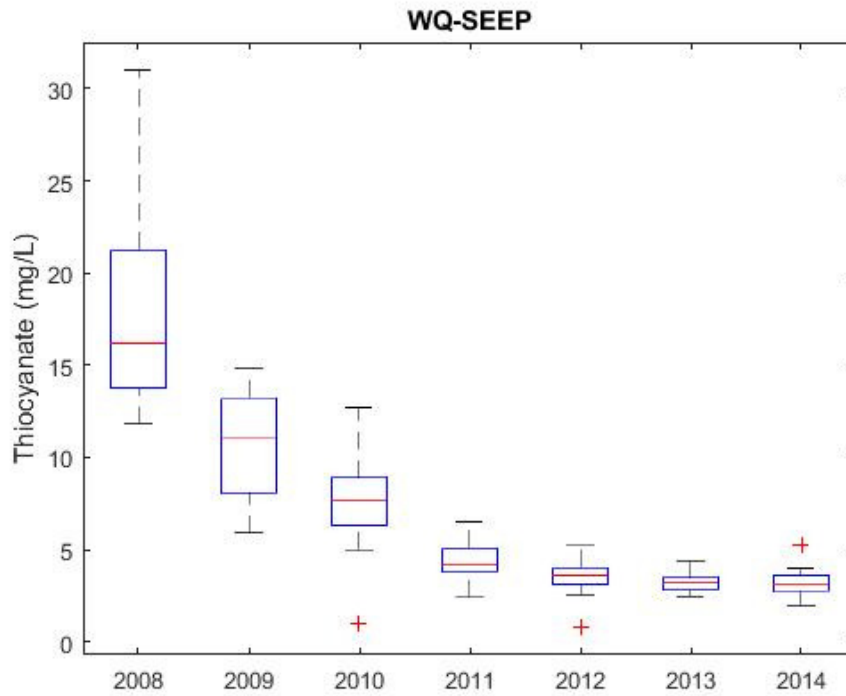


Figure 21: Seepage Pond Discharge WQS – Thiocyanate annual statistical summary. No CCME Guideline or EQS available.

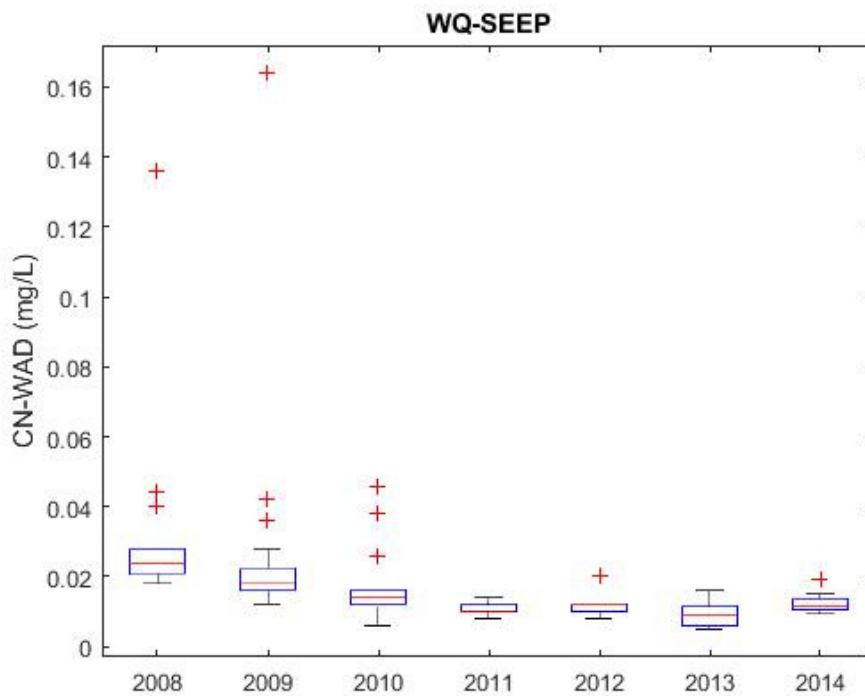


Figure 22: Seepage Pond Discharge WQS – CN-WAD annual statistical summary. CCME Guideline is 0.005 mg/L as free CN.

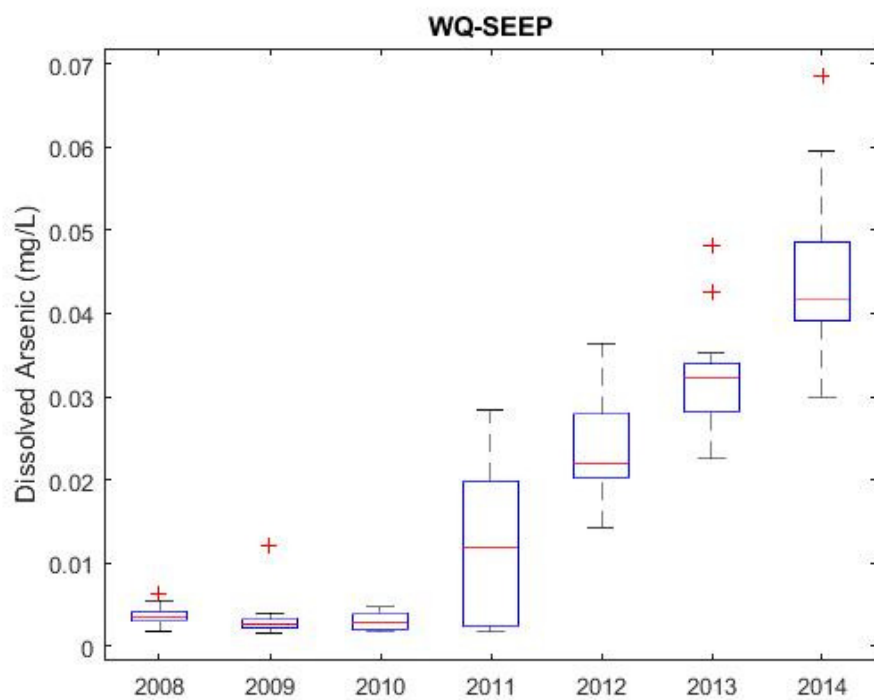


Figure 23: Seepage Pond Discharge WQS – Dissolved Arsenic annual statistical summary. Dissolved arsenic EQS is 0.15 mg/L.

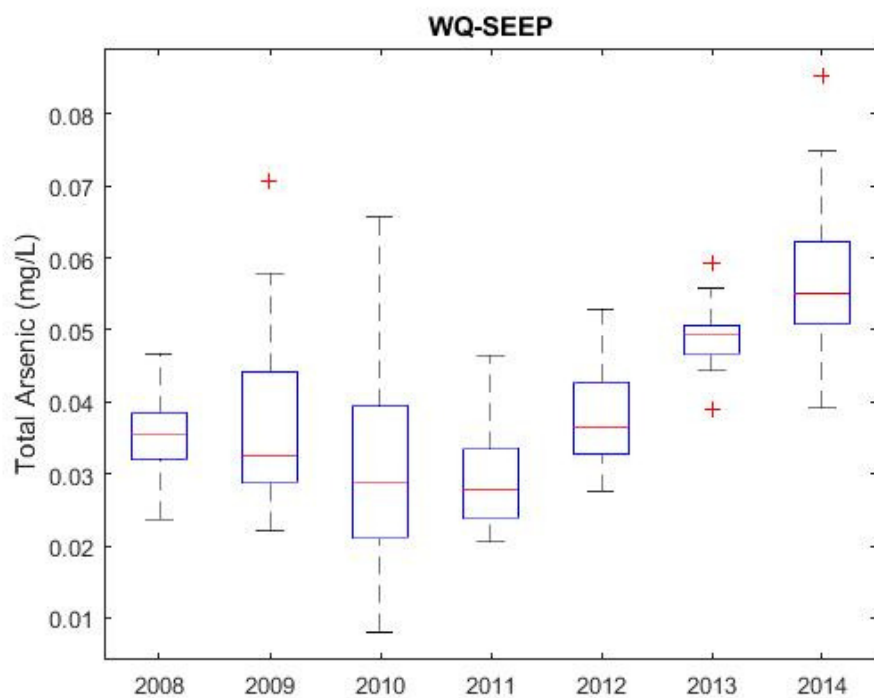


Figure 24: Seepage Pond Discharge WQS –Total Arsenic annual statistical summary. CCME Guideline is 0.005 mg/L.

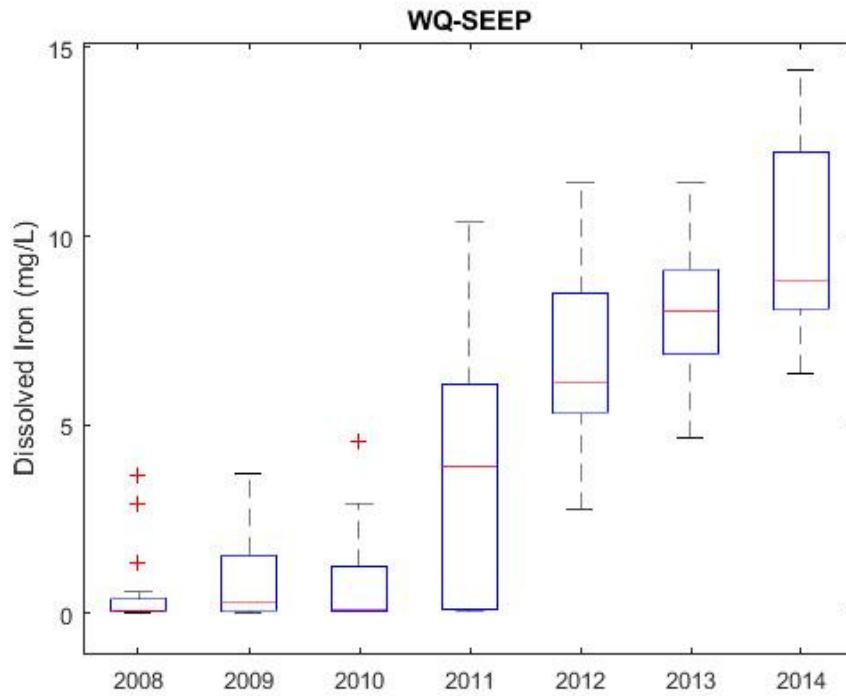


Figure 25: Seepage Pond Discharge WQS –Dissolved Iron annual statistical summary. No CCME Guideline or EQS available.

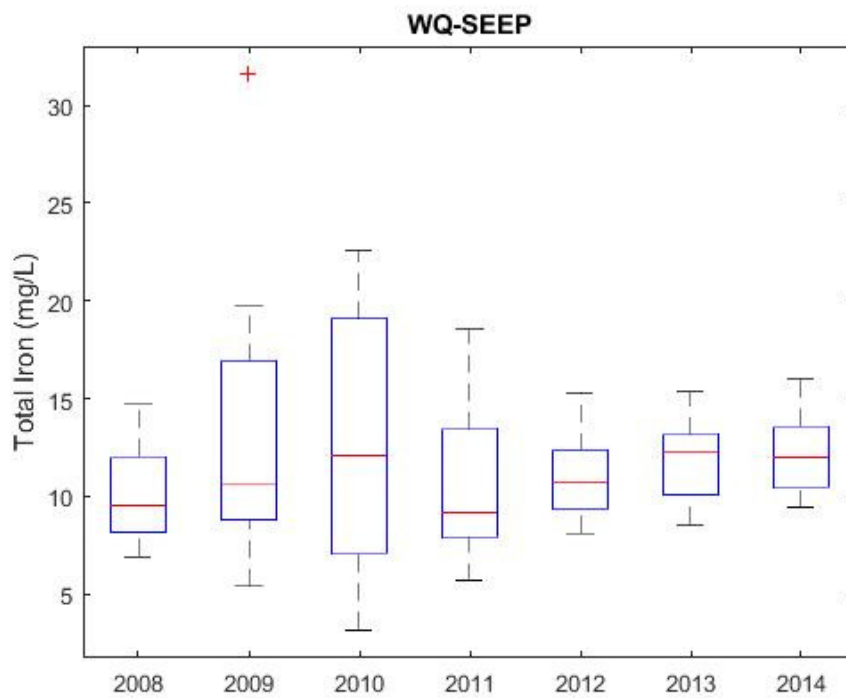


Figure 26: Seepage Pond Discharge WQS –Total Iron annual statistical summary. CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

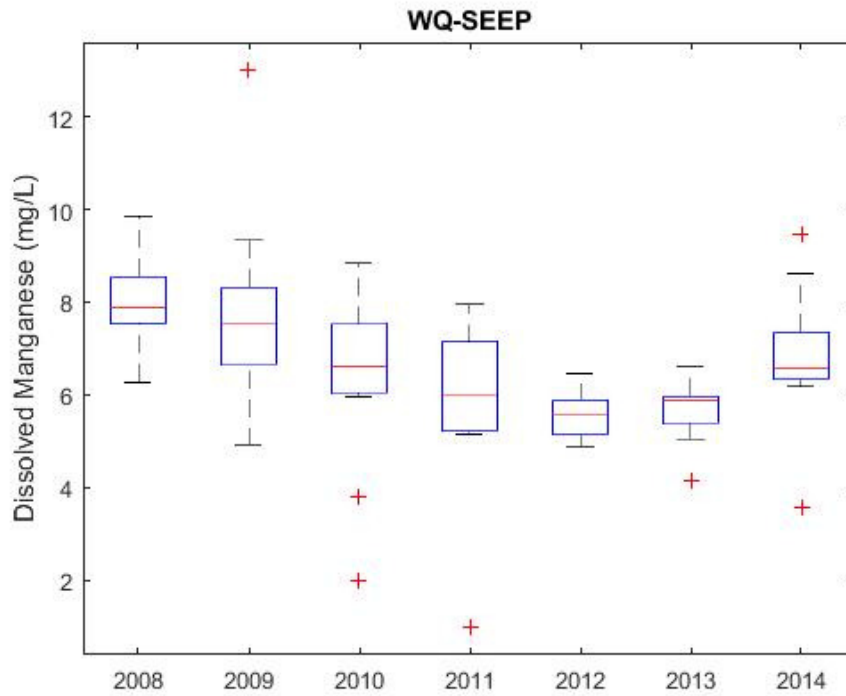


Figure 27: Seepage Pond Discharge WQS –Dissolved Manganese annual statistical summary. No CCME Guideline or EQS available.

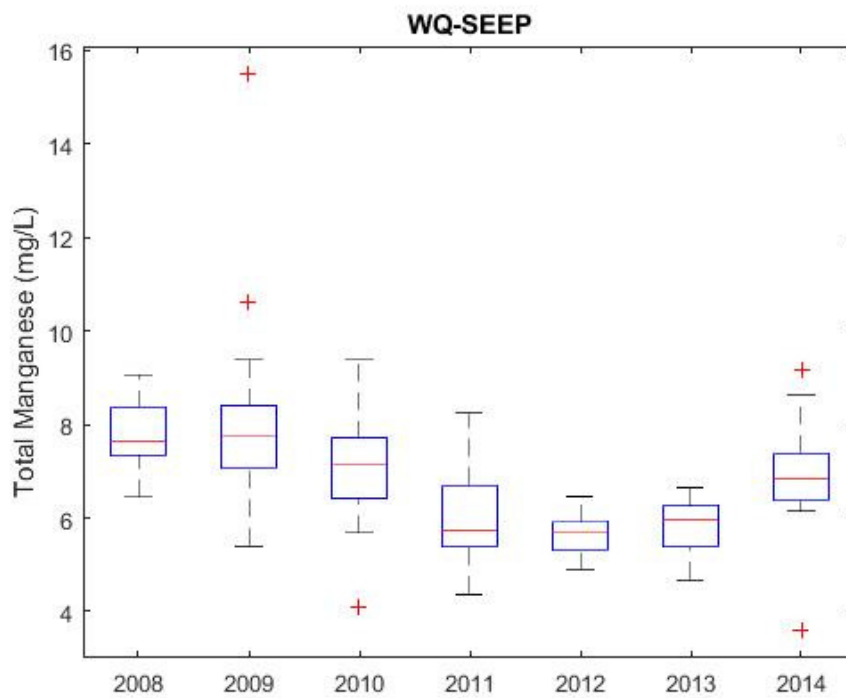


Figure 28: Seepage Pond Discharge WQS –Total Manganese annual statistical summary. EQS is 0.5 mg/L.

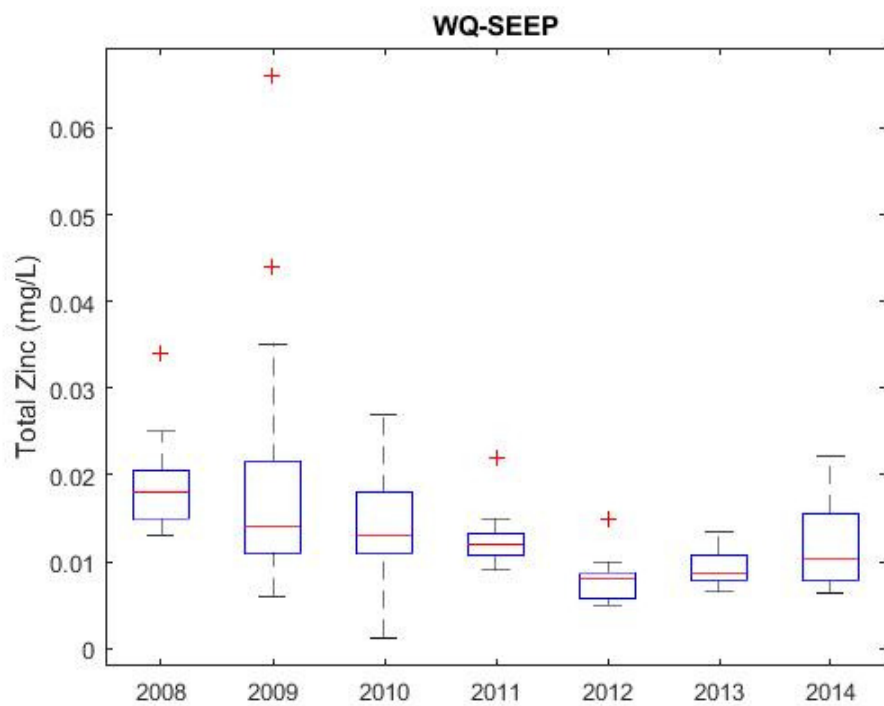


Figure 29: Seepage Pond Discharge WQS –Total Zinc annual statistical summary. CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

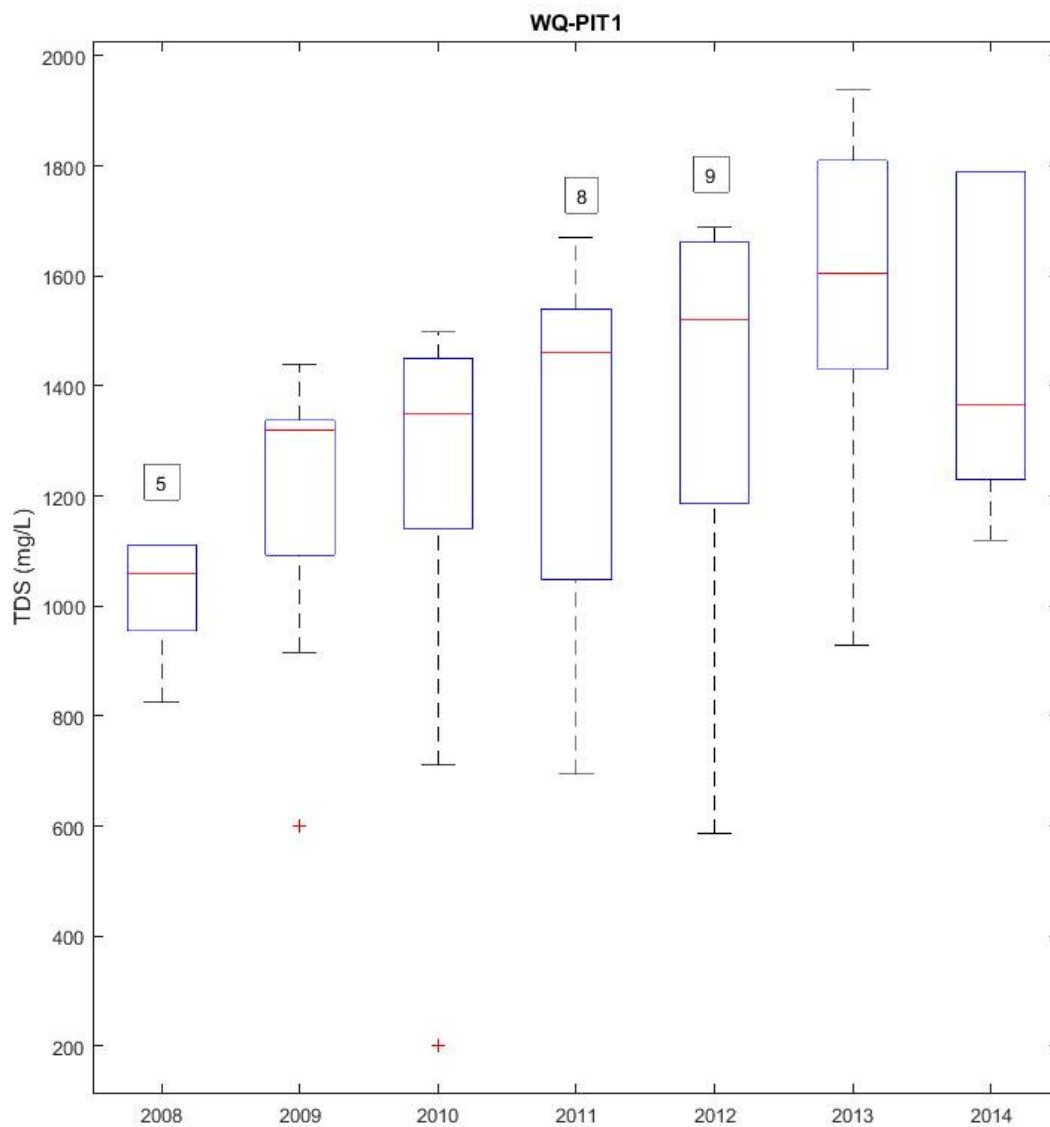


Figure 30: Brown-McDade Pit TOP WQS – Total Dissolved Solids annual statistical summary. Years with less than 10 years of data noted in box above boxplot. No CCME Guideline or EQS available.

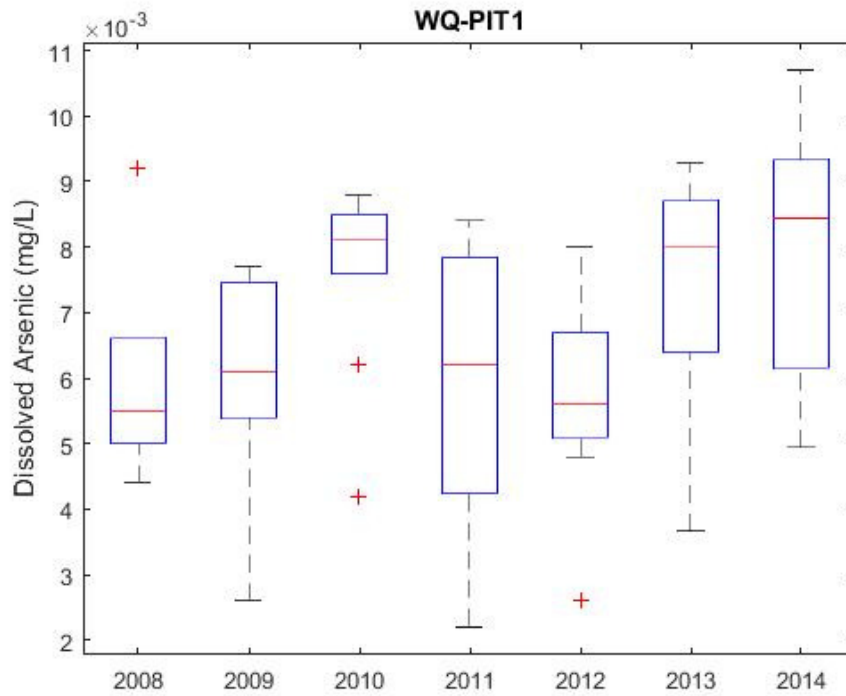


Figure 31: Brown-McDade Pit TOP WQS – Dissolved Arsenic annual statistical summary. Dissolved arsenic EQS is 0.15 mg/L.

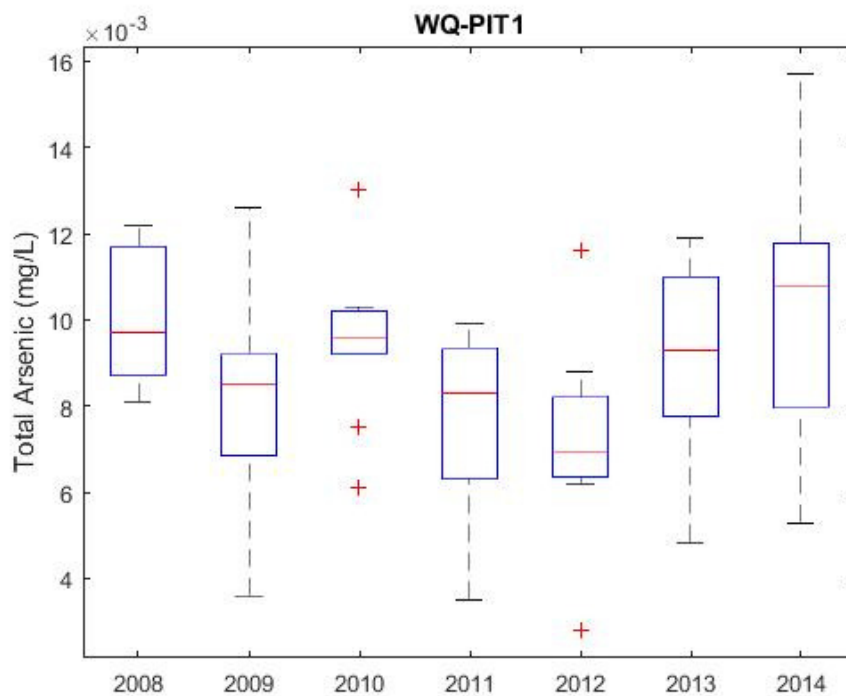


Figure 32: Brown-McDade Pit TOP WQS – Total Arsenic annual statistical summary. Total arsenic CCME Guideline is 0.005 mg/L.

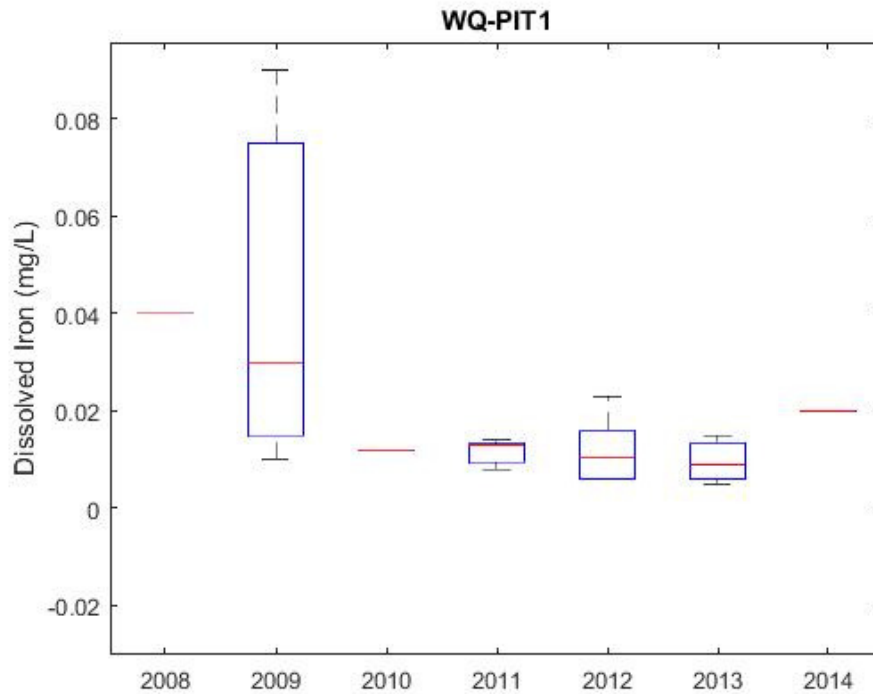


Figure 33: Brown-McDade Pit TOP WQS – Dissolved Iron annual statistical summary. No CCME Guideline or EQS available.

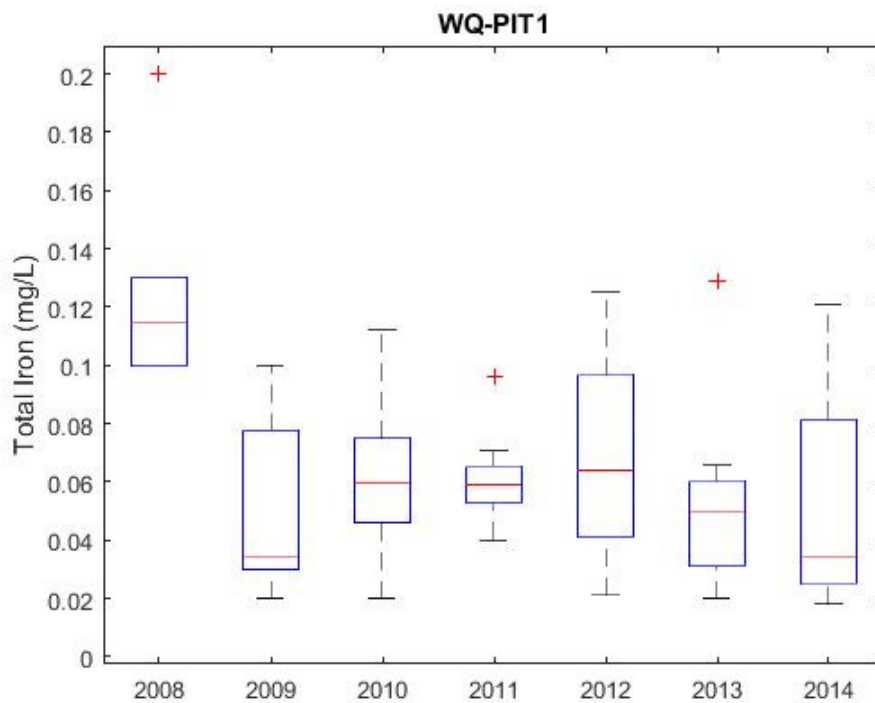


Figure 34: Brown-McDade Pit TOP WQS – Total Iron annual statistical summary. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

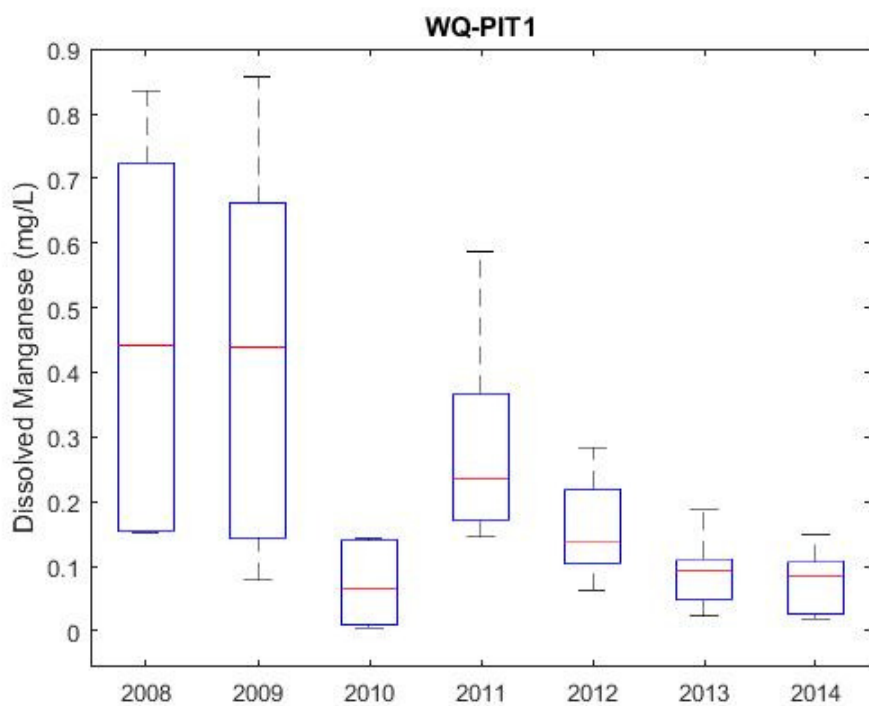


Figure 35: Brown-McDade Pit TOP WQS – Dissolved Manganese annual statistical summary. No CCME Guideline or EQS available.

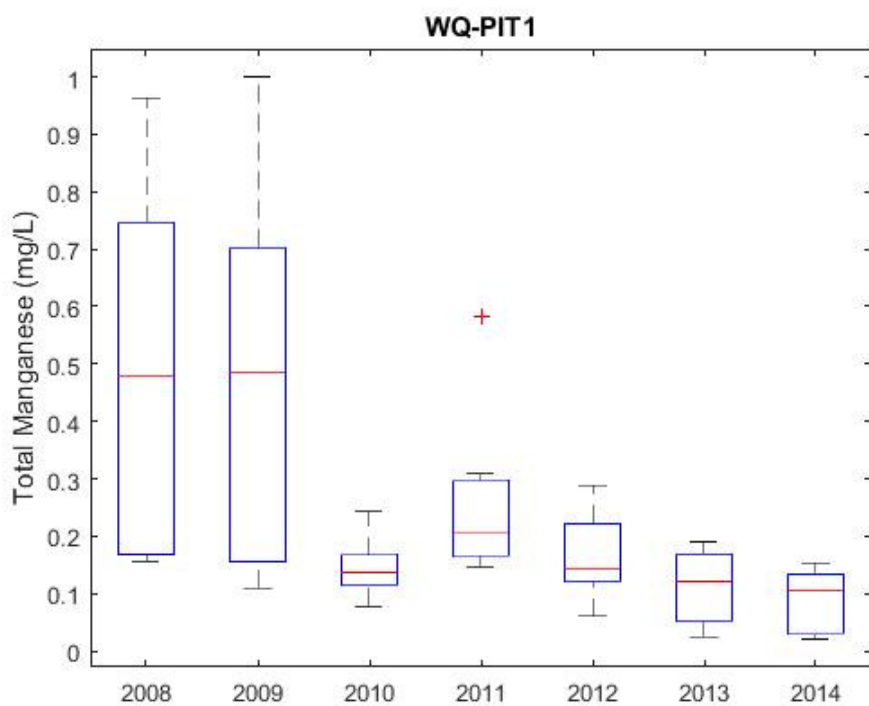


Figure 36: Brown-McDade Pit TOP WQS – Total Manganese annual statistical summary. EQS is 0.5 mg/L.

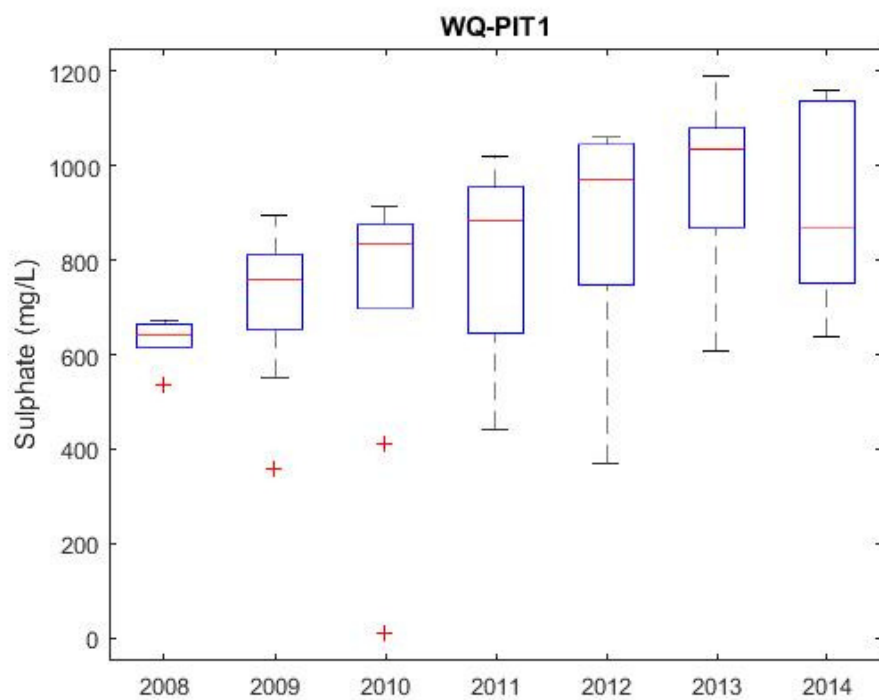


Figure 37: Brown-McDade Pit TOP WQS – Sulphate annual statistical summary. No CCME Guideline or EQS available.

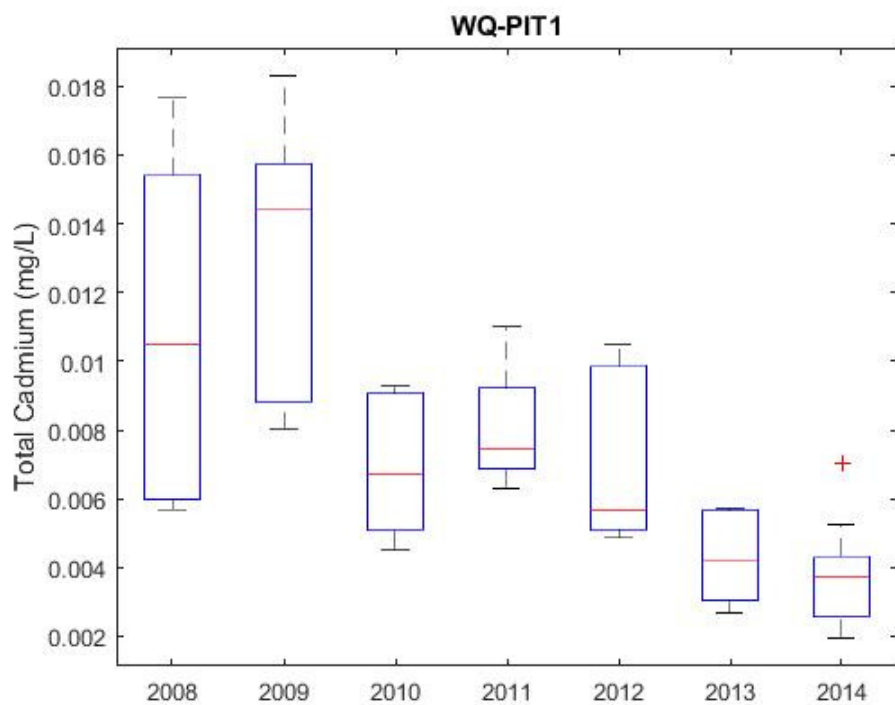


Figure 38: Brown-McDade Pit TOP WQS – Total Cadmium annual statistical summary. CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.

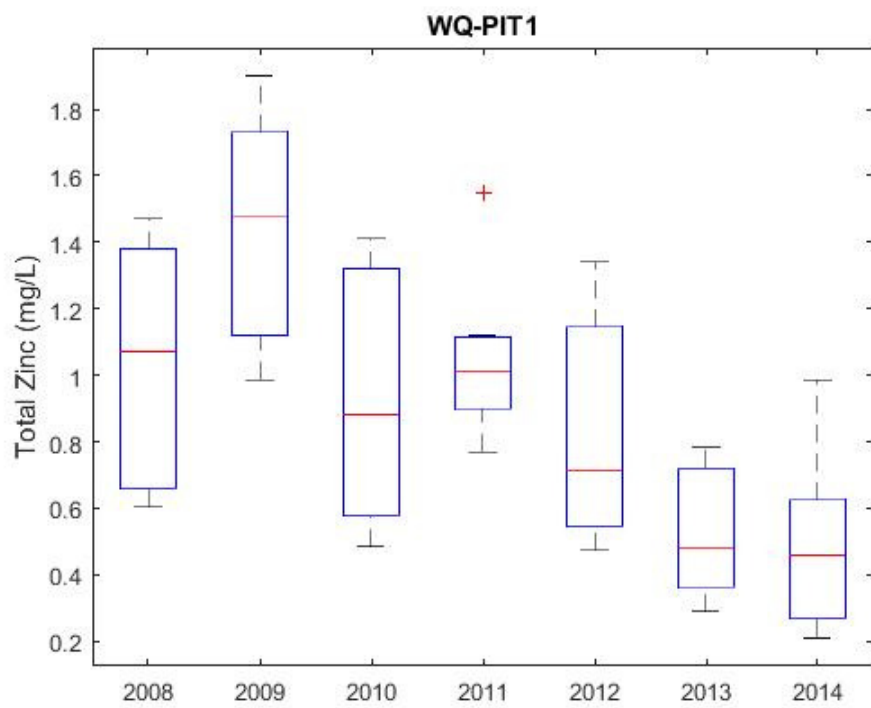


Figure 39: Brown-McDade Pit TOP WQS – Total Zinc annual statistical summary. CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

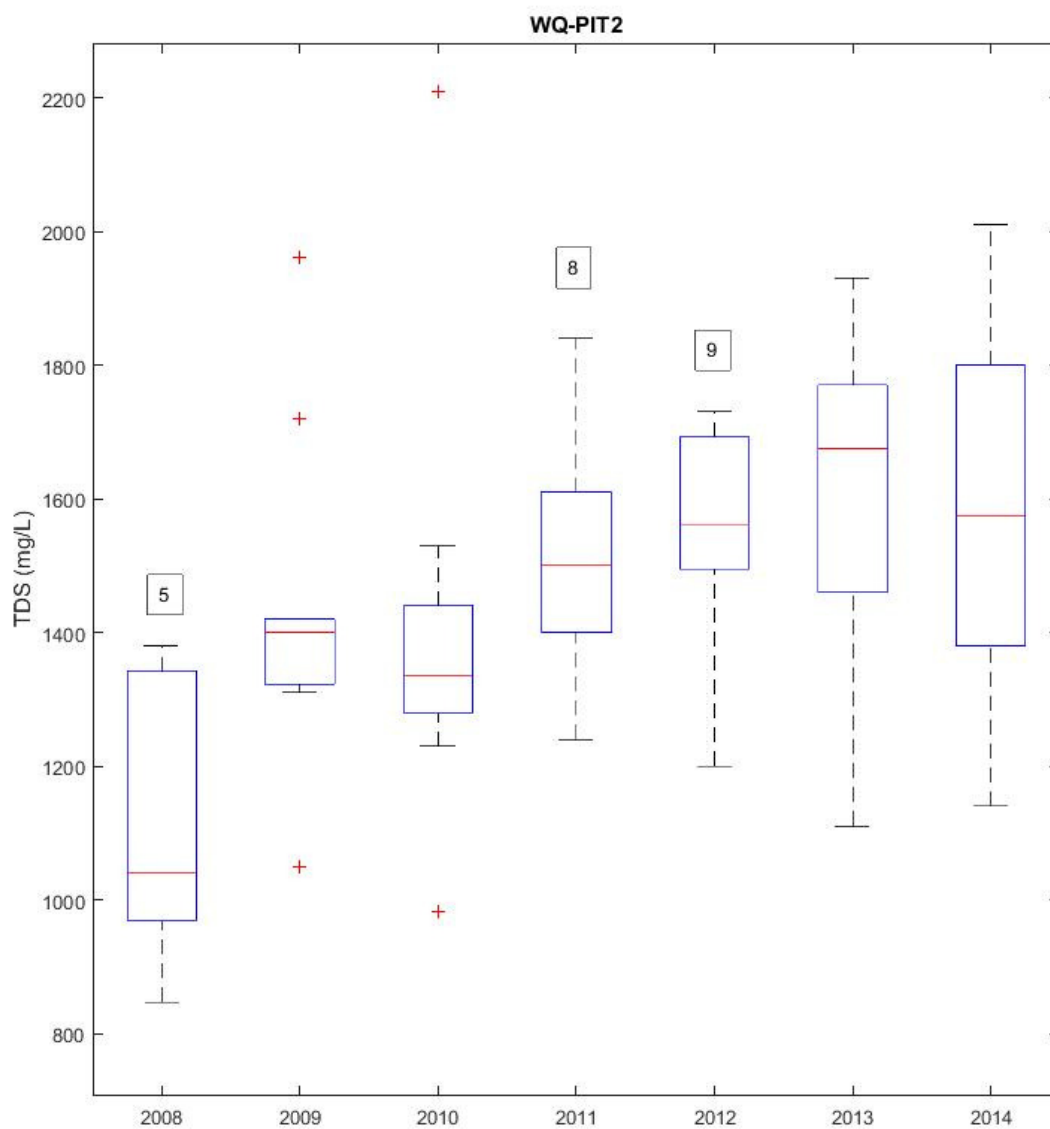


Figure 40: Brown-McDade Pit MIDDLE WQS – Total Dissolved Solids annual statistical summary. Years with less than 10 years of data noted in box above boxplot. No CCME Guideline or EQS available.

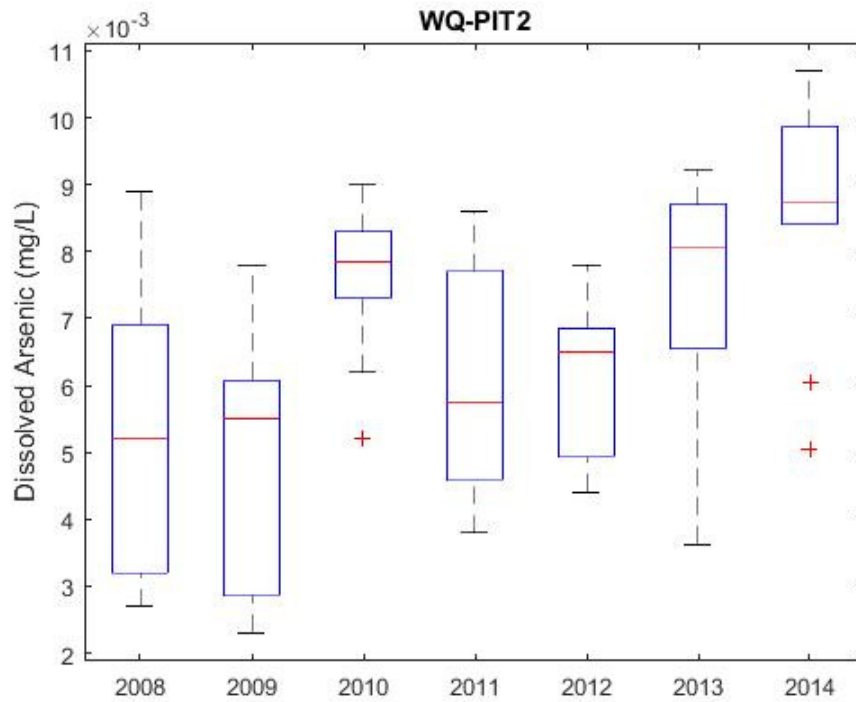


Figure 41: Brown-McDade Pit MIDDLE WQS – Dissolved Arsenic annual statistical summary. Dissolved arsenic EQS is 0.15 mg/L.

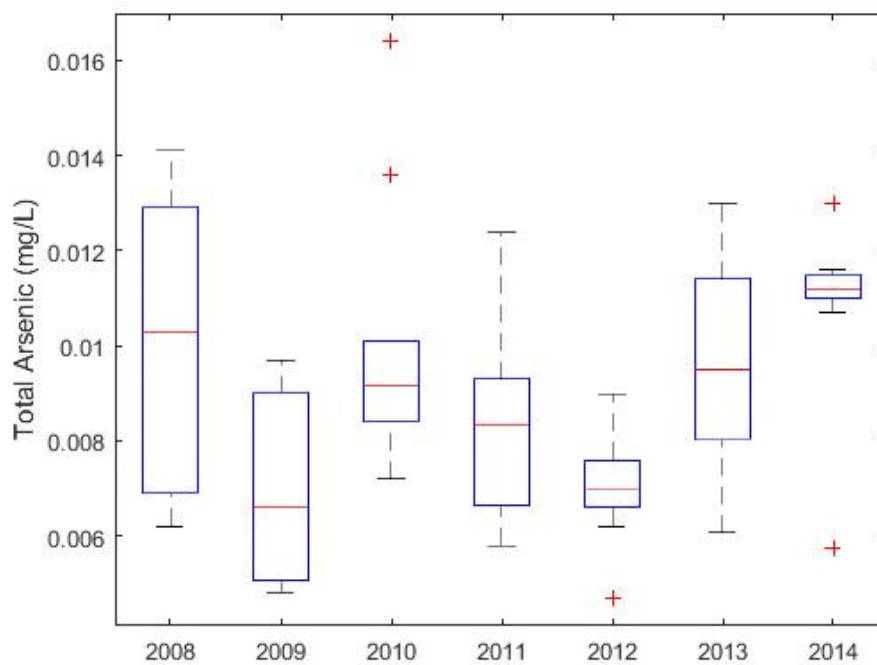


Figure 42: Brown-McDade Pit MIDDLE WQS – Total Arsenic annual statistical summary. Total arsenic CCME Guideline is 0.005 mg/L.

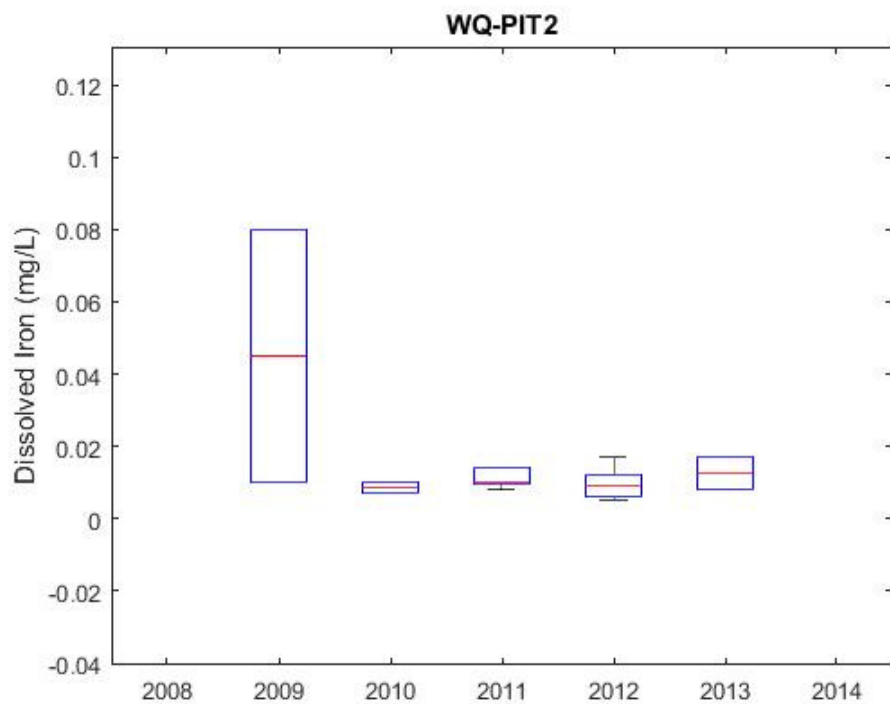


Figure 43: Brown-McDade Pit MIDDLE WQS – Dissolved Iron annual statistical summary. No CCME Guideline or EQS available.

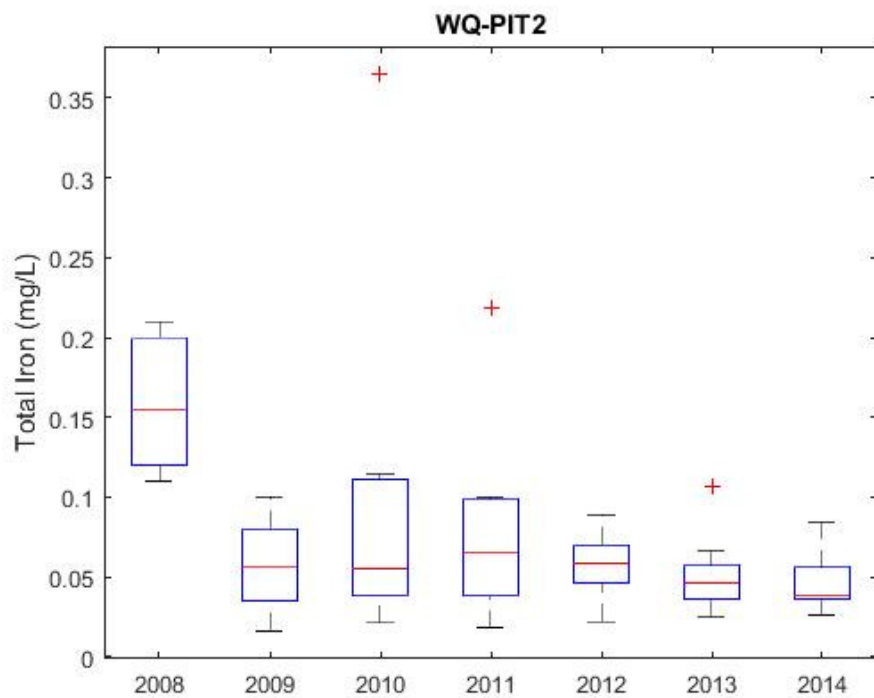


Figure 44: Brown-McDade Pit MIDDLE WQS – Total Iron annual statistical summary. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

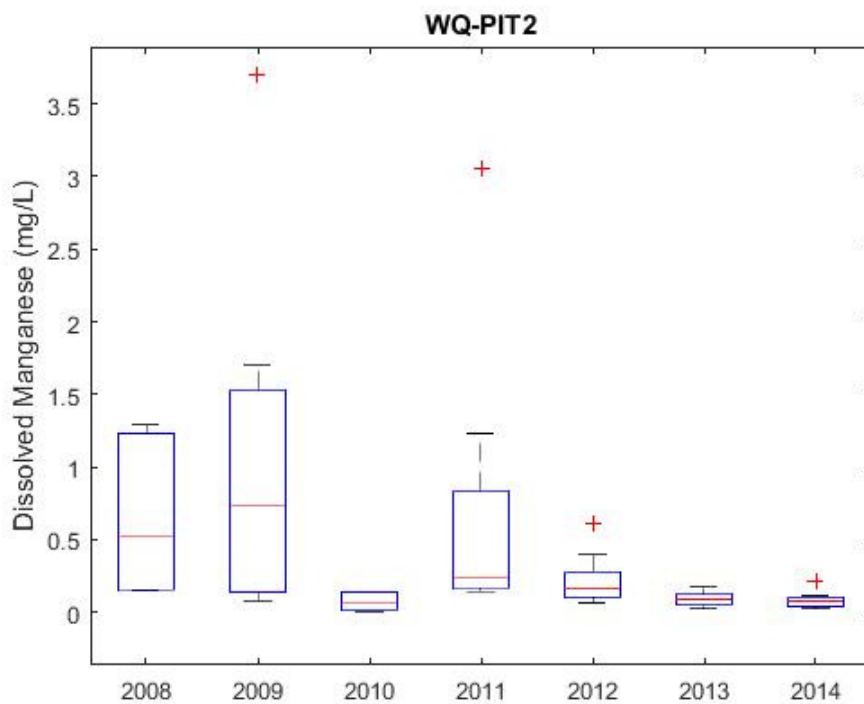


Figure 45: Brown-McDade Pit MIDDLE WQS – Dissolved Manganese annual statistical summary. No CCME Guideline or EQS available.

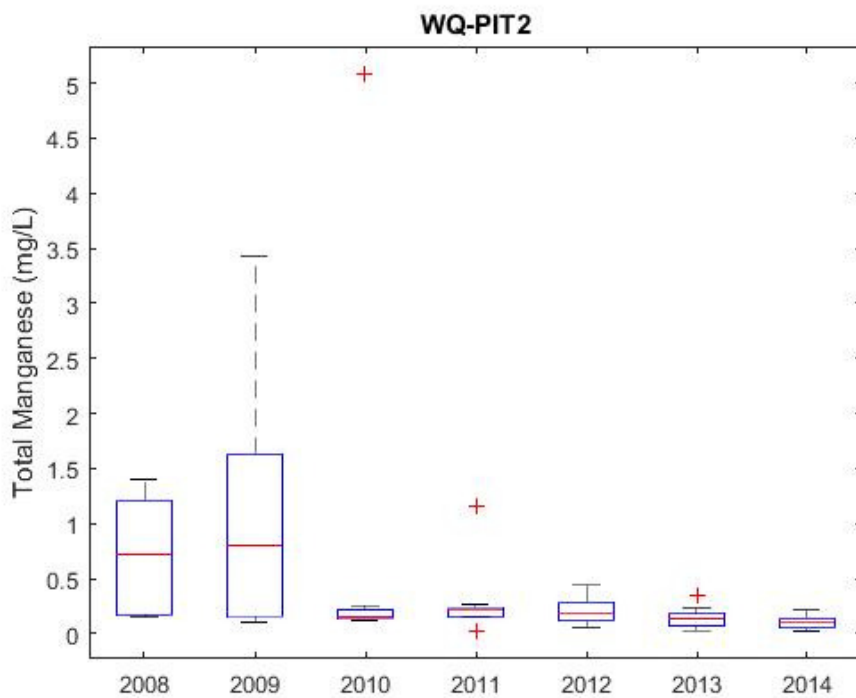


Figure 46: Brown-McDade Pit MIDDLE WQS – Total Manganese annual statistical summary. Total manganese EQS is 0.5 mg/L.

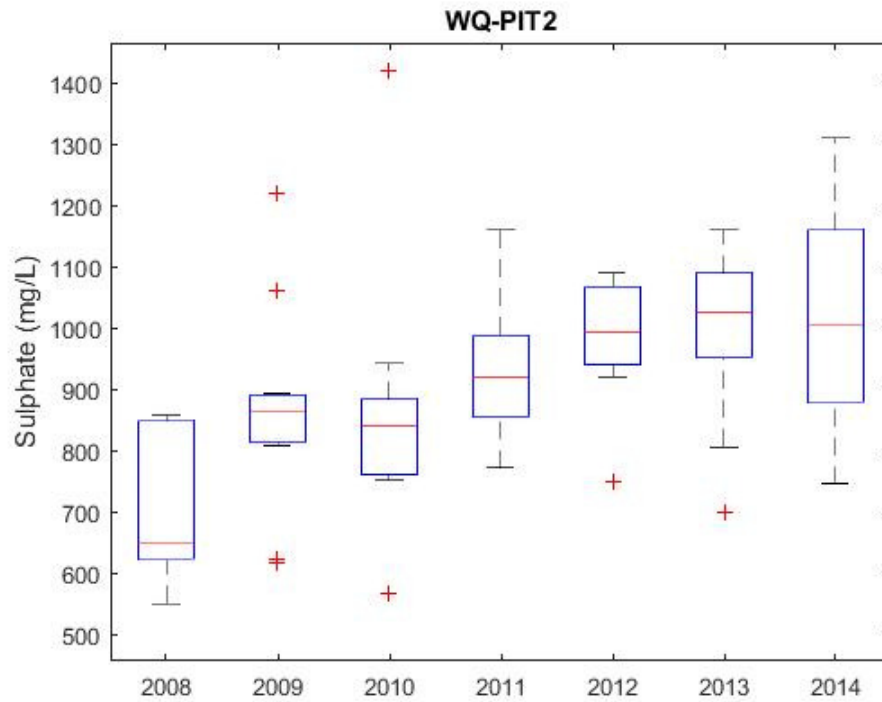


Figure 47: Brown-McDade Pit MIDDLE WQS – Sulphate annual statistical summary. No CCME Guideline or EQS available.

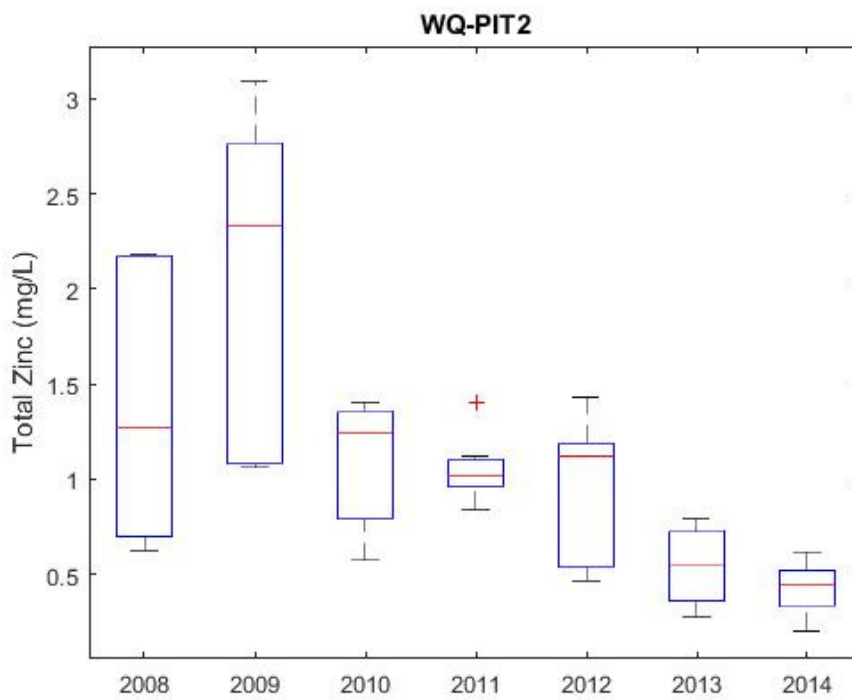


Figure 48: Brown-McDade Pit MIDDLE WQS – Total Zinc annual statistical summary. Total zinc CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

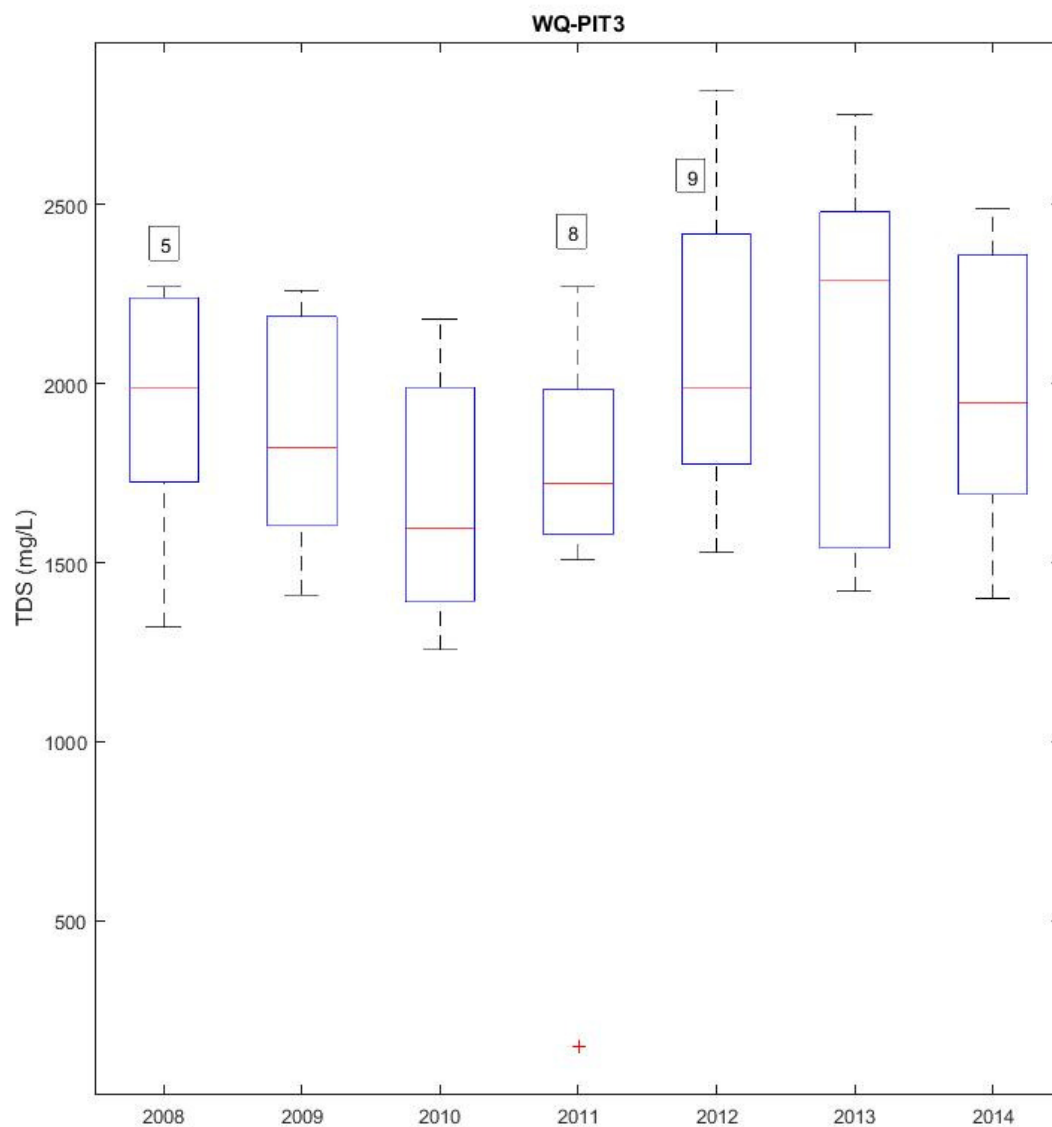


Figure 49: Brown-McDade Pit BOTTOM WQS – Total Dissolved Solids annual statistical summary. Years with less than 10 years of data noted in box above boxplot. No CCME Guideline or EQS available.

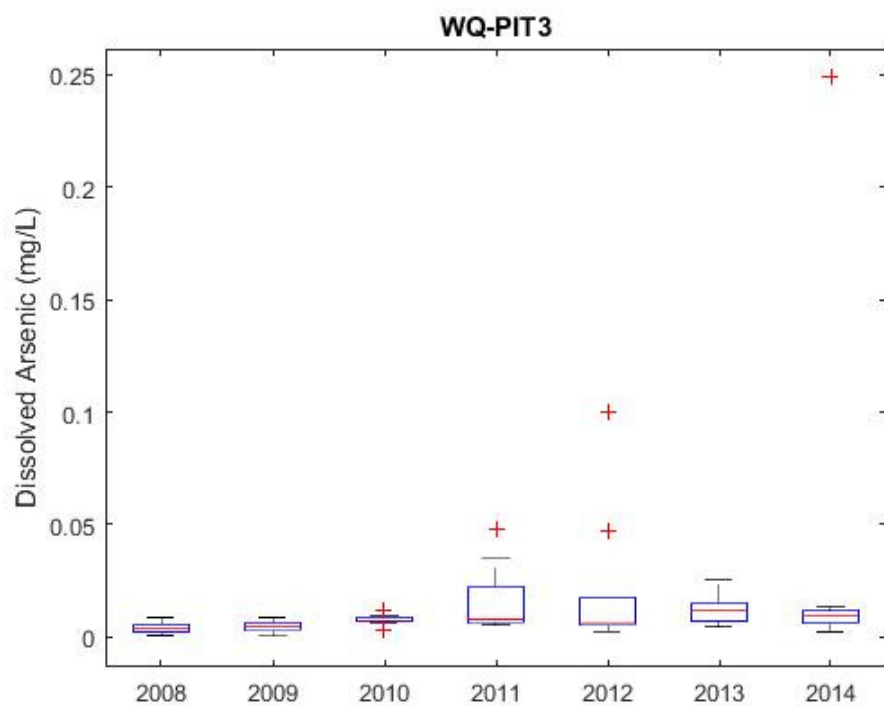


Figure 50: Brown-McDade Pit BOTTOM WQS – Dissolved Arsenic annual statistical summary. Dissolved arsenic EQS is 0.15 mg/L.

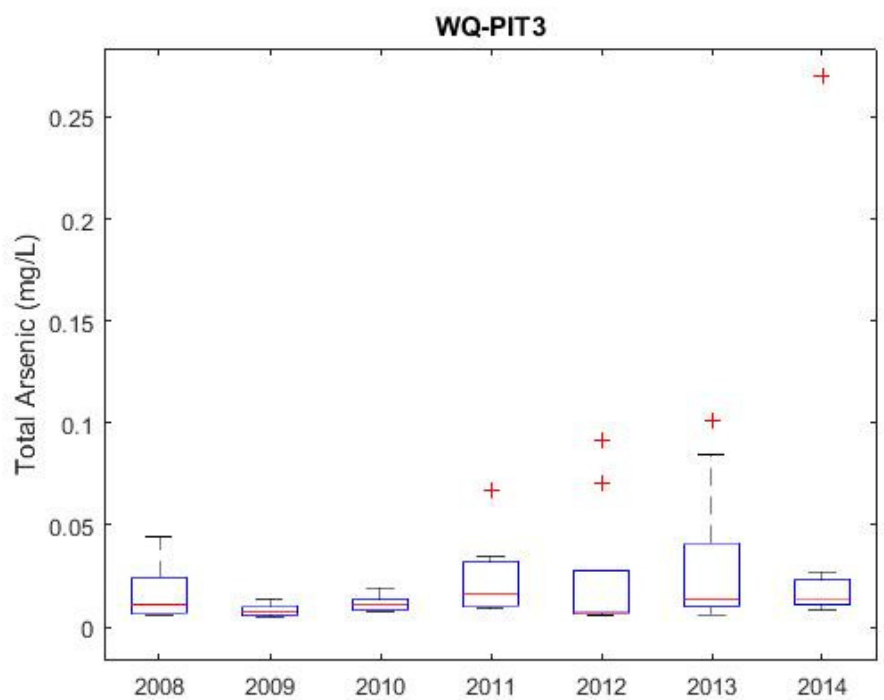


Figure 51: Brown-McDade Pit BOTTOM WQS – Total Arsenic annual statistical summary. Total arsenic CCME Guideline is 0.005 mg/L.

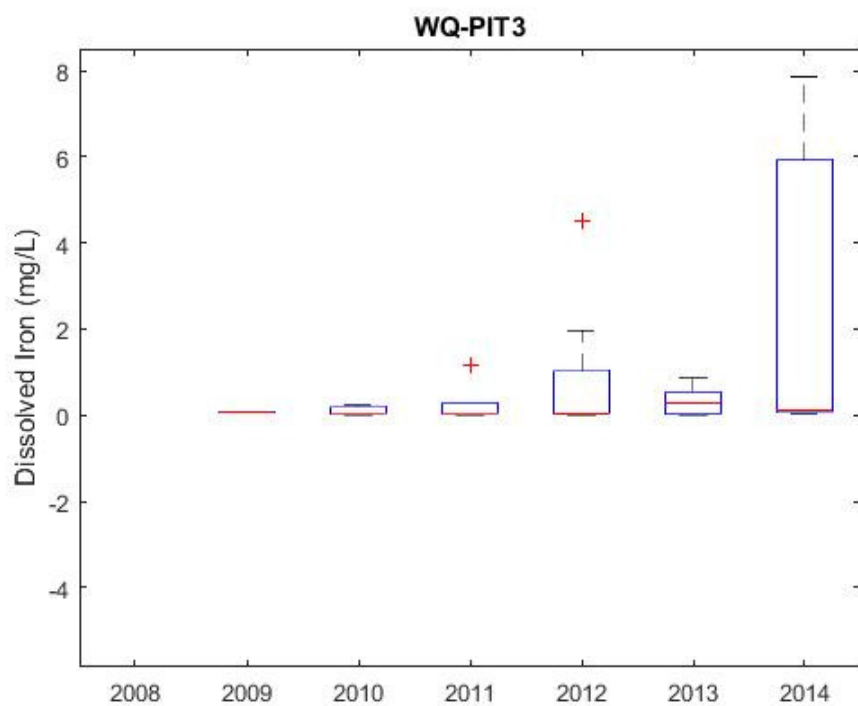


Figure 52: Brown-McDade Pit BOTTOM WQS – Dissolved Iron annual statistical summary. No CCME Guideline or EQS available.

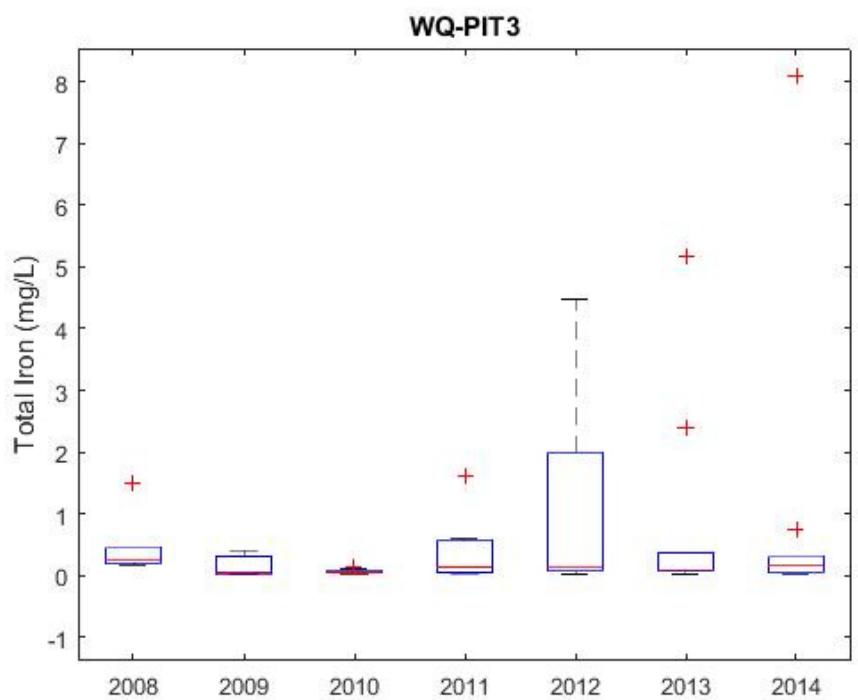


Figure 53: Brown-McDade Pit BOTTOM WQS – Total Iron annual statistical summary. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

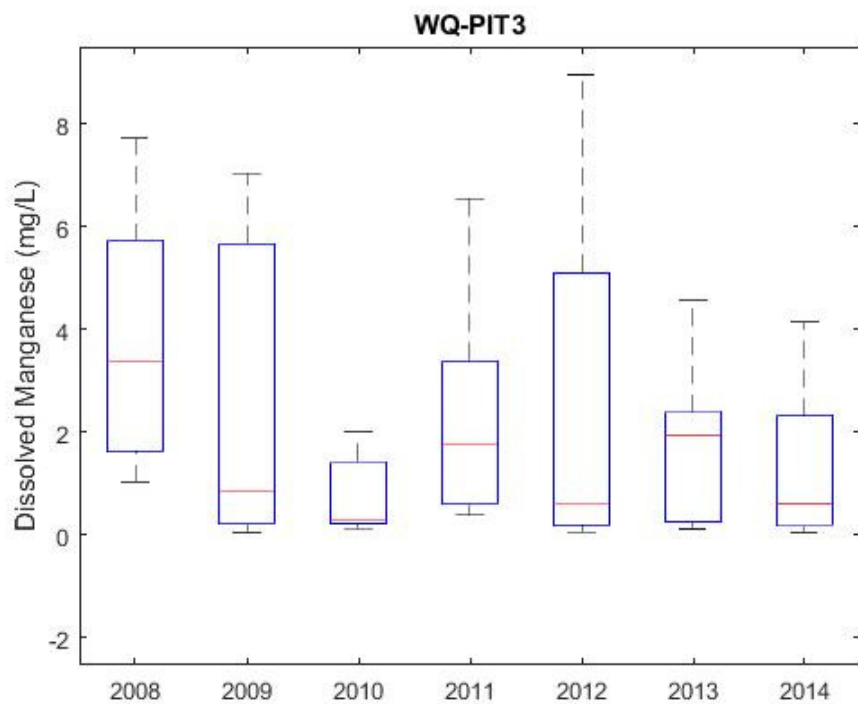


Figure 54: Brown-McDade Pit BOTTOM WQS – Dissolved Manganese annual statistical summary. No CCME Guideline or EQS available.

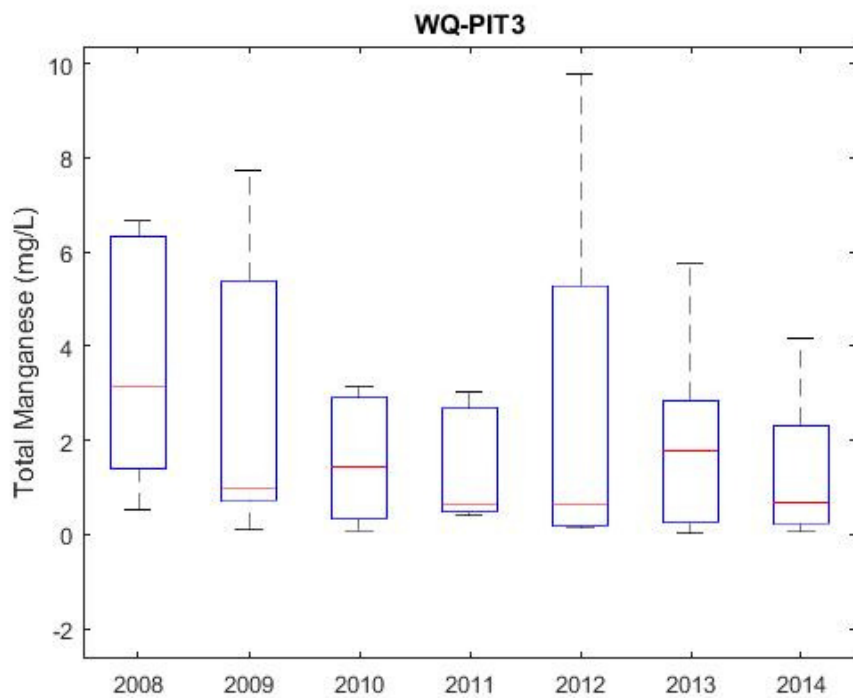


Figure 55: Brown-McDade Pit BOTTOM WQS – Total Manganese annual statistical summary. Total manganese EQS is 0.5 mg/L.

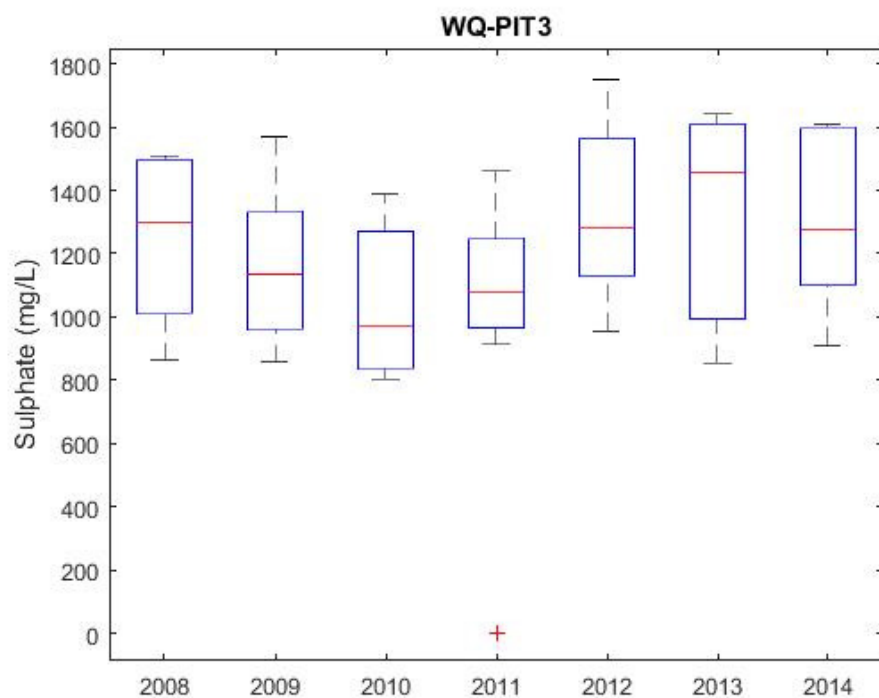


Figure 56: Brown-McDade Pit BOTTOM WQS – Sulphate annual statistical summary. No CCME Guideline or EQS available.

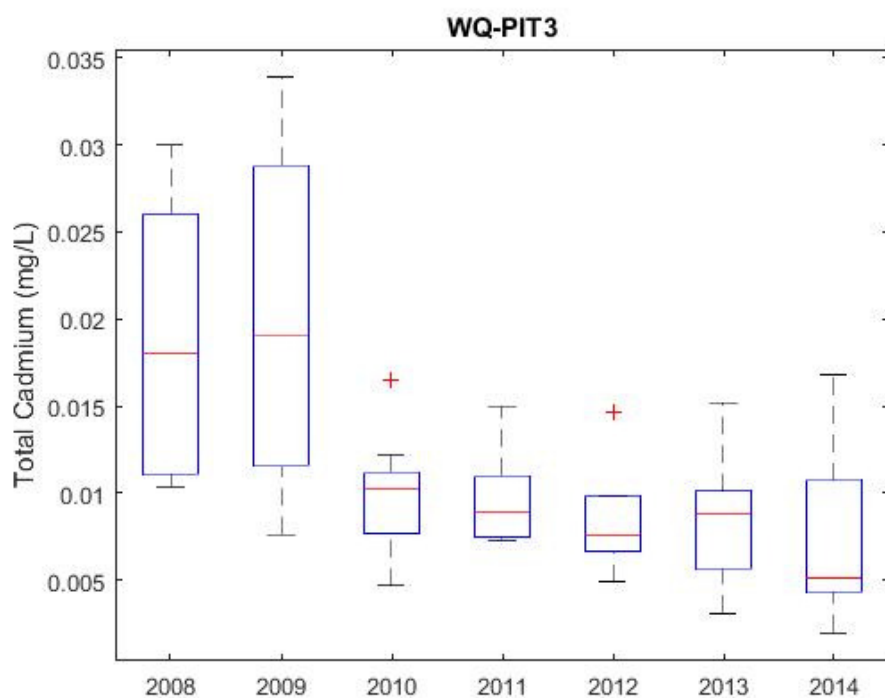


Figure 57: Brown-McDade Pit BOTTOM WQS – Total Cadmium annual statistical summary. CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.

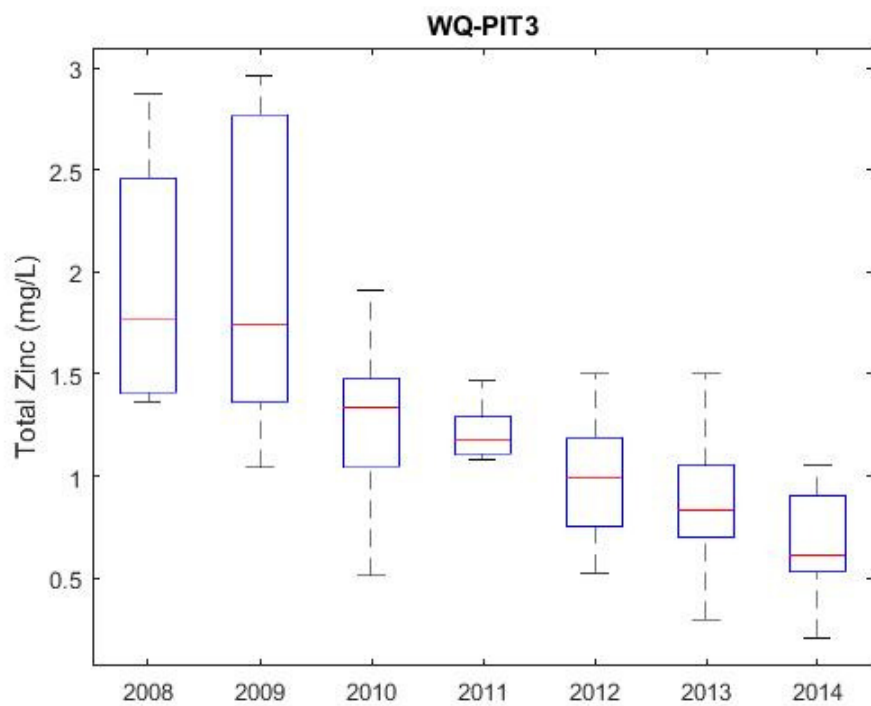


Figure 58: Brown-McDade Pit BOTTOM WQS – Total Zinc annual statistical summary. Total zinc CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

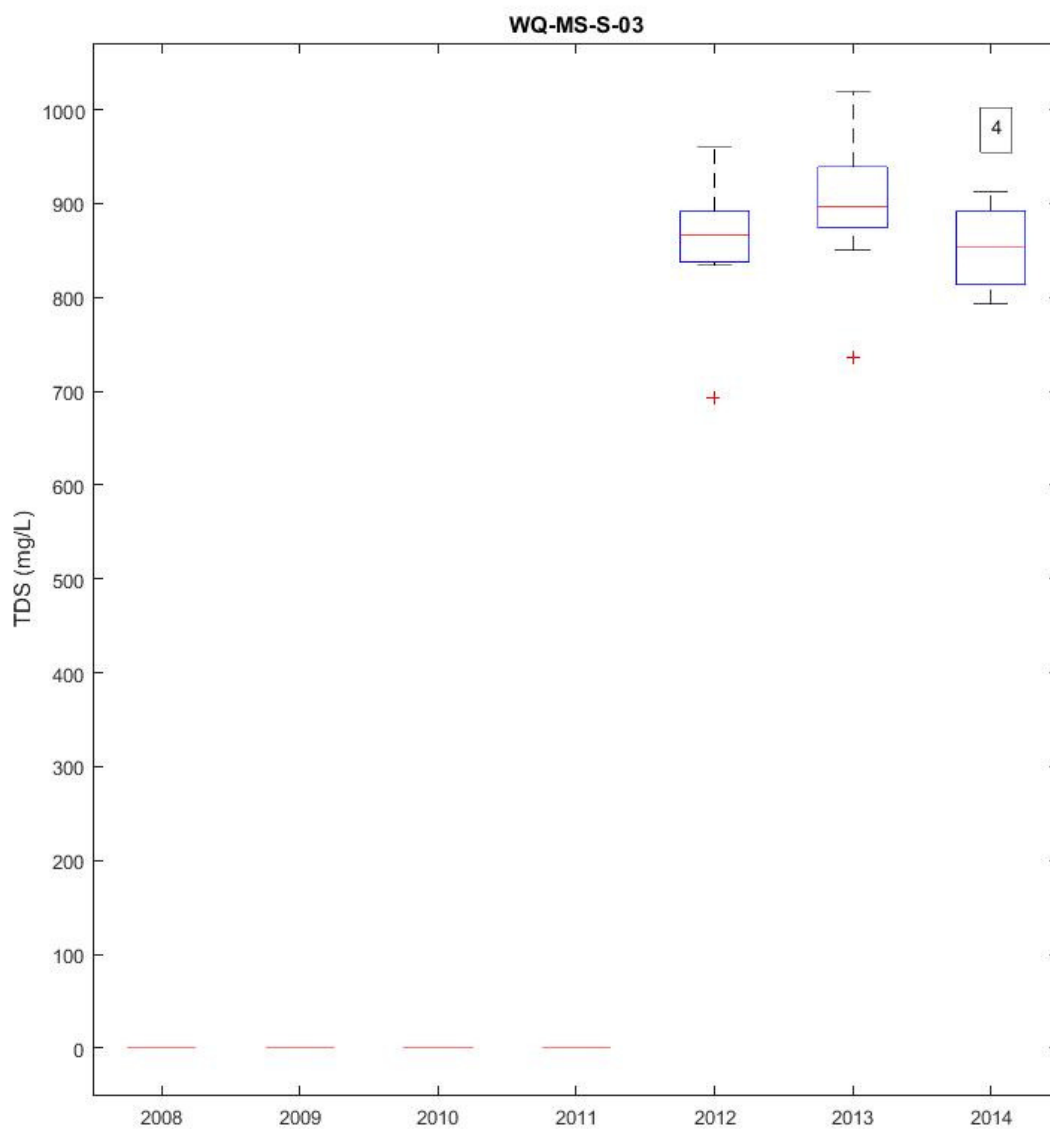


Figure 59: Mill Site Seep 03 WQS – Total Dissolved Solids annual statistical summary. Years with less than 10 years of data noted in box above boxplot. No CCME Guideline or EQS available.

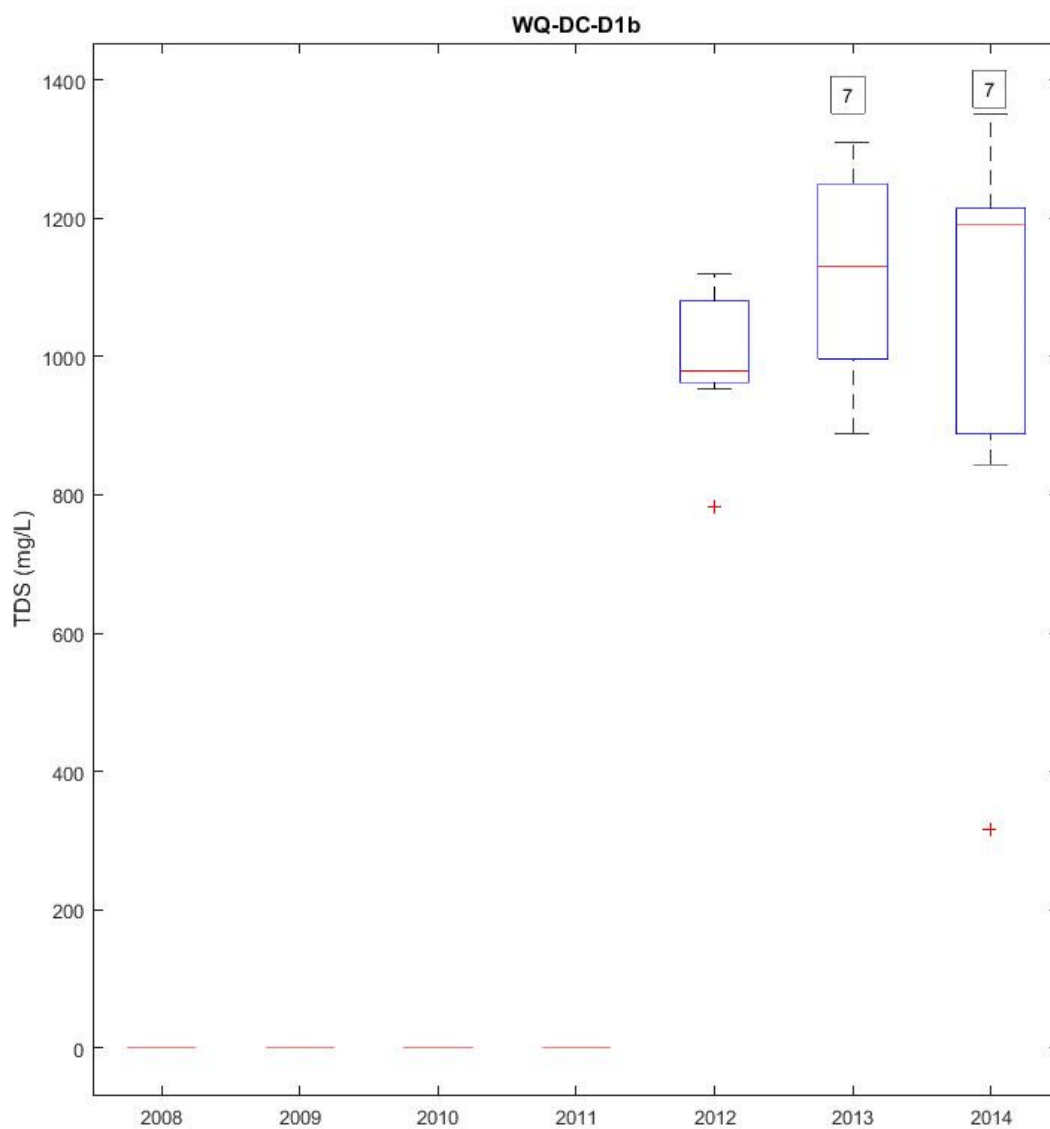


Figure 60: Dome Creek Downstream of Mill Site and Upstream of Tailings Pond WQS – Total Dissolved Solids annual statistical summary. Years with less than 10 years of data noted in box above boxplot. No CCME Guideline or EQS available.

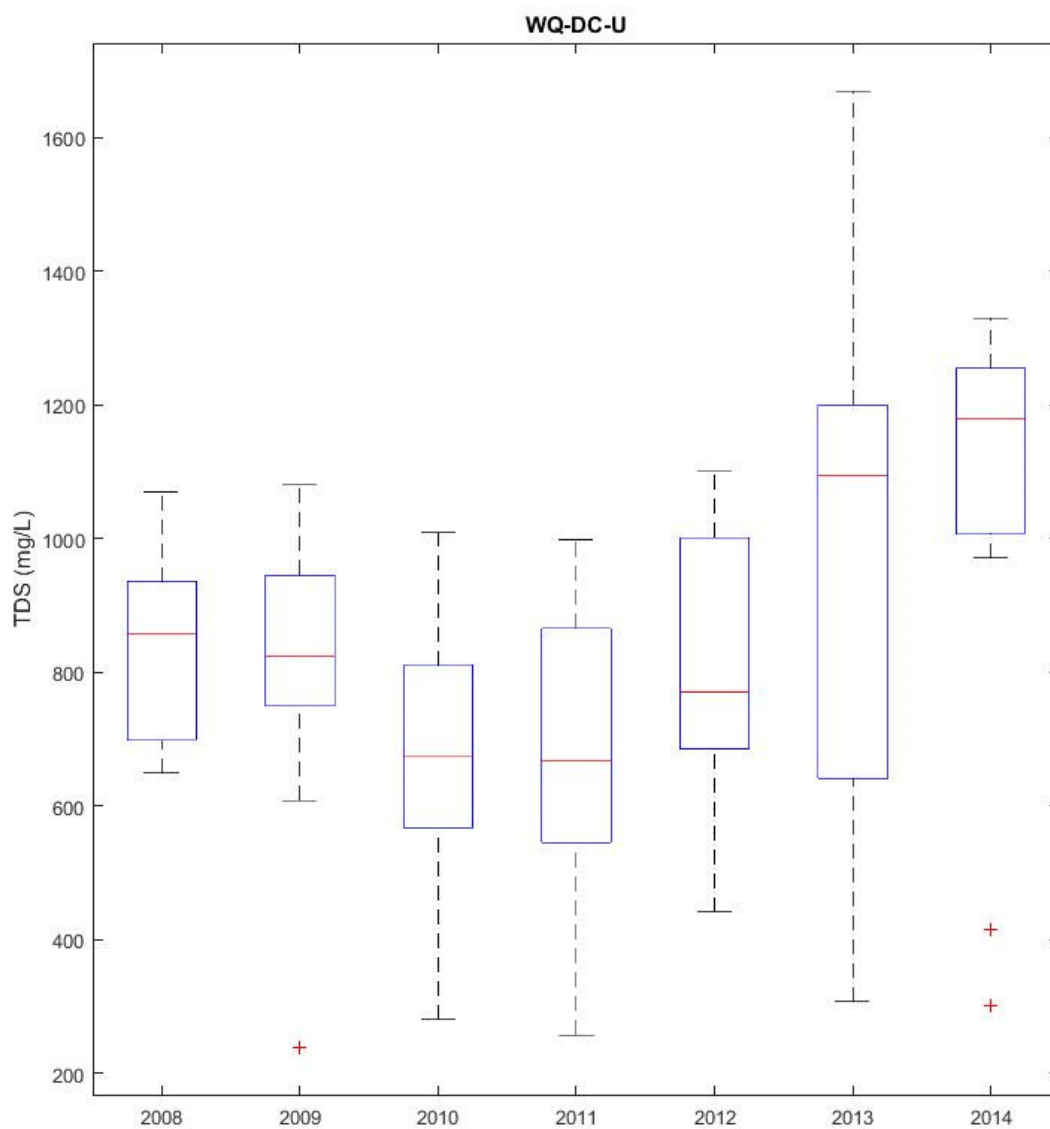


Figure 61: Upper Dome Creek Downstream of Tailings Pond WQS – Total Dissolved Solids annual statistical summary. No CCME Guideline or EQS available.

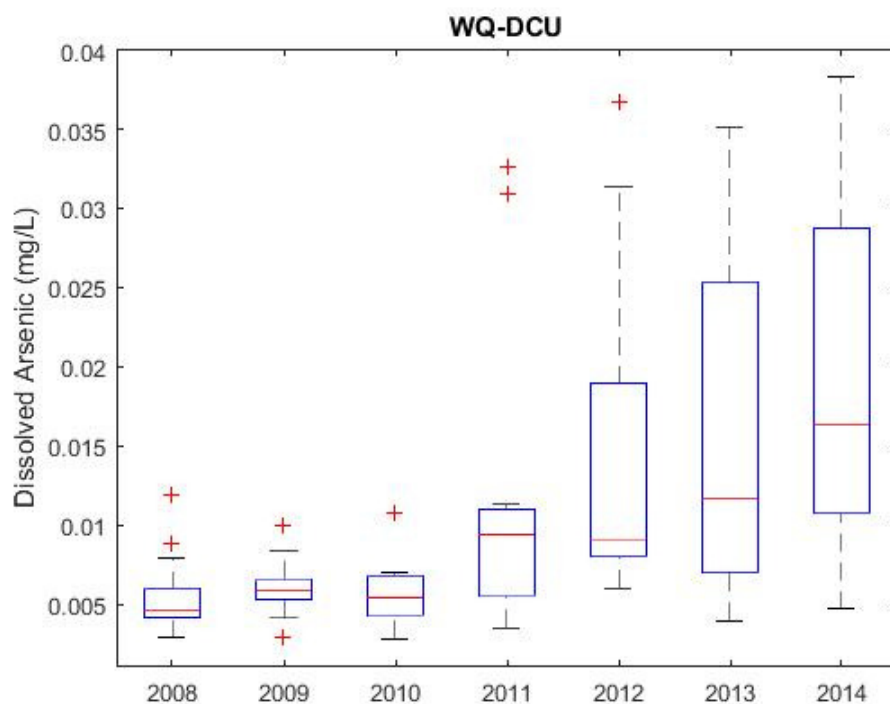


Figure 62: Upper Dome Creek Downstream of Tailings Pond WQS – Dissolved Arsenic annual statistical summary. Dissolved arsenic EQS is 0.15 mg/L.

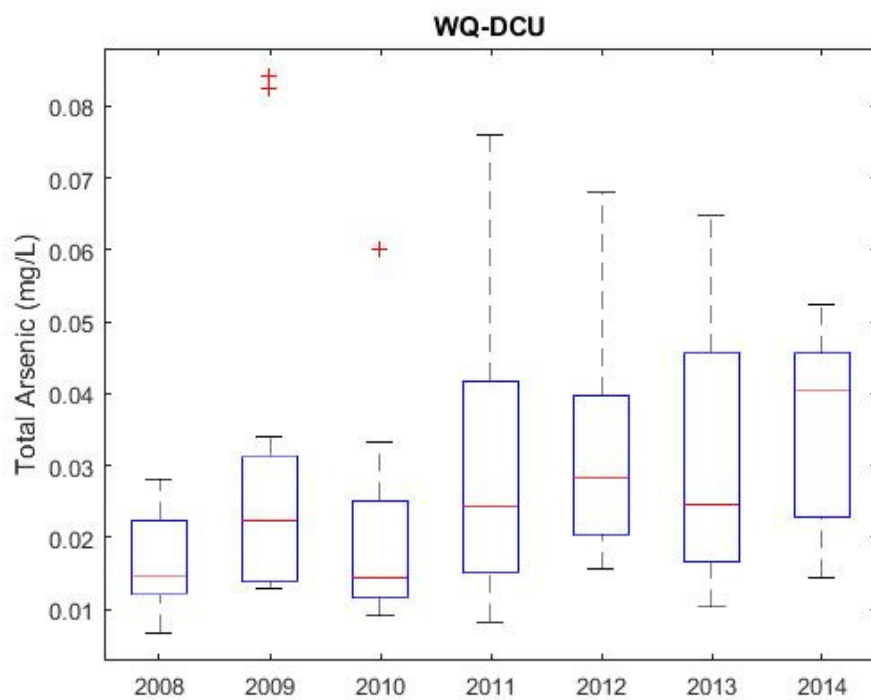


Figure 63: Upper Dome Creek Downstream of Tailings Pond WQS – Total Arsenic annual statistical summary. Total arsenic CCME Guideline is 0.005 mg/L.

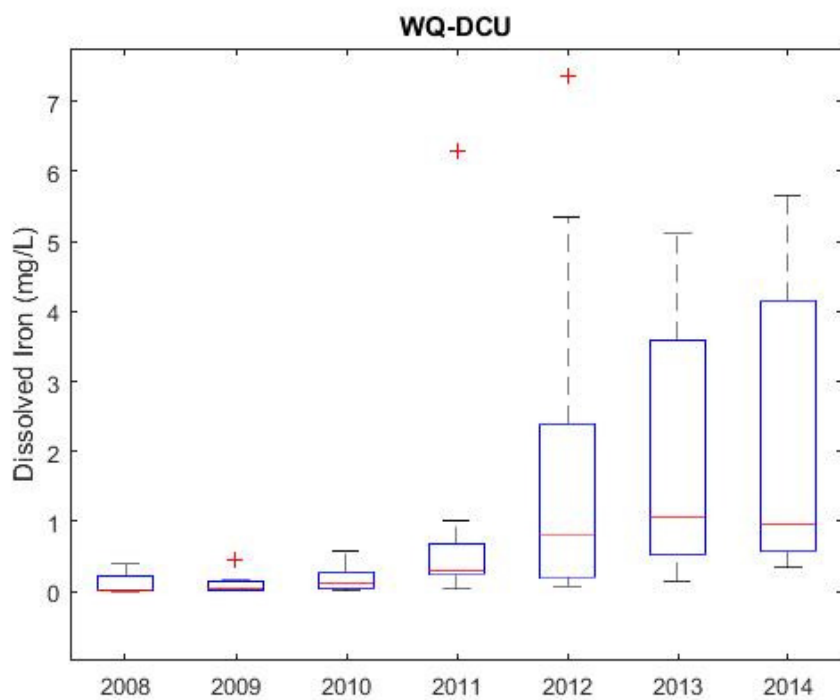


Figure 64: Upper Dome Creek Downstream of Tailings Pond WQS – Dissolved Iron annual statistical summary. No CCME Guideline or EQS available.

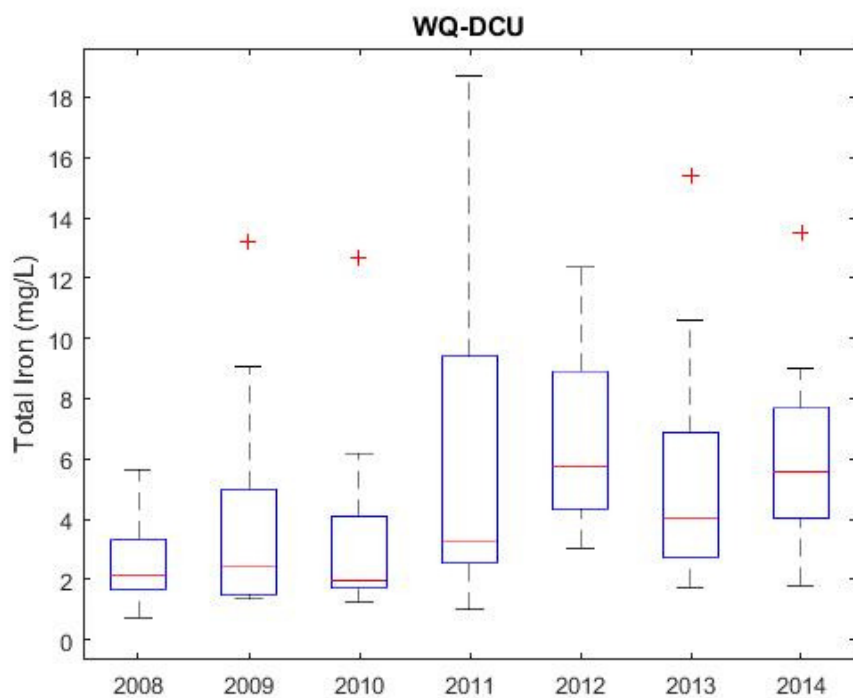


Figure 65: Upper Dome Creek Downstream of Tailings Pond WQS – Total Iron annual statistical summary. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

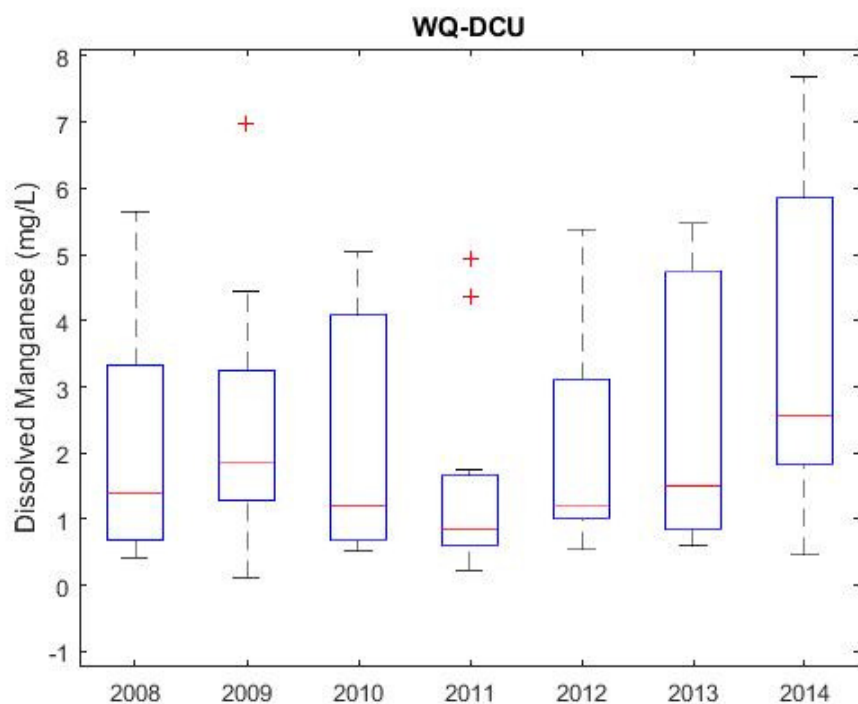


Figure 66: Upper Dome Creek Downstream of Tailings Pond WQS – Dissolved Manganese annual statistical summary. No CCME Guideline or EQS available.

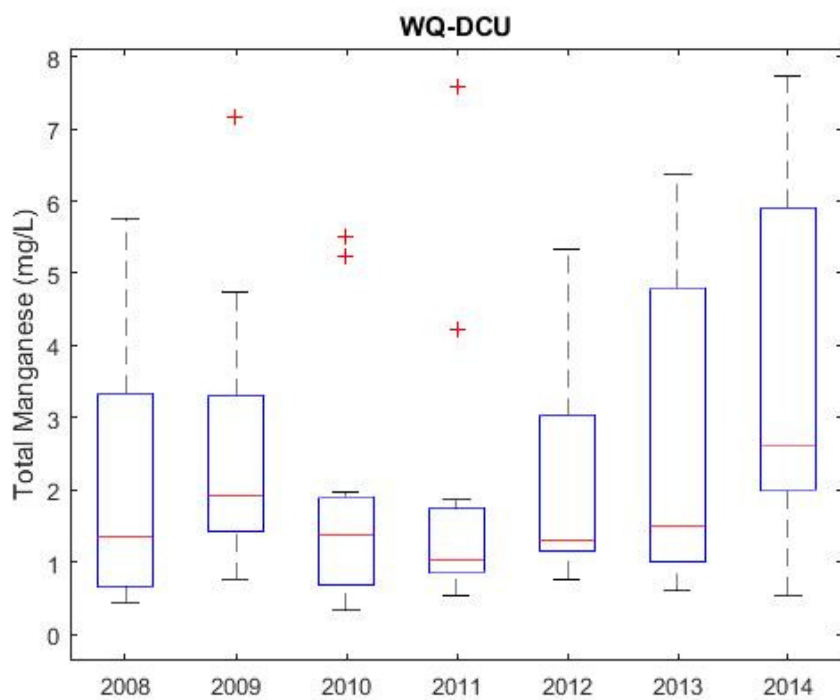


Figure 67: Upper Dome Creek Downstream of Tailings Pond WQS – Total Manganese annual statistical summary. Total manganese EQS is 0.5 mg/L.

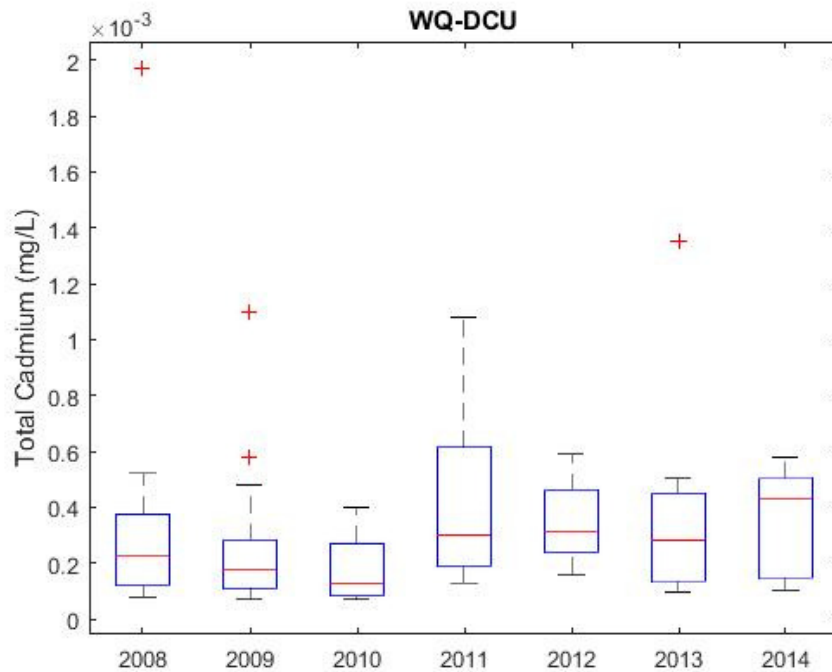


Figure 68: Upper Dome Creek Downstream of Tailings Pond WQS – Total Cadmium annual statistical summary. CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.

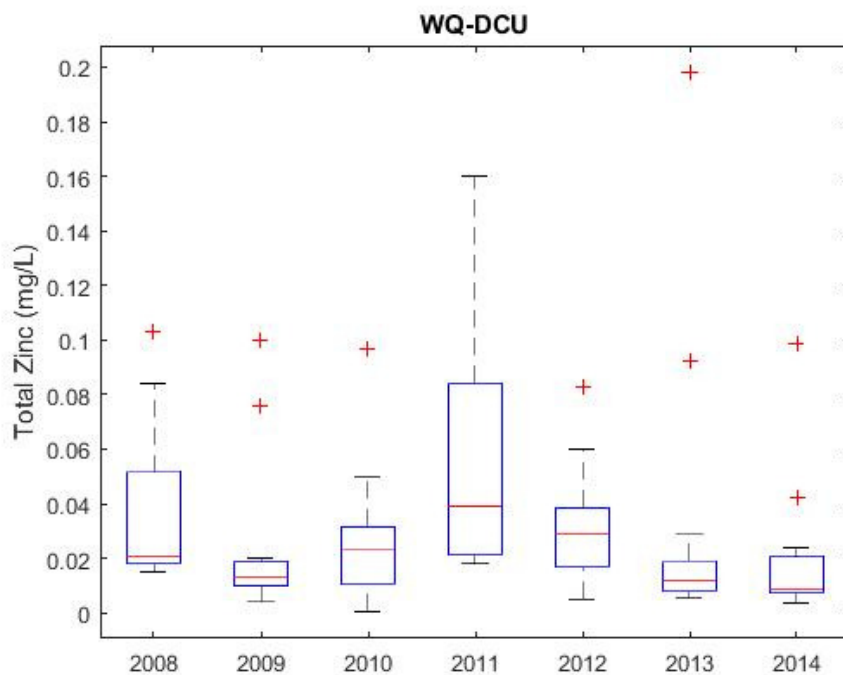


Figure 69: Upper Dome Creek Downstream of Tailings Pond WQS – Total Zinc annual statistical summary. Total Zinc CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

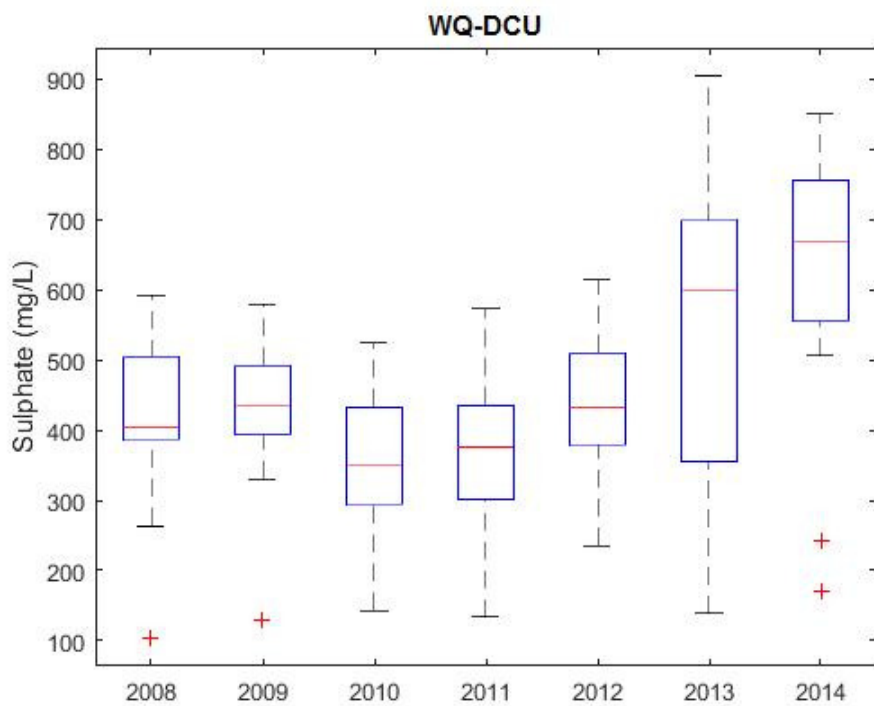


Figure 70: Upper Dome Creek Downstream of Tailings Pond WQS – Sulphate annual statistical summary. No CCME Guideline or EQS available.

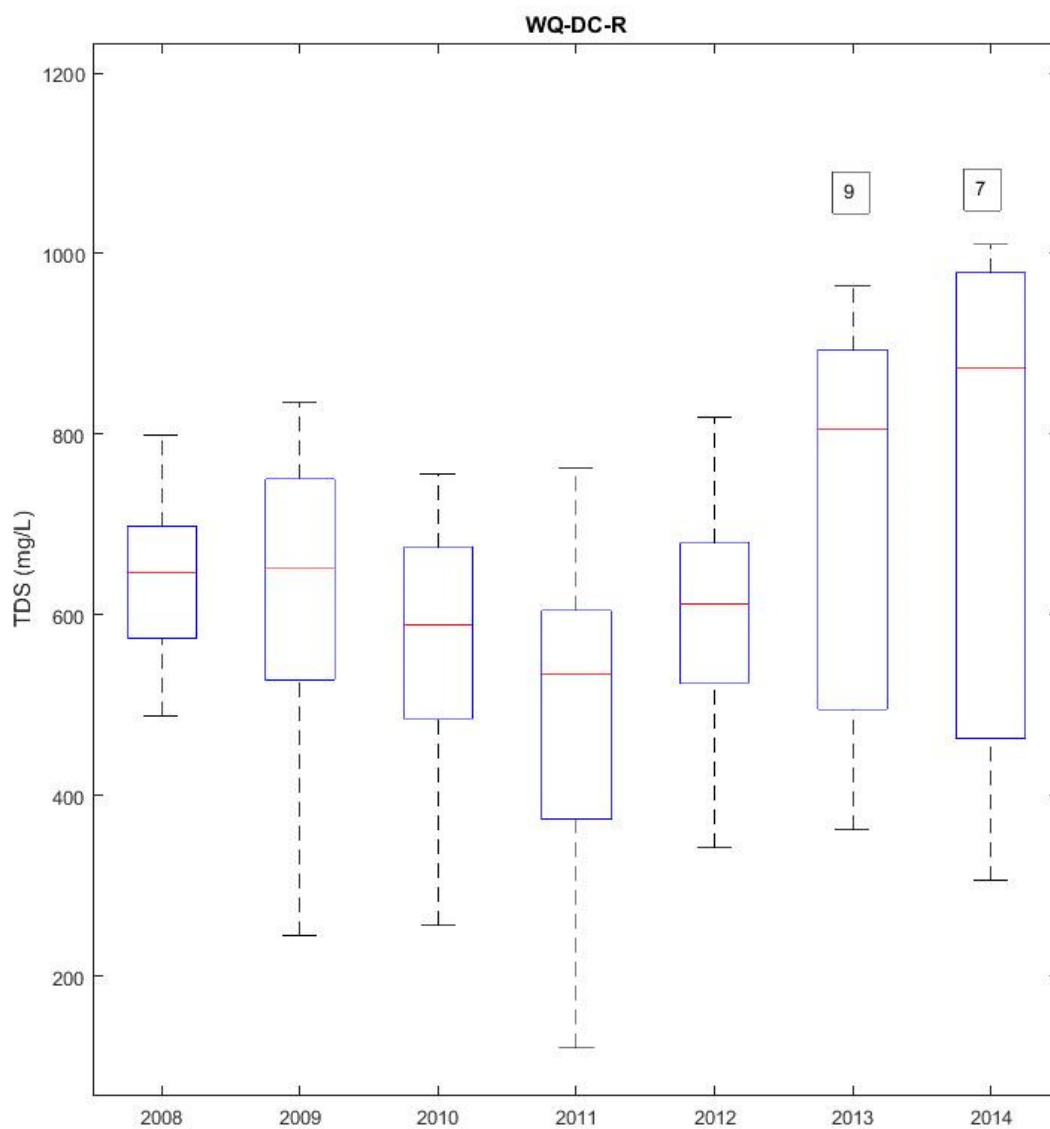


Figure 71: Dome Creek at Road WQS – Total Dissolved Solids annual statistical summary. Years with less than 10 years of data noted in box above boxplot. No CCME Guideline or EQS available.

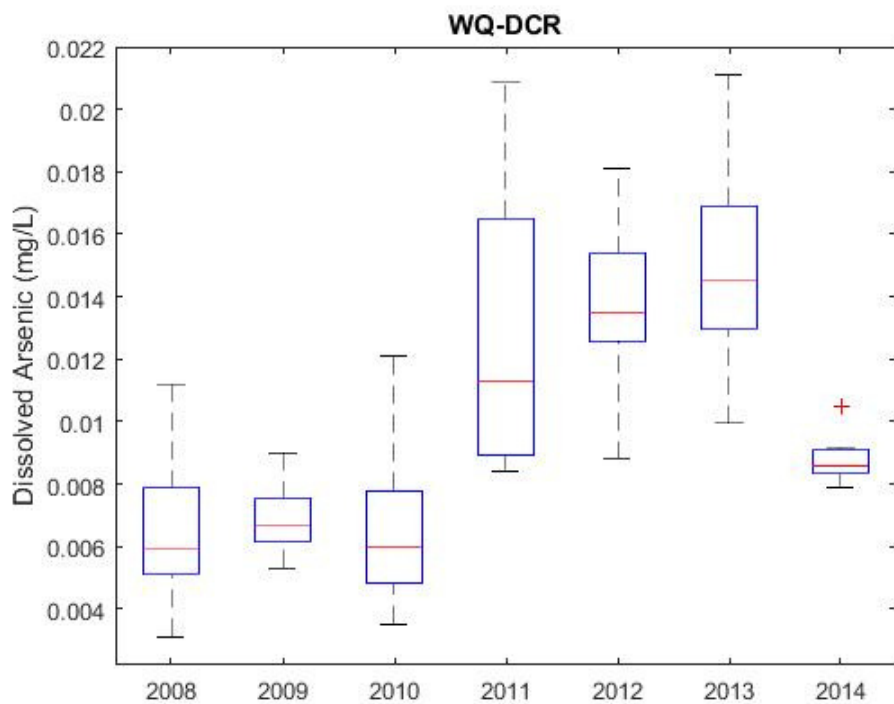


Figure 72: Dome Creek at Road WQS – Dissolved Arsenic annual statistical summary. Dissolved arsenic EQS is 0.15 mg/L.

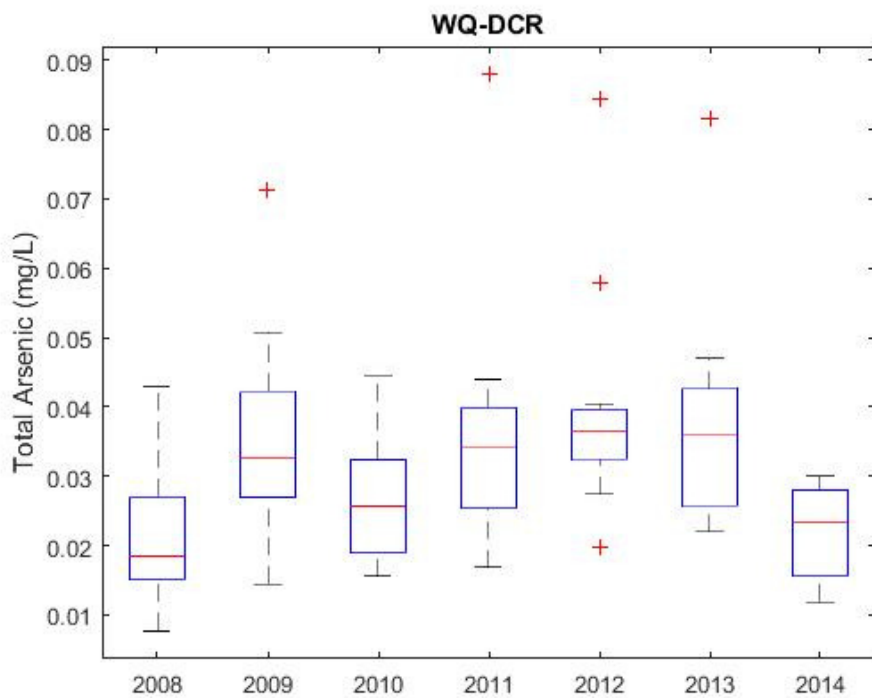


Figure 73: Dome Creek at Road WQS – Total Arsenic annual statistical summary. Total arsenic CCME Guideline is 0.005 mg/L.

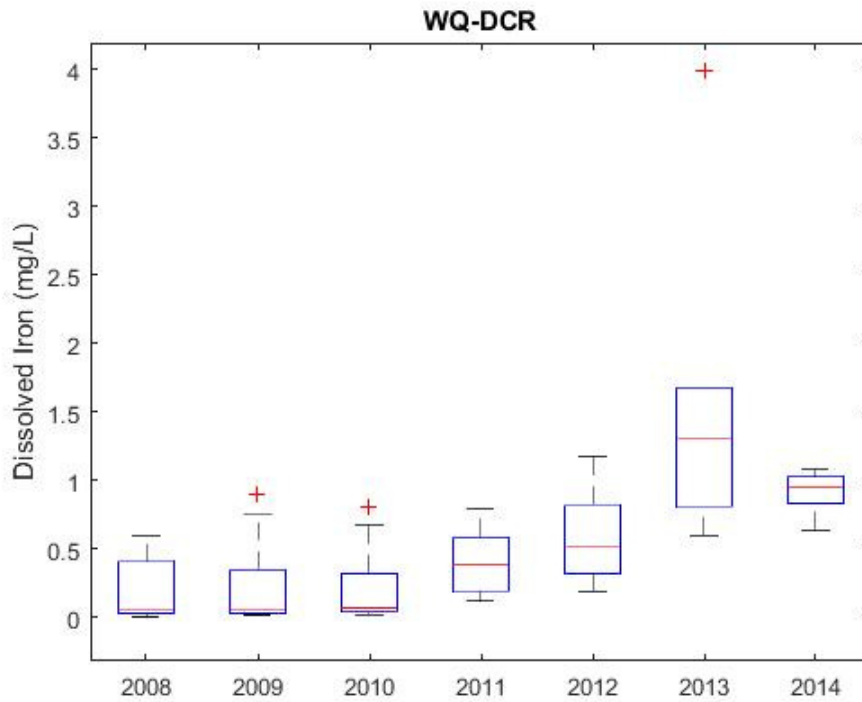


Figure 74: Dome Creek at Road WQS – Dissolved Iron annual statistical summary. No CCME Guideline or EQS available.

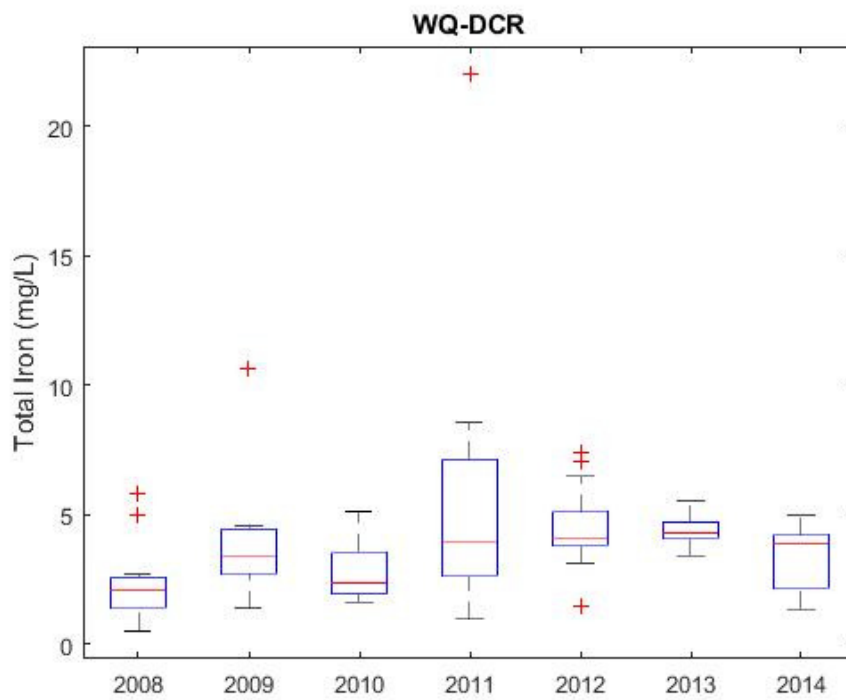


Figure 75: Dome Creek at Road WQS – Total Iron annual statistical summary. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

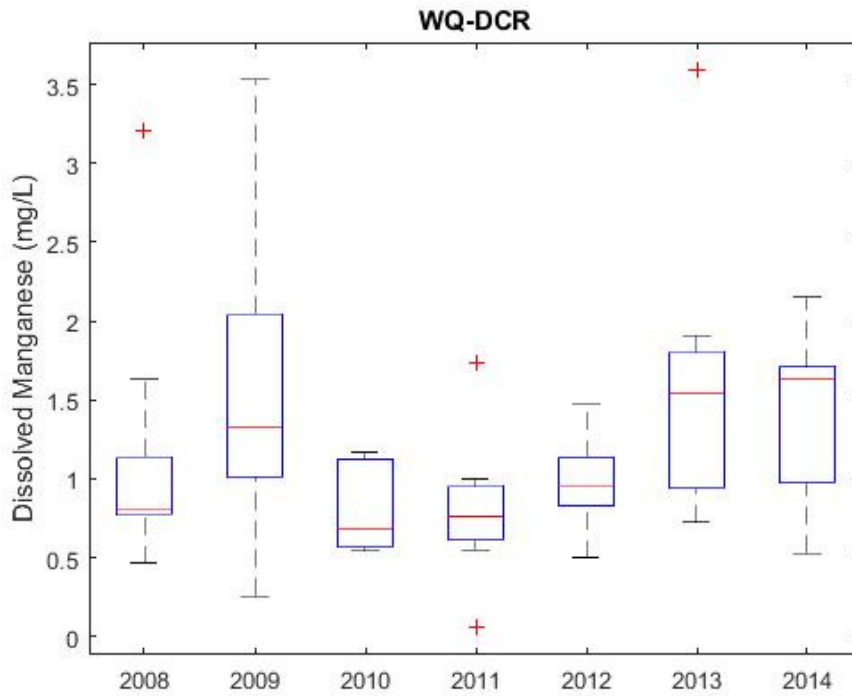


Figure 76: Dome Creek at Road WQS – Dissolved Manganese annual statistical summary. No CCME Guideline or EQS available.

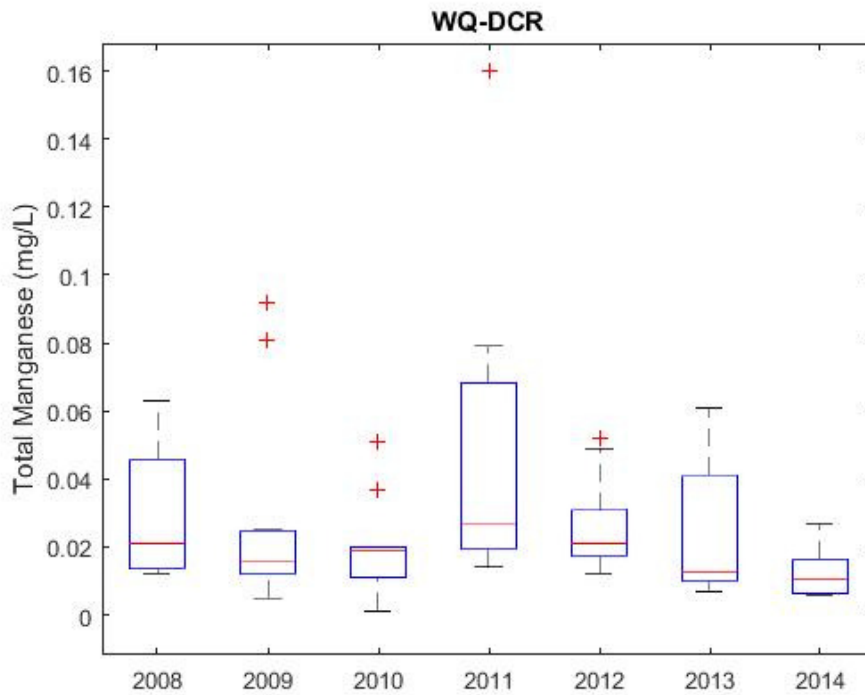


Figure 77: Dome Creek at Road WQS – Total Manganese annual statistical summary. Total manganese EQS is 0.5 mg/L.

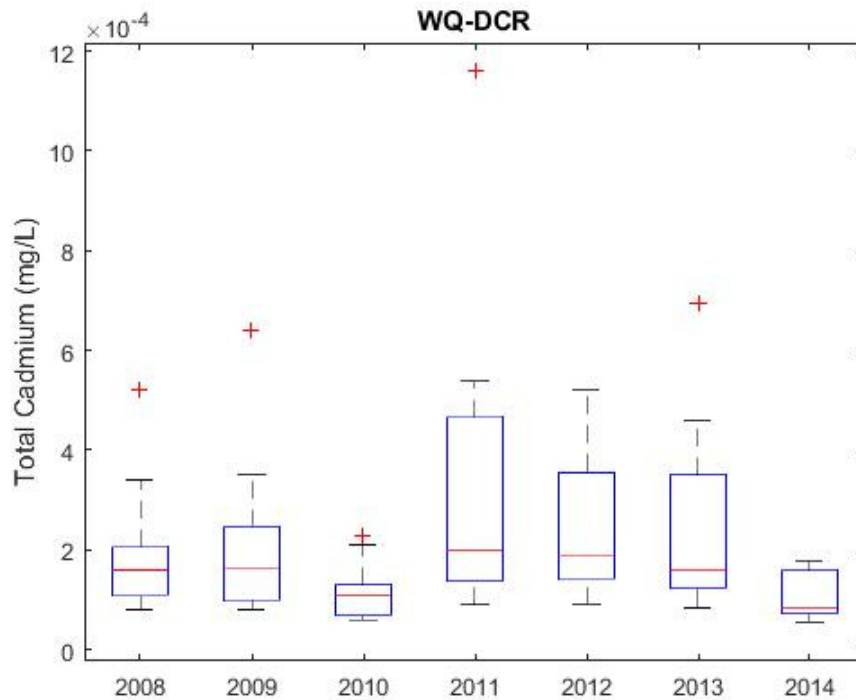


Figure 78: Dome Creek at Road WQS – Total Cadmium annual statistical summary. Total cadmium CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.

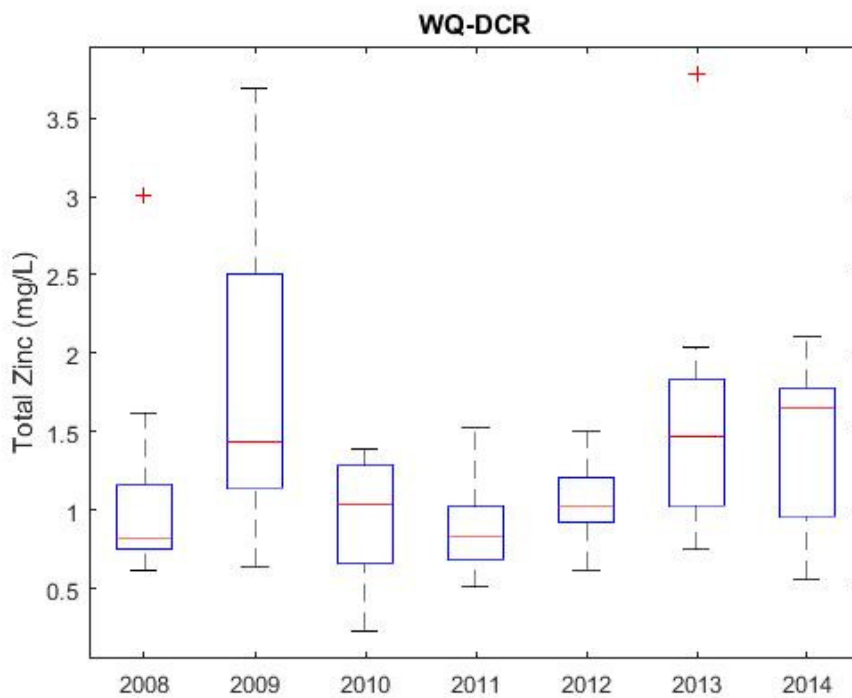


Figure 79: Dome Creek at Road WQS – Total Zinc annual statistical summary. CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

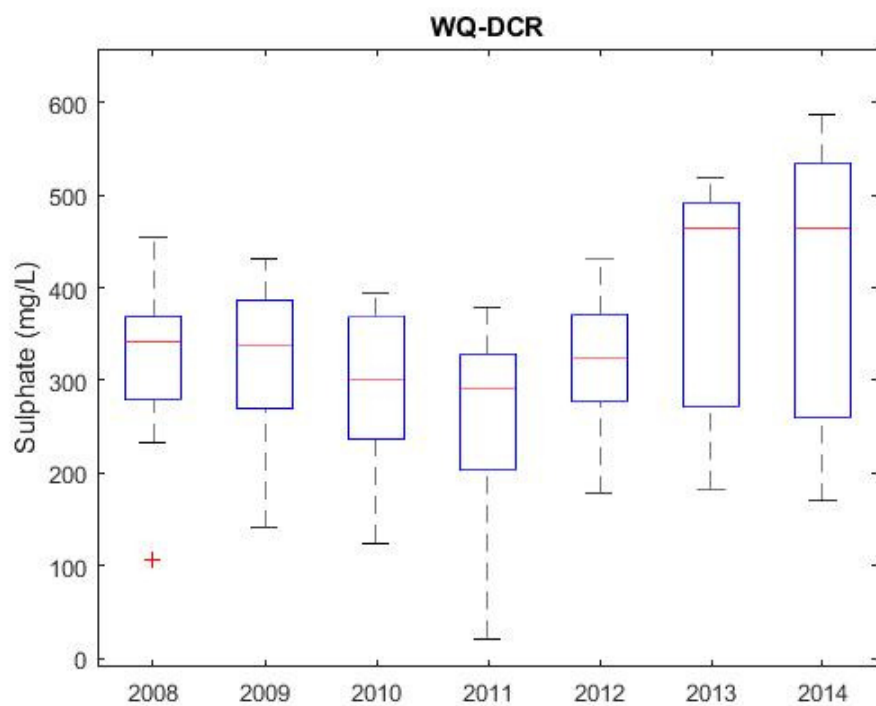


Figure 80: Dome Creek at Road WQS – Sulphate annual statistical summary. No CCME Guideline or EQS available.

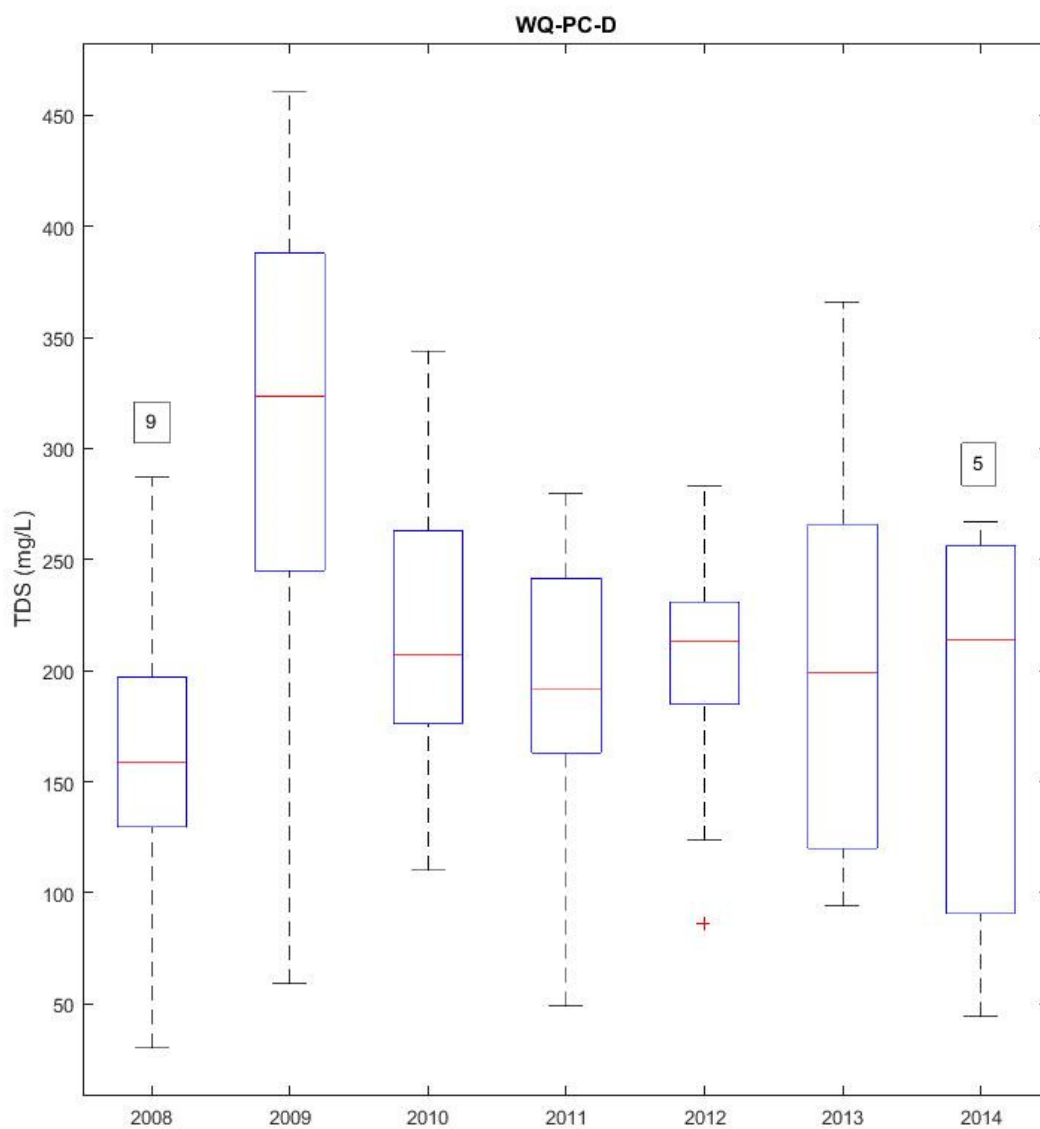


Figure 81: Pony Creek Downstream of Pit WQS – Total Dissolved Solids annual statistical summary. Years with less than 10 years of data noted in box above boxplot. No CCME Guideline or EQS available.

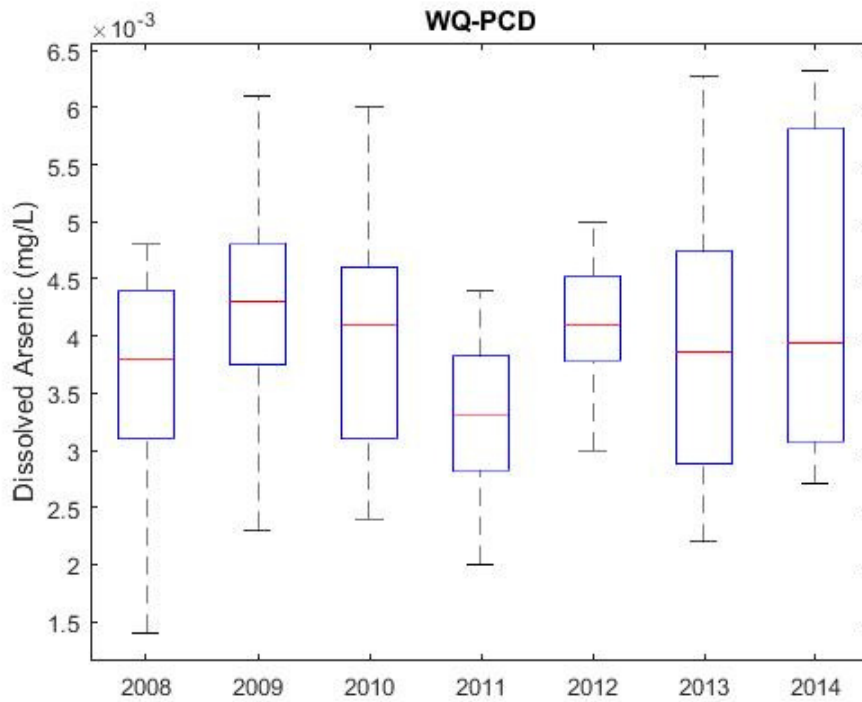


Figure 82: Pony Creek Downstream of Pit WQS – Dissolved Arsenic annual statistical summary. Dissolved arsenic EQS is 0.15 mg/L.

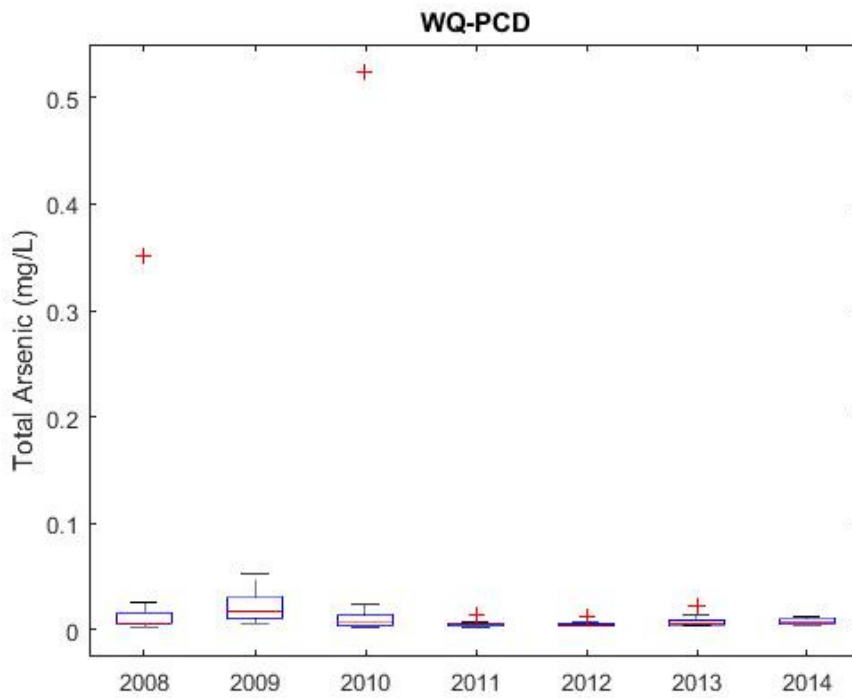


Figure 83: Pony Creek Downstream of Pit WQS – Total Arsenic annual statistical summary. Total arsenic CCME Guideline is 0.005 mg/L.

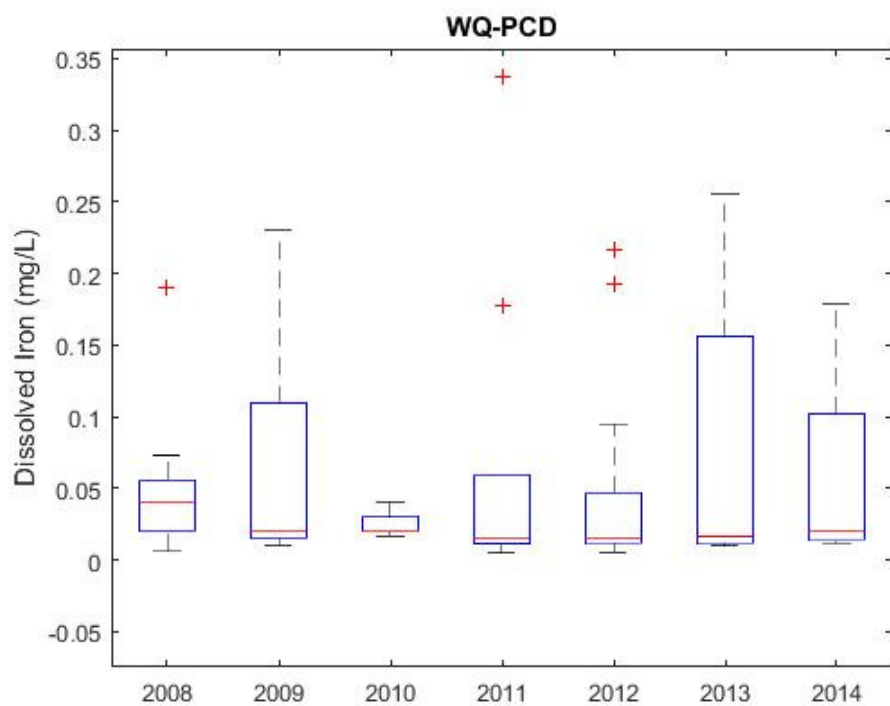


Figure 84: Pony Creek Downstream of Pit WQS – Dissolved Iron annual statistical summary. No CCME Guideline or EQS available.

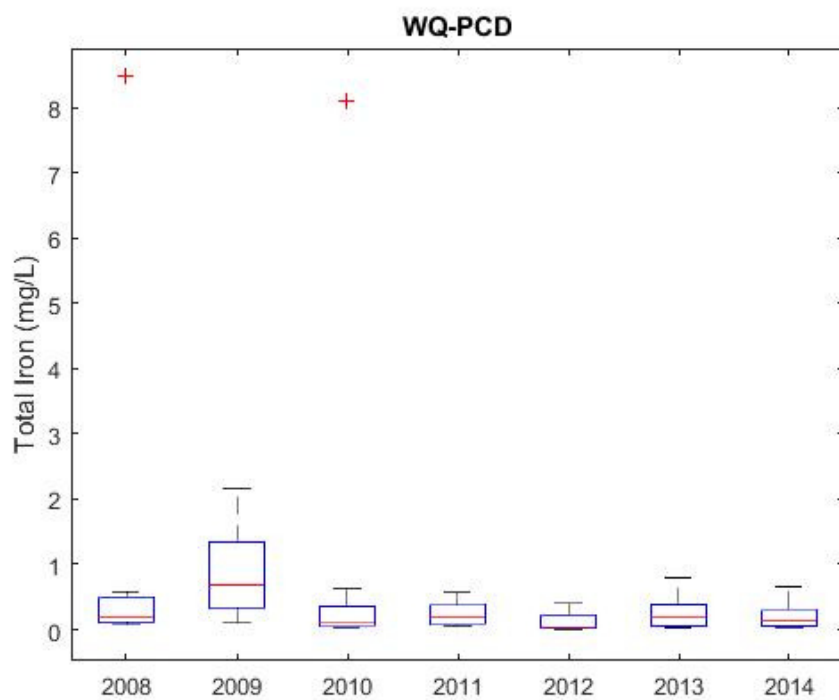


Figure 85: Pony Creek Downstream of Pit WQS – Total Iron annual statistical summary. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

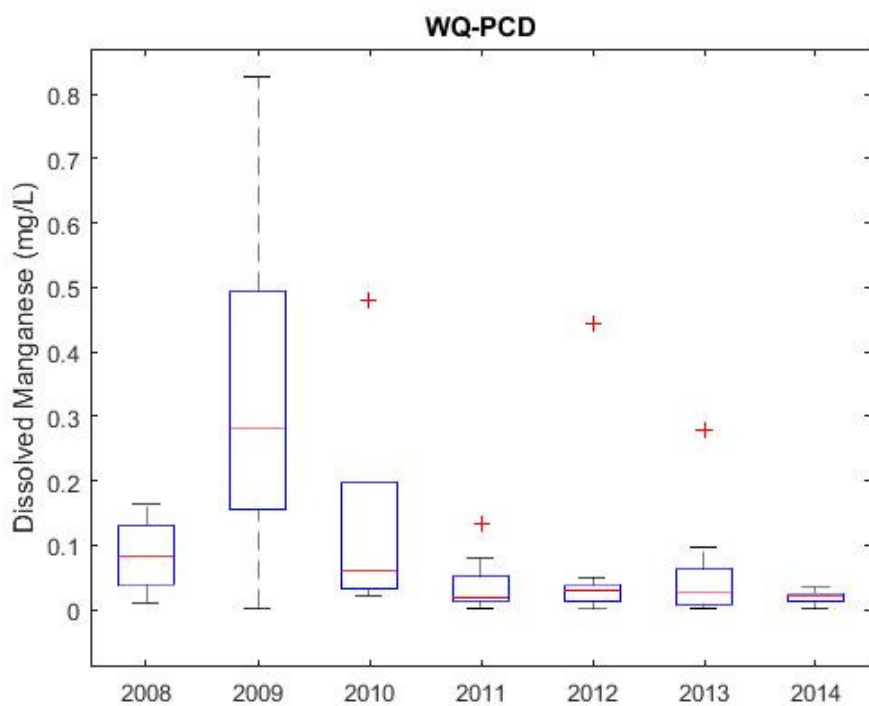


Figure 86: Pony Creek Downstream of Pit WQS – Dissolved Manganese annual statistical summary. No CCME Guideline or EQS available.

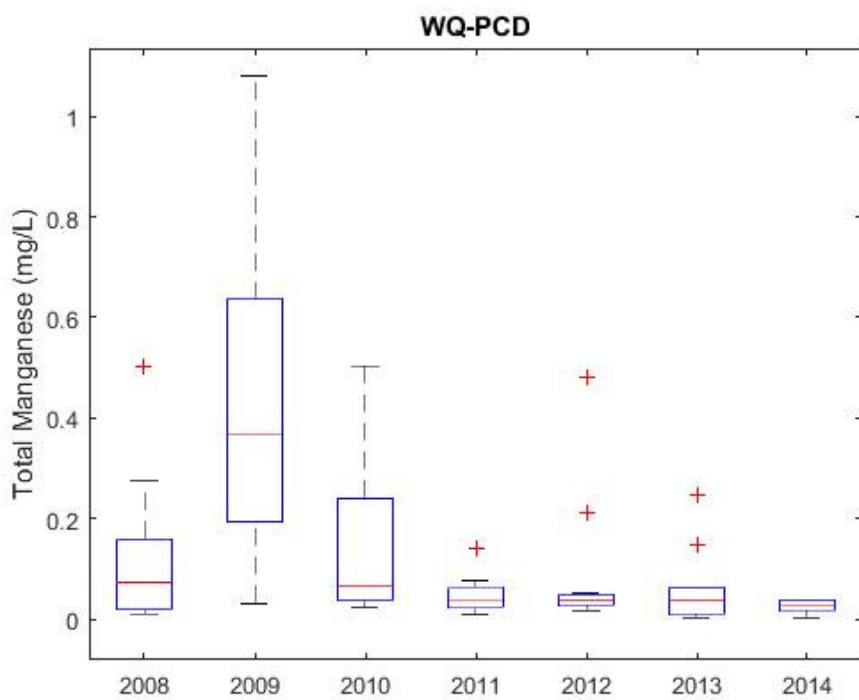


Figure 87: Pony Creek Downstream of Pit WQS – Total Manganese annual statistical summary. Total manganese EQS is 0.5 mg/L.

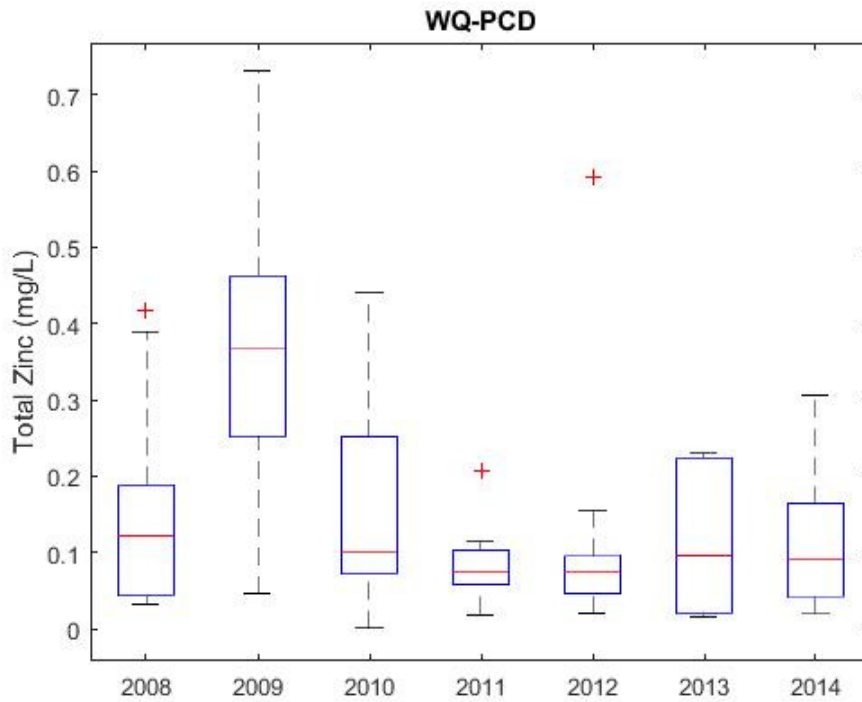


Figure 88: Pony Creek Downstream of Pit WQS – Total Zinc annual statistical summary. Total zinc CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

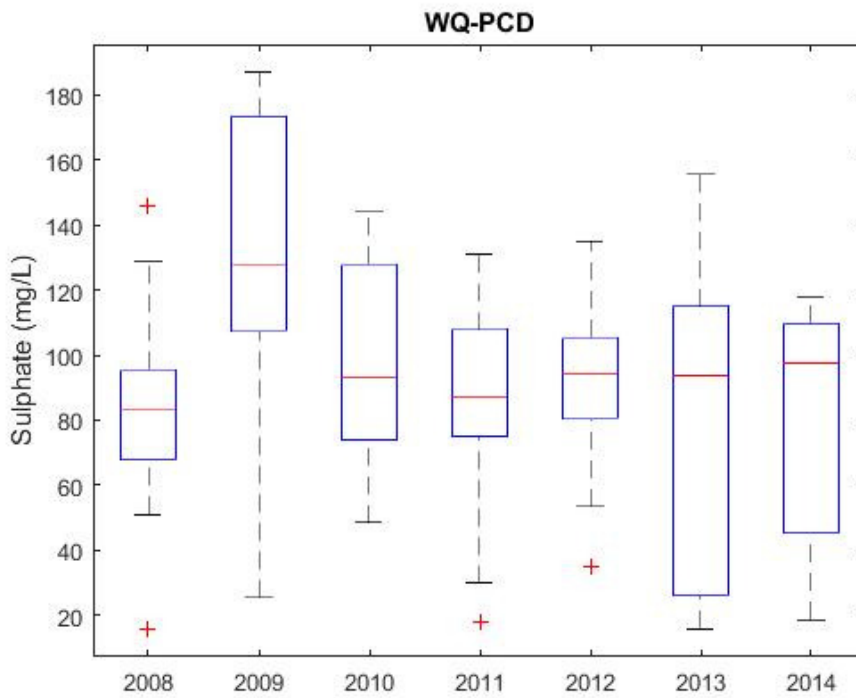


Figure 89: Pony Creek Downstream of Pit WQS – Sulphate annual statistical summary. No CCME Guideline or EQS available.

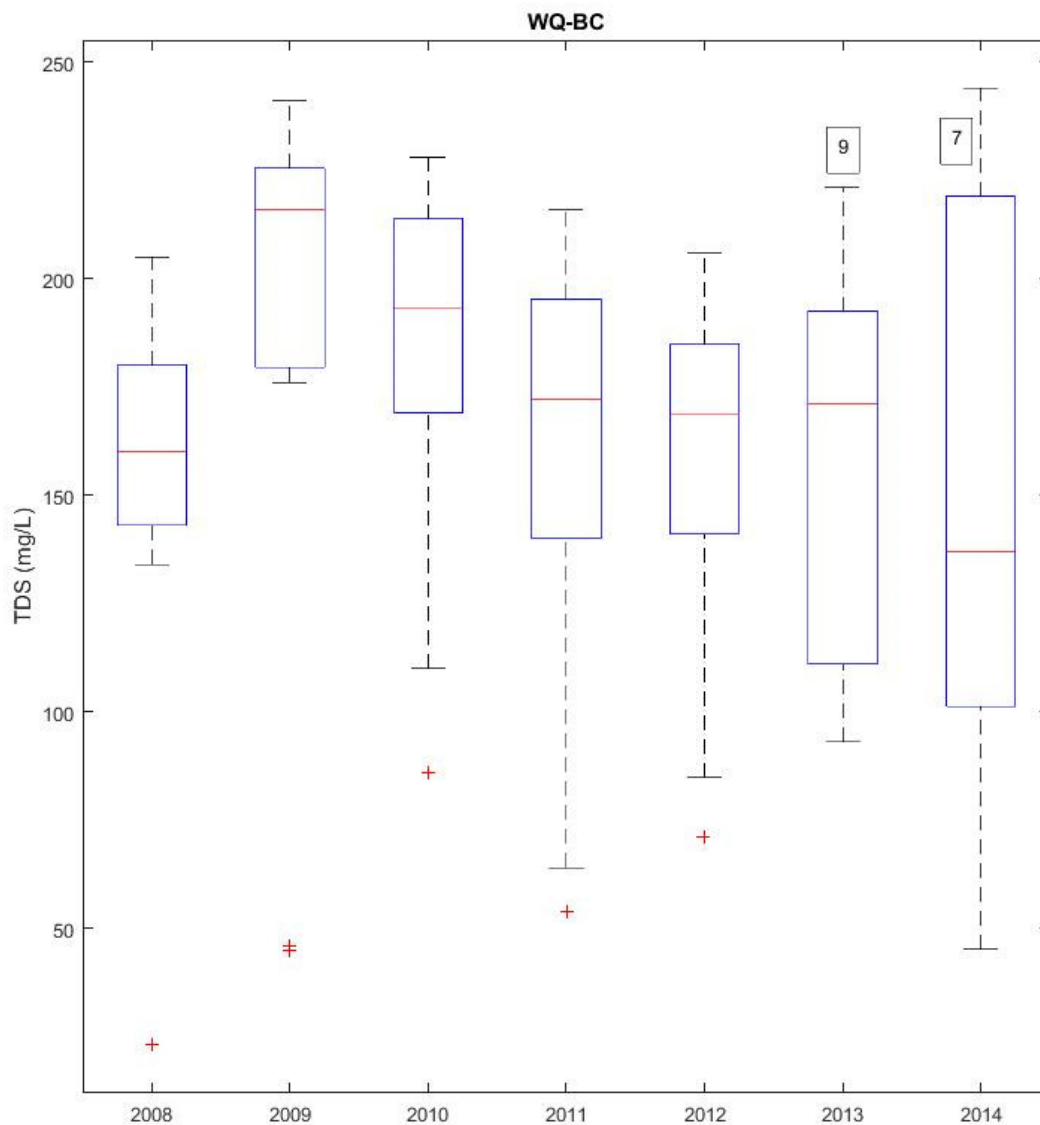


Figure 90: Back Creek Near Confluence with Victoria Creek WQS – Total Dissolved Solids annual statistical summary. Years with less than 10 years of data noted in box above boxplot. No CCME Guideline or EQS available.

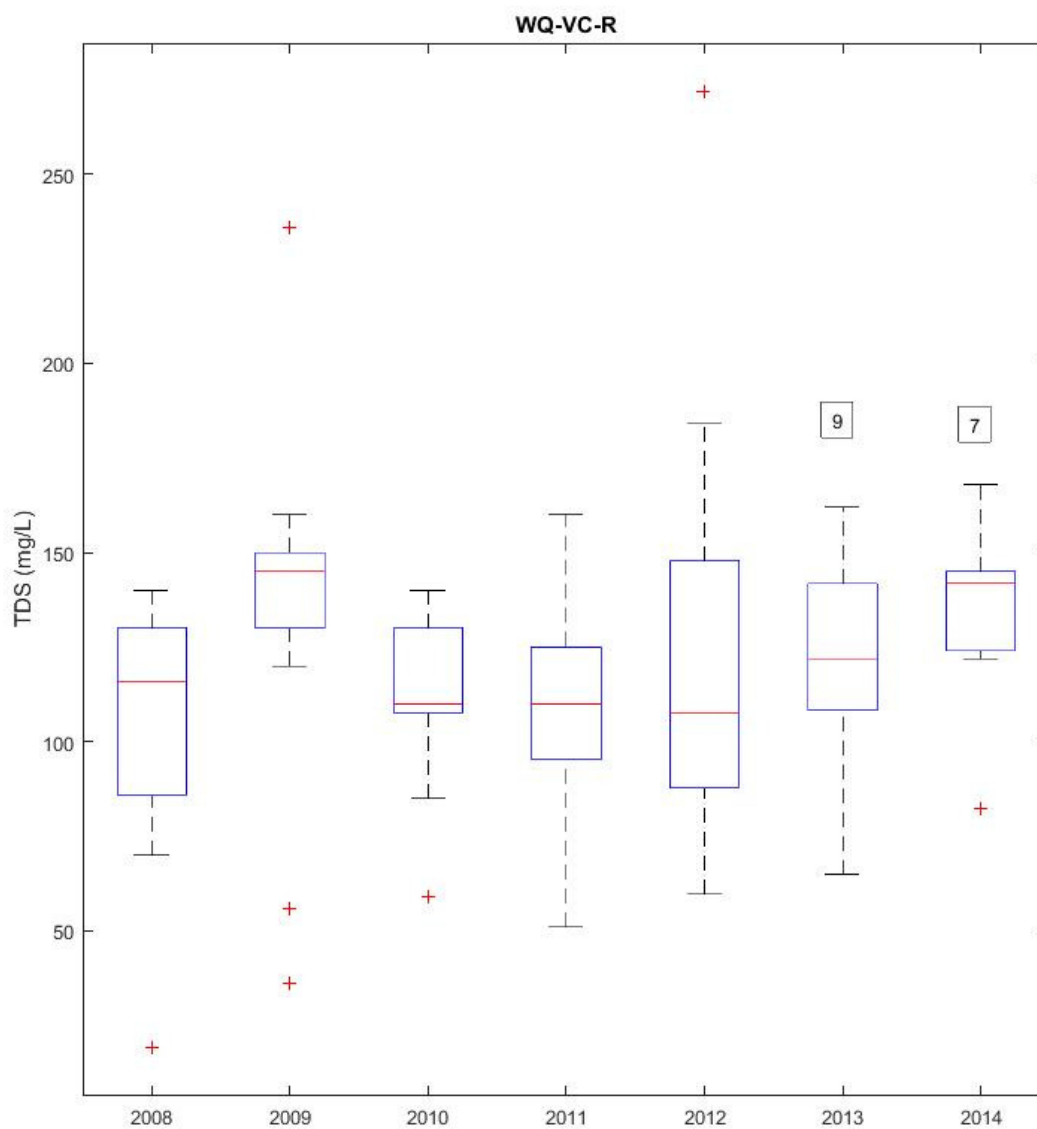


Figure 91: Victoria Creek North of Mine Access Road WQS – Total Dissolved Solids annual statistical summary. Years with less than 10 years of data noted in box above boxplot. No CCME Guideline or EQS available.

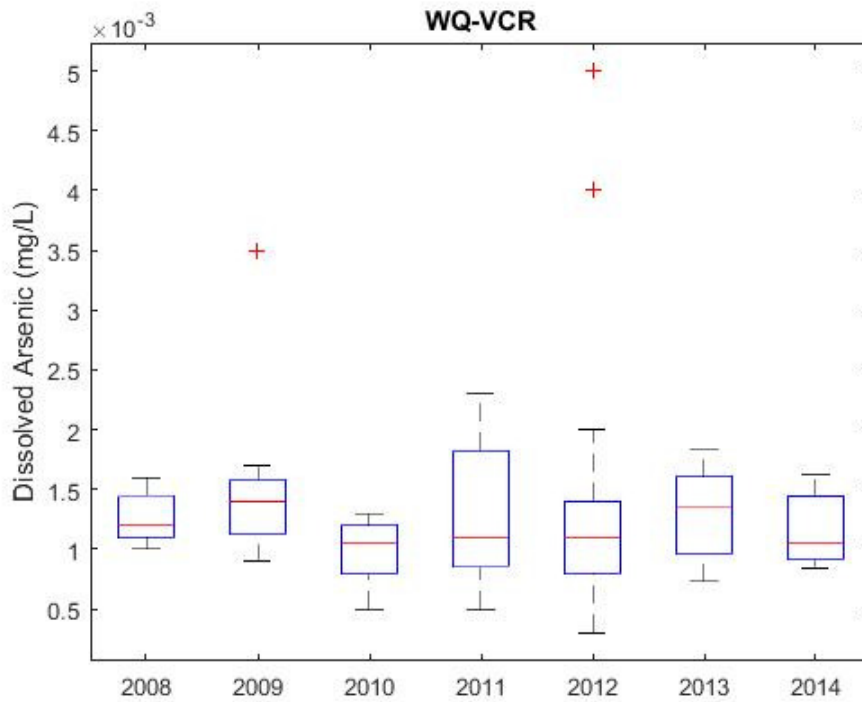


Figure 92: Victoria Creek North of Mine Access Road WQS – Dissolved Arsenic annual statistical summary. Dissolved arsenic EQS is 0.15 mg/L.

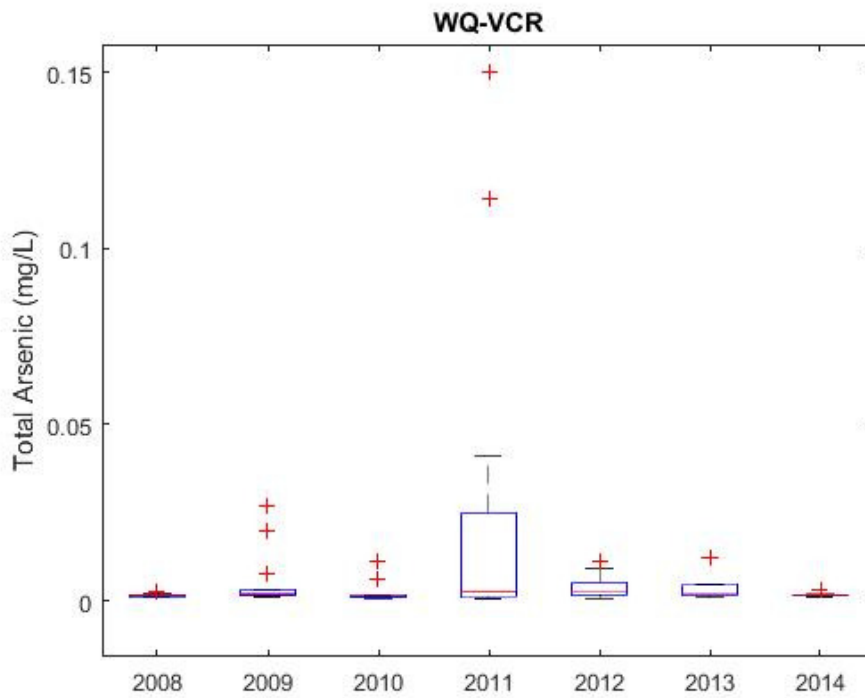


Figure 93: Victoria Creek North of Mine Access Road WQS – Total Arsenic annual statistical summary. Total arsenic CCME Guideline is 0.005 mg/L.

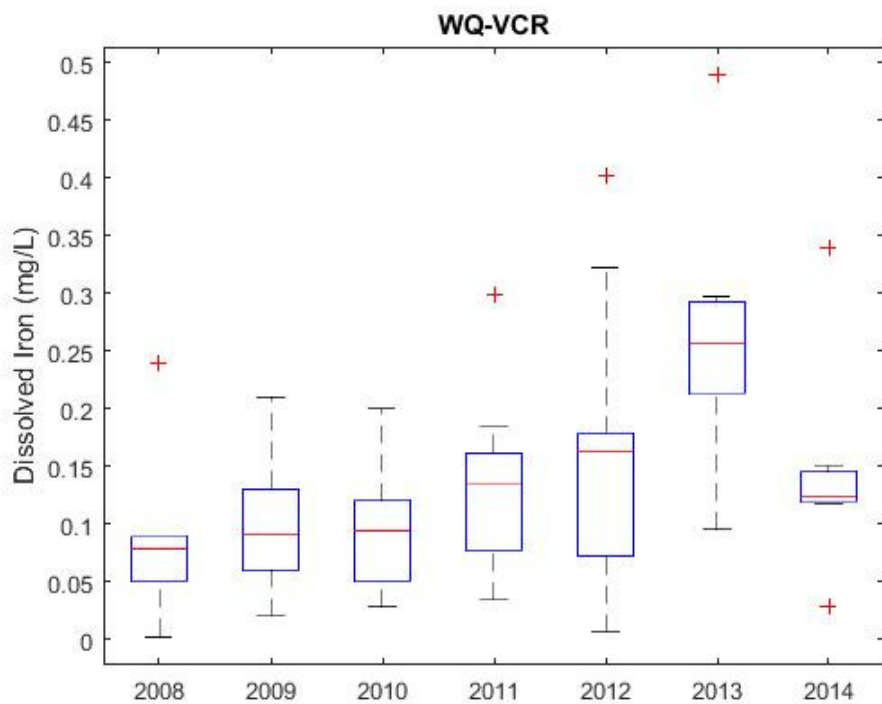


Figure 94: Victoria Creek North of Mine Access Road WQS – Dissolved Iron annual statistical summary. No CCME Guideline or EQS available.

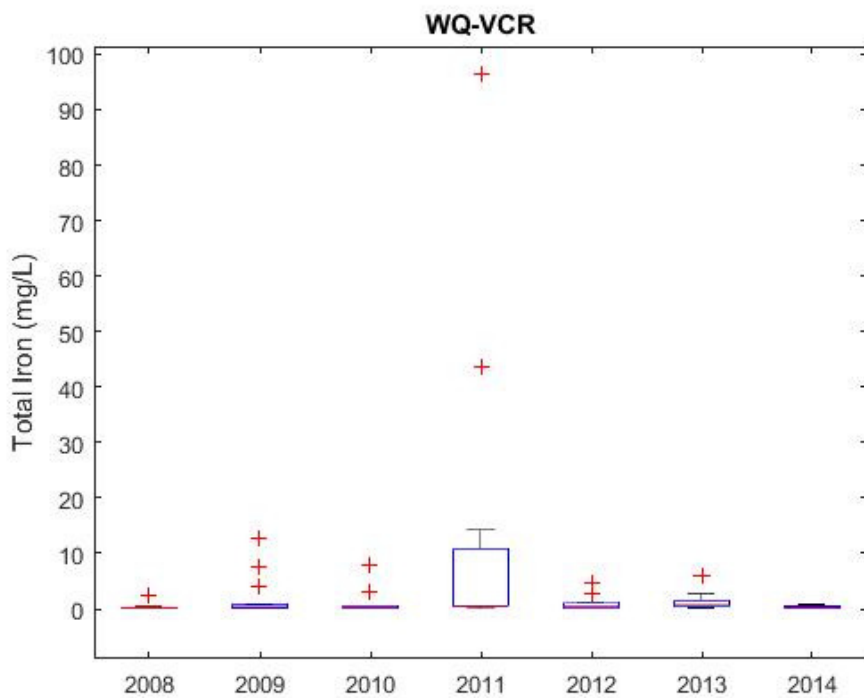


Figure 95: Victoria Creek North of Mine Access Road WQS – Total Iron annual statistical summary. Total iron CCME Guideline is 0.3 mg/L and EQS is 1 mg/L.

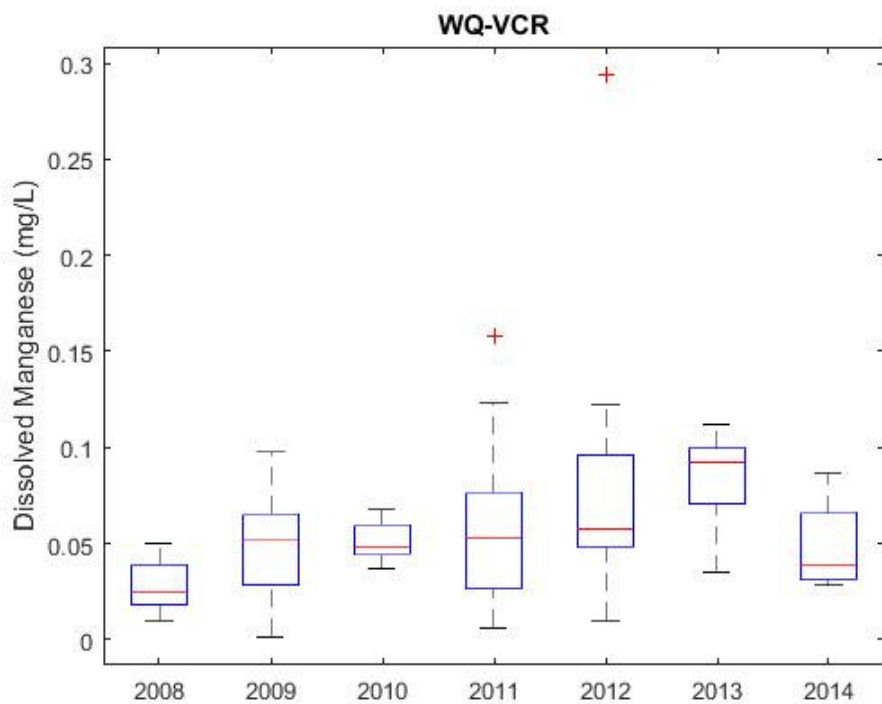


Figure 96: Victoria Creek North of Mine Access Road WQS – Dissolved Manganese annual statistical summary. No CCME Guideline or EQS available.

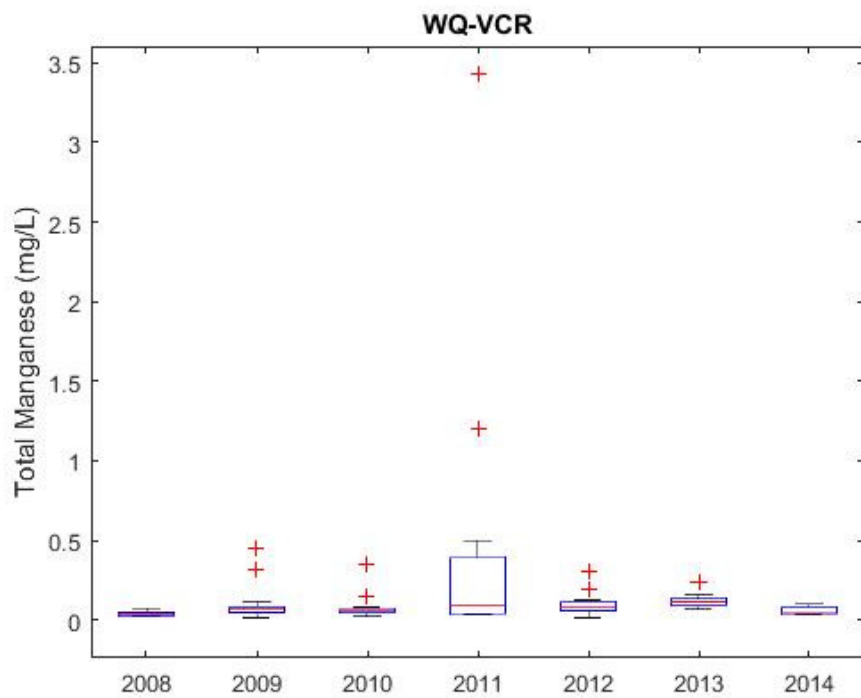


Figure 97: Victoria Creek North of Mine Access Road WQS – Total Manganese annual statistical summary. Total manganese EQS is 0.5 mg/L.

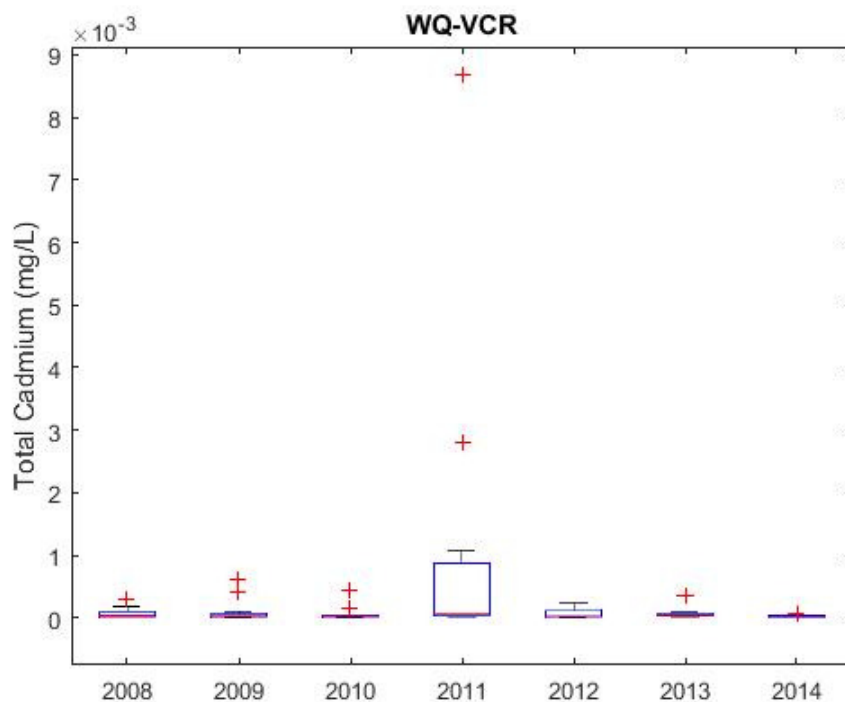


Figure 98: Victoria Creek North of Mine Access Road WQS – Total Cadmium annual statistical summary. CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.

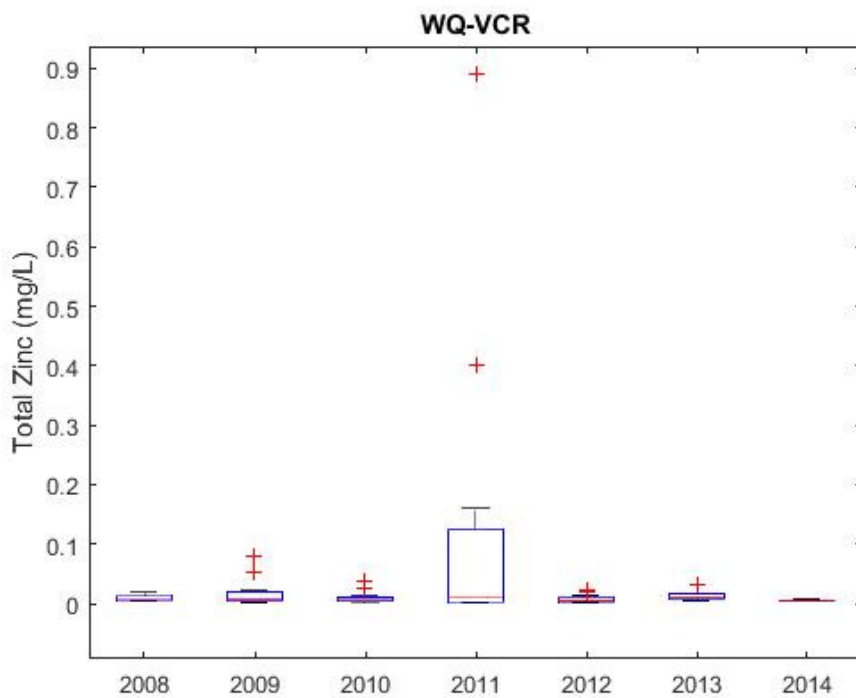


Figure 99: Victoria Creek North of Mine Access Road WQS – Total Zinc annual statistical summary. CCME Guideline is 0.03 mg/L and EQS is 0.3 mg/L.

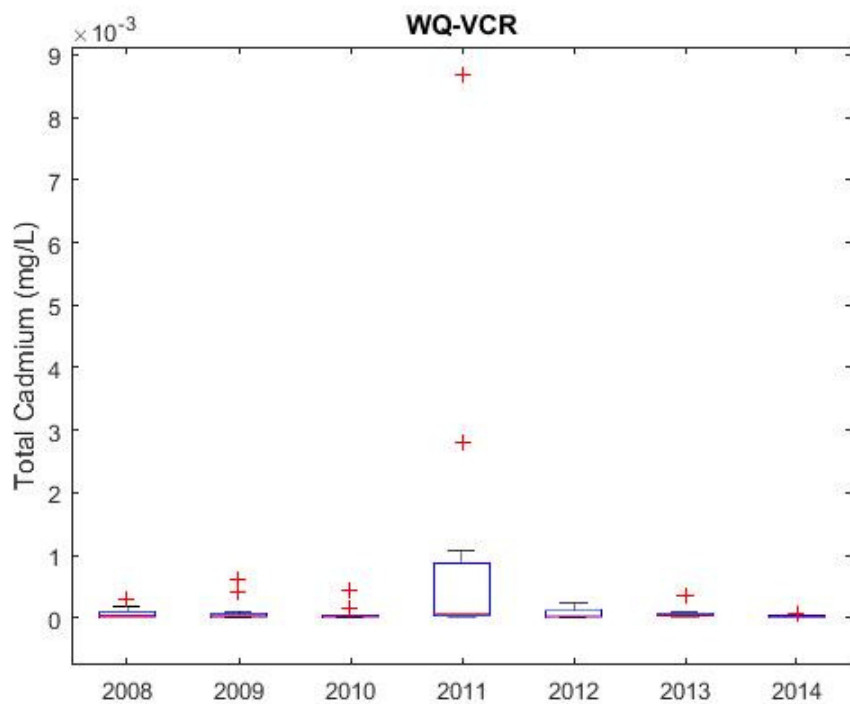


Figure 100: Victoria Creek North of Mine Access Road WQS – Total Cadmium annual statistical summary. CCME Guideline is a function of water hardness, maximum value of 0.00037 mg/L and EQS is 0.02 mg/L.

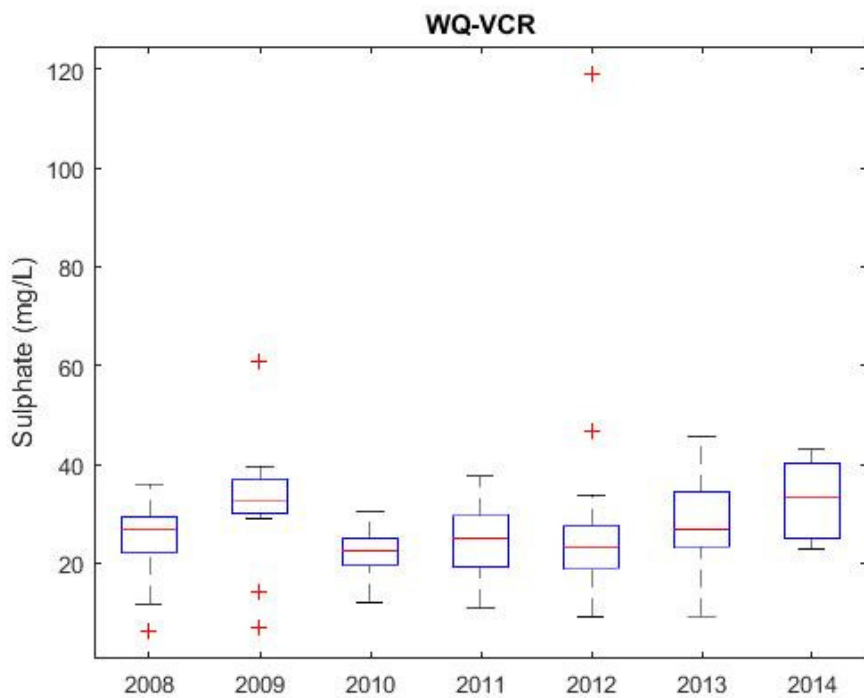


Figure 101: Victoria Creek North of Mine Access Road WQS – Sulphate annual statistical summary. No CCME Guideline or EQS available.

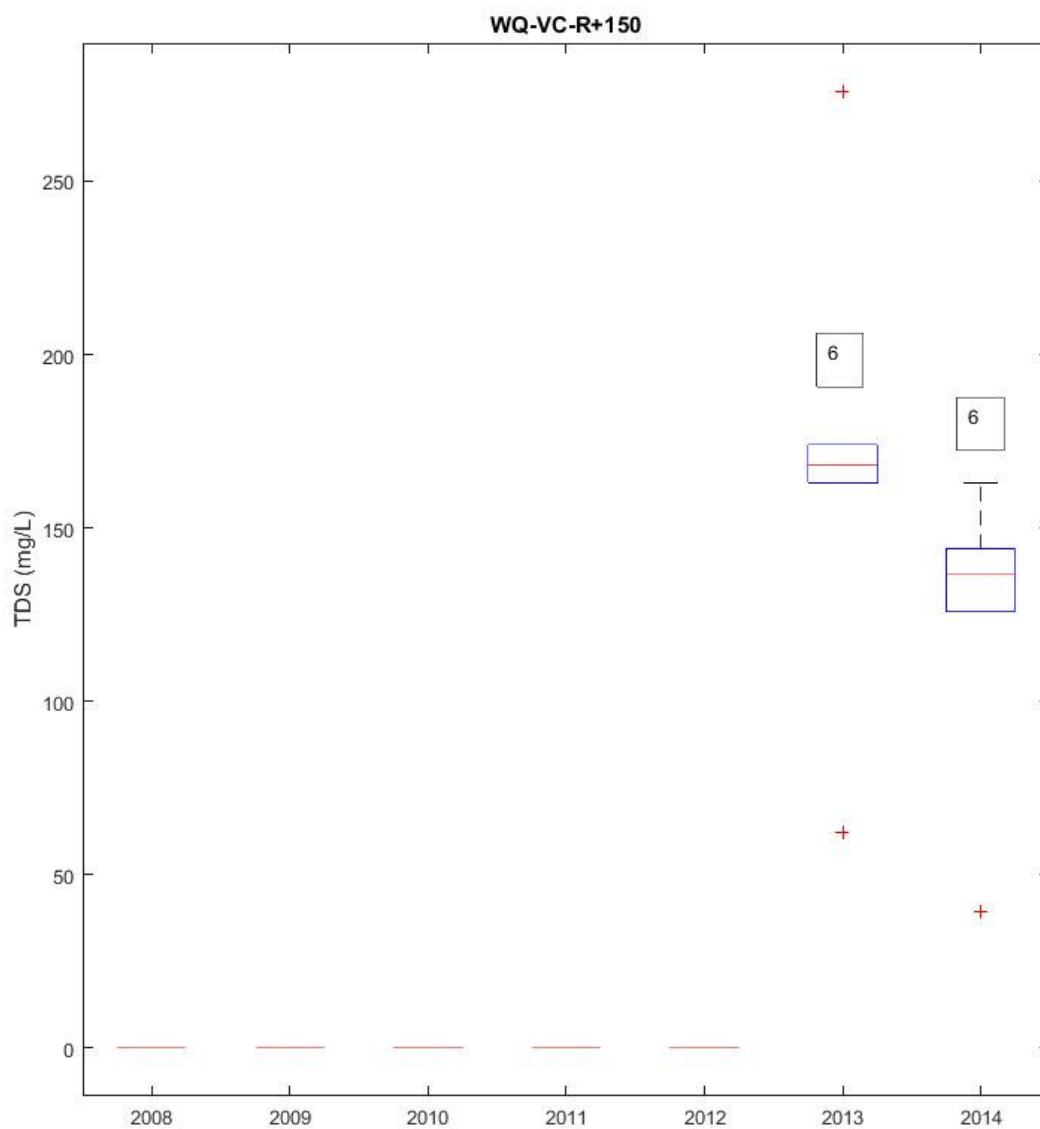


Figure 102: Victoria Creek Winter Sampling Location – Total Dissolved Solids annual statistical summary. No CCME Guideline or EQS available.

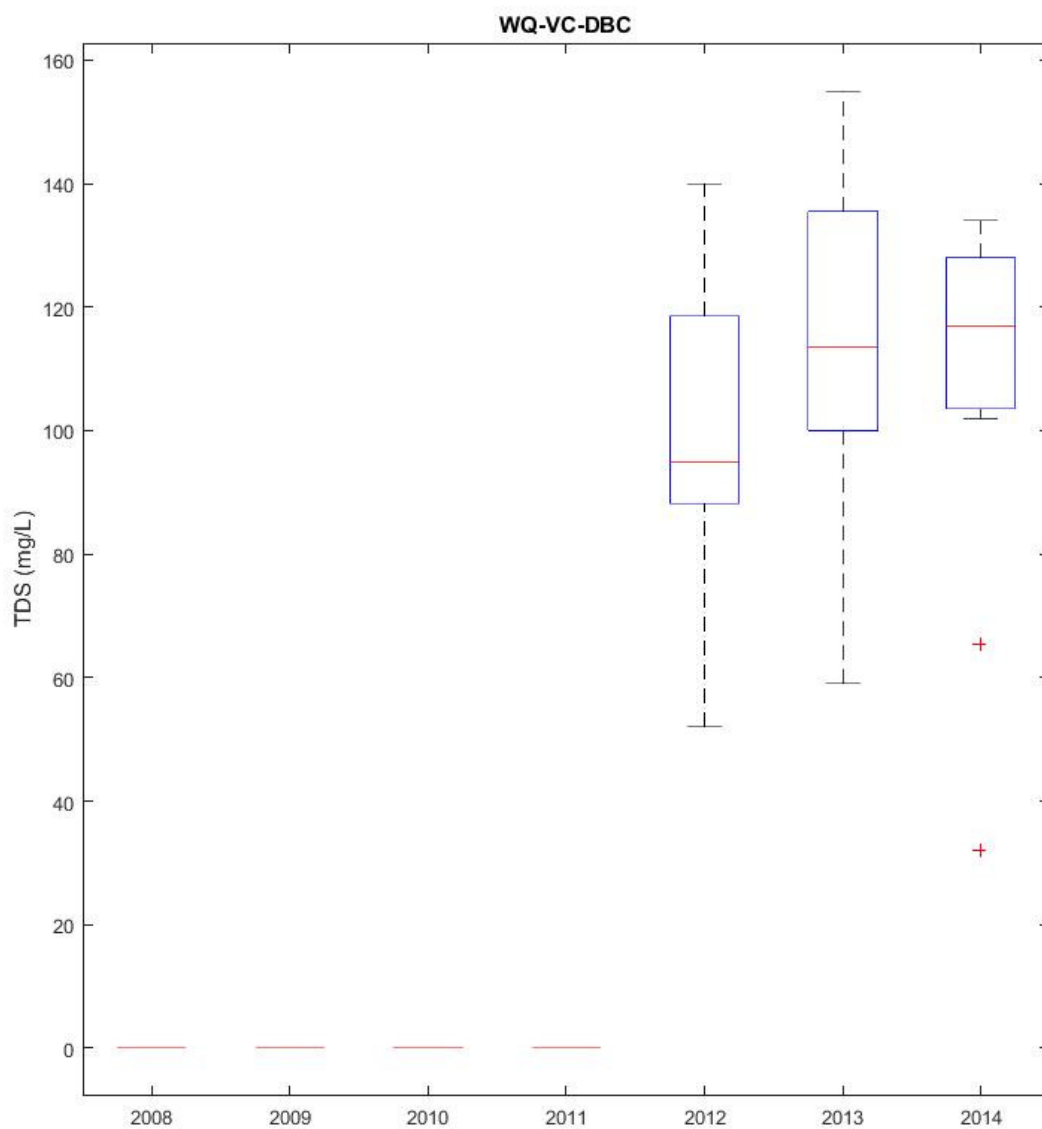


Figure 103: Victoria Creek Downstream of Back Creek WQS – Total Dissolved Solids annual statistical summary. No CCME Guideline or EQS available.

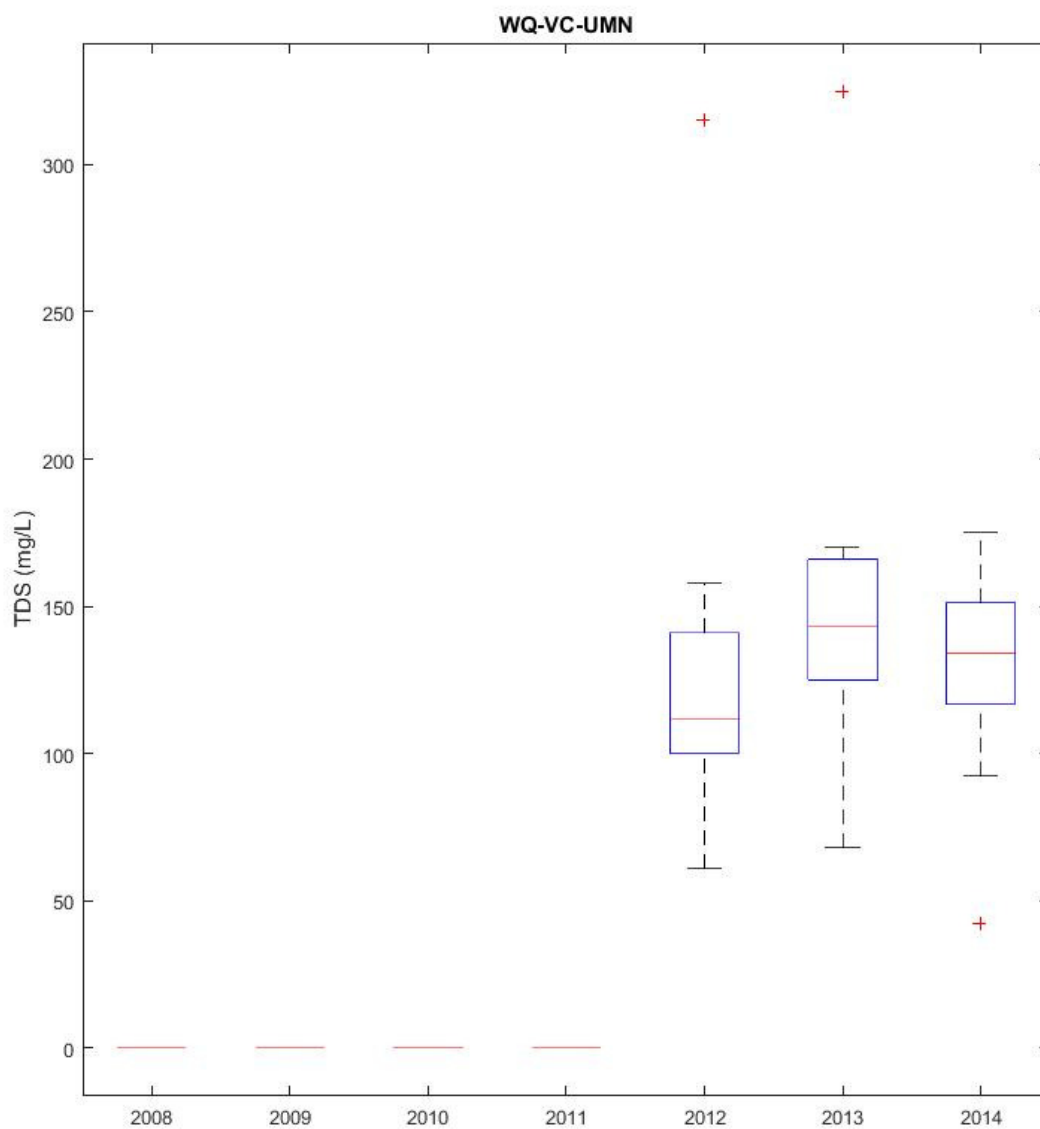


Figure 104: Victoria Creek Upstream of Minnesota Creek WQS – Total Dissolved Solids annual statistical summary. No CCME Guideline or EQS available.

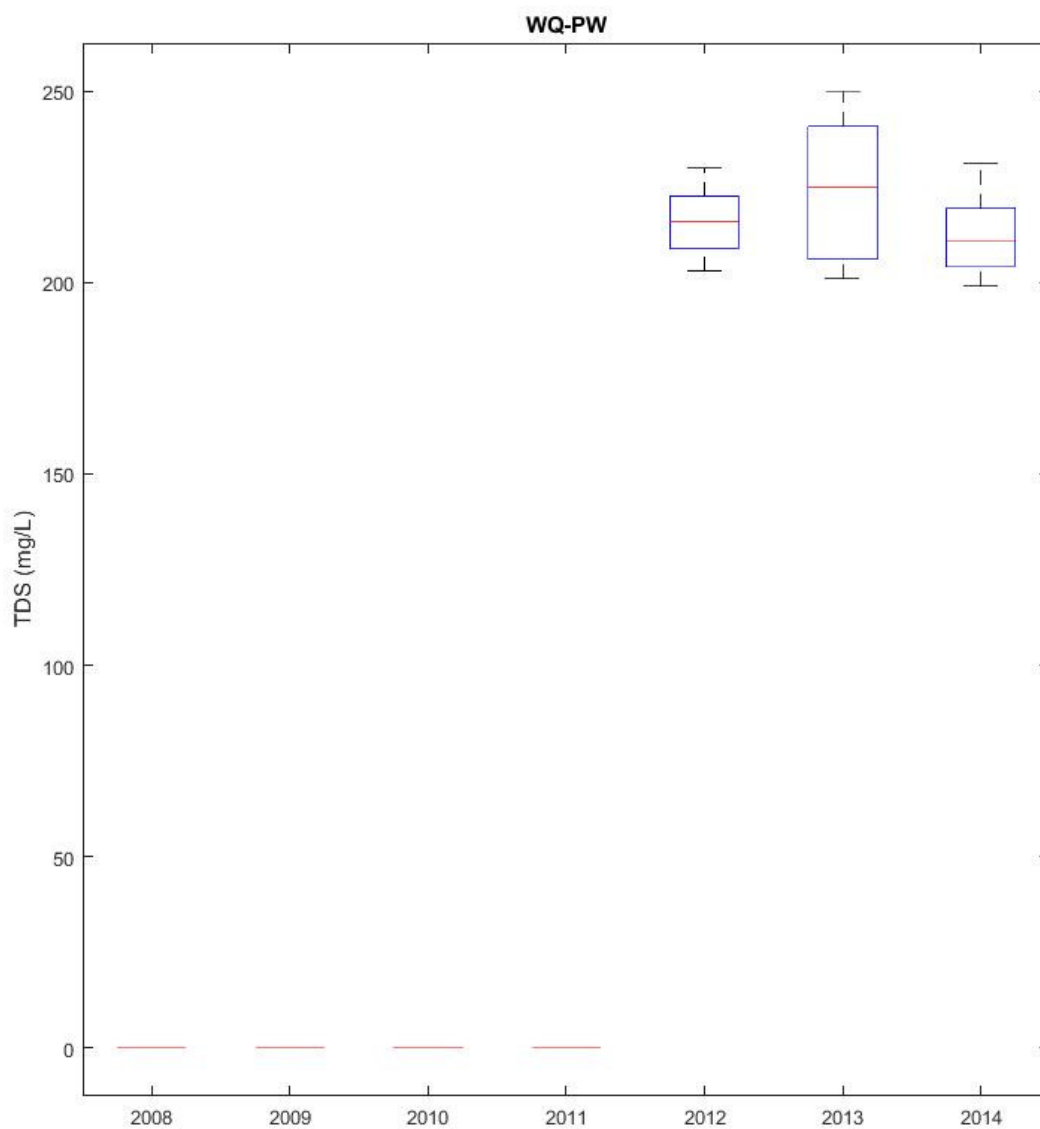


Figure 105: Pumphouse Well WQS – Total Dissolved Solids annual statistical summary. No CCME Guideline or EQS available.

APPENDIX E

MASS LOAD ASSESSMENT

Table E1: Sulphate Loading Data

	Upper Dome (DC-DX+105)			Seepage (SEEP)			Dome@Road (DC-R)			Vic@Road (VC-R)			CCME Aquatic Life Guidelines ¹	EQS ²
	Reference WQS			Mine Source WQS			NFRE WQS			FFRE WQS				
Date	Flow	[]	Load	Flow	[]	Load	Flow	[]	Load	Flow	[]	Load	(mg/L)	(mg/L)
	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)		
14-Apr-14	NSM	NS	CNC	0.003	790	205	NSM	NS	CNC	NSM	44	CNC	--	--
09-May-14	0.019	25.7	42	0.005	419	181	0.152	170	2233	3.204	9.56	2646		
21-May-14	0.011	111	105	0.001	721	62	0.056	203	982	0.758	24.1	1578		
24-Jun-14	0.001	446	39	0.003	867	225	0.014	546	660	0.179	43	665		
15-Jul-14	NSM	441	CNC	0.003	812	210	0.009	587	456	0.121	42.1	440		
11-Aug-14	NSM	434	CNC	0.003	806	209	0.023	502	998	0.329	34.5	981		
16-Sep-14	NSM	379	CNC	0.003	801	208	0.024	429	890	0.77	27.8	1849		
14-Oct-14	NSM	416	CNC	0.003	804	208	0.022	464	882	0.577	33.2	1655		
13-Nov-14	0	421	0	0.003	783	203	NSM	NS	CNC	NSM	22.8	CNC		
16-Dec-14	0.001	436	38	0.003	782	203	NSM	NS	CNC	NSM	26.3	CNC		

Note: CNC - could not calculate

NSM - not suitable for flow measurement

NS - not sampled

[] - concentration

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

23 - Value exceeds the CCME Guideline for the Protection of Freshwater Aquatic Life

23 - Value exceeds the Water License Standard

Table E2: Total Arsenic Loading Data

	Upper Dome (DC-DX+105)			Seepage (SEEP)			Dome@Road (DC-R)			Vic@Road (VC-R)			CCME Aquatic Life Guidelines ¹	EQS ²
	Reference WQS			Mine Source WQS			NFRE WQS			FFRE WQS				
Date	Flow	[]	Load	Flow	[]	Load	Flow	[]	Load	Flow	[]	Load	(mg/L)	(mg/L)
	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)		
14-Apr-14	NSM	NS	CNC	0.003	<u>0.0591</u>	0.015	NSM	NS	CNC	NSM	0.00119	CNC	0.005	--
09-May-14	0.019	<u>0.0153</u>	0.025	0.001	<u>0.0391</u>	0.003	0.152	<u>0.0143</u>	0.188	3.204	0.00436	1.207		
21-May-14	0.011	<u>0.0086</u>	0.008	0.001	<u>0.0563</u>	0.005	0.056	<u>0.0119</u>	0.058	0.758	0.00151	0.099		
24-Jun-14	0.001	<u>0.0336</u>	0.003	0.003	<u>0.0853</u>	0.022	0.014	<u>0.0289</u>	0.035	0.179	0.00168	0.026		
15-Jul-14	NSM	<u>0.0261</u>	CNC	0.003	<u>0.0618</u>	0.016	0.009	<u>0.0233</u>	0.018	0.121	0.00185	0.019		
11-Aug-14	NSM	<u>0.025</u>	CNC	0.003	<u>0.0636</u>	0.016	0.023	<u>0.0254</u>	0.050	0.329	0.00165	0.047		
16-Sep-14	NSM	<u>0.0244</u>	CNC	0.003	<u>0.0471</u>	0.012	0.024	<u>0.02</u>	0.041	0.77	0.00292	0.194		
14-Oct-14	NSM	<u>0.0357</u>	CNC	0.003	<u>0.0521</u>	0.014	0.022	<u>0.03</u>	0.057	0.577	0.00162	0.081		
13-Nov-14	0	<u>0.0378</u>	0.000	0.003	<u>0.075</u>	0.019	NSM	NS	CNC	NSM	0.00111	CNC		
16-Dec-14	0.001	<u>0.0386</u>	0.003	0.003	<u>0.0518</u>	0.013	NSM	NS	CNC	NSM	0.00157	CNC		

Note: CNC - could not calculate

NSM - not suitable for flow measurement

NS - not sampled

[] - concentration

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

23 - Value exceeds the CCME Guideline for the Protection of Freshwater Aquatic Life

23 - Value exceeds the Water License Standard

Table E3: Total Iron Loading Data

	Upper Dome (DC-DX+105)			Seepage (SEEP)			Dome@Road (DC-R)			Vic@Road (VC-R)			CCME Aquatic Life Guidelines ¹	EQS ²
	Reference WQS			Mine Source WQS			NFRE WQS			FFRE WQS				
Date	Flow	[]	Load	Flow	[]	Load	Flow	[]	Load	Flow	[]	Load	(mg/L)	(mg/L)
	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)		
14-Apr-14	NSM	NS	CNC	0.003	14.4	3.732	NSM	NS	CNC	NSM	0.021	CNC	0.3	1
09-May-14	0.019	0.834	1.369	0.001	9.45	0.816	0.152	1.71	22.457	3.204	1.56	431.8		
21-May-14	0.011	0.155	0.147	0.001	12	1.037	0.056	1.35	6.532	0.758	0.578	37.9		
24-Jun-14	0.001	0.464	0.040	0.003	13.6	3.525	0.014	4.22	5.105	0.179	0.22	3.4		
15-Jul-14	NSM	0.403	CNC	0.003	10.2	2.644	0.009	3.85	2.994	0.121	0.221	2.3		
11-Aug-14	NSM	0.387	CNC	0.003	10.1	2.618	0.023	4.09	8.128	0.329	0.288	8.2		
16-Sep-14	NSM	0.336	CNC	0.003	10.6	2.748	0.024	3.58	7.423	0.77	0.842	56.0		
14-Oct-14	NSM	0.406	CNC	0.003	12	3.110	0.022	4.95	9.409	0.577	0.421	21.0		
13-Nov-14	0	0.467	0.000	0.003	16	4.147	NSM	NS	CNC	NSM	0.088	CNC		
16-Dec-14	0.001	0.445	0.038	0.003	12.2	3.162	NSM	NS	CNC	NSM	0.019	CNC		

Note: CNC - could not calculate

NSM - not suitable for flow measurement

NS - not sampled

[] - concentration

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

23 - Value exceeds the CCME Guideline for the Protection of Freshwater Aquatic Life

23 - Value exceeds the Water License Standard

Table E4: Total Manganese Loading Data

	Upper Dome (DC-DX+105)			Seepage (SEEP)			Dome@Road (DC-R)			Vic@Road (VC-R)			CCME Aquatic Life Guidelines ¹	EQS ²
	Reference WQS			Mine Source WQS			NFRE WQS			FFRE WQS				
Date	Flow	[]	Load	Flow	[]	Load	Flow	[]	Load	Flow	[]	Load	(mg/L)	(mg/L)
	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)		
14-Apr-14	NSM	NS	CNC	0.003	6.8	1.8	NSM	NS	CNC	NSM	0.01	CNC	--	0.5
09-May-14	0.019	0.047	0.1	0.001	3.6	0.3	0.152	0.753	9.9	3.204	0.11	30.5		
21-May-14	0.011	0.197	0.2	0.001	6.38	0.6	0.056	0.561	2.7	0.758	0.0403	2.6		
24-Jun-14	0.001	1.03	0.1	0.003	7.16	1.9	0.014	1.69	2.0	0.179	0.0423	0.7		
15-Jul-14	NSM	1.05	CNC	0.003	6.14	1.6	0.009	2.11	1.6	0.121	0.0402	0.4		
11-Aug-14	NSM	1.12	CNC	0.003	6.95	1.8	0.023	1.81	3.6	0.329	0.0562	1.6		
16-Sep-14	NSM	1.07	CNC	0.003	7.23	1.9	0.024	1.59	3.3	0.77	0.094	6.3		
14-Oct-14	NSM	1.18	CNC	0.003	7.86	2.0	0.022	1.65	3.1	0.577	0.0982	4.9		
13-Nov-14	0	1.28	0.0	0.003	8.62	2.2	NSM	NS	CNC	NSM	0.0331	CNC		
16-Dec-14	0.001	1.28	0.1	0.003	9.18	2.4	NSM	NS	CNC	NSM	0.0246	CNC		

Note: CNC - could not calculate

NSM - not suitable for flow measurement

NS - not sampled

[] - concentration

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

23 - Value exceeds the CCME Guideline for the Protection of Freshwater Aquatic Life

23 - Value exceeds the Water License Standard

Table E5: Total Cadmium Loading Data

	Upper Dome (DC-DX+105)			Seepage (SEEP)			Dome@Road (DC-R)			Vic@Road (VC-R)			CCME Aquatic Life Guidelines ¹	EQS ²
	Reference WQS			Mine Source WQS			NFRE WQS			FFRE WQS				
Date	Flow	[]	Load	Flow	[]	Load	Flow	[]	Load	Flow	[]	Load	(mg/L)	(mg/L)
	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)		
14-Apr-14	NSM	NS	CNC	0.003	0.00088	0.0002	NSM	NS	CNC	NSM	3.8E-05	CNC	0.0004 for hardness >0 to <17mg/L, CWQG= $\frac{1}{1000} \cdot 10^{(0.83(\log(\text{hardness}))-2.46)}$ for hardness >17 to <280mg/L, 0.00037 for hardness >280mg/L	0.02
09-May-14	0.019	0.00167	0.0027	0.001	0.00062	0.0001	0.152	0.00017	0.0023	3.204	0.00013	0.037		
21-May-14	0.011	0.0011	0.0010	0.001	0.00046	0.0000	0.056	8.5E-05	0.0004	0.758	2.6E-05	0.0017		
24-Jun-14	0.001	0.00348	0.0003	0.003	0.00033	0.0001	0.014	0.00012	0.0001	0.179	1.7E-05	0.0003		
15-Jul-14	NSM	0.0029	CNC	0.003	0.00049	0.0001	0.009	5.6E-05	0.0000	0.121	1.6E-05	0.0002		
11-Aug-14	NSM	0.0029	CNC	0.003	0.0006	0.0002	0.023	7.1E-05	0.0001	0.329	1.9E-05	0.0005		
16-Sep-14	NSM	0.0026	CNC	0.003	0.00059	0.0002	0.024	7.6E-05	0.0002	0.77	7.2E-05	0.0048		
14-Oct-14	NSM	0.0036	CNC	0.003	0.00077	0.0002	0.022	0.00018	0.0003	0.577	3.8E-05	0.0019		
13-Nov-14	0	0.00335	0.0000	0.003	0.00079	0.0002	NSM	NS	CNC	NSM	2.2E-05	CNC		
16-Dec-14	0.001	0.0031	0.0003	0.003	0.00108	0.0003	NSM	NS	CNC	NSM	1.6E-05	CNC		

Note: CNC - could not calculate

NSM - not suitable for flow measurement

NS - not sampled

[] - concentration

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

23 - Value exceeds the CCME Guideline for the Protection of Freshwater Aquatic Life

23 - Value exceeds the Water License Standard

Table E6: Total Zinc Loading Data

	Upper Dome (DC-DX+105)			Seepage (SEEP)			Dome@Road (DC-R)			Vic@Road (VC-R)			CCME Aquatic Life Guidelines ¹	EQS ²
	Reference WQS			Mine Source WQS			NFRE WQS			FFRE WQS				
Date	Flow	[]	Load	Flow	[]	Load	Flow	[]	Load	Flow	[]	Load	(mg/L)	(mg/L)
	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)	(m ³ /s)	(mg/L)	(kg/d)		
14-Apr-14	NSM	NS	CNC	0.003	0.0129	0.003	NSM	NS	CNC	NSM	0.0035	CNC	0.03	0.3
09-May-14	0.019	0.218	0.358	0.001	0.018	0.002	0.152	0.0269	0.353	3.204	0.0109	3.017		
21-May-14	0.011	0.185	0.176	0.001	0.0082	0.001	0.056	0.0124	0.060	0.758	0.0035	0.229		
24-Jun-14	0.001	0.631	0.055	0.003	0.0064	0.002	0.014	0.0106	0.013	0.179	0.003	0.046		
15-Jul-14	NSM	0.624	CNC	0.003	0.0066	0.002	0.009	0.0059	0.005	0.121	0.003	0.031		
11-Aug-14	NSM	0.662	CNC	0.003	0.0082	0.002	0.023	0.0061	0.012	0.329	0.003	0.085		
16-Sep-14	NSM	0.595	CNC	0.003	0.0103	0.003	0.024	0.0071	0.015	0.77	0.0075	0.499		
14-Oct-14	NSM	0.743	CNC	0.003	0.0125	0.003	0.022	0.0178	0.034	0.577	0.0048	0.239		
13-Nov-14	0	0.872	0.000	0.003	0.0147	0.004	NSM	NS	CNC	NSM	0.0036	CNC		
16-Dec-14	0.001	0.876	0.076	0.003	0.0208	0.005	NSM	NS	CNC	NSM	0.003	CNC		

Note: CNC - could not calculate

NSM - not suitable for flow measurement

NS - not sampled

[] - concentration

1 - CCME Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (September 2015)

2 - Water Licence Effluent Quality Standards

23 - Value exceeds the CCME Guideline for the Protection of Freshwater Aquatic Life

23 - Value exceeds the Water License Standard