Lac de Gras Water Chemistry, Spatial Variability, and Temporal Trends

An Analysis of 'Cumulative Effects' in Lac de Gras Water Chemistry over the Period of Record

Final Report

April 2015

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Project Number: **144901977**
SC440008

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Executive Summary

Through a Request-for-Proposal (RFP; SC440008) issued by the Government of Northwest Territories (GNWT) Department of Public Works and Services, Deton' Cho Stantec (DCS) was retained in April 2014 to undertake statistical analyses of the existing water chemistry data record for Lac de Gras (LDG) in the Northwest Territories, and to develop a calibrated hydrodynamic model for the lake. The statistical analyses sought to answer the GNWT's first key question, whether there are currently cumulative effects to LDG's water quality resulting from the operation of two diamond mines within its watershed. The statistical analyses would also create the basis for calibration of the hydrodynamic model, which, through its use, would attempt to answer the GNWT's second key question, whether there is potential for future cumulative effects given the current and expected levels of diamond mine operation.

This report outlines the results of the statistical analyses conducted by DCS to assess potential current cumulative effects to the water chemistry of LDG. To complete this, DCS was required to examine the existing water-chemistry data record for LDG to define baseline water chemistry, to evaluate spatial and temporal trends in specific parameters of concern, and to evaluate relative loading rates, to form the basis for retrospective examination of lake effects, and prospective tracking of future effluent-loading effects.

Lac de Gras is located about 300 km northeast of Yellowknife and is the headwater of the Coppermine River, which flows north and discharges into the Arctic Ocean. The area experiences long, cold winters with short, cool summers. There are two diamond mines that operate within the Lac de Gras watershed, including the Dominion Diamond Corporation's (DDC's) Ekati Diamond Mine, and the DDC-RioTinto Diavik Diamond Mine. The Ekati mine has been operational since 1998, with discharge points into LDG at both the Slipper Lake and Lac du Sauvage outlets. The Diavik mine has been operational since 2000, with a discharge point at the identified diffuser located in LDG adjacent to the mine.

The objective of the assignment was to determine if cumulative effects on LDG's water chemistry resulting from the past and current levels of operation of the Ekati and Diavik Diamond Mines can be discerned within the data record. For the purpose of this report, a 'cumulative effect' was defined as: *an observable or statistically significant change in water chemistry within LDG, potentially resulting from the discharge of effluent from the Ekati and Diavik mines*. Spatial cumulative effects on water chemistry were assessed in two specific areas of LDG, where effluent plumes from both mines may overlap and persistent additive effects may be observed. Temporal cumulative effects on water chemistry were assessed throughout the lake, over the entire data record. The objective of the assignment was addressed initially by developing an understanding of the water-chemistry data, defining the baseline condition, examining spatial variability within LDG, conducting a robust statistical analysis of temporal trends within the existing chemistry data for LDG, and examining relative loading rates from each of the mines.

An understanding of lake chemistry was developed by undertaking an extensive QA/QC of the Ekati and Diavik datasets to determine their compatibility for subsequent statistical analyses, calculating dissolved-to-total metal ratios, and graphing depth-profile data. Baseline water chemistry was defined for many of the analytes, although the development of summary statistics for some parameters was limited by the prevalence of "non-detect" lab results within the data record. Finally, mean annual loading rates were calculated and spatial variability and temporal trends tests for individual analytes were undertaken to determine if there has been an alteration in water chemistry in LDG over time, attributable to the mine discharges.

The Ekati and Diavik datasets were not easily compared due to a variety of quality control and analyte issues, as discussed within the main body of the document. However, extensive QA and other rationalizations of the data allowed eventual integration of the two datasets for further analysis.

The calculated dissolved-to-total metal ratios indicated that most metals within LDG were in the dissolved fraction, though exceptions occurred including Al, P, and Fe. Extreme variability in the metal data, however, precluded a comprehensive understanding of dissolved-to-total metal ratios, and determination of the reasons for this variability was beyond the scope of this study.

Examination of the available temperature data indicated that thermoclines did not persist above 20 m in LDG during the open-water season. This means that the water column to a depth of 20 m was a relatively uniform temperature and presumably fully mixed. Given the geographic location and the mean temperature profiles, LDG was tentatively classified as a cold-water 'polymictic' (continuously circulating) lake, though there was some uncertainty regarding this designation because profile data from the deepest areas of LDG were not available for analysis. Similarly, dissolved oxygen (DO) concentration, conductivity and pH in LDG did not exhibit marked depth gradients to 20 m through the period of record. The presence of near-saturation levels of DO in waters at depth will affect microbial activity within the surficial sediments. Importantly, it will also markedly influence phosphorus dynamics within large areas of LDG. It is expected that with a persistent surficial oxidized sediment layer, phosphorus will remain sequestered within the lake sediments and will not readily diffuse from the deeper sediment pore spaces into the overlying water column. This means that the lake will likely remain relatively 'nutrient starved', with low primary productivity, for the foreseeable future, and that the baseline nutrient conditions have been well-established for monitoring the effects of future nutrient additions.

Incorporating all baseline data collected in LDG from approximately 1994 to 2000, it was determined that LDG naturally contained waters that were clear (median total suspended solids and turbidity were < 0.4 mg/L and 0.3 NTU, respectively), acidic to circumneutral (pH ranged from 5.7 to 6.7), very soft (total hardness was ≤ 5.7 mg/L as $CaCO_3$), and dilute with low specific conductivity (≤ 23.6 µS/cm). Based on total phosphorus and total nitrogen baseline data (total phosphorus ≤ 0.010 mg/L and total nitrogen ≤ 0.242 mg/L), LDG was classified as an 'oligotrophic to ultra-oligotrophic' (clear, cold, unproductive and nutrient-limited) waterbody.

Given this overall classification, the significance of the point-source effluent loadings and the spatial distribution of their plumes were examined. Spatial differences in post-baseline (2001 to 2013) water chemistry indicate that the DDMI effluent and Ekati/Slipper Lake effluent mixed rapidly within LDG over relatively short distances, which resulted in steep concentration gradients moving away from the discharge zone, through the mixing zone, and into the main basin of LDG. It was apparent that the DDMI effluent was relatively rapidly and well-mixed within LDG, such that no spatially or temporally persistent concentrated effluent plumes were observed beyond the mixing zones.

Within the main basin of LDG and beyond the DDMI mixing zone, there was a slight spatial gradient for hardness, sulphate, total dissolved solids, ammonia, total nitrogen, and total aluminum, arsenic, molybdenum, strontium and uranium, observed moving downstream over relatively long distances. These relatively slight spatial gradients indicated that the DDMI effluent in LDG was not completely mixed throughout the entire main basin, but rather that concentrations did decrease slightly moving further downstream from the DDMI mixing zone.

Because of the rapid mixing of both the DDMI effluent and the Slipper Lake discharge, and the assumed rapid mixing of the LDS discharge, there was no observable evidence of a persistent spatial overlap in effluent plumes within the designated zones of potential overlap. For the DDMI effluent and the LDS discharge, there was no indication of increased concentration of any analyte at FF2, relative to other areas of LDG. For the DDMI effluent and the Slipper Lake discharge, there was no indication of increased concentration at the LDG outlet, relative to other areas of LDG. These results indicate that there was no evidence to fulfill the definition of "Spatial Cumulative Effect".

Temporal trends analysis considered six individual sample areas within LDG. The six sample areas were situated over a gradient, from the discharge points to the LDG outlet, to examine potential temporal trends throughout the entire lake. Trends analysis indicated that the concentration of many analytes has increased steadily and significantly throughout the entire LDG over the past 14 years. Analytes with consistent and persistent increasing temporal trends through the entire lake include conductivity, hardness, chloride, sulphate, and total strontium. These significant increasing trends indicate that there has been a significant alteration in water chemistry within the entirety of LDG over the operational period of the two mines discharging into LDG. These results again indicate that there has been a temporally significant cumulative effect of mine discharge on LDG water chemistry throughout the entirety of the lake, and indicate clear evidence to fulfill the definition of "Temporal Cumulative Effect."

Significant temporal trends were also observed for total hardness and total strontium in three nearby 'reference' lakes (Nanuq, Vulture and Counts), while an increasing trend was also identified for sulphate in Nanuq Lake only. The results indicate that the lake-wide temporal trends observed in LDG could at least partially have been caused by alterations in water chemistry from natural causes. However, the magnitude of increase observed in the reference lakes was considerably less than that observed in LDG, suggesting that temporal trends observed over the past 14 years in LDG were primarily the result of mine discharge.

The mean annual loading into LDG from the DDMI effluent is greater than that from the Ekati/Slipper Lake effluent for sulphate, chloride, total nitrogen, total phosphorus, and total aluminum, arsenic, molybdenum, nickel, strontium, and uranium. The mean annual loading from the Ekati/Slipper Lake effluent into LDG is greater than that from the DDMI effluent for total iron and total copper. The relative contribution of the two identified discharge points (i.e., DDMI diffuser, Ekati/Slipper Lake Outlet) to those analytes with an observed increase in the entirety of LDG therefore appears to be largely related to loading from the DDMI effluent, with the exception of total iron.

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Acronyms and Abbreviations

°C	degrees Celsius
< DL	less than method detection limit
µg/L	micrograms per litre
µS/cm	microSiemens per centimetre
mg/L	milligrams per litre
AANDC	Aboriginal Affairs and Northern Development Canada
CCME FAL	Canadian Council of Ministers of the Environment Freshwater Aquatic Life guidelines
CEA Act	*Canadian Environmental Assessment Act*
CIMP	Cumulative Impact Monitoring Program
DCS	Deton’ Cho Stantec
DDC	Dominion Diamond Corporation
DDMI	Diavik Diamond Mine Inc.
Diavik	Diavik Diamond Mine
DO	Dissolved oxygen
DOC	Dissolved organic carbon
EIS	Environmental Impact Statement
Ekati	Ekati Diamond Mine
FF	Far-Field
GNWT	Government of the Northwest Territories
IQR	Interquartile range
LDG	Lac de Gras
LDS	Lac du Sauvage
LLCF	Long Lake Containment Facility
MF	Mid-Field
MVEIRB	Mackenzie Valley Environmental Impact Review Board
MVLWB	Mackenzie Valley Land and Water Board
MVRMA	*Mackenzie Valley Resource Management Act*
ND	Non-detect
NF	Near-Field
QA/QC	Quality assurance/quality control
REA	Report of Environmental Assessment
RFP	Request for Proposal
TDS	Total dissolved solids
TKN	Total Kjeldahl nitrogen
TN	Total nitrogen
TOC	Total organic carbon
TP	Total phosphorus
TSS	Total suspended solids
WLWB	Wek’èezhìi Land and Water Board

Glossary

Cumulative Effect	An observable or statistically significant change in water chemistry from baseline conditions within Lac de Gras, potentially resulting from the discharge of effluent from the Ekati and Diavik diamond mines. Baseline condition was defined from water samples collected in Lac de Gras between 1994 and 2000.
Designated Zone of Potential Overlap	An area(s) of Lac de Gras where effluent plumes from Ekati and Diavik potentially overlap and persistent additive effects may be observed. This includes the FF2 sample area, potentially influenced by Diavik effluent discharge and Ekati discharge from Lac du Sauvage, and the Lac de Gras Outlet, potentially influenced by Diavik effluent discharge and Ekati discharge from the Slipper Lake Outlet.
Effluent	Treated mine water discharged to Lac de Gras either directly (Diavik) or indirectly (Ekati via Lac du Sauvage and the Slipper Lake Outlet).
Effluent Plume	An area with elevated concentrations of analytes that occur in the effluent discharge, relative to baseline conditions.
Spatial Cumulative Effect	A cumulative effect on water chemistry resulting from persistent additive effects of effluent discharge in designated zones of potential overlap.
Temporal Cumulative Effect	A temporal cumulative effect occurs when there is a statistically significant alteration in water chemistry over time.

1 INTRODUCTION

Through a Request-for-Proposal (RFP; SC440008) issued by the Government of Northwest Territories (GNWT) Department of Public Works and Services, Deton' Cho Stantec (DCS) was retained in April 2014 to undertake statistical analyses of the existing water chemistry data record for Lac de Gras (LDG) in the Northwest Territories, and to develop a calibrated hydrodynamic model for the lake. The statistical analyses sought to answer the GNWT's first key question, whether there are currently cumulative effects to LDG's water quality resulting from the operation of two diamond mines within its watershed.
The statistical analyses would also create the basis for calibration of the hydrodynamic model, which, through its use, would attempt to answer the GNWT's second key question, whether there is potential for future cumulative effects given the current and expected levels of diamond mine operation.

This report outlines the results of the statistical analyses conducted by DCS to assess potential current cumulative effects to the water chemistry of LDG. To complete this, DCS was required to examine the existing water-chemistry data record for Lac de Gras to define baseline water chemistry, to evaluate spatial and temporal trends in specific parameters of concern, and to evaluate relative loading rates, to form the basis for retrospective examination of lake effects, and prospective tracking of future effluent-loading effects.

1.1 Background

Lac de Gras is located about 300 km northeast of Yellowknife in the Slave Geological Province of the Precambrian Shield in the Northwest Territories. The Lac de Gras watershed is the headwater of the Coppermine River, which flows north and discharges into the Arctic Ocean near Kugluktuk, Nunavut. The land is flat and interspersed with chains of lakes, pools, streams, and boulder fields. The area experiences long, cold winters with short, cool summers, and is underlain by continuous permafrost with a shallow active layer that thaws briefly during the summer. Precipitation averages less than 350 mm annually, most of which falls as snow. Historical human use of the area was periodic and is recorded in archaeological records and in the oral and written histories of the Aboriginal people.

The two diamond mines which operate within the Lac de Gras (LDG) watershed are the Dominion Diamond Corporation's (DDC's) Ekati Diamond Mine, and the DDC-RioTinto Diavik Diamond Mine.

1.1.1 Ekati Diamond Mine

The Ekati Diamond Mine (Ekati) was the first mine to be developed in the LDG watershed and is situated approximately 10 km north of LDG. Ekati was initially majority-owned by BHP, which later became BHP Billiton. Majority-ownership of the mine was later sold to the DDC. The Ekati Environmental Impact Statement (EIS) outlined the predicted environmental effects and was submitted to a Canadian Environmental Assessment Agency Environmental Impact Review panel in 1996. Approval was granted in November 1996 and the project proceeded to the licensing and permitting stage. The mine was constructed and production started in October 1998 with the Panda Pit. In 1998, BHP submitted the first

Project Description Report for the development of the Sable, Pigeon and Beartooth kimberlite pipes, which are located in the Koala and LDG watersheds. The Project was referred to an environmental review administered by the Mackenzie Valley Environmental Impact Review Board (MVEIRB) in April 1999. The MVEIRB's Report of Environmental Assessment (REA) was issued in February 2001. In the Ministerial Report, of the 62 recommendations made in the REA, only two were resolved as 'recommendations'; the other 60 were deemed 'observations.' However, Recommendation 61 in the 2001 REA states:

> *"That DIAND and EC jointly initiate an evaluation of the cumulative effects of total loadings of nutrients and metals into Lac De Gras watershed, and that the resulting long term effects on this oligotrophic system. BHP and Diavik, and others, as requested, shall assist DIAND and EC by providing the monitoring and predictive data needed to examine the anticipated total loadings of contaminants into the Lac De Gras watershed."*

Recently, DDC has applied to expand Ekati by mining the Jay and Cardinal kimberlite pipes within Lac Du Sauvage, which is a major contributor to LDG's inflows. Development of these pipes was referred to the MVEIRB for an environmental assessment in November 2013.

1.1.2 Diavik Diamond Mine

In 1999, Diavik Diamond Mine Inc. (Diavik, DDMI) and Aber Diamond Mines Ltd. completed a comprehensive study under the *Canadian Environmental Assessment Act* (CEA Act) to mine four diamond-bearing kimberlite pipes at LDG. The Diavik Mine is situated on East Island of LDG with its kimberlite pipes located under the lake bed of LDG. Diavik received its land-use permit and water license in 2000 to commence the construction and operation of the diamond mine. Mining operations began with construction of a dike adjacent to the northeast shore of East Island, followed by dewatering, and open-pit excavation of kimberlite from the two A154 pipes (A154N and A154S). Construction of a second dike to mine the A418 pipe began in 2005 and was followed by open-pit mining of the kimberlite. Underground mining of the A154 and A418 pipes commenced in 2010 and has continued since then. Development of their fourth kimberlite pipe (A21) was recently approved by DDC-RioTinto, with construction beginning in late 2015 and production planned for 2018 (RioTinto 2014).

1.2 Regulatory Overview

Environmental reviews in the LDG area were previously conducted under the CEA Act with the responsibility for water licensing being held by the Northwest Territories Water Board. With the subsequent passing of the *Mackenzie Valley Resource Management Act* (MVRMA) in 1998, the MVEIRB was created to conduct environmental impact assessments/reviews in the Northwest Territories, while the Mackenzie Valley Land and Water Board (MVLWB) was created to handle land-use permitting and water licensing. Through the promulgation of, and subsequent amendments to, the MVRMA, responsibility for the water licensing of projects in the LDG area was transferred from the Northwest Territories Water Board to the MVLWB, and then to the Wek'èezhìi Land and Water Board (WLWB). Water-licensing responsibility in this area is now in the process of being transferred back to the MVLWB.

With the referral of Ekati's proposal to mine the Jay and Cardinal pipes to the MVEIRB for an environmental assessment, the MVEIRB and other parties could request the assessment of the cumulative effects of diamond mining on LDG and its watershed, as was required in Recommendation 61 of the MVEIRB's 2001 REA for Ekati's Sable, Pigeon and Beartooth pipes. To address Recommendation 61, and to provide a starting point for a cumulative effects assessment for the proposed development of Ekati's Jay project, a multi-party Working Group is conducting a quantitative cumulative effects assessment for LDG, focusing on water quality. The Working Group was initiated in January 2014 and is comprised of DDC (Ekati), DDC-RioTinto (Diavik), the WLWB, the MVEIRB, GNWT (formerly Aboriginal Affairs and Northern Development Canada) Water Resources, and GNWT Cumulative Impact Monitoring Program (CIMP). The purpose of the Working Group is to collaboratively inform the assessment of potential cumulative effects to water quality in LDG from the operation of the Diavik and Ekati diamond mines.

1.3 Study Objectives

Within the purpose and objective of the overall Project, the objective of this report was to address the following question:

> *Are there currently cumulative effects to LDG's water quality resulting from the past and current levels of operation of the Ekati and Diavik Diamond Mines?*

For the purpose of the overall study objectives, the GNWT defines "cumulative effects" as: *measurable changes in water quality, specifically nutrient and metal parameters, in overlapping spatial and temporal zones of LDG* (RFP SC440008). To further define "measurable" and "spatial and temporal zones" however, and to consider the effects of lake inputs from the mines, DCS refined the definition of "cumulative effects" for LDG for the purpose of this report as: "…*an observable or statistically significant change in water-chemistry analyte concentrations within LDG, potentially resulting from the discharge of effluent from the Ekati and Diavik mines."* Spatial cumulative effects on water chemistry were assessed in two specific areas of LDG, where effluent plumes from both mines may overlap and persistent additive effects may be observed. Temporal cumulative effects on water chemistry were assessed throughout the lake, over the entire data record (i.e., from baseline to current).

Using these two definitions of cumulative effects, the above question was addressed by developing an understanding of baseline water chemistry in LDG, and conducting the appropriate statistical analyses of existing water-chemistry data that have been collected from LDG over the last 15+ years to determine if there have been alterations in water chemistry over time. Specifically, the work tasks include (as outlined in the RFP):

1. Review meta-data analysis provided to confirm that the Ekati and Diavik datasets are compatible and can both be used for the remaining tasks.
2. Conduct a robust statistical analysis of existing nutrient and metal data in LDG to determine if there is an additive and/or interactive effect from the two mines on the lake's water quality.

To complete the above two tasks, the following steps were completed:

- Review the existing water chemistry datasets from Ekati and Diavik to assess compatibility.
- Calculate baseline summary statistics for all analytes of potential concern within categorized sample-site groups. Sample-site groups were categorized based on discharge into LDG (e.g., Slipper Lake outlet, Diavik effluent, Lac du Sauvage [LDS] outlet), or distance from Diavik (i.e., sites within LDG).
- Calculate the ratio between dissolved-metal and total-metal concentrations for each metal that was analyzed, as an indication of data quality.
- Use a Mann-Kendall trends test to provide a statistical understanding of whether LDG water chemistry had changed temporally over the period of record, or spatially across the lake, and if appropriate, by how much.
- Complete loading calculations to assess the relative contribution of analytes of potential concern from each of the two mines to LDG.

The purpose of this preliminary analysis was ultimately to assist in addressing the following question, as outlined in the RFP:

> *Are there likely to be cumulative effects in the future to Lac De Gras' water quality as a result of these two mines operating at current and future levels (excluding the proposed Lynx, Jay and Cardinal Pipes)?*

This question will be addressed in a subsequent report addressing development of a calibrated hydrodynamic model and prediction of future nutrient and metal loadings, temporally and spatially in LDG (including closure and post-closure conditions). The model is being developed based on the statistical relationships determined from answers to the first question above, and calibrated using the 15+ years of water-chemistry data collected from LDG.

2 METHODS

Water chemistry and limnological profile data were obtained from the GNWT, Diavik and Ekati over the period from May 2014 to January 2015, in Excel format. After removing the field limnological data from the water chemistry datasets, the majority (approximately 95%) of the water-chemistry data received for the LDG watershed were collected under the Diavik sampling program (493 rows of Ekati data versus 8,954 rows of Diavik data).

2.1 Quality Assurance/Quality Control

2.1.1 Compatibility of the Diavik and Ekati Water Chemistry Datasets

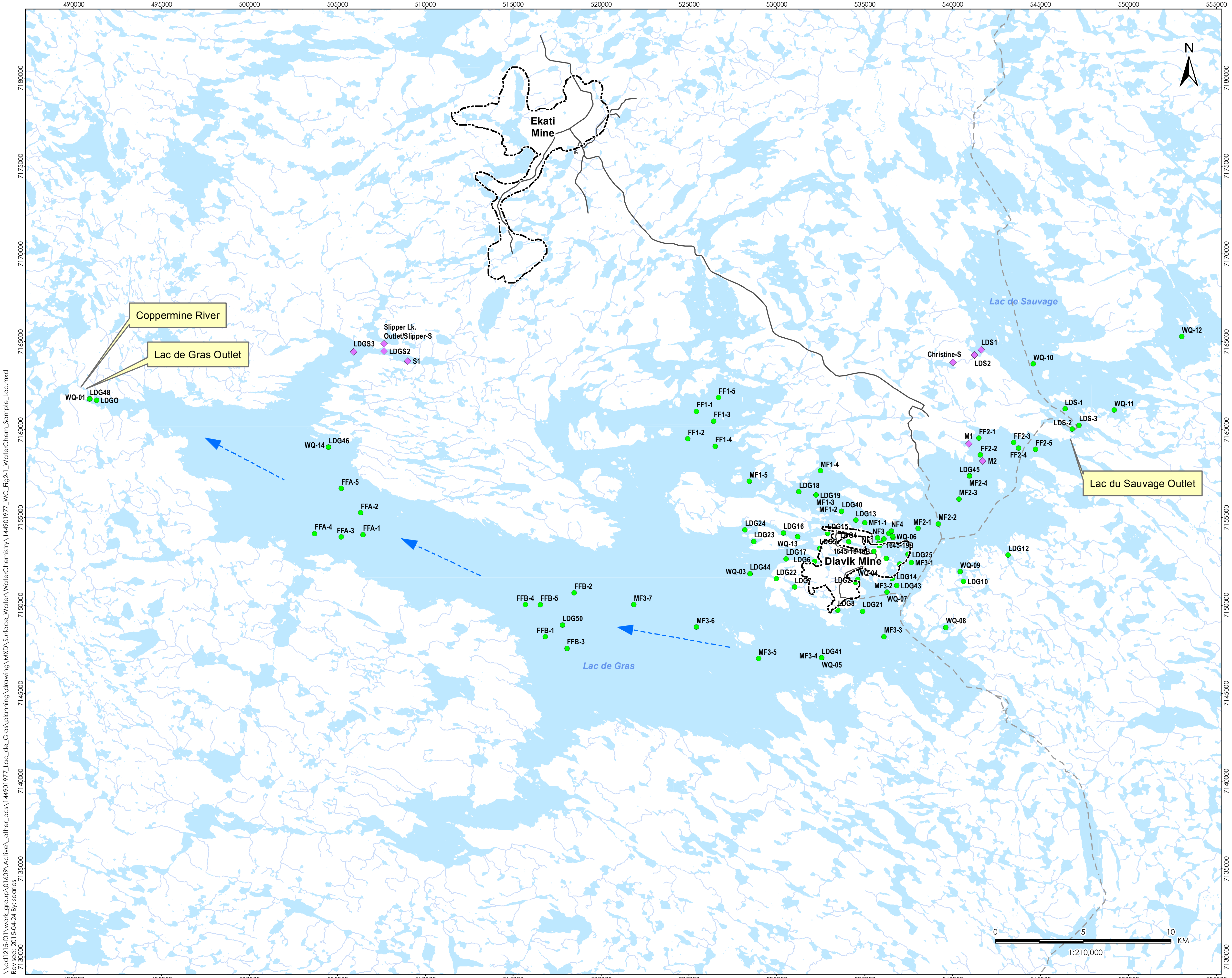
In the format received, the Ekati and Diavik water-chemistry datasets were largely incompatible for use in examining the existing data record and undertaking the requested statistical and trends analysis. Even within the larger Diavik dataset, inconsistencies were identified throughout. To make the datasets more compatible, however, DCS completed extensive data re-organization and quality assurance/quality control (QA/QC) checking. Further information on the QA/QC activities that were completed is provided in Section 2.1.2.

In examining the consistency in the array of analytes monitored over time between the two datasets, overlap was found between the two programs for only a handful of analytes. This is presumably due to the difference between the two mines in the parameters of their respective concern, and the difference in the overall scope of the required monitoring at Ekati and Diavik. For example, data were received for 32 analytes within the Ekati dataset and 103 analytes within the Diavik dataset, with 31 analytes in common between them (see Table A1 in Appendix A). Therefore, DCS' analysis of some parameters of potential concern necessarily included only Diavik data due to a lack of Ekati data, and given that the majority of the monitoring in LDG has been completed by Diavik.

2.1.2 QA/QC Activities

To make the Ekati and Diavik datasets more compatible for statistical analysis, the following QA/QC activities were completed:

- Ekati and Diavik data were combined into one spreadsheet.
- All 117 sample sites were identified, located, listed and categorized, with available meta-data compiled for each site. Naming conventions for sites were identified (see Table A2 in Appendix A for a list of all sites, available coordinates/locations, period of data record, rationale/purpose). See Figure 2-1 and Figure 2-2 for the location of all sites within LDG).
    - o Rationale/purpose for sample-site selection was obtained where possible, but it proved to be extremely challenging to obtain historical baseline information and data reports to rationalize sample-site selection.



Legend

- Mine Footprint
- Diavik Sample Site
- Ekati Sample Site
- Mine Road
- Winter Road
- Waterbody
- Approximate Flow Direction

Notes

1. Coordinate System: NAD 1983 UTM Zone 12N
2. Base features source: CANVEC dataset from Geogratis © Natural Resources Canada, 2013.

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Figure No.

2-1

Title

Water Chemistry Sample Sites for the Ekati Diamond Mine and the Diavik Diamond Mine

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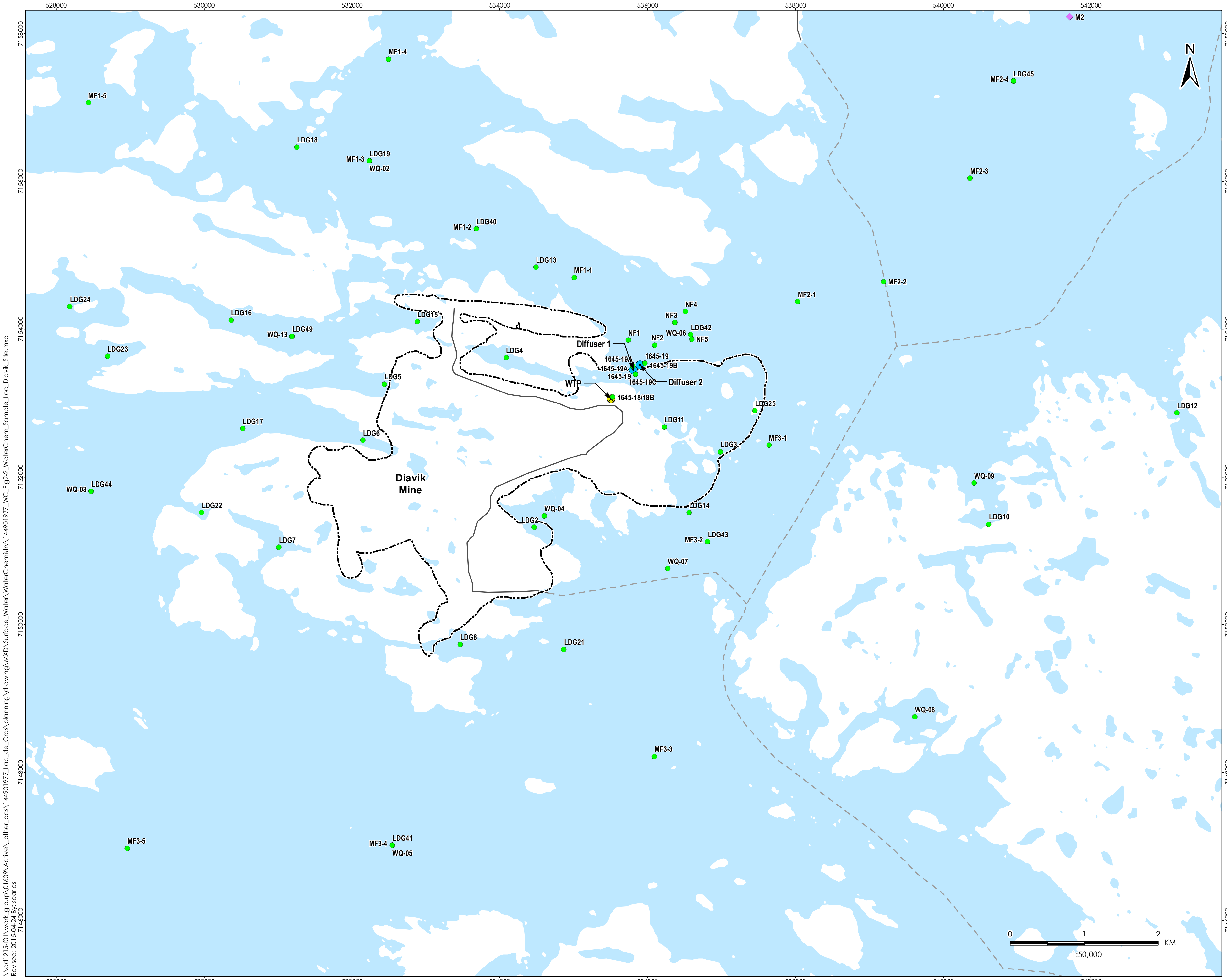
Revised: 2015-04-24 By: searles



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Legend

- Mine Boundary
- Diavik Sample Site
- Ekati Sample Site
- North Inlet Water Treatment Plant (WTP)
- Diffuser
- Mine Road
- Winter Road
- Waterbody

Notes

1. Coordinate System: NAD 1983 UTM Zone 12N
2. Base features source: CANVEC dataset from Geogratis © Natural Resources Canada, 2013.

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Figure No.
2-2

Title

Water Chemistry Sample Sites Nearest the Diavik Diamond Mine

- Coordinates for nearly all of the 117 sites were compiled.
- Diavik's diffuser-mixing zone sites were identified and defined.
- Decisions were made regarding use of data in the calculation of baseline condition, or subsequent analyses for several sample sites, resulting in determinations that these data could not be used. These sample sites could not be located and/or the purpose for these sites was unknown; see Table 2-2 in Section 2.3.1 for a list of these sites.
- All data were transformed to a standard concentration metric (i.e., milligrams per litre [mg/L]) from a mixture of data records using the micrograms per litre (µg/L) and mg/L units.
- Multiple columns in the dataset spreadsheets for analytes were typically combined so that there were a maximum of two columns for any given analyte (i.e., dissolved and total). This proved challenging because of the variability in methods, laboratories, and naming conventions through the years of the two monitoring programs.
- Spreadsheet columns for total and dissolved sulphate, and for total and dissolved chloride, were combined into one column each for sulphate and chloride. For these two analytes, total and dissolved values were considered the same since they are typically in the dissolved form in aquatic systems.
- Similar data with multiple columns and multiple data points for individual samples were excluded from use; the data with more significant figures were retained. For example, data columns entitled "Calcium (Water–old data)" and "Calcium–Total (mg/L)" were received and values for both parameters were reported for individual samples. Data in the "Calcium–Total (mg/L)" column were retained for use because "Calcium (Water–old data)" values were reported to only one significant figure (versus two significant figure records for "Calcium–Total (mg/L)").
- Results reported as text values (i.e., "<DL", "NULL", "Yes", "No", "Y", "PASS", "Plant Down") were removed from the dataset and the result left blank.
- Limnological depth-profile data from Diavik (identified as 'DDMI-FIELD' in the 'Data Source' column) were separated from chemistry data and placed into a separate spreadsheet. The maximum depth of profile data received was 38 m; however, nearly 95% of the data received provided profile data down to only 20 m deep. While the average depth of the lake is reported at 12 m (DDMI 1998), the relatively shallow depths used for development of depth-temperature, depth-oxygen and other profiles underscores a significant gap in the lake-profile data because the maximum depth of LDG is reported as approximately 56 m (DDMI 1998).
- Depth-profile data were reduced to include only the five main depth parameters for which data were received: dissolved oxygen (mg/L), pH (pH units), turbidity (NTU), conductivity (µS/cm), and temperature (°C). Analytes erroneously identified as profile data (i.e., ammonia, total thallium) were removed.
- All chemistry data reported as less than the "Method Detection Limit" (e.g., <0.02 mg/L) were transformed to a numerical value of half the detection limit, consistent with standard statistical practice. This process was made difficult because there were multiple detection limits for each parameter,

detection limits did not consistently improve over time, and the detection limits ranged over several orders of magnitude for any given analyte. The variability in method-detection limits compromised the ability to define baseline condition and undertake trends analysis.

- Numerical values reported for duplicates and blanks (field and travel) were removed from the water-chemistry data spreadsheets. These QA/QC samples were entirely from Ekati; DCS obtained information from Diavik on QA/QC sample-naming conventions however none of these names were found within the data received. Therefore, DCS made the decision that QA/QC sample data were not to be included within the database.
- Attempts were made to identify and ultimately combine the data for sites where there had been one or more name changes over the period of record.
- Attempts were made to define numerical sample depth for each sample identified as "top" (T), "mid-depth" (M) or "bottom" (B). Through notes which accompanied the data, it was determined that all top samples were collected at 2 m depth but sample depths for mid- or bottom samples were not defined as they would be site-specific. However, given the apparent lack of thermal stratification in the lake at any given season (to a depth of at least 20 m; see Section 3.2.1 for more information), it was determined that it would be appropriate to combine all site data. It would, however, be useful in future monitoring to record sampling depths for each monitoring site as part of the sample ID (e.g., LDGS3-2 for the "top" samples at 2 m).
- Given the extremely large number of sample sites, and the inconsistent period of record amongst sites, attempts were made to group sites into categories based on discharge into LDG (e.g., Slipper Lake outlet, Diavik effluent, LDS outlet) or distance from Diavik (i.e., sites within LDG). This reduced the number of sites requiring analysis and increased the sample size for each group.
- A total of six sites were identified with a full set of water-chemistry data over the period of record (i.e., baseline to current), and in areas deemed representative of potential concentration gradients (i.e., from effluent to the LDG outlet). These were identified as most appropriate sites for trends analysis.
- A full examination of the data for outliers and obvious transcription errors was beyond the scope of this project, but was undertaken as nonsensical data (likely data entry errors) were identified during routine analysis of the data. Previous recognition of data QA/QC shortcomings has also occurred (Zajdlik 2005).

2.1.3 Dissolved-to-Total Metal Ratios

As a QA/QC step, the dissolved-to-total ratio for all metals was calculated for each sample event for which both a dissolved and total-metal concentration were reported, and where both values were reported above the detection limit. For those metals where the majority of data were <DL, this necessarily resulted in development of dissolved-to-total ratio summary statistics using a reduced set of data.

From this, it was determined that the dataset contained nonsensical values. It was also determined that the dissolved-to-total ratio was > 1.2 for approximately 12% of the data (with a range of 0 to 50% for individual analytes). Further, maximum ratios ranged from 1.1 to 110. A ratio > 1.2 is not considered acceptable and the prevalence of high ratios suggested that basic QA/QC procedures were not followed for the data collected in LDG. This created uncertainty in the definition of 'baseline' and compromised the ability to undertake temporal and spatial trends analysis.

Regardless, ratios were summarized for all metals (as in Table 2-1) for the entire set of data. In addition, ratios were developed for nickel (Ni) and iron (Fe), with ratios for each metal separated into DDMI "effluent", "mixing zone", and "lake" sites to assess variability over a gradient from effluent to lake. Nickel and Fe were chosen to provide a contrast between a metal with a ratio of close to one (e.g., Ni, typically present as the dissolved ion), and a metal with a ratio less than one (e.g., Fe, typically present in particulate form).

2.2 Limnological Depth Profiles

Limnological depth-profile data for temperature, dissolved oxygen, pH and conductivity were examined. Data were evaluated prior to development of depth profiles, and anomalous data were removed. Because of the inconsistent sampling schedules, data from the period of record were averaged to produce near-monthly profiles for one site in Lac de Gras. It was understood that averaging the data would necessarily affect precision of the profiles, but averaging was the only approach that allowed for the development of a relatively comprehensive seasonal understanding of the effect of depth on the listed parameters. Turbidity data were excluded from the limnological depth profile analysis as far fewer data were received and turbidity is not expected to change with depth.

For development of the temperature, oxygen and pH profiles, data were gathered from one of the six sample sites which had a complete data record (i.e., from baseline to present), and limnological depth profile data were received. The selected site was the WQ-05/LDG41/MF3-4 sample site (Figure 2-1 and Figure 2-2). This sample site has consistent data up to approximately 20 m deep (with sporadic data between 20 m and 26 m) and the period of record received is inclusive of 1996, 1997 and 1999 (WQ-05), 2000 to 2006 (LDG41), and 2007 to 2009 (MF3-4).

The following adjustments were made for development of the temperature profile:

- Since data appear to be collected every 2 m, only data from even-numbered depths between 2 to 20 m were used to develop the temperature profile.
- Temperature data from 2009 for the months July, August, and September were excluded from the analyses as they negatively skewed the temperature profiles. Temperature data from 2009 was markedly cooler than other years and this was attributed to the late spring in 2009 where LDG did not become ice-free until July 25, 2009 (DDMI, unpublished).
- Data for the months of January, May, June, and December were inclusive of one sample event each; therefore, for these months, n = 1.
- Data for the month of August were averaged by depth over seven sample events (n = 7, inclusive of August 16, 1996; August 16, 1997; August 23, 2000; August 14, 2002; August 19, 2004; August 31, 2005; and, August 20, 2006). Data from August 5, 1996 were not included due to

insufficient data, while data from August 5, 2000, were not included due to anomalous temperature readings.

- Data for the month of July were averaged by depth over two sample events (n = 2, inclusive of July 22, 1997; and July 27, 2008). It is noted however that temperature data from 2009 were markedly cooler than other years and this was attributed to the late spring in 2009; Diavik reported that LDG did not become completely ice-free until July 25, 2009 (DDMI, unpublished).
- Data for the month of September were averaged by depth over two sample events (n = 2, inclusive of September 15, 1996; and September 4, 1997). It is noted that profile data initially reported as "April 9, 1997" were included within the September averages as September 4, 1997. Temperature values received for these April sample events were uncharacteristically high for the reported month; for example, a temperature of 11.28°C was reported at 2 m depth for April 9, 1997. Given that data were entered into Excel with a specific date format (e.g., "04/09/97 for April 9, 1997"), DCS assumed that the data were entered incorrectly and the reported April values should have been September (e.g., 09/04/97).
- Data for the month of October were averaged by depth over two sample events (n = 2, inclusive of October 8, 2001, and October 9, 2007).
- Missing data not available in the dataset were interpolated from nearby available data. This included some depths from September 15, 1996, and August 5, 2000.

The following adjustments were made for development of the oxygen profile:

- Since data appear to be collected every 2 m, only data from even-numbered depths between 2 to 20 m were used to develop the dissolved oxygen profile.
- Data from August 5 and 16, 1996, were not complete and were therefore excluded.
- Data for the months of January, May, June, and December were inclusive of one sample event each; therefore, for these months, n = 1.
- Data for the month of June 2005 were not included as values were identified as anomalous (ranged from 5.99 mg/L to 42.1 mg/L).

The following adjustments were made for development of the conductivity and pH profiles:

- Since data appear to be collected every 2 m, only data from even-numbered depths between 2 to 20 m were used to develop the pH profile. When pH values from even-numbered depths were not available, they were averaged from available even- and odd-numbered pH values.
- Data for the months of January, May, June, and December were inclusive of one sample event each; therefore, for these months, n = 1.
- Data from August 5 and 16, 1996, were not complete and therefore were excluded.
- Depth-profile data from September 15, 1996, August 5, 2000, and July 24, 2009, were not complete for all depths, so missing values were obtained through interpolation.

2.3 Water-Chemistry Data

2.3.1 Definition of Baseline Water Chemistry

Similar to methods reported in Zajdlik (2005), the period of record for calculation of "baseline conditions" in LDG was determined to be from September 1994 up to and including December 2000. As of December 31, 2000, all construction activities at Diavik were limited to infrastructure development on East Island and there were no direct discharges to Lac de Gras (DDMI 2001). After that time, in-water construction of the A154 dike at Diavik had begun and water chemistry of LDG may have been affected. Additionally, discharge from Ekati's Misery King-Cujo system into Lac du Sauvage, upstream of LDG, began in August 2001 (E. Denholm, pers. comm.).

Operation of the Ekati mine and deposition of processed kimberlite (tailings) into their Long Lake Containment Facility (LLCF) began in September 1998 however effluent from their LLCF is not expected to have reached LDG until a few years later. The LLCF is comprised of five cells; processed kimberlite is deposited into the upstream cells (Cells A, B and C) of the LLCF and the downstream cells (Cells D and E) are used as polishing ponds (McKenzie et. al. 2011). Discharge to the receiving environment (i.e., Leslie Lake) occurs from the downstream end of Cell E of the LLCF (E. Denholm, pers. comm., McKenzie et. al. 2011). It is assumed that there was a lag time between the deposition of processed kimberlite into the upstream LLCF and the appearance of an effluent signature in the downstream LLCF, and in the downstream environment (i.e., Leslie Lake through a chain of lakes to Slipper Lake and into LDG). The residence time within the polishing cells D and E of the LLCF is estimated at approximately 3.9 years and 1 year, respectively (Rescan 2012). The total residence time in the series of lakes between the LLCF and LDG has been estimated at 324 days (during an average annual runoff of 166.5 mm) (Rescan 2012). Therefore, it is estimated that it took five to six years for the first effluent signature, from the 1998 commencement of LLCF operations, to reach LDG (i.e., in 2003 or 2004), and that the definition of "baseline" as being from 1994 to 2000 is valid.

An approach to defining, and understanding, 'baseline' conditions was developed using percentile data and boxplot analysis (Table 2-1). This non-parametric estimate of baseline was utilized because the approach makes no assumptions regarding the normality of the data, is resistant to outliers (hence they are left in the analyses), and can accommodate up to 25% non-detect data without seriously affecting the definition of baseline. Because water chemistry data are inherently "noisy," and are not usually (statistically speaking) distributed "normally," this approach is considered not only statistically appropriate but is also a more robust approach to assessments of similarity or dissimilarity of data, and to tests of trend.

The upper and lower bounds of 'baseline' were defined as the highest or lowest recorded value still contained within 1.5 times the interquartile range (IQR) of the 25th or 75th percentile of the data (Table 2-1). The upper bounds of baseline, as defined, are approximately comparable to the 95th percentile of the data.

Table 2-1 Statistics used to Summarize Water-Chemistry Data from Lac de Gras, NT

Parameter	Description
n	Sample Size
ND (#, %)	Number and percent of samples reported as non-detects (or less than the detection limit)
CCME FAL	Canadian Council of Ministers of the Environment Freshwater Aquatic Life guidelines
>CCME (#, %)	Number and percent of samples greater than the CCME guideline value
Min	The minimum observed value in the set of data, considered an outlier if it is less than the defined 'low' value of the dataset
Low	The lowest observed value in the set of data still within 1.5 x IQR of the 25th percentile. Comparable to the ~5th percentile of the data and considered as the lower bound of baseline concentration
25%[1]	The 25th percentile of the set of data
Median	The 50th percentile of the set of data
75%[1]	The 75th percentile of the set of data
High	The highest observed value in the set of data still within 1.5 x IQR of the 75th percentile. Comparable to the ~95th percentile of the data and considered as the upper bound of baseline concentration
Max	The maximum observed value in the set of data, considered an outlier if it is greater than the defined 'high' value of the dataset
Mean	The average value of the set of data
STD	The standard deviation of the set of data
SE	The standard error of the set of data (STD/√N)
CV	The coefficient of variation (MEAN/STD)
IQR	The Interquartile Range, calculated as the 75th percentile minus the 25th percentile
1.5 x IQR	1.5 times the Interquartile Range. The 75th percentile plus 1.5 x IQR and the 25th percentile minus 1.5 x IQR is roughly equivalent to the 95th percentile of the data

NOTE:
[1] Definition of percentile data is limited to datasets with five or more observations. If n < 5, then baseline can only be described by the mean and standard deviation.

For results reported as "below detection," a value of half the detection limit was used for calculation of summary statistics. Although substituting a value of half the detection limit for non-detect records may introduce a degree of bias and imprecision into the data analysis, it is an accepted procedure and is used widely for Environmental Effects Monitoring programs in Canada (EC 2012). Summary statistics for water-chemistry data from LDG were calculated with Microsoft Excel 2010 and are reported in Appendix C. For analytes which had greater than 30% of their dataset reported as <DL, only the minimum and maximum values are reported in the summary statistics. When non-detect records comprise more than 30% of the dataset, the lower bound of 'baseline' (i.e., 25th percentile) is undefined and the 'baseline' condition cannot be accurately described.

It is recognized that concerns have been expressed regarding the set of baseline water-chemistry data collected within the study area (c.f. Zajdlik 2005). Despite these concerns, "baseline" was defined for all analytes using the available data, including all depths, seasons and sites. The inclusion of all data from the 'baseline' period (1994 to 2000) resulted in a definition of baseline that is broader than might have otherwise been the case and it is acknowledged that the accuracy and precision of the baseline summary statistics calculated here may have been compromised by the stated shortcomings of the data (Zajdlik 2005). But, it was considered that inclusion of any seasonal, spatial and temporal variability within the baseline record was acceptable for the objective of the present study, to determine if spatial or temporal trends are evident. A broader definition of baseline means that, when all data were combined, the confidence in any observed trends is increased over what they would be if seasonal data were separated.

2.3.1.1 Sample Site Groups

Due to the large number of sample sites, many in close proximity to each other, and the inconsistent data collection over the period of record, sample sites were combined into 19 different groups for definition of baseline condition, and examination of spatial differences (Table 2-2). 'Baseline' sites were primarily concentrated in the area around East Island (Diavik) with data from September 1994 up to and including data from December 2000 (Figure 2-1; Table C2a in Appendix C). Post-baseline sites, or those with data from 2001 onwards, were grouped based on proximity to each other and to the Diavik and Ekati effluent discharge locations.

Table 2-2 Sample Site Groups for Statistical Analyses; Lac de Gras, NT

Group Name	Period of Data	Sample Sites
LDG Baseline	1994 to 2000	Diavik: WQ-02, WQ-03, WQ-04, WQ-05, WQ-06, WQ-07, WQ-08, WQ-09, WQ-13, LDG1A, LDG1B, LDG2, LDG3, LDG4, LDG5, LDG6 LDG7, LDG8, LDG9, LDG10, LDG11, LDG12, LDG14, LDG15, LDG16, LDG17, LDG18, LDG19, LDG20, LDG21, LDG22, LDG23, LDG24, LDG25, LDG40, LDG41, LDG42, LDG43, LDG44, LDG45, LDG46, LDG48 Ekati: LDGS2 and LDGS3
DDMI Effluent	2002–present	Diavik: 1645-18
DDMI Mixing Zone	2002–present	Diavik: 1645-19 (including 19A, 19B, 19B2, and 19C)
Near-Field (NF)	2001–2013	Diavik: LDG42, NF1, NF2, NF3, NF4, NF5
Mid-Field 1 (MF1)	2001–2013	Diavik: MF1-1, LDG40/MF1-2, MF1-3, MF1-4, MF1-5
Mid-Field 2 (MF2)	2001–2013	Diavik: MF2-1, MF2-2, MF2-3, LDG45/MF2-4
Mid-Field 3 (MF3)	2001–2013	Diavik: MF3-1, LDG43/MF3-2, MF3-3, LDG41/MF3-4, MF3-5, MF3-6, MF3-7,
Mid-Field West (MFW)	2001–2006	Diavik: LDG44, LDG49
Far-Field 1 (FF1)	2007–2013	Diavik: FF1-1, FF1-2, FF1-3, FF1-4, FF1-5
Far-Field 2 (FF2)	2007–2013	Diavik: FF2-1, FF2-2, FF2-3, FF2-4, FF2-5
Far-Field B (FFB)	2002–2013	Diavik: LDG50, FFB-1, FFB-2, FFB-3, FFB-4, FFB-5
Far-Field A (FFA)	2000–2013	Diavik: LDG46, FFA-1, FFA-2, FFA-3, FFA-4, FFA-5
Slipper Outlet	2000–2013	Ekati: Slipper Lake Outlet/Slipper-S
LDGS3	2001–2013	Ekati: LDGS3
LDG Outlet	1995, 1998, 2000–2013	Diavik: LDG20/WQ-01/LDGO/LDG48

Table 2-2 Sample Site Groups for Statistical Analyses; Lac de Gras, NT

Group Name	Period of Data	Sample Sites
Christine Out	2000–2013	Ekati: Christine-S
LDS	1996, 1998, 2000–2013	Ekati: LDS1, LDS2 Diavik: WQ-10, WQ-11, WQ-12
LDS Outlet	2010–2013	Diavik: LDS-1, LDS-2, LDS-3
Unknown	Various	Ekati: LDG13, WQ-01, WQ-03, WQ-05, WQ-06. WQ-07. WQ-13, WQ-14, BHP-S1, BHP-S2, BHP-S3, M1 and M2 Diavik: e3, e6, e7, e8, e10, EMAB1, EMAB3 and EMAB3, LDG47, FF3-4, FF4-2, FFC-2

Because the project was focused on examination of the water-chemistry data record within LDG, data from sites in the 'Christine Out' and 'LDS' sample groups were excluded. All data from sample sites in the 'Unknown' group were also excluded from the analyses because DCS could not confirm either the location of these sites, or whether sites with identical names were indeed the same site. Therefore, DCS focused on the following sample groups:

- 'LDG Baseline' to establish the baseline condition of LDG.
- 'DDMI Effluent' and 'DDMI Mixing Zone' to examine Diavik inputs to, and mixing within, LDG, respectively.
- 'Slipper Outlet' and 'LDGS3' to examine Ekati inputs to, and mixing within, LDG, respectively.
- 'NF' through to 'FFA' to examine spatial differences in water chemistry within the lake.
- 'LDG Out' to examine the water chemistry record at the outlet of the lake, which also represents downstream water chemistry after inputs from both Ekati and Diavik (i.e., a designated zone of potential overlap in effluent plumes where persistent additive effects may be observed).
    - Modeled hydrodynamic and circulation patterns of LDG (see parallel report) indicate that the FFA sample group may represent an area where the effluent plumes from Ekati (Slipper Lake Outlet) and Diavik also overlap (see Figure 2-1).
- The FF2 sample group specifically to examine a second designated zone of potential overlap in effluent plumes, where persistent additive effects may be observed, from the Ekati (via the LDS Outlet) and Diavik discharges (see Figure 2-1.)

Since LDS is a major contributor of flows to LDG, and since LDS has received effluent discharge from Ekati's Misery project (via Christine Creek; see Figure 2-1), DCS also attempted to examine data within the 'LDS Outlet' group. However, data from only five sampling events were received (LDS-1 from April 2010, May 2011, and April 2013; and, LDS-2 and LDS-3 from April 2013) and they provided limited information on water-chemistry inputs from LDS. Therefore, only the minimum, maximum, mean and standard deviation of these five sampling events were calculated and reported for the LDS Outlet sample group (Table C16 in Appendix C).

2.3.1.2 Analytes of Potential Concern

The GNWT provided a list of "analytes of potential concern" for inclusion in the hydrodynamic model, being addressed in the parallel report, and for the examination of the water-chemistry record, including:

- pH
- Hardness
- Total dissolved solids (TDS)
- Major ions (calcium, magnesium, potassium, sodium, sulphate, chloride)
- Fluoride
- Total phosphorus (TP)
- Total phosphate
- Orthophosphate
- Total dissolved nitrogen
- Nitrate and Nitrite (as N)
- Particulate (total) nitrogen
- Total organic carbon (TOC)
- Total metals, including aluminum, arsenic, copper, iron, manganese, molybdenum, strontium, uranium and zinc.

As noted by the GNWT in documentation forwarded to DCS, these analytes were selected if: (1) they were reported as being 'elevated' in the annual Aquatic Effects Monitoring Program reports from either Diavik or Ekati, or (2) they were listed as a 'priority parameter' by either mine.

The list supplied by the GNWT was used as a guideline for determination of which analytes to include in the definition of 'baseline'. Unfortunately, baseline conditions could not be defined for all analytes of potential concern, due either to a complete lack of data (i.e., total dissolved nitrogen), or due to concentrations for analytes typically being reported below detection (i.e., fluoride, total phosphate, orthophosphate, and some metals). DCS also did not examine all metals identified as parameters of potential concern given the issues identified for much of the metals dataset (see Section 2.1.3 and Section 3.1). Therefore, DCS focused its definition of baseline on metals which had acceptable datasets. These included total aluminum, arsenic, iron, molybdenum, nickel, strontium and uranium.

2.3.2 Post-Baseline Water Chemistry

To examine potential spatial differences in water chemistry within LDG following the onset of mine operations (i.e., from 2001 onwards), summary statistics (Table 2-1) were generated for each parameter of interest within each group (Table 2-2). Similar to the definition of 'baseline,' boxplot analysis and comparison of descriptive statistics between groups was completed to assess any spatial variation in water chemistry. This analysis focused on the parameters of potential concern, as outlined above in Section 2.3.1.2.

2.4 Temporal Trends Analysis

Generally, trends in biological datasets (whether positive or negative) occur either gradually (a true trend) or abruptly (a 'step-change'). DCS assessed persistent temporal trends in water chemistry for five sites in LDG, plus one sample area (Table 2-3). These sites/areas were selected because they were identified as having data over the entire period of record (i.e., from baseline to current). Parameters of interest included those outlined in Section 2.3.1.2 above. Upon examination of the data for each analyte and site, it was determined that the sampling periods were not regular and data records were not complete. Therefore, missing time-periods, a variable baseline record, and a variable number of missing data for each analyte within each set of site data were identified (Table 2-3). These data gaps necessarily compromised the robustness of the trends test.

Table 2-3 Selected Sample Sites/Areas for Trends Analysis and the Corresponding Period of Record; Lac de Gras, NT

Sample Site/Area	Site/Area Type	Period of Record
WQ-06/LDG42/NF5	Near-Field	1996, 1998, 2000–2013
WQ-02/LDG19/MF1-3	Mid-Field	1995–1996, 2007–2013
WQ-05/LDG41/MF3-4	Mid-Field	1996, 2000–2013
LDG46/FFA[1]	Far-Field	2000–2011, 2013
LDGS3	Near-Field	1994, 1997–2013
LDG20/WQ-01/LDGO/LDG48	LDG Outlet	1998, 2000–2013

NOTE:
[1] FFA comprised of data from sample sites FFA-1, FFA-2, FFA-3, FFA-4, and FFA-5.

These limitations notwithstanding, the Mann-Kendall trends test (Appendix B) was selected for trends analysis as it is a non-parametric test and makes no assumptions regarding the structure of the data; it is also robust and can handle missing values (USEPA 2013).

The Mann-Kendall test requires that the dataset be monotonic over time, and that there is only one value per time period. Therefore, when multiple data points existed within the dataset for a single time-period (i.e., if there were multiple sampling events per year, or, in the case of the Far-Field group, multiple sites per year), the data for the parameters of interest (see Section 2.3.1.2) were averaged to produce a single yearly value.

For values that were reported as "< DL", a numerical value of half the reported DL was substituted. However, where method DLs were variable through the time series, all '< DL' records were equated to a numerical value of half the DL of the highest reported '< DL result'. For example, if '< DL' values for a given parameter included such records as < 0.0001 mg/L, < 0.0002 mg/L, and < 0.0004 mg/L, all '< DL' results were set at 0.0002 mg/L (half of < 0.0004 mg/L). Although this did reduce the resolution of the dataset to some extent, it was a necessary step to normalize all non-detect data (Helsel and Hirsch 2002, p. 353). With the exception of total phosphorus, most < DL values were within two to five-fold of each other. This likely was not a large enough difference to compromise the validity of the trends test. For total phosphorus, one data point (at three of the sites) had a < DL value 100-fold greater than any of the other data points. In this case, this one data point was considered an outlier and was removed with the < DLs equated to the next greatest DL.

Trends analysis was initially undertaken on all parameters of interest at the Near-Field sites as these would be the most likely to show trends, if present. These sites include WQ-06/LDG42/NF5, situated close to the Diavik diffuser, and LDGS3, situated close to the Slipper Lake Outlet (see Figure 2-1). If significant ($p < 0.05$), trends were identified for any of the selected analytes at the Near-Field sites, the trends analysis was expanded to include the same analytes at the two Mid-Field sites and the Far-Field area. The trends analysis at the LDG outlet was undertaken on all analytes of interest (similar to the Near-Field site) as it is a designated zone of potential overlap. Temporal trends were also reviewed on water chemistry data received for Counts, Vulture and Nanuq lakes from the Ekati AEMP. These lakes are 'reference' lakes and are not influenced by discharges from the two mines. This allowed for an evaluation of the nature of any the cumulative temporal trends in LDG. It was considered that if temporal trends were observed in these reference lakes, then any trends observed in LDG could at least partially be related to natural phenomena (e.g., climate change). However, if temporal trends were not observed in these reference lakes, trends observed in LDG are entirely related to the discharge of effluent from the two mines.

Data averaging was completed using Microsoft Excel 2010. The Mann-Kendall test was performed using ProUCL (USEPA 2013); see Appendix B for additional information and the calculation steps for the Mann-Kendall test.

2.5 Relative Loading Rates

Annual loading calculations for each of the mines were completed to assess the relative contribution of analytes of potential concern to LDG. Annual effluent discharge volumes were obtained for the Diavik diffuser (2000 to 2013), and the Slipper Lake Outlet (2000 to 2010 [Rescan 2012] and 2011 to 2013 [K. Mansfield, pers. comm.]) to examine loadings from Diavik and Ekati, respectively. All data were converted to litres for loading calculations. Annual discharge data for the Diavik diffuser and the Slipper Lake Outlet into LDG are provided in Table 2-4. Data have not been collected for LDS and loadings from LDS to LDG could not be calculated.

Table 2-4 Annual effluent discharge volumes from the Diavik diffuser and the Ekati Slipper Lake Outlet into Lac de Gras, NT

Year	Diavik Diffuser (L)	Slipper Lake Outlet (L)
2000	0	34,680,000,000
2001	0	35,970,000,000
2002	4,078,009,000	15,910,000,000
2003	6,821,444,000	17,460,000,000
2004	4,670,864,000	20,650,000,000
2005	5,600,586,000	21,130,000,000
2006	7,611,334,000	51,520,000,000
2007	7,661,542,000	17,050,000,000
2008	8,196,352,000	26,060,000,000
2009	10,990,705,000	17,770,000,000
2010	12,951,724,000	20,810,000,000
2011	12,490,689,000	12,883,276,800
2012	11,905,009,000	19,630,252,800
2013	12,601,229,000	22,151,750,400

Loadings were calculated for TN and TP as well as for chloride, sulphate, and the identified metals of potential concern (see Section 2.3.1.2). Since the effluent discharge data were received in the form of annual concentrations, the mean annual concentration of each parameter of interest was calculated and used to determine mean loadings for a given year.

3 RESULTS AND DISCUSSION

The results of DCS' analysis of the existing water-chemistry data record for LDG are contained within the following five sections. Section 3.1 details the QA/QC results for the examination of dissolved-to-total ratios for metals, while Section 3.2 contains the limnological profile data for temperature, dissolved oxygen, pH and conductivity. Section 0 outlines the results for the definition of "baseline chemistry" within the study area and the examination of post-baseline spatial variation in water chemistry. Section 3.4 contains trends analysis for select analytes at the selected sites/area with the longest continuous data record while Section 3.5 provides the results of the relative loading rate calculations.

3.1 Quality Assurance/Quality Control: Dissolved-to-Total Metal Ratios

Summary statistics for metal ratios indicated the presence of numerous anomalous data. Though variable amongst analytes, the dissolved-to-total ratio was greater than 1.2 for approximately 12% of the data (Table C1 in Appendix C). Maximum ratios were also unusually large, and ranged from 1.1 upwards to values that could only be considered nonsensical. Despite the presence of unacceptably high dissolved-to-total metal ratios, median and percentile data were reasonable and within expected ranges (Table C1 in Appendix C).

Amongst the metals, there were several categories of ratios. For many of the metals, the median ratio was estimated at ±1.0. These included arsenic (As), barium (Ba), calcium (Ca), copper (Cu), potassium (K), lithium (Li), magnesium (Mg), nickel (Ni), molybdenum (Mo), sodium (Na), and strontium (Sr) (Figure 3-1; Table C1 in Appendix C). These metals were therefore classified as highly soluble and considered to exist in lake water almost completely as the dissolved ion (e.g., Ca).

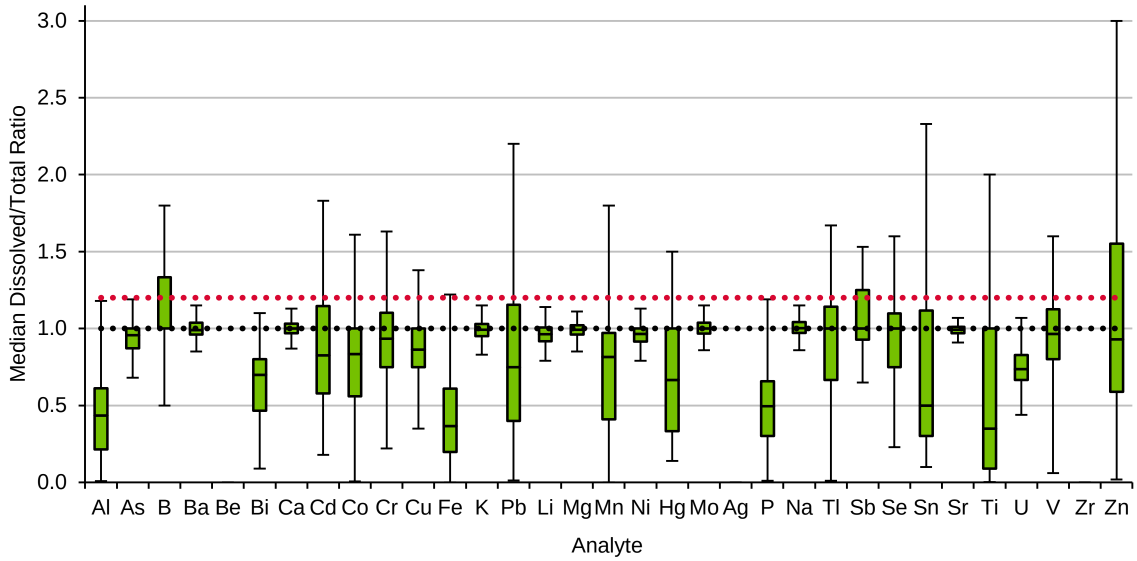

Figure 3-1 Boxplot for Median Dissolved: Total Ratios for Metals, Summarized from all Sample Site Data; Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean; outliers are not shown. The black dotted line represents a maximum expected ratio of 1.0. The red dotted line represents a dissolved: total ratio of 1.20, above which the data are considered anomalous.

A second group included those metals with a median ratio noticeably < 1.0; these included aluminum (Al), bismuth (Bi), iron (Fe), phosphorus (P), and uranium (U) (Figure 3-1; Table C1 in Appendix C). These metals tended to be associated with the particulate fraction in the water column. These results were not surprising as Fe is sparingly soluble, Al is a major constituent of inorganic particulates, and P is readily absorbed by algae and bacteria, particularly in an oligotrophic lake such as LDG.

A third group included metals for which most results were reported as being '< DL' and of which there were not enough data to develop summary statistics. These metals included beryllium (Be), silver (Ag) and zirconium (Zr) (Figure 3-1; Table C1 in Appendix C).

The results for the rest of the metals were highly variable and contained considerable number of values > 1.2. These metals included Cd, Co, Cr, Pb, Mn, Hg, Tl, Sb, Se, Sn, Ti and Zn. The reasons for this variability are unexplained, but these ratios highlight the need for greater scrutiny and QA/QC of incoming data. The prevalence of dissolved-to-total ratios greater than 1.20 is considered to be an indication of analytical or reporting error, and should have triggered ongoing re-analysis and/or an examination of the sampling and analytical protocols.

The current lack of confidence in the reported data for many of the metals has precluded in many cases further detailed analysis of the affected metals.

Dissolved-to-total ratios developed for specific site groups were examined to assess variation between (1) areas affected by discharged DDMI effluent, (2) the DDMI mixing zone in LDG, and (3) the larger area of LDG. These areas were examined specifically for their Ni and Fe ratios to examine differences between a 'typically dissolved' metal (e.g., Ni, with a median ratio ± 1.0; Figure 3-1) and a 'typically particulate-sorbed' metal (e.g., Fe, with a median ratio < 1.0; Figure 3-1). Examining ratios for Ni at the DDMI effluent-affected area, within the DDMI mixing zone, and for the wider area of LDG indicated that median and mean values were similar within all three groups. This indicated that the data were not skewed and contained few outliers. Both mean and median ratios were also similar between all three areal groups (Figure 3-2). This indicated that the dissolved-to-total ratio for Ni was not affected as the DDMI effluent mixed with the LDG waters. Nickel ratios were more variable for LDG, though it was beyond the scope of this report to examine causes of this variability.

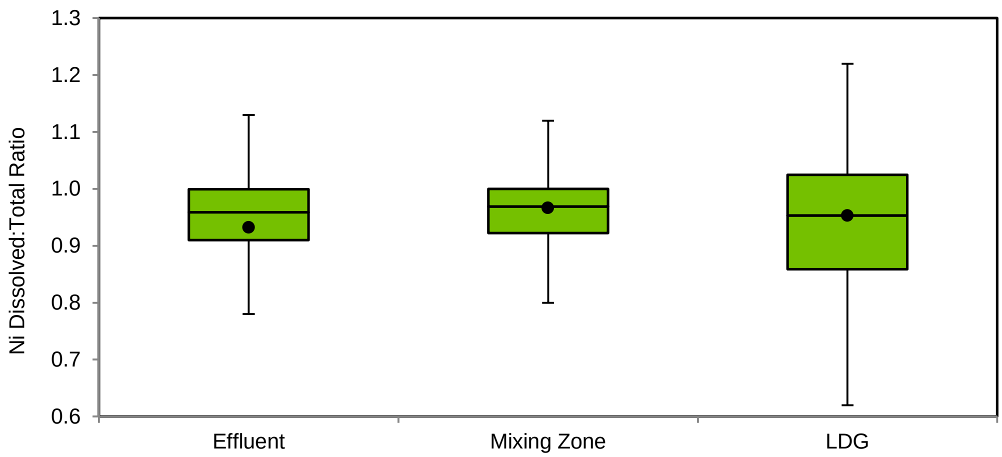

Figure 3-2 Dissolved-to-Total Ratios for Nickel in Discharged Effluent from Diavik, the Diavik Mixing Zone, and the Remainder of the Lac de Gras Sample Sites; Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean; outliers are not shown.

Similarly, there were no obvious differences in dissolved-to-total Fe ratios between the three types of exposure sites, although the Fe ratio at the LDG sites was slightly higher (Figure 3-3). For all three site types, the mean value was higher than the median, which indicated the presence of a considerable number of higher-value outliers in the set of data. This was also indicated by the longer boxplot 'whiskers', two of which extended beyond a ratio of 1.2 (Figure 3-3). As was observed for Ni, the lack of site-specific differences indicated that the dissolved-to-total ratio for Fe was not noticeably affected as the DDMI effluent mixed with LDG waters.

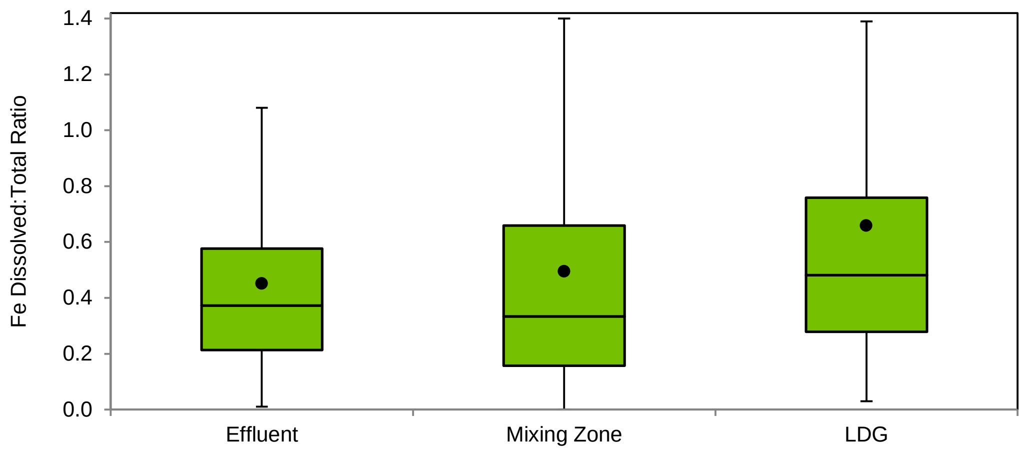

Figure 3-3 Dissolved: Total Ratio for Iron in Discharged Effluent from Diavik, the Diavik Mixing Zone, and the Remainder of the Lac de Gras Sample Sites; Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean; outliers are not shown.

The data indicated that there were no obvious site-specific differences in the dissolved-to-total ratios related to site proximity to discharged effluent. Further, the dissolved-to-total ratio data for metals indicated that, with a few exceptions, most metals were predominantly in the dissolved form within LDG.

3.2 Limnological Depth Profiles

3.2.1 Temperature

Lac de Gras is typically ice-covered from approximately late-October to late-June or early/mid-July (DDMI, unpublished). At the WQ-05/LDG41/MF3-4 sample site, under-ice surface-water temperature over the period of record was approximately 0 to -1°C (Figure 3-4). Between June and September, water temperatures gradually warmed from approximately 1°C to 9 or 10°C, and maximum mean summer surface-water temperature in LDG was estimated at approximately 10°C (Figure 3-4).

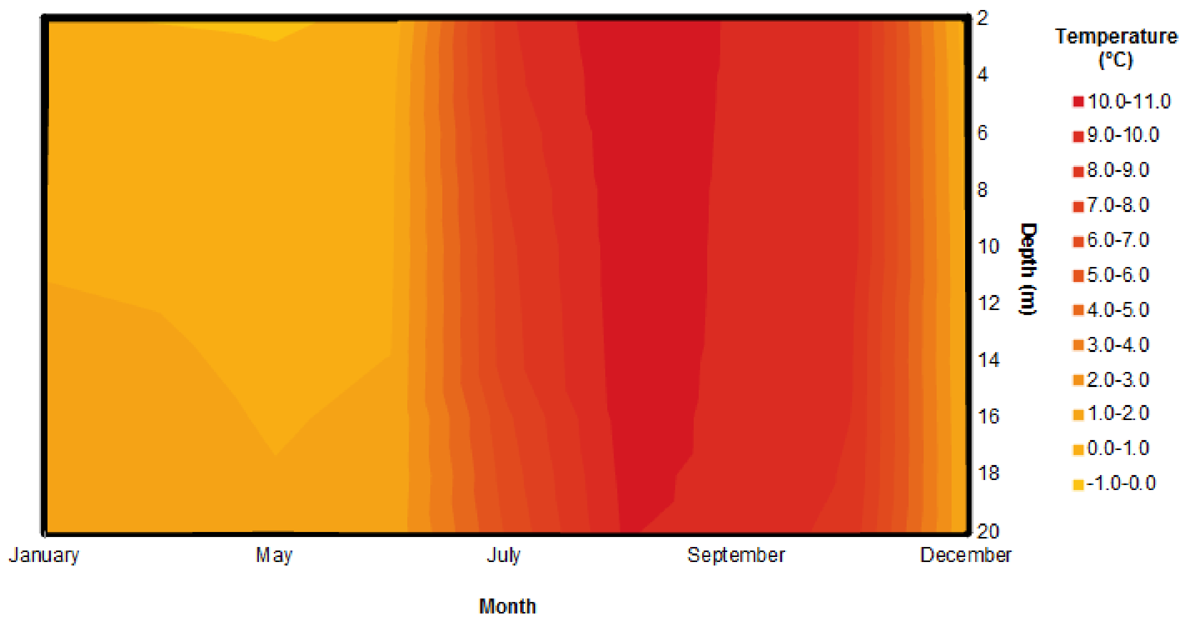

Figure 3-4 Mean Seasonal Temperature Depth Profile at Sample Site WQ-05/LDG41/MF3-4, Lac de Gras, NT

Examination of the available temperature data indicated that thermoclines did not persist above 20 m in LDG during the open-water season (Figure 3-4), and therefore the water column to a depth of 20 m was a relatively uniform temperature and presumably fully mixed; this is consistent with previous findings (i.e., Golder 2014). There was, however, a slight temperature inversion during the ice-covered season, whereby surface temperatures were 2 to 3°C cooler than at the 20 m depth (Figure 3-4). It is expected that the densest water (i.e., 4°C) would be found in the deepest areas of the lake (Wetzel 2001), which for LDG is estimated at approximately 56 m. Given the relatively warmer temperatures observed at the 20 m depth, the data suggest that the mass of water at 4°C does not extend upwards to the 20 m depth.

Given the geographic location and the mean temperature profiles, LDG is tentatively classified as a cold-water polymictic (continuous circulation) lake (Wetzel 2001), although there is some uncertainty regarding this designation because profile data were not gathered at the deepest area of LDG. The lake apparently mixes continuously at depth to 20 m, which is likely a result of the latitude, morphometry, orientation and shape. Given the lake's northern location, this designation is not unexpected, although it is unusual given the lake's average depth of 12 m and maximum depth of approximately 56 m (DDMI 1998).

The general lack of a summer thermocline over large areas of LDG has implications for hydrodynamics, biological productivity and nutrient dynamics within the lake. Water movement within the lake will

encompass the entire water column for the duration of the open-water season, which is in sharp contrast with the behaviour of stratified lakes, where the cold hypolimnion (the lowest lake stratum) is separated from warm surface layers by density gradients (Wetzel 2001). The fully-mixed condition of LDG will therefore affect concentrations of potential contaminants both temporally and spatially. The relatively warm summer-water temperatures of approximately 10°C at depth will also increase biological activity within the sediment, resulting in greater nutrient recycling than might otherwise be expected.
The fully-mixed lake will also result in the persistence of considerable amounts of oxygen at the sediment/water interface, which will have major impacts on the potential for phosphorus movement (Wetzel 2001) and for the associated lake productivity.

3.2.2 Dissolved Oxygen

Dissolved oxygen (DO) concentration at the WQ-05/LDG41/MF3-4 sample site in LDG did not exhibit marked depth gradients down to 20 m through the period of record (Figure 3-5). One exception included a portion of the ice-covered period (approximately April to May) when surface waters contained upwards of 16 to17 mg DO/L. Under-ice algal blooms are known to occur in some lakes during late winter when light levels are high and ice surfaces become wind swept, and this can result in an increase in oxygen concentrations under-ice (Mitchell and Prepas, 1990). Whether this occurs in LDG is unknown but may partially explain higher DO concentrations in the late winter. These DO concentrations may also be an artefact of winter sampling (i.e., artificial inflation of surface DO values due to ice-auger use). It is notable that the DO concentration remained at or above 9 to 11 mg/L throughout the water column for the duration of the ice-covered period of record (Figure 3-5).

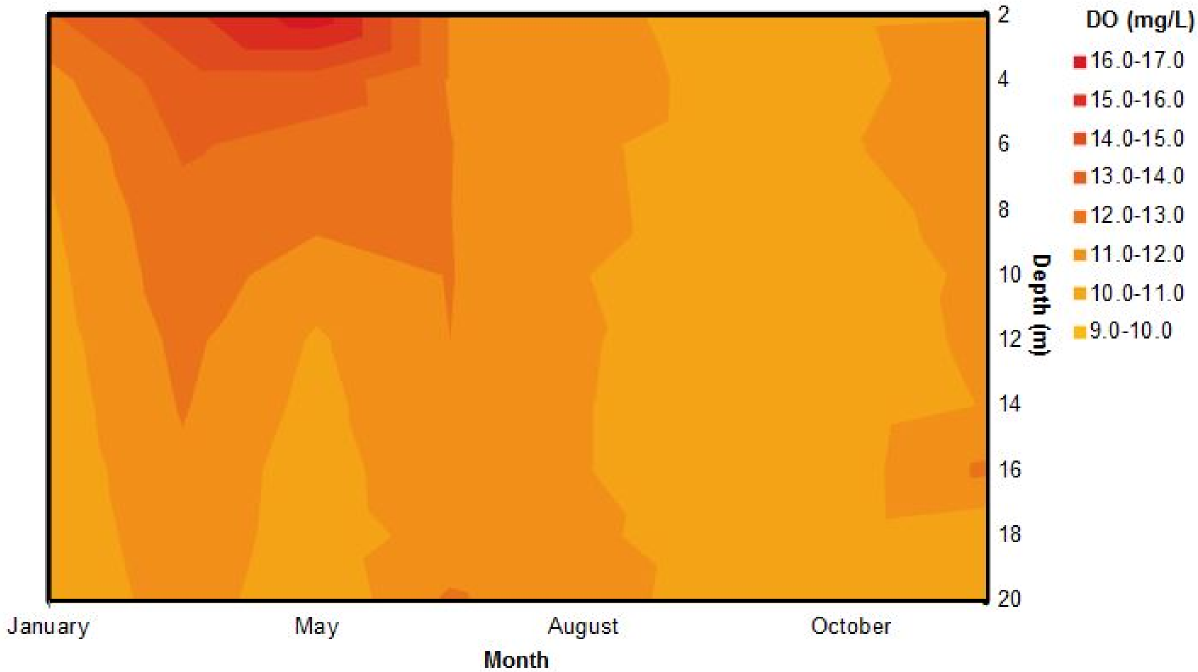

Figure 3-5 Mean Seasonal Dissolved Oxygen (DO) Depth Profile at Sample Site WQ-05/LDG41/MF3-4, Lac de Gras, NT

During the open-water season, DO was a uniform 11 to 12 mg/L throughout the water column down to a depth of 20 m. This was consistent with the tentative designation that LDG is a cold polymictic lake, with a fully-mixed water column (cf. Section 2.3.1). At a water temperature of approximately 10°C, DO saturation occurs at 11 mg/L (Wetzel 2001), which matched the mean water column DO concentration during the open-water season (Figure 3-5) and indicated that during the period of record the water column was at or near 100% saturation. Similar to water temperature, the presence of near-saturation levels of oxygen at depth will affect microbial activity within the surficial sediments, and will markedly influence phosphorus dynamics within large areas of LDG. It is expected that with a persistent surficial oxidized sediment layer, phosphorus will remain sequestered within the sediment and will not readily diffuse from the deeper sediment pore spaces into the overlying water column (Wetzel 2001).

3.2.3 pH

The pH in LDG did not exhibit marked depth-related gradients over the period of record (Figure 3-6). There were, however, seasonal differences in pH, with a winter minimum near 5.0 and a summer maximum of approximately 7.0 during the open-water season (Figure 3-6). The pH also appeared to fluctuate during the early spring to early summer season, though the differences were less than a full pH unit.

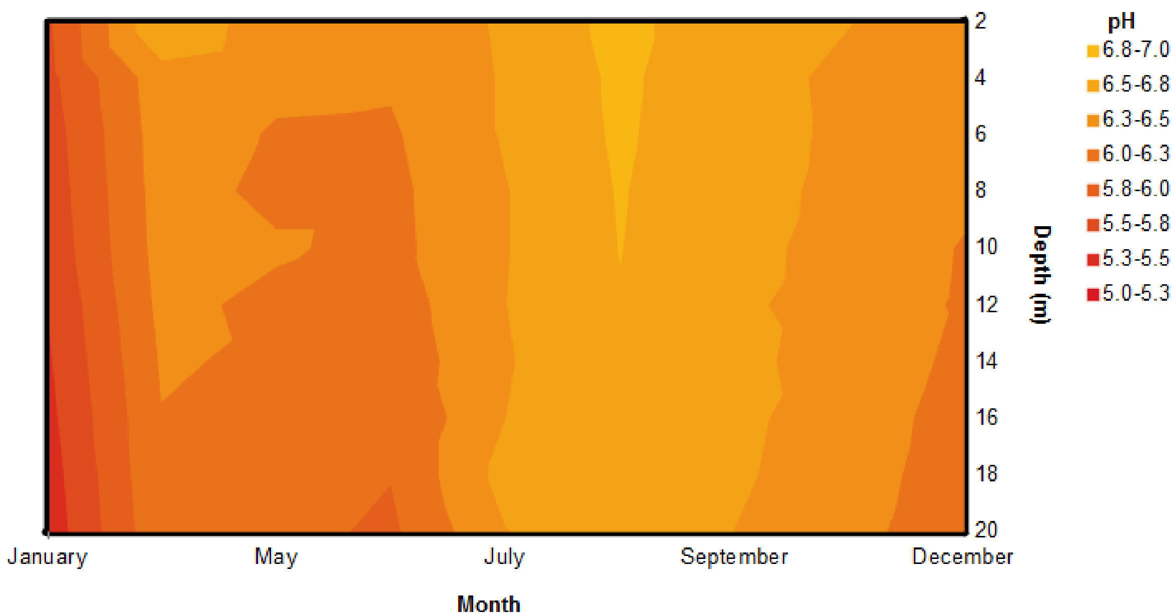

Figure 3-6 Mean Seasonal pH Depth Profile at Sample Site WQ-05/LDG41/MF3-4, Lac de Gras, NT

3.2.4 Conductivity

Conductivity in LDG did not exhibit marked depth-related gradients over the period of record (Figure 3-7). There were, however, seasonal differences in conductivity, with a winter minimum and a summer maximum during the open water season (Figure 3-7). The pattern of these seasonal fluctuations was similar to that found for pH, although with pH the summer maximum occurred earlier in the season. During late winter and just prior to the loss of ice cover, conductivity ranged from 6 to 8 µS/cm. This increased through spring and into the ice-free season until a maximum conductivity of 18 to 20 µS/cm occurred in September, shortly before freeze-up. The seasonal fluctuations therefore resulted in a two- to three-fold difference in conductivity through the year. Considering that conductivity is proportional to the concentration of major ions in solution (Wetzel 2001), these seasonal fluctuations suggested that seasonal alterations in major ions have consistently occurred in LDG through the period of record. Understanding the factors responsible for these fluctuations, however, was beyond the scope of this report.

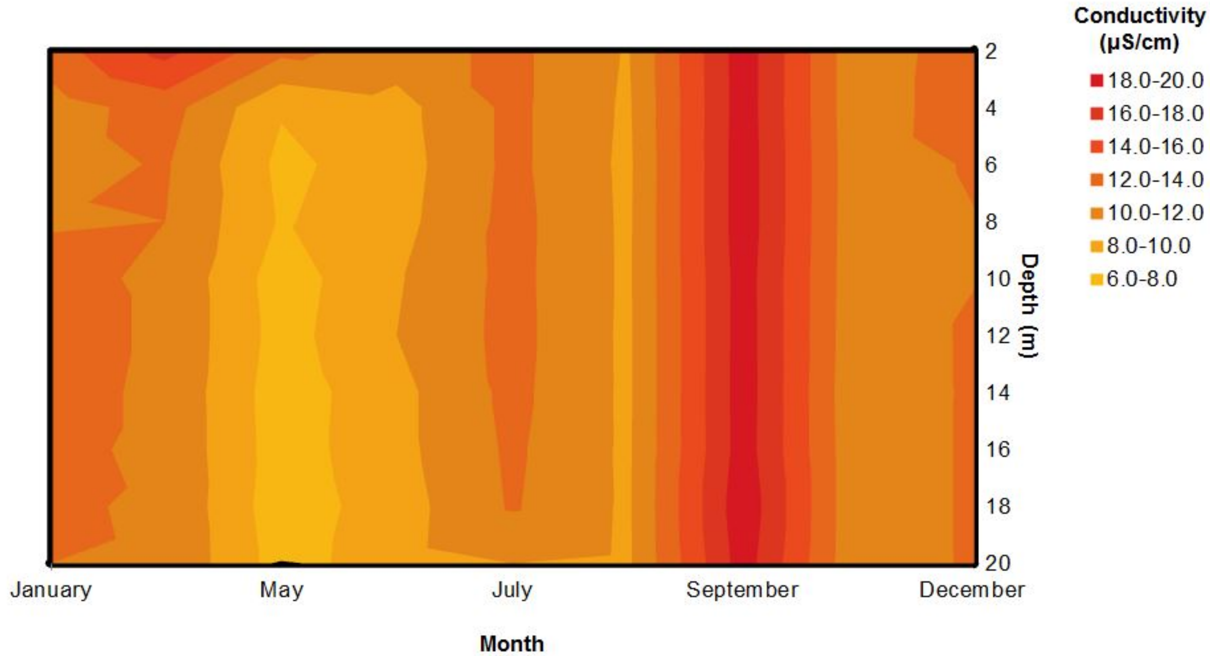

Figure 3-7 Mean Seasonal Conductivity Depth Profile at Sample Site WQ-05/LDG41/MF3-4, Lac de Gras, NT

3.3 Water-Chemistry Data

3.3.1 Baseline Water Chemistry (1994 to 2000)

Incorporating all data collected in LDG from approximately 1994 to 2000 (see Table 2-2 for a list of included sample sites), LDG contains waters that are clear (median total suspended solids and turbidity were < 0.2 mg/L and 0.3 NTU, respectively), acidic to circumneutral (pH ranged from 5.7 to 6.7), very soft (total hardness was ≤ 5.7 mg/L as $CaCO_3$), dilute with low specific conductivity (≤ 23.6 µS/cm), and oligotrophic to ultra-oligotrophic (total phosphorus ≤ 0.010 mg/L and total nitrogen ≤ 0.254 mg/L; see Figure 3-8 and Figure 3-9, and Table C2b in Appendix C).

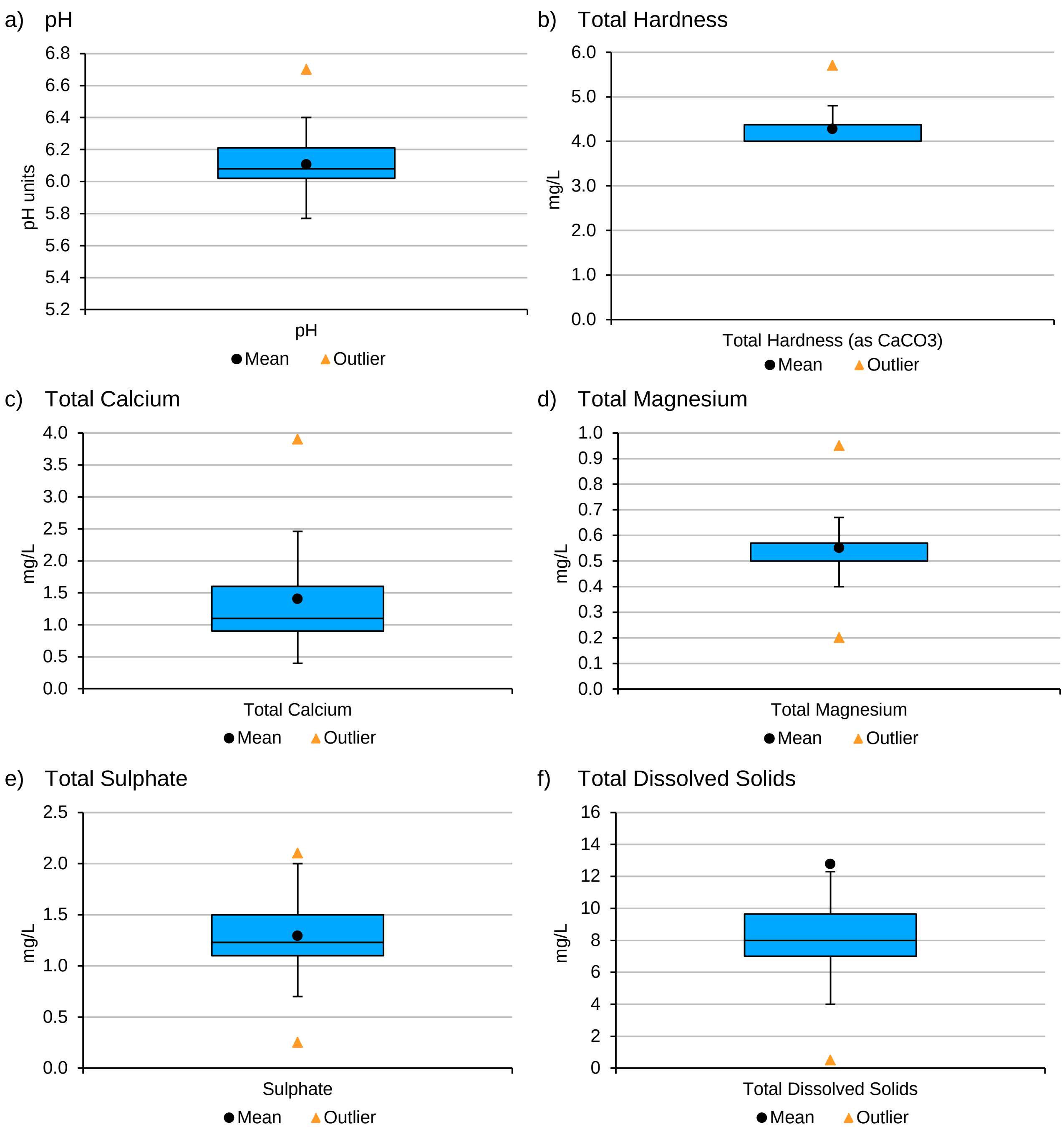

Figure 3-8 Boxplots for pH, Total Hardness, Total Calcium, Total Magnesium, Total Sulphate, and Total Dissolved Solids during the Baseline Study Period, 1994–2000; Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

pH

The mean and median pH for LDG during the baseline period of record was 6.1, which indicated the pH data were not skewed, and that there were no large fluctuations or outliers through the data-collection period (Figure 3-8 and Table C2b in Appendix C). This finding was also consistent with the mean seasonal pH depth profile, as discussed in Section 3.2.3. Baseline pH was defined by a low value of 5.8 and a high value of 6.4. The water in LDG was therefore considered slightly acidic (pH < 6.5) to borderline circumneutral (pH 6.5 to 7.5).

TOTAL HARDNESS AND ALKALINITY

Mean and median total hardness values were 4.3 and 4.0 mg/L, respectively, which indicate that the data are slightly skewed upwards, although there are no large outliers in the dataset. Over the period of record, total hardness values ranged from 4.0 to 5.7 mg/L (Figure 3-8 and Table C2b in Appendix C). Baseline hardness was defined by a low value of 4.0 and a high value of 4.8 mg/L.

The dominant cation was calcium (Ca) with a mean and median total Ca concentration of 1.4 and 1.1 mg/L, respectively. Total Ca concentrations ranged from 0.4 to 3.9 mg/L, and "baseline" was defined as occurring between 0.4 and 2.5 mg/L. The mean and median total magnesium concentration during the period of record was 0.55 and 0.50 mg/L. Magnesium concentrations ranged from 0.20 to 0.95 mg/L, and for the period of record "baseline" was defined as occurring between 0.40 to 0.67 mg/L (Figure 3-8 and Table C2b in Appendix C).

Total alkalinity values ranged from less than detection (< 5 mg/L) to 8.3 mg/L (as $CaCO_3$). The mean and median values were 5.9 mg/L which indicates that the data are not skewed and that there were no large outliers in the data. The "baseline condition" for total alkalinity was defined by a low value of 4.5 mg/L and a high value of 8.2 mg/L (Figure 3-9 and Table C2b in Appendix C). The alkalinity data indicated that LDG has very high sensitivity to acid deposition (i.e., a low buffering capacity).

The dominant anion could not be defined because baseline data were not collected for bicarbonate, carbonate, or hydroxide; however, data for sulphate, fluoride, and chloride were collected. Much of the baseline condition for fluoride and chloride was undefined because 94% (n = 81) and 73% (n = 114) of the datasets, respectively, were reported as less than detection (Table C2b in Appendix C). The maximum reported value for fluoride during the baseline period was 0.08 mg/L, while the maximum value for chloride was reported at 1.4 mg/L.

SULPHATE

Mean and median sulphate concentrations were 1.3 and 1.2 mg/L over the baseline period, which indicates that the data are not skewed and that there were few outliers in the data. The sulphate concentration ranged from < 0.5 to 2.1 mg/L (Figure 3-8 and Table C2b in Appendix C). Baseline sulphate over the period of record was defined by a low concentration of 0.7 mg/L and a high concentration of 2.0 mg/L.

TOTAL DISSOLVED SOLIDS

Baseline data for TDS ranged from less than detection (< 1.0 mg/L) to 130 mg/L. Mean TDS was larger than the median (13 mg/L vs. 8 mg/L); this was related to one outlier (the maximum) at 130 mg/L. Baseline TDS was defined by a low value of 4 mg/L and a high value of 12 mg/L (Figure 3-8 and Table C2b in Appendix C).

TROPHIC STATUS

Baseline nutrient levels in LDG were generally low and were frequently below detection. Data were not collected for total nitrogen (TN) as part of the baseline-monitoring program; however, data were available for total Kjeldahl nitrogen (TKN), nitrate (as N) and nitrite (as N), or nitrate+nitrite (as N), and TN could be calculated by summing those parameters where data for all three species were reported (n = 33). Using this calculated TN, the mean and median TN concentrations during the baseline period were found to be 0.089 and 0.070 mg/L, respectively, with a total range from 0.027 to 0.254 mg/L. The "baseline" condition for TN was defined by a low boundary of 0.027 mg/L and a high boundary of 0.222 mg/L (Figure 3-9 and Table C2b in Appendix C).

Baseline condition for total ammonia was largely undefined because 88% of the dataset (n = 105) was reported as being below detection; the maximum value for total ammonia was reported at 0.07 mg/L (Table C2b in Appendix C).

Mean and median values for total phosphorous (TP) over the baseline period of record were 0.005 and 0.003 mg/L, respectively, with 39% (n = 111) of data reported as < DL. These values indicated that the data were skewed upwards; "baseline" TP was undefined at the low end (i.e., was below detection; < 0.001 mg/L) while the high value was 0.010 mg/L (Figure 3-9 and Table C2b in Appendix C). The data are highly variable, with the coefficient of variation estimated at 170% (Table C2b in Appendix C). Minimal data for total phosphate were received (n = 12) and data ranged from below detection (< 0.001 mg/L) to 0.006 mg/L. Results for dissolved phosphorus, phosphate, and orthophosphate were below detection for 100% of the baseline dataset.

Baseline TN and TP values indicated that LDG could be classified during the baseline data collection period as being ultra-oligotrophic to oligotrophic (Vollenweider 1968, Carlson and Simpson 1996). This estimate of trophic status was further verified with Secchi depth results provided by Diavik and Ekati (data not shown). The definition of LDG at baseline as an extremely low productivity lake is consistent with previous findings (e.g., DDMI 1998).

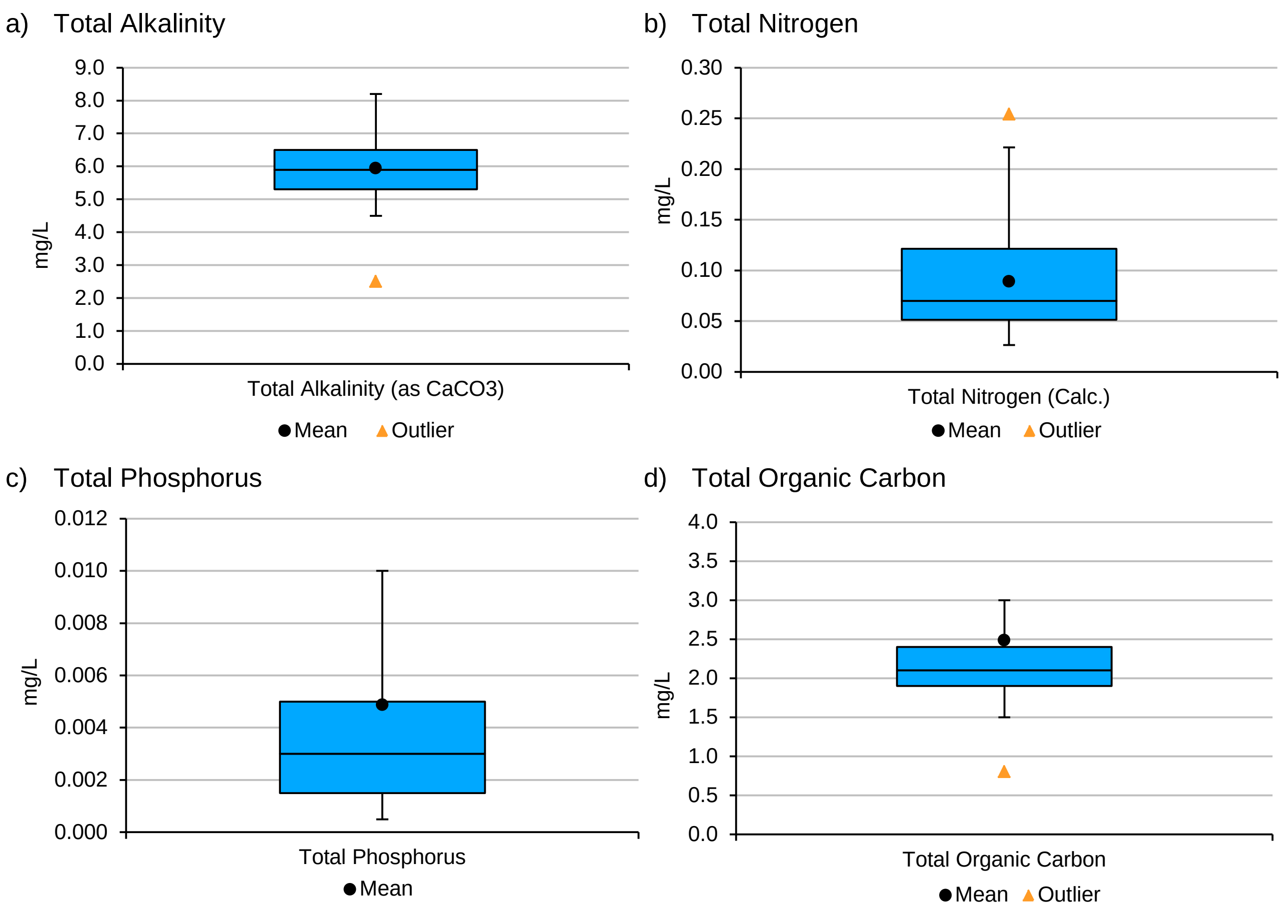

Figure 3-9 Boxplots for Total Alkalinity, Total Nitrogen, Total Phosphorus, and Total Organic Carbon during the Baseline Study Period, 1994–2000; Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

ORGANIC CARBON

Mean and median values for total organic carbon (TOC) were 2.5 and 2.1 mg/L, respectively (Figure 3-9 and Table C2b in Appendix C), which indicated the data are skewed upwards. The TOC in LDG ranged from a minimum value of 0.8 to a maximum value of 10.4 mg/L, both of which were considered outliers within the period of record. The "baseline condition" for TOC within the period of record was defined as occurring between 1.5 and 3.0 mg/L. Data for dissolved organic carbon (DOC) from the baseline period of record were not received, however DOC values in oligotrophic lakes tend to be less than 3.0 mg/L (Thurman 1985).

METALS

During the baseline period of record, data (total and dissolved) were collected for 32 metals with 'n' ranging from nine to 114. Of these, 21 of the total metals had datasets with greater than 30% non-detect data; this number increased to 23 metals when examining the dissolved metal datasets (Table C2b in Appendix C). In examining metals identified as of 'potential concern' that had acceptable datasets (i.e., aluminum, arsenic, iron, molybdenum, nickel, strontium and uranium; see Section 3.1), the "baseline" condition for several of these was largely undefined due to the prevalence of non-detect data. This included total arsenic (67% < DL with a maximum value of 0.00027 mg/L), total molybdenum (78% < DL with a maximum value of 0.007 mg/L), and total uranium (97% < DL with a maximum defined value of 0.0019 mg/L) (Table C2b in Appendix C).

TOTAL ALUMINUM

Given the previously discussed issues with many of the metals data (see Section 3.1), total Al was examined in the baseline condition as it was an acceptable dataset and is typically found in the particulate form, making it useful for examining potential variation in concentrations over time (i.e., post-baseline; see Section 3.3.2). Only 13% of the baseline total aluminum (Al) data were < DL. Mean and median Al were 0.035 mg/L and 0.023 mg/L, respectively. The data were skewed upwards as the lower values were reported as < DL with a maximum value (outlier) at 0.660 mg/L. Baseline condition for total Al was undefined at the lower boundary (< 0.015 mg/L) and defined as 0.080 mg/L at the upper boundary (Figure 3-10 and Table C2b in Appendix C).

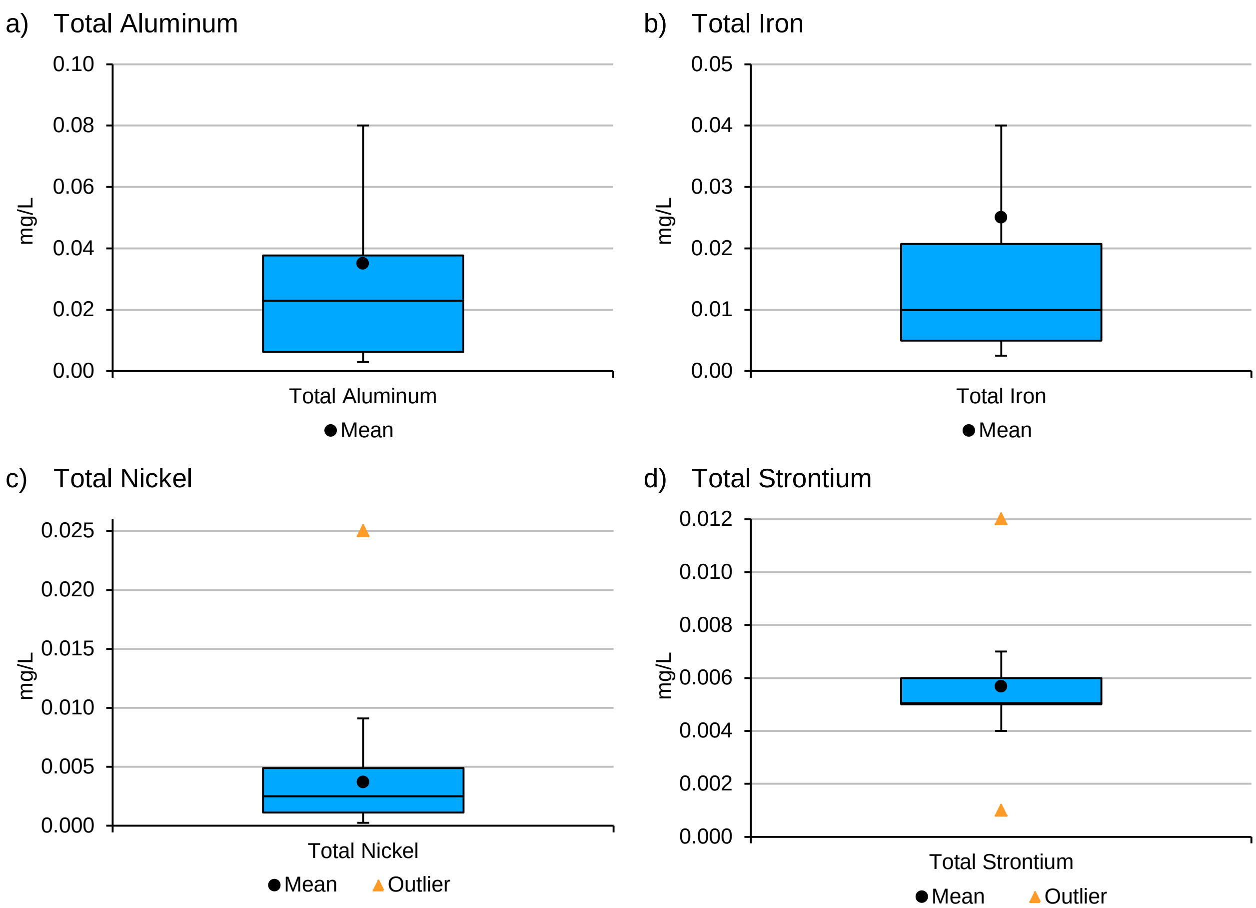

Figure 3-10 Boxplots for Total Aluminum, Total Iron, Total Nickel, and Total Strontium during the Baseline Study Period, 1994–2000; Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

TOTAL IRON

Similar to total Al, total iron (Fe) was examined in the baseline condition as it was an acceptable dataset and is typically found in the particulate form, making it useful for examining potential variation in concentrations over time (i.e., post-baseline; see Section 3.3.2). Approximately 31% of the baseline total Fe data were < DL, which reduced the precision and accuracy of the summary statistics; however, results reported as < DL were common for many of the metals in the baseline dataset. Mean and median Fe were 0.025 mg/L and 0.010 mg/L, respectively. The data were skewed upwards as the lower values were reported as < DL, with a maximum value (an outlier) measured at 0.410 mg/L. The "baseline condition" for total Fe was undefined at the lower boundary (< 0.005 mg/L) and defined as 0.040 mg/L at the upper boundary (Figure 3-10 and Table C2b in Appendix C).

Total Nickel

Given the issues with many of the metals data (see Section 3.1), total Ni was examined in the baseline condition because, once again, it was an acceptable dataset and it is typically found as the dissolved ion, making it useful for examining potential variation in concentrations over time (i.e., post-baseline; see Section 3.3.2). Approximately 43% of the data were < DL (Table C2b in Appendix C). This reduced the precision and accuracy of the summary statistics, but analyses < DL were common for many of the metals. Mean and median for Ni were 0.0037 mg/L and 0.0025 mg/L, respectively. The data were skewed upwards: the lower values were reported as < DL (< 0.0005 mg/L), while there were several outliers in the data set that ranged up to 0.025 mg/L. Baseline during the period of record was undefined at the lower boundary, and defined as 0.0091 mg/L at the upper boundary (Figure 3-10 and Table C2b in Appendix C).

Total Strontium

Total strontium (Sr) was examined in the baseline data set for the same reasons noted above (i.e., it was an acceptable dataset (see Section 3.1), was listed as a parameter of potential concern, and it is typically found as the dissolved ion, making it useful for examining potential variation in concentrations over time (i.e., post-baseline; see Section 3.3.2). None of the data were < DL (Table C1-C13 in Appendix C). Mean and median for Sr were 0.006 mg/L and 0.005 mg/L, respectively, implying little variation in Sr values over the baseline data record. The maximum value was reported at 0.012 mg/L. "Baseline" during the period of record was defined as 0.004 mg/L at the lower boundary and 0.007 mg/L at the upper boundary (Figure 3-10 and Table C2b in Appendix C).

3.3.2 Spatial Variability in Post-Baseline (2001 to 2013) Water Chemistry

Water-chemistry data were summarized for groups of sites for the period 2001 onwards for the purpose of examining post-baseline spatial differences within LDG. Compilation of site groups through the period of record, and disregarding depth or seasonal variation, necessarily decreased the precision of the summary statistics. However, it was considered that the decreased precision did not materially affect the conclusions of the analyses presented below. The entire range of post-baseline variability is assessed for each group and this broader definition provides increased confidence in any observed spatial trends compared to the examination of seasonal variability with a reduced set of data.

Total Hardness

Mean and median concentrations for hardness in DDMI effluent during the period of record were 117 and 118 mg/L, respectively (Figure 3-11 and Table C3 in Appendix C). The mean and median concentrations in the Diavik mixing zone sites over the period of record were 9.4 and 8.5 mg/L, respectively (Figure 3-11 and Table C4 in Appendix C), which indicated a rapid dilution within the designated mixing zone. Mean and median concentrations of hardness at the Near-Field (NF) site group were 7.8 and 7.3 mg/L, respectively. Mean and median concentrations at Mid-Field (MF) and Far-Field (FF) site groups over the period of record ranged from 5.3 to 7.1 mg/L, and were slightly less at the FF sites than the NF and MF sites (Table C5 to Table C13 in Appendix C).

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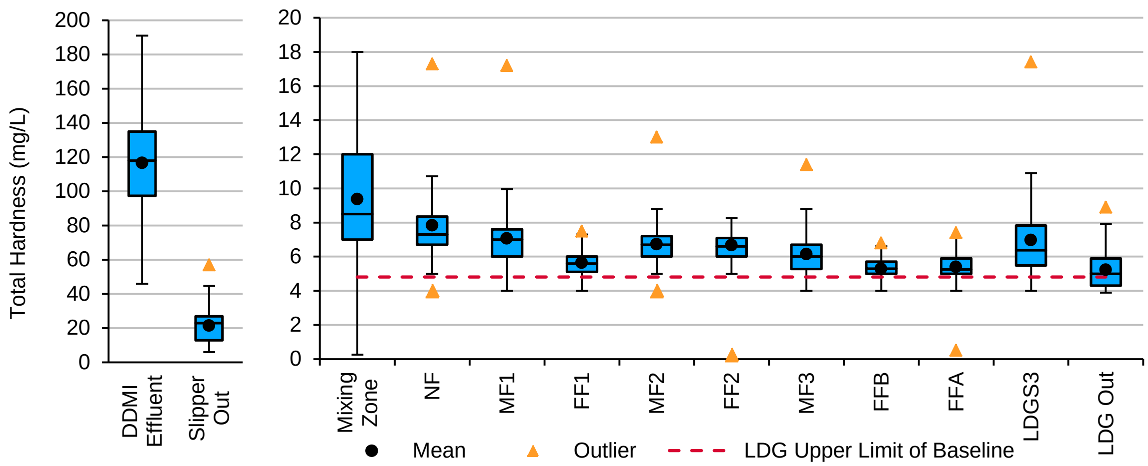


Figure 3-11 Boxplots for Total Hardness across all Sample Groups, Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown. The red dotted line represents the defined upper boundary of baseline.

Mean hardness at the LDS outlet was 5.8 mg/L (n = 5) and was lower than values observed downstream at FF2 (Table C16 in Appendix C). At FF2, which is potentially influenced by inputs from both the Diavik effluent in LDG and Ekati's Misery discharge to LDS, mean and median hardness was 6.7 and 6.6 mg/L, respectively, and were comparable to MF sites, but were only slightly elevated in comparison to hardness further 'downstream' at FF1, FFA and FFB (Figure 3-11). There was therefore no indication of a spatial overlap of plumes at FF2, defined by an increase in hardness at FF2 compared to sites affected by only one plume. Total hardness values at FF2 appear to be largely influenced by concentrations at the mixing zone and NF sites.

Mean and median hardness concentrations at the Slipper Lake outlet were 21.5 and 22.9 mg/L, respectively (Figure 3-11 and Table C14 in Appendix C); less than that in the DDMI effluent, but greater than MF or FF sites in LDG. Further downstream of the Slipper Lake outlet, mean and median hardness at LDGS3 were 7.0 and 6.4 mg/L (Figure 3-11 and Table C15 in Appendix C), respectively, which was comparable to other NF sites and indicated rapid dilution of the Ekati discharge.

Mean and median concentrations at the LDG Outlet were 5.2 and 5.0 mg/L, respectively, and were similar to those at the FFA and FFB sample sites (Figure 3-11 and Table C17 in Appendix C). These sites had the lowest hardness levels recorded in LDG. There was no indication of an increase in hardness at the LDG Outlet, compared to sites affected by only one plume, and no indication of a spatial overlap of plumes at the LDG Outlet, potentially related to the proximal mixing of water from the Slipper Lake Outlet with water from 'upstream' in the greater portion of LDG.

However, at all site groups, including the 'downstream' FF site groups (FF1, FFA, FFB) and the LDG outlet, hardness was greater than that defined as the upper boundary of baseline (c.f. Section 3.3.1; defined as 4.8 mg/L as $CaCO_3$). The data therefore indicate that there has been an overall observable increase in hardness that has extended throughout LDG (Figure 3-11 and Table C3 to Table C17 in Appendix C).

Despite the observed increases in hardness, LDG is still classified as a soft-water lake and, as such, is still particularly sensitive to increases in concentrations of those metals with hardness-related toxicity (i.e., Cd, Cu, Pb, Ni; more toxic at low hardness).

SULPHATE

Mean and median concentrations for sulphate in the DDMI effluent during the period of record were 52.7 and 40.5 mg/L, respectively (Figure 3-12 and Table C3 in Appendix C), which indicated the data were skewed upwards with several outliers in the data, ranging up to 133 mg/L. The mean and median concentrations in the DDMI mixing zone sites over the period of record were 3.2 and 3.0 mg/L, respectively (Figure 3-12 and Table C4 in Appendix C), which indicated a rapid dilution within the designated mixing zone. Mean and median concentrations of sulphate at the NF site group were 2.9 and 2.7 mg/L, respectively (Figure 3-12 and Table C5 in Appendix C). Mean and median concentrations at MF and FF site groups over the period of record ranged from 2.0 to 2.5 mg/L, and were relatively similar between MF and FF groups with the exception of MF1 which was slightly elevated (Figure 3-12 and Table C6 to Table C13 in Appendix C). Sulphate values at MF and FF site groups were lower than those observed at NF sites.

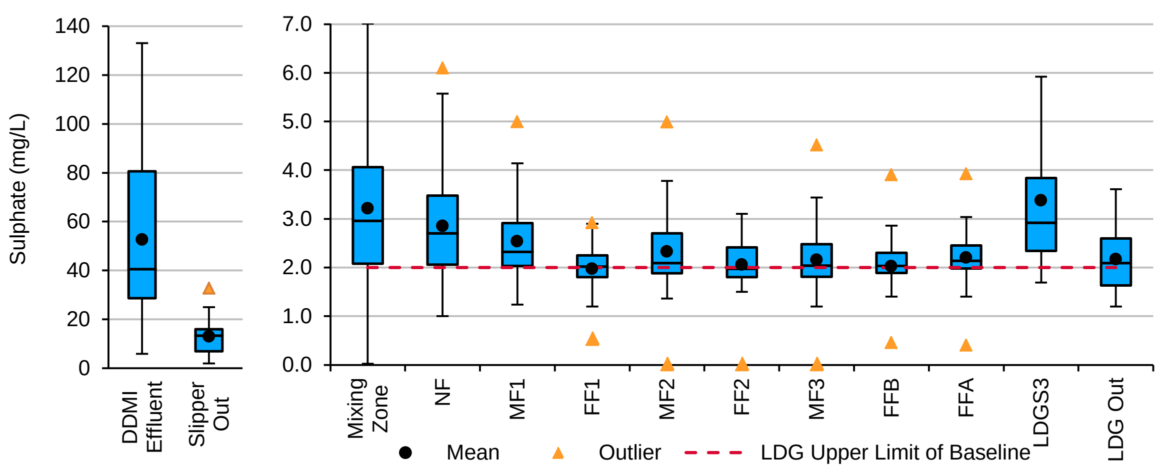


Figure 3-12 Boxplots for Total Sulphate across all Sample Groups, Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown. The red dotted line represents the defined upper boundary of baseline.

Mean sulphate concentration at the LDS Outlet was 1.5 mg/L and was lower than values observed downstream at FF2 (Table C16 in Appendix C). Mean and median sulphate at FF2, potentially influenced by inputs from both Diavik effluent discharge and Ekati's Misery discharge from LDS, was 2.1 and 2.0 mg/L, respectively, and were comparable to MF and FF sites downstream within LDG (Figure 3-12). There was, therefore, no observable increase in sulphate, or a spatial overlap of plumes, at FF2 in comparison with values at sites further 'downstream' and affected by only one plume. Sulphate values at FF2 appear to be largely influenced by concentrations at the mixing zone and NF sites.

Mean and median sulphate concentrations at the Slipper Lake Outlet were 13.1 and 13.4 mg/L, respectively (Table C14 in Appendix C), which was less than that in the DDMI effluent but greater than mixing zone, NF, MF or FF sites in LDG. Further downstream of the Slipper Lake outlet, mean and median sulphate at LDGS3 were 3.4 and 2.9 mg/L, respectively (Table C15 in Appendix C), which was slightly elevated in comparison to other NF and MF sites, but still indicated rapid dilution of the Ekati discharge from Slipper Lake.

Mean and median sulphate concentrations at the LDG Outlet were 2.2 and 2.1 mg/L, and were similar to those in the FFA and FFB sample areas (Figure 3-12 and Table C17 in Appendix C). There was therefore no indication of an increase in sulphate at the LDG Outlet, or a spatial overlap of plumes, potentially related to the proximal mixing of water from the Slipper Lake Outlet with water from 'upstream' in the greater portion of LDG.

However, at all site groups, even at the FF site groups and the LDG outlet, the sulphate concentrations were greater than that defined during the baseline period of data collection (cf. Section 3.3.1), which was calculated between 0.70 and 2.0 mg/L. The data therefore indicate that there has been an overall observable increase in sulphate concentration that has extended throughout LDG.

TOTAL DISSOLVED SOLIDS

Mean and median concentrations for TDS in the DDMI effluent during the period of record were 281 and 289 mg/L, respectively (Figure 3-13 and Table C3 in Appendix C). In contrast, the mean and median concentrations in the mixing zone sites over the period of record were 19 and 18 mg/L, respectively (Table C4 in Appendix C), which was more than ten-fold less than in the DDMI effluent, and indicated a rapid dilution within the designated mixing zone. Mean and median TDS concentrations at the NF site group were 21 and 19 mg/L, respectively, and these decreased slightly in the MF and FF site groups, with mean and median values ranging from 14 to 19 mg/L at MF site groups, and 12 to 17 mg/L at FF site groups (Figure 3-13 and Table C5 to Table C13 in Appendix C). The latter values were comparable to the upper limit of baseline for TDS (cf. Section 3.3.1), which was defined as 12 mg/L (Figure 3-13).

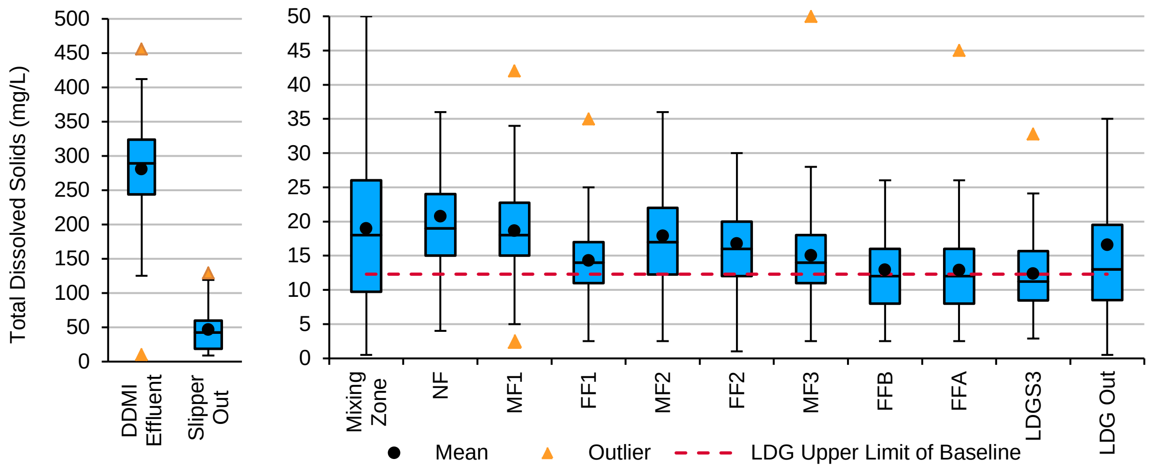


Figure 3-13 Boxplots for Total Dissolved Solids across all Sample Groups, Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown. The red dotted line represents the defined upper boundary of baseline.

Mean TDS concentration at the LDS outlet was 9.0 mg/L and was lower than values observed downstream at FF2 (Table C16 in Appendix C). Mean and median TDS at FF2, potentially influenced by inputs from both the DDMI effluent discharge and Ekati's Misery discharge from LDS, was 17 and 16 mg/L, respectively, and were comparable to MF sites but slightly elevated in comparison to TDS further downstream at FF1, FFB and FFA (Figure 3-13). There was therefore no indication of an increase in TDS at FF2, or a spatial overlap of plumes for TDS, potentially related to the input of discharge waters from both the DDMI effluent and LDS. The TDS values at FF2 appear to be largely influenced by concentrations at the mixing zone and NF sites.

Mean and median TDS at the Slipper Lake Outlet was 47 and 43 mg/L, respectively (Figure 3-13 and Table C14 in Appendix C). This was less than that in the DDMI effluent but greater than mixing zone, NF, MF or FF sites in LDG. Further downstream of the Slipper Lake Outlet, mean and median TDS at LDGS3 were 12 and 11 mg/L (Figure 3-13 and Table C15 in Appendix C), respectively, which was comparable to FF sites and indicated rapid dilution of the Ekati discharge from Slipper Lake.

Mean and median concentrations at the LDG outlet were 17 and 13 mg/L, respectively, which indicated the data were skewed upwards with several outliers in the data (Table C17 in Appendix C). The LDG outlet TDS concentrations were comparable to those at the FF1, FFB, FFA, and LDGS3 site groups (Figure 3-13). There was, therefore, no indication of an increase in TDS at the LDG outlet, or a spatial overlap of plumes, potentially related to the proximal mixing of water from the Slipper Lake Outlet with water from 'upstream' in the greater portion of LDG.

The upper level of baseline for TDS was defined as occurring at 12 mg/L. Median TDS concentrations from all site groups were near or greater than the upper limit of baseline. The data therefore indicate that there has been an overall observable increase in TDS that has extended throughout LDG.

TROPHIC STATUS

To examine spatial variation in nutrients in LDG, DCS focused on total ammonia, total nitrogen, and total phosphorus. Data for phosphate were largely not collected in LDG (i.e., total and dissolved phosphate) or were frequently below detection (i.e., orthophosphate ranged from 38% < DL in the effluent up to 95% < DL in all other LDG site groups).

TOTAL AMMONIA

Mean and median concentrations for ammonia in the DDMI effluent during the period of record were 0.453 and 0.300 mg/L, respectively (Figure 3-14 and Table C3 in Appendix C), which indicated the data were skewed upwards. The mean and median concentrations in the mixing-zone sites over the period of record were 0.049 and 0.026 mg/L, which also indicated the data were skewed upwards (Figure 3-14 and Table C4 in Appendix C). The concentration of ammonia in the mixing zone was approximately ten-fold less than in the DDMI effluent, and as seen for all the parameters noted above, indicated a rapid dilution within the designated mixing zone. Mean and median concentrations of ammonia at NF sites were 0.024 and 0.015 mg/L, respectively, again indicating the presence of occasional high values within the period of record (Figure 3-14 and Table C5 in Appendix C). Mean and median concentrations of ammonia at MF and FF sites over the period of record ranged from 0.009 to 0.020 mg/L, and were somewhat lower at FF site groups than NF and MF site groups (Figure 3-14 and Table C6 to Table C13 in Appendix C).

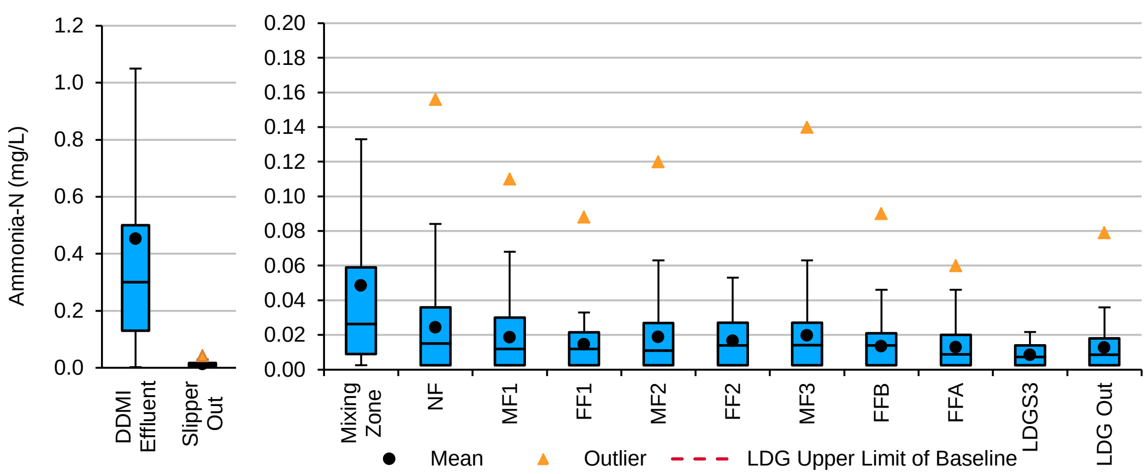


Figure 3-14 Boxplots for Total Ammonia across all Sample Groups; Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

Mean ammonia concentration at the LDS outlet was 0.029 mg/L and was higher than values observed downstream at FF2 (Table C16 in Appendix C). Mean and median ammonia concentration at FF2, potentially influenced by inputs from both the DDMI effluent discharge and Ekati's Misery discharge from LDS, was 0.016 and 0.014 mg/L, respectively, and were comparable to MF and FF sites. There was therefore no indication of an increase in ammonia at FF2, or evidence of a spatial overlap of plumes for ammonia, potentially related to the input of DDMI effluent and Ekati's Misery discharge waters from LDS.

Mean and median total ammonia concentrations at the Slipper Lake outlet were 0.012 mg/L (Figure 3-14 and Table C14 in Appendix C), and were similar to concentrations throughout LDG. Further downstream of the Slipper Lake Outlet, mean and median ammonia at LDGS3 was 0.009 and 0.007 mg/L, respectively, and were slightly lower than the MF and FF sites (Figure 3-14 and Table C15 in Appendix C).

Mean and median concentrations at the LDG Outlet were 0.013 and 0.009 mg/L, respectively, and indicated the data were comparable to those observed throughout the lake (Figure 3-14 and Table C17 in Appendix C).

The baseline condition for total ammonia was undefined, because 88% of the data were reported below detection (cf. Section 3.3.1). However, ammonia is no longer predominantly below detection as < DL data comprised only 3% of the effluent dataset, 17% of the mixing zone dataset, between 29% (NF and FF2 site group) to 46% (FFA site group) for the other LDG site groups, 24% for the Slipper Lake Outlet, and 40% for the LDGS3 dataset (Table C3 to Table C17 in Appendix C). While there has been an improvement in detection limits since the baseline period (i.e. most common detection limit between 1994 and 2000 was 0.01 mg/L compared to 0.005 mg/L in the post-baseline dataset), the mean and median ammonia values for most site groups in LDG are greater than the baseline detection limit of 0.01 mg/L. This suggests that there has been an overall increase in ammonia that has extended throughout LDG, and/or detection limits have improved.

TOTAL NITROGEN

Mean and median concentrations for TN in the DDMI effluent during the period of record were 5.11 and 3.85 mg/L, respectively (Figure 3-15 and Table C3 in Appendix C), which again indicated that the data were skewed upwards. The mean and median concentrations in the mixing zone sites over the period of record were 0.90 and 0.28 mg/L, which also indicated the data were skewed upwards (Figure 3-15 and Table C4 in Appendix C). However, the mean and median concentrations of TN in the mixing zone were nearly six to 14-fold less than in the DDMI effluent, again indicating a rapid dilution within the designated mixing zone. Mean and median concentrations of TN at NF sites were 4.40 and 0.25 mg/L, respectively, and again indicated the presence of some extremely high values within the period of record (NF site data ranged from 0.02 to 1,340 mg/L, primarily attributed to one high TKN value during September 2011) (Figure 3-15 and Table C5 in Appendix C). Mean concentrations of TN at MF and FF sites over the period of record ranged from 0.19 to 10.29 mg/L, while median concentrations ranged from 0.18 to 0.22 mg/L, and again indicated the presence of occasional high values throughout all LDG site groups (Figure 3-15 and Table C6 to Table C13 in Appendix C). There was a slight decrease in median TN values from NF to MF and FF site groups throughout LDG.

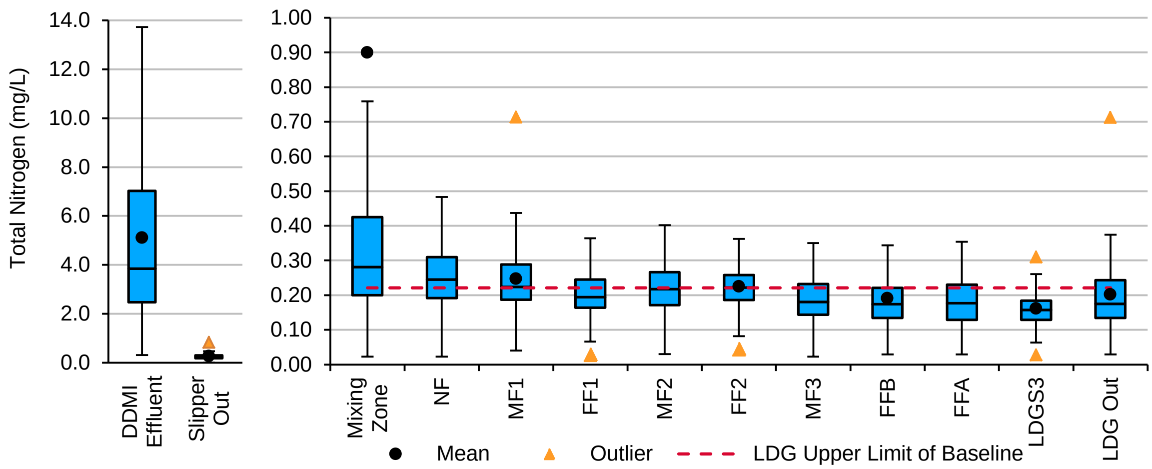


Figure 3-15 Boxplots for Total Nitrogen across all Sample Groups; Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all means and outliers are shown. The red dotted line represents the defined upper boundary of baseline.

Mean TN at the LDS outlet was 0.28 mg/L (Table C16 in Appendix C). Mean and median TN at FF2, potentially influenced by inputs from both the DDMI effluent discharge and Ekati's Misery discharge from LDS, was 0.23 and 0.22 mg/L, respectively, and were comparable to other sites within LDG (Figure 3-15 and Table C11 in Appendix C). There was no indication of an increase in TN at FF2, or a spatial overlap of plumes, potentially related to the input of discharge waters from both the DDMI effluent and LDS.

Mean and median TN at the Slipper Lake Outlet was 0.27 and 0.23 mg/L, respectively (Figure 3-13 and Table C14 in Appendix C) which indicated the Slipper Lake TN data were not skewed and there were few outliers. These values were much less than that in the DDMI effluent and comparable to values observed at mixing zone and NF sites in LDG. Further downstream of the Slipper Lake Outlet, mean and median TN at LDGS3 were 0.16 mg/L (Figure 3-13 and Table C15 in Appendix C), which was comparable to, and slightly lower than, FF sites and indicated rapid dilution of the Ekati discharge from Slipper Lake.

Mean and median TN concentrations at the LDG Outlet were 0.20 and 0.18 mg/L, respectively, and median concentrations were similar to values for the FFB and FFA site groups (Figure 3-15 and Table C17 in Appendix C). There was no indication of an increase in TN at the LDG outlet, or a spatial overlap of plumes, potentially related to the proximal mixing of water from the Slipper Lake Outlet with water from 'upstream' in the greater portion of LDG.

Median values at NF and some MF and FF site groups were slightly elevated compared with the upper bound of baseline (cf. Section 3.3.1), which was defined over the period of record as 0.22 mg/L (Figure 3-15). The data therefore indicate that there has been an observable overall increase in median TN that has extended throughout LDG. Mean post-baseline TN concentrations in LDG are higher than baseline, caused by intermittent and extreme spikes in TN concentration, typically attributed to extremely high (e.g., greater than 800 mg/L) TKN values.

Despite the observed increases in TN, LDG is still classified as an oligotrophic lake based on the calculated TN concentrations (Carlson and Simpson 1996).

Total Phosphorus

Mean and median concentrations for TP in the DDMI effluent during the period of record were 0.042 and 0.035 mg/L, respectively (Figure 3-16 and Table C3 in Appendix C). The mean and median concentrations in the mixing zone sites over the period of record were both 0.004 mg/L (Figure 3-16 and Table C4 in Appendix C), which was approximately ten-fold less than in the DDMI effluent, once again indicating rapid dilution within the designated mixing zone. Mean and median concentrations of TP at the NF, MF and FF site groups over the period of record ranged from 0.002 to 0.003 mg/L (Figure 3-16 and Table C5 to Table C13 in Appendix C) with little apparent difference between NF, MF and FF site groups.

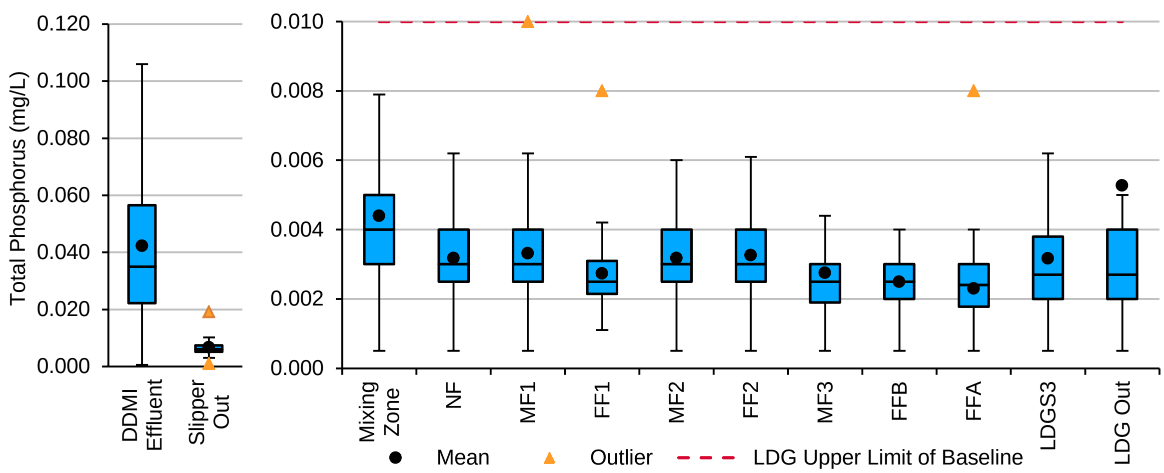


Figure 3-16 Boxplots for Total Phosphorus across all Sample Groups; Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown. The red dotted line represents the defined upper boundary of baseline.

Mean TP concentration at the LDS outlet was 0.005 mg/L (Table C16 in Appendix C). Mean and median concentrations at FF2, potentially influenced by inputs from both the DDMI effluent discharge and Ekati's Misery discharge from LDS, was 0.003 mg/L and were comparable to other sites within LDG (Figure 3-16). There was therefore no indication of an increase in TP at FF2, or a spatial overlap of plumes for TP, potentially related to the input of discharge waters from both the DDMI effluent and Ekati discharge from LDS.

Mean and median TP at the Slipper Lake Outlet was 0.007 and 0.006 mg/L, respectively (Figure 3-13 and Table C14 in Appendix C). This was less than that in the DDMI effluent but slightly higher than that observed at mixing zone, NF, MF and FF sites in LDG. Further downstream of the Slipper Lake Outlet, mean and median TP at LDGS3 was 0.003 mg/L (Figure 3-13 and Table C15 in Appendix C), which was comparable to FF sites and indicated dilution of the Ekati discharge from Slipper Lake.

Mean and median concentrations of TP at the LDG Outlet were 0.005 and 0.003 mg/L and indicated the data were comparable to other sites within LDG (Figure 3-16 and Table C3 to Table C17 in Appendix C). There was therefore no indication of an increase in TP at the LDG outlet potentially related to the proximal mixing of water from the Slipper Lake Outlet with water from 'upstream' in the greater portion of LDG. However, DCS was not provided with TP data for the Slipper Lake Outlet or LDGS3 sites and is unable to comment further on TP contributions to LDG from Ekati.

All data, including TP values determined for the effluent mixing zone, were comparable to baseline, which was undefined at the lower boundary (< 0.001 mg/L) and defined at 0.010 mg/L at the upper boundary (cf. Section 3.3.1). The data indicated that there was perhaps a slight increase in TP within the mixing zone compared with the rest of LDG (16 and Table C3 to Table C17 in Appendix C). However, the data also suggested that an increase in TP has not yet occurred throughout the entire LDG. Together with the post-baseline TN values, LDG would still be considered an oligotrophic waterbody (Carlson and Simpson 1996).

ORGANIC CARBON

Mean and median concentrations for TOC in the DDMI effluent during the period of record were 2.4 and 2.0 mg/L, respectively (Figure 3-17 and Table C3 in Appendix C), which again indicated the data were slightly skewed upwards. The mean and median concentrations in the mixing zone sites over the period of record were 2.7 and 3.0 mg/L, respectively (Figure 3-17 and Table C4 in Appendix C), which was slightly elevated compared with the DDMI effluent. Data for DOC have been collected for the DDMI effluent, mixing zone, and the LDG Outlet site groups only and not in other LDG site groups. Mean and median concentrations for DOC in the DDMI effluent during the period of record were 2.2 and 2.0 mg/L, respectively, while mean and median concentrations for the mixing zone sites were 2.6 and 2.7 mg/L, respectively. Together, these data indicate that organic carbon is primarily found in the dissolved form within these two site groups, and that there is no dilution within the designated mixing zone for either TOC or DOC.

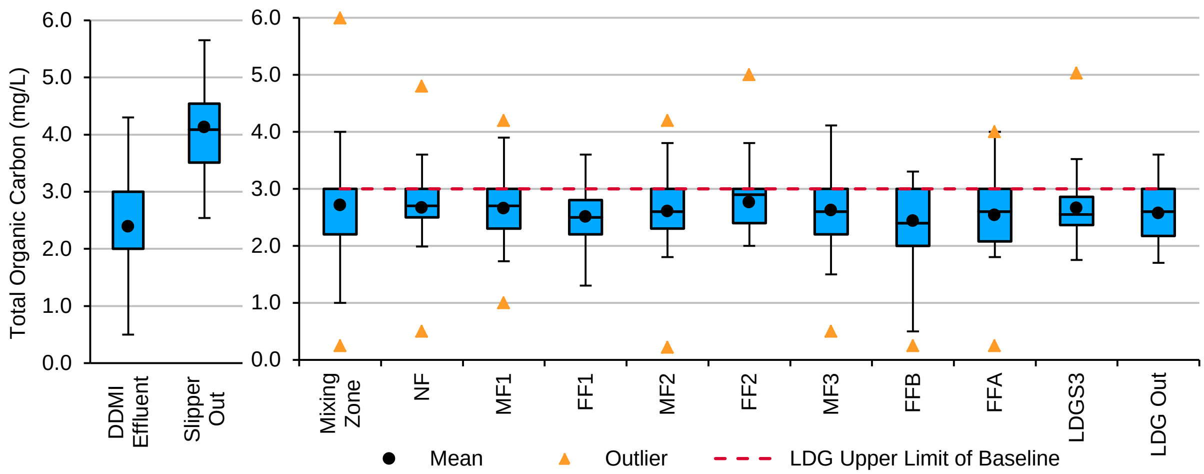


Figure 3-17 Boxplots for Total Organic Carbon across all Sample Groups; Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown. The red dotted line represents the defined upper boundary of baseline.

At the NF site group, mean and median concentrations of TOC were both 2.7 mg/L, respectively. Mean and median concentrations at MF and FF site groups over the period of record ranged from 2.4 to 2.9 mg/L, and there was no apparent difference between the NF and FF site groups (Figure 3-17 and Table C5 to Table C13 in Appendix C).

Mean TOC concentration at the LDS outlet was 2.8 mg/L (Table C16 in Appendix C) and was similar to values within the MF and FF site groups. Mean and median concentrations at FF2, potentially influenced by inputs from both the DDMI effluent discharge and Ekati's Misery discharge from LDS, was 2.8 and 2.9 mg/L and were comparable to other sites within LDG (Figure 3-17). There was therefore no indication of an increase in TOC at FF2, or a spatial overlap of plumes for TOC, potentially related to the input of discharge waters from both the DDMI effluent and Ekati discharge from LDS.

Mean and median TOC at the Slipper Lake outlet were both 4.1 mg/L (Figure 3-17 and Table C14 in Appendix C), which was elevated compared with TOC in LDG. Further downstream of the Slipper Lake Outlet, mean and median TOC at LDGS3 were 2.7 and 2.6 mg/L (Figure 3-17 and Table C15 in Appendix C), respectively, which was comparable to NF, MF, and FF sites and indicated rapid dilution of the Ekati discharge.

Mean and median TOC concentrations at the LDG Outlet were 2.6 mg/L, respectively, and were similar to values throughout the rest of LDG (Figure 3-17 and Table C3 to Table C17 in Appendix C). There was also no indication of an increase in TOC at the LDG outlet, or a spatial overlap of plumes, potentially related to the proximal mixing of water from the Slipper Lake Outlet with water from 'upstream' in the greater portion of LDG.

As mentioned above, DOC data were also collected at the LDG outlet and mean and median values were 2.5 mg/L (Table C17 in Appendix C), indicating that organic carbon is primarily found in the dissolved form at this site. All TOC data in LDG data were slightly elevated compared to baseline (defined between 1.5 and 3.0 mg/L; cf. Section 3.3.1) as post-baseline high values ranged from 3.0 to 4.1 mg/L across NF, MF, FF, and LDG outlet site groups (Figure 3-17 and Table C5 to Table C17 in Appendix C). The data therefore indicate that there has been a slight increase in TOC that has extended throughout LDG.

METALS

TOTAL ALUMINUM

Mean and median concentrations for total Al in the DDMI effluent during the period of record were 0.42 and 0.34 mg/L, respectively (Figure 3-18 and Table C3 in Appendix C). In contrast, the mean and median concentrations in the mixing zone sites over the period of record were 0.019 and 0.012 mg/L, respectively (Figure 3-18 and Table C4 in Appendix C), which was nearly 30-fold less than in the DDMI effluent. Again, this indicated a rapid dilution within the designated mixing zone. Mean and median concentrations at NF, MF, and FF site groups over the period of record ranged from 0.004 to 0.009 mg/L, with values at the NF sites slightly greater than those at FF sites (Figure 3-18 and Table C5 to Table C13 in Appendix C).

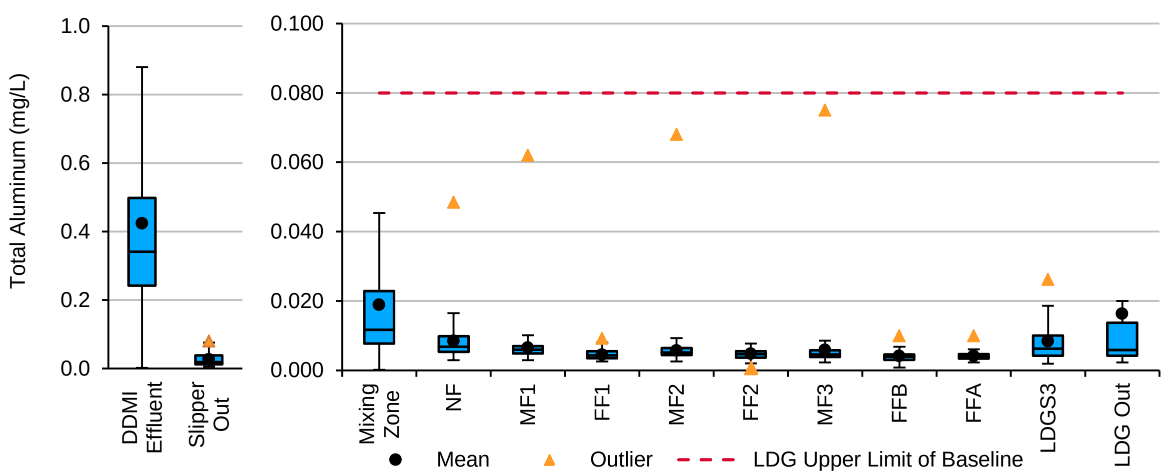


Figure 3-18 Boxplots for Total Aluminum across all Sample Groups; Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

The mean total Al concentration at the LDS outlet was 0.004 mg/L (Table C16 in Appendix C) and was similar to values at NF, MF, and FF site groups. Mean and median concentrations at FF2, potentially influenced by inputs from both the DDMI effluent discharge and Ekati's Misery discharge from LDS, was 0.005 mg/L and were comparable to other sites within LDG (Figure 3-18). There was therefore no indication of an increase in total Al at FF2, or a spatial overlap of plumes for Al, potentially related to the input of discharge waters from both the DDMI effluent and Ekati discharge from LDS.

At the Slipper Lake Outlet, mean and median total Al concentrations were 0.027 and 0.019 mg/L, respectively (Figure 3-18 and Table C14 in Appendix C). Because total Al is usually found in the particulate form, higher Al values may be characteristic of this stream. Mean and median turbidity values for the Slipper Lake Outlet were 0.73 and 0.66 NTU, respectively, and higher than the rest of LDG (excluding DDMI effluent and the mixing zone) where mean and median values ranged from 0.19 to 0.330 NTU (Table C5 to Table C17 in Appendix C). Further downstream of the Slipper Lake Outlet, mean and median total Al at LDGS3 were 0.008 and 0.006 mg/L, respectively (Figure 3-18 and Table C15 in Appendix C), which were elevated in comparison to values for the NF, MF and FF sites within LDG.

At the LDG Outlet, mean and median total Al concentrations were 0.016 and 0.006 mg/L, respectively, again indicating the data were skewed upwards with several outliers (Figure 3-18 and Table C17 in Appendix C). The data were also elevated and more variable at the LDG Outlet compared with other LDG site groups. Mean and median turbidity values at the LDG outlet were 0.33 and 0.21 NTU, and comparable to the rest of LDG, but also indicated the data were slightly skewed upwards with a few outliers (see Table C3 to Table C17 in Appendix C). This may be a characteristic of the LDG Outlet site, with turbidity values potentially influenced by outflow volume from the lake, but also indicates that water from the Slipper Lake Outlet may be contributing to increased Al concentrations at the LDG outlet. However, there is no indication of an increase in Al concentrations at the LDG outlet, or a persistent spatial overlap of plumes, potentially related to the proximal mixing of water from the Slipper Lake Outlet with water from 'upstream' in the greater portion of LDG.

With the exception of the Diavik effluent, all data were comparable with the LDG baseline, which was undefined at the lower boundary (< DL) and defined as 0.080 mg/L at the upper boundary (cf. Section 3.3.1). The data suggested that over the period of record there may have been a slight gradient in Al concentration within LDG, radiating out from the discharge points; however, values do not appear to have exceeded baseline conditions, even in the mixing zones, and an additive and/or interactive effect is not apparent.

Total Arsenic

Mean and median concentrations for total As in the DDMI effluent during the period of record were 0.00138 and 0.00128 mg/L, respectively (Figure 3-19 and Table C3 in Appendix C). In contrast, the mean and median concentrations in the DDMI mixing zone sites over the period of record were 0.00027 and 0.00025 mg/L (Figure 3-19 and Table C4 in Appendix C), which was approximately four-fold less than in the effluent. A rapid dilution within the designated mixing zone is again indicated. Mean and median concentrations at NF, MF, and FF site groups over the period of record ranged from 0.00018 to 0.00025 mg/L, with values at the NF and MF sites slightly greater than those at FF sites (Figure 3-19 and Table C5 to Table C13 in Appendix C).

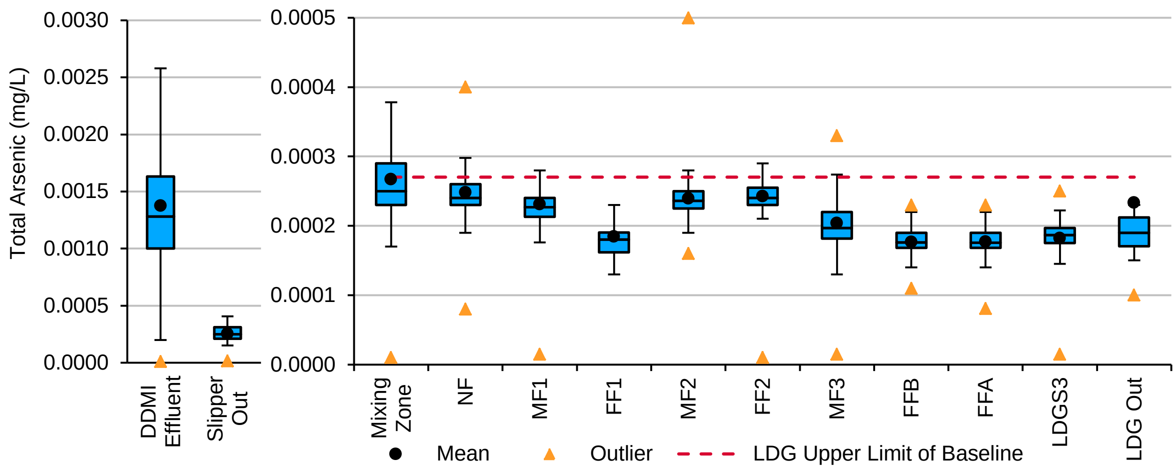


Figure 3-19 Boxplots for Total Arsenic across all Sample Groups; Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown. The red dotted line represents the maximum value reported in the baseline dataset.

Mean total As at the LDS outlet was 0.00027 mg/L (Table C16 in Appendix C) and was slightly elevated compared with values downstream at sites in LDG. Mean and median concentrations at FF2, potentially influenced by inputs from both the DDMI effluent discharge and Ekati's Misery discharge from LDS, was 0.00024 mg/L and were comparable to NF and MF sites within LDG but slightly higher than other FF sites (Figure 3-19). There was therefore no indication of an increase in total As at FF2, or a spatial overlap of plumes for As, potentially related to the input of discharge waters from both the DDMI effluent and Ekati discharge from LDS. Total As concentrations at FF2 appear to be largely related to concentrations from the mixing zone and NF sites.

Mean and median total As concentrations at the Slipper Lake Outlet were 0.00025 mg/L (Figure 3-19 and Table C14 in Appendix C) and were elevated and more variable compared to other LDG site groups. Further downstream of the Slipper Lake Outlet, mean and median total As at LDGS3 were 0.00018 and 0.00019 mg/L, respectively (Table C15 in Appendix C), which were comparable with values for MF and FF sites within LDG, indicating rapid dilution of the Ekati discharge.

Mean and median total As values at the LDG outlet were 0.00023 and 0.00019 mg/L. Again, the data were slightly skewed upwards with one outlier (Figure 3-19 and Table C17 in Appendix C). These total As values were similar to those found in much of LDG, and indicated no increase in total As at the LDG outlet, or a spatial overlap of plumes, potentially related to the proximal mixing of water from the Slipper Lake outlet with water from 'upstream' in the greater portion of LDG.

With the exception of the Diavik effluent and mixing zone, and Ekati's Slipper Lake outlet, most data were within baseline, which was undefined at the upper boundary (< DL) but had a maximum concentration of

0.00027 mg/L (cf. Section 3.3.1 and Figure 3-19). However, high values at several of the LDG site groups were greater than the maximum observed baseline concentration. In addition, while 67% of the baseline data were < DL, subsequent data were consistently above DLs (Table C3 to Table C17 in Appendix C). The data suggest, therefore, that there has been a slight increase in total As over time that has extended throughout LDG.

TOTAL IRON

Mean and median concentrations for total Fe in the DDMI effluent during the period of record were 0.035 and 0.015 mg/L, respectively (Figure 3-20 and Table C3 in Appendix C). The mean and median concentrations in the DDMI mixing zone sites over the period of record were 0.012 and 0.004 mg/L, respectively (Figure 3-20 and Table C4 in Appendix C). The concentration of Fe in the mixing zone was therefore three to four times less than in the effluent and indicated some dilution within the designated mixing zone. Mean and median concentrations at NF, MF and FF site groups over the period of record ranged from 0.003 to 0.006 mg/L, with no obvious differences between NF and FF site groups (Figure 3-20 and Table C5 to Table C13 in Appendix C).

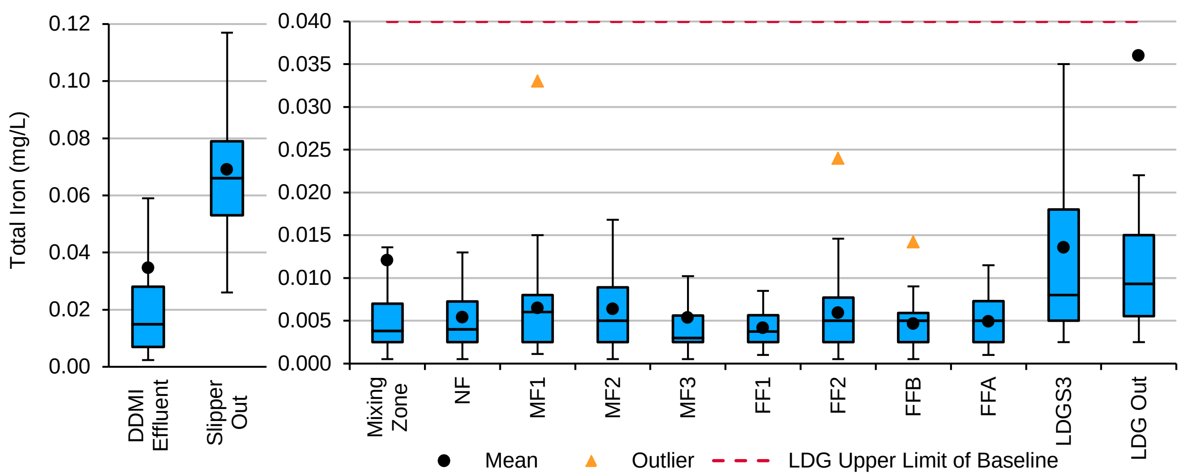


Figure 3-20 Boxplots for Total Iron across all Sample Groups; Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown. The red dotted line represents the defined upper boundary of baseline.

Mean total Fe concentration at the LDS outlet was 0.008 mg/L (Table C16 in Appendix C) and was slightly elevated compared with values downstream at FF2. Mean and median concentrations at FF2, potentially influenced by inputs from both the DDMI effluent discharge and Ekati's Misery discharge from LDS, was 0.006 and 0.005 mg/L and were comparable to other sites within LDG (Figure 3-20). There was therefore no indication of an increase in total Fe at FF2, or a spatial overlap of plumes for Fe, potentially related to the input of discharge waters from both the DDMI effluent and Ekati discharge from LDS.

Mean and median total Fe concentrations at the Slipper Lake Outlet were 0.070 and 0.069 mg/L, respectively (Figure 3-20 and Table C14 in Appendix C), and were greater than values in the Diavik effluent and other LDG site groups (Figure 3-20 and Table C3 to Table C17 in Appendix C). Similar to the case for total Al this may be a typical characteristic of this stream given that turbidity values are elevated compared to the rest of LDG. Further downstream of the Slipper Lake Outlet, mean and median total Fe at LDGS3 were 0.013 and 0.008 mg/L (Figure 3-20 and Table C15 in Appendix C), respectively, which indicated dilution of the Ekati discharge, though the concentration at LDGS3 was still higher than other sites within LDG (Figure 3-20).

At the LDG Outlet, mean and median concentrations of total Fe were 0.036 and 0.009 mg/L, respectively (Figure 3-20 and Table C17 in Appendix C). There were several outliers in the data such that the mean was considered an outlier in the entire set of data (Figure 3-20). Total Fe concentration at the LDG outlet was elevated compared with other LDG site groups though turbidity data were comparable, with the exception of a few outliers. This indicates that water from the Slipper Lake Outlet may be contributing to increased Fe concentrations at the LDG outlet. However, there is no indication of an increase in Fe at the LDG outlet, or a persistent spatial overlap of plumes, potentially related to the proximal mixing of water from the Slipper Lake Outlet with water from 'upstream' in the greater portion of LDG.

However, all values within the Diavik mixing zone, NF, MF, FF and LDG Outlet site groups were comparable to baseline, which was undefined at the lower boundary and defined as 0.040 mg/L at the upper boundary (cf. Section 3.3.1). The data suggested that over the period of record there was no observable increase in Fe concentration at almost all sites within LDG. However, given that total Fe concentrations at the LDG Outlet were higher than other LDG site groups, the LDG outlet may be affected by elevated Fe concentrations from the Slipper Lake Outlet.

Total Molybdenum

Mean and median concentrations for total Mo in the DDMI effluent during the period of record were 0.033 and 0.026 mg/L, respectively (Figure 3-21 and Table C3 in Appendix C). In contrast, the mean and median concentrations in the DDMI mixing zone sites over the period of record were 0.0010 and 0.0008 mg/L, respectively (Figure 3-21 and Table C4 in Appendix C), which was approximately 20 to 30-fold less than in the effluent. Rapid dilution within the designated mixing zone is again indicated. Mean and median concentrations for NF, MF, and FF site groups over the period of record ranged from 0.00007 to 0.00061 mg/L, with a decreasing gradient between NF, MF and FF site groups (Figure 3-21 and Table C5 to Table C13 in Appendix C).

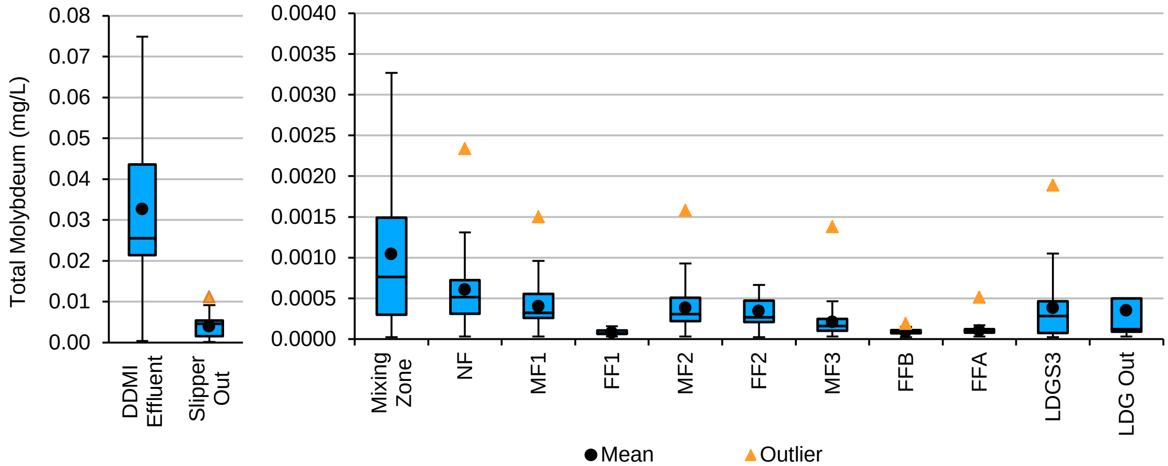


Figure 3-21 Boxplots for Total Molybdenum across all Sample Groups; Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

The mean total Mo concentration at the LDS outlet was 0.00004 mg/L (Table C16 in Appendix C) and was lower than values downstream at FF2. Mean and median total Mo concentrations at FF2, potentially influenced by inputs from both the DDMI effluent discharge and Ekati's Misery discharge from LDS, was 0.0003 mg/L and were higher than other FF sites within LDG (Figure 3-21). There was therefore no indication of an increase in total Mo at FF2, or a spatial overlap of plumes for Mo, potentially related to the input of discharge waters from both the DDMI effluent and Ekati discharge from LDS. Total Mo concentrations at FF2 appear to be related to concentrations from the mixing zone and NF sites.

At the Slipper Lake Outlet, mean and median total Mo concentrations were 0.004 and 0.005 mg/L (Figure 3-21 and Table C14 in Appendix C), less than that in the DDMI effluent but greater than MF or FF sites in LDG. Further downstream of the Slipper Lake Outlet, mean and median total Mo at LDGS3 were 0.0004 and 0.0003 mg/L, respectively (Figure 3-21 and Table C15 in Appendix C), which was comparable with the NF and MF sites within LDG, but higher than FF sites (Figure 3-21), and indicated dilution of the Ekati discharge from the Slipper Lake Outlet.

Mean and median concentrations at the LDG Outlet were 0.0004 and 0.0001 mg/L, respectively, indicating the data were skewed upwards (Figure 3-21 and Table C17 in Appendix C). There was one outlier in the LDG outlet dataset and median total Mo was similar to values at other LDG site groups (Figure 3-21 and Table C3 to Table C17 in Appendix C). There was no indication of an increase in total Mo at the LDG outlet, or a persistent spatial overlap of plumes, related to the proximal mixing of water from the Slipper Lake Outlet with water from 'upstream' in the greater portion of LDG. However, the variability observed at the LDG outlet indicates that water from the Slipper Lake Outlet may be contributing to increased Mo concentrations at the LDG outlet.

The total Mo concentrations recorded over the period of record were considerably less than the maximum baseline Mo concentration of 0.007 mg/L (Table C3 to Table C17 in Appendix C) though the data did suggest that over the period of record there was an increase in Mo concentration within LDG. Through the baseline period 78% of the data were < DL, while after 2001 and for most sites, < DL values comprised less than 10% of the data. However, the relatively lower maximum Mo concentrations and prevalence of < DL data observed recently may have been due to improvements in method detection limits over the past 16 years, rather than to any effect of mine discharge.

Total Nickel

Mean and median concentrations for total Ni in the effluent during the period of record were 0.0091 and 0.0066 mg/L, respectively (Figure 3-22 and Table C3 in Appendix C). In contrast, the mean and median concentrations in the mixing zone sites over the period of record were 0.0015 and 0.0008 mg/L, respectively (Figure 3-22 and Table C4 in Appendix C), which was approximately five to ten-fold less than in the effluent, suggesting a rapid dilution within the designated mixing zone. Mean and median concentrations NF, MF, and FF site groups over the period of record ranged from 0.0006 to 0.0010 mg/L, with a slight increasing gradient from NF to FF sites and the LDG Outlet (Figure 3-22 and Table C5 to Table C13 in Appendix C).

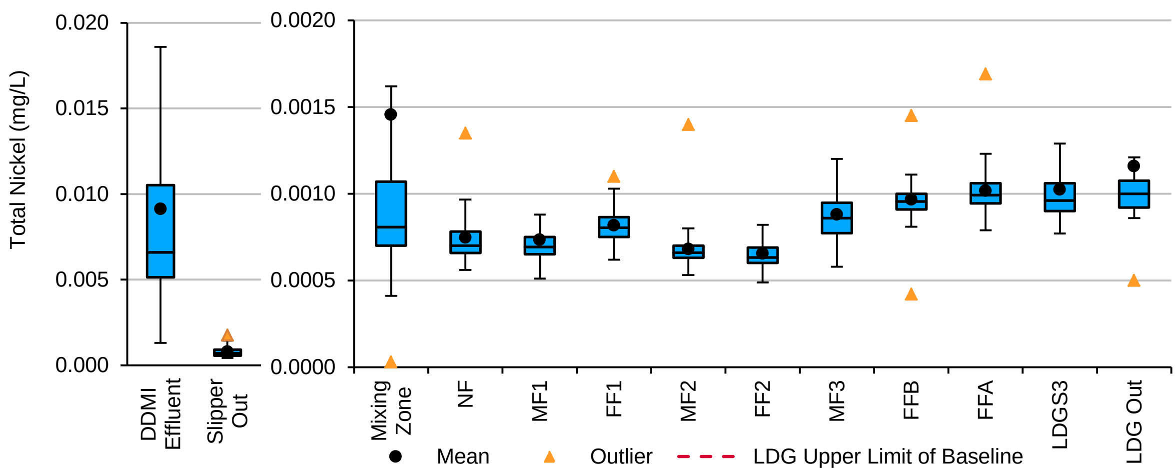


Figure 3-22 Boxplots for Total Nickel across all Sample Groups; Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

The mean total Ni concentration at the LDS outlet was 0.0004 mg/L (Table C16 in Appendix C) and was lower than values downstream at FF2. Mean and median total Ni concentrations at FF2, potentially influenced by inputs from both the DDMI effluent discharge and Ekati's Misery discharge from LDS, was 0.0007 and 0.0006 mg/L, respectively and were comparable to other sites within LDG (Figure 3-21).

There was therefore no indication of an increase in total Ni at FF2, or a spatial overlap of plumes for Ni, potentially related to the input of discharge waters from both the DDMI effluent and Ekati discharge from LDS.

At the Slipper Lake Outlet, mean and median total Ni concentrations were 0.0008 and 0.0007 mg/L, respectively (Figure 3-22 and Table C14 in Appendix C), less than the Diavik effluent and similar to values in other LDG site groups. Further downstream of the Slipper Lake Outlet, mean and median total Ni at LDGS3 were 0.0010 mg/L (Figure 3-22 and Table C15 in Appendix C), and was slightly elevated compared with the Slipper Lake Outlet but comparable to values at FFA and FFB.

Mean and median concentrations at the LDG Outlet were 0.0012 and 0.0010 mg/L, respectively (Figure 3-22 and Table C17 in Appendix C). Nickel concentrations at the LDG Outlet were similar to those in the FFB, FFA and LDGS3 areas (Figure 3-22 and Table C12 to Table C15 in Appendix C), which suggested no increase in total Ni, or a spatial overlap of plumes, related to the proximal mixing of water from the Slipper Lake outlet with water from ‘upstream’ in the greater portion of LDG.

The Ni concentrations recorded over the period of record were considerably less than the upper bound of baseline of 0.0091 mg/L (Table C3 to Table C17 in Appendix C) although the data do suggest that over the period of record there was an increase in Ni concentration within LDG. Through the baseline period, 43% of the Ni data were < DL, but since 2001, and for most sites, < DL values comprised less than 1% of the data. The relatively lower maximum Ni concentrations and prevalence of < DL data observed recently may have been due to improvements in method detection limits over the past 16 years, rather than to any effect of mine discharge, but neither cause is reliably indicated.

TOTAL STRONTIUM

Mean and median concentrations for total Sr in the effluent during the period of record were 0.48 and 0.51 mg/L, respectively (Figure 3-23 and Table C3 in Appendix C). In contrast, the mean and median concentrations in the mixing zone sites over the period of record were 0.023 and 0.019 mg/L, respectively (Figure 3-23 and Table C4 in Appendix C), which was approximately 20-fold less than in the effluent. A rapid dilution within the designated mixing zone is indicated again. Mean and median concentrations for NF, MF, and FF site groups over the period of record ranged from 0.008 to 0.018 mg/L, with a decreasing gradient between NF, MF and FF site groups (Figure 3-23 and Table C5 to Table C13 in Appendix C).

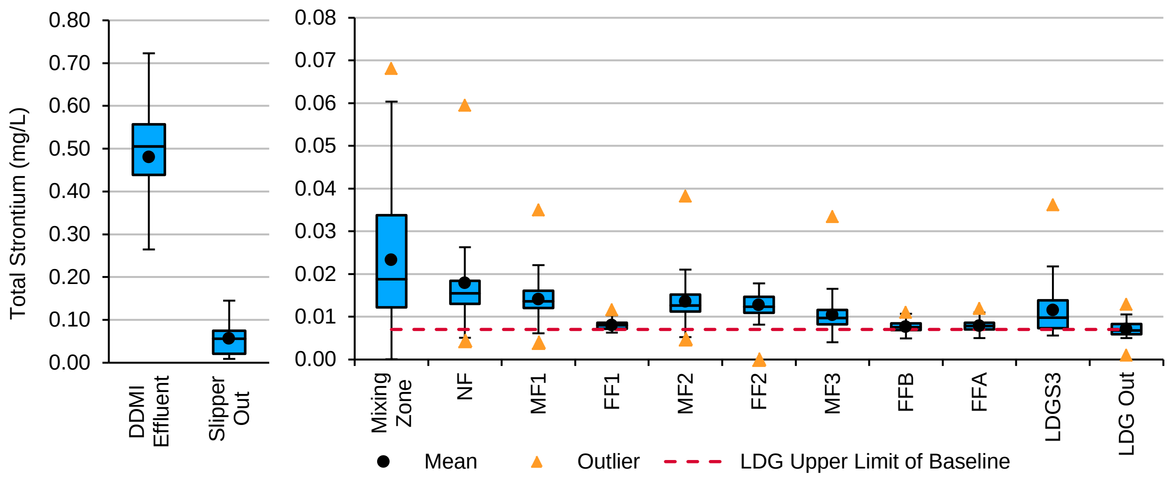


Figure 3-23 Boxplots for Total Strontium across all Sample Groups; Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown. The red dotted line represents the defined upper boundary of baseline.

Mean total Sr at the LDS Outlet was 0.007 mg/L (Table C16 in Appendix C) and was lower than values downstream at FF2. Mean and median total Sr at FF2, potentially influenced by inputs from both the DDMI effluent discharge and Ekati's Misery discharge from LDS, were 0.013 and 0.012 mg/L, respectively, and was comparable to values at MF sites but slightly elevated in comparison to total Sr values further downstream at other FF sites (Figure 3-23). There was therefore no indication of an increase in total Sr at FF2 potentially related to the input of discharge waters from both the DDMI effluent and LDS. Total Sr concentrations at FF2 appear to be related to concentrations from the mixing zone and NF sites.

At the Slipper Lake Outlet, mean and median total Sr values were 0.056 mg/L (Figure 3-23 and Table C14 in Appendix C), less than the Diavik effluent but elevated compared with values for other LDG site groups, including the Diavik mixing zone. Further downstream of the Slipper Lake Outlet, mean and median total Sr at LDGS3 were 0.012 and 0.010 mg/L (Figure 3-23 and Table C15 in Appendix C), respectively, which was comparable with NF and MF sites within LDG and indicated rapid dilution of the Ekati discharge.

Mean and median total Sr concentrations at the LDG outlet were 0.007 mg/L, and were comparable to values at the FFB and FFA site groups (Figure 3-23 and Table C3 to Table C17 in Appendix C). These sites had the lowest total Sr levels recorded in LDG. No increase in total Sr is suggested at the LDG Outlet, or a spatial overlap of plumes, related to the mixing of waters from the Slipper Lake Outlet with water from the greater portion of LDG.

At all sites within LDG, including the LDG Outlet, total Sr appears elevated compared to baseline conditions as the median of all site groups is equal to or greater than the upper boundary of baseline (Figure 3-23), defined as 0.007 mg/L for total Sr,. The data therefore indicate that there has been an increase in total Sr over time that has extended throughout the lake (Figure 3-23 and Table C3 to Table C17 in Appendix C).

Total Uranium

Mean and median concentrations for total U in the effluent during the period of record were 0.0043 and 0.0034 mg/L, respectively (Figure 3-24 and Table C3 in Appendix C). By contrast, the mean and median concentrations in the mixing zone sites over the period of record were 0.0003 and 0.0002 mg/L, respectively (Figure 3-23 and Table C4 in Appendix C), which were approximately ten to twenty-fold less than values in the effluent showing rapid dilution occurring within the designated mixing zone. Mean and median concentrations NF, MF, and FF site groups over the period of record were approximately 0.0001 mg/L or lower, though with a slight decreasing gradient between NF, MF and FF site groups (Figure 3-24 and Table C5 to Table C13 in Appendix C).

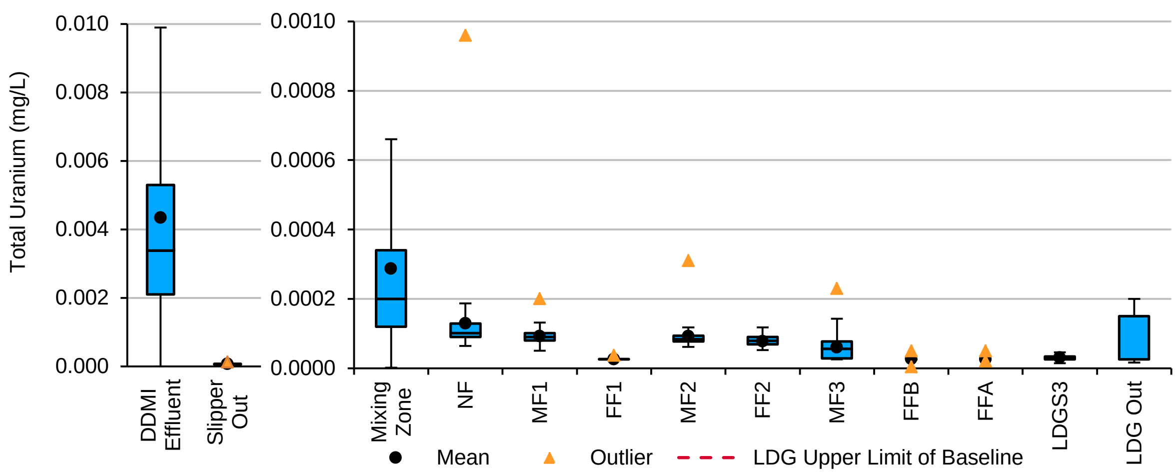


Figure 3-24 Boxplots for Total Uranium across all Sample Groups, Lac de Gras, NT

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

Mean total U at the LDS Outlet was 0.00002 mg/L (Table C16 in Appendix C) and was lower than values downstream at FF2. Mean and median total Sr at FF2, potentially influenced by inputs from both the DDMI effluent discharge and Ekati's Misery discharge from LDS, were 0.00008 mg/L and was higher than values at other FF sites (Figure 3-24). There was therefore no indication of an increase in total U at FF2, or a spatial overlap of plumes, potentially related to the input of discharge waters from both the DDMI effluent and Ekati discharge from LDS. Total U concentrations at FF2 appear to be related to concentrations from the mixing zone and NF sites.

Mean and median total U values at Slipper Lake Outlet were 0.00007 mg/L (Figure 3-24 and Table C14 in Appendix C); less than the Diavik effluent but similar to other LDG site groups. Further downstream of the Slipper Lake Outlet, mean and median total U at LDGS3 were 0.00003 mg/L (Figure 3-24 and Table C15 in Appendix C) and were comparable with values for MF and FF sites within LDG, suggesting dilution of the Ekati discharge.

At the LDG Outlet, mean and median total U values were 0.0107 and 0.00003 mg/L (Figure 3-24 and Table C17 in Appendix C), which showed the data were skewed upwards due to the presence of two outliers, which were a result of high < DL results (i.e., <0.50 mg/L). Baseline condition for total U was undefined because most baseline data (97%) were < DL (cf. Section 3.3.1) however most post-baseline data, including that in the DDMI effluent, were less than the single defined baseline value for total U (0.0019 mg/L). Reductions in method detection limits have likely occurred over the past 16 years.

CONCLUSION

Analysis of the water-chemistry data indicated that for many of the analytes, concentrations were considerably higher in the identified mixing zones and DDMI effluent than in LDG proper. It was consistently apparent that dilution occurred rapidly over relatively short distances, which resulted in steep concentration gradients for hardness, sulphate, TDS, ammonia, TN, and total Al, As, Mo, Sr and U moving away from the discharge zone, through the mixing zone, and into the main basin of LDG. It was apparent that the DDMI effluent was relatively rapidly and well-mixed within LDG, such that no spatially or temporally persistent concentrated effluent plumes were observed beyond the mixing zones.

Within the main basin of LDG and beyond the DDMI mixing zone, there was a slight spatial gradient for hardness, sulphate, TDS, ammonia, TN, and total Al, As, Mo, Sr and U observed moving downstream over relatively long distances; this is consistent with previous findings (i.e., Golder 2014). These relatively slight spatial gradients indicated that the DDMI effluent in LDG was not completely mixed throughout the entire main basin, but rather that concentrations did decrease slightly moving further downstream from the DDMI mixing zone.

Similarly, discharge from Slipper Lake was relatively rapidly mixed with LDG lake waters, which also resulted in relatively steep concentration gradients moving away from the Slipper Lake outlet downstream to LDGS3, and relatively slight concentration gradients moving from LDGS3 downstream to the outlet of the lake.

Because of the rapid mixing of both the DDMI effluent and the Slipper Lake discharge, and the assumed rapid mixing of the LDS discharge, there was no observable evidence of a persistent spatial overlap in effluent plumes within the designated zones of potential overlap. For the DDMI effluent and Ekati's Misery discharge from LDS, there was no indication of increased concentration of any analyte at FF2, compared to other areas of LDG. For the DDMI effluent and the Slipper Lake discharge, there was no indication of increased concentration of those analytes at the LDG outlet that had been found to have increased throughout LDG. These results indicate that there was no evidence to fulfill the definition of "Spatial Cumulative Effect" related to spatial overlap of effluent plumes over the period of record.

Through the post-baseline period of record, median values for hardness, sulphate, TDS, TN and total Sr have exceeded the upper boundary of their defined baseline conditions throughout all sites within LDG. There has, therefore, been a consistent, long-term observable lake-wide increase for these analytes in LDG since 2001. These results indicate that there has been a temporal cumulative effect of mine discharge on LDG water chemistry throughout the entirety of the lake. However, despite these alterations in the water chemistry within LDG, the lake is still classified as a dilute, soft-water, circumneutral, ultra-oligotrophic to oligotrophic waterbody.

3.4 Temporal Trends Analysis

Site WQ-06/LDG42/NF5 is a near-field monitoring site located close to the Diavik discharge point into LDG (Figure 2-1 and Figure 2-2). There was a significant ($p < 0.05$) increasing trend over the period of record for TP; a more strongly significant ($p < 0.01$) increasing trend over the period of record for TN and As; and, strongly significant increasing trends ($p < 0.001$) for pH, conductivity, hardness, chloride, sulphate, Mo and Sr (Table 3-1 and Appendix C). Given the large number of trends analyses, the latter (i.e., the statistically strongest) trends ($p < 0.001$) were of the most interest. The numerous significant and increasing trends observed at WQ-06/LDG42/NF5 indicate that water chemistry has been altered near the DDMI discharge point within LDG over time.

Site LDGS3 is a near-field monitoring site located close to the Ekati discharge from the Slipper Lake Outlet. There was a strongly significant ($p \leq 0.0001$) increasing trend over the period of record for conductivity, TDS, alkalinity, hardness, chloride, sulphate, and Sr, similar to the increases observed at Site WQ-06/LDG42/NF5 (Table 3-1). A significant ($p < 0.01$) increasing trend was also identified for total Mo at LDGS3. The numerous significant and increasing trends observed at LDGS3 indicate that water chemistry has also been altered near the Ekati discharge point within LDG over time.

Table 3-1 Trends Analysis Statistics for Six Sample Sites/Areas between 1994 to 2013; Lac de Gras, NT

Parameter	Statistic[1]	Near-Field WQ-06/LDG42/ NF5	Mid-Field WQ-02/LDG19/ MF1-3[a]	Mid-Field WQ-05/LDG41/ MF3-4[a]	Far-Field LDG46/FFA[a]	Near-Field LDGS3	LDG Outlet WQ-01/LDGO/ LDG48
pH	n	15	9	15	14	0	15
	M-K *S*	59	20	41	22	–	40
	T-S Slope	0.0343	0.0473	0.0230	0.0241	–	0.0173
	Calc. p-value	0.001	0.0220	0.0230	0.1020	–	0.023
	Trend	Increasing	Not Significant	Not Significant	Not Significant	–	Increasing
Conductivity	n	15	9	15	14	18	15
	M-K *S*	97	30	95	43	125	83
	T-S Slope	1.3731	1.2190	0.5267	0.3598	1.0094	0.5333
	Calc. p-value	< 0.00001	< 0.01	< 0.0001	0.005	<0.0001	< 0.0001
	Trend	Increasing	Increasing	Increasing	Increasing	Increasing	Increasing
Total Dissolved Solids (TDS)	n	16	–	–	–	17	16
	M-K *S*	18	–	–	–	94	18
	T-S Slope	0.4583	–	–	–	0.9984	0.3490
	Calc. p-value	0.2250	–	–	–	<0.0001	0.2250
	Trend	Not Significant	–	–	–	Increasing	Not Significant
Total Alkalinity	n	15	–	–	–	16	15
	M-K *S*	11	–	–	–	69	-5
	T-S Slope	0.0474	–	–	–	0.1258	0.0000
	Calc. p-value	0.3130	–	–	–	0.001	0.4230
	Trend	Not Significant	–	–	–	Increasing	Not Significant
Total Hardness	n	15	8	15	14	17	14
	M-K *S*	84	28	70	63	108	68
	T-S Slope	0.4063	0.5430	0.2157	0.1968	0.3231	0.2083
	Calc. p-value	< 0.0001	< 0.001	< 0.0001	< 0.0001	< 0.0001	< 0.001
	Trend	Increasing	Increasing	Increasing	Increasing	Increasing	Increasing

Table 3-1 Trends Analysis Statistics for Six Sample Sites/Areas between 1994 to 2013; Lac de Gras, NT

Parameter	Statistic[1]	Near-Field WQ-06/LDG42/ NF5	Mid-Field WQ-02/LDG19/ MF1-3[a]	Mid-Field WQ-05/LDG41/ MF3-4[a]	Far-Field LDG46/FFA[a]	Near-Field LDGS3	LDG Outlet WQ-01/LDGO/ LDG48
Fluoride (F)	n	14	–	–	–	0	13
	M-K *S*	6	–	–	–	–	14
	T-S Slope	0.0000	–	–	–	–	0.0000
	Calc. p-value	0.3740	–	–	–	–	0.2180
	Trend	Not Significant	–	–	–	–	Not Significant
Chloride (Cl)	n	16	9	15	14	15	16
	M-K *S*	103	32	56	59	83	75
	T-S Slope	0.01987	0.1518	0.0511	0.0636	0.1709	0.0557
	Calc. p-value	< 0.00001	< 0.001	0.0020	< 0.0001	< 0.0001	< 0.001
	Trend	Increasing	Increasing	Increasing	Increasing	Increasing	Increasing
Sulphate (SO_4)	n	16	9	15	14	16	16
	M-K *S*	107	34	93	36	84	90
	T-S Slope	0.1663	0.1740	0.0860	0.0594	0.2063	0.0900
	Calc. p-value	< 0.00001	< 0.001	< 0.0001	0.0150	0.0001	< 0.0001
	Trend	Increasing	Increasing	Increasing	Increasing	Increasing	Increasing
Total Nitrogen (TN)	n	16	8	15	14[b]	14	14
	M-K *S*	60	12	65	58	-5	15
	T-S Slope	0.0122	0.0128	0.0118	0.0130	-0.0002	0.0036
	Calc. p-value	0.0030	0.089	< 0.0001	< 0.0001	0.413	0.2250
	Trend	Increasing	Not Significant	Increasing	Increasing	Not Significant	Not Significant
Total Phosphorus (TP)	n	16	7	15	14	18	16
	M-K *S*	40	17	24	20	-37	-16
	T-S Slope	0.0001	0.0002	0.0001	0.0001	-0.0001	0.0000
	Calc. p-value	0.0390	0.0050	0.1200	0.1260	0.0080	0.2530
	Trend	Increasing	Increasing	Not Significant	Not Significant	Decreasing[2]	Not Significant

Table 3-1 Trends Analysis Statistics for Six Sample Sites/Areas between 1994 to 2013; Lac de Gras, NT

Parameter	Statistic[1]	Near-Field WQ-06/LDG42/ NF5	Mid-Field WQ-02/LDG19/ MF1-3[a]	Mid-Field WQ-05/LDG41/ MF3-4[a]	Far-Field LDG46/FFA[a]	Near-Field LDGS3	LDG Outlet WQ-01/LDGO/ LDG48
Total Organic Carbon (TOC)	n	14	–	–	–	10	16
	M-K *S*	25	–	–	–	9	20
	T-S Slope	0.0200	–	–	–	0.242	0.0101
	Calc. p-value	0.0960	–	–	–	0.0499	0.1990
	Trend	Not Significant	–	–	–	Not Significant	Not Significant
Total Aluminum (Al)	n	16	–	–	–	14	16
	M-K *S*	-28	–	–	–	-43	-50
	T-S Slope	-0.0007	–	–	–	-0.0005	-0.0005
	Calc. p-value	0.1140	–	–	–	0.0100	0.0130
	Trend	Not Significant	–	–	–	Decreasing[2]	Decreasing[2]
Total Arsenic (As)	n	15	9	15	14	17	16
	M-K *S*	56	30	36	-9	19	-46
	T-S Slope	0.0000	< 0.0001	< 0.0001	<0.0001	< 0.0001	0.0210
	Calc. p-value	0.0020	< 0.01	0.0370	0.3380	0.2290	0.0000
	Trend	Increasing	Increasing	Increasing	Not Significant	Not Significant	Decreasing[2]
Total Iron (Fe)	n	10	7	8	14	16	9
	M-K *S*	-23	-7	-19	-6	-27	-24
	T-S Slope	-0.0011	-0.0004	-0.0006	-0.0003	-0.0005	-0.0020
	Calc. p-value	0.0230	0.1910	0.0160	0.1360	0.1330	0.0060
	Trend	Decreasing[2]	Not Significant	Decreasing[2]	Not Significant	Not Significant	Decreasing[2]
Total Molybdenum (Mo)	n	16	9	15	14	16	16
	M-K *S*	75	2	62	59	70	-45
	T-S Slope	0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	0.0000
	Calc. p-value	< 0.001	0.4600	0.0010	< 0.0001	0.0009	0.0260
	Trend	Increasing	Not Significant	Increasing	Increasing	Increasing	Decreasing[2]

Table 3-1 Trends Analysis Statistics for Six Sample Sites/Areas between 1994 to 2013; Lac de Gras, NT

Parameter	Statistic[1]	Near-Field WQ-06/LDG42/ NF5	Mid-Field WQ-02/LDG19/ MF1-3[a]	Mid-Field WQ-05/LDG41/ MF3-4[a]	Far-Field LDG46/FFA[a]	Near-Field LDGS3	LDG Outlet WQ-01/LDGO/ LDG48
Total Nickel (Ni)	n	16	–	–	–	14	16
	M-K *S*	36	–	–	–	29	7
	T-S Slope	< 0.0001	–	–	–	< 0.0001	< 0.0001
	Calc. p-value	0.0580	–	–	–	0.0630	0.4120
	Trend	Not Significant	–	–	–	Not Significant	Not Significant
Total Strontium (Sr)	n	16	9	15	14	15	16
	M-K *S*	103	32	83	67	83	98
	T-S Slope	0.0013	0.0010	0.0006	0.0004	0.0009	0.0004
	Calc. p-value	< 0.00001	< 0.001	< 0.0001	< 0.0001	< 0.0001	< 0.00001
	Trend	Increasing	Increasing	Increasing	Increasing	Increasing	Increasing
Total Uranium (U)	n	16	9	15	14	14	15
	M-K *S*	-53	-15	-46	8	19	-32
	T-S Slope	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
	Calc. p-value	0.0100	0.0900	0.0100	0.3380	0.1650	0.0570
	Trend	Decreasing[2]	Not Significant	Decreasing[2]	Not Significant	Not Significant	Not Significant

NOTES:
[1] Statistics include number of samples/years (n); Mann-Kendall test value S (M-K S); Theil-Sens Slope value (T-S Slope); and, the calculated p-value (Calc. p-value).
[2] Trend result is likely influenced by higher baseline detection limits and/or variable detection limits throughout the dataset, with all < DL values brought to a value of half of the highest < DL result; see Section 2.4 and Appendix D.
[a] Trends analysis for specific parameters carried forward to MF and FF sites if a significant trend identified at the NF site; otherwise, not applicable (–).
[b] One outlier (1090 mg/L) removed from the dataset for trends analysis.

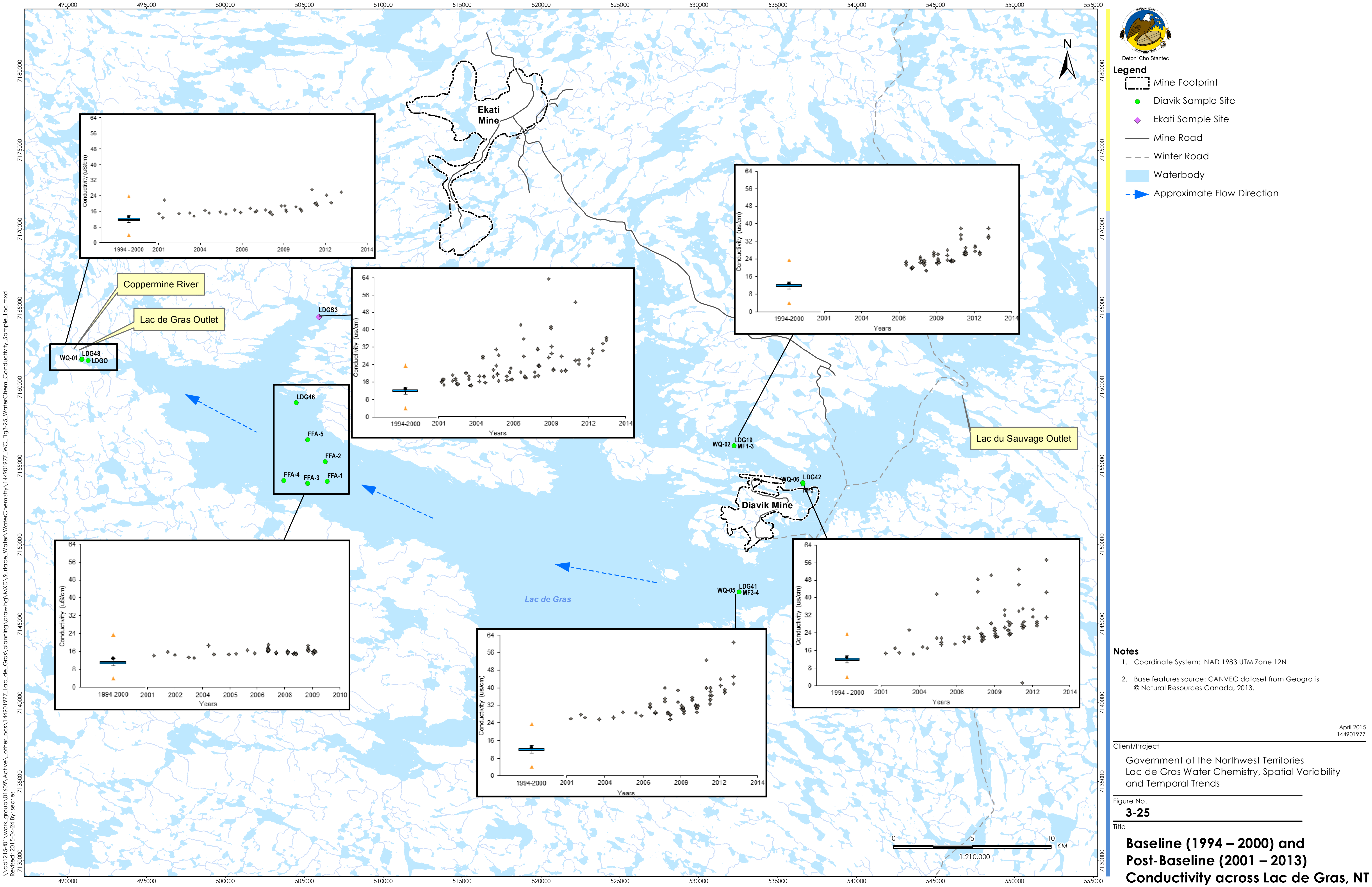
Two mid-field sites were also examined for temporal trends in analyte concentration however only those analytes with a significant trend in concentration at the near-field site WQ-06/LDG42/NF5 were carried forward for analysis at the mid-field sites (see Section 2.4). Site WQ-02/LDG19/MF1-3 is a mid-field monitoring site located northwest of the Diavik diffuser (Figure 2-1 and Figure 2-2). There was a significant increasing trend ($p < 0.05$) for pH, a stronger significant increasing trend ($p < 0.01$) for conductivity, total arsenic and total phosphorus, and strongly significant increasing trends ($p < 0.001$) for hardness, chloride, sulphate, and Sr (Table 3-1 and Appendix C). The analytes with strongly significant trends ($p < 0.001$) matched those with the lowest p-values at the near-field sites.

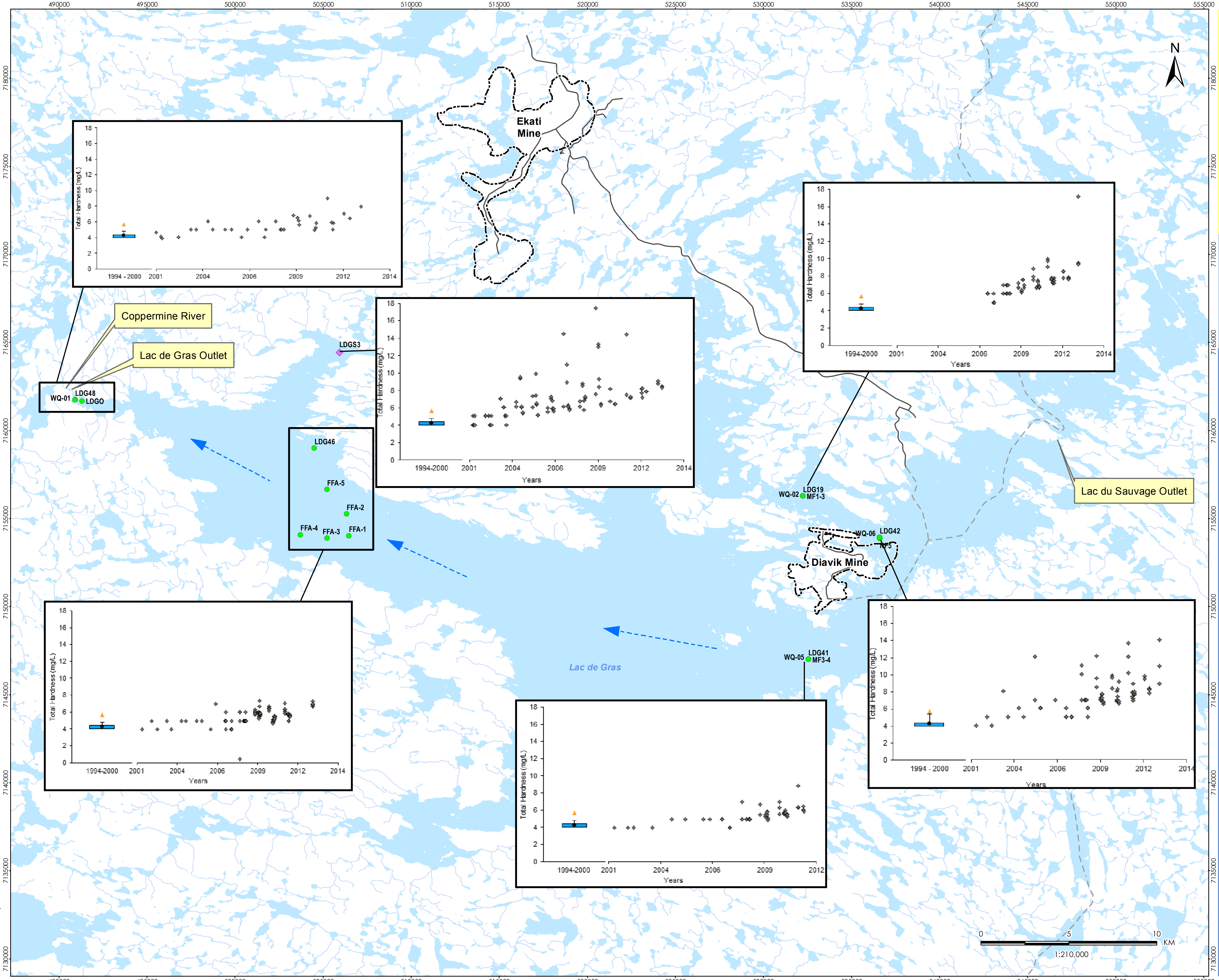
Site WQ-05/LDG41/MF3-4 is also a mid-field site, and is located south of the Diavik diffuser on the opposite side of East Island from WQ-02/LDG19/MF1-3 (Figure 2-1 and Figure 2-2). There was a significant increasing trend ($p < 0.05$) for pH and As, a stronger significant increasing trend ($p < 0.01$) for chloride, and strongly significant increasing trends ($p < 0.001$) for conductivity, hardness, sulphate, TN, Mo and Sr (Table 3-1and Appendix C). Again, there were consistent trends for the same analytes amongst the near-field and mid-field study sites.

The LDG46/FFA area is a far-field sample area located downstream of WQ-05/LDG41/MF3-4 and just upstream of the input from the Slipper Lake Outlet (Figure 2-1 and Figure 2-2). There was a significant increasing trend ($p < 0.05$) for sulphate, a stronger significant increasing trend ($p < 0.01$) for conductivity, and strong significant increasing trends ($p < 0.001$) for hardness, chloride, Mo, Sr and TN (Table 3-1 and Appendix C). These analytes matched many of the trends at the near-field and mid-field sites.

Site LDG20/WQ-01/LDGO/LDG48 is a far-field site located at the LDG Outlet (Figure 2-1 and Figure 2-2). There was a significant increasing trend ($p < 0.05$) for pH, and strongly significant increasing trends ($p < 0.001$) for conductivity, hardness, chloride, sulphate, and Sr. Again, there were consistent trends for the same analytes amongst all study sites in LDG.

Overall, the temporal trends analyses provide a clear weight-of-evidence that numerous analyte concentrations have increased over time throughout the entire LDG basin. Of particular significance are conductivity, hardness, chloride, sulphate and strontium, which consistently increased at all monitored sites. Baseline and post-baseline data for each of these analytes at the sites assessed for trends are presented in Figure 3-25 to Figure 3-29. Similar graphical representation of other analyte concentration data where trends analyses were completed can be found in Figure D-1 to Figure D-49 in Appendix D. Flow diagrams for analytes with consistent and persistent temporal trends are available in Appendix F to demonstrate post-baseline median concentrations across LDG, including all effluent inputs.


Ekati Mine
Diavik Mine
Lac de Gras
Coppermine River
Lac de Gras Outlet
Lac du Sauvage Outlet
LDGS3
WQ-01
LDG48
LDGO
LDG46
FFA-5
FFA-2
FFA-4
FFA-3
FFA-1
WQ-02
LDG19
MF1-3
WQ-06
LDG42
MF5
WQ-05
LDG41
MF3-4
Conductivity (uS/cm)
Years
1994 - 2000
Deton' Cho Stantec
Legend
Mine Footprint
Diavik Sample Site
Ekati Sample Site
Mine Road
Winter Road
Waterbody
Approximate Flow Direction
Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Base features source: CANVEC dataset from Geogratis © Natural Resources Canada, 2013.
April 2015
144901977
Client/Project
Government of the Northwest Territories
Lac de Gras Water Chemistry, Spatial Variability and Temporal Trends
Figure No.
3-25
Title
Baseline (1994 – 2000) and Post-Baseline (2001 – 2013) Conductivity across Lac de Gras, NT
1:210,000
KM
\\Cd1215-f01\work_group\01609\Active_other_pcs\144901977_Lac_de_Gras\planning\drawing\MXD\Surface_Water\WaterChemistry\144901977_WC_Fig3-25_WaterChem_Conductivity_Sample_Loc.mxd
Revised: 2015-04-24 By: searles



Deton' Cho Stantec

Legend

- Mine Footprint
- Diavik Sample Site
- Ekati Sample Site
- Mine Road
- Winter Road
- Waterbody
- Approximate Flow Direction

Notes

1. Coordinate System: NAD 1983 UTM Zone 12N
2. Base features source: CANVEC dataset from Geogratis © Natural Resources Canada, 2013.

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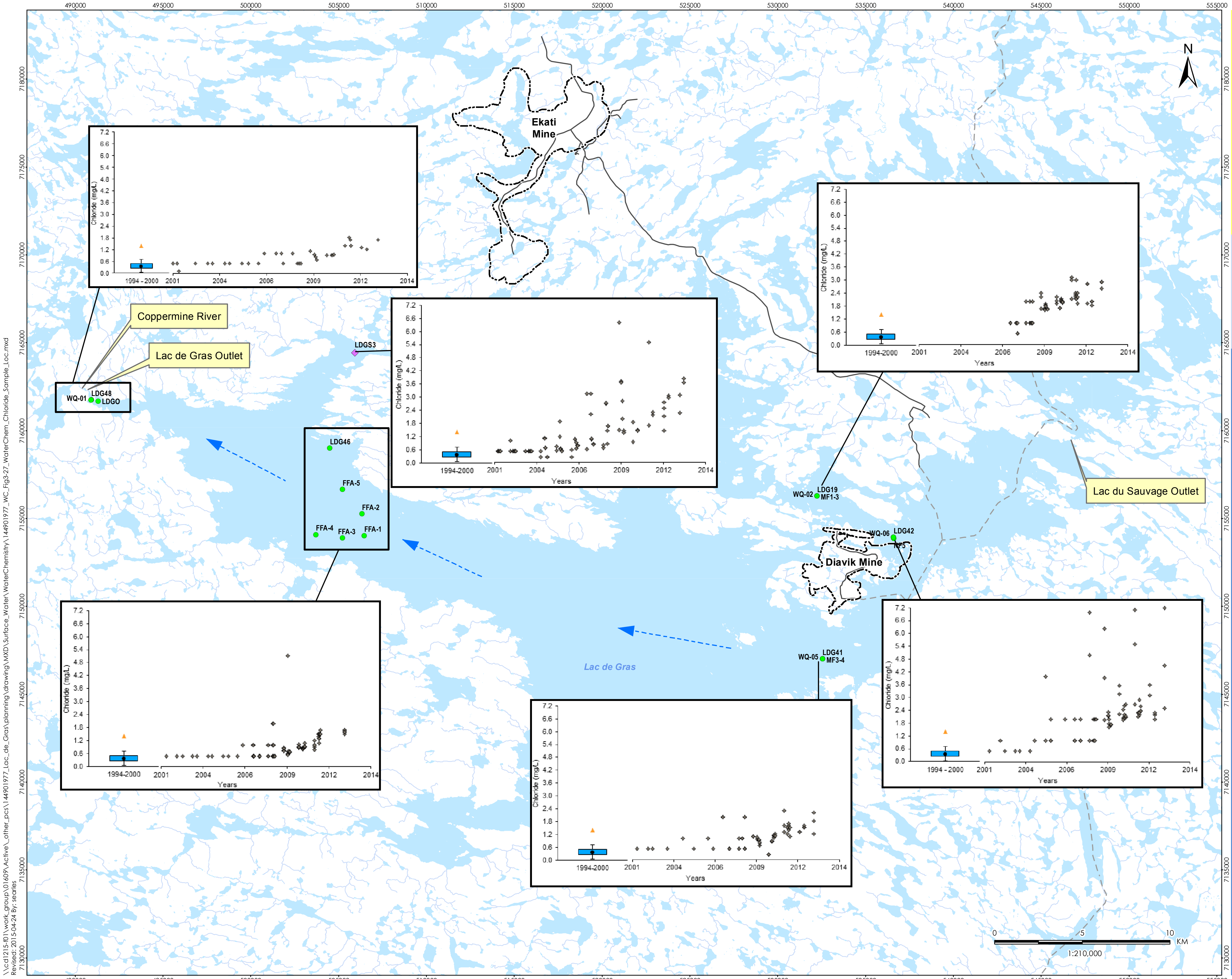
Figure No.

3-26

Title

Baseline (1994 – 2000) and Post-Baseline (2001 – 2013) Total Hardness across Lac de Gras, NT



Deton' Cho Stantec

Legend

- Mine Footprint
- Diavik Sample Site
- Ekati Sample Site
- Mine Road
- Winter Road
- Waterbody
- Approximate Flow Direction

Notes

1. Coordinate System: NAD 1983 UTM Zone 12N
2. Base features source: CANVEC dataset from Geogratis © Natural Resources Canada, 2013.

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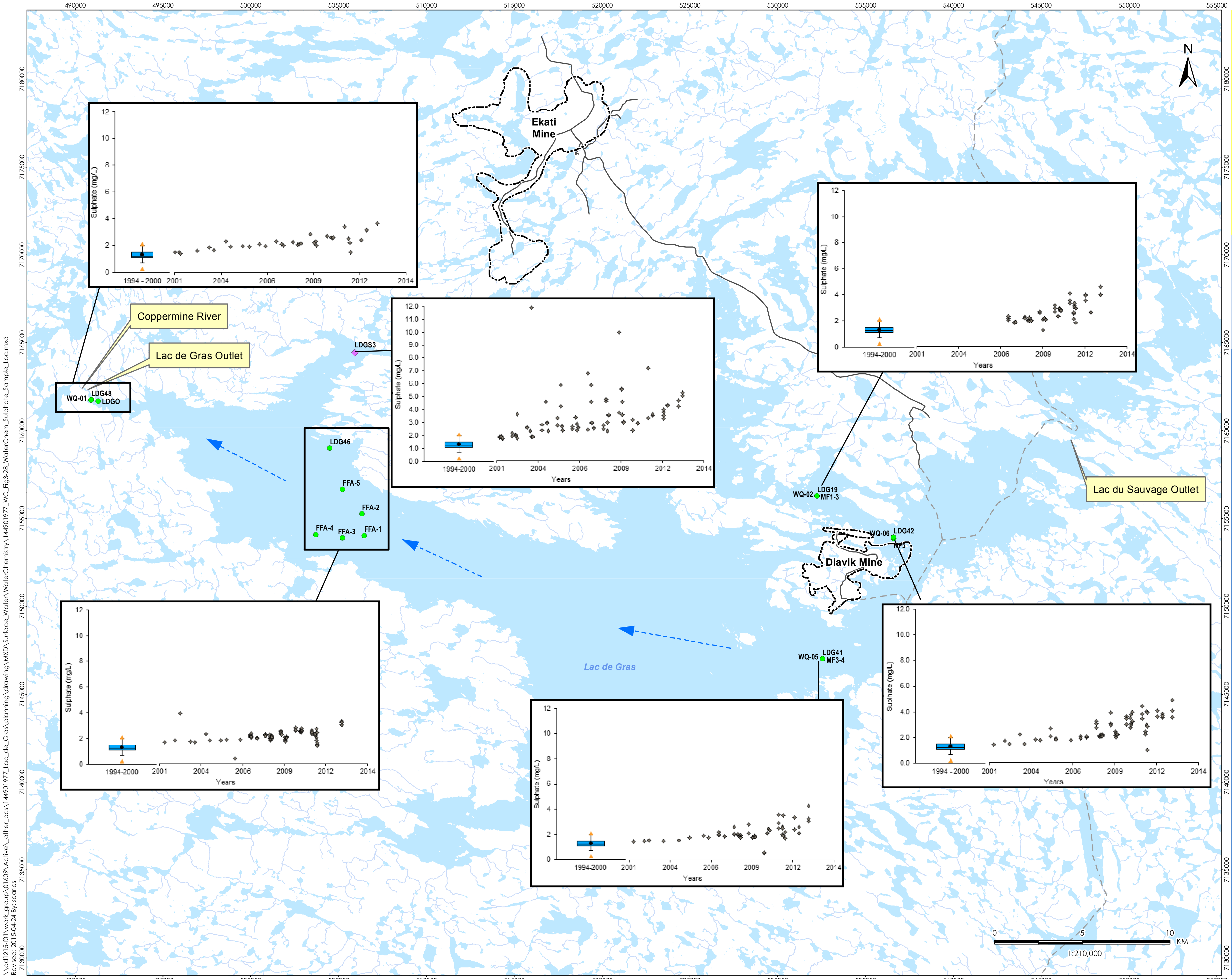
Lac de Gras Water Chemistry, Spatial Variability and Temporal Trends

Figure No.

3-27

Title

Baseline (1994 – 2000) and Post-Baseline (2001 – 2013) Chloride Concentrations across Lac de Gras, NT



Deton' Cho Stantec

Legend

- Mine Footprint
- Diavik Sample Site
- Ekati Sample Site
- Mine Road
- Winter Road
- Waterbody
- Approximate Flow Direction

Notes

1. Coordinate System: NAD 1983 UTM Zone 12N
2. Base features source: CANVEC dataset from Geogratis © Natural Resources Canada, 2013.

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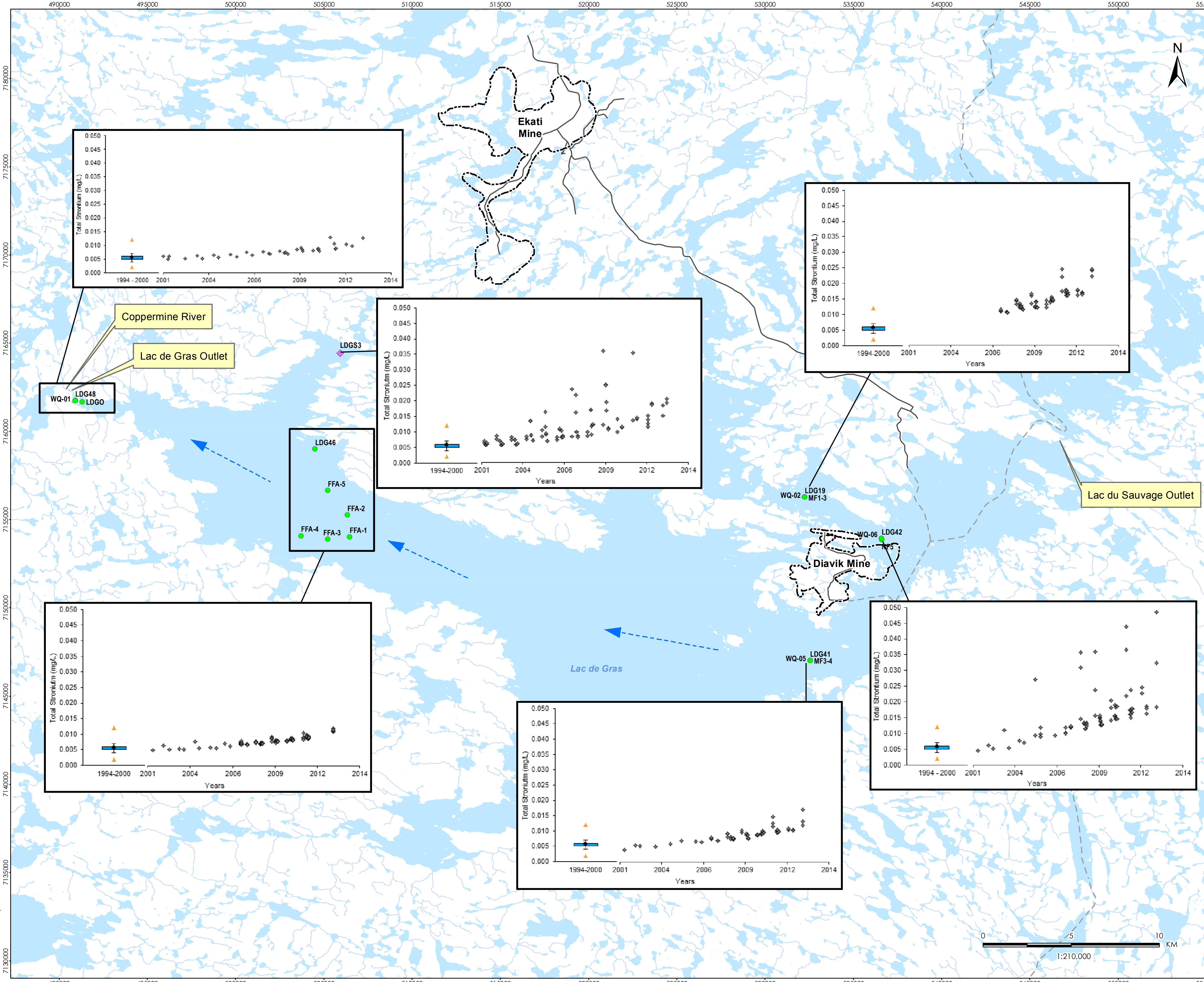
Lac de Gras Water Chemistry, Spatial Variability and Temporal Trends

Figure No.
3-28

Title

Baseline (1994 – 2000) and Post-Baseline (2001 – 2013) Sulphate Concentrations across Lac de Gras, NT



Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Base features source: CANVEC dataset from Geogratis © Natural Resources Canada, 2013.

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Client/Project
Government of the Northwest Territories
Lac de Gras Water Chemistry, Spatial Variability and Temporal Trends

Figure No.
3-29

Title
Baseline (1994 – 2000) and Post-Baseline (2001 – 2013) Total Strontium Concentrations across Lac de Gras, NT

\\Ccd1215-f01\work_group\01609\Active_other_pcs\144901977_Lac_de_Gras\planning\drawing\MXD\Surface_Water\WaterChemistry\144901977_WC_Fig3-29_WaterChem_Total_Strontium_Sample_Loc.mxd
Revised: 2015-04-24 By: searles

To characterize the magnitude of cumulative effect at each site, analytes that demonstrated significant ($p < 0.05$) increasing temporal trends throughout LDG are summarized in Table 3-2. Statistics are provided for the baseline period and the median over the past three years (2011 to 2013) for each site to evaluate baseline versus current conditions. The NF sites (WQ-06/LDG42/NF5 and LDGS3) tended to have the greatest magnitude of effect, displaying the largest change over baseline conditions, compared to the MF, FF or LDG Outlet sites. Chloride displayed the largest effect of all parameters with persistent temporal trends given that the baseline condition was largely undefined due to the prevalence of < DL data.

As one example monitored at all sites, sulphate exhibited a highly significant increasing trend in concentration at all six sites (Figure 3-28), and provided a clear example of the magnitude of increase. At the near-field site NF5, the sulphate concentration has increased steadily within LDG, and the median sulphate concentration between 2011 to 2013 was 3.6 mg/L (Figure 3-25). In comparison, median baseline sulphate concentrations over the period of record was 1.2 mg/L, which represents a 200% increase in sulphate concentration over the past 14 years at near-field site NF5. Similarly, the upper boundary of baseline over the period of record was estimated at approximately 2.0 mg/L, which is nearly half the current average concentration. The data also suggest that sulphate concentration has not plateaued, and will continue to increase in LDG into the future. Indeed reference to the patterns of the data scatter in Figure 3-28 might even suggest an accelerated rate of sulphate increase in LDG water in recent years. Considering that sulphate concentration in the DDMI effluent typically ranges from approximately 29 to 81 mg/L, and from 6 to 16 mg/L at the Slipper Lake Outlet (Ekati effluent) (Figure 3-12 in Section 3.3.2), there is still likely considerable scope for increases in sulphate concentration within LDG.

Table 3-2 Summary of Analyte Concentrations with Increasing Trends in Lac de Gras, NT, from the baseline period (1994–2000) to 2011–2013

Sample Site	Summary Statistic				Trend	Current Status of Post-Baseline Median	% Change[2]
	% ND[1]	Low (~5th percentile)	Median (50th percentile)	High (~95th percentile)			
Conductivity							
Baseline (BL) (1994–2000)							
All Sites	0	10.4	11.8	13.7	–	–	–
2011–2013							
WQ-06/LDG42/NF5	0	–	29	–	Increase	Exceeds BL high	146%
WQ-02/LDG19/MF1-3	0	–	27	–	Increase	Exceeds BL high	129%
WQ-05/LDG41/MF3-4	0	–	21.5	–	Increase	Exceeds BL high	82%
LDG46/FFA	0	–	19	–	Increase	Exceeds BL high	61%
LDGS3	0	–	29.9	–	Increase	Exceeds BL high	153%
LDG Outlet	0	–	20.4	–	Increase	Exceeds BL high	73%
Total Hardness							
Baseline (BL) (1994–2000)							
All Sites	0	4.0	4.0	4.8	–	–	–
2011–2013							
WQ-06/LDG42/NF5	0	–	8.2	–	Increase	Exceeds BL high	105%
WQ-02/LDG19/MF1-3	0	–	7.8	–	Increase	Exceeds BL high	95%
WQ-05/LDG41/MF3-4	0	–	6.4	–	Increase	Exceeds BL high	60%
LDG46/FFA	17	–	5.8	–	Increase	Exceeds BL high	45%
LDGS3	0	–	8.0	–	Increase	Exceeds BL high	100%
LDG Outlet	14	–	6.4	–	Increase	Exceeds BL high	60%

Table 3-2 Summary of Analyte Concentrations with Increasing Trends in Lac de Gras, NT, from the baseline period (1994–2000) to 2011–2013

Sample Site	Summary Statistic				Trend	Current Status of Post-Baseline Median	% Change[2]
	% ND[1]	Low (~5th percentile)	Median (50th percentile)	High (~95th percentile)			
Chloride[3]							
Baseline (BL) (1994–2000)							
All Sites	73	<0.1	–	1.4	–	–	–
2011–2013							
WQ-06/LDG42/NF5	0	–	2.5	–	Increase	Exceeds BL max	–
WQ-02/LDG19/MF1-3	0	–	2.3	–	Increase	Exceeds BL max	–
WQ-05/LDG41/MF3-4	0	–	1.5	–	Increase	Exceeds BL max	–
LDG46/FFA	0	–	1.5	–	Increase	Exceeds BL max	–
LDGS3	0	–	2.6	–	Increase	Exceeds BL max	–
LDG Outlet	0	–	1.4	–	Increase	Equal to BL max	–
Sulphate							
Baseline (BL) (1994–2000)							
All Sites	4	0.7	1.2	2.0	–	–	–
2011–2013							
WQ-06/LDG42/NF5	0	–	3.6	–	Increase	Exceeds BL high	200%
WQ-02/LDG19/MF1-3	0	–	3.1	–	Increase	Exceeds BL high	158%
WQ-05/LDG41/MF3-4	0	–	2.5	–	Increase	Exceeds BL high	108%
LDG46/FFA	0	–	2.4	–	Increase	Exceeds BL high	100%
LDGS3	0	–	4.1	–	Increase	Exceeds BL high	242%
LDG Outlet	0	–	2.5	–	Increase	Exceeds BL high	108%

Table 3-2 Summary of Analyte Concentrations with Increasing Trends in Lac de Gras, NT, from the baseline period (1994–2000) to 2011–2013

Sample Site	Summary Statistic				Trend	Current Status of Post-Baseline Median	% Change[2]
	% ND[1]	Low (~5th percentile)	Median (50th percentile)	High (~95th percentile)			
Total Strontium (mg/L)							
Baseline (BL) (1994–2000)							
All Sites	0	0.0040	0.0051	0.0070	–	–	–
2011–2013							
WQ-06/LDG42/NF5	0	–	0.0181	–	Increase	Exceeds BL high	255%
WQ-02/LDG19/MF1-3	0	–	0.0169	–	Increase	Exceeds BL high	231%
WQ-05/LDG41/MF3-4	0	–	0.0104	–	Increase	Exceeds BL high	104%
LDG46/FFA	0	–	0.0091	–	Increase	Exceeds BL high	78%
LDGS3	0	–	0.0152	–	Increase	Exceeds BL high	198%
LDG Outlet	0	–	0.0104	–	Increase	Exceeds BL high	104%

NOTES:
1 % ND = percentage of data reported as 'less than detection'.
2 % Change calculated with the baseline and 2013 median values for all analytes except chloride.
3 Baseline condition is undefined for chloride due to prevalence of non-detect data; summary statistics provided are the minimum and maximum baseline values reported between 1994 to 2000. The % change in chloride is not calculated because baseline condition is undefined.

Interpretation of cumulative temporal effects in LDG required an understanding of whether there had been temporal trends in water chemistry in lakes unaffected by mine discharge. It was considered that if temporal trends were observed in reference lakes, then any trends observed in LDG could at least partially have been due to natural phenomena (e.g., climate change). If, however, no temporal trends were observed in nearby reference lakes, then it was considered that any trends observed in LDG were solely the result of mine discharge. Conductivity, hardness, chloride and sulphate data from three nearby 'reference' lakes (Nanuq, Count and Vulture) were therefore made available for analysis of temporal trends. Significant ($p < 0.05$) temporal trends were observed for some analytes in some of the lakes (Table 3-3). Significant increasing trends were identified for total hardness and total strontium in all three of the lakes, while an increasing trend was identified for sulphate in Nanuq Lake only.

Table 3-3 Trends Analysis Statistics for Three Reference Lakes near Lac de Gras, between 2000/2001 to 2013

Parameter	Statistic	Nanuq Lake	Vulture Lake	Counts Lake
Conductivity	M-K *S*	0.11	-0.33	0.99
	Calc. p-value	0.456	0.628	0.162
	Trend	Not Significant	Not Significant	Not Significant
Total Hardness	M-K *S*	2.26	2.26	2.38
	Calc. p-value	0.012	0.012	0.009
	Trend	Increasing	Increasing	Increasing
Sulphate	M-K *S*	3.07	1.20	0.05
	Calc. p-value	0.001	0.114	0.478
	Trend	Increasing	Not Significant	Not Significant
Total Strontium	M-K *S*	4.05	3.28	4.16
	Calc. p-value	< 0.0001	0.0005	< 0.0001
	Trend	Increasing	Increasing	Increasing

The results indicate that the lake-wide temporal trends observed in LDG (Table 3-1) could at least partially have been caused by alterations in water chemistry from natural causes. However, the magnitude of increase observed in the reference lakes was considerably less than that observed in LDG. For example, sulphate in Nanuq Lake has increased by approximately 46%, from approximately 1.2 mg/L in 2000 to 1.8 mg/L in 2013 (Figure 3-30), compared to the 100 to 242% increase observed in LDG (Table 3-2). This suggests that temporal trends observed over the past 14 years in LDG were largely the result of mine discharge.

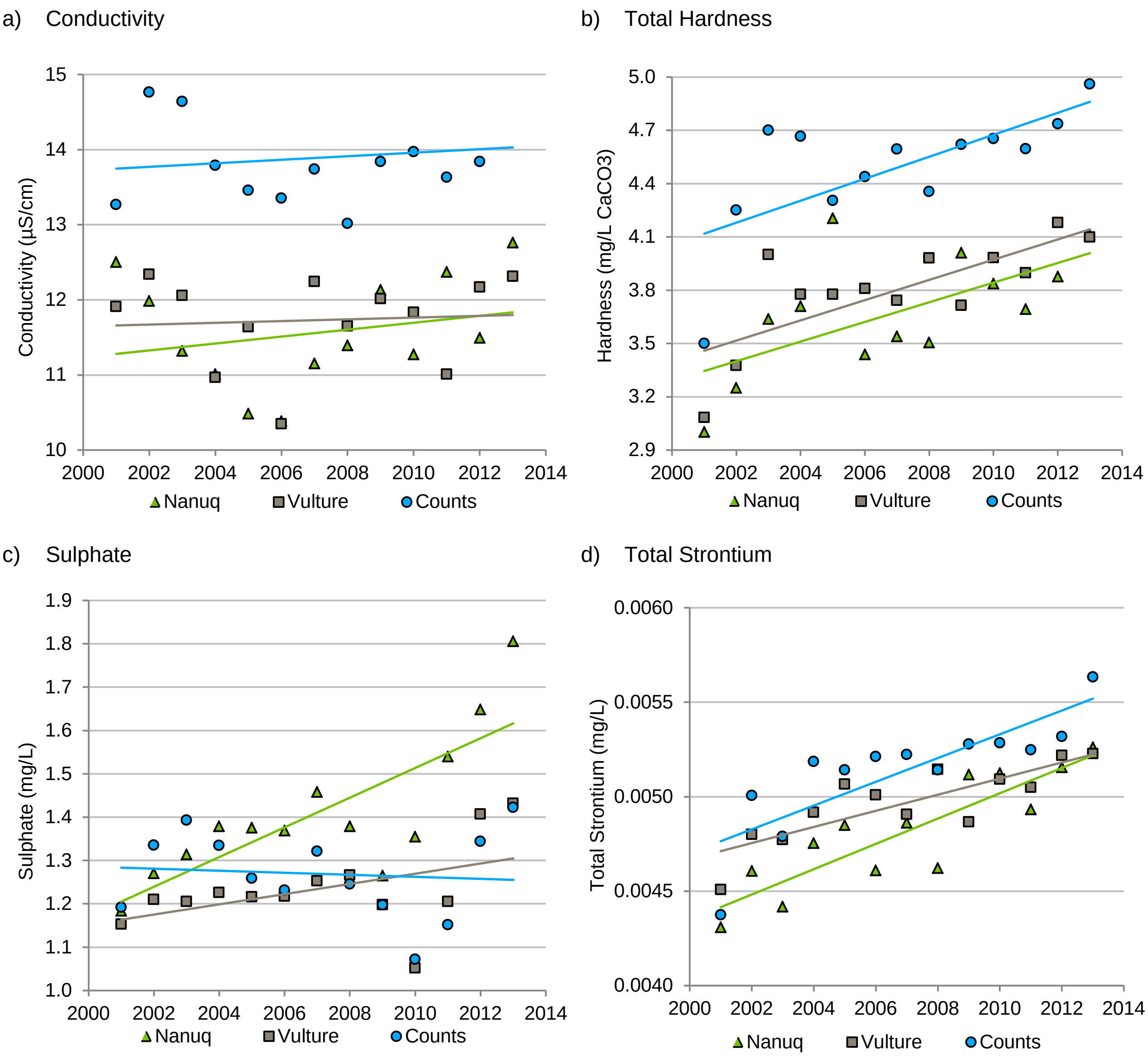

Figure 3-30 Mean Annual Water Chemistry for Three Reference Lakes near Lac de Gras, NT

3.5 Relative Loading Rates

A summary of the mean annual loadings for select analytes of potential concern is provided in Table 3-4, with mean annual effluent concentrations available in Table E1 of Appendix E, and mean annual loadings available in Table E2 of Appendix E.

Through the data record, an average of 44,857 kg of nitrogen have been released into LDG through the DDMI effluent per year (Table 3-4 and Table E2 in Appendix E). The Ekati/Slipper Lake effluent, in comparison, has released an average of 6,501 kg of nitrogen per year (Table 3-4 and Table E2 in Appendix E). Similarly, the DDMI effluent has released an average of 352 kg of phosphorus into LDG per year, while the Ekati/Slipper Lake effluent has released an average of 156 kg per year (Table 3-4 and Table E2 in Appendix E).

Table 3-4 Summary of mean annual loadings from Diavik and Ekati effluent discharges to Lac de Gras, NT

Year	Mean Annual Loadings (kg)[1,2]															
	TN		TP		Chloride		Sulphate		Total As		Total Fe		Total Mo		Total Sr	
	DDMI	Slip.	DDMI	Slip.	DDMI	Slip.	DDMI	Slip.	DDMI	Slip	DDMI	Slip	DDMI	Slip.	DDMI	Slip.
2000	0	13,837	0	197	0	17,340	0	86,006	0	6.2	0	3,075	0	4.2	0	365
2001	0	5,443	0	234	0	17,985	0	92,263	0	3.5	0	4,155	0	8.8	0	335
2002	2,546	4,678	27	76	4,937	19,888	75,076	69,686	2.4	3.9	727	982	4.5	5.4	120	207
2003	40,311	3,433	118	111	198,825	11,640	178,842	80,607	7.1	4.5	804	1,280	87	8.4	1,223	234
2004	43,352	6,244	92	138	311,080	49,147	174,235	164,787	5.5	4.9	152	1,225	126	52	1,672	484
2005	59,883	5,342	147	77	529,306	107,129	136,016	284,551	6.6	4.5	140	1,014	130	95	2,703	771
2006	80,103	12,075	371	366	726,173	325,478	228,559	651,728	14	16	1,113	4,199	228	220	4,192	2,307
2007	65,427	6,602	307	222	759,211	194,882	297,864	307,753	12	4.1	257	1,142	202	103	4,095	1,280
2008	55,385	6,433	252	189	832,340	316,195	385,666	399,587	12	7.2	106	1,546	216	132	4,243	1,641
2009	46,003	5,805	535	95	959,232	258,790	569,071	315,714	13	4.2	190	1,007	406	97	5,433	1,519
2010	33,170	6,535	508	144	955,461	255,963	982,945	282,322	15	5.4	265	1,686	611	73	6,017	1,409
2011	38,230	2,357	454	80	972,645	174,246	753,960	184,231	15	3.2	271	828	424	54	6,353	878
2012	33,470	4,316	684	156	824,712	222,559	699,899	216,439	22	4.0	266	805	396	72	5,848	1,088
2013	40,411	7,914	729	166	945,565	250,902	881,732	235,442	19	3.9	145	883	457	83	6,795	1,223
Average	**44,857**	**6,501**	**352**	**156**	**668,290**	**170,997**	**446,989**	**251,440**	**12**	**5.5**	**370**	**1,638**	**274**	**76**	**4,057**	**1,020**
% of Total Average Loading	**87**	**13**	**69**	**31**	**80**	**20**	**64**	**36**	**68**	**32**	**18**	**82**	**78**	**22**	**80**	**20**

NOTES:
[1] DDMI = mean annual loadings from DDMI effluent, released via the diffuser in Lac de Gras.
[2] Slip. = mean annual loadings from Ekati effluent, enters Lac de Gras through the Slipper Lake Outlet.

Comparable results were obtained for most other analytes examined for mean annual loading to LDG, including those that have demonstrated an increasing trend overtime, and over baseline conditions (i.e., chloride, sulphate, total As, Mo, Sr) (Table 3-4 and Table E2 in Appendix E). As two examples, mean loading for sulphate and chloride was calculated at almost 450,000 kg and 670,000 kg per year, respectively, from DDMI effluent, and just over 250,000 kg and 170,000 kg per year, respectively, from the Ekati/Slipper Lake effluent (Table 3-4).

Therefore, the relative contribution of the two identified discharge points (i.e., DDMI diffuser and the Ekati/Slipper Lake Outlet) to the observed increases in LDG appears to be largely related to loading from the DDMI effluent, specifically for TN, TP, chloride, sulphate, and total Al, As, Mo, Ni, Sr, and U (Table 3-4 and Table E2 in Appendix E). For these analytes, the DDMI effluent contributed approximately 64% (sulphate) to 96% (total U) of the total average annual loadings to LDG (Table 3-4 and Table E2 in Appendix E). The loading rates of the Ekati/Slipper Lake effluent are not irrelevant, but they are typically less than those from DDMI. For these same analytes, the Ekati/Slipper Lake effluent contributed approximately 4% (total U) to 36% (sulphate) of the total average annual loadings to LDG (Table 3-4 and Table E2 in Appendix E).

Total Cu and Fe were two exceptions and mean annual loadings from the Ekati/Slipper Lake Outlet were typically greater than that from the DDMI diffuser. Through the data record, an annual average of 370 kg Fe and 11 kg Cu were released by the DDMI effluent, while 1,638 kg Fe and 24 kg Cu were released in the Ekati/Slipper Lake effluent (Table 3-4 and Table E2 in Appendix E). Therefore, it appears that the effluent from the Slipper Lake Outlet has largely contributed to the observed increase in Fe concentrations at the LDG outlet, as discussed in Section 3.3.2. Total Cu has not become elevated in LDG over baseline conditions.

It is noted, however, that loadings from the LDS discharge could not be calculated, since flow data have not been collected and only minimal water-chemistry data have been collected.

4 CONCLUSIONS

From the analysis of the existing water-chemistry data record for LDG, and Ekati and Diavik effluent discharge into LDG, the following conclusions were made regarding the limnology of LDG and the potential for cumulative effects (as defined in Section 1.3).

4.1 Conclusions

4.1.1 Quality Assurance/Quality Control

The median ratio of dissolved:total metals was estimated at approximately 1.0 for As, Ba, Ca, Cu, K, Li, Mg, Ni, Mo, Na, and Sr. This indicates these metals are highly soluble and exist almost completely as the dissolved ion in LDG. Metals with a median ratio < 1.0 included Al, Bi, Fe, P, and U. These metals tend to be associated with the particulate fraction in the LDG water column. Metals for which most results were < DL included Be, Ag and Zr.

Metals with highly variable (> 1.2) dissolved:total ratios included Cd, Co, Cr, Pb, Mn, Hg, Tl, Sb, Se, Sn, Ti and Zn, and indicate data quality issues.

4.1.2 Limnological Depth Profiles

Upon examining the limnological data for one site (WQ-05/LDG41/MF3-4) in LDG, it was observed that, between June and September, water temperatures in LDG gradually warm from approximately 1°C to 10°C, which was the maximum mean summer surface-water temperature in LDG. Thermoclines do not persist above the 20 m depth in LDG during the open-water season, and the water column, down to a depth of 20 m, has therefore typically experienced a relatively uniform temperature.

Dissolved oxygen concentration in LDG is generally near or at saturation, and did not exhibit marked depth gradients down to the 20 m depth in the period of record. Conductivity and pH in LDG did not exhibit marked depth-related gradients over the period of record, but seasonal differences were present.

4.1.3 Baseline Water Chemistry (1994 to 2000)

'Baseline' condition, as defined at the approximate 5th and 95th percentile of the data between 1994 and 2000, was defined for a number of parameters, including pH, TDS, hardness, alkalinity, TN, TP, TOC, and total Al, Fe, Ni, and Sr. Baseline was undefined for a number of parameters, including chloride and many total metals due to the prevalence of data reported as 'less than detection.'

4.1.4 Spatial Variability in Post-Baseline (2001 to 2013) Water Chemistry

Upon examining spatial differences in post-baseline (2001 to 2013) water chemistry in LDG, it was determined that the DDMI effluent mixed rapidly within LDG over relatively short distances, which resulted in steep concentration gradients for hardness, sulphate, TDS, ammonia, TN, and total Al, As, Mo, Sr and U moving away from the discharge zone, through the mixing zone, and into the main basin of LDG. It was apparent that the DDMI effluent was relatively rapidly and well-mixed within LDG, such that no spatially or temporally persistent concentrated effluent plumes were observed beyond the mixing zones.

Within the main basin of LDG and beyond the DDMI mixing zone, there was a slight spatial gradient for hardness, sulphate, TDS, ammonia, TN, and total Al, As, Mo, Sr and U observed moving downstream over relatively long distances. These relatively slight spatial gradients indicated that the DDMI effluent in LDG was not completely mixed throughout the entire main basin, but rather that concentrations did decrease slightly moving further downstream from the DDMI mixing zone.

Similarly, discharge from the Slipper Lake Outlet was relatively rapidly mixed with LDG lake waters, which also resulted in relatively steep concentration gradients moving away from the Slipper Lake Outlet downstream to LDGS3, and relatively slight concentration gradients moving from LDGS3 downstream to the outlet of the lake.

Because of the rapid mixing of both the DDMI effluent and the Slipper Lake discharge, and the assumed rapid mixing of the LDS discharge, there was no spatially or temporally consistent observable evidence of spatial overlap in effluent plumes within the designated potential zones of overlap. For the DDMI effluent and the LDS discharge, there was no indication of increased concentration of any analyte at FF2. For the DDMI effluent and the Slipper Lake discharge, there was no indication of increased concentration of those analytes that had been found to have increased throughout LDG. These results indicate that there was no evidence to fulfill the definition of "Cumulative Effect" related to spatial overlap of effluent plumes, as advanced by the GNWT.

Through the post-baseline period of record, median values for hardness, sulphate, TDS, TN and total Sr have exceeded the upper boundary of their defined baseline conditions throughout all sites within LDG. There has, therefore, been a consistent, long-term observable overall lake-wide increase for these analytes in LDG since 2001. These results indicate that there has been a cumulative effect of mine discharge on LDG water chemistry throughout the entirety of the lake. However, despite these alterations in the water chemistry within LDG, the lake is still classified as a dilute, soft-water, circumneutral, ultra-oligotrophic to oligotrophic waterbody.

4.1.5 Temporal Trends Analysis

Temporal trends analysis indicated that the concentration of many analytes has increased steadily and significantly throughout the entire LDG over the past 14 years. Analytes with consistent and persistent increasing temporal trends through the entire lake include conductivity, hardness, chloride, sulphate, and total strontium. These significant increasing trends indicate that there has been a significant alteration in water chemistry within the entirety of LDG over the operational period of the two mines discharging into LDG. These results again indicate that there has been a temporally significant cumulative effect of mine discharge on LDG water chemistry throughout the entirety of the lake, and indicate clear evidence to fulfill the definition of "Temporal Cumulative Effect," as advanced by the GNWT.

Significant temporal trends were also observed for total hardness and total strontium in three nearby 'reference' lakes (Nanuq, Vulture and Counts), while an increasing trend was also identified for sulphate in Nanuq Lake only. The results indicate that the lake-wide temporal trends observed in LDG could at least partially have been caused by alterations in water chemistry from natural causes. However, the magnitude of increase observed in the reference lakes was considerably less than that observed in LDG, suggesting that temporal trends observed over the past 14 years in LDG were primarily the result of mine discharge.

In respect of the ongoing requirement (and parallel work) to create a hydrodynamic model of LDG, the analyses of water chemistry documented above gives rise to the following conclusions about model development and the ability to predict future water-chemistry regimes:

- The available water-chemistry data are sufficient to allow for water-quality calibration of the hydrodynamic model for LDG, allowing for the simulation of the general trends in lake chemistry.
- This will enable the prediction of future cumulative effects of the mine discharges at the LDG outlet.

4.1.6 Relative Loading Rates

The mean annual loading from the DDMI effluent is greater than that from the Ekati/Slipper Lake effluent for sulphate, chloride, total nitrogen, total phosphorus, and total Al, As, Mo, Ni, Sr, and U. The mean annual loading from the Ekati/Slipper Lake effluent is greater than that from the DDMI effluent for total Fe and total Cu. The relative contribution of the two identified discharge points (i.e., DDMI diffuser, Ekati/Slipper Lake Outlet) to those analytes with an observed increase in the entirety of LDG therefore appears to be largely related to loading from the DDMI effluent, with the exception of total Fe.

5 CLOSURE

Stantec Consulting has prepared this report for the sole benefit of the Government of the Northwest Territories (GNWT) for the purpose of documenting baseline water chemistry and spatial and temporal alterations in water chemistry within Lac de Gras. The report may not be relied upon by any other person or entity, other than for its intended purposes, without the express written consent of Deton' Cho Stantec and the GNWT. Any use of this preliminary report by a third party, or any reliance on decisions made based upon it, are the responsibility of such third parties.

The information provided in this report was compiled by Deton' Cho Stantec from existing documents and water chemistry data provided by the GNWT, Diavik and Ekati. This report represents the best professional judgment of our personnel available at the time of its preparation. Deton' Cho Stantec reserves the right to modify the contents of this report, in whole or in part, to reflect any new information that becomes available. If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that we be notified immediately to reassess the conclusions provided herein.

Respectfully Submitted,

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APPENDIX A Lac de Gras Water Chemistry Sample Sites

Table A1 Comparison of Data Received from the Water Chemistry Sampling Programs at the Diavik Diamond Mine and Ekati Diamond Mine, Lac de Gras, NT

Parameters	Units	Diavik		Ekati	
		Data Received?	No. Data Points	Data Received?	No. Data Points
Physical					
pH	pH units	✔	5,482		
Conductivity	µS/cm	✔	4,253	✔	139
Color (True)	TCU	✔	60		
Dissolved Oxygen (Total)	mg/L	✔	2,114		
Total Dissolved Solids (TDS)	mg/L	✔	4,250	✔	397
Total Suspended Solids (TSS)	mg/L	✔	4,032		
Turbidity	NTU	✔	3,993		
Biochemical Oxygen Demand (BOD)	mg/L	✔	228		
Anions					
Acidity (pH 4.5)	mg/L	✔	1,310		
Acidity (pH 8.3)	mg/L	✔	1,309		
Alkalinity (Total as $CaCO_3$)	mg/L	✔	4,254	✔	141
Alkalinity (PP as $CaCO_3$)	mg/L	✔	1,306		
Bicarbonate (HCO_3)	mg/L	✔	4,134	✔	139
Carbonate (CO_3)	mg/L	✔	4,134	✔	139
Hydroxide (OH)	mg/L	✔	4,134	✔	139
Hardness (as CaCO3) - Dissolved	mg/L	✔	759		
Hardness (as CaCO3) - Total	mg/L	✔	4,183	✔	399
Chloride (Cl)	mg/L	✔	4,239	✔	399
Fluoride (F)	mg/L	✔	4,201		
Sulphate (SO_4)	mg/L	✔	4,220	✔	399
Nutrients					
Nitrite-N	mg/L	✔	4,261	✔	392
Nitrate-N	mg/L	✔	4,256	✔	399
Nitrate plus Nitrite (N)	mg/L	✔	4,217		
Ammonia-N	mg/L	✔	6,765	✔	399
Total Kjeldahl Nitrogen (TKN)	mg/L	✔	4,129	✔	140
Nitrogen (N) (Total)	mg/L	✔	1,271	✔	140
Phosphorus - Total	mg/L	✔	4,272	✔	140
Phosphorus - Dissolved	mg/L	✔	4,053		
Phosphate - Total	mg/L			✔	387
Phosphate - Total Dissolved	mg/L	✔	17		
Orthophosphate	mg/L	✔	4,157	✔	396
Silica (SiO_2) - Reactive	mg/L	✔	56		
Carbon					
Total Inorganic Carbon	mg/L	✔	95		
Total Organic Carbon (TOC)	mg/L	✔	3,806	✔	268
Dissolved Organic Carbon (DOC)	mg/L	✔	2,129		
Metals					
Aluminum (Al) - Total	µg/L / mg/L	✔	4,282	✔	387
Aluminum (Al) - Dissolved	µg/L / mg/L	✔	2,314		
Antimony (Sb) - Total	µg/L / mg/L	✔	3,930	✔	387
Antimony (Sb) - Dissolved	µg/L / mg/L	✔	2,304		
Arsenic (As) - Total	µg/L / mg/L	✔	4,239	✔	399
Arsenic (As) - Dissolved	µg/L / mg/L	✔	2,305		
Barium (Ba) - Total	µg/L / mg/L	✔	4,283		
Barium (Ba) - Dissolved	µg/L / mg/L	✔	2,315		
Beryllium (Be) - Total	µg/L / mg/L	✔	4,276		
Beryllium (Be) - Dissolved	µg/L / mg/L	✔	2,315		
Bismuth (Bi) - Total	µg/L / mg/L	✔	2,005		
Bismuth (Bi) - Dissolved	µg/L / mg/L	✔	1,260		
Boron (B) - Total	µg/L / mg/L	✔	3,992		

Table A1 Comparison of Data Received from the Water Chemistry Sampling Programs at the Diavik Diamond Mine and Ekati Diamond Mine, Lac de Gras, NT

Parameters	Units	Diavik		Ekati	
		Data Received?	No. Data Points	Data Received?	No. Data Points
Metals (cont'd)					
Boron (B) - Dissolved	µg/L / mg/L	a	2,315		
Cadmium (Cd) - Total	µg/L / mg/L	✔	4,011		
Cadmium (Cd) - Dissolved	µg/L / mg/L	✔	2,315		
Calcium (Ca) - Total	µg/L / mg/L	✔	4,261		
Calcium (Ca) - Dissolved	µg/L / mg/L	✔	2,979		
Chromium (Cr) - Total	µg/L / mg/L	✔	4,284		
Chromium (Cr) - Dissolved	µg/L / mg/L	✔	2,282		
Chromium, Hexavalent (Cr^{6+}) - Total	µg/L / mg/L	✔	102		
Cobalt (Co) - Total	µg/L / mg/L	✔	4,283		
Cobalt (Co) - Dissolved	µg/L / mg/L	✔	2,282		
Copper (Cu) - Total	µg/L / mg/L	✔	4,284	✔	387
Copper (Cu) - Dissolved	µg/L / mg/L	✔	2,282		
Iron (Fe) - Total	µg/L / mg/L	✔	2,957	✔	399
Iron (Fe) - Dissolved	µg/L / mg/L	✔	2,867		
Lead (Pb) - Total	µg/L / mg/L	✔	4,283		
Lead (Pb) - Dissolved	µg/L / mg/L	✔	2,282		
Lithium (Li) - Total	µg/L / mg/L	✔	1,383		
Lithium (Li) - Dissolved	µg/L / mg/L	✔	685		
Magnesium (Mg) - Total	µg/L / mg/L	✔	4,261		
Magnesium (Mg) - Dissolved	µg/L / mg/L	✔	2,978		
Manganese (Mn) - Total	µg/L / mg/L	✔	4,284		
Manganese (Mn) - Dissolved	µg/L / mg/L	✔	2,281		
Mercury (Hg) - Total	µg/L / mg/L	✔	4,067		
Mercury (Hg) - Dissolved	µg/L / mg/L	✔	2,216		
Molybdenum (Mo) - Total	µg/L / mg/L	✔	4,283	✔	399
Molybdenum (Mo) - Dissolved	µg/L / mg/L	✔	2,281		
Nickel (Ni) - Total	µg/L / mg/L	✔	4,284	✔	387
Nickel (Ni) - Dissolved	µg/L / mg/L	✔	2,282		
Potassium (K) - Total	µg/L / mg/L	✔	4,256	✔	387
Potassium (K) - Dissolved	µg/L / mg/L	✔	2,969		
Selenium (Se) - Total	µg/L / mg/L	✔	4,241	✔	387
Selenium (Se) - Dissolved	µg/L / mg/L	✔	2,270		
Silicon (Si) - Total	µg/L / mg/L	✔	1,350		
Silicon (Si) - Dissolved	µg/L / mg/L	✔	685		
Silver (Ag) - Total	µg/L / mg/L	✔	4,283		
Silver (Ag) - Dissolved	µg/L / mg/L	✔	2,282		
Sodium (Na) - Total	µg/L / mg/L	✔	4,261		
Sodium (Na) - Dissolved	µg/L / mg/L	✔	2,980		
Strontium (Sr) - Total	µg/L / mg/L	✔	4,283	✔	399
Strontium (Sr) - Dissolved	µg/L / mg/L	✔	2,282		
Sulphur (S) - Total	µg/L / mg/L	✔	1,316		
Sulphur (S) - Dissolved	µg/L / mg/L	✔	710		
Thallium (Tl) - Total	µg/L / mg/L	✔	1,800		
Thallium (Tl) - Dissolved	µg/L / mg/L	✔	1,260		
Tin (Sn) - Total	µg/L / mg/L	✔	2,024		
Tin (Sn) - Dissolved	µg/L / mg/L	✔	1,261		
Titanium (Ti) - Total	µg/L / mg/L	✔	2,105		
Titanium (Ti) - Dissolved	µg/L / mg/L	✔	1,261		
Uranium (U) - Total	µg/L / mg/L	✔	4,006	✔	387
Uranium (U) - Dissolved	µg/L / mg/L	✔	2,282		
Vanadium (V) - Total	µg/L / mg/L	✔	4,283		
Vanadium (V) - Dissolved	µg/L / mg/L	✔	2,281		

Table A1 Comparison of Data Received from the Water Chemistry Sampling Programs at the Diavik Diamond Mine and Ekati Diamond Mine, Lac de Gras, NT

Parameters	Units	Diavik		Ekati	
		Data Received?	No. Data Points	Data Received?	No. Data Points
Metals (cont'd)					
Zinc (Zn) - Total	µg/L / mg/L	✔	4,283	✔	387
Zinc (Zn) - Dissolved	µg/L / mg/L	✔	2,280		
Zirconium (Zr) - Total	µg/L / mg/L	✔	1,273		
Zirconium (Zr) - Dissolved	µg/L / mg/L	✔	651		

Table A2 Water Chemistry Sample Sites over the Period of Record; Lac de Gras, NT

Mine	Site ID	Former Site Name	Coordinates (NAD 83, UTM Zone 12)		Waterbody	Program	Type	Location Description	Purpose/Rationale	Sampling Frequency	Data Record Received	Source
			Easting	Northing								
Diavik	1645-18	-	Water Treatment Plant	Water Treatment Plant	Lac de Gras	SNP	-	North Inlet Water Treatment Plant Outlet; original discharge line	Monitor treated effluent	Approx. every 6 days	2002–present	-
Diavik	1645-18B	-	Water Treatment Plant	Water Treatment Plant	Lac de Gras	SNP	-	North Inlet Water Treatment Plant Outlet; new discharge line (2009)	Monitor treated effluent	Approx. every 6 days	2009–present	-
Diavik	1645-19	-	535966	7153538	Lac de Gras	SNP	-	Approx. 60 m from diffuser	Monitor the diffuser mixing zone and dilution	Monthly	2002–2009	Wek'eezhii Land and Water Board. Letter to Diavik Diamond Mines Inc. *re* Diavik Request for Changes to the Surveillance Network Program, Stations 1645-18 and 1645-19. 11 September 2009. Diavik Diamond Mines Inc. *Diavik Diamond Mine Aquatic Effects Monitoring Program: 2007 AEMP Annual Report* . DDMI, April 2008.
Diavik	1645-19A	-	535800	7153496	Lac de Gras	SNP	-	Approx. 60 m from diffuser	Monitor the diffuser mixing zone and dilution	Monthly	2002–present	Wek'eezhii Land and Water Board. Letter to Diavik Diamond Mines Inc. re Diavik Request for Changes to the Surveillance Network Program, Stations 1645-18 and 1645-19. 11 September 2009. Diavik Diamond Mines Inc. Diavik Diamond Mine Aquatic Effects Monitoring Program: 2007 AEMP Annual Report. DDMI, April 2008.
Diavik	1645-19B	-	535966	7153538	Lac de Gras	SNP	-	Approx. 60 m from diffuser	Monitor the diffuser mixing zone and dilution	Monthly	2002-2012	Wek'eezhii Land and Water Board. Letter to Diavik Diamond Mines Inc. re Diavik Request for Changes to the Surveillance Network Program, Stations 1645-18 and 1645-19. 11 September 2009.
Diavik	1645-19B2	-	?	?	Lac de Gras	SNP	-	Approx. 60 m from diffuser	Monitor the diffuser mixing zone and dilution	Monthly	2009–present	Wek'eezhii Land and Water Board. Letter to Diavik Diamond Mines Inc. re Diavik Request for Changes to the Surveillance Network Program, Stations 1645-18 and 1645-19. 11 September 2009.
Diavik	1645-19C	-	535840	7153389	Lac de Gras	SNP	-	Approx. 60 m from diffuser	Monitor the diffuser mixing zone and dilution	Monthly	2002–present	Wek'eezhii Land and Water Board. Letter to Diavik Diamond Mines Inc. re Diavik Request for Changes to the Surveillance Network Program, Stations 1645-18 and 1645-19. 11 September 2009.
Diavik	e10	-	?	?	-	-	-	-	-	-	-	-
Diavik	e3	-	?	?	-	-	-	-	-	-	-	-
Diavik	e3--0.2	-	?	?	-	-	-	-	-	-	-	-
Diavik	e6	-	?	?	-	-	-	-	-	-	-	-
Diavik	e7	-	?	?	-	-	-	-	-	-	-	-
Diavik	e8	-	?	?	-	-	-	-	-	-	-	-
Diavik	EMAB1	-	?	?	-	-	-	-	-	-	-	-
Diavik	EMAB2	-	?	?	-	-	-	-	-	-	-	-
Diavik	EMAB3	-	?	?	-	-	-	-	-	-	-	-
Diavik	FF1-1	-	525430	7161043	Lac de Gras	AEMP	Far-Field	North side of Lac de Gras; 13,571 m from diffuser	Reference Area	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011, 2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	FF1-2	-	524932	7159476	Lac de Gras	AEMP	Far-Field	North side of Lac de Gras; 12,915 m from diffuser	Reference Area	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011, 2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	FF1-3	-	526407	7160492	Lac de Gras	AEMP	Far-Field	North side of Lac de Gras; 12,788 m from diffuser	Reference Area	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011, 2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	FF1-4	-	526493	7159058	Lac de Gras	AEMP	Far-Field	North side of Lac de Gras; 11,399 m from diffuser	Reference Area	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011, 2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX

Table A2 Water Chemistry Sample Sites over the Period of Record; Lac de Gras, NT

Mine	Site ID	Former Site Name	Coordinates (NAD 83, UTM Zone 12)		Waterbody	Program	Type	Location Description	Purpose/Rationale	Sampling Frequency	Data Record Received	Source
			Easting	Northing								
Diavik	FF1-5	-	526683	7161824	Lac de Gras	AEMP	Far-Field	North side of Lac de Gras; 12,823 m from diffuser	Reference Area	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011, 2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	FF2-1	-	541500	7159522	Lac de Gras	AEMP	Far-Field	8,276 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011	RioTinto. Diavik Diamond Mine Aquatic Effects Monitoring Program 2009 Annual Report. RioTinto, 31 March 2010.
Diavik	FF2-2	-	541588	7158561	Lac de Gras	AEMP	Far-Field	East side of Lac de Gras and South of Lac du Sauvage; 8,276 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	FF2-3	-	543478	7159267	Lac de Gras	AEMP	Far-Field	10,096 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011	RioTinto. Diavik Diamond Mine Aquatic Effects Monitoring Program 2009 Annual Report. RioTinto, 31 March 2010.
Diavik	FF2-4	-	543752	7158945	Lac de Gras	AEMP	Far-Field	10,194 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011	RioTinto. Diavik Diamond Mine Aquatic Effects Monitoring Program 2009 Annual Report. RioTinto, 31 March 2010.
Diavik	FF2-5	-	544724	7158879	Lac de Gras	AEMP	Far-Field	East side of Lac de Gras and South of Lac du Sauvage; 11,444 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	FF3-4	-	?	?	-	-	-	-	-	-	-	-
Diavik	FF4-2	-	?	?	-	-	-	-	-	-	-	-
Diavik	FFA-1	-	506453	7154021	Lac de Gras	AEMP	Far-Field	West side of Lac de Gras; 36,769 m from diffuser	Reference Area	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011, 2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	FFA-2	-	506315	7155271	Lac de Gras	AEMP	Far-Field	West side of Lac de Gras; 38,312 m from diffuser	Reference Area	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011, 2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	FFA-3	-	505207	7153887	Lac de Gras	AEMP	Far-Field	West side of Lac de Gras; 38,734 m from diffuser	Reference Area	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011, 2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	FFA-4	-	503703	7154081	Lac de Gras	AEMP	Far-Field	West side of Lac de Gras; 40,211 m from diffuser	Reference Area	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011, 2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	FFA-5	-	505216	7156657	Lac de Gras	AEMP	Far-Field	West side of Lac de Gras; 39,956 m from diffuser	Reference Area	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011, 2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX

Table A2 Water Chemistry Sample Sites over the Period of Record; Lac de Gras, NT

Mine	Site ID	Former Site Name	Coordinates (NAD 83, UTM Zone 12)		Waterbody	Program	Type	Location Description	Purpose/Rationale	Sampling Frequency	Data Record Received	Source
			Easting	Northing								
Diavik	FFB-1	-	516831	7148207	Lac de Gras	AEMP	Far-Field	Central part of Lac de Gras; 26,355 m from diffuser	Reference Area	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011, 2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	FFB-2	-	518473	7150712	Lac de Gras	AEMP	Far-Field	Central part of Lac de Gras; 24,991 m from diffuser	Reference Area	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011, 2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	FFB-3	-	518048	7147557	Lac de Gras	AEMP	Far-Field	Central part of Lac de Gras; 25,245 m from diffuser	Reference Area	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011, 2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	FFB-4	-	515687	7150036	Lac de Gras	AEMP	Far-Field	Central part of Lac de Gras; 27,591 m from diffuser	Reference Area	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011, 2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	FFB-5	-	516533	7150032	Lac de Gras	AEMP	Far-Field	Central part of Lac de Gras; 26,761 m from diffuser	Reference Area	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011, 2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	FFC-2	-	?	?	-	-	-	-	-	-	-	-
Diavik	LDG2	-	534466.62	7151316.02	Lac de Gras	Baseline Survey	-	-	Metal Monitoring Exploration Site, possible mine site	Discontinued	1994–1995	Pers. Comm., David Wells, DDMI. Acres/Bryant Environmental Consultants. Diavik Diamonds Project: Environmental Baseline Program for the Diavik Diamond Project, Lac de Gras, NWT; 1995 Year End Report, Fisheries and Aquatics Resources. Prepared for Diavik Diamond Mine Inc., January 1996. Diavik Diamond Mines Inc. Compilation of Baseline Information, Submission to the Mackenzie Valley Land and Water Board, Manual 2 of 6. 16 October 2000.
Diavik	LDG3	-	536986.00	7152341.61	Lac de Gras	Baseline Survey	-	-	Metal Monitoring Exploration Site, possible mine site	Discontinued	1994–1995	Pers. Comm., David Wells, DDMI. Acres/Bryant Environmental Consultants. Diavik Diamonds Project: Environmental Baseline Program for the Diavik Diamond Project, Lac de Gras, NWT; 1995 Year End Report, Fisheries and Aquatics Resources. Prepared for Diavik Diamond Mine Inc., January 1996. Diavik Diamond Mines Inc. Compilation of Baseline Information, Submission to the Mackenzie Valley Land and Water Board, Manual 2 of 6. 16 October 2000.
Diavik	LDG4	-	534087.60	7153612.44	Lac de Gras	Baseline Survey	-	-	Baseline Monitoring for the area associated with the kimberlite pipe A418 Possible waste rock disposal site	Discontinued	1994–1995	Pers. Comm., David Wells, DDMI. Acres/Bryant Environmental Consultants. Diavik Diamonds Project: Environmental Baseline Program for the Diavik Diamond Project, Lac de Gras, NWT; 1995 Year End Report, Fisheries and Aquatics Resources. Prepared for Diavik Diamond Mine Inc., January 1996. Diavik Diamond Mines Inc. Compilation of Baseline Information, Submission to the Mackenzie Valley Land and Water Board, Manual 2 of 6. 16 October 2000.
Diavik	LDG40	LDG-13 LDG-18 LDG-19	533682	7155356	Lac de Gras	AEMP	Mid-Field	North of East Island	-	1 x open-water, 1 x ice-covered	LDG40-(2000–2006) LDG13,18,19-(1994–1995)	RioTinto. Diavik Diamond Mine Aquatic Effects Monitoring Program 2009 Annual Report. RioTinto, 31 March 2010. Diavik Diamond Mines Inc. Diavik Diamond Mine Aquatic Effects Monitoring Program. DDMI, April 2006. Diavik Diamond Mine Inc. 2000 Aquatic Effects Monitoring Program Technical Report. DDMI, March 2001. Zajdlik & Associates Inc. Review of DDMI Baseline Data Set. Prepared for DIAND, 27 September 2005.

Table A2 Water Chemistry Sample Sites over the Period of Record; Lac de Gras, NT

Mine	Site ID	Former Site Name	Coordinates (NAD 83, UTM Zone 12)		Waterbody	Program	Type	Location Description	Purpose/Rationale	Sampling Frequency	Data Record Received	Source
			Easting	Northing								
Diavik	LDG41	WQ-05	532545	7147011	Lac de Gras	AEMP	Mid-Field	South of East Island	-	1 x open-water, 1 x ice-covered	LDG41-(2000–2006) WQ-05-(1996–1999)	Golder Associates. DDMI Aquatic Effects Monitoring Program Version 3.0. Prepared for Diavik Diamond Mines Inc., October 2011. Diavik Diamond Mines Inc. Diavik Diamond Mine Aquatic Effects Monitoring Program. DDMI, April 2006. Diavik Diamond Mine Inc. 2000 Aquatic Effects Monitoring Program Technical Report. DDMI, March 2001. Zajdlik & Associates Inc. Review of DDMI Baseline Data Set. Prepared for DIAND, 27 September 2005.
Diavik	LDG42	WQ-06 N7 LDG-11 LDG-3 LDG-25	536584.68	7153924.58	Lac de Gras	AEMP	Mid-Field	Northeast of East Island	-	1 x open-water, 1 x ice-covered	LDG42-(2000–2006) WQ-06-(1996–1999) LDG-11,3,25-(1994–1995)	Pers. Comm., David Wells, DDMI. Diavik Diamond Mines Inc. Diavik Diamond Mine Aquatic Effects Monitoring Program. DDMI, April 2006. Diavik Diamond Mine Inc. 2000 Aquatic Effects Monitoring Program Technical Report. DDMI, March 2001. Zajdlik & Associates Inc. Review of DDMI Baseline Data Set. Prepared for DIAND, 27 September 2005.
Diavik	LDG43	WQ-07 LDG-14	536816	7151126	Lac de Gras	AEMP	Mid-Field	Due east of Double Bay	-	1 x open-water, 1 x ice-covered	LDG43-(2000-2006) WQ-07-(1996–1999) LDG-14-(1994–1995)	Golder Associates. DDMI Aquatic Effects Monitoring Program Version 3.0. Prepared for Diavik Diamond Mines Inc., October 2011. Diavik Diamond Mines Inc. Diavik Diamond Mine Aquatic Effects Monitoring Program. DDMI, April 2006. Diavik Diamond Mine Inc. 2000 Aquatic Effects Monitoring Program Technical Report. DDMI, March 2001. Zajdlik & Associates Inc. Review of DDMI Baseline Data Set. Prepared for DIAND, 27 September 2005.
Diavik	LDG44	WQ-03 LDG-21 LDG-22	528469.16	7151806.52	Lac de Gras	AEMP	Mid-Field	Southwest of East Island	-	1 x open-water, 1 x ice-covered	LDG44-(2000–2006) WQ-03(1996–1999) LDG-21,22-(1994–1995)	Pers. Comm., David Wells, DDMI. Diavik Diamond Mines Inc. Diavik Diamond Mine Aquatic Effects Monitoring Program. DDMI, April 2006. Diavik Diamond Mine Inc. 2000 Aquatic Effects Monitoring Program Technical Report. DDMI, March 2001. Zajdlik & Associates Inc. Review of DDMI Baseline Data Set. Prepared for DIAND, 27 September 2005.
Diavik	LDG45	M1 M2	540955	7157359	Lac de Gras	AEMP	Mid-Field	Southwest of Misery outlet	-	1 x open-water, 1 x ice-covered	LDG45-(2000–2006) M1,M2-(1998–2000)	RioTinto. Diavik Diamond Mine Aquatic Effects Monitoring Program 2009 Annual Report. RioTinto, 31 March 2010. Diavik Diamond Mines Inc. Diavik Diamond Mine Aquatic Effects Monitoring Program. DDMI, April 2006. Diavik Diamond Mine Inc. 2000 Aquatic Effects Monitoring Program Technical Report. DDMI, March 2001. Zajdlik & Associates Inc. Review of DDMI Baseline Data Set. Prepared for DIAND, 27 September 2005.
Diavik	LDG46	WQ-14	504491.61	7159009.68	Lac de Gras	AEMP	Far-Field	Southeast of Slipper Lake Bay	-	1 x open-water, 1 x ice-covered	LDG46-(2000–2006) WQ-14-(1996–1999)	Pers. Comm., David Wells, DDMI. Diavik Diamond Mines Inc. Diavik Diamond Mine Aquatic Effects Monitoring Program. DDMI, April 2006. Diavik Diamond Mine Inc. 2000 Aquatic Effects Monitoring Program Technical Report. DDMI, March 2001. Zajdlik & Associates Inc. Review of DDMI Baseline Data Set. Prepared for DIAND, 27 September 2005.
Diavik	LDG47	-	?	?	-	-	-	-	-	-	-	-
Diavik	LDG48	WQ-01 LDG-20 LDGO	490900	7161762	Lac de Gras	AEMP	Far-Field	LDG Outlet	-	1 x open-water, 1 x ice-covered	LDG-20-(2002–2013) LDGO-(2000)	Diavik Diamond Mines Inc. Diavik Diamond Mine Aquatic Effects Monitoring Program. DDMI, April 2006. Diavik Diamond Mine Inc. 2000 Aquatic Effects Monitoring Program Technical Report. DDMI, March 2001. Zajdlik & Associates Inc. Review of DDMI Baseline Data Set. Prepared for DIAND, 27 September 2005.
Diavik	LDG49	WQ-13 LDG-15 LDG-16 LDG-5 LDG-6	531189.20	7153902.28	Lac de Gras	Baseline Survey AEMP	Mid-Field	Between East and West Islands	-	1 x open-water, 1 x ice-covered	2002–2006	Pers. Comm., David Wells, DDMI. Diavik Diamond Mines Inc. Diavik Diamond Mine Aquatic Effects Monitoring Program. DDMI, April 2006. Diavik Diamond Mine Inc. 2000 Aquatic Effects Monitoring Program Technical Report. DDMI, March 2001. Zajdlik & Associates Inc. Review of DDMI Baseline Data Set. Prepared for DIAND, 27 September 2005.

Table A2 Water Chemistry Sample Sites over the Period of Record; Lac de Gras, NT

Mine	Site ID	Former Site Name	Coordinates (NAD 83, UTM Zone 12)		Waterbody	Program	Type	Location Description	Purpose/Rationale	Sampling Frequency	Data Record Received	Source
			Easting	Northing								
Diavik	LDG5	-	532437.74	7153255.72	Lac de Gras	Baseline Survey	-	-	Contaminate Monitoring Receiving water for catchment possibly affected by development; possible tailings disposal site	Discontinued	1994–1995	Pers. Comm., David Wells, DDMI. Acres/Bryant Environmental Consultants. Diavik Diamonds Project: Environmental Baseline Program for the Diavik Diamond Project, Lac de Gras, NWT; 1995 Year End Report, Fisheries and Aquatics Resources. Prepared for Diavik Diamond Mine Inc., January 1996. Diavik Diamond Mines Inc. Compilation of Baseline Information, Submission to the Mackenzie Valley Land and Water Board, Manual 2 of 6. 16 October 2000.
Diavik	LDG50	-	-	-	Lac de Gras	AEMP	Far-Field	West of East Island		1 x open-water, 1 x ice-covered	2002–2006	Diavik Diamond Mines Inc. Diavik Diamond Mine Aquatic Effects Monitoring Program. DDMI, April 2006.
Diavik	LDG6	-	532147.90	7152497.67	Lac de Gras	Baseline Survey	-	-	Monitoring of tailing disposal and waste treatment. Receiving water for catchment possibly affected by development; possible tailings disposal site	Discontinued	1994–1995	Pers. Comm., David Wells, DDMI. Acres/Bryant Environmental Consultants. Diavik Diamonds Project: Environmental Baseline Program for the Diavik Diamond Project, Lac de Gras, NWT; 1995 Year End Report, Fisheries and Aquatics Resources. Prepared for Diavik Diamond Mine Inc., January 1996. Diavik Diamond Mines Inc. Compilation of Baseline Information, Submission to the Mackenzie Valley Land and Water Board, Manual 2 of 6. 16 October 2000.
Diavik	LDG7	-	531010.84	7151048.47	Lac de Gras	Baseline Survey	-	-	Potential Tailings disposal site	Discontinued	1994–1995	Pers. Comm., David Wells, DDMI. Acres/Bryant Environmental Consultants. Diavik Diamonds Project: Environmental Baseline Program for the Diavik Diamond Project, Lac de Gras, NWT; 1995 Year End Report, Fisheries and Aquatics Resources. Prepared for Diavik Diamond Mine Inc., January 1996. Diavik Diamond Mines Inc. Compilation of Baseline Information, Submission to the Mackenzie Valley Land and Water Board, Manual 2 of 6. 16 October 2000.
Diavik	LDG8	-	533463.33	7149733.05	Lac de Gras	Baseline Survey	-	-	Upstream contaminant monitoring site. Channel near exploration site, possible mining site.	Discontinued	1994–1995	Pers. Comm., David Wells, DDMI. Acres/Bryant Environmental Consultants. Diavik Diamonds Project: Environmental Baseline Program for the Diavik Diamond Project, Lac de Gras, NWT; 1995 Year End Report, Fisheries and Aquatics Resources. Prepared for Diavik Diamond Mine Inc., January 1996. Diavik Diamond Mines Inc. Compilation of Baseline Information, Submission to the Mackenzie Valley Land and Water Board, Manual 2 of 6. 16 October 2000.
Diavik	LDG9	-	?	?	Lac de Gras	Baseline Survey	-	-	Downstream contaminant monitoring site. Inlet to Lac de Gras from Lac du Savage, reflecting upstream background conditions.	Discontinued	1994–1995	Acres/Bryant Environmental Consultants. Diavik Diamonds Project: Environmental Baseline Program for the Diavik Diamond Project, Lac de Gras, NWT; 1995 Year End Report, Fisheries and Aquatics Resources. Prepared for Diavik Diamond Mine Inc., January 1996. Diavik Diamond Mines Inc. Compilation of Baseline Information, Submission to the Mackenzie Valley Land and Water Board, Manual 2 of 6. 16 October 2000.
Diavik	LDGO	-	491285.89	7161674.84	Lac de Gras	DIAND WQ	-	-	-	Discontinued	2000–2001	Pers. Comm., David Wells, DDMI.
Diavik	LDS-1	-	546398	7161179	Lac du Sauvage	AEMP	-	Lac du Sauvage	-	1 x open-water, 1 x ice-covered	2010–2011, 2013	
Diavik	LDS-2	-	546807	7160027	Lac du Sauvage	AEMP	-	Lac du Sauvage	-	1 x open-water, 1 x ice-covered	2013	
Diavik	LDS-3	-	547191	7160256	Lac du Sauvage	AEMP	-	Lac du Sauvage	-	1 x open-water, 1 x ice-covered	2013	
Diavik	MF1-1	LDG 13	535008	7154699	Lac de Gras	AEMP	Mid-Field	1,452 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX

Table A2 Water Chemistry Sample Sites over the Period of Record; Lac de Gras, NT

Mine	Site ID	Former Site Name	Coordinates (NAD 83, UTM Zone 12)		Waterbody	Program	Type	Location Description	Purpose/Rationale	Sampling Frequency	Data Record Received	Source
			Easting	Northing								
Diavik	MF1-2	LDG 40	533682	7155356	Lac de Gras	AEMP	Mid-Field	2,941 m from diffuser		2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011	RioTinto. Diavik Diamond Mine Aquatic Effects Monitoring Program 2009 Annual Report. RioTinto, 31 March 2010.
Diavik	MF1-3	LDG 19 WQ-02	532236	7156276	Lac de Gras	AEMP	Mid-Field	4,650 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	MF1-4	-	532494	7157657	Lac de Gras	AEMP	Mid-Field	7,244 m from diffuser		2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007-2011	RioTinto. Diavik Diamond Mine Aquatic Effects Monitoring Program 2009 Annual Report. RioTinto, 31 March 2010.
Diavik	MF1-5	-	528432	7157066	Lac de Gras	AEMP	Mid-Field	8,535 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007, 2012–2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	MF2-1	-	538033	7154371	Lac de Gras	AEMP	Mid-Field	East side of Lac de Gras; 2,363 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	MF2-2	LDG MF F14	539198	7154643	Lac de Gras	AEMP	Mid-Field	3,663 m from diffuser		2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011	RioTinto. Diavik Diamond Mine Aquatic Effects Monitoring Program 2009 Annual Report. RioTinto, 31 March 2010.
Diavik	MF2-3	-	540365	7156045	Lac de Gras	AEMP	Mid-Field	East side of Lac de Gras; 5,386 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2013	RioTinto. Diavik Diamond Mine Aquatic Effects Monitoring Program 2009 Annual Report. RioTinto, 31 March 2010. Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	MF2-4	-	540955	7157359	Lac de Gras	AEMP	Mid-Field	6,948 m from diffuser	-	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2011	RioTinto. Diavik Diamond Mine Aquatic Effects Monitoring Program 2009 Annual Report. RioTinto, 31 March 2010.
Diavik	MF3-1	-	537645	7152432	Lac de Gras	AEMP	Mid-Field	East side of Lac de Gras; 2,730 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	MF3-2	LDG 43 WQ-07	536816	7151126	Lac de Gras	AEMP	Mid-Field	East side of Lac de Gras; 4,215 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	MF3-3	-	536094	7148215	Lac de Gras	AEMP	Mid-Field	7,245 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007, 2012–2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	MF3-4	LDG 41 WQ-05	532545	7147011	Lac de Gras	AEMP	Mid-Field	Southeast side of Lac de Gras; 11,023 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX

Table A2 Water Chemistry Sample Sites over the Period of Record; Lac de Gras, NT

Mine	Site ID	Former Site Name	Coordinates (NAD 83, UTM Zone 12)		Waterbody	Program	Type	Location Description	Purpose/Rationale	Sampling Frequency	Data Record Received	Source
			Easting	Northing								
Diavik	MF3-5	-	528956	7146972	Lac de Gras	AEMP	Mid-Field	14,578 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007, 2012–2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	MF3-6	-	525427	7148765	Lac de Gras	AEMP	Mid-Field	South-central side of Lac de Gras; 18,532 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	MF3-7	-	521859	7150039	Lac de Gras	AEMP	Mid-Field	22,330 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2012–2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	NF1	-	535740	7153854	Lac de Gras	AEMP	Near-Field	394 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	NF2	-	536095	7153784	Lac de Gras	AEMP	Near-Field	501 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	NF3	-	536369	7154092	Lac de Gras	AEMP	Near-Field	936 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	NF4	-	536512	7154240	Lac de Gras	AEMP	Near-Field	1,131 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	NF5	LDG 42 LDG NF WQ-06 N7	536600	7153864	Lac de Gras	AEMP	Near-Field	968 m from diffuser	Exposure station	2007-2011: 3 x open-water, 1 x ice-covered 2012-2013: 1 x open-water, 1 x ice-covered	2007–2013	Excel file from GNWT: 16. NT_REGION-#617717-v1-CEA_-_2013_14_-_LDG_-_EKATI_AND_DIAVIK_SAMPLE_SITE_COORDINATES.XLSX
Diavik	WQ-01	-	490877.71	7161746.87	Lac de Gras	Baseline Survey	-	-	Dike construction(porewater release and sedimentation) Dike leaching	1996: 2 x open-water, 1 x ice-covered 1997: 3 x open-water	1996–1999	Pers. Comm., David Wells, DDMI. Golder Associates. Technical Memorandum #03-2: 1996 Late Winter Water Quality Report, Environmental Baseline Program. 3 April 1997. Golder Associates. Technical Memorandum #26-2: 1997 Aquatic Resources Baseline Program Report, Environmental Baseline Program. 11 October 2000.
Diavik	WQ-02	-	532236	7156276	Lac de Gras	Baseline Survey	-	4,650 m from diffuser	Exposure station	2 x open-water, 1 x ice-covered	1996	Golder Associates. DDMI Aquatic Effects Monitoring Program Version 3.0. Prepared for Diavik Diamond Mines Inc., October 2011. Golder Associates. Technical Memorandum #03-2: 1996 Late Winter Water Quality Report, Environmental Baseline Program. 3 April 1997.

Table A2 Water Chemistry Sample Sites over the Period of Record; Lac de Gras, NT

Mine	Site ID	Former Site Name	Coordinates (NAD 83, UTM Zone 12)		Waterbody	Program	Type	Location Description	Purpose/Rationale	Sampling Frequency	Data Record Received	Source
			Easting	Northing								
Diavik	WQ-03	-	528469.16	7151806.52	Lac de Gras	Baseline Survey	-	-	East island runoff	1996: 2 x open-water, 1 x ice-covered 1997: 3 x open-water	1996–1997, 1999	Pers. Comm., David Wells, DDMI. Golder Associates. Technical Memorandum #03-2: 1996 Late Winter Water Quality Report, Environmental Baseline Program. 3 April 1997. Golder Associates. Technical Memorandum #26-2: 1997 Aquatic Resources Baseline Program Report, Environmental Baseline Program. 11 October 2000.
Diavik	WQ-04	-	534600.39	7151472.09	Lac de Gras	Baseline Survey	-	-	Dust and air emissions Open pit flooding & dewatering	1996: 2 x open-water, 1 x ice-covered 1997: 3 x open-water	1996–1997, 1999, 2003	Pers. Comm., David Wells, DDMI. Golder Associates. Technical Memorandum #03-2: 1996 Late Winter Water Quality Report, Environmental Baseline Program. 3 April 1997. Golder Associates. Technical Memorandum #26-2: 1997 Aquatic Resources Baseline Program Report, Environmental Baseline Program. 11 October 2000.
Diavik	WQ-05	-	532545	7147011	Lac de Gras	Baseline Survey	-	-	-	1996: 2 x open-water, 1 x ice-covered 1997: 3 x open-water	1996–1997, 1999	Golder Associates. DDMI Aquatic Effects Monitoring Program Version 3.0. Prepared for Diavik Diamond Mines Inc., October 2011. Golder Associates. Technical Memorandum #03-2: 1996 Late Winter Water Quality Report, Environmental Baseline Program. 3 April 1997. Golder Associates. Technical Memorandum #26-2: 1997 Aquatic Resources Baseline Program Report, Environmental Baseline Program. 11 October 2000.
Diavik	WQ-06	-	536584.68	7153924.58	Lac de Gras	Baseline Survey	-	-	-	1996: 2 x open-water, 1 x ice-covered 1997: 3 x open-water	1996–1999	Pers. Comm., David Wells, DDMI. Golder Associates. Technical Memorandum #03-2: 1996 Late Winter Water Quality Report, Environmental Baseline Program. 3 April 1997. Golder Associates. Technical Memorandum #26-2: 1997 Aquatic Resources Baseline Program Report, Environmental Baseline Program. 11 October 2000.
Diavik	WQ-07	-	536272.55	7150758.63	Lac de Gras	Baseline Survey	-	-	-	1996: 2 x open-water, 1 x ice-covered 1997: 3 x open-water	1996–1999	Pers. Comm., David Wells, DDMI. Golder Associates. Technical Memorandum #03-2: 1996 Late Winter Water Quality Report, Environmental Baseline Program. 3 April 1997. Golder Associates. Technical Memorandum #26-2: 1997 Aquatic Resources Baseline Program Report, Environmental Baseline Program. 11 October 2000.
Diavik	WQ-08	-	539616.85	7148752.05	Lac de Gras	Baseline Survey	-	-	-	2 x open-water, 1 x ice-covered	1996	Pers. Comm., David Wells, DDMI. Golder Associates. Technical Memorandum #03-2: 1996 Late Winter Water Quality Report, Environmental Baseline Program. 3 April 1997.
Diavik	WQ-09	-	540419.49	7151917.99	Lac de Gras	Baseline Survey	-	-	-	2 x open-water, 1 x ice-covered	1996	Pers. Comm., David Wells, DDMI. Golder Associates. Technical Memorandum #03-2: 1996 Late Winter Water Quality Report, Environmental Baseline Program. 3 April 1997.
Diavik	WQ-10	-	544579.39	7163744.50	Lac du Sauvage	Baseline Survey	-	-	Upstream reference	1996: 2 x open-water, 1 x ice-covered 1997: 3 x open-water	1996–1997	Pers. Comm., David Wells, DDMI. Golder Associates. Technical Memorandum #03-2: 1996 Late Winter Water Quality Report, Environmental Baseline Program. 3 April 1997. Golder Associates. Technical Memorandum #26-2: 1997 Aquatic Resources Baseline Program Report, Environmental Baseline Program. 11 October 2000.

Table A2 Water Chemistry Sample Sites over the Period of Record; Lac de Gras, NT

Mine	Site ID	Former Site Name	Coordinates (NAD 83, UTM Zone 12)		Waterbody	Program	Type	Location Description	Purpose/Rationale	Sampling Frequency	Data Record Received	Source
			Easting	Northing								
Diavik	WQ-11	-	549201.74	7161123.40	Lac du Sauvage	Baseline Survey	-	-	Upstream reference	1996: 2 x open-water, 1 x ice-covered 1997: 3 x open-water	1996–1998	Pers. Comm., David Wells, DDMI. Golder Associates. Technical Memorandum #03-2: 1996 Late Winter Water Quality Report, Environmental Baseline Program. 3 April 1997. Golder Associates. Technical Memorandum #26-2: 1997 Aquatic Resources Baseline Program Report, Environmental Baseline Program. 11 October 2000.
Diavik	WQ-12	-	553044.85	7165303.00	Lac du Sauvage	Baseline Survey	-	-	Upstream reference	2 x open-water, 1 x ice-covered	1996	Pers. Comm., David Wells, DDMI. Golder Associates. Technical Memorandum #03-2: 1996 Late Winter Water Quality Report, Environmental Baseline Program. 3 April 1997.
Diavik	WQ-13	-	531189.20	7153902.28	Lac de Gras	Baseline Survey	-	-	-	1996: 2 x open-water, 1 x ice-covered 1997: 3 x open-water	1996–1999	Pers. Comm., David Wells, DDMI. Golder Associates. Technical Memorandum #03-2: 1996 Late Winter Water Quality Report, Environmental Baseline Program. 3 April 1997. Golder Associates. Technical Memorandum #26-2: 1997 Aquatic Resources Baseline Program Report, Environmental Baseline Program. 11 October 2000.
Diavik	WQ-14	-	504491.61	7159009.68	Lac de Gras	Baseline Survey	-	-	-	3 x open-water	1997 (Field Data Only)	Pers. Comm., David Wells, DDMI. Golder Associates. Technical Memorandum #26-2: 1997 Aquatic Resources Baseline Program Report, Environmental Baseline Program. 11 October 2000.
Ekati	Christine-S	-	540025	7163840	Christine Creek	AEMP	-	Stream connecting Christine Lake with Lac du Sauvage	Monitor WQ in King-Cujo Watershed?	3 x open-water (freshet, summer low flow, fall high flow)	June 2000 to September 2013	Worksheet "AEMP" in Excel file 14 NT_REGION-#609026-v1-CEA_-_2013_14_-_LDG_-_DATA_-_EKATI_S_DATA_-_2014-JAN-14.XLSX (provided by GNWT) Wek'eezhii Land and Water Board. Letter to Diavik Diamond Mines Inc. re Diavik Request for Changes to the Surveillance Network Program, Stations 1645-18 and 1645-19. 11 September 2009. Diavik Diamond Mines Inc. Diavik Diamond Mine Aquatic Effects Monitoring Program. DDMI, April 2006. Rescan. 2013. Ekati Diamond Mine: Aquatic Effects Monitoring Program Plan for 2013 to 2015. Prepared for Dominion Diamon Ekati Corporation, Yellowknife, NT.
Ekati	LDGS2	-	507638	7164468	Lac de Gras	AEMP	-	Northwest side of Lake de Gras, downstream of Spiper Lake	Monitor WQ downstream of LLCF (Cell E) and in the vicinity of the outflow from Slipper Lake?	1 x open-water, 1 x ice-covered	- B: April 2002 to April 2014 - T: July 2000 to August 2014 - M: July 2000 to August 2014 (April 2002 started mid samples in addition to July/August samples)	Worksheet "AEMP" in "14 NT_REGION-#609026-v1-CEA_-_2013_14_-_LDG_-_DATA_-_EKATI_S_DATA_-_2014-JAN-14.XLSX" Wek'eezhii Land and Water Board. Letter to Diavik Diamond Mines Inc. re Diavik Request for Changes to the Surveillance Network Program, Stations 1645-18 and 1645-19. 11 September 2009. AEMP 2011, Golder Associates Rescan. 2013. Ekati Diamond Mine: Aquatic Effects Monitoring Program Plan for 2013 to 2015. Prepared for Dominion Diamon Ekati Corporation, Yellowknife, NT. Worksheet from "N and P data LDG LDS and Slipper-S_received20141028.xlsx"

Table A2 Water Chemistry Sample Sites over the Period of Record; Lac de Gras, NT

Mine	Site ID	Former Site Name	Coordinates (NAD 83, UTM Zone 12) Easting	Northing	Waterbody	Program	Type	Location Description	Purpose/Rationale	Sampling Frequency	Data Record Received	Source
Ekati	LDGS3	-	505912	7164439	Lac de Gras	AEMP	-	Northwest side of Lake de Gras, downstream of LDGS2	Monitor WQ downstream of LLCF (Cell E) and in the vicinity of the outflow from Slipper Lake?	1 x open-water, 1 x ice-covered	- B: April 2002 to April 2014 - T: July 2000 to August 2014 - M: July 2000 to August 2014 (April 2002 started mid samples in addition to July/August samples)	-Worksheet "AEMP" in "14 NT_REGION-#609026-v1-CEA_-_2013_14_-_LDG_-_DATA_-_EKATI_S_DATA_-_2014-JAN-14.XLSX"-8. Ekati_AEMP…pdf Wek'eezhii Land and Water Board. Letter to Diavik Diamond Mines Inc. re Diavik Request for Changes to the Surveillance Network Program, Stations 1645-18 and 1645-19. 11 September 2009. AEMP 2011, Golder Associates Rescan. 2013. Ekati Diamond Mine: Aquatic Effects Monitoring Program Plan for 2013 to 2015. Prepared for Dominion Diamon Ekati Corporation, Yellowknife, NT. Worksheet from "N and P data LDG LDS and Slipper-S_received20141028.xlsx"
Ekati	LDS1	-	541616	7164530	Lac du Sauvage	AEMP	-	West side of Lac du Sauvage	Monitor WQ in King-Cujo Watershed?	1 x open-water, 1 x ice-covered	- B: April 2002 to April 2014 - T: July 2000 to August 2014 - M: July 2000 to August 2014 (April 2002 started mid samples in addition to July/August samples)	Worksheet "AEMP" in "14 NT_REGION-#609026-v1-CEA_-_2013_14_-_LDG_-_DATA_-_EKATI_S_DATA_-_2014-JAN-14.XLSX" Wek'eezhii Land and Water Board. Letter to Diavik Diamond Mines Inc. re Diavik Request for Changes to the Surveillance Network Program, Stations 1645-18 and 1645-19. 11 September 2009. Rescan. 2013. Ekati Diamond Mine: Aquatic Effects Monitoring Program Plan for 2013 to 2015. Prepared for Dominion Diamon Ekati Corporation, Yellowknife, NT. Worksheet from "N and P data LDG LDS and Slipper-S_received20141028.xlsx"
Ekati	LDS2	-	541240	7164235	Lac du Sauvage	AEMP	-	West side of Lac du Sauvage, west of LDS1	Monitor WQ in King-Cujo Watershed?	1 x open-water, 1 x ice-covered	T: August 2000 to August 2014	Worksheet "AEMP" in "14 NT_REGION-#609026-v1-CEA_-_2013_14_-_LDG_-_DATA_-_EKATI_S_DATA_-_2014-JAN-14.XLSX" Wek'eezhii Land and Water Board. Letter to Diavik Diamond Mines Inc. re Diavik Request for Changes to the Surveillance Network Program, Stations 1645-18 and 1645-19. 11 September 2009. Rescan. 2013. Ekati Diamond Mine: Aquatic Effects Monitoring Program Plan for 2013 to 2015. Prepared for Dominion Diamon Ekati Corporation, Yellowknife, NT. Worksheet from "N and P data LDG LDS and Slipper-S_received20141028.xlsx"
Ekati	Slipper Lk. Outlet/ Slipper-S	-	507643	7164878	Slipper Creek	SNP/AEMP	-	Outlet of Slipper Lake, prior to entering Lac de Gras	Monitor outflow of Slipper Lake	1 x freshet, 1 x fall low flow	October 1997 to July 2014	Worksheet "SNP" in Excel file 14 NT_REGION-#609026-v1-CEA_-_2013_14_-_LDG_-_DATA_-_EKATI_S_DATA_-_2014-JAN-14.XLSX (provided by GNWT) Pers. comm. (E. Denholm) Wek'eezhii Land and Water Board. Letter to Diavik Diamond Mines Inc. re Diavik Request for Changes to the Surveillance Network Program, Stations 1645-18 and 1645-19. 11 September 2009. Diavik Diamond Mines Inc. Diavik Diamond Mine Aquatic Effects Monitoring Program. DDMI, April 2006. BHP Billiton Diamond Mine Inc. Water License W2009L2-0001. 15 August 2009. Worksheet from "N and P data LDG LDS and Slipper-S_received20141028.xlsx"

APPENDIX B Additional information on the Mann-Kendall Trend Test

B.1 Mann-Kendall Trend Test

The following text is an excerpt from Section 10.2.1 of the ProUCL Version 5.0.00 Technical Guide (USEPA 2013):

The Mann-Kendall (M-K) trend test is a nonparametric test which is used on a time series data set: *(ti, yi); i:=1,2,….n* as described earlier. As a nonparametric procedure, the M-K test does not require the underlying data to follow a specific distribution. The M-K test can be used to determine increasing or decreasing trends in measurement values of the response variable, *y*, observed during a certain time period. If an increasing trend in measurements exists, then the measurement taken first from any randomly selected pair of measurements should on average have a lower response (concentration) than the measurement collected at a later point.

The M-K statistic, *S*, is computed by examining all possible distinct pairs of measurements in the time series data set and scoring each pair as follows. It should be noted that for a measurement data set of size, *n,* there are *n(n-1)/2* distinct pairs, *(yj, yi)* with *j>i*, which are being compared:

- If an earlier measurement, yi, is less in magnitude than a later measurement, yj, then that pair is assigned a score of 1.
- If an earlier measurement value is greater in magnitude than a later value, the pair is assigned a score of -1.
- Pairs with identical ($y_i = y_j$) measurements values are assigned a score of 0.

The M-K test statistic, *S*, equals the sum of scores assigned to all pairs. The following conclusions are derived based upon the values of the M-K statistic, *S*:

- A positive value of *S* implies that a majority of the differences between earlier and later measurements are positive suggesting the presence of a potential upward and increasing trend over time.
- A negative value for *S* implies that a majority of the differences between earlier and later measurements are negative suggesting the presence of a potential downward/decreasing trend.
- A value of *S* close to zero indicates a roughly equal number of positive and negative scores assigned to all possible distinct pairs, (y_j, y_i) with *j>i*, suggesting that the data do not exhibit any evidence of an increasing or decreasing trend.

It is noted that when no trend is present in time series measurements, positive differences in randomly selected pairs of measurements should balance negative differences. In other words, the expected value of the test statistic *S,* E[S], should be close to '0' when the measurement data set does not exhibit any evidence of a trend. To account for randomness and inherent variability in measurements, the statistical significance of the M-K test statistic is determined. The larger the absolute value of *S*, the stronger the evidence for a real increasing or decreasing trend. The M-K test in ProUCL can be used to test the following hypotheses:

- Null Hypothesis, H_0:
  - Data set does not exhibit sufficient evidence of any trends (stationary measurements) versus,

- Alternative Hypothesis, H_A:
  - Data set exhibits an upward trend, or
  - Data set exhibits a downward trend, or
  - Data set exhibits a trend (two-sided alternative).

Under the null hypothesis of no trend, it is expected that the mean value of *S* =0; that is E[S] =0.

Notes: The M-K test in ProUCL can be used for testing a two-sided alternative, H_A, stated above. For a two-sided alternative hypothesis, the p-values (exact as well as approximate) reported by ProUCL need to be doubled.

B.1.1 Large Sample Approximation for the Mann-Kendall Test

This section has been omitted as it is not applicable to the current document due to n < 23; see Section 10.2.1.1 of USEPA (2013).

B.1.2 Step-by-Step Procedure to Perform the Mann-Kendall Test

The M-K test does not require the availability of an event or a time variable. However, if graphical trend displays (e.g., Theil-Sen line) are desired, the user should provide the values for a time variable. When a time or an event variable is not provided, ProUCL generates an index variable and displays the time-series graph using the index variable.

Step 1: Order the measurement data: $y_1, y_2, \ldots, y_n$ by sampling event or time of collection. If the numerical values of data collection times (event variable) are not known, the user should enter data values according to the order they were collected. Next, compute all possible differences between pairs of measurements, ($y_j - y_i$) for $j > i$. For each pair, compute the *sign* of the difference, defined by:

$$sgn(y_j - y_i) = \begin{cases} 1 \; if \; (y_j - y_i) > 0 \\ 0 \; if \; (y_j - y_i) = 0 \\ -1 \; if \; (y_j - y_i) < 0 \end{cases}$$

Step 2: Compute the M-K test statistic, *S*, given by the following equation:

$$S = \sum_{i=1}^{n} \sum_{j=i+1}^{n} sgn(y_j - y_i)$$

Step 3: For *n<23,* the tabulated critical levels, αcp (tabulated p-values) given in Hollander and Wolfe (1999) have been incorporated in ProUCL. If *S* > 0 and α > αcp, conclude there is statistically significant evidence of an increasing trend at the α significance level. If *S* < 0 and α > αcp, conclude there is statistically significant evidence of a decreasing trend. If α ≤ αcp, conclude that data do not exhibit sufficient evidence of any significant trend at the α level of significance.

Specifically the M-K test in ProUCL tests for one-sided alternative hypothesis as follows:

H0: no trend, vs. H_A: upward trend

or

H0: no trend vs. H_A: downward trend

ProUCL computes tabulated p-values (for sample sizes <23) based upon the sign of the M-K statistic, S, as follows:

- If S > 0, the tabulated p-value (αcp) is computed for H0: no trend, vs. H_A: upward trend.
- If S < 0, the tabulated p-value (αcp) is computed for H0: no trend vs. H_A: downward trend.
- If the p-value is larger than the specified α (e.g., 0.05), the null hypothesis of no trend is not rejected.

Step 4: *See Section 10.2.1.1 of USEPA (2013) for more information.* For *n* > 22, large sample normal approximation is used for *S*, and a standardized *S* is computed. Under the null hypothesis of no trend, E(S) =0, and the *sd* is computed using equations (10-14) or (10-15); when ties are present, *sd(S)* is computed by adjusting for ties as given in (10-14).Standardized S, denoted by Z is computed using equation (10-16).

Step 5: *See Section 10.2.1.1 of USEPA (2013) for more information.* For a given significance level *(α),* the critical value *zα* is determined from the standard normal distribution.

If Z >0, a critical value and *p*-value are computed for *H0: no trend*, vs. *H_A: upward trend*.

If Z < 0, a critical value and *p*-value are computed for *H0: no trend* vs. *H_A: downward trend*

If the *p*-value is larger than the specified α (e.g., 0.05), the null hypothesis of no trend is not rejected.

Specifically, compare *Z* against this critical value, *zα*. If Z > 0 and *Z* > *zα*, conclude there is a statistically significant evidence of an increasing trend at an α level of significance. If Z< 0 and Z < *–zα*, conclude there is statistically significant evidence of a decreasing trend. If neither exists, conclude that the data do not exhibit sufficient evidence of any significant trend. For large samples, ProUCL computes the p-value associated with Z.

<u>Notes</u>: As mentioned above, Mann-Kendall test in ProUCL can be used for testing a two-sided alternative, HA stated above. For a two-sided alternative hypothesis, p-values (both exact and approximate) reported by ProUCL need to be doubled.

APPENDIX C Water Chemistry Summary Statistics

Table C1 Summary Statistics for the Dissolved/Total Metal Ratio Data; Lac de Gras, NT

Metals	n	Min	Low	25th	Median	75th	High	Max	Mean	SD	# > 1.20	% > 1.20
Aluminum	1,970	0.0084	0.0080	0.2147	0.4360	0.6107	1.1800	19.2500	0.4683	0.6525	1	33
Arsenic	2,038	0.1765	0.6800	0.8710	0.9565	1.0000	1.1900	6.5714	0.9342	0.2556	0	49
Boron	1,288	0.2500	0.5000	1.0000	1.0000	1.3333	1.8000	55.0000	1.8661	3.8619	1	371
Barium	2,261	0.0037	0.8500	0.9615	0.9900	1.0377	1.1500	62.5866	1.7389	3.7576	0	234
Beryllium	0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bismuth	23	0.09	0.09	0.47	0.70	0.80	1.10	1.10	0.62	0.27	1	0
Calcium	2,932	0.40129	0.87000	0.96836	1.00000	1.03274	1.13000	1.50000	1.00122	0.07691	0	23
Cadmium	62	0.18	0.18	0.58	0.83	1.15	1.83	3.00	0.92	0.48	1	12
Cobalt	1,007	0.0067	0.0070	0.5600	0.8333	1.0000	1.6100	78.4000	0.8446	2.4637	1	30
Chromium	698	0.0115	0.2200	0.7500	0.9341	1.1031	1.6300	50.4375	1.0403	1.9309	1	128
Copper	1,359	0.0432	0.3500	0.7500	0.8625	1.0000	1.3800	11.8889	0.9388	0.5888	0	146
Iron	450	0.001	0.001	0.197	0.367	0.610	1.220	3.727	0.475	0.452	1	24
Potassium	2,938	0.0165	0.8300	0.9501	0.9929	1.0295	1.1500	2.0968	0.9902	0.1215	0	112
Lead	203	0.0123	0.0120	0.4000	0.7500	1.1538	2.2000	68.0000	1.3161	4.8199	1	44
Lithium	660	0.04	0.79	0.92	0.96	1.01	1.14	2.26	0.95	0.18	0	13
Magnesium	2,954	0.105	0.850	0.962	0.992	1.022	1.110	1.581	0.995	0.074	0	23
Manganese	2,088	0.00084	0.00080	0.41077	0.81590	0.97055	1.80000	71.66667	0.81158	2.02056	1	98
Nickel	2,257	0.00582	0.79000	0.91549	0.96552	1.00000	1.13000	32.55814	0.95760	0.68776	0	34
Mercury	15	0.1429	0.1400	0.3333	0.6667	1.0000	1.5000	2.0000	0.7751	0.5148	1	3
Molybdenum	2,152	0.034	0.860	0.968	1.000	1.038	1.150	5.969	0.999	0.177	0	49
Silver	2	0.75	ND	ND	1.08	ND	ND	1.40	1.08	0.46	ND	1
Phosphorus	2,550	0.0109	0.0100	0.3016	0.4959	0.6574	1.1900	10.0000	0.4949	0.3329	1	36
Sodium	2,692	0.48	0.86	0.97	1.00	1.04	1.15	1.92	1.02	0.10	0	144
Thallium	191	0.0113	0.0100	0.6667	1.0000	1.1429	1.6700	3.2000	0.9592	0.4585	1	39
Antimony	1,319	0.04	0.65	0.93	1.00	1.25	1.53	27.11	1.21	1.10	0	363
Selenium	508	0.038	0.230	0.750	1.000	1.098	1.600	4.400	0.974	0.429	1	92
Tin	53	0.10	0.10	0.30	0.50	1.12	2.33	3.87	0.80	0.71	1	12
Strontium	2,272	0.4749	0.9100	0.9693	0.9928	1.0100	1.0700	2.7078	0.9873	0.0711	0	9
Titanium	19	0.0024	0.0020	0.0900	0.3500	1.0000	2.0000	2.0000	0.4313	0.6008	1	2
Uranium	2,034	0.0588	0.4400	0.6667	0.7368	0.8290	1.0700	6.6667	0.7398	0.2576	0	10
Vanadium	667	0.0625	0.06	0.8	0.9646018	1.125	1.6	95.333333	1.1840609	3.7343794	0	123
Zirconium	0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	1,206	0.0175	0.0200	0.5889	0.9306	1.5522	3.0000	109.6250	3.9632	11.0627	1	405

NOTE:

1. Only data where both the total and dissolved fraction were reported above the detection limit (>DL) were retained for the dissolved/total ratio analysis and calculation of summary statistics; therefore, 'n' represents the number of data points used for the analysis and not the total number of data points received.

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Table C2A Sample Sites and Dates* included in the Baseline Water Chemistry Dataset, 1994–2000; Lac de Gras, NT

Sample Site[1]	Former Site Name[2]	Date									
		1994	1995			1996	1998	2000			
		September	March	July	September	August	September	May	July	August	September
LDG 01A	-		X	X							
LDG 01B	-	X	X		X						
LDG 02	WQ-04	X	X	X	X	X					
LDG 03	-	X	X	X	X						
LDG 04	-	X	X	X	X						
LDG 05	-	X	X	X	X						
LDG 06	-	X	X	X	X						
LDG 07	-	X	X	X	X						
LDG 08	-	X	X	X	X						
LDG 09	-	X	X	X	X						
LDG 10	WQ-09		X	X	X	X					
LDG 11	-		X	X	X						
LDG 12	-			X, X, X	X, X						
LDG 14	WQ-07			X	X	X	X				
LDG 15	-			X	X						
LDG 16	-			X	X						
LDG 17	-			X	X						
LDG 18	-			X	X						
LDG 19	WQ-02			X	X	X					
LDG 20	-			X	X						
LDG 21	-			X	X						
LDG 22	-			X	X						
LDG 23	-			X	X						
LDG 24	-			X	X						
LDG 25	-				X						
LDG 40	-							X		X	
LDG 41	WQ-05					X		X		X	
LDG 42	WQ-06					X	X	X		X	
LDG 43	-							X		X	
LDG 44	WQ-03					X				X	
LDG 45	-							X		X	
LDG 46	-							X			
LDG 48	WQ-01						X	X		X	
LDG 49	WQ-13					X	X				
WQ-08	-					X					
LDGS2	-								X	X	X
LDGS3	-								X	X	X
	Total	**9**	**12**	**25**	**25**	**9**	**4**	**7**	**2**	**9**	**2**

NOTES:

[1] Not all analytes were sampled on all dates.

[2] Data from equivalent sample sites were combined - See Figures 2-1 and 2-2 in Section 2.0 of the main body of the report, for sample site locations.

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Table C2b Summary Statistics for the Baseline Water Chemistry Dataset, 1994–2000; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Physical																
pH	pH units	0 / 99	0%	5.73	5.77	6.02	6.11	6.08	6.21	6.40	6.70	0.21	0.02	0.03	-	0
Conductivity	µS/cm	0 / 105	0%	4.0	10.4	11.3	13.0	11.8	13.4	16.0	23.6	3.3	0.3	0.3	-	-
Color (True)	TCU	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids (TDS)	mg/L	9 / 114	8%	0.5	4.0	7.0	12.8	8.0	9.7	12.3	130.0	22.7	2.1	1.8	-	-
Total Suspended Solids (TSS)	mg/L	95 / 105	90%	0.2	0.2	0.2	0.70	0.2	0.2	0.2	10	1.44	0.14	2.07	-	-
Turbidity	NTU	7 / 30	23%	0.1	0.1	0.12	0.24	0.30	0.30	0.40	0.70	0.15	0.03	0.64	-	-
Biochemical Oxygen Demand (BOD)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 4.5)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Cations																
Alkalinity (Total as $CaCO_3$)	mg/L	5 / 105	5%	2.50	4.5	5.3	5.9	5.9	6.5	8.2	8.3	1.21	0.12	0.20	-	-
Alkalinity (PP as $CaCO_3$)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicarbonate (HCO_3)	mg/L	0 / 6	0%	6.0	6.0	6.0	6.3	6.0	6.8	7.0	7.0	0.52	0.21	0.08	-	-
Carbonate (CO_3)	mg/L	6 / 6	100%	2.5	-	-	2.5	-	-	-	2.5	-	-	-	-	-
Hydroxide (OH)	mg/L	6 / 6	100%	2.5	-	-	2.5	-	-	-	2.5	-	-	-	-	-
Hardness (as $CaCO_3$) - Total	mg/L	0 / 42	0%	4.0	4.0	4.0	4.3	4.0	4.4	4.8	5.7	0.47	0.07	0.11	-	-
Hardness (as CaCO3) - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	mg/L	83 / 114	73%	0.05	-	-	0.3	-	-	-	1.4	-	-	-	-	-
Fluoride (F)	mg/L	76 / 81	94%	0.03	-	-	0.03	-	-	-	0.08	-	-	-	-	-
Sulphate (SO_4)	mg/L	5 / 114	4%	0.25	0.7	1.1	1.3	1.2	1.5	2.0	2.1	0.38	0.04	0.30	-	-
Nutrients																
Nitrite-N	mg/L	81 / 81	100%	0.0010	-	-	0.0720	-	-	-	0.100	-	-	-	-	-
Nitrate-N	mg/L	67 / 81	83%	0.0015	-	-	0.003	-	-	-	0.028	-	-	-	-	-
Nitrate + Nitrite (as N)	mg/L	19 / 27	70%	0.0015	-	-	0.0067	-	-	-	0.046	-	-	-	-	-
Ammonia-N	mg/L	92 / 105	88%	0.0025	-	-	0.0057	-	-	-	0.070	-	-	-	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	10 / 39	26%	0.025	0.025	0.038	0.080	0.060	0.105	0.180	0.250	0.058	0.009	0.728	-	-
Nitrogen (N) - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen - Total Calculated	mg/L	0 / 33	0%	0.027	0.027	0.052	0.089	0.070	0.122	0.222	0.254	0.062	0.011	0.695	-	-
Phosphate - Total	mg/L	4 / 12	33%	0.001	-	-	0.004	-	-	-	0.006	-	-	-	-	-
Phosphate - Total Dissolved	mg/L	12 / 12	100%	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.000	0.000	0.000	-	-
Phosphorus - Total	mg/L	43 / 111	39%	0.00050	-	-	0.00479	-	-	-	0.0500	-	-	-	-	-
Phosphorus - Total dissolved	mg/L	15 / 15	100%	0.05000	-	-	0.05000	-	-	-	0.0500	-	-	-	-	-
Orthophosphate	mg/L	30 / 30	100%	0.0005	-	-	0.0011	-	-	-	0.0015	-	-	-	-	-
Silica (SiO_2)-Reactive	mg/L	18 / 18	100%	0.025	-	-	0.025	-	-	-	0.025	-	-	-	-	-
Total Inorganic Carbon	mg/L	8 / 87	9%	0.3	0.3	0.6	0.8	0.7	1.0	1.4	1.70	0.31	0.03	0.40	-	-
Total Organic Carbon (TOC)	mg/L	0 / 102	0%	0.8	1.5	1.9	2.5	2.1	2.4	3.0	10.40	1.26	0.12	0.51	-	-
Carbon																
Dissolved Organic Carbon (DOC)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum - Total	mg/L	15 / 114	13%	0.0030	0.003	0.006	0.035	0.023	0.038	0.080	0.660	0.073	0.007	2.078	-	87
Aluminum - Dissolved	mg/L	2 / 24	8%	0.001	0.001	0.003	0.010	0.006	0.008	0.011	0.065	0.014	0.003	1.50	-	5
Metals																
Antimony - Total	mg/L	17 / 42	40%	0.00003	-	-	0.0015	-	-	-	0.0131	-	-	-	-	-
Antimony - Dissolved	mg/L	17 / 18	94%	0.00010	-	-	0.0001	-	-	-	0.0002	-	-	-	-	-
Arsenic - Total	mg/L	51 / 76	67%	0.00002	-	-	0.0001	-	-	-	0.00027	-	-	-	-	-
Arsenic - Dissolved	mg/L	18 / 18	100%	0.00010	-	-	0.0001	-	-	-	0.0001	-	-	-	-	-
Barium - Total	mg/L	69 / 102	68%	0.00010	-	-	0.00508	-	-	-	0.13000	-	-	-	-	-
Barium - Dissolved	mg/L	8 /24	33%	0.00010	-	-	0.00066	-	-	-	0.0020	-	-	-	-	-
Beryllium - Total	mg/L	76 / 102	75%	0.0001	-	-	0.0006	-	-	-	0.0040	-	-	-	-	-
Beryllium - Dissolved	mg/L	23 / 24	96%	0.0001	-	-	0.0001	-	-	-	0.0003	-	-	-	-	-

Table C2b Summary Statistics for the Baseline Water Chemistry Dataset, 1994–2000; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Bismuth - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron - Total	mg/L	65 / 102	64%	0.001	-	-	0.015	-	-	-	0.190	-	-	-	-	-
Boron - Dissolved	mg/L	20 / 24	83%	0.005	-	-	0.007	-	-	-	0.02	-	-	-	-	-
Cadmium - Total	mg/L	96 / 106	91%	0.000025	-	-	0.001160	-	-	-	0.004000	-	-	-	-	-
Cadmium - Dissolved	mg/L	22 / 24	92%	0.000100	-	-	0.000117	-	-	-	0.000400	-	-	-	-	-
Calcium - Total	mg/L	0 / 93	0%	0.400	0.400	0.904	1.403	1.100	1.600	2.460	3.900	0.736	0.076	0.524	-	-
Calcium - Dissolved	mg/L	0 / 15	0%	0.700	0.700	0.905	1.015	0.970	1.130	1.400	1.400	0.211	0.054	0.208	-	-
Chromium - Total	mg/L	47 / 102	46%	0.00003	-	-	0.00316	-	-	-	0.01600	-	-	-	-	-
Chromium - Dissolved	mg/L	11 / 24	46%	0.00050	-	-	0.00123	-	-	-	0.003	-	-	-	-	-
Chromium Hexavalent (Cr6+) - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt - Total	mg/L	69 / 102	68%	0.000050	-	-	0.002145	-	-	-	0.0120	-	-	-	-	-
Cobalt - Dissolved	mg/L	16 / 24	67%	0.000150	-	-	0.000242	-	-	-	0.0008	-	-	-	-	-
Copper - Total	mg/L	55 / 114	48%	0.00020	-	-	0.001258	-	-	-	0.0172	-	-	-	-	-
Copper - Dissolved	mg/L	2 / 24	8%	0.00010	0.00010	0.00050	0.00175	0.00080	0.00143	0.00230	0.01070	0.00269	0.00055	1.53817	-	-
Iron - Total	mg/L	35 / 114	31%	0.0025	-	-	0.025031	-	-	-	0.410	-	-	-	-	-
Iron - Dissolved	mg/L	20 / 24	83%	0.0050	-	-	0.0071	-	-	-	0.02	-	-	-	-	-
Lead - Total	mg/L	75 / 102	74%	0.000025	-	-	0.009723	-	-	-	0.06000	-	-	-	-	-
Lead - Dissolved	mg/L	20 / 24	83%	0.000150	-	-	0.000200	-	-	-	0.0005	-	-	-	-	-
Lithium - Total	mg/L	24 / 90	27%	0.0001	0.0001	0.0005	0.0012	0.0010	0.0010	0.0010	0.0090	0.0012	0.0001	1.0392	-	-
Lithium - Dissolved	mg/L	14 / 24	58%	0.0001	-	-	0.0010	-	-	-	0.0050	-	-	-	-	-
Magnesium - Total	mg/L	0 / 93	0%	0.200	0.400	0.500	0.550	0.500	0.570	0.670	0.950	0.130	0.013	0.235	-	-
Magnesium - Dissolved	mg/L	0 / 15	0%	0.430	0.430	0.460	0.635	0.580	0.800	0.900	0.900	0.193	0.050	0.304	-	-
Manganese - Total	mg/L	4 / 102	4%	0.0005	0.0005	0.0014	0.0026	0.0020	0.0030	0.0053	0.0074	0.0016	0.0002	0.6224	-	-
Manganese - Dissolved	mg/L	9 / 24	38%	0.0005	-	-	0.0015	-	-	-	0.0030	-	-	-	-	-
Mercury - Total	mg/L	59 / 64	92%	0.000010	-	-	0.000034	-	-	-	0.00025	-	-	-	-	-
Mercury - Dissolved	mg/L	18 / 18	100%	0.000025	-	-	0.000025	-	-	-	0.000025	-	-	-	-	-
Molybdenum - Total	mg/L	89 / 114	78%	0.000030	-	-	0.001409	-	-	-	0.00700	-	-	-	-	-
Molybdenum - Dissolved	mg/L	21 / 24	88%	0.000100	-	-	0.000258	-	-	-	0.0015	-	-	-	-	-
Nickel - Total	mg/L	49 / 114	43%	0.00025	-	-	0.003701	-	-	-	0.0250	-	-	-	-	-
Nickel - Dissolved	mg/L	10 / 24	42%	0.00025	-	-	0.00194	-	-	-	0.0092	-	-	-	-	-
Potassium - Total	mg/L	2 / 102	2%	0.010	0.260	0.416	0.517	0.500	0.548	0.710	1.370	0.195	0.019	0.377	-	-
Potassium - Dissolved	mg/L	0 / 9	0%	0.400	0.400	0.420	0.480	0.450	0.550	0.610	0.610	0.075	0.025	0.157	-	-
Selenium - Total	mg/L	73 / 76	96%	0.000050	-	-	0.00009	-	-	-	0.00010	-	-	-	-	-
Selenium - Dissolved	mg/L	18 / 18	100%	0.000100	-	-	0.000100	-	-	-	0.000100	-	-	-	-	-
Silicon - Total	mg/L	10 / 33	30%	0.050	0.050	0.050	0.130	0.110	0.190	0.310	0.410	0.091	0.016	0.700	-	-
Silicon - Dissolved	mg/L	10 / 24	42%	0.010	-	-	0.026	-	-	-	0.090	-	-	-	-	-
Silver - Total	mg/L	93 / 102	91%	0.000050	-	-	0.000800	-	-	-	0.003000	-	-	-	-	-
Silver - Dissolved	mg/L	24 / 24	100%	0.000050	-	-	0.000050	-	-	-	0.000050	-	-	-	-	-
Sodium - Total	mg/L	2 / 93	2%	0.005	0.200	0.460	0.711	0.500	0.690	1.000	3.620	0.596	0.062	0.838	-	-
Sodium - Dissolved	mg/L	0 / 15	0%	0.460	0.460	0.485	1.013	0.580	1.700	2.100	2.100	0.650	0.168	0.641	-	-
Strontium - Total	mg/L	0 / 114	0%	0.00200	0.004	0.005	0.00571	0.00505	0.00600	0.00700	0.01200	0.00164	0.00015	0.28640	-	-
Strontium - Dissolved	mg/L	0 / 24	0%	0.00400	0.004	0.004	0.00483	0.00450	0.00525	0.00700	0.00700	0.00101	0.00021	0.20839	-	-
Sulphur - Total	mg/L	9 / 33	27%	0.250	0.25	0.25	0.398	0.4	0.5	0.6	0.600	0.1049	0.0183	0.2634	-	-
Sulphur - Dissolved	mg/L	0 / 24	0%	0.300	0.3	0.4	0.429	0.4	0.5	0.6	0.600	0.062	0.013	0.145	-	-
Thallium - Total	mg/L	16 / 18	89%	0.000500	-	-	0.000556	-	-	-	0.001000	-	-	-	-	-
Thallium - Dissolved	mg/L	22 / 24	92%	0.000500	-	-	0.000542	-	-	-	0.001000	-	-	-	-	-
Tin - Total	mg/L	14 / 21	67%	0.00050	-	-	0.00086	-	-	-	0.00200	-	-	-	-	-
Tin - Dissolved	mg/L	20 / 24	83%	0.00050	-	-	0.00058	-	-	-	0.00100	-	-	-	-	-
Titanium - Total	mg/L	64 / 90	71%	0.0005	-	-	0.0019	-	-	-	0.0080	-	-	-	-	-
Titanium - Dissolved	mg/L	16 / 24	67%	0.0005	-	-	0.0010	-	-	-	0.0030	-	-	-	-	-

Table C2b Summary Statistics for the Baseline Water Chemistry Dataset, 1994–2000; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Uranium - Total	mg/L	111 / 114	97%	0.000025	-	-	0.151373	-	-	-	0.250000	-	-	-	-	-
Uranium - Dissolved	mg/L	24 / 24	100%	0.000200	-	-	0.000200	-	-	-	0.000200	-	-	-	-	-
Vanadium - Total	mg/L	78 / 102	76%	0.00003	-	-	0.00132	-	-	-	0.00700	-	-	-	-	-
Vanadium - Dissolved	mg/L	24 / 24	100%	0.00050	-	-	0.00050	-	-	-	0.00050	-	-	-	-	-
Zinc - Total	mg/L	29 / 114	25%	0.00030	0.00030	0.00058	0.01591	0.00600	0.01488	0.03600	0.36900	0.03997	0.00374	2.51200	-	11
Zinc - Dissolved	mg/L	5 / 24	21%	0.00030	0.00030	0.00188	0.00422	0.00375	0.00618	0.01000	0.01600	0.00369	0.00075	0.87352	-	-
Zirconium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table C3 Summary Statistics for the Diavik Effluent Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Physical																
pH	pH units	0 / 1467	0%	5.91	6.58	7.24	7.44	7.47	7.69	8.22	8.37	0.31	0.01	0.04	-	0
Conductivity	µS/cm	0 / 888	0%	40.7	234.0	448.0	515.3	530.0	594.0	731.0	731.0	114.2	3.8	0.2	-	-
Color (True)	TCU	13 / 13	100%	2.5	-	-	2.5	-	-	-	2.5	-	-	-	-	-
Dissolved Oxygen	mg/L	0 / 454	0%	5.4	7.2	10.5	11.6	12.0	12.7	15.4	18.1	1.6	0.1	0.1	-	-
Total Dissolved Solids (TDS)	mg/L	0 / 881	0%	10.0	125.0	244.0	280.5	289.0	324.0	412.0	456.0	62.0	2.1	0.2	-	-
Total Suspended Solids (TSS)	mg/L	410 / 895	46%	<1.0	-	-	2.92	-	-	-	70	-	-	-	-	-
Turbidity	NTU	1 / 916	0%	<0.1	0.2	0.69	1.44	1.05	1.64	3.03	36.10	1.80	0.06	1.25	-	-
Biochemical Oxygen Demand (BOD)	mg/L	205 / 228	90%	1	-	-	1.264	-	-	-	11	-	-	-	-	-
Acidity (pH 4.5)	mg/L	397 / 397	100%	<0.5	-	-	0.25	-	-	-	0.25	-	-	-	-	-
Acidity (pH 8.3)	mg/L	76 / 397	19%	<0.5	0.25	0.6	1.282	1.01	1.7	3.31	9.1	1.09	0.05	0.85	-	-
Anions and Cations																
Alkalinity (Total as $CaCO_3$)	mg/L	0 / 889	0%	7.00	16.5	42.2	53.6	51.8	60.0	86.0	116.0	19.22	0.64	0.36	-	-
Alkalinity (PP as $CaCO_3$)	mg/L	394 / 394	100%	<0.5	-	-	0.25	-	-	-	0.25	-	-	-	-	-
Bicarbonate (HCO_3)	mg/L	0 / 889	0%	8.0	20.9	52.0	65.4	63.0	73.0	103.0	142.0	23.46	0.79	0.36	-	-
Carbonate (CO_3)	mg/L	889 / 889	100%	<0.5	-	-	1.5	-	-	-	2.5	-	-	-	-	-
Hydroxide (OH)	mg/L	889 / 889	100%	<0.5	-	-	1.5	-	-	-	2.5	-	-	-	-	-
Hardness (as $CaCO_3$) - Total	mg/L	1 / 889	0%	0.3	46.0	97.4	116.6	118.0	135.0	191.0	500.0	30.09	1.01	0.26	-	-
Hardness (as CaCO3) - Dissolved	mg/L	0 / 128	0%	75.40	75.40	94.40	116.21	114.50	138.00	160.00	160.00	23.49	2.08	0.20	-	-
Chloride (Cl)	mg/L	14 / 886	2%	<1	40	70	78.1	78.05	90	119	133.0	21.743	0.730	0.279	0	11
Fluoride (F)	mg/L	65 / 873	7%	<0.05	0.025	0.066	0.09	0.09	0.11	0.14	0.32	0.029	0.001	0.334	-	25
Sulphate (SO_4)	mg/L	0 / 879	0%	5.94	5.9	28.6	52.7	40.5	80.6	133.0	133.0	29.34	0.99	0.56	-	-
Nutrients																
Nitrite-N	mg/L	79 / 937	8%	<0.002	0.001	0.0368	0.0962	0.069	0.119	0.242	3.840	0.159	0.005	1.655	-	567
Nitrate-N	mg/L	2 / 934	0%	0.0030	0.003	1.7525	3.694	3.175	4.91	9.6	15.800	2.448	0.080	0.663	0	488
Nitrate + Nitrite (as N)	mg/L	1 / 936	0%	0.0500	0.05	1.7975	3.7961	3.255	5.09	10	15.900	2.505	0.082	0.660	-	-
Ammonia-N	mg/L	116 / 3410	3%	<0.005	0.0025	0.13	0.4526	0.3	0.5	1.05	5.840	0.640	0.011	1.413	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	72 / 874	8%	<0.04	0.020	0.391	1.196	0.670	1.698	3.590	34.800	1.597	0.054	1.335	-	-
Nitrogen (N) - Total	mg/L	0 / 388	0%	1.310	1.310	1.888	3.025	3.005	3.823	6.700	7.700	1.189	0.060	0.393	-	-
Nitrogen - Total Calculated	mg/L	0 / 871	0%	0.313	0.313	2.470	5.109	3.850	7.028	13.720	39.776	3.597	0.122	0.704	-	-
Phosphate - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphate - Total Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
phosphorus - Total	mg/L	7 / 928	1%	0.0005	0.0005	0.022175	0.04225	0.035	0.056475	0.106	0.4660	0.0312	0.0010	0.739	-	-
Phosphorus - Total dissolved	mg/L	84 / 866	10%	0.0005	0.0005	0.003	0.01570	0.007	0.020075	0.0452	0.1440	0.0203	0.0007	1.296	-	-
Orthophosphate	mg/L	333 / 877	38%	<0.001	-	-	0.0106	-	-	-	0.0995	-	-	-	-	-
Silica (SiO_2)-Reactive	mg/L	0 / 9	0%	12.0	12.8	13	13.0	13.2	13.3	13.6	13.6	0.453	0.151	0.035	-	-
Carbon																
Total Inorganic Carbon	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon (TOC)	mg/L	16 / 498	3%	<1.0	0.5	2.0	2.4	2.0	3.0	4.3	19.00	1.25	0.06	0.52	-	-
Dissolved Organic Carbon (DOC)	mg/L	26 / 490	5%	<1.0	1.4	2	2.16	2	2.4	2.9	18	1.12	0.05	0.52	-	-
Metals																
Aluminum - Total	mg/L	0 / 940	0%	0.0014	0.001	0.242	0.424	0.342	0.498	0.880	9.610	0.396	0.013	0.935	-	931
Aluminum - Dissolved	mg/L	5 / 541	1%	0.005	0.005	0.033	0.063	0.045	0.066	0.113	0.770	0.077	0.003	1.22	-	399
Antimony - Total	mg/L	68 / 802	8%	0.00001	0.00001	0.00033725	0.0005	0.0005015	0.00060675	0.001	0.0075	0.0004	0.000015	0.7841	-	-
Antimony - Dissolved	mg/L	71 / 541	13%	0.00018	0.00018	0.0004	0.0006	0.0005	0.00069	0.0011	0.0089	0.0005	0.000024	0.9372	-	-
Arsenic - Total	mg/L	19 / 940	2%	<0.00002	0.0002	0.001	0.0014	0.00128	0.0016325	0.00258	0.00780	0.0007	0.000021	0.4726	-	2
Arsenic - Dissolved	mg/L	30 / 541	6%	<0.00003	0.000015	0.000731	1.08E-03	0.000926	0.0013	0.00215	0.0262	0.0012	0.0001	1.0966	-	1
Barium - Total	mg/L	1 / 940	0%	0.00001	0.00001	0.0566	0.12693	0.068	0.174	0.347	3.55000	0.1537	0.0050	1.2108	-	-
Barium - Dissolved	mg/L	0 / 541	0%	0.00403	0.00403	0.0647	0.17329	0.135	0.265	0.55	0.5880	0.1243	0.0053	0.7170	-	-
Beryllium - Total	mg/L	939 / 940	100%	<0.00001	-	-	0.0003	-	-	-	0.0005	-	-	-	-	-
Beryllium - Dissolved	mg/L	539 / 541	100%	<0.00001	-	-	0.0003	-	-	-	0.0380	-	-	-	-	-

Table C3 Summary Statistics for the Diavik Effluent Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Bismuth - Total	mg/L	892 / 938	95%	<0.000005	-	-	4.77E-05	-	-	-	0.001	-	-	-	-	-
Bismuth - Dissolved	mg/L	467 / 539	87%	<0.000005	-	-	2.90E-05	-	-	-	0.00022	-	-	-	-	-
Boron - Total	mg/L	317 / 940	34%	<0.005	-	-	0.028	-	-	-	0.060	-	-	-	-	-
Boron - Dissolved	mg/L	78 / 541	14%	<0.005	0.012	0.025	0.031	0.0284	0.034	0.047	0.18	0.014	0.0006	0.446	-	-
Cadmium - Total	mg/L	579 / 802	72%	<0.000005	-	-	0.000057	-	-	-	0.000600	-	-	-	-	-
Cadmium - Dissolved	mg/L	449 / 541	83%	<0.000005	-	-	0.000114	-	-	-	0.038200	-	-	-	-	-
Calcium - Total	mg/L	9 / 940	1%	<0.00005	12.600	21.475	23.806	24.400	27.500	36.300	46.600	6.030	0.197	0.253	-	-
Calcium - Dissolved	mg/L	0 / 609	0%	2.600	10.200	20.500	23.407	24.000	27.400	37.700	37.700	6.247	0.253	0.267	-	-
Chromium - Total	mg/L	362 / 940	39%	0.00019	-	-	0.00104	-	-	-	0.04360	-	-	-	-	-
Chromium - Dissolved	mg/L	248 / 537	46%	<0.00006	-	-	0.00093	-	-	-	0.032	-	-	-	-	-
Chromium Hexavalent (Cr6+) - Total	mg/L	63 / 65	97%	<0.001	-	-	0.000515385	-	-	-	0.001	-	-	-	-	-
Cobalt - Total	mg/L	34 / 940	4%	0.000085	0.000085	0.000203	0.000384	0.0003	0.0005	0.0009	0.0123	0.00051	0.00002	1.31892	-	-
Cobalt - Dissolved	mg/L	2 / 537	0%	0.000044	0.000044	0.000205	0.000493	0.0004	0.0005	0.0009	0.0392	0.00176	0.00008	3.57303	-	-
Copper - Total	mg/L	238 / 940	25%	<0.0005	0.00016	0.00039	0.001104	0.0005	0.001	0.0016	0.0120	0.00134	0.00004	1.21545	-	122
Copper - Dissolved	mg/L	61 / 537	11%	<0.00005	0.00003	0.00030	0.00140	0.00094	0.00180	0.00400	0.07830	0.00350	0.00015	2.50469	-	-
Iron - Total	mg/L	103 / 938	11%	0.0023	0.0023	0.007	0.034602	0.0149	0.028	0.059	3.610	0.14806	0.00483	4.27886	-	10
Iron - Dissolved	mg/L	231 / 538	43%	<0.001	-	-	0.0127	-	-	-	1.30	-	-	-	-	-
Lead - Total	mg/L	377 / 940	40%	<0.000005	-	-	0.000100	-	-	-	0.02040	-	-	-	-	-
Lead - Dissolved	mg/L	445 / 537	83%	<0.000005	-	-	0.000085	-	-	-	0.0136	-	-	-	-	-
Lithium - Total	mg/L	1 / 390	0%	0.0003	0.0120	0.0140	0.0148	0.0147	0.0155	0.0177	0.0273	0.0017	0.0001	0.113	-	-
Lithium - Dissolved	mg/L	0 / 124	0%	0.0112	0.0121	0.0136	0.0143	0.0142	0.014825	0.0165	0.0181	0.00121	0.00011	0.085	-	-
Magnesium - Total	mg/L	1 / 940	0%	0.005	0.900	9.805	13.044	12.500	16.000	24.500	99.900	5.264	0.172	0.404	-	-
Magnesium - Dissolved	mg/L	0 / 608	0%	0.870	1.100	10.500	13.622	13.400	16.800	24.900	24.900	4.604	0.187	0.338	-	-
Manganese - Total	mg/L	1 / 940	0%	0.0002	0.0002	0.0182	0.0680	0.0400	0.0719	0.1520	0.5570	0.0811	0.0026	1.194	-	-
Manganese - Dissolved	mg/L	1 / 537	0%	0.0005	0.0005	0.0219	0.0927	0.053	0.128	0.286	0.5600	0.0977	0.0042	1.0540	-	-
Mercury - Total	mg/L	888 / 906	98%	<0.000002	-	-	0.000052	-	-	-	0.00090	-	-	-	-	-
Mercury - Dissolved	mg/L	451 / 509	89%	<0.000002	-	-	0.000053	-	-	-	0.000500	-	-	-	-	-
Molybdenum - Total	mg/L	0 / 940	0%	0.0004	0.0004	0.0214	0.032666	0.02555	0.0436	0.0749	0.50200	0.0225	0.0007	0.688	-	10
Molybdenum - Dissolved	mg/L	0 / 537	0%	0.0004	0.0034	0.0208	0.028064	0.0244	0.0325	0.0499	0.4780	0.0235	0.0010	0.837	-	-
Nickel - Total	mg/L	0 / 940	0%	0.0013	0.0013	0.00513	0.009121	0.006595	0.010525	0.0186	0.1050	0.0084	0.0003	0.926	-	18
Nickel - Dissolved	mg/L	0 / 537	0%	0.0013	0.0013	0.00526	0.00923	0.0079	0.0126	0.0231	0.0316	0.0050	0.0002	0.537	-	-
Potassium - Total	mg/L	0 / 940	0%	0.014	0.014	8.000	12.056	11.950	15.000	25.400	61.300	5.635	0.184	0.467	-	-
Potassium - Dissolved	mg/L	0 / 609	0%	1.400	1.400	9.300	12.297	12.500	14.700	22.700	36.800	4.781	0.194	0.389	-	-
Selenium - Total	mg/L	240 / 938	26%	<0.00004	0.00002	0.0001565	0.00086	0.0002	0.001	0.00225	0.01280	0.00154	0.00005	1.8	-	218
Selenium - Dissolved	mg/L	195 / 535	36%	<0.00004	-	-	0.000806	-	-	-	0.006900	-	-	-	-	-
Silicon - Total	mg/L	1 / 390	0%	0.050	1.830	4.295	5.074	5.455	6.080	7.190	7.190	1.308	0.066	0.258	-	-
Silicon - Dissolved	mg/L	0 / 124	0%	0.950	2.89	4.6	5.098	5.43	5.8775	6.92	6.920	1.20340	0.10807	0.236	-	-
Silver - Total	mg/L	889 / 940	95%	<0.000005	-	-	0.000125	-	-	-	0.002460	-	-	-	-	-
Silver - Dissolved	mg/L	516 / 537	96%	<0.000005	-	-	0.000083	-	-	-	0.001000	-	-	-	-	-
Sodium - Total	mg/L	1 / 940	0%	0.005	24.000	38.300	41.882	43.000	48.000	62.000	74.100	10.285	0.335	0.246	-	-
Sodium - Dissolved	mg/L	0 / 610	0%	1.300	19.100	37.325	42.177	44.100	49.600	65.000	65.000	11.886	0.481	0.282	-	-
Strontium - Total	mg/L	1 / 940	0%	0.00003	0.265	0.439	0.48016	0.50550	0.55700	0.72300	0.72300	0.12158	0.00397	0.253	-	-
Strontium - Dissolved	mg/L	0 / 537	0%	0.01270	0.197	0.418	0.46435	0.49600	0.56700	0.66600	0.66600	0.14515	0.00626	0.313	-	-
Sulphur - Total	mg/L	1 / 390	0%	0.300	0.3	12.8	22.984	23.95	31.5	47	79.000	11.2657	0.5705	0.490	-	-
Sulphur - Dissolved	mg/L	0 / 124	0%	7.000	7.0	13.0	25.026	28.4	34.0	44.5	44.500	11.391	1.023	0.455	-	-
Thallium - Total	mg/L	478 / 938	51%	<0.000002	-	-	0.000057	-	-	-	0.005300	-	-	-	-	-
Thallium - Dissolved	mg/L	282 / 534	53%	<0.000002	-	-	0.000051	-	-	-	0.000910	-	-	-	-	-
Tin - Total	mg/L	896 / 938	96%	<0.00001	-	-	0.00018	-	-	-	0.00879	-	-	-	-	-
Tin - Dissolved	mg/L	513 / 535	96%	<0.00001	-	-	0.00011	-	-	-	0.00216	-	-	-	-	-
Titanium - Total	mg/L	818 / 938	87%	<0.0005	-	-	0.0020	-	-	-	0.1270	-	-	-	-	-
Titanium - Dissolved	mg/L	256 / 535	48%	<0.0003	-	-	0.0005	-	-	-	0.0081	-	-	-	-	-

Table C3 Summary Statistics for the Diavik Effluent Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Uranium - Total	mg/L	1 / 802	0%	0.000001	0.000001	0.0021	0.004343	0.003385	0.0053	0.0099	0.050700	0.0039	0.00014	0.89	1	7
Uranium - Dissolved	mg/L	7 / 537	1%	<0.000002	0.00005	0.0008	0.003355	0.00251	0.0042	0.0092	0.023000	0.0035	0.00015	1.03	-	-
Vanadium - Total	mg/L	146 / 940	16%	<0.00005	0.0001	0.0005	0.00085	0.000765	0.0011	0.0019	0.02210	0.0009	0.00003	1.08	-	-
Vanadium - Dissolved	mg/L	120 / 536	22%	<0.00005	0.000025	0.0004	0.00083	0.00066	0.0011	0.002	0.02860	0.0013	0.00006	1.61	-	-
Zinc - Total	mg/L	424 / 939	45%	<0.0004	-	-	0.00256	-	-	-	0.09500	-	-	-	-	-
Zinc - Dissolved	mg/L	78 / 536	15%	<0.0001	0.00005	0.00050	0.01516	0.00400	0.00800	0.01900	0.32700	0.03525	0.00152	2.32	-	-
Zirconium - Total	mg/L	517 / 519	100%	<0.0001	-	-	5.03846E-05	-	-	-	0.0001	-	-	-	-	-
Zirconium - Dissolved	mg/L	292 / 292	100%	<0.0001	-	-	0.00005	-	-	-	0.00005	-	-	-	-	-

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Table C4 Summary Statistics for the Diavik Mixing Zone Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Physical																
pH	pH units	0 / 2286	0%	5.22	6.43	6.79	6.91	6.90	7.03	7.38	9.48	0.24	0.00	0.03	-	0
Conductivity	µS/cm	1 / 1629	0%	0.1	0.1	22.5	35.7	31.0	47.9	82.8	135.0	15.8	0.4	0.4	-	-
Color (True)	TCU	20 / 22	91%	2.5	-	-	2.73	-	-	-	5	-	-	-	-	-
Dissolved Oxygen	mg/L	0 / 1585	0%	5.3	7.2	10.6	11.7	11.9	12.9	16.2	17.0	1.6	0.0	0.1	-	-
Total Dissolved Solids (TDS)	mg/L	49 / 1629	3%	<5.0	0.5	9.7	19.0	18.0	26.0	50.0	70.0	10.9	0.3	0.6	-	-
Total Suspended Solids (TSS)	mg/L	1260 / 1700	74%	<1.0	-	-	1.51	-	-	-	40	-	-	-	-	-
Turbidity	NTU	10 / 1715	1%	<0.1	0.1	0.32	0.56	0.44	0.61	1.04	8.89	0.52	0.01	0.93	-	-
Biochemical Oxygen Demand (BOD)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 4.5)	mg/L	445 / 445	100%	<0.5	-	-	0.25	-	-	-	0.25	-	-	-	-	-
Acidity (pH 8.3)	mg/L	351 / 444	79%	<0.5	-	-	0.441	-	-	-	12.2	-	-	-	-	-
Anions and Cations																
Alkalinity (Total as $CaCO_3$)	mg/L	425 / 1629	26%	<0.5	0.3	2.5	5.9	6.0	8.0	16.0	16.0	2.55	0.06	0.43	-	-
Alkalinity (PP as $CaCO_3$)	mg/L	444 / 444	100%	<0.5	-	-	0.25	-	-	-	0.25	-	-	-	-	-
Bicarbonate (HCO_3)	mg/L	73 / 1629	4%	<0.5	2.5	6.0	7.7	7.1	9.5	14.0	20.0	2.53	0.06	0.33	-	-
Carbonate (CO_3)	mg/L	1629 / 1629	100%	<0.5	-	-	1.9	-	-	-	2.5	-	-	-	-	-
Hydroxide (OH)	mg/L	1629 / 1629	100%	<0.5	-	-	1.9	-	-	-	2.5	-	-	-	-	-
Hardness (as $CaCO_3$) - Total	mg/L	2 / 1629	0%	0.3	0.3	7.0	9.4	8.5	12.0	18.0	65.6	3.69	0.09	0.39	-	-
Hardness (as CaCO3) - Dissolved	mg/L	1 / 444	0%	0.25	5.05	8.15	10.51	9.88	12.30	17.40	17.4	2.81	0.13	0.27	-	-
Chloride (Cl)	mg/L	207 / 1612	13%	<1	0.25	2	3.5	2.685	5.1	9.6	30.0	2.575	0.064	0.738	0	0
Fluoride (F)	mg/L	1059 / 1629	65%	<0.01	-	-	0.03	-	-	-	0.61	-	-	-	-	-
Sulphate (SO_4)	mg/L	3 / 1600	0%	0.03	0.025	2.1	3.2	3.0	4.1	7.0	8.6	1.38	0.03	0.43	-	-
Nutrients																
Nitrite-N	mg/L	1045 / 1629	64%	<0.002	-	-	0.0028	-	-	-	0.017	-	-	-	-	-
Nitrate-N	mg/L	144 / 1628	9%	<0.002	0.001	0.032	0.128	0.073	0.16	0.351	0.774	0.141	0.003	1.098	0	0
Nitrate + Nitrite (as N)	mg/L	140 / 1621	9%	<0.002	0.001	0.032	0.1306	0.075	0.167	0.369	0.776	0.143	0.004	1.093	-	-
Ammonia-N	mg/L	282 / 1628	17%	<0.005	0.0025	0.009	0.0485	0.02635	0.059	0.133	0.326	0.059	0.001	1.217	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	42 / 1599	3%	<0.05	0.010	0.157	0.767	0.200	0.260	0.412	870	21.753	0.544	28.366	-	-
Nitrogen (N) - Total	mg/L	4 / 415	1%	<0.02	0.070	0.206	2.395	0.260	0.319	0.488	870	42.696	2.096	17.825	-	-
Nitrogen - Total Calculated	mg/L	0 / 1599	0%	0.023	0.023	0.200	0.900	0.281	0.425	0.759	870.024	21.751	0.544	24.173	-	-
Phosphate - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphate - Total Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
phosphorus - Total	mg/L	158 / 1600	10%	<0.001	0.0005	0.003	0.00439	0.004	0.005	0.0079	0.0447	0.0027	0.0001	0.608	-	-
Phosphorus - Total dissolved	mg/L	555 / 1572	35%	<0.001	-	-	0.00222	-	-	-	0.0300	-	-	-	-	-
Orthophosphate	mg/L	1465 / 1629	90%	<0.001	-	-	0.0014	-	-	-	0.0250	-	-	-	-	-
Silica (SiO_2)-Reactive	mg/L	41275	8%	<0.05	0.025	0.14	0.6	0.83	0.87	0.97	1.0	0.368	0.102	0.597	-	-
Carbon																
Total Inorganic Carbon	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon (TOC)	mg/L	20 / 1628	1%	<0.5	1.0	2.2	2.7	3.0	3.0	4.0	6.00	0.64	0.02	0.23	-	-
Dissolved Organic Carbon (DOC)	mg/L	23 / 1627	1%	<0.5	0.5	2	2.57	2.73	3	4.4	5	0.60	0.015	0.23	-	-
Metals																
Aluminum - Total	mg/L	89 / 1597	6%	<0.0003	0.000	0.008	0.019	0.012	0.023	0.045	1.140	0.042	0.001	2.216	-	718
Aluminum - Dissolved	mg/L	101 / 1627	6%	<0.0003	0.000	0.004	0.007	0.006	0.009	0.018	0.090	0.006	0.00015	0.83	-	593
Antimony - Total	mg/L	523 / 1458	36%	<0.00002	-	-	0.0001	-	-	-	0.0028	-	-	-	-	-
Antimony - Dissolved	mg/L	584 / 1627	36%	<0.00002	-	-	0.0001	-	-	-	0.0095	-	-	-	-	-
Arsenic - Total	mg/L	159 / 1597	10%	<0.00002	0.00017	0.00023	0.0003	0.00025	0.00029	0.000378	0.00413	0.00012	0.000003	0.4499	-	0
Arsenic - Dissolved	mg/L	153 / 1628	9%	<0.00002	0.00015	0.00022	2.57E-04	0.0002435	0.00027025	0.000345	0.0039	0.00011	0.0000027	0.4306	-	0
Barium - Total	mg/L	1 / 1597	0%	0.000024	0.000024	0.00338	0.00681	0.00453	0.0075	0.0136	0.07020	0.0059	0.0001	0.8629	-	-
Barium - Dissolved	mg/L	2 / 1628	0%	0.000010	0.00001	0.00328	0.01393	0.004685	0.00941	0.0185	0.2710	0.0276	0.0007	1.9815	-	-
Beryllium - Total	mg/L	1595 / 1597	100%	<0.00001	-	-	0.0001	-	-	-	0.0005	-	-	-	-	-
Beryllium - Dissolved	mg/L	1628 / 1628	100%	<0.00001	-	-	0.0001	-	-	-	0.0003	-	-	-	-	-

Table C4 Summary Statistics for the Diavik Mixing Zone Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Bismuth - Total	mg/L	568 / 581	98%	<0.000005	-	-	2.39E-05	-	-	-	0.0026	-	-	-	-	-
Bismuth - Dissolved	mg/L	572 / 609	94%	<0.000005	-	-	1.22E-05	-	-	-	0.0002	-	-	-	-	-
Boron - Total	mg/L	726 / 1597	45%	<0.001	-	-	0.008	-	-	-	0.103	-	-	-	-	-
Boron - Dissolved	mg/L	599 / 1628	37%	<0.005	-	-	0.009	-	-	-	0.11	-	-	-	-	-
Cadmium - Total	mg/L	1398 / 1458	96%	<0.000005	-	-	0.000026	-	-	-	0.0003	-	-	-	-	-
Cadmium - Dissolved	mg/L	1592 / 1628	98%	<0.000005	-	-	0.000022	-	-	-	0.0002	-	-	-	-	-
Calcium - Total	mg/L	18 / 1597	1%	<0.00005	0.000	1.190	1.785	1.610	2.340	3.950	7.040	0.757	0.019	0.424	-	-
Calcium - Dissolved	mg/L	2 / 1600	0%	0.005	0.005	1.200	1.792	1.600	2.360	3.920	6.710	0.729	0.018	0.407	-	-
Chromium - Total	mg/L	962 / 1597	60%	<0.00005	-	-	0.00025	-	-	-	0.02620	-	-	-	-	-
Chromium - Dissolved	mg/L	1054 / 1599	66%	<0.00005	-	-	0.00013	-	-	-	0.008	-	-	-	-	-
Chromium Hexavalent (Cr6+) - Total	mg/L	37 / 37	100%	<0.001	-	-	0.0005	-	-	-	0.0005	-	-	-	-	-
Cobalt - Total	mg/L	1168 / 1597	73%	<0.000005	-	-	0.000063	-	-	-	0.0122	-	-	-	-	-
Cobalt - Dissolved	mg/L	1194 / 1599	75%	<0.000005	-	-	0.000043	-	-	-	0.0035	-	-	-	-	-
Copper - Total	mg/L	432 / 1597	27%	<0.0005	0.000248	0.0005	0.000642	0.0006	0.0007	0.00096	0.0111	0.00047	0.00001	0.73889	-	10
Copper - Dissolved	mg/L	668 / 1599	42%	<0.00005	-	-	0.00054	-	-	-	0.01040	-	-	-	-	-
Iron - Total	mg/L	273 / 856	32%	<0.001	-	-	0.012056	-	-	-	3.160	-	-	-	-	-
Iron - Dissolved	mg/L	1397 / 1599	87%	<0.001	-	-	0.0026	-	-	-	0.07	-	-	-	-	-
Lead - Total	mg/L	1194 / 1597	75%	<0.000005	-	-	0.000041	-	-	-	0.00360	-	-	-	-	-
Lead - Dissolved	mg/L	1410 / 1599	88%	<0.000005	-	-	0.000026	-	-	-	0.0004	-	-	-	-	-
Lithium - Total	mg/L	2 / 415	0%	0.00025	0.0003	0.0017	0.0025	0.0020	0.0026	0.0038	0.0755	0.0039	0.0002	1.561	-	-
Lithium - Dissolved	mg/L	1 / 415	0%	0.00025	0.0013	0.001585	0.0020	0.0019	0.0024	0.00354	0.0065	0.00065	0.00003	0.318	-	-
Magnesium - Total	mg/L	2 / 1597	0%	0.0020	0.002	0.800	1.141	1.060	1.410	2.280	12.800	0.522	0.013	0.457	-	-
Magnesium - Dissolved	mg/L	2 / 1600	0%	0.005	0.005	0.789	1.119	1.040	1.410	2.250	5.000	0.402	0.010	0.360	-	-
Manganese - Total	mg/L	32 / 1597	2%	<0.00005	0.0000	0.0019	0.0045	0.0030	0.0047	0.0088	0.2540	0.0081	0.0002	1.791	-	-
Manganese - Dissolved	mg/L	151 / 1598	9%	<0.00005	0.000025	0.00033	0.0033	0.001375	0.0037	0.0087	0.2150	0.0072	0.0002	2.1622	-	-
Mercury - Total	mg/L	1532 / 1555	99%	<0.000002	-	-	0.000018	-	-	-	0.00041	-	-	-	-	-
Mercury - Dissolved	mg/L	1544 / 1571	98%	<0.000002	-	-	0.000013	-	-	-	0.000280	-	-	-	-	-
Molybdenum - Total	mg/L	88 / 1597	6%	<0.00005	0.000025	0.0003	0.001045	0.000764	0.00149	0.00327	0.02580	0.0013	0.0000	1.230	-	0
Molybdenum - Dissolved	mg/L	86 / 1598	5%	<0.00005	0.000025	0.0003	0.000951	0.00075	0.00146	0.00308	0.0077	0.0008	0.0000	0.801	-	-
Nickel - Total	mg/L	1 / 1597	0%	0.00003	0.00041	0.0007	0.001456	0.000808	0.00107	0.00162	0.1160	0.0052	0.0001	3.555	-	13
Nickel - Dissolved	mg/L	2 / 1599	0%	0.00001	0.00036	0.00066	0.00090	0.00077	0.000987	0.00147	0.0280	0.0008	0.0000	0.840	-	-
Potassium - Total	mg/L	2 / 1597	0%	0.005	0.005	0.700	0.973	0.902	1.200	1.930	3.380	0.323	0.008	0.332	-	-
Potassium - Dissolved	mg/L	14 / 1600	1%	0.010	0.010	0.693	0.946	0.901	1.190	1.920	3.210	0.338	0.008	0.357	-	-
Selenium - Total	mg/L	1330 / 1597	83%	<0.00004	-	-	0.00009	-	-	-	0.00270	-	-	-	-	-
Selenium - Dissolved	mg/L	1334 / 1599	83%	<0.00004	-	-	0.000084	-	-	-	0.001000	-	-	-	-	-
Silicon - Total	mg/L	157 / 415	38%	<0.05	-	-	0.236	-	-	-	6.220	-	-	-	-	-
Silicon - Dissolved	mg/L	184 / 415	44%	<0.05	-	-	0.207	-	-	-	0.664	-	-	-	-	-
Silver - Total	mg/L	1584 / 1597	99%	<0.000005	-	-	0.000053	-	-	-	0.000200	-	-	-	-	-
Silver - Dissolved	mg/L	1594 / 1599	100%	<0.000005	-	-	0.000043	-	-	-	0.000100	-	-	-	-	-
Sodium - Total	mg/L	75 / 1597	5%	<0.005	0.003	1.060	2.136	1.770	3.170	5.470	7.300	1.279	0.032	0.599	-	-
Sodium - Dissolved	mg/L	6 / 1600	0%	0.003	0.003	1.180	2.183	1.780	3.200	6.100	7.140	1.277	0.032	0.585	-	-
Strontium - Total	mg/L	2 / 1597	0%	0.00003	0.000	0.012	0.02331	0.01880	0.03380	0.06040	0.06810	0.01402	0.00035	0.602	-	-
Strontium - Dissolved	mg/L	2 / 1599	0%	0.00003	0.000	0.012	0.02299	0.01850	0.03360	0.06530	0.06530	0.01388	0.00035	0.604	-	-
Sulphur - Total	mg/L	215 / 415	52%	<0.6	-	-	9.946	-	-	-	1800.000	-	-	-	-	-
Sulphur - Dissolved	mg/L	229 / 415	55%	<0.6	-	-	1.419	-	-	-	6.130	-	-	-	-	-
Thallium - Total	mg/L	533 / 581	92%	<0.000002	-	-	0.000016	-	-	-	0.000230	-	-	-	-	-
Thallium - Dissolved	mg/L	531 / 580	92%	<0.000002	-	-	0.000008	-	-	-	0.000110	-	-	-	-	-
Tin - Total	mg/L	551 / 581	95%	<0.00001	-	-	0.00016	-	-	-	0.00889	-	-	-	-	-
Tin - Dissolved	mg/L	547 / 580	94%	<0.00001	-	-	0.00009	-	-	-	0.00250	-	-	-	-	-
Titanium - Total	mg/L	564 / 581	97%	<0.0005	-	-	0.0012	-	-	-	0.0863	-	-	-	-	-
Titanium - Dissolved	mg/L	556 / 580	96%	<0.0003	-	-	0.0002	-	-	-	0.0028	-	-	-	-	-

Table C4 Summary Statistics for the Diavik Mixing Zone Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Uranium - Total	mg/L	3 / 1458	0%	0.000001	0.000001	0.00012	0.000287	0.0002	0.00034	0.00066	0.012600	0.0004	0.000012	1.53	1	12
Uranium - Dissolved	mg/L	55 / 1599	3%	<0.000002	0.000001	0.0000885	0.000198	0.00014	0.00025	0.00049	0.003460	0.0002	0.000005	1.01	-	-
Vanadium - Total	mg/L	1176 / 1597	74%	<0.00005	-	-	0.00010	-	-	-	0.01240	-	-	-	-	-
Vanadium - Dissolved	mg/L	1201 / 1599	75%	<0.00005	-	-	0.00008	-	-	-	0.00118	-	-	-	-	-
Zinc - Total	mg/L	718 / 1597	45%	<0.0004	-	-	0.00156	-	-	-	0.11400	-	-	-	-	-
Zinc - Dissolved	mg/L	216 / 1598	14%	<0.0001	0.00005	0.00068	0.00802	0.00160	0.00410	0.00900	0.19000	0.01922	0.00048	2.40	-	-
Zirconium - Total	mg/L	478 / 480	100%	<0.0001	-	-	5.13253E-05	-	-	-	0.00025	-	-	-	-	-
Zirconium - Dissolved	mg/L	253 / 254	100%	<0.0001	-	-	5.03614E-05	-	-	-	0.0002	-	-	-	-	-

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Table C5 Summary Statistics for the Near-Field (NF) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Physical																
pH	pH units	0 / 321	0%	5.28	6.50	6.79	6.86	6.90	7.00	7.28	7.28	0.20	0.011	0.030	-	0
Conductivity	µS/cm	0 / 325	0%	1.0	14.1	22.3	28.5	25.9	29.9	40.3	75.3	10.2	0.563	0.356	-	-
Color (True)	TCU	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	0 / 7	0%	10.1	10.1	10.8	11.4	10.8	12.4	12.6	12.6	1.0	0.389	0.090	-	-
Total Dissolved Solids (TDS)	mg/L	7 / 325	2%	<5.0	4.0	15.0	20.8	19.0	24.0	36.0	61.0	9.1	0.504	0.438	-	-
Total Suspended Solids (TSS)	mg/L	257 / 263	98%	<1.0	-	-	1.32	-	-	-	3	-	-	-	-	-
Turbidity	NTU	18 / 263	7%	<0.1	0.1	0.18	0.29	0.27	0.32	0.50	2.20	0.23	0.014	0.786	-	-
Biochemical Oxygen Demand (BOD)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 4.5)	mg/L	101 / 101	100%	<0.5	-	-	0.25	-	-	-	0.25	-	-	-	-	-
Acidity (pH 8.3)	mg/L	83 / 101	82%	<0.5	-	-	0.337	-	-	-	2	-	-	-	-	-
Anions and Cations																
Alkalinity (Total as $CaCO_3$)	mg/L	142 / 325	44%	<0.5	-	-	4.4	-	-	-	10.3	-	-	-	-	-
Alkalinity (PP as $CaCO_3$)	mg/L	101 / 101	100%	<0.5	-	-	0.25	-	-	-	0.25	-	-	-	-	-
Bicarbonate (HCO_3)	mg/L	11 / 325	3%	<0.5	5.0	5.7	6.4	6.0	6.9	8.5	12.5	1.58	0.088	0.247	-	-
Carbonate (CO_3)	mg/L	325 / 325	100%	<0.5	-	-	1.8	-	-	-	2.5	-	-	-	-	-
Hydroxide (OH)	mg/L	325 / 325	100%	<0.5	-	-	1.8	-	-	-	2.5	-	-	-	-	-
Hardness (as $CaCO_3$) - Total	mg/L	0 / 325	0%	4.0	5.0	6.7	7.8	7.3	8.4	10.7	17.3	2.15	0.119	0.274	-	-
Hardness (as CaCO3) - Dissolved	mg/L	16072	2%	0.25	7.48	7.89	9.48	9.12	10.50	14.10	16.6	2.66	0.401	0.281	-	-
Chloride (Cl)	mg/L	7 / 325	2%	<1	1	1.84	2.5	2.1	2.6	3.7	9.3	1.621	0.090	0.643	0	0
Fluoride (F)	mg/L	222 / 325	68%	0.02	-	-	0.03	-	-	-	0.05	-	-	-	-	-
Sulphate (SO_4)	mg/L	0 / 325	0%	1.00	1.00	2.1	2.9	2.7	3.5	5.6	6.1	0.94	0.052	0.329	-	-
Nutrients																
Nitrite-N	mg/L	300 / 325	92%	<0.002	-	-	0.0015	-	-	-	0.007	-	-	-	-	-
Nitrate-N	mg/L	61 / 325	19%	<0.002	0.001	0.0158	0.073	0.0363	0.067	0.143	3.340	0.232	0.013	3.17	0	1
Nitrate + Nitrite (as N)	mg/L	61 / 325	19%	<0.002	0.001	0.0158	0.0735	0.0363	0.067	0.14	3.340	0.232	0.013	3.16	-	-
Ammonia-N	mg/L	94 / 325	29%	<0.005	0.0025	0.0025	0.0244	0.015	0.036	0.084	0.156	0.027	0.0015	1.11	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	10 / 325	3%	<0.05	0.010	0.150	4.327	0.193	0.244	0.381	1340	74	4.12	17.2	-	-
Nitrogen (N) - Total	mg/L	1 / 101	1%	0.010	0.060	0.190	13.502	0.230	0.281	0.395	1340	133	13.26	9.87	-	-
Nitrogen - Total Calculated	mg/L	0 / 325	0%	0.02	0.02	0.19	4.40	0.25	0.31	0.48	1340.01	74.32	4.12	16.9	-	-
Phosphate - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphate - Total Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
phosphorus - Total	mg/L	73 / 325	22%	<0.001	0.00050	0.00250	0.00318	0.00300	0.00400	0.00620	0.0180	0.00159	0.00009	0.501	-	-
Phosphorus - Total dissolved	mg/L	153 / 323	47%	<0.001	-	-	0.00181	-	-	-	0.0086	-	-	-	-	-
Orthophosphate	mg/L	296 / 325	91%	<0.001	-	-	0.000991	-	-	-	0.005	-	-	-	-	-
Silica (SiO_2)-Reactive	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon																
Total Inorganic Carbon	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon (TOC)	mg/L	1 / 308	0%	0.5	2.0	2.5	2.7	2.7	3.0	3.6	4.80	0.41	0.02	0.154	-	-
Dissolved Organic Carbon (DOC)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																
Aluminum - Total	mg/L	1 / 324	0%	0.0029	0.003	0.005	0.009	0.007	0.010	0.017	0.049	0.0055	0.00031	0.648	-	113
Aluminum - Dissolved	mg/L	0 / 28	0%	0.002	0.002	0.005	0.007	0.007	0.009	0.012	0.012	0.0027	0.00052	0.388	-	4
Antimony - Total	mg/L	246 / 325	76%	<0.00002	-	-	0.0000	-	-	-	0.0020	-	-	-	-	-
Antimony - Dissolved	mg/L	15 / 28	54%	<0.00002	-	-	0.0000	-	-	-	0.0000	-	-	-	-	-
Arsenic - Total	mg/L	1 / 325	0%	0.00008	0.00019	0.00023	0.0002	0.00024	0.00026	0.000298	0.00040	0.00003	0.000002	0.139	-	0
Arsenic - Dissolved	mg/L	0 / 28	0%	0.00019	0.00019	0.00024	2.64E-04	0.00026	0.00028	0.00031	0.0004	0.0000351	0.0000066	0.133	-	0
Barium - Total	mg/L	0 / 325	0%	0.00131	0.00131	0.00306	0.00402	0.00358	0.00424	0.00598	0.01560	0.00176	0.00010	0.438	-	-
Barium - Dissolved	mg/L	0 / 28	0%	0.00240	0.0024	0.0025625	0.00301	0.00277	0.00336	0.00389	0.0051	0.0006	0.0001	0.208	-	-
Beryllium - Total	mg/L	324 / 325	100%	<0.00001	-	-	0.0001	-	-	-	0.0005	-	-	-	-	-
Beryllium - Dissolved	mg/L	28 / 28	100%	<0.00001	-	-	0.0000	-	-	-	0.0000	-	-	-	-	-

Table C5 Summary Statistics for the Near-Field (NF) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Bismuth - Total	mg/L	102 / 102	100%	<0.000005	-	-	3.09E-06	-	-	-	0.00005	-	-	-	-	-
Bismuth - Dissolved	mg/L	27 / 28	96%	<0.000005	-	-	2.88E-06	-	-	-	0.000013	-	-	-	-	-
Boron - Total	mg/L	115 / 268	43%	<0.001	-	-	0.008	-	-	-	0.150	-	-	-	-	-
Boron - Dissolved	mg/L	25 / 28	89%	<0.005	-	-	0.014	-	-	-	0.03	-	-	-	-	-
Cadmium - Total	mg/L	311 / 325	96%	<0.000005	-	-	0.000019	-	-	-	0.0001	-	-	-	-	-
Cadmium - Dissolved	mg/L	28 / 28	100%	<0.000005	-	-	0.000003	-	-	-	0.0000	-	-	-	-	-
Calcium - Total	mg/L	0 / 325	0%	0.569	0.781	1.230	1.531	1.410	1.600	2.150	4	0.489	0.027	0.319	-	-
Calcium - Dissolved	mg/L	1 / 160	1%	0.005	1.160	1.400	1.658	1.500	1.763	2.230	4	0.481	0.038	0.290	-	-
Chromium - Total	mg/L	251 / 325	77%	<0.00005	-	-	0.00005	-	-	-	0.0007	-	-	-	-	-
Chromium - Dissolved	mg/L	19 / 28	68%	<0.00005	-	-	0.00006	-	-	-	0.000	-	-	-	-	-
Chromium Hexavalent (Cr6+) - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt - Total	mg/L	225 / 325	69%	0.000006	-	-	0.000039	-	-	-	0.0001	-	-	-	-	-
Cobalt - Dissolved	mg/L	9 / 28	32%	<0.000005	-	-	0.000007	-	-	-	0.0000	-	-	-	-	-
Copper - Total	mg/L	158 / 325	49%	0.0003	-	-	0.000473	-	-	-	0.0012	-	-	-	-	-
Copper - Dissolved	mg/L	0 / 28	0%	0.00038	0.00038	0.00048	0.00052	0.00050	0.00055	0.00060	0.00080	0.00008	0.000014	0.145	-	-
Iron - Total	mg/L	72 / 219	33%	<0.001	-	-	0.005402	-	-	-	0.072	-	-	-	-	-
Iron - Dissolved	mg/L	68 / 134	51%	<0.001	-	-	0.0057	-	-	-	0.06	-	-	-	-	-
Lead - Total	mg/L	253 / 324	78%	<0.000005	-	-	0.000036	-	-	-	0.00084	-	-	-	-	-
Lead - Dissolved	mg/L	21 / 28	75%	<0.000005	-	-	0.000006	-	-	-	0.0001	-	-	-	-	-
Lithium - Total	mg/L	1 / 101	1%	0.0013	0.0013	0.0015	0.0017	0.0016	0.0019	0.0024	0.0029	0.00037	0.000037	0.211	-	-
Lithium - Dissolved	mg/L	0 / 28	0%	0.0008	0.00139	0.0014475	0.0015	0.001505	0.00162	0.0018	0.0021	0.00021	0.00004	0.137	-	-
Magnesium - Total	mg/L	0 / 325	0%	0.297	0.492	0.772	0.943	0.893	1.030	1.400	1.900	0.236	0.013	0.250	-	-
Magnesium - Dissolved	mg/L	1 / 160	1%	0.005	0.760	0.870	1.013	0.942	1.145	1.550	1.690	0.212	0.017	0.210	-	-
Manganese - Total	mg/L	0 / 325	0%	0.0005	0.0005	0.0016	0.0029	0.0025	0.0035	0.0060	0.0136	0.0019	0.0001	0.663	-	-
Manganese - Dissolved	mg/L	5 / 28	18%	<0.00005	0.00003	0.00006	0.0005	0.00014	0.00077	0.00157	0.0024	0.00062	0.00012	1.299	-	-
Mercury - Total	mg/L	295 / 311	95%	<0.00001	-	-	0.000010	-	-	-	0.00010	-	-	-	-	-
Mercury - Dissolved	mg/L	28 / 28	100%	<0.00001	-	-	0.000005	-	-	-	0.000005	-	-	-	-	-
Molybdenum - Total	mg/L	2 / 325	1%	<0.00006	0.00003	0.00031	0.000609	0.00051	0.00072	0.00131	0.00234	0.00043	0.00002	0.712	-	0
Molybdenum - Dissolved	mg/L	0 / 28	0%	0.000514	0.00051	0.00061	0.000751	0.00071	0.00080	0.00096	0.0014	0.00021	0.00004	0.276	-	-
Nickel - Total	mg/L	0 / 325	0%	0.00056	0.00056	0.00066	0.000747	0.00070	0.00078	0.00097	0.0014	0.00015	0.00001	0.198	-	0
Nickel - Dissolved	mg/L	0 / 28	0%	0.00051	0.00051	0.00057	0.00065	0.00062	0.00070	0.00081	0.0010	0.00010	0.00002	0.154	-	-
Potassium - Total	mg/L	0 / 325	0%	0.404	0.475	0.709	0.829	0.780	0.907	1.200	1.380	0.181	0.010	0.219	-	-
Potassium - Dissolved	mg/L	0 / 160	0%	0.019	0.530	0.790	0.900	0.870	0.983	1.250	1.580	0.204	0.016	0.226	-	-
Selenium - Total	mg/L	309 / 325	95%	<0.00004	-	-	0.00005	-	-	-	0.00030	-	-	-	-	-
Selenium - Dissolved	mg/L	22 / 28	79%	<0.00004	-	-	0.000030	-	-	-	0.000127	-	-	-	-	-
Silicon - Total	mg/L	61 / 105	58%	<0.05	-	-	0.137	-	-	-	0.615	-	-	-	-	-
Silicon - Dissolved	mg/L	13 / 28	46%	<0.05	-	-	0.115	-	-	-	0.425	-	-	-	-	-
Silver - Total	mg/L	322 / 325	99%	<0.000005	-	-	0.000036	-	-	-	0.000200	-	-	-	-	-
Silver - Dissolved	mg/L	28 / 28	100%	<0.000005	-	-	0.000003	-	-	-	0.000003	-	-	-	-	-
Sodium - Total	mg/L	1 / 325	0%	0.356	0.356	1.190	1.671	1.450	1.750	2.560	4.860	0.791	0.044	0.473	-	-
Sodium - Dissolved	mg/L	1 / 160	1%	0.005	1.300	1.500	1.903	1.600	2.000	2.710	4.820	0.754	0.060	0.396	-	-
Strontium - Total	mg/L	0 / 325	0%	0.00440	0.005	0.013	0.01791	0.01550	0.01840	0.02630	0.05950	0.00893	0.00050	0.498	-	-
Strontium - Dissolved	mg/L	0 / 28	0%	0.01520	0.015	0.016	0.01987	0.01705	0.02288	0.02790	0.04240	0.00593	0.00112	0.299	-	-
Sulphur - Total	mg/L	67 / 101	66%	0.64	-	-	16.760	-	-	-	1580.000	-	-	-	-	-
Sulphur - Dissolved	mg/L	14 / 36	39%	0.84	-	-	50.879	-	-	-	1790.000	-	-	-	-	-
Thallium - Total	mg/L	62 / 70	89%	<0.000002	-	-	0.000002	-	-	-	0.000050	-	-	-	-	-
Thallium - Dissolved	mg/L	26 / 28	93%	<0.000002	-	-	0.000001	-	-	-	0.000002	-	-	-	-	-
Tin - Total	mg/L	72 / 102	71%	<0.00001	-	-	0.00003	-	-	-	0.00042	-	-	-	-	-
Tin - Dissolved	mg/L	25 / 28	89%	<0.00001	-	-	0.00006	-	-	-	0.00010	-	-	-	-	-
Titanium - Total	mg/L	100 / 102	98%	<0.0005	-	-	0.0003	-	-	-	0.0046	-	-	-	-	-
Titanium - Dissolved	mg/L	28 / 28	100%	<0.0005	-	-	0.0003	-	-	-	0.0003	-	-	-	-	-

Table C5 Summary Statistics for the Near-Field (NF) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Uranium - Total	mg/L	0 / 325	0%	0.000064	0.000064	0.00009	0.000129	0.000101	0.000129	0.000187	0.000960	0.000085	0.0000047	0.66	0	0
Uranium - Dissolved	mg/L	0 / 28	0%	0.000050	0.00005	0.00005975	0.000086	0.000074	0.00010525	0.000138	0.000203	0.000035	0.00001	0.41	-	-
Vanadium - Total	mg/L	287 / 325	88%	<0.00005	-	-	0.00005	-	-	-	0.00050	-	-	-	-	-
Vanadium - Dissolved	mg/L	21 / 28	75%	<0.0001	-	-	0.00011	-	-	-	0.00027	-	-	-	-	-
Zinc - Total	mg/L	168 / 325	52%	<0.0004	-	-	0.00077	-	-	-	0.00620	-	-	-	-	-
Zinc - Dissolved	mg/L	0 / 28	0%	0.00023	0.00023	0.00041	0.00066	0.00055	0.00075	0.00101	0.00266	0.00048	0.00009	0.737	-	-
Zirconium - Total	mg/L	39 / 39	100%	<0.00005	-	-	4.45545E-05	-	-	-	0.00025	-	-	-	-	-
Zirconium - Dissolved	mg/L	12 / 12	100%	<0.00005	-	-	0.0000375	-	-	-	0.00005	-	-	-	-	-

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Table C6 Summary Statistics for the Mid-Field 1 (MF1) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Physical																
pH	pH units	0 / 252	0%	5.44	6.50	6.79	6.87	6.90	7.00	7.30	7.30	0.21	0.01	0.03	-	0
Conductivity	µS/cm	1 / 258	0%	0.5	15.6	21.9	24.4	23.4	26.3	31.4	48.0	4.8	0.3	0.2	-	-
Color (True)	TCU	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	0 / 8	0%	10.2	10.2	10.4	10.8	10.8	11.0	11.1	12.2	0.6	0.2	0.1	-	-
Total Dissolved Solids (TDS)	mg/L	11 / 258	4%	<5.0	5.0	15.0	18.6	18.0	22.8	34.0	42.0	7.5	0.5	0.4	-	-
Total Suspended Solids (TSS)	mg/L	192 / 204	94%	<1.0	-	-	1.43	-	-	-	8	-	-	-	-	-
Turbidity	NTU	33 / 204	16%	<0.1	0.1	0.16	0.30	0.29	0.37	0.64	1.09	0.20	0.01	0.67	-	-
Biochemical Oxygen Demand (BOD)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 4.5)	mg/L	73 / 73	100%	<0.5	-	-	0.25	-	-	-	0.25	-	-	-	-	-
Acidity (pH 8.3)	mg/L	63 / 73	86%	<0.5	-	-	0.335	-	-	-	1.46	-	-	-	-	-
Anions and Cations																
Alkalinity (Total as $CaCO_3$)	mg/L	133 / 258	52%	<0.5	-	-	3.9	-	-	-	9.5	-	-	-	-	-
Alkalinity (PP as $CaCO_3$)	mg/L	73 / 73	100%	<0.5	-	-	0.25	-	-	-	0.25	-	-	-	-	-
Bicarbonate (HCO_3)	mg/L	9 / 258	3%	<0.5	4.1	5.4	5.9	6.0	6.3	7.6	11.6	1.17	0.07	0.20	-	-
Carbonate (CO_3)	mg/L	258 / 258	100%	<0.5	-	-	1.9	-	-	-	2.5	-	-	-	-	-
Hydroxide (OH)	mg/L	258 / 258	100%	<0.5	-	-	1.9	-	-	-	2.5	-	-	-	-	-
Hardness (as $CaCO_3$) - Total	mg/L	0 / 258	0%	4.0	4.0	6.0	7.1	7.0	7.6	10.0	17.2	1.36	0.08	0.19	-	-
Hardness (as CaCO3) - Dissolved	mg/L	0 / 26	0%	6.01	6.45	7.59	8.18	8.06	8.48	9.81	11.6	1.50	0.29	0.18	-	-
Chloride (Cl)	mg/L	10 / 258	4%	<1	0.5	1	1.8	2	2.1925	3.7	5.3	0.673	0.042	0.372	0	0
Fluoride (F)	mg/L	182 / 258	71%	0.02	-	-	0.03	-	-	-	0.05	-	-	-	-	0
Sulphate (SO_4)	mg/L	0 / 258	0%	1.24	1.240	2.0	2.5	2.3	2.9	4.1	5.0	0.68	0.04	0.27	-	-
Nutrients																
Nitrite-N	mg/L	248 / 258	96%	<0.002	-	-	0.0014	-	-	-	0.012	-	-	-	-	0
Nitrate-N	mg/L	77 / 258	30%	<0.002	0.001	0.01	0.036	0.02295	0.048825	0.102	0.240	0.040	0.003	1.119	0	0
Nitrate + Nitrite (as N)	mg/L	76 / 258	29%	<0.002	0.001	0.01	0.0361	0.023	0.048825	0.102	0.240	0.040	0.003	1.115	-	-
Ammonia-N	mg/L	88 / 257	34%	<0.005	-	-	0.0187	-	-	-	0.110	-	-	-	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	3 / 257	1%	<0.05	0.040	0.158	0.209	0.190	0.240	0.360	1	0.090	0.006	0.429	-	-
Nitrogen (N) - Total	mg/L	0 / 73	0%	0.030	0.150	0.190	0.232	0.212	0.250	0.330	1	0.088	0.010	0.377	-	-
Nitrogen - Total Calculated	mg/L	0 / 255	0%	0.040	0.040	0.187	0.247	0.224	0.288	0.437	0.713	0.096	0.006	0.389	-	-
Phosphate - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphate - Total Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
phosphorus - Total	mg/L	56 / 257	22%	0.00050	0.0005	0.0025	0.00331	0.003	0.004	0.0062	0.0100	0.0015	0.0001	0.447	-	-
Phosphorus - Total dissolved	mg/L	125 / 253	49%	0.00050	-	-	0.00169	-	-	-	0.0060	-	-	-	-	-
Orthophosphate	mg/L	236 / 258	91%	<0.001	-	-	0.0010	-	-	-	0.0050	-	-	-	-	-
Silica (SiO_2)-Reactive	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon																
Total Inorganic Carbon	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon (TOC)	mg/L	0 / 243	0%	1.0	1.7	2.3	2.7	2.7	3.0	3.9	4.20	0.46	0.03	0.17	-	-
Dissolved Organic Carbon (DOC)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																
Aluminum - Total	mg/L	0 / 261	0%	0.0029	0.003	0.005	0.007	0.006	0.007	0.010	0.062	0.004	0.000	0.653	-	78
Aluminum - Dissolved	mg/L	0 / 18	0%	0.002	0.002	0.003	0.004	0.003	0.004	0.004	0.008	0.001	0.00032	0.38	-	0
Antimony - Total	mg/L	229 / 261	88%	<0.00002	-	-	0.0000	-	-	-	0.0015	-	-	-	-	-
Antimony - Dissolved	mg/L	15 / 18	83%	<0.00002	-	-	0.0000	-	-	-	0.0000	-	-	-	-	-
Arsenic - Total	mg/L	1 / 261	0%	<0.00003	0.000176	0.000213	0.0002	0.000227	0.00024	0.00028	0.00086	0.00005	0.000003	0.2191	-	0
Arsenic - Dissolved	mg/L	0 / 18	0%	0.00017	0.00017	0.000202	2.29E-04	0.0002335	0.00025225	0.000291	0.0003	0.00003	0.0000081	0.1492	-	0
Barium - Total	mg/L	0 / 261	0%	0.00131	0.00177	0.00294	0.00336	0.00329	0.00373	0.00483	0.00560	0.0006	0.000039	0.1900	-	-
Barium - Dissolved	mg/L	0 / 18	0%	0.00169	0.00169	0.0021225	0.00236	0.0025	0.0026775	0.00288	0.0029	0.0004	0.0001	0.1724	-	-
Beryllium - Total	mg/L	261 / 261	100%	<0.00001	-	-	0.0001	-	-	-	0.0001	-	-	-	-	-
Beryllium - Dissolved	mg/L	18 / 18	100%	<0.00001	-	-	0.0000	-	-	-	0.0000	-	-	-	-	-

Table C6 Summary Statistics for the Mid-Field 1 (MF1) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Bismuth - Total	mg/L	73 / 73	100%	<0.000005	-	-	2.50E-06	-	-	-	0.0000025	-	-	-	-	-
Bismuth - Dissolved	mg/L	18 / 18	100%	<0.000005	-	-	2.50E-06	-	-	-	0.0000025	-	-	-	-	-
Boron - Total	mg/L	86 / 215	40%	<0.001	-	-	0.007	-	-	-	0.025	-	-	-	-	-
Boron - Dissolved	mg/L	18 / 18	100%	<0.005	-	-	0.003	-	-	-	0.00	-	-	-	-	-
Cadmium - Total	mg/L	249 / 261	95%	<0.000005	-	-	0.000019	-	-	-	0.0001	-	-	-	-	-
Cadmium - Dissolved	mg/L	16 / 18	89%	<0.000005	-	-	0.000003	-	-	-	0.0000	-	-	-	-	-
Calcium - Total	mg/L	0 / 261	0%	0.588	0.847	1.200	1.367	1.340	1.480	1.880	4.380	0.298	0.018	0.218	-	-
Calcium - Dissolved	mg/L	0 / 119	0%	1.140	1.140	1.320	1.437	1.390	1.510	1.750	2.230	0.191	0.018	0.133	-	-
Chromium - Total	mg/L	202 / 261	77%	<0.00005	-	-	0.00005	-	-	-	0.00023	-	-	-	-	-
Chromium - Dissolved	mg/L	17 / 18	94%	<0.00005	-	-	0.00003	-	-	-	0.000	-	-	-	-	-
Chromium Hexavalent (Cr6+) - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt - Total	mg/L	186 / 261	71%	0.000007	-	-	0.000045	-	-	-	0.0013	-	-	-	-	-
Cobalt - Dissolved	mg/L	1 / 18	6%	<0.000005	0.0000025	0.000006	0.000007	0.000007	0.00000875	0.000012	0.0000	0.00000	0.00000	0.32610	-	-
Copper - Total	mg/L	122 / 261	47%	0.00030	-	-	0.000560	-	-	-	0.0082	-	-	-	-	-
Copper - Dissolved	mg/L	0 / 18	0%	0.00044	0.00044	0.00048	0.00052	0.00051	0.00055	0.00064	0.00064	0.00006	0.00001	0.11398	-	-
Iron - Total	mg/L	46 / 167	28%	0.0011	0.0011	0.0025	0.006489	0.006	0.008	0.015	0.033	0.00465	0.00036	0.71631	-	0
Iron - Dissolved	mg/L	51 / 112	46%	0.0005	-	-	0.0101	-	-	-	0.40	-	-	-	-	-
Lead - Total	mg/L	226 / 261	87%	<0.000005	-	-	0.000027	-	-	-	0.00095	-	-	-	-	-
Lead - Dissolved	mg/L	15 / 18	83%	<0.000005	-	-	0.000004	-	-	-	0.0000	-	-	-	-	-
Lithium - Total	mg/L	0 / 73	0%	0.0013	0.0013	0.0014	0.0016	0.0015	0.0017	0.0021	0.0027	0.0003	0.0000	0.171	-	-
Lithium - Dissolved	mg/L	0 / 18	0%	0.0011	0.00129	0.00141	0.0014	0.001465	0.00151	0.00165	0.0017	0.00014	0.00003	0.099	-	-
Magnesium - Total	mg/L	0 / 261	0%	0.299	0.537	0.757	0.873	0.860	0.950	1.220	1.540	0.157	0.010	0.180	-	-
Magnesium - Dissolved	mg/L	0 / 119	0%	0.700	0.700	0.840	0.917	0.890	0.952	1.090	1.470	0.124	0.011	0.135	-	-
Manganese - Total	mg/L	0 / 261	0%	0.0004	0.0004	0.0015	0.0044	0.0021	0.0030	0.0052	0.5230	0.0323	0.0020	7.275	-	-
Manganese - Dissolved	mg/L	4 / 18	22%	<0.00005	0.000025	0.000055	0.0002	0.000142	0.000275	0.000539	0.0007	0.0002	0.0000	1.0119	-	-
Mercury - Total	mg/L	234 / 249	94%	<0.00001	-	-	0.000009	-	-	-	0.00003	-	-	-	-	-
Mercury - Dissolved	mg/L	18 / 18	100%	<0.00001	-	-	0.000005	-	-	-	0.000005	-	-	-	-	-
Molybdenum - Total	mg/L	3 / 261	1%	<0.00006	0.00003	0.00026	0.000404	0.000322	0.000554	0.000958	0.00150	0.0002	0.0000	0.572	-	0
Molybdenum - Dissolved	mg/L	0 / 18	0%	0.000132	0.000132	0.000185	0.000459	0.0005845	0.00060575	0.000686	0.0007	0.0002	0.0001	0.465	-	-
Nickel - Total	mg/L	0 / 261	0%	0.00051	0.00051	0.00065	0.000735	0.000694	0.00075	0.00088	0.0032	0.0002	0.0000	0.325	-	0
Nickel - Dissolved	mg/L	0 / 18	0%	0.00055	0.000553	0.0006105	0.00066	0.000652	0.000687	0.000743	0.0009	0.0001	0.0000	0.116	-	-
phosphorus - Total	mg/L	56 / 257	22%	0.00050	0.0005	0.0025	0.00331	0.003	0.004	0.0062	0.0100	0.0015	0.0001	0.447	-	-
Phosphorus - Total dissolved	mg/L	125 / 253	49%	0.00050	-	-	0.00169	-	-	-	0.0060	-	-	-	-	-
Potassium - Total	mg/L	0 / 261	0%	0.409	0.550	0.690	0.765	0.749	0.812	0.989	1.380	0.119	0.007	0.156	-	-
Potassium - Dissolved	mg/L	0 / 119	0%	0.580	0.580	0.710	0.811	0.800	0.889	1.130	1.300	0.134	0.012	0.165	-	-
Selenium - Total	mg/L	252 / 261	97%	<0.00004	-	-	0.00004	-	-	-	0.00013	-	-	-	-	-
Selenium - Dissolved	mg/L	17 / 18	94%	<0.00004	-	-	0.000022	-	-	-	0.000049	-	-	-	-	-
Silicon - Total	mg/L	46 / 75	61%	<0.05	-	-	0.076	-	-	-	0.336	-	-	-	-	-
Silicon - Dissolved	mg/L	8 / 18	44%	<0.05	-	-	0.057	-	-	-	0.112	-	-	-	-	-
Silver - Total	mg/L	260 / 261	100%	<0.000005	-	-	0.000037	-	-	-	0.000050	-	-	-	-	-
Silver - Dissolved	mg/L	18 / 18	100%	<0.000005	-	-	0.000003	-	-	-	0.000003	-	-	-	-	-
Sodium - Total	mg/L	0 / 261	0%	0.365	0.569	1.120	1.342	1.310	1.520	2.070	3.360	0.341	0.021	0.254	-	-
Sodium - Dissolved	mg/L	0 / 119	0%	0.947	0.947	1.305	1.476	1.500	1.600	2.040	2.270	0.224	0.021	0.152	-	-
Strontium - Total	mg/L	0 / 261	0%	0.00400	0.006	0.012	0.01408	0.01360	0.01610	0.02210	0.03500	0.00347	0.00021	0.246	-	-
Strontium - Dissolved	mg/L	0 / 18	0%	0.00931	0.009	0.010	0.01408	0.01590	0.01628	0.01730	0.01730	0.00320	0.00075	0.227	-	-
Sulphur - Total	mg/L	46 / 73	63%	0.450	-	-	1.367	-	-	-	21.400	-	-	-	-	-
Sulphur - Dissolved	mg/L	0 / 26	0%	0.700	0.7	1.0	1.220	1.1	1.5	1.8	1.790	0.328	0.064	0.269	-	-
Thallium - Total	mg/L	44 / 47	94%	<0.000002	-	-	0.000001	-	-	-	0.000002	-	-	-	-	-
Thallium - Dissolved	mg/L	14 / 18	78%	<0.000002	-	-	0.000001	-	-	-	0.000002	-	-	-	-	-
Tin - Total	mg/L	47 / 73	64%	<0.00001	-	-	0.00003	-	-	-	0.00022	-	-	-	-	-
Tin - Dissolved	mg/L	12 / 18	67%	<0.00001	-	-	0.00001	-	-	-	0.00002	-	-	-	-	-

Table C6 Summary Statistics for the Mid-Field 1 (MF1) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Titanium - Total	mg/L	71 / 73	97%	<0.0005	-	-	0.0003	-	-	-	0.0007	-	-	-	-	-
Titanium - Dissolved	mg/L	18 / 18	100%	<0.0005	-	-	0.0003	-	-	-	0.0003	-	-	-	-	-
Uranium - Total	mg/L	0 / 261	0%	0.000032	0.00005	0.00008	0.000092	0.00009	0.000101	0.000132	0.000200	0.0000	0.000001	0.22	0	0
Uranium - Dissolved	mg/L	0 / 18	0%	0.000018	0.000018	0.0000305	0.000046	0.000054	0.0000575	0.000067	0.000067	0.0000	0.000004	0.36	-	-
Vanadium - Total	mg/L	244 / 261	93%	<0.00005	-	-	0.00004	-	-	-	0.00020	-	-	-	-	-
Vanadium - Dissolved	mg/L	17 / 18	94%	<0.0001	-	-	0.00005	-	-	-	0.00012	-	-	-	-	-
Zinc - Total	mg/L	137 / 261	52%	<0.0004	-	-	0.00091	-	-	-	0.01040	-	-	-	-	-
Zinc - Dissolved	mg/L	0 / 18	0%	0.00038	0.00038	0.00052	0.00103	0.00064	0.00129	0.00175	0.00295	0.00077	0.00018	0.75	-	-
Zirconium - Total	mg/L	26 / 26	100%	<0.00005	-	-	4.10959E-05	-	-	-	0.00005	-	-	-	-	-
Zirconium - Dissolved	mg/L	8 / 8	100%	<0.00005	-	-	0.000025	-	-	-	0.000025	-	-	-	-	-

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Table C7 Summary Statistics for the Mid-Field 2 (MF2) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Physical																
pH	pH units	0 / 247	0%	5.0	6.5	6.8	6.8	6.9	7.0	7.2	7.2	0.2	0.0	0.0	-	0
Conductivity	µS/cm	0 / 250	0%	13.7	13.7	20.2	23.4	22.6	26.0	34.0	48.0	5.0	0.3	0.2	-	-
Color (True)	TCU	3 / 3	100%	<5.0	-	-	-	-	-	-	<5.0	-	-	-	-	-
Dissolved Oxygen	mg/L	0 / 8	0%	9.4	9.4	10.5	11.2	11.1	11.8	13.5	13.5	1.3	0.4	0.1	-	-
Total Dissolved Solids (TDS)	mg/L	14 / 250	6%	<5.0	<5.0	12.3	17.9	17.0	22.0	36.0	160.0	11.9	0.8	0.7	-	-
Total Suspended Solids (TSS)	mg/L	188 / 198	95%	<1.0	-	-	-	-	-	-	9	-	-	-	-	-
Turbidity	NTU	34 / 198	17%	<0.1	<0.1	0.2	0.3	0.3	0.4	0.6	1.4	0.2	0.0	0.7	-	-
Biochemical Oxygen Demand (BOD)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 4.5)	mg/L	64 / 64	100%	<0.5	-	-	-	-	-	-	<0.5	-	-	-	-	-
Acidity (pH 8.3)	mg/L	56 / 64	88%	<0.5	-	-	-	-	-	-	1.1	-	-	-	-	-
Anions and Cations																
Alkalinity (Total as $CaCO_3$)	mg/L	139 / 250	56%	<5.0	-	-	-	-	-	-	8.0	-	-	-	-	-
Alkalinity (PP as $CaCO_3$)	mg/L	64 / 64	100%	<0.5	-	-	-	-	-	-	<0.5	-	-	-	-	-
Bicarbonate (HCO_3)	mg/L	7 / 250	3%	<5.0	4.60	5.40	5.94	6.00	6.38	7.80	9.14	1.04	0.07	0.18	-	-
Carbonate (CO_3)	mg/L	250 / 250	100%	<0.5	-	-	-	-	-	-	2.50	-	-	-	-	-
Hydroxide (OH)	mg/L	250 / 250	100%	<0.5	-	-	-	-	-	-	2.50	-	-	-	-	-
Hardness (as $CaCO_3$) - Total	mg/L	0 / 250	0%	4.00	5.00	6.00	6.74	6.70	7.20	8.80	13.00	1.37	0.09	0.20	-	-
Hardness (as CaCO3) - Dissolved	mg/L	0 / 17	0%	7.28	7.28	7.67	8.66	8.19	9.24	11.50	12.10	1.46	0.35	0.17	-	-
Chloride (Cl)	mg/L	14 / 250	6%	<0.5	1	1.36	1.84	1.91	2.125	3.2	5.7	0.82	0.05	0.45	0	0
Fluoride (F)	mg/L	183 / 250	73%	0.02	-	-	-	-	-	-	0.05	-	-	-	-	0
Sulphate (SO_4)	mg/L	1 / 250	0.4%	<0.05	1.36	1.88	2.33	2.09	2.7	3.78	4.99	0.61	0.04	0.26	-	-
Nutrients																
Nitrite-N	mg/L	234 / 250	94%	<0.002	-	-	-	-	-	-	0.0034	-	-	-	-	0
Nitrate-N	mg/L	66 / 250	26%	<0.002	<0.002	0.0100	0.0293	0.0220	0.0374	0.0746	0.2800	0.0319	0.0020	1.0864	0	0
Nitrate + Nitrite (as N)	mg/L	65 / 250	26%	<0.002	<0.002	0.0100	0.0295	0.0220	0.0374	0.0746	0.2800	0.0320	0.0020	1.0844	-	-
Ammonia-N	mg/L	76 / 250	30%	<0.005	<0.005	0.0025	0.0189	0.0110	0.0268	0.0630	0.1200	0.0210	0.0013	1.1076	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	5 / 250	2%	<0.02	0.025	0.150	4.631	0.188	0.237	0.360	1110.000	70.190	4.439	15.155	-	-
Nitrogen (N) - Total	mg/L	0 / 64	0%	0.040	0.040	0.169	17.552	0.210	0.256	0.332	1110.000	138.724	17.340	7.903	-	-
Nitrogen (N) - Total (Calculated)	mg/L	0 / 250	0%	0.030	0.030	0.171	4.662	0.218	0.267	0.402	1110.013	70.189	4.439	15.055		
Phosphorus - Total	mg/L	63 / 250	25%	<0.001	<0.001	0.0025	0.0032	0.0030	0.0040	0.0060	0.0219	0.0018	0.0001	0.5788	-	-
Phosphorus - Dissolved (TDP)	mg/L	128 / 247	52%	<0.001	-	-	-	-	-	-	0.0042	-	-	-	-	-
Phosphate - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphate - Total Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	236 / 250	94%	<0.001	-	-	-	-	-	-	0.0050	-	-	-	-	-
Silica (SiO_2)-Reactive	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon																
Total Inorganic Carbon	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon (TOC)	mg/L	0 / 241	0%	0.22	1.80	2.30	2.61	2.60	3.00	3.80	4.20	0.47	0.03	0.18	-	-
Dissolved Organic Carbon (DOC)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																
Aluminum - Total	mg/L	0 / 250	0%	0.00250	0.00250	0.00440	0.00576	0.00510	0.00640	0.00931	0.06800	0.00449	0.00028	0.78006	-	6
Aluminum - Dissolved	mg/L	0 / 12	0%	0.00244	0.00244	0.00282	0.00410	0.00338	0.00391	0.00399	0.00903	0.00213	0.00062	0.52066	-	0
Antimony - Total	mg/L	217 / 250	87%	<0.00002	-	-	-	-	-	-	0.00052	-	-	-	-	-
Antimony - Dissolved	mg/L	9 / 12	75%	<0.00002	-	-	-	-	-	-	0.00003	-	-	-	-	-
Arsenic - Total	mg/L	0 / 250	0%	0.00016	0.00019	0.00023	0.00024	0.00024	0.00025	0.00028	0.00050	0.00003	0.00000	0.12571	-	0
Arsenic - Dissolved	mg/L	0 / 12	0%	0.00023	0.00023	0.00024	0.00025	0.00024	0.00026	0.00028	0.00028	0.00002	0.00000	0.06577	-	0
Barium - Total	mg/L	0 / 250	0%	0.00127	0.00197	0.00285	0.00322	0.00309	0.00351	0.00448	0.00956	0.00073	0.00005	0.22548	-	-
Barium - Dissolved	mg/L	0 / 12	0%	0.00230	0.00230	0.00239	0.00264	0.00253	0.00271	0.00277	0.00389	0.00043	0.00012	0.16291	-	-
Beryllium - Total	mg/L	250 / 250	100%	<0.00001	-	-	-	-	-	-	0.00010	-	-	-	-	-
Beryllium - Dissolved	mg/L	12 / 12	100%	<0.00001	-	-	-	-	-	-	<0.00001	-	-	-	-	-

Table C7 Summary Statistics for the Mid-Field 2 (MF2) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Bismuth - Total	mg/L	64 / 64	100%	<0.000005	-	-	-	-	-	-	0.00002	-	-	-	-	-
Bismuth - Dissolved	mg/L	12 / 12	100%	<0.000005	-	-	-	-	-	-	<0.000005	-	-	-	-	-
Boron - Total	mg/L	66 / 203	33%	<0.001	-	-	-	-	-	-	0.150	-	-	-	0	0
Boron - Dissolved	mg/L	12 / 12	100%	<0.005	-	-	-	-	-	-	<0.005	-	-	-	-	-
Cadmium - Total	mg/L	232 / 250	93%	<0.000005	-	-	-	-	-	-	0.000170	-	-	-	1	1
Cadmium - Dissolved	mg/L	12 / 12	100%	<0.000005	-	-	-	-	-	-	<0.000005	-	-	-	-	-
Calcium - Total	mg/L	0 / 250	0%	0.7590	0.759	1.133	1.310	1.260	1.420	1.850	2.770	0.278	0.018	0.212	-	-
Calcium - Dissolved	mg/L	0 / 110	0%	1.1400	1.140	1.253	1.399	1.330	1.440	1.700	2.620	0.231	0.022	0.165	-	-
Chromium - Total	mg/L	196 / 250	78%	<0.00005	-	-	-	-	-	-	0.00025	-	-	-	-	0
Chromium - Dissolved	mg/L	11 / 12	92%	<0.00005	-	-	-	-	-	-	0.00005	-	-	-	-	-
Chromium Hexavalent (Cr^{6+}) - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cobalt - Total	mg/L	186 / 250	74%	0.000008	-	-	-	-	-	-	0.000114	-	-	-	-	-
Cobalt - Dissolved	mg/L	0 / 12	0%	0.000005	0.000005	0.000007	0.000008	0.000007	0.000009	0.000011	0.000013	0.000002	0.000001	0.291126	-	-
Copper - Total	mg/L	135 / 250	54%	<0.0006	-	-	-	-	-	-	0.00178	-	-	-	-	0
Copper - Dissolved	mg/L	0 / 12	0%	0.00044	0.00044	0.00046	0.00050	0.00050	0.00052	0.00058	0.00058	0.00004	0.00001	0.07992	-	-
Iron - Total	mg/L	49 / 158	31%	<0.001	-	-	-	-	-	-	0.0946	-	-	-	-	0
Iron - Dissolved	mg/L	48 / 104	46%	<0.001	-	-	-	-	-	-	0.0140	-	-	-	-	-
Lead - Total	mg/L	213 / 250	85%	<0.000005	-	-	-	-	-	-	0.001130	-	-	-	-	1
Lead - Dissolved	mg/L	9 / 12	75%	<0.000005	-	-	-	-	-	-	0.000018	-	-	-	-	-
Lithium - Total	mg/L	1 / 64	2%	0.0013	0.0013	0.0014	0.0016	0.0015	0.0016	0.0019	0.0023	0.0002	0.0000	0.1485	-	-
Lithium - Dissolved	mg/L	0 / 12	0%	0.0014	0.0014	0.0015	0.0015	0.0015	0.0016	0.0017	0.0017	0.0001	0.0000	0.0462	-	-
Magnesium - Total	mg/L	0 / 250	0%	0.483	0.483	0.726	0.838	0.821	0.915	1.180	1.480	0.155	0.010	0.185	-	-
Magnesium - Dissolved	mg/L	0 / 110	0%	0.630	0.640	0.800	0.870	0.840	0.908	1.060	1.440	0.136	0.013	0.157	-	-
Manganese - Total	mg/L	0 / 250	0%	0.00030	0.00030	0.00135	0.00264	0.00183	0.00317	0.00570	0.01640	0.00221	0.00014	0.83645	-	-
Manganese - Dissolved	mg/L	3 / 12	25%	<0.00005	<0.00005	0.00006	0.00028	0.00013	0.00030	0.00058	0.00146	0.00041	0.00012	1.46806	-	-
Mercury - Total	mg/L	232 / 235	99%	<0.00001	-	-	-	-	-	-	0.000030	-	-	-	-	1
Mercury - Dissolved	mg/L	12 / 12	100%	<0.00001	-	-	-	-	-	-	<0.00001	-	-	-	-	-
Molybdenum - Total	mg/L	7 / 250	3%	<0.00006	<0.00006	0.000221	0.000382	0.000307	0.000507	0.000927	0.001580	0.000227	0.000014	0.594072	-	0
Molybdenum - Dissolved	mg/L	0 / 12	0%	0.000503	0.000503	0.000556	0.000644	0.000601	0.000709	0.000775	0.000952	0.000126	0.000036	0.195813	-	-
Nickel - Total	mg/L	0 / 250	0%	0.00053	0.00053	0.00063	0.00068	0.00066	0.00070	0.00080	0.00140	0.00010	0.00001	0.15089	-	0
Nickel - Dissolved	mg/L	0 / 12	0%	0.00048	0.00048	0.00059	0.00063	0.00065	0.00068	0.00080	0.00080	0.00009	0.00002	0.13591	-	-
Potassium - Total	mg/L	0 / 250	0%	0.467	0.490	0.660	0.734	0.720	0.776	0.928	1.280	0.119	0.008	0.162	-	-
Potassium - Dissolved	mg/L	0 / 110	0%	0.490	0.490	0.660	0.762	0.774	0.830	1.030	1.270	0.143	0.014	0.188	-	-
Selenium - Total	mg/L	239 / 250	96%	<0.00004	-	-	-	-	-	-	0.000400	-	-	-	-	0
Selenium - Dissolved	mg/L	11 / 12	92%	<0.00004	-	-	-	-	-	-	0.000042	-	-	-	-	-
Silicon - Total	mg/L	50 / 66	76%	<0.05	-	-	-	-	-	-	0.406	-	-	-	-	-
Silicon - Dissolved	mg/L	5 / 12	42%	<0.05	-	-	-	-	-	-	0.249	-	-	-	-	-
Silver - Total	mg/L	249 / 250	100%	<0.000005	-	-	-	-	-	-	0.000050	-	-	-	-	0
Silver - Dissolved	mg/L	12 / 12	100%	<0.000005	-	-	-	-	-	-	<0.000005	-	-	-	-	-
Sodium - Total	mg/L	0 / 250	0%	0.456	0.514	1.070	1.294	1.250	1.450	1.930	3.450	0.400	0.025	0.310	-	-
Sodium - Dissolved	mg/L	6 / 110	5%	<1.0	1.000	1.300	1.402	1.400	1.500	1.790	3.250	0.388	0.037	0.277	-	-
Strontium - Total	mg/L	0 / 250	0%	0.00480	0.00520	0.01120	0.01360	0.01265	0.01520	0.02100	0.03820	0.00435	0.00028	0.32024	-	-
Strontium - Dissolved	mg/L	0 / 12	0%	0.01460	0.01460	0.01488	0.01696	0.01575	0.01740	0.01750	0.02820	0.00372	0.00107	0.21919	-	-
Sulphur - Total	mg/L	43 / 64	67%	0.880	-	-	-	-	-	-	1700.000	-	-	-	-	-
Sulphur - Dissolved	mg/L	0 / 12	0%	0.760	0.760	0.860	1.090	1.045	1.263	1.520	1.520	0.257	0.074	0.236	-	-
Thallium - Total	mg/L	36 / 43	84%	<0.000002	-	-	-	-	-	-	0.000010	-	-	-	-	0
Thallium - Dissolved	mg/L	11 / 12	92%	<0.000002	-	-	-	-	-	-	0.000002	-	-	-	-	-
Tin - Total	mg/L	41 / 64	64%	<0.00001	-	-	-	-	-	-	0.00013	-	-	-	-	-
Tin - Dissolved	mg/L	8 / 12	67%	<0.00001	-	-	-	-	-	-	0.00002	-	-	-	-	-
Titanium - Total	mg/L	61 / 64	95%	<0.0005	-	-	-	-	-	-	0.0032	-	-	-	-	-
Titanium - Dissolved	mg/L	12 / 12	100%	<0.0005	-	-	-	-	-	-	<0.0005	-	-	-	-	-

Table C7 Summary Statistics for the Mid-Field 2 (MF2) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Uranium - Total	mg/L	0 / 250	0%	0.000050	0.000061	0.000077	0.000092	0.000084	0.000094	0.000118	0.000310	0.000032	0.000002	0.351266	0	0
Uranium - Dissolved	mg/L	0 / 12	0%	0.000049	0.000049	0.000053	0.000067	0.000058	0.000070	0.000084	0.000133	0.000024	0.000007	0.355103	-	-
Vanadium - Total	mg/L	241 / 250	96%	<0.00005	-	-	-	-	-	-	0.00050	-	-	-	-	-
Vanadium - Dissolved	mg/L	9 / 12	75%	<0.0001	-	-	-	-	-	-	0.00016	-	-	-	-	-
Zinc - Total	mg/L	137 / 250	55%	0.00020	-	-	-	-	-	-	0.00650	-	-	-	-	0
Zinc - Dissolved	mg/L	0 / 12	0%	0.00024	0.00024	0.00034	0.00072	0.00045	0.00094	0.00126	0.00214	0.00056	0.00016	0.78172	-	-
Zirconium - Total	mg/L	64 / 64	100%	<0.00005	-	-	-	-	-	-	0.00025	-	-	-	-	-
Zirconium - Dissolved	mg/L	12 / 12	100%	<0.00005	-	-	-	-	-	-	<0.00005	-	-	-	-	-

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Table C8 Summary Statistics for the Mid-Field 3 (MF3) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Physical																
pH	pH units	0 / 306	0%	0.57	6.40	6.69	6.76	6.81	6.92	7.24	7.47	0.54	0.03	0.08	-	0
Conductivity	µS/cm	0 / 300	0%	13.3	13.3	16.8	20.1	19.1	22.2	29.6	46.0	4.9	0.3	0.24	-	-
Color (True)	TCU	6 / 6	100%	2.5	-	-	2.5	-	-	-	2.5	-	-	-	-	-
Dissolved Oxygen	mg/L	0 / 10	0%	8.9	8.9	10.9	11.8	12.1	12.8	14.0	14.0	1.7	0.5	0.15	-	-
Total Dissolved Solids (TDS)	mg/L	24 / 300	8%	2.5	2.5	11.0	15.0	14.0	18.0	28.0	50.0	7.5	0.4	0.50	-	-
Total Suspended Solids (TSS)	mg/L	244 / 259	94%	<1.0	-	-	1.38	-	-	-	9	-	-	-	-	-
Turbidity	NTU	44 / 261	17%	<0.1	0.05	0.13	0.28	0.23	0.30	0.53	3.5	0.36	0.02	1.28	-	-
Biochemical Oxygen Demand (BOD)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 4.5)	mg/L	107 / 107	100%	<0.5	-	-	0.25	-	-	-	0.25	-	-	-	-	-
Acidity (pH 8.3)	mg/L	82 / 107	77%	<0.5	-	-	0.49	-	-	-	4.2	-	-	-	-	-
Anions and Cations																
Alkalinity (Total as CaCO3)	mg/L	164 / 300	55%	<5	-	-	3.6	-	-	-	8.0	-	-	-	-	-
Alkalinity (PP as CaCO3)	mg/L	107 / 107	100%	<0.5	-	-	0.25	-	-	-	0.25	-	-	-	-	-
Bicarbonate (HCO3)	mg/L	84 / 300	28%	<5	2.50	2.50	4.83	5.08	6.00	9.00	9.00	1.69	0.10	0.35	-	-
Carbonate (CO3)	mg/L	300 / 300	100%	<0.5	-	-	1.70	-	-	-	2.50	-	-	-	-	-
Hydroxide (OH)	mg/L	300 / 300	100%	<0.5	-	-	1.70	-	-	-	2.50	-	-	-	-	-
Hardness (as CaCO3) - Total	mg/L	0 / 300	0%	4.00	4.00	5.28	6.14	6.00	6.70	8.80	11.40	1.24	0.07	0.20	-	-
Hardness (as CaCO3) - Dissolved	mg/L	0 / 61	0%	5.42	5.42	6.23	7.00	6.51	7.56	9.06	12.30	1.27	0.16	0.18	-	-
Chloride (Cl)	mg/L	55 / 300	18%	<0.5	0.25	0.78	1.33	1.2	1.8	3	9.5	0.86	0.05	0.65	0	0
Fluoride (F)	mg/L	192 / 300	64%	<0.01	-	-	0.02	-	-	-	0.07	-	-	-	-	-
Sulphate (SO4)	mg/L	1 / 300	0.00%	<0.05	1.2	1.81	2.16	2.04	2.48	3.44	4.52	0.64	0.04	0.30	-	-
Nutrients																
Nitrite-N	mg/L	290 / 300	97%	<0.002	-	-	0.0014	-	-	-	0.008	-	-	-	-	-
Nitrate-N	mg/L	173 / 300	58%	<0.002	-	-	0.0165	-	-	-	0.20	-	-	-	-	-
Nitrate + Nitrite (as N)	mg/L	172 / 300	57%	<0.002	-	-	0.0166	-	-	-	0.20	-	-	-	-	-
Ammonia-N	mg/L	109 / 300	36%	<0.005	-	-	0.0197	-	-	-	0.14	-	-	-	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	10 / 300	3%	<0.02	0.020	0.130	4.735	0.160	0.209	0.327	1370	79.1	4.57	16.7	-	-
Nitrogen (N) - Total	mg/L	5 / 107	5%	<0.02	0.030	0.147	12.99	0.186	0.231	0.330	1370	132.4	12.8	10.2	-	-
Nitrogen (N) - Total (Calculated)	mg/L	0 / 300	0%	0.023	0.023	0.144	4.75	0.180	0.232	0.350	1370	79.1	4.57	16.6	-	-
Phosphate - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphate - Dissolved (TDP)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus - Total	mg/L	103 / 300	34%	<0.001	-	-	0.0027	-	-	-	0.067	-	-	-	-	-
Phosphorus - Dissolved	mg/L	162 / 296	55%	<0.001	-	-	0.0015	-	-	-	0.006	-	-	-	-	-
Orthophosphate	mg/L	279 / 300	93%	<0.001	-	-	0.001	-	-	-	0.008	-	-	-	-	-
Silica (SiO2)-Reactive	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Inorganic Carbon	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon (TOC)	mg/L	1 / 288	0%	0.5	1.5	2.2	2.6	2.6	3.0	4.1	4.1	0.501	0.030	0.191	-	-
Carbon																
Dissolved Organic Carbon (DOC)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum - Total	mg/L	0 / 303	0%	0.0023	0.0023	0.0038	0.0059	0.0046	0.0058	0.0085	0.0750	0.0075	0.0004	1.2619	-	58
Aluminum - Dissolved	mg/L	0 / 40	0%	0.0019	0.0019	0.0029	0.0047	0.0034	0.0070	0.0102	0.0102	0.0024	0.0004	0.4991	-	1
Metals																
Antimony - Total	mg/L	276 / 303	91%	<0.00002	-	-	0.0000	-	-	-	0.0012	-	-	-	-	-
Antimony - Dissolved	mg/L	36 / 40	90%	<0.00002	-	-	0.0000	-	-	-	0.0000	-	-	-	-	-
Arsenic - Total	mg/L	1 / 303	0%	0.000015	0.00013	0.00018	0.00020	0.00020	0.00022	0.00027	0.00033	0	0	0.17	-	0
Arsenic - Dissolved	mg/L	0 / 40	0%	0.00015	0.00015	0.00018	0.00020	0.00019	0.00021	0.00027	0.00027	0	0	0.15	-	0
Barium - Total	mg/L	0 / 303	0%	0.00125	0.0013	0.0020	0.0024	0.0023	0.0027	0.0038	0.0064	0.0007	0.000041	0.29	-	-
Barium - Dissolved	mg/L	0 / 40	0%	0.00176	0.0018	0.0019	0.0021	0.0021	0.0023	0.0028	0.0029	0.0003	0.000045	0.13	-	-
Beryllium - Total	mg/L	303 / 303	100%	<0.00001	-	-	0.000067	-	-	-	0.0001	-	-	-	-	-
Beryllium - Dissolved	mg/L	40 / 40	100%	<0.00001	-	-	0.000005	-	-	-	0.000005	-	-	-	-	-
Bismuth - Total	mg/L	107 / 107	100%	<0.000005	-	-	0.0000026	-	-	-	0.000013	-	-	-	-	-
Bismuth - Dissolved	mg/L	40 / 40	100%	<0.000005	-	-	0.0000025	-	-	-	0.0000025	-	-	-	-	-

Table C8 Summary Statistics for the Mid-Field 3 (MF3) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Boron - Total	mg/L	112 / 255	44%	<0.001	-	-	0.0060	-	-	-	0.025	-	-	-	-	-
Boron - Dissolved	mg/L	40 / 40	100%	<0.005	-	-	0.0025	-	-	-	0.0025	-	-	-	-	-
Cadmium - Total	mg/L	288 / 303	95%	<0.000005	-	-	0.000017	-	-	-	0.000025	-	-	-	-	-
Cadmium - Dissolved	mg/L	40 / 40	100%	<0.000005	-	-	0.0000025	-	-	-	0.0000025	-	-	-	-	-
Calcium - Total	mg/L	0 / 303	0%	0.59	0.77	1.01	1.17	1.13	1.27	1.65	2.37	0.24	0.01	0.21	-	-
Calcium - Dissolved	mg/L	0 / 155	0%	0.96	0.96	1.10	1.25	1.18	1.32	1.63	2.64	0.24	0.02	0.19	-	-
Chromium - Total	mg/L	247 / 303	82%	<0.00005	-	-	0.000051	-	-	-	0.001060	-	-	-	-	-
Chromium - Dissolved	mg/L	25 / 40	63%	<0.00005	-	-	0.000043	-	-	-	0.000129	-	-	-	-	-
Chromium Hexavalent (Cr6+) - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cobalt - Total	mg/L	193 / 303	64%	0.000007	-	-	0.000044	-	-	-	0.0013	-	-	-	-	-
Cobalt - Dissolved	mg/L	14793	18%	<0.000005	0.0000025	0.000005	0.00002	0.000007	0.000008	0.000012	0.00046	0.000072	0.000011	4.02	-	-
Copper - Total	mg/L	134 / 303	44%	<0.0006	-	-	0.00048	-	-	-	0.00100	-	-	-	-	-
Copper - Dissolved	mg/L	0 / 40	0%	0.0004020	0.000402	0.000458	0.000485	0.000478	0.000503	0.000559	0.000578	0.000040	0.0000063	0.08	-	-
Iron - Total	mg/L	66 / 203	33%	<0.001	-	-	0.005351	-	-	-	0.140000	-	-	-	-	-
Iron - Dissolved	mg/L	84 / 140	60%	<0.001	-	-	0.008220	-	-	-	0.255000	-	-	-	-	-
Lead - Total	mg/L	237 / 303	78%	<0.000005	-	-	0.00004	-	-	-	0.00040	-	-	-	-	-
Lead - Dissolved	mg/L	36 / 40	90%	<0.000005	-	-	0.00000	-	-	-	0.00001	-	-	-	-	-
Lithium - Total	mg/L	1 / 107	1%	0.00112	0.0011	0.0013	0.0015	0.0014	0.0015	0.0018	0.0022	0.00022	0.000021	0.1505	-	-
Lithium - Dissolved	mg/L	0 / 40	0%	0.00125	0.0013	0.0013	0.0014	0.0013	0.0014	0.0016	0.0017	0.00010	0.000016	0.0716	-	-
Magnesium - Total	mg/L	0 / 303	0%	0.283000	0.47	0.67	0.77	0.75	0.85	1.11	1.38	0.15	0.0089	0.20	-	-
Magnesium - Dissolved	mg/L	0 / 155	0%	0.600000	0.60	0.72	0.81	0.78	0.84	1.01	1.38	0.14	0.011	0.17	-	-
Manganese - Total	mg/L	0 / 303	0%	0.0004	0.0004	0.0011	0.0025	0.0017	0.0025	0.0045	0.1700	0.010	0.0006	3.84	-	-
Manganese - Dissolved	mg/L	7 / 40	18%	<0.00005	0.0000	0.0001	0.0026	0.0001	0.0002	0.0003	0.0948	0.015	0.0024	5.84	-	-
Mercury - Total	mg/L	278 / 280	99%	<0.00001	-	-	0.00001	-	-	-	0.00084	-	-	-	-	-
Mercury - Dissolved	mg/L	40 / 40	100%	<0.00001	-	-	0.000005	-	-	-	0.000005	-	-	-	-	-
Molybdenum - Total	mg/L	18 / 303	6%	<0.00006	0	0	0.000208	0	0	0	0.00138	0	0	0.81	-	0
Molybdenum - Dissolved	mg/L	0 / 40	0%	0.000065	0	0	0.000258	0	0	0	0.00063	0	0	0.61	-	-
Nickel - Total	mg/L	0 / 303	0%	0.000578	0.000578	0.000773	0.000880	0.000860	0.000949	0.001200	0.002340	0.00016	0.000009	0.19	-	0
Nickel - Dissolved	mg/L	0 / 40	0%	0.000593	0.000593	0.000761	0.000838	0.000822	0.000881	0.000981	0.001940	0.00020	0.000032	0.24	-	-
Potassium - Total	mg/L	0 / 303	0%	0.370	0.370	0.573	0.656	0.630	0.711	0.910	1.170	0.123	0.007	0.19	-	-
Potassium - Dissolved	mg/L	0 / 155	0%	0.300	0.370	0.600	0.695	0.680	0.756	0.970	1.310	0.149	0.012	0.21	-	-
Selenium - Total	mg/L	285 / 303	94%	<0.00004	-	-	0.000043	-	-	-	0.000160	-	-	-	-	-
Selenium - Dissolved	mg/L	40 / 40	100%	<0.00004	-	-	0.000020	-	-	-	0.000020	-	-	-	-	-
Silicon - Total	mg/L	79 / 115	69%	<0.05	-	-	0.060	-	-	-	0.303	-	-	-	-	-
Silicon - Dissolved	mg/L	21 / 40	53%	<0.05	-	-	0.052	-	-	-	0.192	-	-	-	-	-
Silver - Total	mg/L	303 / 303	100%	<0.000005	-	-	0.000033	-	-	-	0.000050	-	-	-	-	-
Silver - Dissolved	mg/L	40 / 40	100%	<0.000005	-	-	0.000003	-	-	-	0.000003	-	-	-	-	-
Sodium - Total	mg/L	0 / 303	0%	0.343	0.343	0.740	0.974	0.924	1.105	1.630	3.000	0.361	0.021	0.37	-	-
Sodium - Dissolved	mg/L	57 / 155	37%	<1.0	-	-	0.980	-	-	-	3.130	-	-	-	-	-
Strontium - Total	mg/L	0 / 303	0%	0.004	0.004	0.008	0.010	0.010	0.012	0.017	0.033	0.00368	0.00021	0.35	-	-
Strontium - Dissolved	mg/L	0 / 40	0%	0.0089	0.0089	0.0096	0.0112	0.0105	0.0118	0.0151	0.0173	0.0024	0.00037	0.21	-	-
Sulphur - Total	mg/L	42 / 107	39%	0.660	-	-	17.350	-	-	-	1740.000	-	-	-	-	-
Sulphur - Dissolved	mg/L	0 / 46	0%	0.650	0.650	0.978	1.163	1.165	1.280	1.650	1.650	0.220	0.032	0.19	-	-
Thallium - Total	mg/L	68 / 71	96%	<0.000002	-	-	0.0000011	-	-	-	0.0000050	-	-	-	-	-
Thallium - Dissolved	mg/L	30 / 40	75%	<0.000002	-	-	0.0000013	-	-	-	0.0000022	-	-	-	-	-
Tin - Total	mg/L	47 / 107	44%	<0.00001	-	-	0.00003	-	-	-	0.00015	-	-	-	-	-
Tin - Dissolved	mg/L	17 / 40	43%	<0.00001	-	-	0.00001	-	-	-	0.00008	-	-	-	-	-
Titanium - Total	mg/L	105 / 107	98%	<0.0005	-	-	0.00027	-	-	-	0.0013	-	-	-	-	-
Titanium - Dissolved	mg/L	40 / 40	100%	<0.0005	-	-	0.00025	-	-	-	0.0003	-	-	-	-	-
Uranium - Total	mg/L	64 / 303	21%	<0.00005	0.000025	0.000028	0.000060	0.000056	0.000078	0.000143	0.000230	0.000036	0.000002	0.61	0	1
Uranium - Dissolved	mg/L	0 / 40	0%	0.000015	0.000015	0.000020	0.000032	0.000025	0.000040	0.000064	0.000093	0.000017	0.000003	0.54	-	-
Vanadium - Total	mg/L	286 / 303	94%	<0.00005	-	-	0.00005	-	-	-	0.00059	-	-	-	-	-
Vanadium - Dissolved	mg/L	29 / 40	73%	<0.0001	-	-	0.00011	-	-	-	0.00039	-	-	-	-	-

Table C8 Summary Statistics for the Mid-Field 3 (MF3) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Zinc - Total	mg/L	128 / 303	42%	<0.0001	-	-	0.00094	-	-	-	0.00970	-	-	-	-	-
Zinc - Dissolved	mg/L	0 / 40	0%	0.00023	0.00023	0.00035	0.00071	0.00061	0.00088	0.00140	0.00255	0.00049	0.00008	0.70	-	-
Zirconium - Total	mg/L	49 / 49	100%	<0.00005	-	-	0.00004	-	-	-	0.00013	-	-	-	-	-
Zirconium - Dissolved	mg/L	22 / 22	100%	<0.00005	-	-	0.00003	-	-	-	0.00003	-	-	-	-	-

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Table C9 Summary Statistics for the Mid-Field West (MFW) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Physical																
pH	pH units	0 / 17	0%	6.0	6.0	6.4	6.5	6.6	6.8	7.1	7.1	0.3	0.1	0.0	-	0
Conductivity	µS/cm	0 / 16	0%	13.3	13.3	14.2	16.2	15.0	17.2	21.2	25.7	3.3	0.8	0.2	-	-
Color (True)	TCU	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	0 / 6	0%	5.9	8.4	8.7	9.6	9.6	10.5	13.1	13.1	2.4	1.0	0.3	-	-
Total Dissolved Solids (TDS)	mg/L	1 / 16	6%	<10	<10	15.3	30.7	30.0	40.0	50.0	80.0	19.2	4.8	0.6	-	-
Total Suspended Solids (TSS)	mg/L	13 / 16	81%	<2.0	-	-	-	-	-	-	12	-	-	-	-	-
Turbidity	NTU	1 / 16	6%	<0.1	<0.1	0.2	1.2	0.3	0.6	1.1	13.2	3.2	0.8	2.7	-	-
Biochemical Oxygen Demand (BOD)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 4.5)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Cations																
Alkalinity (Total as $CaCO_3$)	mg/L	12 / 16	75%	<5.0	-	-	-	-	-	-	8.0	-	-	-	-	-
Alkalinity (PP as $CaCO_3$)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicarbonate (HCO_3)	mg/L	9 / 16	56%	<5.0	-	-	-	-	-	-	10.00	-	-	-	-	-
Carbonate (CO_3)	mg/L	16 / 16	100%	<5.0	-	-	-	-	-	-	<5.0	-	-	-	-	-
Hydroxide (OH)	mg/L	16 / 16	100%	<5.0	-	-	-	-	-	-	<5.0	-	-	-	-	-
Hardness (as $CaCO_3$) - Total	mg/L	0 / 16	0%	4.00	4.00	5.00	5.31	5.00	6.00	7.00	8.00	1.08	0.27	0.20	-	-
Hardness (as CaCO3) - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	mg/L	13 / 16	81.25%	<1	-	-	-	-	-	-	1	-	-	-	0	0
Fluoride (F)	mg/L	15 / 16	94%	<0.05	-	-	-	-	-	-	0.05	-	-	-	-	0
Sulphate (SO_4)	mg/L	0 / 16	0%	1.58	1.58	1.645	1.89	1.755	1.985	2.11	3.07	0.40	0.10	0.21	-	-
Nutrients																
Nitrite-N	mg/L	14 / 16	88%	<0.002	-	-	-	-	-	-	0.0020	-	-	-	-	0
Nitrate-N	mg/L	9 / 16	56%	<0.006	-	-	-	-	-	-	0.0230	-	-	-	0	0
Nitrate + Nitrite (as N)	mg/L	9 / 16	56%	<0.006	-	-	-	-	-	-	0.0230	-	-	-	-	-
Ammonia-N	mg/L	5 / 17	29%	<0.005	<0.005	<0.005	0.0148	0.0140	0.0210	0.0380	0.0380	0.0111	0.0027	0.7511	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	2 / 17	12%	<0.05	<0.05	0.090	0.117	0.110	0.150	0.230	0.230	0.053	0.013	0.455	-	-
Nitrogen (N) - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen (N) - Total (Calculated)	mg/L	0 / 16	0%	0.029	0.104	0.109	0.129	0.125	0.154	0.194	0.235	0.053	0.013	0.410		
Phosphorus - Total	mg/L	3 / 17	18%	<0.001	<0.001	0.0020	0.0026	0.0030	0.0040	0.0050	0.0050	0.0014	0.0003	0.5167	-	-
Phosphorus - Dissolved (TDP)	mg/L	8 / 14	57%	<0.001	-	-	-	-	-	-	0.0100	-	-	-	-	-
Phosphate - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphate - Total Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	15 / 16	94%	<0.001	-	-	-	-	-	-	0.0020	-	-	-	-	-
Silica (SiO_2)-Reactive	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon																
Total Inorganic Carbon	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon (TOC)	mg/L	2 / 15	13%	<1.0	<1.0	2.00	2.40	3.00	3.00	3.00	5.00	1.17	0.30	0.49	-	-
Dissolved Organic Carbon (DOC)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																
Aluminum - Total	mg/L	0 / 16	0%	0.00240	0.00240	0.00395	0.00591	0.00510	0.00768	0.01130	0.01130	0.00286	0.00071	0.48407	-	1
Aluminum - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Antimony - Total	mg/L	0 / 16	0%	0.00005	0.00005	0.00014	0.00027	0.00020	0.00024	0.00036	0.00149	0.00034	0.00008	1.24492	-	-
Antimony - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic - Total	mg/L	0 / 16	0%	0.00013	0.00013	0.00017	0.00019	0.00019	0.00021	0.00025	0.00028	0.00004	0.00001	0.19934	-	0
Arsenic - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Barium - Total	mg/L	0 / 16	0%	0.00123	0.00123	0.00136	0.00159	0.00150	0.00171	0.00175	0.00244	0.00034	0.00009	0.21422	-	-
Barium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium - Total	mg/L	16 / 16	100%	<0.0002	-	-	-	-	-	-	<0.0002	-	-	-	-	-
Beryllium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C9 Summary Statistics for the Mid-Field West (MFW) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Bismuth - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron - Total	mg/L	4 / 16	25%	<0.001	<0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.000	0.500	0	0
Boron - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium - Total	mg/L	16 / 16	100%	<0.00005	-	-	-	-	-	-	<0.00005	-	-	-	0	0
Cadmium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium - Total	mg/L	0 / 16	0%	0.7650	0.765	0.803	0.964	0.885	1.068	1.380	1.500	0.225	0.056	0.233	-	-
Calcium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium - Total	mg/L	7 / 16	44%	<0.00006	-	-	-	-	-	-	0.00125	-	-	-	-	0
Chromium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium Hexavalent (Cr^{6+}) - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cobalt - Total	mg/L	15 / 16	94%	<0.0001	-	-	-	-	-	-	0.000300	-	-	-	-	-
Cobalt - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper - Total	mg/L	4 / 16	25%	<0.0006	<0.0006	0.00053	0.00062	0.00060	0.00080	0.00110	0.00110	0.00023	0.00006	0.37888	-	0
Copper - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron - Total	mg/L	0 / 1	0%	0.0090	-	-	0.0090	-	-	-	0.0090	-	-	-	-	0
Iron - Dissolved	mg/L	4 / 15	27%	<0.005	<0.005	0.0038	0.0084	0.0060	0.0115	0.0220	0.0220	0.0062	0.0016	0.7329	-	-
Lead - Total	mg/L	16 / 16	100%	<0.00005	-	-	-	-	-	-	<0.00005	-	-	-	-	0
Lead - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium - Total	mg/L	0 / 16	0%	0.419	0.419	0.511	0.600	0.566	0.681	0.935	0.935	0.139	0.035	0.232	-	-
Magnesium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese - Total	mg/L	0 / 16	0%	0.00110	0.00180	0.00190	0.00229	0.00210	0.00220	0.00220	0.00580	0.00108	0.00027	0.47080	-	-
Manganese - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury - Total	mg/L	16 / 16	100%	<0.00002	-	-	-	-	-	-	<0.00002	-	-	-	-	0
Mercury - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum - Total	mg/L	15 / 16	94%	<0.00006	-	-	-	-	-	-	0.000070	-	-	-	-	0
Molybdenum - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel - Total	mg/L	0 / 16	0%	0.00061	0.00061	0.00071	0.00080	0.00084	0.00089	0.00099	0.00099	0.00012	0.00003	0.15085	-	0
Nickel - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium - Total	mg/L	0 / 16	0%	0.434	0.434	0.471	0.546	0.505	0.574	0.615	0.870	0.119	0.030	0.219	-	-
Potassium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium - Total	mg/L	14 / 16	88%	<0.0001	-	-	-	-	-	-	0.000100	-	-	-	-	0
Selenium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon - Total	mg/L	7 / 7	100%	<0.1	-	-	-	-	-	-	<0.1	-	-	-	-	-
Silicon - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver - Total	mg/L	16 / 16	100%	<0.0001	-	-	-	-	-	-	<0.0001	-	-	-	-	0
Silver - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium - Total	mg/L	0 / 16	0%	0.432	0.432	0.467	0.558	0.522	0.605	0.776	0.876	0.123	0.031	0.221	-	-
Sodium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium - Total	mg/L	0 / 16	0%	0.00500	0.00500	0.00538	0.00627	0.00600	0.00690	0.00870	0.00960	0.00133	0.00033	0.21289	-	-
Strontium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Thallium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C9 Summary Statistics for the Mid-Field West (MFW) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Uranium - Total	mg/L	5 / 16	31%	<0.00005	<0.00005	<0.00005	0.000077	0.000070	0.000105	0.000170	0.000170	0.000050	0.000013	0.652922	0	0
Uranium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium - Total	mg/L	16 / 16	100%	<0.00005	-	-	-	-	-	-	<0.00005	-	-	-	-	-
Vanadium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc - Total	mg/L	8 / 16	50%	<0.0008	-	-	-	-	-	-	0.00480	-	-	-	-	0
Zinc - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table C10 Summary Statistics for the Far-Field 1 (FF1) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Physical																
pH	pH units	0 / 90	0%	6.5	6.5	6.7	6.8	6.8	6.9	7.0	7.0	0.1	0.0	0.0	-	0
Conductivity	µS/cm	0 / 92	0%	14.0	14.0	15.6	17.5	17.4	19.0	23.0	23.0	2.2	0.2	0.1	-	-
Color (True)	TCU	5 / 5	100%	<5.0	-	-	-	-	-	-	<5.0	-	-	-	-	-
Dissolved Oxygen	mg/L	0 / 5	0%	10.3	10.3	10.6	11.4	11.6	11.7	13.0	13.0	1.1	0.5	0.1	-	-
Total Dissolved Solids (TDS)	mg/L	4 / 92	4%	<5.0	<5.0	11.0	14.3	14.0	17.0	25.0	35.0	5.7	0.6	0.4	-	-
Total Suspended Solids (TSS)	mg/L	69 / 70	99%	<1.0	-	-	-	-	-	-	4	-	-	-	-	-
Turbidity	NTU	12 / 70	17%	<0.1	<0.1	0.1	0.2	0.2	0.2	0.4	0.6	0.1	0.0	0.6	-	-
Biochemical Oxygen Demand (BOD)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 4.5)	mg/L	25 / 25	100%	<0.5	-	-	-	-	-	-	<0.5	-	-	-	-	-
Acidity (pH 8.3)	mg/L	25 / 25	100%	<0.5	-	-	-	-	-	-	<0.5	-	-	-	-	-
Anions and Cations																
Alkalinity (Total as $CaCO_3$)	mg/L	62 / 92	67%	<5.0	-	-	-	-	-	-	6.1	-	-	-	-	-
Alkalinity (PP as $CaCO_3$)	mg/L	25 / 25	100%	<0.5	-	-	-	-	-	-	<0.5	-	-	-	-	-
Bicarbonate (HCO_3)	mg/L	36 / 92	39%	<5.0	-	-	-	-	-	-	7.44	-	-	-	-	-
Carbonate (CO_3)	mg/L	92 / 92	100%	<0.5	-	-	-	-	-	-	2.50	-	-	-	-	-
Hydroxide (OH)	mg/L	92 / 92	100%	<0.5	-	-	-	-	-	-	2.50	-	-	-	-	-
Hardness (as $CaCO_3$) - Total	mg/L	0 / 92	0%	4.00	4.00	5.10	5.64	5.60	6.00	7.30	7.50	0.66	0.07	0.12	-	-
Hardness (as CaCO3) - Dissolved	mg/L	0 / 5	0%	6.48	6.48	6.50	6.92	6.56	7.35	7.73	7.73	0.58	0.26	0.08	-	-
Chloride (Cl)	mg/L	12 / 92	13%	<0.5	0.5	0.685	1.15	0.87	1	1.4	17	1.78	0.19	1.55	0	0
Fluoride (F)	mg/L	67 / 92	73%	0.01	-	-	-	-	-	-	0.04	-	-	-	-	0
Sulphate (SO_4)	mg/L	0 / 92	0%	0.546	1.2	1.8	1.98	2.02	2.2475	2.9	2.92	0.50	0.05	0.25	-	-
Nutrients																
Nitrite-N	mg/L	92 / 92	100%	<0.002	-	-	-	-	-	-	0.0025	-	-	-	-	0
Nitrate-N	mg/L	67 / 92	73%	<0.006	-	-	-	-	-	-	0.0800	-	-	-	0	0
Nitrate + Nitrite (as N)	mg/L	67 / 92	73%	<0.006	-	-	-	-	-	-	0.0800	-	-	-	-	-
Ammonia-N	mg/L	37 / 91	41%	<0.005	-	-	-	-	-	-	0.0880	-	-	-	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	1 / 91	1%	<0.05	0.062	0.155	10.277	0.190	0.230	0.341	917.000	96.107	10.075	9.352	-	-
Nitrogen (N) - Total	mg/L	0 / 25	0%	0.090	0.090	0.160	36.880	0.170	0.230	0.280	917.000	183.358	36.672	4.972	-	-
Nitrogen (N) - Total (Calculated)	mg/L	0 / 91	0%	0.029	0.066	0.164	10.287	0.194	0.245	0.364	917.013	96.107	10.075	9.343		
Phosphorus - Total	mg/L	29 / 91	32%	<0.001	-	-	-	-	-	-	0.0080	-	-	-	-	-
Phosphorus - Dissolved (TDP)	mg/L	48 / 91	53%	<0.001	-	-	-	-	-	-	0.0031	-	-	-	-	-
Phosphate - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphate - Total Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	87 / 92	95%	<0.001	-	-	-	-	-	-	0.0050	-	-	-	-	-
Silica (SiO_2)-Reactive	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon																
Total Inorganic Carbon	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon (TOC)	mg/L	0 / 91	0%	1.30	1.30	2.20	2.52	2.50	2.80	3.60	3.60	0.40	0.04	0.16	-	-
Dissolved Organic Carbon (DOC)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																
Aluminum - Total	mg/L	0 / 92	0%	0.00256	0.00256	0.00349	0.00453	0.00433	0.00552	0.00800	0.00920	0.00140	0.00015	0.30879	-	2
Aluminum - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Antimony - Total	mg/L	92 / 92	100%	<0.00002	-	-	-	-	-	-	0.00005	-	-	-	-	-
Antimony - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic - Total	mg/L	0 / 92	0%	0.00013	0.00013	0.00016	0.00018	0.00018	0.00019	0.00023	0.00070	0.00006	0.00001	0.32181	-	0
Arsenic - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Barium - Total	mg/L	0 / 92	0%	0.00156	0.00156	0.00167	0.00180	0.00175	0.00190	0.00224	0.00233	0.00018	0.00002	0.09918	-	-
Barium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium - Total	mg/L	87 / 87	100%	<0.00001	-	-	-	-	-	-	0.00010	-	-	-	-	-
Beryllium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C10 Summary Statistics for the Far-Field 1 (FF1) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Bismuth - Total	mg/L	25 / 25	100%	<0.000005	-	-	-	-	-	-	0.00002	-	-	-	-	-
Bismuth - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron - Total	mg/L	31 / 73	42%	<0.001	-	-	-	-	-	-	0.150	-	-	-	0	0
Boron - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium - Total	mg/L	90 / 92	98%	<0.000005	-	-	-	-	-	-	0.000025	-	-	-	0	0
Cadmium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium - Total	mg/L	0 / 92	0%	0.8700	0.870	0.977	1.058	1.050	1.120	1.300	1.370	0.113	0.012	0.107	-	-
Calcium - Dissolved	mg/L	0 / 44	0%	0.8900	0.890	0.978	1.070	1.040	1.135	1.370	1.430	0.127	0.019	0.119	-	-
Chromium - Total	mg/L	83 / 92	90%	<0.00005	-	-	-	-	-	-	0.00025	-	-	-	-	0
Chromium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium Hexavalent (Cr^{6+}) - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cobalt - Total	mg/L	68 / 92	74%	0.000007	-	-	-	-	-	-	0.000056	-	-	-	-	-
Cobalt - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper - Total	mg/L	45 / 92	49%	<0.0006	-	-	-	-	-	-	0.00090	-	-	-	-	0
Copper - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron - Total	mg/L	26 / 64	41%	0.0010	-	-	-	-	-	-	0.0085	-	-	-	-	0
Iron - Dissolved	mg/L	23 / 28	82%	<0.005	-	-	-	-	-	-	0.0110	-	-	-	-	-
Lead - Total	mg/L	68 / 92	74%	<0.000005	-	-	-	-	-	-	0.000385	-	-	-	-	0
Lead - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium - Total	mg/L	1 / 25	4%	0.0012	0.0012	0.0012	0.0013	0.0013	0.0014	0.0016	0.0022	0.0002	0.0000	0.1650	-	-
Lithium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium - Total	mg/L	0 / 92	0%	0.530	0.530	0.650	0.704	0.712	0.747	0.881	0.984	0.091	0.009	0.129	-	-
Magnesium - Dissolved	mg/L	0 / 44	0%	0.570	0.570	0.620	0.705	0.690	0.735	0.879	1.010	0.106	0.016	0.150	-	-
Manganese - Total	mg/L	0 / 92	0%	0.00037	0.00037	0.00147	0.00201	0.00167	0.00240	0.00377	0.01110	0.00132	0.00014	0.65605	-	-
Manganese - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury - Total	mg/L	78 / 82	95%	<0.00001	-	-	-	-	-	-	0.000030	-	-	-	-	1
Mercury - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum - Total	mg/L	17 / 92	18%	<0.00006	<0.00006	0.000063	0.000080	0.000070	0.000104	0.000156	0.000156	0.000034	0.000004	0.427845	-	0
Molybdenum - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel - Total	mg/L	0 / 92	0%	0.00062	0.00062	0.00075	0.00082	0.00080	0.00086	0.00103	0.00110	0.00010	0.00001	0.12679	-	0
Nickel - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium - Total	mg/L	0 / 92	0%	0.490	0.490	0.556	0.595	0.590	0.629	0.723	0.801	0.065	0.007	0.110	-	-
Potassium - Dissolved	mg/L	0 / 44	0%	0.370	0.370	0.510	0.596	0.590	0.673	0.861	0.980	0.121	0.018	0.203	-	-
Selenium - Total	mg/L	91 / 92	99%	<0.00004	-	-	-	-	-	-	0.000300	-	-	-	-	0
Selenium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon - Total	mg/L	21 / 25	84%	<0.05	-	-	-	-	-	-	0.250	-	-	-	-	-
Silicon - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver - Total	mg/L	91 / 92	99%	<0.000005	-	-	-	-	-	-	0.000050	-	-	-	-	0
Silver - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium - Total	mg/L	0 / 92	0%	0.521	0.521	0.640	0.724	0.723	0.787	0.970	1.140	0.116	0.012	0.160	-	-
Sodium - Dissolved	mg/L	38 / 44	86%	<1.0	-	-	-	-	-	-	1.140	-	-	-	-	-
Strontium - Total	mg/L	0 / 92	0%	0.00630	0.00630	0.00718	0.00800	0.00802	0.00858	0.01030	0.01160	0.00102	0.00011	0.12708	-	-
Strontium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur - Total	mg/L	19 / 25	76%	0.580	-	-	-	-	-	-	1860.000	-	-	-	-	-
Sulphur - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Thallium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin - Total	mg/L	17 / 25	68%	<0.00001	-	-	-	-	-	-	0.00013	-	-	-	-	-
Tin - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium - Total	mg/L	25 / 25	100%	<0.0005	-	-	-	-	-	-	0.0015	-	-	-	-	-
Titanium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C10 Summary Statistics for the Far-Field 1 (FF1) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Uranium - Total	mg/L	67 / 92	73%	0.000010	-	-	-	-	-	-	0.000037	-	-	-	0	0
Uranium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium - Total	mg/L	91 / 92	99%	<0.00005	-	-	-	-	-	-	0.00050	-	-	-	-	-
Vanadium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc - Total	mg/L	31 / 92	34%	0.00030	-	-	-	-	-	-	0.00400	-	-	-	-	0
Zinc - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium - Total	mg/L	25 / 25	100%	<0.00005	-	-	-	-	-	-	0.00025	-	-	-	-	-
Zirconium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table C11 Summary Statistics for the Far-Field 2 (FF2) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Physical																
pH	pH units	0 / 114	0%	5.4	6.6	6.8	6.8	6.9	6.9	7.1	7.2	0.2	0.0	0.0	-	0
Conductivity	µS/cm	0 / 114	0%	1.1	18.8	20.6	22.8	21.6	25.0	29.6	41.7	4.0	0.4	0.2	-	-
Color (True)	TCU	5 / 5	100%	<5.0	-	-	-	-	-	-	<5.0	-	-	-	-	-
Dissolved Oxygen	mg/L	0 / 5	0%	9.3	9.3	11.2	11.8	11.6	12.7	14.3	14.3	1.9	0.8	0.2	-	-
Total Dissolved Solids (TDS)	mg/L	3 / 114	3%	1.0	1.0	12.0	16.8	16.0	20.0	30.0	77.0	9.2	0.9	0.5	-	-
Total Suspended Solids (TSS)	mg/L	88 / 94	94%	<1.0	-	-	-	-	-	-	11	-	-	-	-	-
Turbidity	NTU	18 / 94	19%	<0.1	<0.1	0.1	0.2	0.2	0.3	0.6	0.9	0.2	0.0	0.7	-	-
Biochemical Oxygen Demand (BOD)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 4.5)	mg/L	38 / 38	100%	<0.5	-	-	-	-	-	-	<0.5	-	-	-	-	-
Acidity (pH 8.3)	mg/L	29 / 38	76%	<0.5	-	-	-	-	-	-	2.12	-	-	-	-	-
Anions and Cations																
Alkalinity (Total as $CaCO_3$)	mg/L	66 / 114	58%	0.89	-	-	-	-	-	-	8.4	-	-	-	-	-
Alkalinity (PP as $CaCO_3$)	mg/L	38 / 38	100%	<0.5	-	-	-	-	-	-	<0.5	-	-	-	-	-
Bicarbonate (HCO_3)	mg/L	4 / 114	4%	1.09	4.50	5.13	5.71	5.81	6.10	7.45	10.30	1.12	0.10	0.20	-	-
Carbonate (CO_3)	mg/L	114 / 114	100%	<0.5	-	-	-	-	-	-	2.50	-	-	-	-	-
Hydroxide (OH)	mg/L	114 / 114	100%	<0.5	-	-	-	-	-	-	2.50	-	-	-	-	-
Hardness (as $CaCO_3$) - Total	mg/L	2 / 114	2%	<0.5	5.00	6.00	6.66	6.60	7.10	8.25	13.60	1.40	0.13	0.21	-	-
Hardness (as CaCO3) - Dissolved	mg/L	1 / 18	6%	<0.5	6.80	6.96	7.12	7.28	7.47	7.99	12.30	2.15	0.51	0.30	-	-
Chloride (Cl)	mg/L	11 / 114	10%	<0.5	0.51	1	1.58	1.7	2	3	4	0.66	0.06	0.42	0	0
Fluoride (F)	mg/L	77 / 114	68%	<0.01	-	-	-	-	-	-	0.04	-	-	-	-	0
Sulphate (SO_4)	mg/L	2 / 114	2%	<0.05	0.49	1.80	2.06	1.98	2.42	3.10	4.39	0.60	0.06	0.29	-	-
Nutrients																
Nitrite-N	mg/L	109 / 114	96%	<0.002	-	-	-	-	-	-	0.0050	-	-	-	-	0
Nitrate-N	mg/L	37 / 114	32%	<0.002	-	-	-	-	-	-	0.1900	-	-	-	0	0
Nitrate + Nitrite (as N)	mg/L	37 / 114	32%	<0.002	-	-	-	-	-	-	0.1900	-	-	-	-	-
Ammonia-N	mg/L	33 / 113	29%	<0.005	<0.005	<0.005	0.0166	0.0140	0.0270	0.0530	0.0530	0.0137	0.0013	0.8253	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	1 / 113	1%	<0.05	0.064	0.160	0.200	0.198	0.236	0.321	0.548	0.070	0.007	0.352	-	-
Nitrogen (N) - Total	mg/L	0 / 38	0%	0.043	0.150	0.201	0.241	0.237	0.260	0.310	0.548	0.083	0.013	0.343	-	-
Nitrogen (N) - Total (Calculated)	mg/L	0 / 113	0%	0.045	0.081	0.186	0.226	0.222	0.258	0.363	0.550	0.070	0.007	0.311		
Phosphorus - Total	mg/L	23 / 113	20%	<0.001	<0.001	0.0025	0.0033	0.0030	0.0040	0.0061	0.0100	0.0014	0.0001	0.4226	-	-
Phosphorus - Dissolved (TDP)	mg/L	49 / 112	44%	<0.001	-	-	-	-	-	-	0.0060	-	-	-	-	-
Phosphate - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphate - Total Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	105 / 114	92%	<0.001	-	-	-	-	-	-	0.0240	-	-	-	-	-
Silica (SiO_2)-Reactive	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon																
Total Inorganic Carbon	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon (TOC)	mg/L	0 / 113	0%	2.00	2.00	2.40	2.77	2.90	3.00	3.80	5.00	0.47	0.04	0.17	-	-
Dissolved Organic Carbon (DOC)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																
Aluminum - Total	mg/L	0 / 114	0%	0.00076	0.00195	0.00367	0.00482	0.00470	0.00549	0.00770	0.01180	0.00174	0.00016	0.36104	-	1
Aluminum - Dissolved	mg/L	0 / 12	0%	0.00227	0.00227	0.00238	0.00290	0.00283	0.00324	0.00394	0.00394	0.00058	0.00017	0.20027	-	0
Antimony - Total	mg/L	112 / 114	98%	<0.00002	-	-	-	-	-	-	0.00002	-	-	-	-	-
Antimony - Dissolved	mg/L	12 / 12	100%	<0.00002	-	-	-	-	-	-	<0.00002	-	-	-	-	-
Arsenic - Total	mg/L	1 / 114	1%	<0.00002	0.00021	0.00023	0.00024	0.00024	0.00026	0.00029	0.00039	0.00004	0.00000	0.14619	-	0
Arsenic - Dissolved	mg/L	0 / 12	0%	0.00022	0.00022	0.00024	0.00025	0.00025	0.00026	0.00028	0.00028	0.00002	0.00001	0.07216	-	0
Barium - Total	mg/L	1 / 114	1%	<0.00002	0.00228	0.00270	0.00297	0.00294	0.00333	0.00425	0.00425	0.00052	0.00005	0.17374	-	-
Barium - Dissolved	mg/L	0 / 12	0%	0.00169	0.00220	0.00224	0.00237	0.00238	0.00252	0.00281	0.00281	0.00029	0.00008	0.12141	-	-
Beryllium - Total	mg/L	114 / 114	100%	<0.00001	-	-	-	-	-	-	0.00010	-	-	-	-	-
Beryllium - Dissolved	mg/L	12 / 12	100%	<0.00001	-	-	-	-	-	-	<0.00001	-	-	-	-	-

Table C11 Summary Statistics for the Far-Field 2 (FF2) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Bismuth - Total	mg/L	38 / 38	100%	<0.000005	-	-	-	-	-	-	<0.000005	-	-	-	-	-
Bismuth - Dissolved	mg/L	12 / 12	100%	<0.000005	-	-	-	-	-	-	0.00	-	-	-	-	-
Boron - Total	mg/L	38 / 94	40%	0.001	-	-	-	-	-	-	0.025	-	-	-	0	0
Boron - Dissolved	mg/L	12 / 12	100%	<0.005	-	-	-	-	-	-	<0.005	-	-	-	-	-
Cadmium - Total	mg/L	111 / 114	97%	<0.000005	-	-	-	-	-	-	0.000025	-	-	-	0	0
Cadmium - Dissolved	mg/L	11 / 12	92%	<0.000005	-	-	-	-	-	-	0.000013	-	-	-	-	-
Calcium - Total	mg/L	1 / 114	1%	<0.01	1.010	1.150	1.307	1.265	1.395	1.660	3.930	0.353	0.033	0.270	-	-
Calcium - Dissolved	mg/L	0 / 58	0%	0.0100	1.090	1.233	1.300	1.290	1.380	1.490	2.230	0.229	0.030	0.176	-	-
Chromium - Total	mg/L	83 / 114	73%	<0.00005	-	-	-	-	-	-	0.00028	-	-	-	-	0
Chromium - Dissolved	mg/L	12 / 12	100%	<0.00005	-	-	-	-	-	-	<0.00005	-	-	-	-	-
Chromium Hexavalent (Cr^{6+}) - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cobalt - Total	mg/L	77 / 114	68%	<0.000005	-	-	-	-	-	-	0.000115	-	-	-	-	-
Cobalt - Dissolved	mg/L	0 / 12	0%	0.000006	0.000006	0.000007	0.000008	0.000007	0.000008	0.000009	0.000013	0.000002	0.000001	0.250870	-	-
Copper - Total	mg/L	49 / 114	43%	0.00006	-	-	-	-	-	-	0.00111	-	-	-	-	0
Copper - Dissolved	mg/L	0 / 12	0%	0.00046	0.00046	0.00048	0.00051	0.00052	0.00053	0.00059	0.00059	0.00004	0.00001	0.07337	-	-
Iron - Total	mg/L	20 / 78	26%	<0.001	<0.001	0.0025	0.0059	0.0050	0.0077	0.0146	0.0240	0.0042	0.0005	0.7083	-	0
Iron - Dissolved	mg/L	24 / 48	50%	<0.001	-	-	-	-	-	-	0.0150	-	-	-	-	-
Lead - Total	mg/L	89 / 114	78%	<0.000005	-	-	-	-	-	-	0.000380	-	-	-	-	0
Lead - Dissolved	mg/L	11 / 12	92%	<0.000005	-	-	-	-	-	-	0.000009	-	-	-	-	-
Lithium - Total	mg/L	1 / 38	3%	<0.0005	0.0012	0.0014	0.0015	0.0014	0.0016	0.0019	0.0027	0.0003	0.0001	0.2195	-	-
Lithium - Dissolved	mg/L	0 / 12	0%	0.0014	0.0014	0.0015	0.0015	0.0016	0.0016	0.0017	0.0017	0.0001	0.0000	0.0457	-	-
Magnesium - Total	mg/L	1 / 114	1%	<0.01	0.640	0.749	0.832	0.846	0.911	1.070	1.600	0.154	0.014	0.185	-	-
Magnesium - Dissolved	mg/L	1 / 58	2%	<0.01	0.730	0.800	0.848	0.845	0.888	0.960	1.630	0.167	0.022	0.197	-	-
Manganese - Total	mg/L	1 / 114	1%	<0.00005	<0.00005	0.00114	0.00233	0.00177	0.00288	0.00429	0.00770	0.00183	0.00017	0.78625	-	-
Manganese - Dissolved	mg/L	1 / 12	8%	<0.00005	<0.00005	0.00005	0.00012	0.00008	0.00019	0.00027	0.00027	0.00009	0.00003	0.73741	-	-
Mercury - Total	mg/L	103 / 104	99%	<0.00001	-	-	-	-	-	-	0.000010	-	-	-	-	0
Mercury - Dissolved	mg/L	12 / 12	100%	<0.00001	-	-	-	-	-	-	0.000005	-	-	-	-	-
Molybdenum - Total	mg/L	1 / 114	1%	<0.00005	<0.00005	0.000209	0.000342	0.000268	0.000470	0.000663	0.000953	0.000161	0.000015	0.469228	-	0
Molybdenum - Dissolved	mg/L	0 / 12	0%	0.000192	0.000362	0.000469	0.000492	0.000535	0.000552	0.000617	0.000617	0.000117	0.000034	0.236950	-	-
Nickel - Total	mg/L	1 / 114	1%	<0.00002	0.00049	0.00060	0.00065	0.00063	0.00069	0.00082	0.00196	0.00016	0.00002	0.24651	-	0
Nickel - Dissolved	mg/L	0 / 12	0%	0.00045	0.00050	0.00053	0.00055	0.00055	0.00056	0.00056	0.00063	0.00005	0.00001	0.08579	-	-
Potassium - Total	mg/L	1 / 114	1%	<0.01	0.600	0.664	0.724	0.722	0.766	0.907	1.400	0.121	0.011	0.168	-	-
Potassium - Dissolved	mg/L	0 / 58	0%	0.012	0.510	0.663	0.733	0.750	0.781	0.950	1.440	0.167	0.022	0.228	-	-
Selenium - Total	mg/L	113 / 114	99%	<0.00004	-	-	-	-	-	-	0.000050	-	-	-	-	0
Selenium - Dissolved	mg/L	12 / 12	100%	<0.00004	-	-	-	-	-	-	<0.00004	-	-	-	-	-
Silicon - Total	mg/L	28 / 38	74%	<0.05	-	-	-	-	-	-	0.153	-	-	-	-	-
Silicon - Dissolved	mg/L	6 / 12	50%	<0.05	-	-	-	-	-	-	0.119	-	-	-	-	-
Silver - Total	mg/L	114 / 114	100%	<0.000005	-	-	-	-	-	-	0.000050	-	-	-	-	0
Silver - Dissolved	mg/L	11 / 12	92%	<0.000005	-	-	-	-	-	-	0.000006	-	-	-	-	-
Sodium - Total	mg/L	1 / 114	1%	<0.01	0.835	1.033	1.236	1.215	1.410	1.760	2.510	0.291	0.027	0.236	-	-
Sodium - Dissolved	mg/L	6 / 58	10%	<0.01	1.100	1.200	1.263	1.300	1.400	1.670	2.610	0.376	0.049	0.297	-	-
Strontium - Total	mg/L	1 / 114	1%	<0.00005	0.00813	0.01093	0.01276	0.01235	0.01468	0.01780	0.02520	0.00274	0.00026	0.21492	-	-
Strontium - Dissolved	mg/L	0 / 12	0%	0.00914	0.01350	0.01390	0.01442	0.01455	0.01508	0.01670	0.01730	0.00201	0.00058	0.13966	-	-
Sulphur - Total	mg/L	19 / 38	50%	<0.1	-	-	-	-	-	-	7.000	-	-	-	-	-
Sulphur - Dissolved	mg/L	0 / 12	0%	1.020	1.020	1.123	1.233	1.175	1.373	1.570	1.570	0.180	0.052	0.146	-	-
Thallium - Total	mg/L	8 / 9	89%	<0.000002	-	-	-	-	-	-	0.000002	-	-	-	-	0
Thallium - Dissolved	mg/L	11 / 12	92%	<0.000002	-	-	-	-	-	-	0.000002	-	-	-	-	-
Tin - Total	mg/L	21 / 38	55%	<0.00001	-	-	-	-	-	-	0.00018	-	-	-	-	-
Tin - Dissolved	mg/L	6 / 12	50%	<0.00001	-	-	-	-	-	-	0.00011	-	-	-	-	-
Titanium - Total	mg/L	36 / 38	95%	<0.0005	-	-	-	-	-	-	0.0014	-	-	-	-	-
Titanium - Dissolved	mg/L	12 / 12	100%	<0.0005	-	-	-	-	-	-	<0.0005	-	-	-	-	-

Table C11 Summary Statistics for the Far-Field 2 (FF2) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Uranium - Total	mg/L	1 / 114	1%	<0.000002	0.000052	0.000069	0.000077	0.000079	0.000090	0.000118	0.000118	0.000016	0.000002	0.208656	0	0
Uranium - Dissolved	mg/L	0 / 12	0%	0.000026	0.000046	0.000047	0.000051	0.000049	0.000052	0.000055	0.000070	0.000012	0.000003	0.228467	-	-
Vanadium - Total	mg/L	113 / 114	99%	<0.00005	-	-	-	-	-	-	0.00010	-	-	-	-	-
Vanadium - Dissolved	mg/L	6 / 12	50%	<0.0001	-	-	-	-	-	-	0.00019	-	-	-	-	-
Zinc - Total	mg/L	43 / 114	38%	<0.0008	-	-	-	-	-	-	0.01830	-	-	-	-	0
Zinc - Dissolved	mg/L	0 / 12	0%	0.00029	0.00029	0.00043	0.00102	0.00079	0.00127	0.00213	0.00300	0.00082	0.00024	0.80788	-	-
Zirconium - Total	mg/L	38 / 38	100%	<0.00005	-	-	-	-	-	-	0.00005	-	-	-	-	-
Zirconium - Dissolved	mg/L	12 / 12	100%	<0.00005	-	-	-	-	-	-	<0.00005	-	-	-	-	-

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Table C12 Summary Statistics for the Far-Field B (FFB) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Physical																
pH	pH units	0 / 109	0%	6.0	6.4	6.7	6.8	6.8	6.9	7.1	7.8	0.2	0.0185	0.0285	-	0
Conductivity	µS/cm	0 / 109	0%	13.4	13.4	15.3	16.5	16.1	17.7	21.0	21.9	1.8	0.1769	0.1120	-	-
Color (True)	TCU	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	0 / 9	0%	9.0	9.0	10.4	11.0	11.6	11.8	12.3	12.3	1.1	0.3732	0.1015	-	-
Total Dissolved Solids (TDS)	mg/L	15 / 109	14%	2.5	2.5	8.0	12.9	12.0	16.0	26.0	60.0	8.3	0.7968	0.6442	-	-
Total Suspended Solids (TSS)	mg/L	81 / 88	92%	<1.0	-	-	1.48	-	-	-	3	-	-	-	-	-
Turbidity	NTU	20 / 85	24%	<0.1	0.1	0.1	0.2	0.2	0.2	0.4	1.7	0.3	0.0276	1.1167	-	-
Biochemical Oxygen Demand (BOD)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 4.5)	mg/L	25 / 25	100%	<0.5	-	-	0.25	-	-	-	0.25	-	-	-	-	-
Acidity (pH 8.3)	mg/L	23 / 25	92%	<0.5	-	-	0.29	-	-	-	0.92	-	-	-	-	-
Anions and Cations																
Alkalinity (Total as $CaCO_3$)	mg/L	81 / 109	74%	<5	-	-	3.0	-	-	-	8.0	-	-	-	-	-
Alkalinity (PP as $CaCO_3$)	mg/L	25 / 25	100%	<0.5	-	-	0.25	-	-	-	0.25	-	-	-	-	-
Bicarbonate (HCO_3)	mg/L	67 / 109	61%	<5	-	-	3.59	-	-	-	9.00	-	-	-	-	-
Carbonate (CO_3)	mg/L	109 / 109	100%	<0.5	-	-	1.98	-	-	-	2.50	-	-	-	-	-
Hydroxide (OH)	mg/L	109 / 109	100%	<0.5	-	-	1.98	-	-	-	2.50	-	-	-	-	-
Hardness (as $CaCO_3$) - Total	mg/L	0 / 109	0%	4.00	4.00	5.00	5.28	5.30	5.70	6.60	6.80	0.68	0.0655	0.1294	-	-
Hardness (as CaCO3) - Dissolved	mg/L	0 / 5	0%	6.45	6.45	6.48	6.69	6.72	6.89	6.89	6.89	0.21	0.0955	0.0319	-	-
Chloride (Cl)	mg/L	41 / 109	38%	<0.5	-	-	0.76	-	-	-	2.8	-	-	-	-	-
Fluoride (F)	mg/L	83 / 109	76%	<0.01	-	-	0.02	-	-	-	0.05	-	-	-	-	-
Sulphate (SO_4)	mg/L	0 / 109	0%	0.463	1.4	1.89	2.03	2.03	2.30	2.86	3.91	0.53	0.0510	0.2622	-	-
Nutrients																
Nitrite-N	mg/L	109 / 109	100%	<0.002	-	-	0.001	-	-	-	0.003	-	-	-	-	-
Nitrate-N	mg/L	96 / 109	88%	<0.002	-	-	0.006	-	-	-	0.040	-	-	-	-	-
Nitrate + Nitrite (as N)	mg/L	96 / 109	88%	<0.002	-	-	0.006	-	-	-	0.040	-	-	-	-	-
Ammonia-N	mg/L	48 / 109	44%	<0.005	-	-	0.014	-	-	-	0.090	-	-	-	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	2 / 109	2%	<0.05	0.025	0.130	0.184	0.170	0.211	0.314	1.390	0.134	0.0129	0.7291	-	-
Nitrogen (N) - Total	mg/L	0 / 25	0%	0.100	0.100	0.150	0.181	0.170	0.220	0.270	0.270	0.046	0.0093	0.2563	-	-
Nitrogen (N) - Total (Calculated)	mg/L	0 / 109	0%	0.029	0.029	0.134	0.191	0.174	0.221	0.344	1.394	0.135	0.0129	0.7034	-	-
Phosphate - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphate - Dissolved (TDP)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus - Total	mg/L	38 / 109	35%	<0.001	-	-	0	-	-	-	0.0191	-	-	-	-	-
Phosphorus - Dissolved	mg/L	61 / 108	56%	<0.001	-	-	0	-	-	-	0.0041	-	-	-	-	-
Orthophosphate	mg/L	105 / 109	96%	<0.001	-	-	0.0011	-	-	-	0.0050	-	-	-	-	-
Silica (SiO_2)-Reactive	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Inorganic Carbon	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon (TOC)	mg/L	2 / 105	2%	<0.5	0.50	2.00	2.44	2.40	3.00	3.30	3.30	0.56	0.0543	0.2279	-	-
Carbon																
Dissolved Organic Carbon (DOC)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum - Total	mg/L	5 / 109	5%	0.0008	0.0008	0.0030	0.0042	0.0039	0.0046	0.0068	0.0100	0.0017	0.0002	0.4015	-	7
Aluminum - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Metals																
Antimony - Total	mg/L	99 / 109	91%	<0.00002	-	-	0.00005	-	-	-	0.00063	-	-	-	-	-
Antimony - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic - Total	mg/L	5 / 109	5%	0.00011	0.00014	0.00017	0.00018	0.00018	0.00019	0.00022	0.00023	0.00002	0.000002	0.1092	-	0
Arsenic - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Barium - Total	mg/L	0 / 109	0%	0.00124	0.00159	0.00179	0.00184	0.00184	0.00194	0.00210	0.00250	0.00016	0.000015	0.0863	-	-
Barium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium - Total	mg/L	107 / 107	100%	<0.00001	-	-	0.00010	-	-	-	0.00050	-	-	-	-	-
Beryllium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C12 Summary Statistics for the Far-Field B (FFB) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Bismuth - Total	mg/L	29 / 30	97%	<0.000005	-	-	0.000019	-	-	-	0.00010	-	-	-	-	-
Bismuth - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron - Total	mg/L	27 / 89	30%	<0.001	0.0005	0.001	0.0067	0.0018	0.0025	0.0025	0.02500	0.009905	0.00105	1.47	0	0
Boron - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium - Total	mg/L	105 / 109	96%	<0.000005	-	-	0.000023	-	-	-	0.00010	-	-	-	-	-
Cadmium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium - Total	mg/L	0 / 109	0%	0.57	0.77	0.95	1.01	1.01	1.08	1.23	1.28	0.11	0.0103	0.1074	-	-
Calcium - Dissolved	mg/L	0 / 44	0%	0.89	0.89	1.03	1.08	1.07	1.12	1.21	1.29	0.09	0.0132	0.0809	-	-
Chromium - Total	mg/L	87 / 109	80%	<0.00005	-	-	0.00008	-	-	-	0.0010	-	-	-	-	-
Chromium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium Hexavalent (Cr^{6+}) - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cobalt - Total	mg/L	85 / 109	78%	<0.000005	-	-	0.000046	-	-	-	0.00010	-	-	-	-	-
Cobalt - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper - Total	mg/L	56 / 109	51%	<0.0006	-	-	0.000467	-	-	-	0.002200	-	-	-	-	-
Copper - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron - Total	mg/L	22 / 64	34%	<0.001	-	-	0.00466	-	-	-	0.01420	-	-	-	-	-
Iron - Dissolved	mg/L	27 / 45	60%	<0.0025	-	-	0.00437	-	-	-	0.01400	-	-	-	-	-
Lead - Total	mg/L	94 / 109	86%	<0.000005	-	-	0.000032	-	-	-	0.00042	-	-	-	-	-
Lead - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium - Total	mg/L	0 / 25	0%	0.0010	0.0011	0.0012	0.0013	0.0013	0.0013	0.0014	0.0018	0.0002	0.000038	0.1496	-	-
Lithium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium - Total	mg/L	0 / 109	0%	0.4440	0.4910	0.6160	0.6680	0.6580	0.7110	0.8000	0.8950	0.0850	0.0081	0.1272	-	-
Magnesium - Dissolved	mg/L	0 / 44	0%	0.6100	0.6100	0.6675	0.7166	0.7050	0.7425	0.8500	0.9110	0.0797	0.0120	0.1111	-	-
Manganese - Total	mg/L	2 / 109	2%	0.0002	0.0002	0.0010	0.0021	0.0018	0.0027	0.0041	0.0071	0.0013	0.0001	0.6458	-	-
Manganese - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury - Total	mg/L	106 / 108	98%	<0.00001	-	-	0.000011	-	-	-	0.00005	-	-	-	-	-
Mercury - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum - Total	mg/L	13 / 109	12%	<0.00006	0.000025	0.000070	0.000090	0.000080	0.000110	0.000150	0.0002	0.000036	0.0000035	0.4009	-	0
Molybdenum - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel - Total	mg/L	0 / 109	0%	0.000420	0.000810	0.000910	0.000968	0.000955	0.001000	0.001110	0.0015	0.000115	0.000011	0.1190	-	0
Nickel - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium - Total	mg/L	0 / 109	0%	0.419	0.440	0.530	0.565	0.560	0.594	0.680	0.747	0.059	0.0056	0.1040	-	-
Potassium - Dissolved	mg/L	0 / 44	0%	0.440	0.440	0.558	0.622	0.605	0.684	0.830	0.900	0.103	0.0155	0.1651	-	-
Selenium - Total	mg/L	107 / 109	98%	<0.00004	-	-	0.000051	-	-	-	0.0002	-	-	-	-	-
Selenium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon - Total	mg/L	28 / 29	97%	<0.05	-	-	0.047	-	-	-	0.068	-	-	-	-	-
Silicon - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver - Total	mg/L	109 / 109	100%	<0.000005	-	-	0.000046	-	-	-	0.0002	-	-	-	-	-
Silver - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium - Total	mg/L	5 / 109	5%	0.418	0.418	0.577	0.673	0.639	0.750	0.960	1.090	0.143	0.0137	0.2125	-	-
Sodium - Dissolved	mg/L	39 / 44	89%	<1.0	-	-	0.57	-	-	-	1.140	-	-	-	-	-
Strontium - Total	mg/L	0 / 109	0%	0.0049	0.0049	0.0069	0.0076	0.0076	0.0084	0.011	0.011	0.0011	0.00011	0.1505	-	-
Strontium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur - Total	mg/L	20 / 25	80%	0.790	-	-	0.984	-	-	-	1.000	-	-	-	-	-
Sulphur - Dissolved	mg/L	0 / 3	0%	1.010	-	-	1.070	-	-	-	1.160	0.079	0.0458	0.0742	-	-
Thallium - Total	mg/L	5 / 5	100%	<0.0001	-	-	0.00005	-	-	-	0.00005	-	-	-	-	-
Thallium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin - Total	mg/L	24 / 30	80%	<0.00001	-	-	0.00004	-	-	-	0.0002	-	-	-	-	-
Tin - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium - Total	mg/L	30 / 30	100%	<0.0005	-	-	0.0006	-	-	-	0.0025	-	-	-	-	-
Titanium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C12 Summary Statistics for the Far-Field B (FFB) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Uranium - Total	mg/L	84 / 109	77%	<0.00005	-	-	0.000027	-	-	-	0.00005	-	-	-	-	-
Uranium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium - Total	mg/L	109 / 109	100%	<0.00005	-	-	0.00005	-	-	-	0.00025	-	-	-	-	-
Vanadium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc - Total	mg/L	36 / 109	33%	<0.0001	-	-	0.00104	-	-	-	0.00340	-	-	-	-	-
Zinc - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium - Total	mg/L	18 / 18	100%	<0.00005	-	-	0.00005	-	-	-	0.00005	-	-	-	-	-
Zirconium - Dissolved	mg/L	8 / 8	100%	-	-	-	0	-	-	-	-	-	-	-	-	-

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Table C13 Summary Statistics for the Far-Field A (FFA) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Physical																
pH	pH units	0 / 127	0%	5.9	6.5	6.7	6.8	6.8	6.9	7.1	8.5	0.3	0.0	0.0	-	0
Conductivity	µS/cm	0 / 125	0%	13.2	13.2	15.4	17.2	16.4	18.0	21.6	41.7	3.1	0.3	0.2	-	-
Color (True)	TCU	5 / 5	100%	2.5	-	-	2.5	-	-	-	2.5	-	-	-	-	-
Dissolved Oxygen	mg/L	0 / 11	0%	9.6	9.6	10.2	10.8	10.4	11.2	12.2	12.2	0.9	0.3	0.1	-	-
Total Dissolved Solids (TDS)	mg/L	20 / 125	16%	2.5	2.5	7.0	13.5	12.0	16.0	26.0	45.0	8.8	0.8	0.7	-	-
Total Suspended Solids (TSS)	mg/L	101 / 105	96%	0.5	-	-	1.40	-	-	-	3	-	-	-	-	-
Turbidity	NTU	28 / 102	27%	0.1	0.1	0.1	0.3	0.2	0.3	0.6	1.5	0.3	0.0	1.1	-	-
Biochemical Oxygen Demand (BOD)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 4.5)	mg/L	24 / 24	100%	0.25	-	-	0.25	-	-	-	0.25	-	-	-	-	-
Acidity (pH 8.3)	mg/L	24 / 24	100%	0.25	-	-	0.25	-	-	-	0.25	-	-	-	-	-
Anions and Cations																
Alkalinity (Total as $CaCO_3$)	mg/L	95 / 125	76%	2.50	-	-	3.0	-	-	-	8.0	-	-	-	-	-
Alkalinity (PP as $CaCO_3$)	mg/L	24 / 24	100%	0.25	-	-	0.25	-	-	-	0.25	-	-	-	-	-
Bicarbonate (HCO_3)	mg/L	72 / 125	58%	2.50	-	-	3.80	-	-	-	10.00	-	-	-	-	-
Carbonate (CO_3)	mg/L	125 / 125	100%	0.25	-	-	2.07	-	-	-	2.50	-	-	-	-	-
Hydroxide (OH)	mg/L	125 / 125	100%	0.25	-	-	2.07	-	-	-	2.50	-	-	-	-	-
Hardness (as $CaCO_3$) - Total	mg/L	5 / 125	4%	0.50	4.00	5.00	5.49	5.30	6.00	7.40	12.00	1.09	0.10	0.20	-	-
Hardness (as CaCO3) - Dissolved	mg/L	0 / 5	0%	6.65	7.04	7.04	7.03	7.09	7.09	7.09	7.28	0.23	0.10	0.03	-	-
Chloride (Cl)	mg/L	42 / 125	34%	0.5	-	-	0.94	-	-	-	5.12	-	-	-	-	-
Fluoride (F)	mg/L	97 / 124	78%	0.01	-	-	0.02	-	-	-	0.05	-	-	-	-	-
Sulphate (SO_4)	mg/L	0 / 125	0%	0.41	1.39	1.94	2.16	2.1	2.41	3.04	3.93	0.44	0.04	0.20	-	-
Nutrients																
Nitrite-N	mg/L	121 / 125	97%	0.0010	-	-	0.0013	-	-	-	0.0040	-	-	-	-	-
Nitrate-N	mg/L	92 / 125	74%	0.0010	-	-	0.0134	-	-	-	0.4090	-	-	-	-	-
Nitrate + Nitrite (as N)	mg/L	92 / 125	74%	0.0010	-	-	0.0135	-	-	-	0.4100	-	-	-	-	-
Ammonia-N	mg/L	57 / 125	46%	0.0025	-	-	0.0134	-	-	-	0.0670	-	-	-	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	5 / 125	4%	0.025	0.025	0.120	8.889	0.164	0.210	0.342	1090.000	97.477	8.719	10.966	-	-
Nitrogen (N) - Total	mg/L	0 / 24	0%	0.060	0.060	0.177	45.621	0.217	0.260	0.300	1090.000	222.452	45.408	4.876	-	-
Nitrogen (N) - Total (Calculated)	mg/L	0 / 125	0%	0.029	0.029	0.133	8.904	0.177	0.231	0.354	1090.013	97.477	8.719	10.948	-	-
Phosphate - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphate - Total Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus - Total	mg/L	37 / 125	30%	0.0005	0.0005	0.0018	0.0024	0.0025	0.0030	0.0040	0.0080	0.0012	0.0001	0.5052	-	-
Phosphorus - Total Dissolved	mg/L	64 / 121	53%	0.00050	-	-	0.00144	-	-	-	0.01000	-	-	-	-	-
Orthophosphate	mg/L	119 / 125	95%	0.0005	-	-	0.0009	-	-	-	0.0050	-	-	-	-	-
Silica (SiO_2)-Reactive	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon																
Total Inorganic Carbon	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon (TOC)	mg/L	2 / 124	2%	0.25	0.50	2.00	2.52	2.60	3.00	4.00	4.00	0.52	0.05	0.21	-	-
Dissolved Organic Carbon (DOC)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																
Aluminum - Total	mg/L	3 / 125	2%	0.0023	0.0023	0.0034	0.0053	0.0040	0.0051	0.0075	0.0485	0.0052	0.0005	0.9898	-	7
Aluminum - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Antimony - Total	mg/L	99 / 125	79%	0.00001	-	-	0.00008	-	-	-	0.00195	-	-	-	-	-
Antimony - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic - Total	mg/L	3 / 125	2%	0.00008	0.00014	0.00017	0.00018	0.00018	0.00019	0.00022	0.00028	0.00003	0.00000	0.16440	-	0
Arsenic - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Barium - Total	mg/L	0 / 125	0%	0.00127	0.00147	0.00178	0.00207	0.00187	0.00199	0.00229	0.01410	0.00120	0.00011	0.57807	-	-
Barium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium - Total	mg/L	125 / 125	100%	0.00001	-	-	0.00009	-	-	-	0.00050	-	-	-	-	-
Beryllium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C13 Summary Statistics for the Far-Field A (FFA) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Bismuth - Total	mg/L	27 / 27	100%	0.0000025	-	-	1.14815E-05	-	-	-	0.00010	-	-	-	-	-
Bismuth - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron - Total	mg/L	40 / 106	38%	0.00	-	-	0.01	-	-	-	0.02500	-	-	-	-	-
Boron - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium - Total	mg/L	124 / 125	99%	0.000	-	-	0.000	-	-	-	0.000	-	-	-	-	-
Cadmium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium - Total	mg/L	0 / 125	0%	0.569	0.742	0.940	1.031	1.020	1.080	1.280	2.080	0.158	0.014	0.154	-	-
Calcium - Dissolved	mg/L	0 / 43	0%	0.890	0.890	1.050	1.127	1.110	1.235	1.410	1.410	0.139	0.021	0.124	-	-
Chromium - Total	mg/L	95 / 125	76%	0.000025	-	-	0.000065	-	-	-	0.000770	-	-	-	-	-
Chromium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium Hexavalent (Cr^{6+}) - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cobalt - Total	mg/L	99 / 125	79%	0.000006	-	-	0.000047	-	-	-	0.000190	-	-	-	-	-
Cobalt - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper - Total	mg/L	62 / 125	50%	0.00030	-	-	0.00049	-	-	-	0.00120	-	-	-	-	-
Copper - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron - Total	mg/L	18 / 65	28%	0.0010	0.0010	0.0025	0.0059	0.0050	0.0074	0.0115	0.0720	0.0087	0.0011	1.4795	-	0
Iron - Dissolved	mg/L	31 / 60	52%	0.00250	-	-	0.00554	-	-	-	0.03000	-	-	-	-	-
Lead - Total	mg/L	108 / 125	86%	0.0000	-	-	0.0000	-	-	-	0.0005	-	-	-	-	-
Lead - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium - Total	mg/L	0 / 24	0%	0.00100	0.00110	0.00120	0.00123	0.00120	0.00131	0.00140	0.00149	0.00011	0.00002	0.09223	-	-
Lithium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium - Total	mg/L	0 / 125	0%	0.2970	0.4770	0.6230	0.6850	0.6800	0.7240	0.8560	1.5600	0.1260	0.0113	0.1839	-	-
Magnesium - Dissolved	mg/L	0 / 43	0%	0.6100	0.6100	0.6800	0.7475	0.7500	0.8000	0.9500	0.9500	0.0869	0.0133	0.1163	-	-
Manganese - Total	mg/L	0 / 125	0%	0.001	0.001	0.001	0.003	0.002	0.003	0.006	0.014	0.002	0.000	0.729	-	-
Manganese - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury - Total	mg/L	117 / 120	98%	0.00001	-	-	0.00001	-	-	-	0.0001	-	-	-	-	-
Mercury - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum - Total	mg/L	12 / 125	10%	0.000030	0.000030	0.000080	0.000115	0.000100	0.000123	0.000182	0.001010	0.000099	0.000009	0.861113	-	0
Molybdenum - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel - Total	mg/L	0 / 125	0%	0.000560	0.000790	0.000920	0.000986	0.000980	0.001050	0.001230	0.001690	0.000156	0.000014	0.158681	-	0
Nickel - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium - Total	mg/L	0 / 125	0%	0.404	0.428	0.531	0.583	0.580	0.610	0.727	1.100	0.087	0.008	0.149	-	-
Potassium - Dissolved	mg/L	0 / 43	0%	0.350	0.350	0.540	0.613	0.600	0.685	0.882	0.882	0.113	0.017	0.185	-	-
Selenium - Total	mg/L	123 / 125	98%	0.000020	-	-	0.000050	-	-	-	0.000300	-	-	-	-	-
Selenium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon - Total	mg/L	28 / 32	88%	0.025	-	-	0.059	-	-	-	0.200	-	-	-	-	-
Silicon - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver - Total	mg/L	125 / 125	100%	0.000003	-	-	0.000044	-	-	-	0.000200	-	-	-	-	-
Silver - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium - Total	mg/L	3 / 125	2%	0.356	0.356	0.577	0.698	0.663	0.777	1.050	2.450	0.221	0.020	0.317	-	-
Sodium - Dissolved	mg/L	38 / 43	88%	0.500	-	-	0.570	-	-	-	1.140	-	-	-	-	-
Strontium - Total	mg/L	0 / 125	0%	0.0044	0.0050	0.0070	0.0080	0.0078	0.0087	0.0110	0.0270	0.0022	0.0002	0.2737	-	-
Strontium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur - Total	mg/L	19 / 24	79%	1.00	-	-	1.03	-	-	-	1.26	-	-	-	-	-
Sulphur - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium - Total	mg/L	3 / 3	100%	0.00005	-	-	0.00005	-	-	-	0.00005	-	-	-	-	-
Thallium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin - Total	mg/L	19 / 27	70%	0.000005	-	-	0.000033	-	-	-	0.000200	-	-	-	-	-
Tin - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium - Total	mg/L	27 / 27	100%	0.00025	-	-	0.00050	-	-	-	0.00250	-	-	-	-	-
Titanium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C13 Summary Statistics for the Far-Field A (FFA) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Uranium - Total	mg/L	86 / 125	69%	0.000020	-	-	0.000056	-	-	-	0.000960	-	-	-	-	-
Uranium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium - Total	mg/L	125 / 125	100%	0.000025	-	-	0.000042	-	-	-	0.000250	-	-	-	-	-
Vanadium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc - Total	mg/L	46 / 125	37%	0.00030	-	-	0.00115	-	-	-	0.00860	-	-	-	-	-
Zinc - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium - Total	mg/L	24 / 24	100%	0.000025	-	-	0.000045	-	-	-	0.000050	-	-	-	-	-
Zirconium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table C14 Summary Statistics for the Slipper Lake Outlet (Slipper Out) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Physical																
pH	pH units	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Conductivity	µS/cm	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Color (True)	TCU	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids (TDS)	mg/L	0 / 45	0%	9.0	9.0	16.0	46.3	41.5	59.0	119.0	129.0	31.2	4.7	0.7	-	-
Total Suspended Solids (TSS)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biochemical Oxygen Demand (BOD)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 4.5)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Cations																
Alkalinity (Total as $CaCO_3$)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity (PP as $CaCO_3$)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicarbonate (HCO_3)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbonate (CO_3)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydroxide (OH)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hardness (as $CaCO_3$) - Total	mg/L	0 / 45	0%	6.00	6.00	10.00	20.93	21.80	26.00	44.70	56.90	10.97	1.64	0.52	-	-
Hardness (as CaCO3) - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	mg/L	9 / 45	20%	<1.0	<1.0	2.00	9.89	8.03	14.50	32.00	35	9.04	1.35	0.91	0	0
Fluoride (F)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Sulphate (SO_4)	mg/L	0 / 45	0%	1.99	1.99	5.56	12.77	12.7	15.6	30.3	32.8	7.83	1.17	0.61	-	-
Nutrients																
Nitrite-N	mg/L	40 / 48	83%	<0.001	-	-	-	-	-	-	0.009	-	-	-	-	0
Nitrate-N	mg/L	25 / 48	52%	<0.005	-	-	-	-	-	-	0.447	-	-	-	0	0
Nitrate + Nitrite (as N)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia-N	mg/L	12 / 48	25%	<0.0050	<0.0050	0.0051	0.0125	0.0125	0.0173	0.0287	0.0425	0.0094	0.0014	0.7493	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen (N) - Total	mg/L	0 / 1	0%	0.41	-	-	0.41	-	-	-	0.41	-	-	-	-	-
Nitrogen (N) - Total (Calculated)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus - Total	mg/L	0 / 3	0%	0.0047	-	-	0.0067	-	-	-	0.0082	0.0018	0.0010	0.2699	-	-
Phosphorus - Dissolved (TDP)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphate - Total	mg/L	1 / 45	2%	<0.0020	0.0030	0.0051	0.0068	0.0063	0.0076	0.0102	0.0191	0.0029	0.0004	0.4241	-	-
Phosphate - Total Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	43 / 48	90%	<0.001	-	-	-	-	-	-	0.006	-	-	-	-	-
Silica (SiO_2)-Reactive	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon																
Total Inorganic Carbon	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon (TOC)	mg/L	0 / 31	0%	2.54	2.54	3.51	4.13	4.09	4.54	5.65	6.40	0.86	0.15	0.21	-	-
Dissolved Organic Carbon (DOC)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																
Aluminum - Total	mg/L	0 / 45	0%	0.00580	0.00580	0.01180	0.02653	0.01880	0.03850	0.07600	0.08000	0.02021	0.00301	0.76189	-	45
Aluminum - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Antimony - Total	mg/L	5 / 45	11%	0.00003	0.00003	0.00012	0.00015	0.00013	0.00018	0.00026	0.00052	0.00009	0.00001	0.56696	-	-
Antimony - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic - Total	mg/L	2 / 45	4%	<0.00003	<0.00003	0.00021	0.00025	0.00025	0.00031	0.00041	0.00041	0.00007	0.00001	0.28937	-	0
Arsenic - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Barium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C14 Summary Statistics for the Slipper Lake Outlet (Slipper Out) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Bismuth - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Boron - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Cadmium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Chromium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium Hexavalent (Cr^{6+}) - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cobalt - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper - Total	mg/L	0 / 45	0%	0.00076	0.00076	0.00092	0.00103	0.00101	0.00110	0.00134	0.00186	0.00019	0.00003	0.18441	-	0
Copper - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron - Total	mg/L	0 / 45	0%	0.0260	0.0260	0.0570	0.0703	0.0690	0.0790	0.1100	0.1440	0.0248	0.0037	0.3527	-	0
Iron - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Lead - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Mercury - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum - Total	mg/L	0 / 45	0%	0.000120	0.000120	0.000520	0.003859	0.004190	0.005250	0.011200	0.011200	0.002859	0.000426	0.740938	-	0
Molybdenum - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel - Total	mg/L	0 / 45	0%	0.00042	0.00042	0.00054	0.00079	0.00070	0.00092	0.00148	0.00176	0.00033	0.00005	0.42069	-	0
Nickel - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium - Total	mg/L	0 / 45	0%	0.702	0.702	1.100	2.897	2.880	3.530	6.990	7.300	1.727	0.257	0.596	-	-
Potassium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium - Total	mg/L	38 / 45	84%	<0.00004	-	-	-	-	-	-	<0.0010	-	-	-	-	0
Selenium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Silver - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium - Total	mg/L	0 / 45	0%	0.00900	0.00900	0.01410	0.05456	0.04930	0.07220	0.14500	0.14500	0.03911	0.00583	0.71671	-	-
Strontium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Thallium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C14 Summary Statistics for the Slipper Lake Outlet (Slipper Out) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Uranium - Total	mg/L	2 / 45	4%	<0.00005	<0.00005	0.000054	0.000065	0.000065	0.000076	0.000100	0.000121	0.000019	0.000003	0.289222	0	0
Uranium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc - Total	mg/L	34 / 45	76%	<0.0008	-	-	-	-	-	-	0.00260	-	-	-	-	0
Zinc - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table C15 Summary Statistics for the LDSG3 Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Physical																
pH	pH units	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Conductivity	µS/cm	0 / 86	0%	14.1	14.1	17.225	22.9534884	20.2	27.075	41.4	63.6	8.749	0.943	0.381	-	-
Color (True)	TCU	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids (TDS)	mg/L	0 / 88	0%	2.9	2.9	8.45	12.4	11.2	15.7	24.1	32.8	5.8	0.6	0.5	-	-
Total Suspended Solids (TSS)	mg/L	84 / 86	98%	1.5	1.5	1.5	1.5	1.5	1.5	1.5	3.0	0.2	0.0	0.1	-	-
Turbidity	NTU	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biochemical Oxygen Demand (BOD)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 4.5)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 8.3)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Cations																
Alkalinity (Total as $CaCO_3$)	mg/L	11 / 86	13%	2.5	2.5	3.8	4.7	4.35	5.6	8	8	1.5	0.2	0.3	-	-
Alkalinity (PP as $CaCO_3$)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicarbonate (HCO_3)	mg/L	8 / 86	9%	1	2.5	3.9	5.0	4.6	5.8	7.3	10.0	1.9	0.2	0.4	-	-
Carbonate (CO_3)	mg/L	86 / 86	100%	0.5	0.5	1.0	1.3	1.0	2.1	2.5	2.5	0.7	0.1	0.5	-	-
Hydroxide (OH)	mg/L	84 / 86	98%	0.5	0.5	1.0	1.4	1.0	2.5	4.7	4.8	0.9	0.1	0.6	-	-
Hardness (as $CaCO_3$) - Total	mg/L	0 / 88	0%	4	4	5.5	7.0	6.4	7.8	10.9	17.4	2.4	0.3	0.3	-	-
Hardness (as CaCO3) - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	mg/L	25 / 88	28%	0.25	0.25	0.5	1.4	0.9	1.9	3.8	6.4	1.2	0.1	0.9	0	0
Fluoride (F)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Sulphate (SO_4)	mg/L	0 / 88	0%	1.69	1.69	2.34	3.4	2.9	3.8	5.9	11.9	1.7	0.2	0.5	-	-
Nutrients																
Nitrite-N	mg/L	78 / 88	89%	0.0005	0.0005	0.0005	0.00134	0.0005	0.001	0.0015	0.0179	0.00251	0.00027	1.9	-	0
Nitrate-N	mg/L	53 / 88	60%	0.0025	0.0025	0.0025	0.01409	0.003	0.014725	0.0312	0.129	0.02251	0.00240	1.6	0	0
Nitrate + Nitrite (as N)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia-N	mg/L	35 / 88	40%	0.0025	0.0025	0.0025	0.00855	0.00725	0.01385	0.0217	0.0217	0.00608	0.00065	0.7	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	1 / 86	1%	0.025	0.05	0.12	0.14570	0.15	0.17	0.229	0.28	0.04603	0.00496	0.3	-	-
Nitrogen (N) - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen (N) - Total (Calculated)	mg/L	0 / 86	0%	0.028	0.063	0.129	0.16131	0.1577	0.18375	0.2612	0.3103	0.05272	0.00568	0.3	-	-
Phosphate - Total	mg/L	17 / 81	21%	0.0005	0.0005	0.001	0.01326	0.0026	0.0036	0.0062	0.855	0.09471	0.01052	7.1	-	-
Phosphate- Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus - Total	mg/L	13 / 85	15%	0.0005	0.0005	0.002	0.00316	0.0027	0.0038	0.0062	0.0215	0.00263	0.00029	0.8	-	-
Phosphorus - Dissolved (TDP)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	75 / 86	87%	0.0005	0.0005	0.0005	0.00122	0.0005	0.0005	0.0005	0.03	0.00412	0.00044	3.4	-	-
Silica (SiO_2)-Reactive	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon																
Total Inorganic Carbon	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon (TOC)	mg/L	0 / 59	0%	1.75	1.75	2.365	2.66186	2.55	2.86	3.52	5.03	0.58227	0.07580	0.2	-	-
Dissolved Organic Carbon (DOC)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																
Aluminum - Total	mg/L	0 / 81	0%	0.0019	0.0019	0.0042	0.00839	0.0062	0.01	0.0186	0.0262	0.00613	0.00068	0.7	-	54
Aluminum - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Antimony - Total	mg/L	65 / 81	80%	0.000015	0.00005	0.00005	0.00007	0.00005	0.00005	0.00005	0.00042	0.00006	0.00001	0.9	-	-
Antimony - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic - Total	mg/L	2 / 88	2%	0.000015	0.000145	0.000175	0.00018	0.0001865	0.000197	0.000222	0.00025	0.00003	0.00000	0.2	-	0
Arsenic - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Barium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C15 Summary Statistics for the LDSG3 Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Bismuth - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Boron - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Cadmium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Chromium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium Hexavalent (Cr^{6+}) - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cobalt - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper - Total	mg/L	0 / 81	0%	0.00046	0.00046	0.00062	0.00074691	0.00068	0.00075	0.00094	0.00466	0.00045585	5.07E-05	0.61	-	1
Copper - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron - Total	mg/L	39 / 88	44%	0.0025	0.0025	0.005	0.01355114	0.008	0.018	0.035	0.151	0.017306075	0.0018	1.28	-	0
Iron - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Lead - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Mercury - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum - Total	mg/L	21 / 88	24%	0.000025	0.000025	0.00007275	0.00038134	0.000282	0.000465	0.00105	0.00189	0.000387425	4.13E-05	1.02	-	0
Molybdenum - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel - Total	mg/L	0 / 81	0%	0.00077	0.00077	0.0009	0.0010251	0.00096	0.00106	0.00129	0.00355	0.000336955	3.74E-05	0.33	-	0
Nickel - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium - Total	mg/L	2 / 81	2%	0.4	0.4	0.605	0.7857037	0.727	0.889	1.26	1.68	0.263754026	0.029	0.34	-	-
Potassium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium - Total	mg/L	80 / 81	99%	0.00002	0.00005	0.00005	4.68E-05	0.00005	0.00005	0.00005	0.00011	1.60E-05	1.77E-06	0.34	-	0
Selenium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Silver - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium - Total	mg/L	0 / 88	0%	0.0056	0.0056	0.0073	0.01157523	0.009805	0.01385	0.0218	0.0362	0.00606	0.00065	0.52	-	-
Strontium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Thallium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C15 Summary Statistics for the LDSG3 Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Uranium - Total	mg/L	20 / 81	25%	0.000014	0.000014	0.000025	3.04E-05	0.00003	0.000034	0.000046	0.000046	5.88E-06	6.54E-07	0.19	0	0
Uranium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc - Total	mg/L	58 / 81	72%	0.0004	0.0004	0.0005	0.00108889	0.0005	0.0013	0.0021	0.0104	0.0015	0.00017	1.38	-	0
Zinc - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table C16 Summary Statistics for the Lac du Sauvage Outlet (LDS Out) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Physical																
pH	pH units	0 / 5	0%	6.5	-	-	6.7	-	-	-	6.9	0.2	-	-	-	0
Conductivity	µS/cm	0 / 5	0%	14.2	-	-	16.3	-	-	-	17.4	1.3	-	-	-	-
Color (True)	TCU	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved Solids (TDS)	mg/L	1 / 5	20%	5.0	-	-	9.0	-	-	-	14.0	3.2	-	-	-	-
Total Suspended Solids (TSS)	mg/L	4 / 4	100%	<1.0	-	-	-	-	-	-	<3.0	-	-	-	-	-
Turbidity	NTU	0 / 4	0%	0.14	-	-	0.17	-	-	-	0.22	0.04	-	-	-	-
Biochemical Oxygen Demand (BOD)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 4.5)	mg/L	4 / 4	100%	<0.50	-	-	-	-	-	-	<0.50	-	-	-	-	-
Acidity (pH 8.3)	mg/L	1 / 4	25%	<0.50	-	-	0.73	-	-	-	1.55	0.57	-	-	-	-
Anions and Cations																
Alkalinity (Total as $CaCO_3$)	mg/L	1 / 5	20%	<5	-	-	4.58	-	-	-	6.11	1.51	-	-	-	-
Alkalinity (PP as $CaCO_3$)	mg/L	4 / 4	100%	<0.50	-	-	-	-	-	-	<0.50	-	-	-	-	-
Bicarbonate (HCO_3)	mg/L	0 / 5	0%	4.30	-	-	6.00	-	-	-	7.45	1.27	-	-	-	-
Carbonate (CO_3)	mg/L	5 / 5	100%	<0.50	-	-	-	-	-	-	<5	-	-	-	-	-
Hydroxide (OH)	mg/L	5 / 5	100%	<0.50	-	-	-	-	-	-	<5	-	-	-	-	-
Hardness (as $CaCO_3$) - Total	mg/L	0 / 5	0%	5.50	-	-	5.83	-	-	-	6.12	0.29	-	-	-	-
Hardness (as CaCO3) - Dissolved	mg/L	0 / 3	0%	6.04	-	-	6.11	-	-	-	6.17	0.07	-	-	-	-
Chloride (Cl)	mg/L	4 / 5	80%	<0.50	-	-	0.31	-	-	-	0.55	0.13	-	-	0	0
Fluoride (F)	mg/L	1 / 5	20%	0.020	-	-	0.026	-	-	-	0.028	0%	-	-	-	0
Sulphate (SO_4)	mg/L	0 / 5	0%	1.30	-	-	1.49	-	-	-	1.70	0.15	-	-	-	-
Nutrients																
Nitrite-N	mg/L	5 / 5	100%	<0.002	-	-	-	-	-	-	<0.005	-	-	-	-	0
Nitrate-N	mg/L	0 / 5	0%	0.0132	-	-	0.0418	-	-	-	0.0700	0.0246	-	-	0	0
Nitrate + Nitrite (as N)	mg/L	0 / 5	0%	0.0132	-	-	0.0418	-	-	-	0.0700	0.0246	-	-	-	-
Ammonia-N	mg/L	0 / 5	0%	0.0220	-	-	0.0285	-	-	-	0.0330	0.0046	-	-		-
Total Kjeldahl Nitrogen (TKN)	mg/L	0 / 5	0%	0.205	-	-	0.241	-	-	-	0.268	0.025	-	-	-	-
Nitrogen (N) - Total	mg/L	0 / 4	0%	0.241	-	-	0.275	-	-	-	0.320	0.033	-	-	-	-
Nitrogen (N) - Total (Calculated)	mg/L	0 / 4	0%	0.242	-	-	0.284	-	-	-	0.323	0.035	-	-	-	-
Phosphorus - Total	mg/L	1 / 5	20%	<0.0050	-	-	0.0046	-	-	-	0.0053	0.0012	-	-	-	-
Phosphorus - Dissolved (TDP)	mg/L	1 / 5	20%	<0.0050	-	-	0.0037	-	-	-	0.0046	0.0008	-	-	-	-
Phosphate - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphate - Total Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg/L	1 / 5	20%	0.0015	-	-	0.0018	-	-	-	<0.0050	0.0005	-	-	-	-
Silica (SiO_2)-Reactive	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon																
Total Inorganic Carbon	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon (TOC)	mg/L	0 / 5	0%	2.60			2.78				2.90	0.13			-	-
Dissolved Organic Carbon (DOC)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																
Aluminum - Total	mg/L	0 / 5	0%	0.00275	-	-	0.00405	-	-	-	0.00611	0.00129	-	-	-	0
Aluminum - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Antimony - Total	mg/L	5 / 5	100%	<0.00002	-	-	-	-	-	-	<0.00003	-	-	-	-	-
Antimony - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic - Total	mg/L	0 / 5	0%	0.00019	-	-	0.00027	-	-	-	0.00031	0.00005	-	-	-	0
Arsenic - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Barium - Total	mg/L	0 / 5	0%	0.00111	-	-	0.00114	-	-	-	0.00117	0.00003	-	-	-	-
Barium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium - Total	mg/L	5 / 5	100%	<0.00001	-	-	-	-	-	-	<0.0002	-	-	-	-	-
Beryllium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C16 Summary Statistics for the Lac du Sauvage Outlet (LDS Out) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Bismuth - Total	mg/L	4 / 4	100%	<0.000005	-	-		-	-	-	<0.000005	-	-	-	-	-
Bismuth - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron - Total	mg/L	4 / 4	100%	<0.005	-	-	-	-	-	-	<0.050	-	-	-	0	0
Boron - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium - Total	mg/L	5 / 5	100%	<0.000005	-	-	-	-	-	-	<0.000050	-	-	-	0	0
Cadmium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium - Total	mg/L	0 / 5	0%	0.91	-	-	1.017	-	-	-	1.060	0.061	-	-	-	-
Calcium - Dissolved	mg/L	0 / 4	0%	1.05	-	-	1.068	-	-	-	1.080	0.013	-	-	-	-
Chromium - Total	mg/L	3 / 5	60%	<0.000050	-	-	0.00005	-	-	-	0.00009	-	-	-	-	0
Chromium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium Hexavalent (Cr^{6+}) - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt - Total	mg/L	1 / 5	20%	0.000009	-	-	0.000020	-	-	-	0.000050	0.000017	-	-	-	-
Cobalt - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper - Total	mg/L	0 / 5	0%	0.00063	-	-	0.00066	-	-	-	0.00070	0.00003	-	-	-	0
Copper - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron - Total	mg/L	0 / 5	0%	0.0056	-	-	0.0084	-	-	-	0.0119	0.0024	-	-	-	0
Iron - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead - Total	mg/L	3 / 5	60%	<0.000005	-	-	0.000011	-	-	-	<0.000050	-	-	-	-	0
Lead - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium - Total	mg/L	0 / 4	0%	0.0011	-	-	0.0015	-	-	-	0.0017	0.0003	-	-	-	-
Lithium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium - Total	mg/L	0 / 5	0%	0.627	-	-	0.766	-	-	-	0.850	0.096	-	-	-	-
Magnesium - Dissolved	mg/L	0 / 4	0%	0.700	-	-	0.804	-	-	-	0.845	0.069	-	-	-	-
Manganese - Total	mg/L	0 / 5	0%	0.00361	-	-	0.00671	-	-	-	0.00914	0.00236	-	-	-	-
Manganese - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury - Total	mg/L	5 / 5	100%	<0.00001	-	-	-	-	-	-	<0.00002	-	-	-	-	-
Mercury - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum - Total	mg/L	4 / 5	80%	<0.00005	-	-	0.000035	-	-	-	0.000070	-	-	-	-	-
Molybdenum - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel - Total	mg/L	0 / 5	0%	0.00031	-	-	0.00035	-	-	-	0.00038	0.00003	-	-	-	0
Nickel - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium - Total	mg/L	0 / 5	0%	0.552	-	-	0.648	-	-	-	0.724	0.078	-	-	-	-
Potassium - Dissolved	mg/L	0 / 4	0%	0.550	-	-	0.661	-	-	-	0.716	0.075	-	-	-	-
Selenium - Total	mg/L	5 / 5	100%	<0.00004	-	-	-	-	-	-	<0.00010	-	-	-	-	-
Selenium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon - Total	mg/L	0 / 4	0%	0.069	-	-	0.100	-	-	-	0.125	0.027	-	-	-	-
Silicon - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver - Total	mg/L	5 / 5	100%	<0.000005	-	-	-	-	-	-	<0.00010	-	-	-	-	-
Silver - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium - Total	mg/L	0 / 5	0%	0.591	-	-	0.694	-	-	-	0.776	0.084	-	-	-	-
Sodium - Dissolved	mg/L	1 / 4	25%	0.500	-	-	0.699	-	-	-	0.783	0.133	-	-	-	-
Strontium - Total	mg/L	0 / 5	0%	0.00534	-	-	0.00650	-	-	-	0.00719	0.00077	-	-	-	-
Strontium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur - Total	mg/L	1 / 4	25%	0.430	-	-	0.705	-	-	-	1.000	0.248	-	-	-	-
Sulphur - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Thallium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin - Total	mg/L	1 / 4	25%	<0.00001	-	-	0.00006	-	-	-	0.00016	0.00007	-	-	-	-
Tin - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium - Total	mg/L	4 / 4	100%	<0.0005	-	-	-	-	-	-	<0.0005	-	-	-	-	-
Titanium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C16 Summary Statistics for the Lac du Sauvage Outlet (LDS Out) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Uranium - Total	mg/L	1 / 5	20%	0.000021	-	-	0.000023	-	-	-	<0.000050	0.000002	-	-	0	0
Uranium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium - Total	mg/L	5 / 5	100%	<0.00005	-	-	-	-	-	-	<0.00020	-	-	-	-	-
Vanadium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc - Total	mg/L	0 / 5	0%	0.00058	-	-	0.00129	-	-	-	0.00334	0.00117	-	-	-	0
Zinc - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium - Total	mg/L	4 / 4	100%	<0.00005	-	-	-	-	-	-	<0.0001	-	-	-	-	-
Zirconium - Dissolved	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table C17 Summary Statistics for the Lac de Gras Outlet (LDG Out) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Physical																
pH	pH units	0 / 47	0%	6.1	6.4	6.6	6.8	6.7	6.8	7.1	8.2	0.3	0.0	0.0	-	0
Conductivity	µS/cm	0 / 47	0%	10.5	10.5	14.4	16.4	15.9	17.4	21.6	27.0	3.4	0.5	0.2	-	-
Color (True)	TCU	1 / 1	100%	<5	-	-	-	-	-	-	<5	-	-	-	-	-
Dissolved Oxygen	mg/L	0 / 5	0%	10.1	10.1	10.7	11.8	12.3	12.7	13.3	13.3	1.4	0.6	0.1	-	-
Total Dissolved Solids (TDS)	mg/L	7 / 47	15%	0.5	0.5	8.5	16.6	13.0	19.5	35.0	64.0	13.5	2.0	0.8	-	-
Total Suspended Solids (TSS)	mg/L	35 / 41	85%	<0.4	-	-	-	-	-	-	14	-	-	-	-	-
Turbidity	NTU	6 / 39	15%	0.1	0.1	0.14	0.33	0.21	0.39	0.70	1.29	0.31	0.05	0.95	-	-
Biochemical Oxygen Demand (BOD)	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acidity (pH 4.5)	mg/L	7 / 7	100%	<0.5	-	-	-	-	-	-	<0.5	-	-	-	-	-
Acidity (pH 8.3)	mg/L	7 / 7	100%	<0.5	-	-	-	-	-	-	<0.5	-	-	-	-	-
Anions and Cations																
Alkalinity (Total as $CaCO_3$)	mg/L	23 / 47	49%	<5.0	-	-	-	-	-	-	8.0	-	-	-	-	-
Alkalinity (PP as $CaCO_3$)	mg/L	7 / 7	100%	<0.5	-	-	-	-	-	-	<0.5	-	-	-	-	-
Bicarbonate (HCO_3)	mg/L	14 / 32	44%	<5.0	-	-	-	-	-	-	9.00	-	-	-	-	-
Carbonate (CO_3)	mg/L	32 / 32	100%	<0.5	-	-	-	-	-	-	<5.0	-	-	-	-	-
Hydroxide (OH)	mg/L	32 / 32	100%	<0.5	-	-	-	-	-	-	<5.0	-	-	-	-	-
Hardness (as $CaCO_3$) - Total	mg/L	1 / 45	2%	3.89	3.89	4.30	5.22	5.00	5.90	7.92	8.90	1.11	0.16	0.21	-	-
Hardness (as CaCO3) - Dissolved	mg/L	0 / 3	0%	6.17	-	-	6.90	-	-	-	7.85	0.86	0.50	0.12	-	-
Chloride (Cl)	mg/L	20 / 48	42%	<0.2	-	-	-	-	-	-	3.6	-	-	-	0	0
Fluoride (F)	mg/L	28 / 35	80%	0.010	-	-	-	-	-	-	0.034	-	-	-	-	0
Sulphate (SO_4)	mg/L	4 / 48	8%	1.20	1.20	1.63	2.18	2.09	2.60	3.61	3.61	0.61	0.09	0.28	-	-
Nutrients																
Nitrite-N	mg/L	42 / 42	100%	<0.002	-	-	-	-	-	-	<0.008	-	-	-	-	0
Nitrate-N	mg/L	39 / 41	95%	<0.002	-	-	-	-	-	-	0.0140	-	-	-	0	0
Nitrate + Nitrite (as N)	mg/L	38 / 42	90%	<0.002	-	-	-	-	-	-	0.0140	-	-	-	-	-
Ammonia-N	mg/L	21 / 48	44%	<0.005	-	-	-	-	-	-	0.0790	-	-	-		-
Total Kjeldahl Nitrogen (TKN)	mg/L	1 / 34	3%	<0.050	<0.050	0.130	0.193	0.165	0.236	0.370	0.700	0.113	0.019	0.585	-	-
Nitrogen (N) - Total	mg/L	0 / 7	0%	0.100	0.100	0.188	0.276	0.240	0.260	0.270	0.700	0.197	0.074	0.713	-	-
Nitrogen (N) - Total (Calculated)	mg/L	0 / 33	0%	0.0290	0.0290	0.1340	0.2017	0.1750	0.2430	0.3740	0.7125	0.1148	0.0200	0.5690	-	-
Phosphorus - Total	mg/L	19 / 49	39%	<0.0010	-	-	-	-	-	-	<0.1	-	-	-	-	-
Phosphorus - Dissolved (TDP)	mg/L	22 / 33	67%	<0.0010	-	-	-	-	-	-	<0.1	-	-	-	-	-
Phosphate - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphate - Total Dissolved	mg/L	1 / 1	100%	<0.003	-	-	-	-	-	-	<0.003	-	-	-		-
Orthophosphate	mg/L	36 / 43	84%	<0.0010	-	-	-	-	-	-	0.2810	-	-	-	-	-
Silica (SiO_2)-Reactive	mg/L	0 / 10	0%	0.100	0.100	0.106	0.117	0.110	0.127	0.140	0.140	0.015	0.005	0.128	-	-
Carbon																
Total Inorganic Carbon	mg/L	0 / 2	0%	0.80	-	-	0.85	-	-	-	0.90	0.07	0.05	0.08	-	-
Total Organic Carbon (TOC)	mg/L	0 / 47	0%	1.70	1.70	2.18	2.58	2.60	3.00	3.60	3.60	0.46	0.07	0.18	-	-
Dissolved Organic Carbon (DOC)	mg/L	0 / 12	0%	1.70	1.70	2.25	2.47	2.50	2.65	2.90	3.50	0.48	0.14	0.19	-	-
Metals																
Aluminum - Total	mg/L	9 / 47	19%	0.00230	0.00230	0.00420	0.01636	0.00583	0.01375	0.02000	0.33000	0.04771	0.00696	2.91579	-	3
Aluminum - Dissolved	mg/L	0 / 4	0%	0.00289	-	-	0.00558	-	-	-	0.00700	0.00184	0.00092	0.32953	-	0
Antimony - Total	mg/L	24 / 44	55%	<0.00002	-	-	-	-	-	-	0.01540	-	-	-	-	-
Antimony - Dissolved	mg/L	2 / 2	100%	<0.00002	-	-	-	-	-	-	<0.00002	-	-	-	-	-
Arsenic - Total	mg/L	7 / 42	17%	<0.00020	0.00015	0.00017	0.00023	0.00019	0.00021	0.00023	0.00100	0.00016	0.00002	0.69160	-	0
Arsenic - Dissolved	mg/L	0 / 2	0%	0.00017	-	-	0.00019	-	-	-	0.00020	0.00002	0.00001	0.10237	-	0
Barium - Total	mg/L	3 / 47	6%	0.00050	0.00100	0.00145	0.00193	0.00183	0.00207	0.00290	0.00500	0.00087	0.00013	0.45072	-	-
Barium - Dissolved	mg/L	0 / 4	0%	0.00178	-	-	0.00200	-	-	-	0.00212	0.00016	0.00008	0.07789	-	-
Beryllium - Total	mg/L	46 / 47	98%	<0.00001	-	-	-	-	-	-	0.00200	-	-	-	-	-
Beryllium - Dissolved	mg/L	3 / 4	75%	<0.00001	-	-	-	-	-	-	0.00030	-	-	-	-	-

Table C17 Summary Statistics for the Lac de Gras Outlet (LDG Out) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Bismuth - Total	mg/L	17 / 17	100%	<0.000005	-	-	-	-	-	-	<0.01	-	-	-	-	-
Bismuth - Dissolved	mg/L	2 / 2	100%	<0.000005	-	-	-	-	-	-	<0.000005	-	-	-	-	-
Boron - Total	mg/L	14 / 33	42%	<0.001	-	-	-	-	-	-	0.050	-	-	-	0	0
Boron - Dissolved	mg/L	4 / 4	100%	<0.005	-	-	-	-	-	-	<0.050	-	-	-	-	-
Cadmium - Total	mg/L	41 / 48	85%	<0.000005	-	-	-	-	-	-	0.000200	-	-	-	1	2
Cadmium - Dissolved	mg/L	2 / 4	50%	<0.000005	-	-	-	-	-	-	0.000400	-	-	-	-	-
Calcium - Total	mg/L	0 / 37	0%	0.7610	0.761	0.930	1.052	1.030	1.130	1.350	1.690	0.185	0.030	0.176	-	-
Calcium - Dissolved	mg/L	0 / 13	0%	0.8000	0.800	0.980	1.121	1.150	1.220	1.510	1.510	0.206	0.057	0.184	-	-
Chromium - Total	mg/L	35 / 48	73%	<0.00005	-	-	-	-	-	-	0.00150	-	-	-	-	0
Chromium - Dissolved	mg/L	1 / 4	25%	<0.00005	-	-	0.00079	-	-	-	0.00200	0.00092	0.00046	1.15737	-	-
Chromium Hexavalent (Cr^{6+}) - Total	mg/L	0 / 0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cobalt - Total	mg/L	38 / 47	81%	0.000018	-	-	-	-	-	-	0.000500	-	-	-	-	-
Cobalt - Dissolved	mg/L	2 / 4	50%	0.000009	-	-	-	-	-	-	0.000150	-	-	-	-	-
Copper - Total	mg/L	16 / 48	33%	<0.0006	-	-	-	-	-	-	0.01000	-	-	-	-	2
Copper - Dissolved	mg/L	0 / 4	0%	0.00059	-	-	0.00064	-	-	-	0.00070	0.00005	0.00003	0.08446	-	-
Iron - Total	mg/L	11 / 32	34%	<0.005	-	-	-	-	-	-	0.6900	-	-	-	-	1
Iron - Dissolved	mg/L	5 / 20	25%	0.0012	0.0012	0.0025	0.0085	0.0080	0.0110	0.0160	0.0300	0.0068	0.0015	0.7916	-	-
Lead - Total	mg/L	39 / 48	81%	<0.000005	-	-	-	-	-	-	0.010000	-	-	-	-	0
Lead - Dissolved	mg/L	2 / 4	50%	<0.000005	-	-	-	-	-	-	0.000300	-	-	-	-	-
Lithium - Total	mg/L	11 / 20	55%	0.0012	-	-	-	-	-	-	0.0090	-	-	-	-	-
Lithium - Dissolved	mg/L	1 / 4	25%	<0.001	-	-	0.0010	-	-	-	0.0014	0.0004	0.0002	0.3715	-	-
Magnesium - Total	mg/L	0 / 37	0%	0.469	0.469	0.577	0.688	0.667	0.748	1.000	1.130	0.150	0.025	0.218	-	-
Magnesium - Dissolved	mg/L	0 / 13	0%	0.640	0.640	0.700	0.778	0.778	0.840	0.989	0.989	0.099	0.027	0.127	-	-
Manganese - Total	mg/L	3 / 48	6%	0.00050	0.00050	0.00100	0.00240	0.00225	0.00305	0.00594	0.00760	0.00162	0.00023	0.67567	-	-
Manganese - Dissolved	mg/L	0 / 4	0%	0.00011	-	-	0.00111	-	-	-	0.00200	0.00104	0.00052	0.93708	-	-
Mercury - Total	mg/L	35 / 36	97%	<0.00001	-	-	-	-	-	-	0.000025	-	-	-	-	0
Mercury - Dissolved	mg/L	2 / 2	100%	<0.00001	-	-	-	-	-	-	<0.00001	-	-	-	-	-
Molybdenum - Total	mg/L	21 / 47	45%	<0.00006	-	-	-	-	-	-	0.006000	-	-	-	-	0
Molybdenum - Dissolved	mg/L	2 / 4	50%	<0.0002	-	-	-	-	-	-	0.000184	-	-	-	-	-
Nickel - Total	mg/L	7 / 48	15%	<0.0010	0.00086	0.00092	0.00116	0.00100	0.00108	0.00121	0.00700	0.00094	0.00014	0.80901	-	0
Nickel - Dissolved	mg/L	0 / 4	0%	0.00090	-	-	0.00128	-	-	-	0.00190	0.00045	0.00022	0.35125	-	-
Potassium - Total	mg/L	0 / 36	0%	0.431	0.431	0.518	0.585	0.576	0.617	0.716	0.940	0.107	0.018	0.182	-	-
Potassium - Dissolved	mg/L	0 / 11	0%	0.410	0.410	0.565	0.651	0.670	0.728	0.836	0.836	0.128	0.039	0.197	-	-
Selenium - Total	mg/L	45 / 46	98%	<0.00004	-	-	-	-	-	-	<0.010	0.002083	0.000310	1.815663	-	0
Selenium - Dissolved	mg/L	2 / 2	100%	<0.00004	-	-	-	-	-	-	<0.00004	-	-	-	-	-
Silicon - Total	mg/L	10 / 13	77%	<0.10	-	-	-	-	-	-	0.120	-	-	-	-	-
Silicon - Dissolved	mg/L	1 / 4	25%	0.020	-	-	0.058	-	-	-	0.110	0.038	0.019	0.649	-	-
Silver - Total	mg/L	45 / 47	96%	<0.000005	-	-	-	-	-	-	0.008000	-	-	-	-	2
Silver - Dissolved	mg/L	4 / 4	100%	<0.000005	-	-	-	-	-	-	<0.000005	-	-	-	-	-
Sodium - Total	mg/L	0 / 37	0%	0.426	0.426	0.516	0.729	0.631	0.798	1.170	2.300	0.340	0.056	0.467	-	-
Sodium - Dissolved	mg/L	7 / 13	54%	<1.0	-	-	-	-	-	-	1.210	-	-	-	-	-
Strontium - Total	mg/L	1 / 47	2%	0.00100	0.00500	0.00590	0.00710	0.00680	0.00829	0.01050	0.01290	0.00210	0.00031	0.29553	-	-
Strontium - Dissolved	mg/L	0 / 4	0%	0.00500	-	-	0.00743	-	-	-	0.01030	0.00283	0.00141	0.38054	-	-
Sulphur - Total	mg/L	6 / 10	60%	<0.50	-	-	-	-	-	-	1.350	-	-	-	-	-
Sulphur - Dissolved	mg/L	1 / 4	25%	0.500	-	-	0.713	-	-	-	1.000	0.253	0.126	0.355	-	-
Thallium - Total	mg/L	10 / 10	100%	<0.0004	-	-	-	-	-	-	<0.0004	-	-	-	-	0
Thallium - Dissolved	mg/L	3 / 4	75%	<0.000002	-	-	-	-	-	-	<0.001	-	-	-	-	-
Tin - Total	mg/L	5 / 8	63%	<0.00001	-	-	-	-	-	-	<0.001	-	-	-	-	-
Tin - Dissolved	mg/L	4 / 4	100%	<0.00001	-	-	-	-	-	-	<0.001	-	-	-	-	-
Titanium - Total	mg/L	17 / 20	85%	<0.0005	-	-	-	-	-	-	0.0060	-	-	-	-	-
Titanium - Dissolved	mg/L	2 / 4	50%	<0.0005	-	-	-	-	-	-	0.0020	-	-	-	-	-

Table C17 Summary Statistics for the Lac de Gras Outlet (LDG Out) Water Chemistry Dataset; Lac de Gras, NT

Parameter	Units	n_{ND} / n	%ND	Min	Low	25th	Mean	Median	75th	High	Max	SD	SE	CV	> CCME st	> CCME lt
Uranium - Total	mg/L	39 / 47	83%	0.000016	-	-	-	-	-	-	<0.50	-	-	-	0	0
Uranium - Dissolved	mg/L	2 / 4	50%	0.000017	-	-	-	-	-	-	0.000200	-	-	-	-	-
Vanadium - Total	mg/L	43 / 47	91%	<0.00005	-	-	-	-	-	-	0.01600	-	-	-	-	-
Vanadium - Dissolved	mg/L	4 / 4	100%	<0.0001	-	-	-	-	-	-	<0.001	-	-	-	-	-
Zinc - Total	mg/L	19 / 48	40%	<0.0008	-	-	-	-	-	-	0.02800	-	-	-	-	0
Zinc - Dissolved	mg/L	0 / 4	0%	0.00187	-	-	0.00464	-	-	-	0.00750	-	-	-	-	-
Zirconium - Total	mg/L	7 / 7	100%	<0.00005	-	-	-	-	-	-	<0.0001	-	-	-	-	-
Zirconium - Dissolved	mg/L	2 / 2	100%	<0.00005	-	-	-	-	-	-	<0.0001	-	-	-	-	-

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APPENDIX D Trends Analysis Results and Figures

WQ-06/LDG42/NF5
ProUCL Trends Analysis Output

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 11:19:50 AM
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Alkalinity (Total as CaCO3) (mg/L)

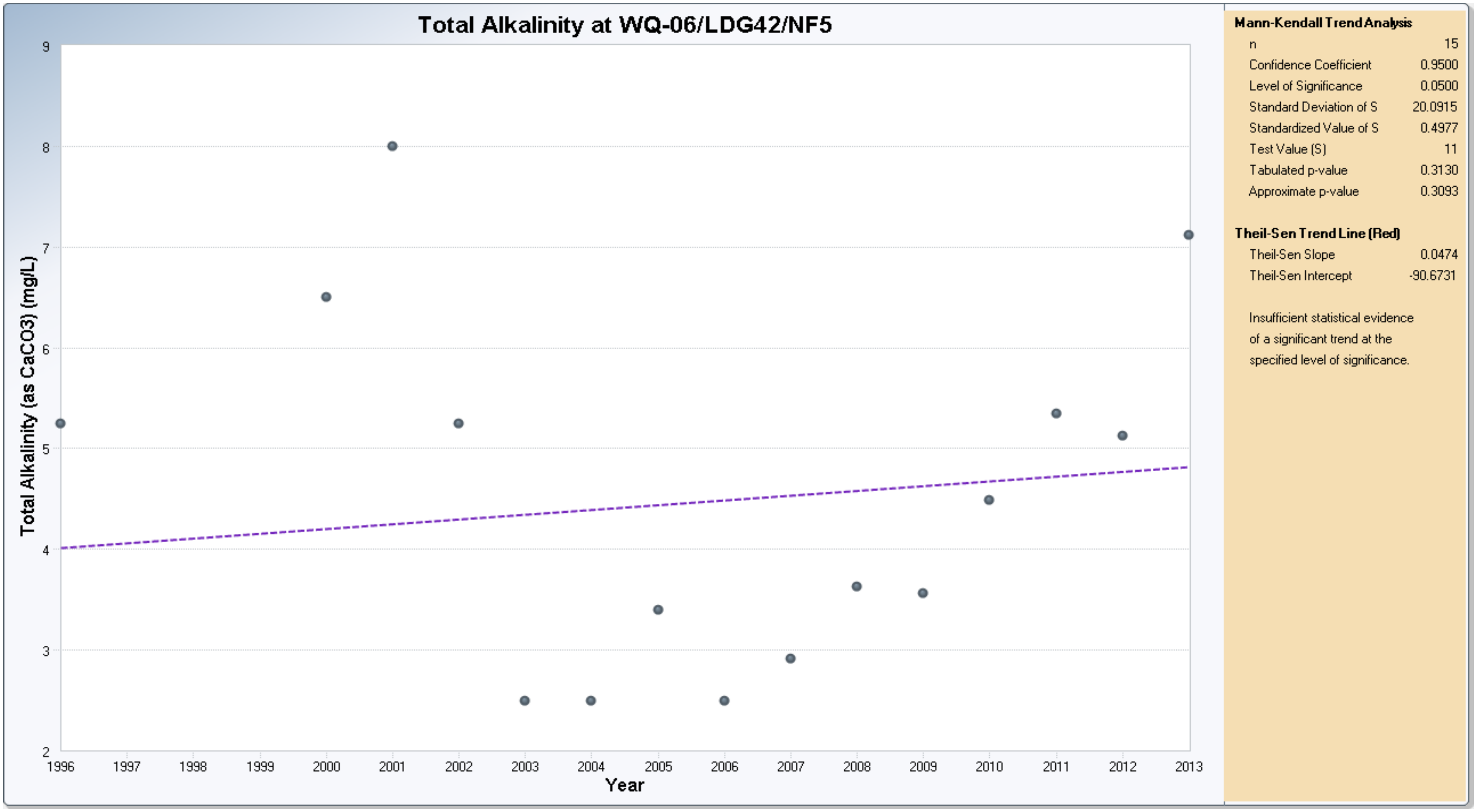
General Statistics

Period of Record	1996, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	2.5
Maximum	8
Mean	4.538
Geometric Mean	4.233
Median	4.483
Standard Deviation	1.746

Mann-Kendall Test

Test Value (S)	11
Tabulated p-value	0.313
Standard Deviation of S	20.09
Standardized Value of S	0.498
Approximate p-value	0.309

Insufficient evidence to identify a significant trend at the specified level of significance.


Total Alkalinity at WQ-06/LDG42/NF5
Total Alkalinity (as CaCO3) (mg/L)
Year
9
8
7
6
5
4
3
2
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.0915
Standardized Value of S 0.4977
Test Value (S) 11
Tabulated p-value 0.3130
Approximate p-value 0.3093
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0474
Theil-Sen Intercept -90.6731
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 11:22:10 AM
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Chloride (mg/L)

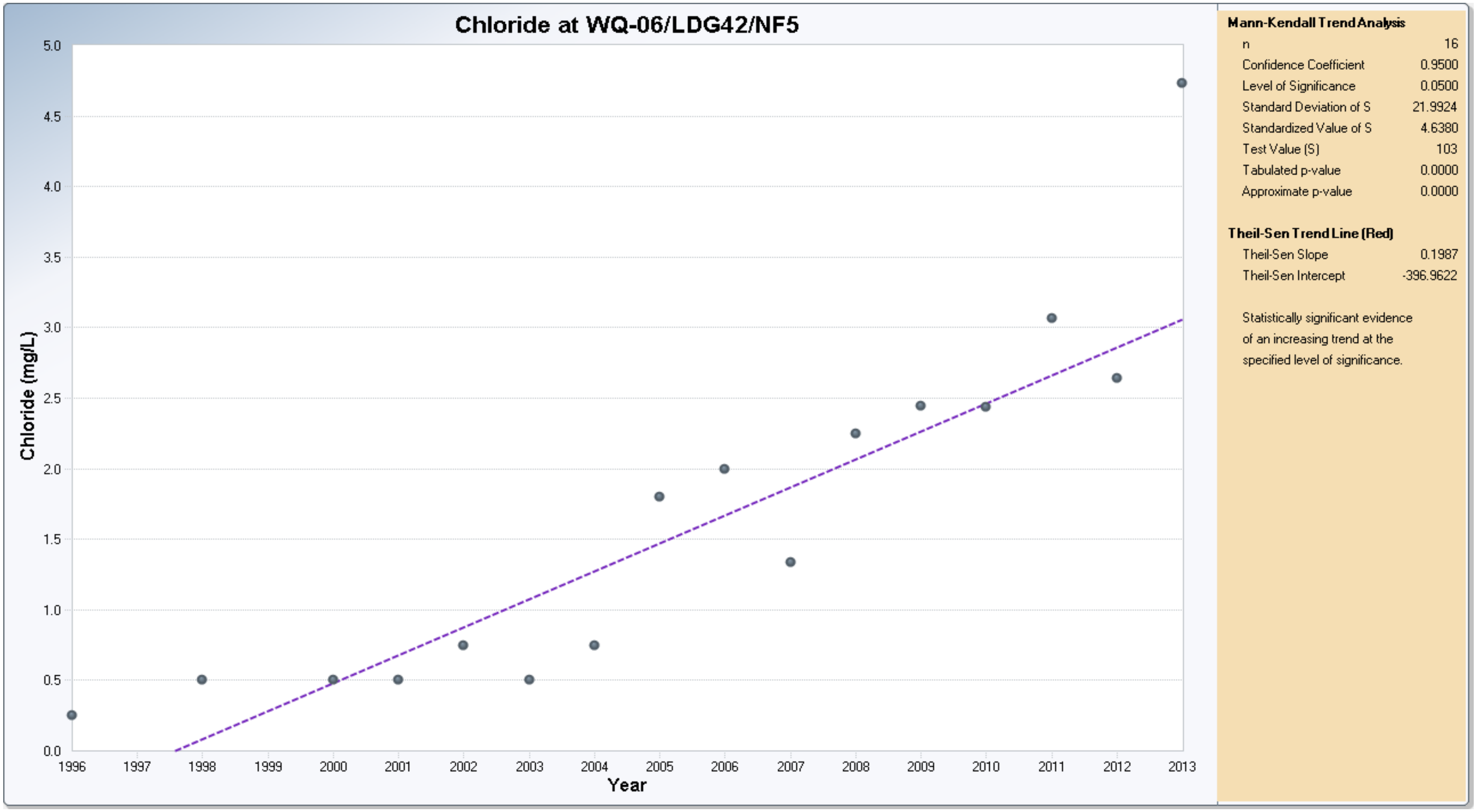
General Statistics

Period of Record	1996, 1998, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	4
Number or Reported Events Used	16
Number Values Reported (n)	20
Number Values Missing	4
Number Values Used	16
Minimum	0.25
Maximum	4.733
Mean	1.653
Geometric Mean	1.212
Median	1.567
Standard Deviation	1.244

Mann-Kendall Test

Test Value (S)	103
Tabulated p-value	0
Standard Deviation of S	21.99
Standardized Value of S	4.638
Approximate p-value	1.7593E-6

Statistically significant evidence of an increasing trend at the specified level of significance.


Chloride at WQ-06/LDG42/NF5
Chloride (mg/L)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 21.9924
Standardized Value of S 4.6380
Test Value (S) 103
Tabulated p-value 0.0000
Approximate p-value 0.0000
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.1987
Theil-Sen Intercept -396.9622
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 11:16:53 AM
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Conductivity (µS/cm)

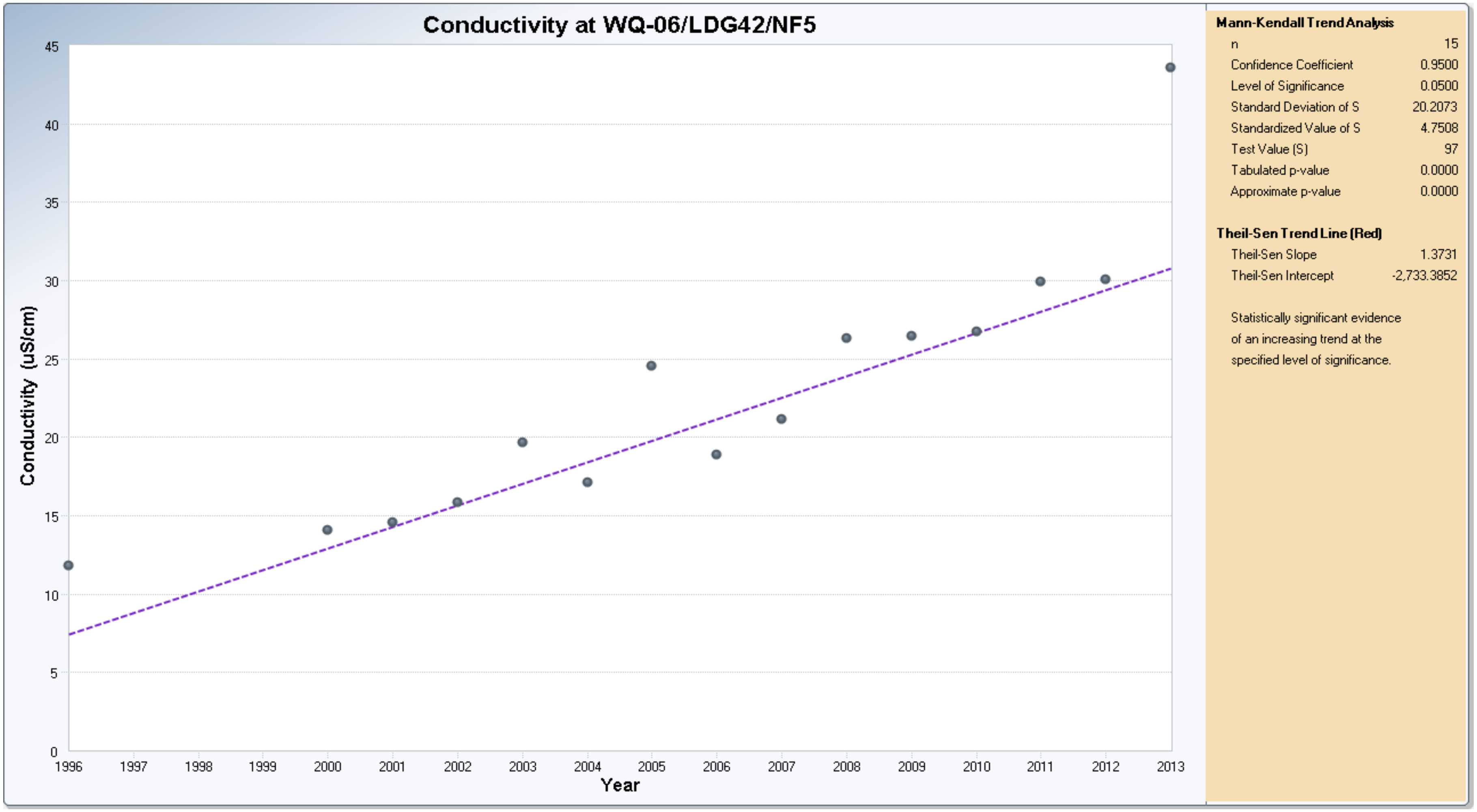
General Statistics

Period of Record	1996, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	11.85
Maximum	43.57
Mean	22.73
Geometric Mean	21.45
Median	21.15
Standard Deviation	8.239

Mann-Kendall Test

Test Value (S)	97
Tabulated p-value	0
Standard Deviation of S	20.21
Standardized Value of S	4.751
Approximate p-value	1.0132E-6

Statistically significant evidence of an increasing trend at the specified level of significance.


Conductivity at WQ-06/LDG42/NF5
Conductivity (uS/cm)
Year
0
5
10
15
20
25
30
35
40
45
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.2073
Standardized Value of S 4.7508
Test Value (S) 97
Tabulated p-value 0.0000
Approximate p-value 0.0000
Theil-Sen Trend Line (Red)
Theil-Sen Slope 1.3731
Theil-Sen Intercept -2,733.3852
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 11:53:15 AM
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Fluoride (mg/L)

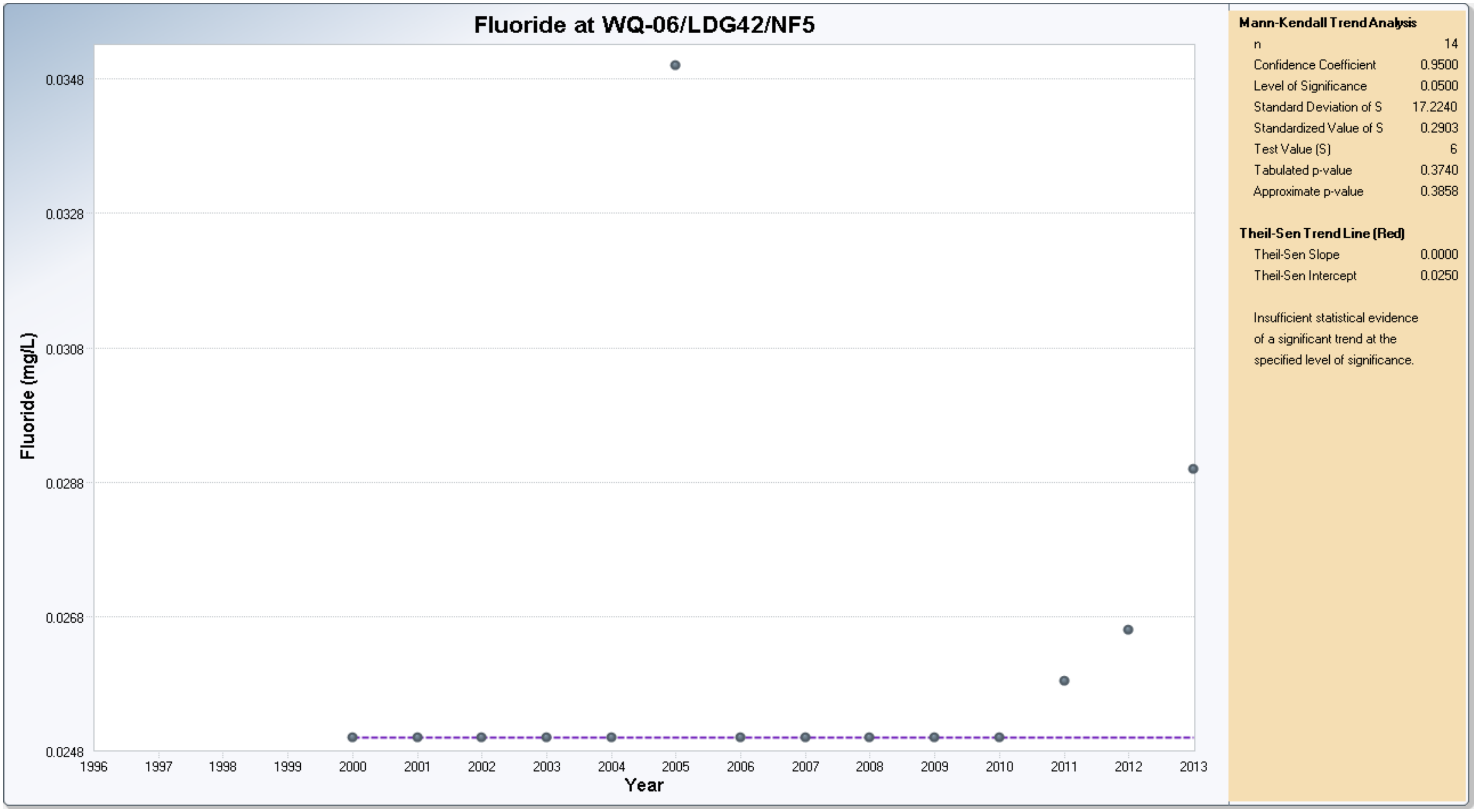
General Statistics

Period of Record	2000–2013
Number of Events Reported (m)	20
Number of Missing Events	6
Number or Reported Events Used	14
Number Values Reported (n)	20
Number Values Missing	6
Number Values Used	14
Minimum	0.025
Maximum	0.035
Mean	0.0262
Geometric Mean	0.0261
Median	0.025
Standard Deviation	0.00277

Mann-Kendall Test

Test Value (S)	6
Tabulated p-value	0.374
Standard Deviation of S	17.22
Standardized Value of S	0.29
Approximate p-value	0.386

Insufficient evidence to identify a significant trend at the specified level of significance.



Fluoride at WQ-06/LDG42/NF5
Fluoride (mg/L)
0.0348
0.0328
0.0308
0.0288
0.0268
0.0248
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 17.2240
Standardized Value of S 0.2903
Test Value (S) 6
Tabulated p-value 0.3740
Approximate p-value 0.3858
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 0.0250
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 11:20:47 AM
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Hardness -Total (mg/L)

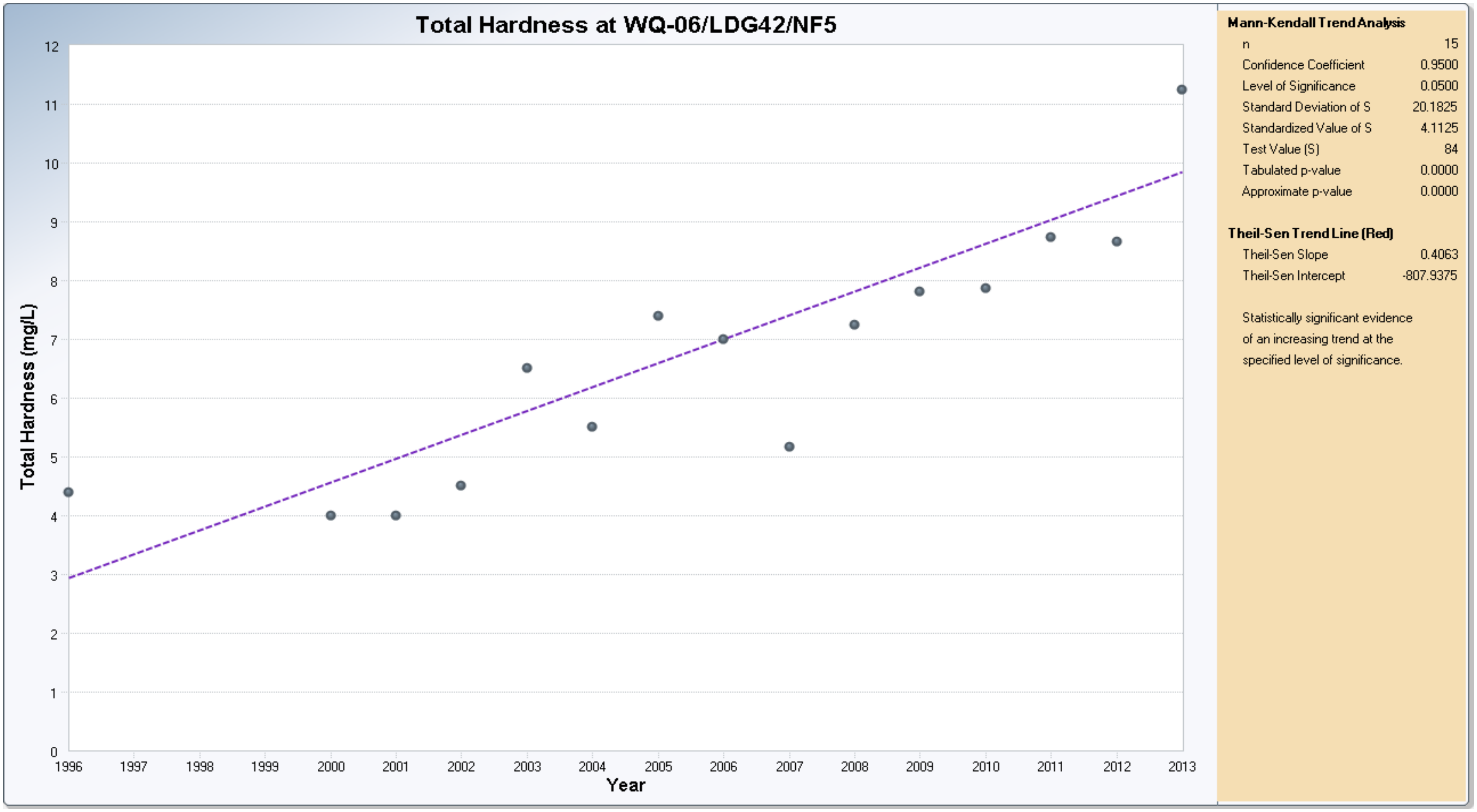
General Statistics

Period of Record	1996, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	4
Maximum	11.25
Mean	6.669
Geometric Mean	6.368
Median	7
Standard Deviation	2.082

Mann-Kendall Test

Test Value (S)	84
Tabulated p-value	0
Standard Deviation of S	20.18
Standardized Value of S	4.112
Approximate p-value	1.9572E-5

Statistically significant evidence of an increasing trend at the specified level of significance.


Total Hardness at WQ-06/LDG42/NF5
Total Hardness (mg/L)
Year
0
1
2
3
4
5
6
7
8
9
10
11
12
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.1825
Standardized Value of S 4.1125
Test Value (S) 84
Tabulated p-value 0.0000
Approximate p-value 0.0000
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.4063
Theil-Sen Intercept -807.9375
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 11:15:00 AM
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

pH (pH units)

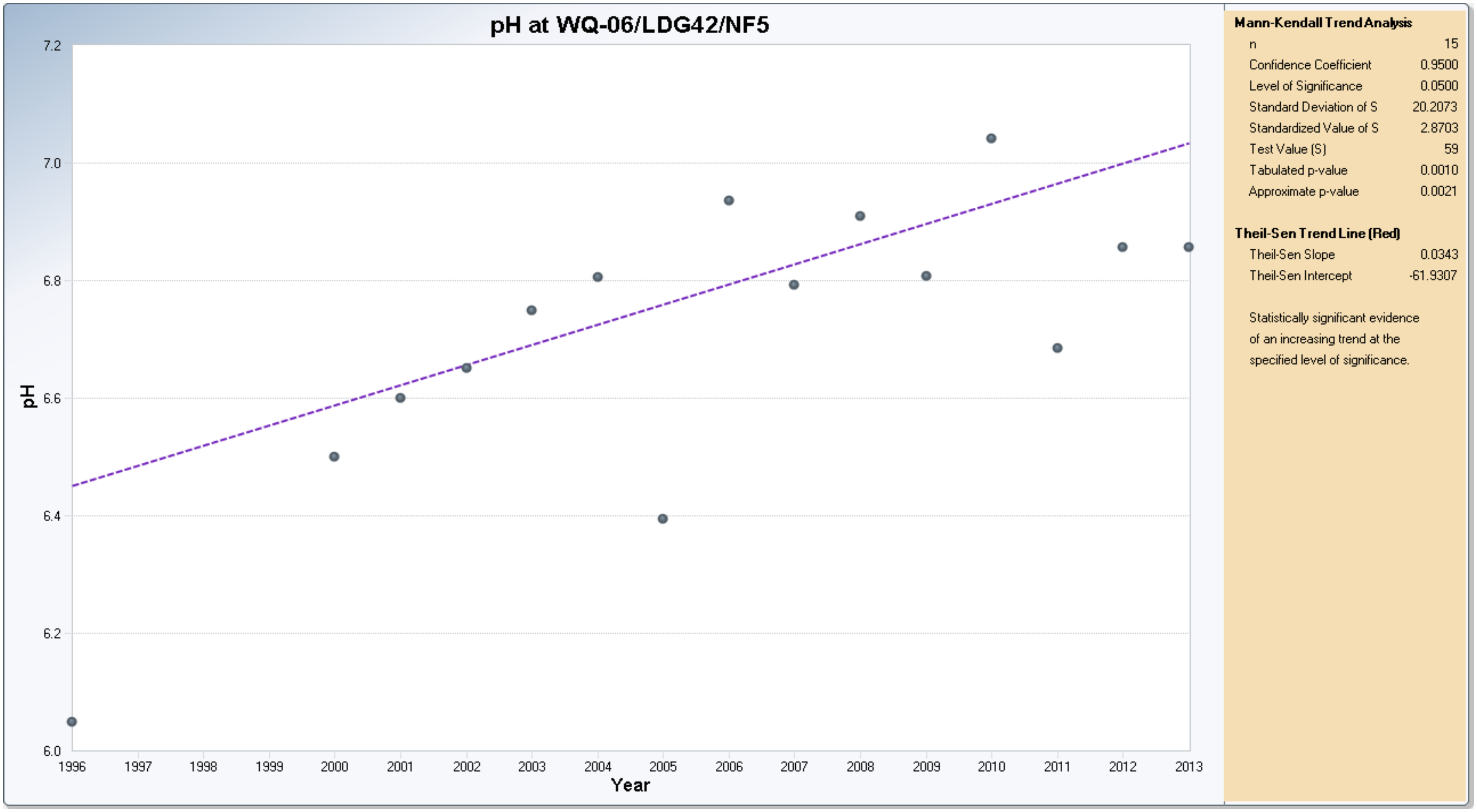
General Statistics

Period of Record	1996, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	6.05
Maximum	7.042
Mean	6.709
Geometric Mean	6.704
Median	6.793
Standard Deviation	0.249

Mann-Kendall Test

Test Value (S)	59
Tabulated p-value	0.001
Standard Deviation of S	20.21
Standardized Value of S	2.87
Approximate p-value	0.00205

Statistically significant evidence of an increasing trend at the specified level of significance.


pH at WQ-06/LDG42/NF5
7.2
7.0
6.8
6.6
6.4
6.2
6.0
pH
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.2073
Standardized Value of S 2.8703
Test Value (S) 59
Tabulated p-value 0.0010
Approximate p-value 0.0021
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0343
Theil-Sen Intercept -61.9307
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 11:54:27 AM
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Sulphate (mg/L)

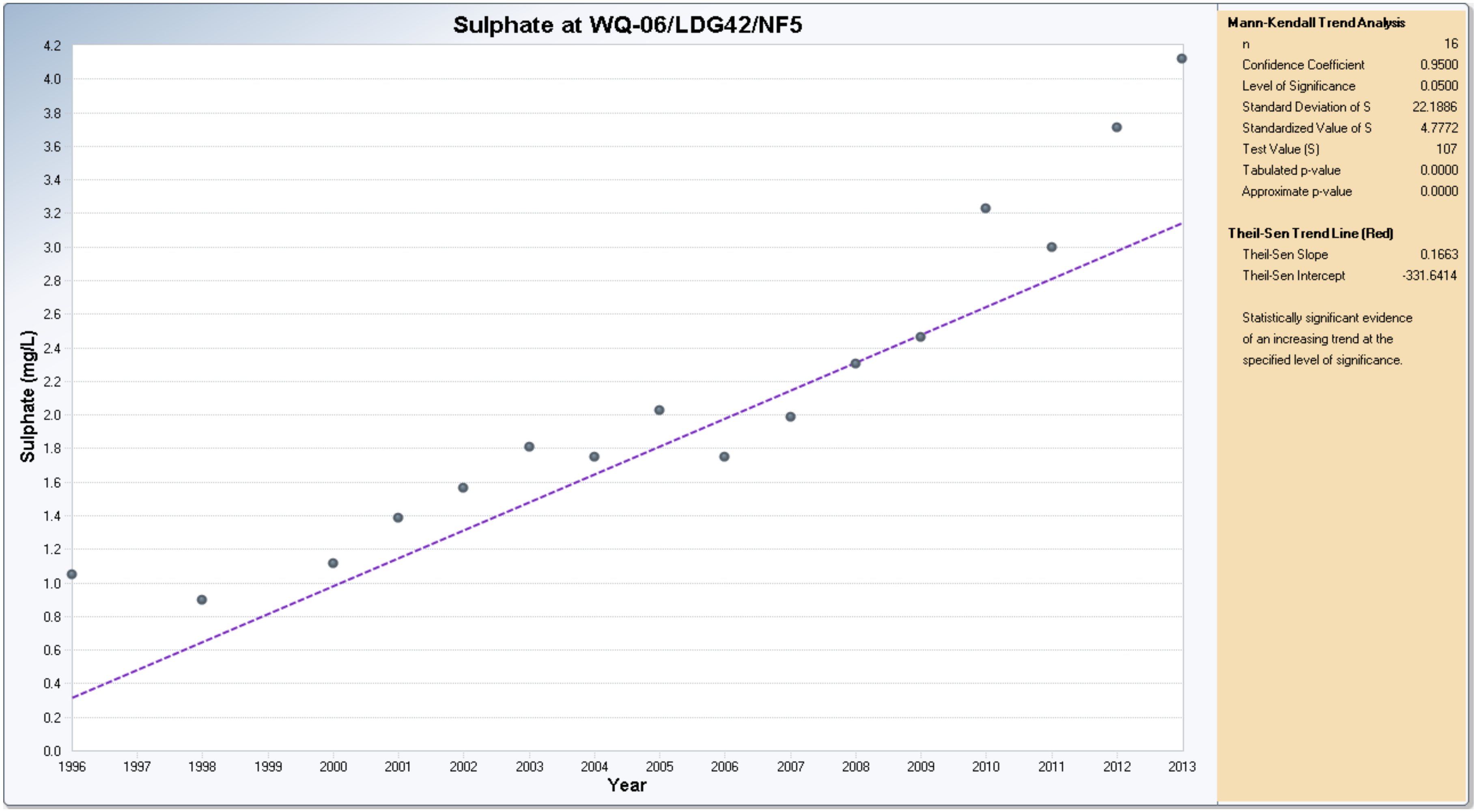
General Statistics

Period of Record	1996, 1998, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	4
Number or Reported Events Used	16
Number Values Reported (n)	20
Number Values Missing	4
Number Values Used	16
Minimum	0.9
Maximum	4.12
Mean	2.136
Geometric Mean	1.948
Median	1.898
Standard Deviation	0.951

Mann-Kendall Test

Test Value (S)	107
Tabulated p-value	0
Standard Deviation of S	22.19
Standardized Value of S	4.777
Approximate p-value	8.8863E-7

Statistically significant evidence of an increasing trend at the specified level of significance.



Sulphate at WQ-06/LDG42/NF5
Sulphate (mg/L)
4.2
4.0
3.8
3.6
3.4
3.2
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.1886
Standardized Value of S 4.7772
Test Value (S) 107
Tabulated p-value 0.0000
Approximate p-value 0.0000
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.1663
Theil-Sen Intercept -331.6414
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 11:18:32 AM
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

TDS (mg/L)

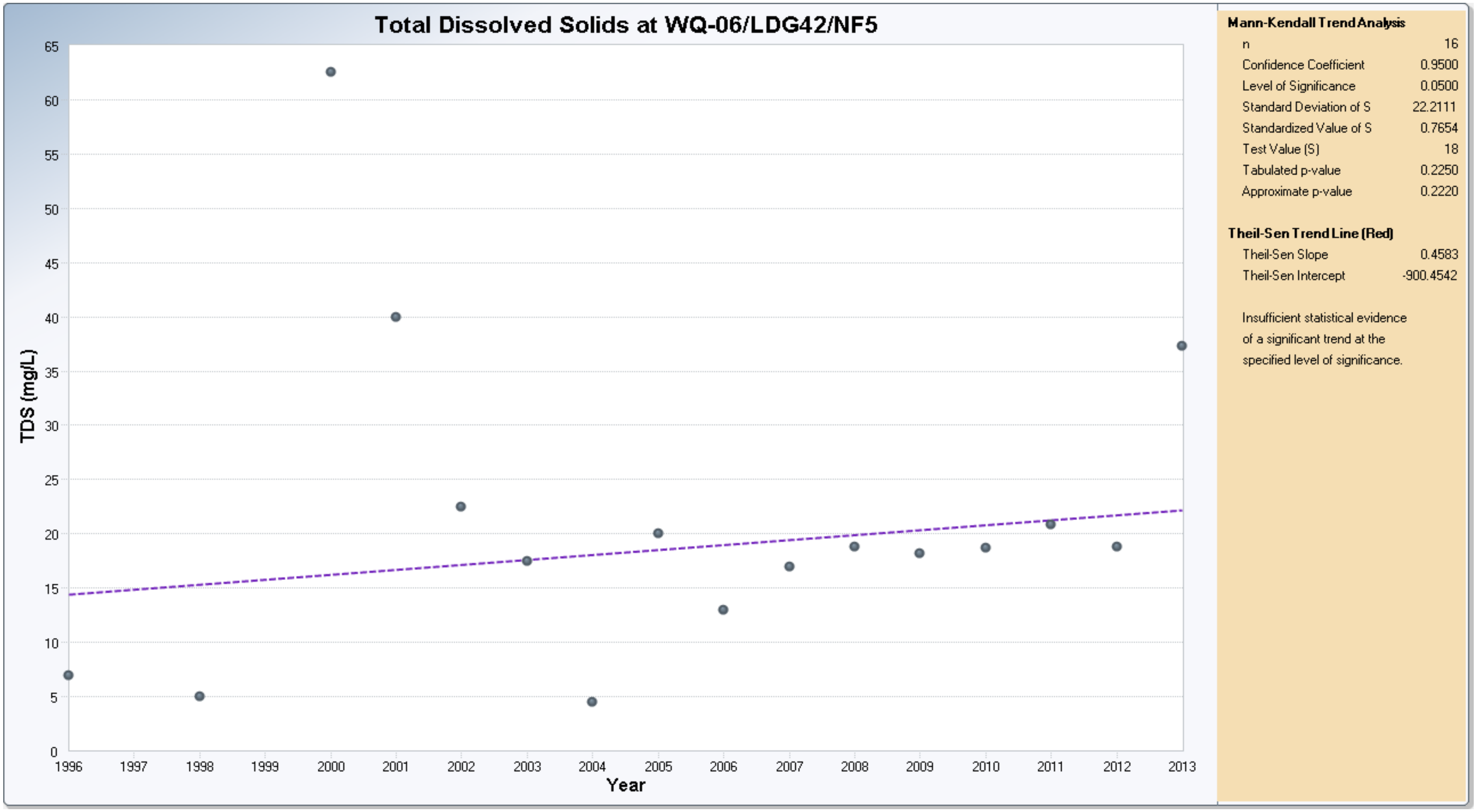
General Statistics

Period of Record	1996, 1998, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	4
Number or Reported Events Used	16
Number Values Reported (n)	20
Number Values Missing	4
Number Values Used	16
Minimum	4.5
Maximum	62.5
Mean	21.35
Geometric Mean	17.29
Median	18.73
Standard Deviation	14.58

Mann-Kendall Test

Test Value (S)	18
Tabulated p-value	0.225
Standard Deviation of S	22.21
Standardized Value of S	0.765
Approximate p-value	0.222

Insufficient evidence to identify a significant trend at the specified level of significance.


Total Dissolved Solids at WQ-06/LDG42/NF5
TDS (mg/L)
Year
0
5
10
15
20
25
30
35
40
45
50
55
60
65
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.2111
Standardized Value of S 0.7654
Test Value (S) 18
Tabulated p-value 0.2250
Approximate p-value 0.2220
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.4583
Theil-Sen Intercept -900.4542
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	4/23/2015 11:03
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Nitrogen (mg/L)

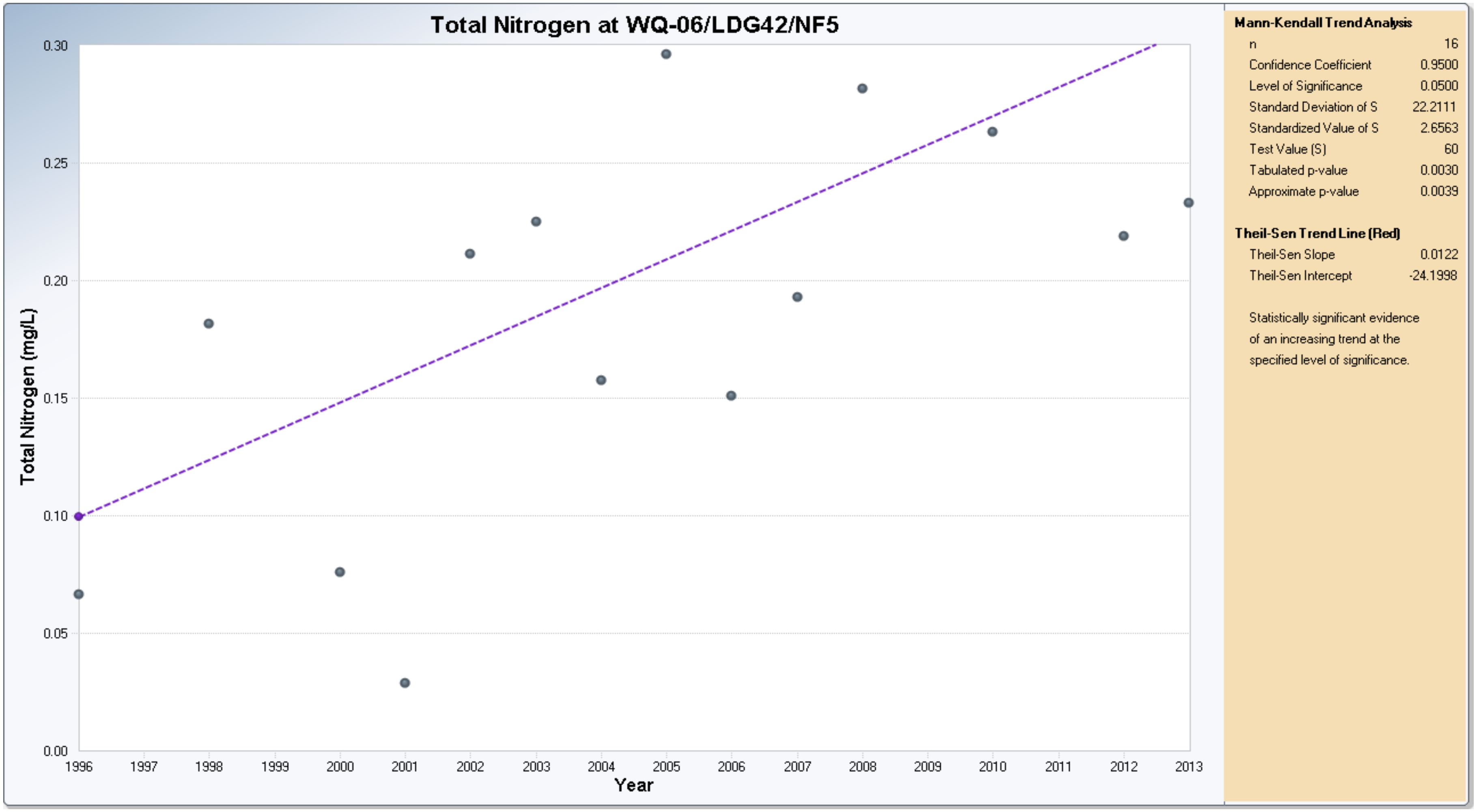
General Statistics

Period of Record	1996, 1998, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	4
Number or Reported Events Used	16
Number Values Reported (n)	20
Number Values Missing	4
Number Values Used	16
Minimum	0.029
Maximum	111.9
Mean	7.172
Geometric Mean	0.25
Median	0.215
Standard Deviation	27.92

Mann-Kendall Test

Test Value (S)	60
Tabulated p-value	0.003
Standard Deviation of S	22.21
Standardized Value of S	2.656
Approximate p-value	0.00395

Statistically significant evidence of an increasing trend at the specified level of significance.



Total Nitrogen at WQ-06/LDG42/NF5
Total Nitrogen (mg/L)
0.30
0.25
0.20
0.15
0.10
0.05
0.00
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.2111
Standardized Value of S 2.6563
Test Value (S) 60
Tabulated p-value 0.0030
Approximate p-value 0.0039
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0122
Theil-Sen Intercept -24.1998
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 2:21:52 PM
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Phosphorus (mg/L)

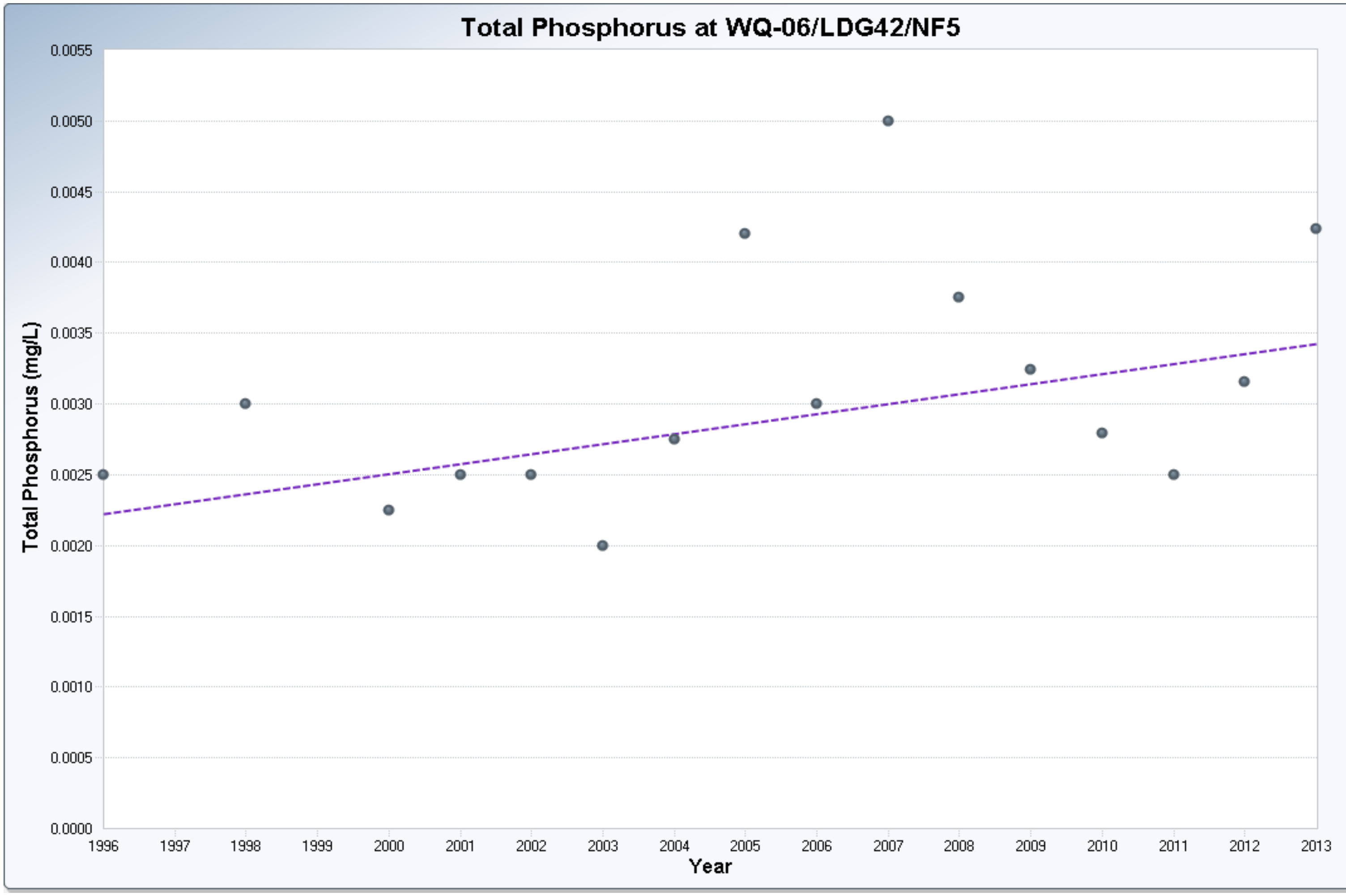
General Statistics

Period of Record	1996, 1998, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	4
Number or Reported Events Used	16
Number Values Reported (n)	20
Number Values Missing	4
Number Values Used	16
Minimum	0.002
Maximum	0.005
Mean	0.00309
Geometric Mean	0.00299
Median	0.0029
Standard Deviation	8.2290E-4

Mann-Kendall Test

Test Value (S)	40
Tabulated p-value	0.039
Standard Deviation of S	22.11
Standardized Value of S	1.764
Approximate p-value	0.0388

Statistically significant evidence of an increasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	16
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	22.1058
Standardized Value of S	1.7642
Test Value (S)	40
Tabulated p-value	0.0390
Approximate p-value	0.0388

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.0001
Theil-Sen Intercept	-0.1385

Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 12:01:38 PM
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

TOC (mg/L)

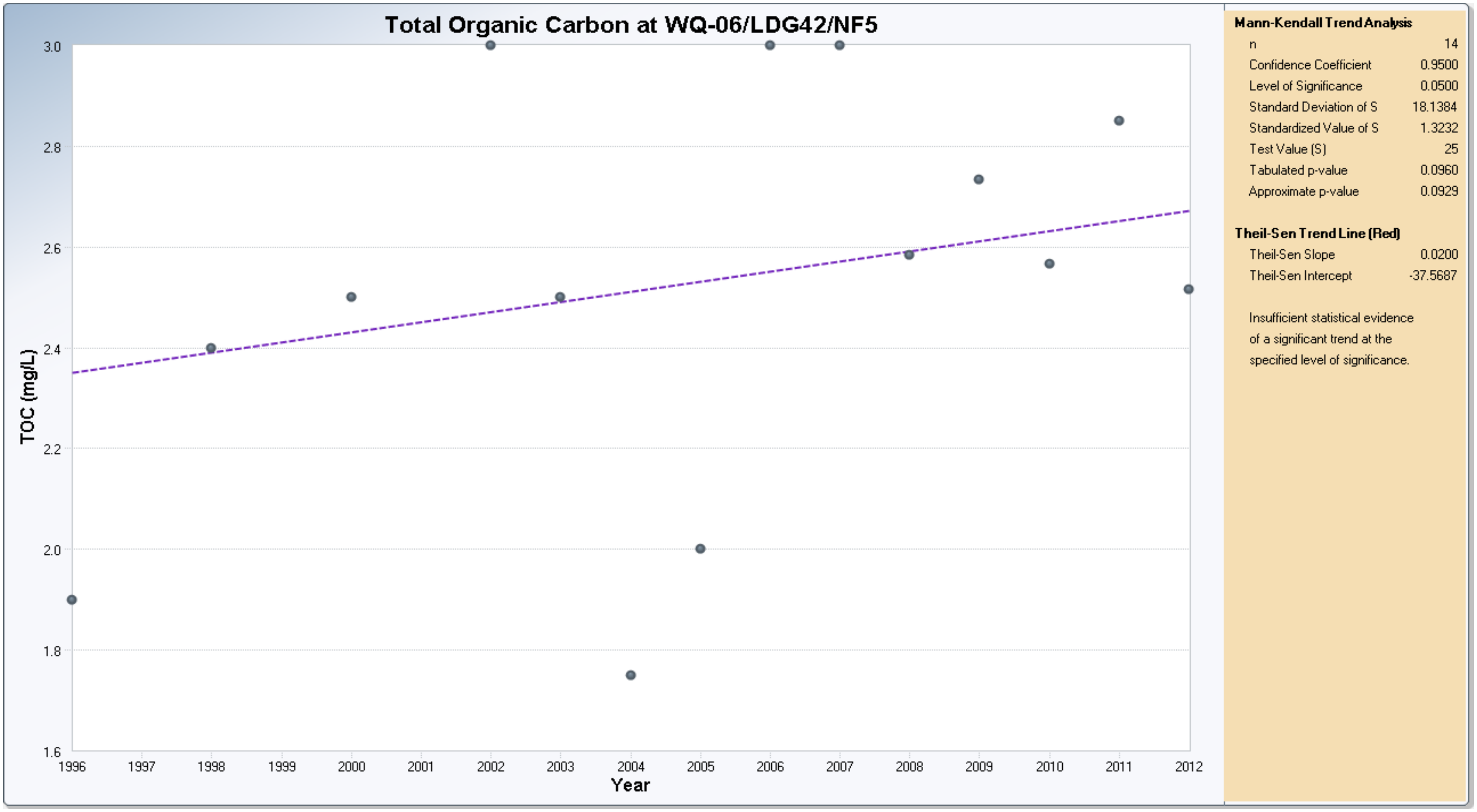
General Statistics

Period of Record	1996, 1998, 2000, 2002–2012
Number of Events Reported (m)	20
Number of Missing Events	6
Number or Reported Events Used	14
Number Values Reported (n)	19
Number Values Missing	5
Number Values Used	14
Minimum	1.75
Maximum	3
Mean	2.521
Geometric Mean	2.489
Median	2.541
Standard Deviation	0.403

Mann-Kendall Test

Test Value (S)	25
Tabulated p-value	0.096
Standard Deviation of S	18.14
Standardized Value of S	1.323
Approximate p-value	0.0929

Insufficient evidence to identify a significant trend at the specified level of significance.



Total Organic Carbon at WQ-06/LDG42/NF5
TOC (mg/L)
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Year
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.1384
Standardized Value of S 1.3232
Test Value (S) 25
Tabulated p-value 0.0960
Approximate p-value 0.0929
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0200
Theil-Sen Intercept -37.5687
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 12:13:17 PM
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Aluminum (mg/L)

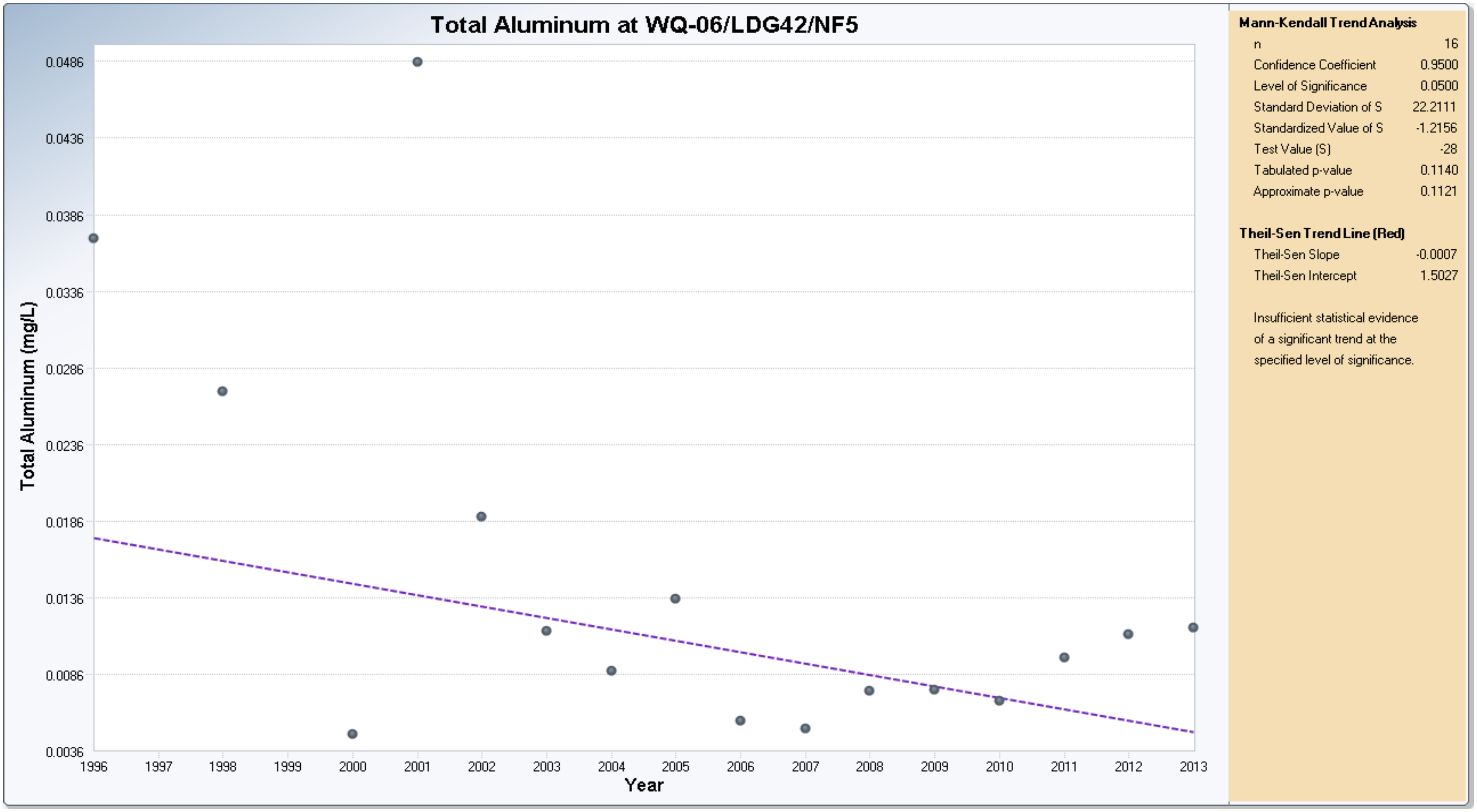
General Statistics

Period of Record	1996, 1998, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	4
Number or Reported Events Used	16
Number Values Reported (n)	20
Number Values Missing	4
Number Values Used	16
Minimum	0.00465
Maximum	0.0485
Mean	0.0146
Geometric Mean	0.0113
Median	0.0104
Standard Deviation	0.0125

Mann-Kendall Test

Test Value (S)	-28
Tabulated p-value	0.114
Standard Deviation of S	22.21
Standardized Value of S	-1.216
Approximate p-value	0.112

Insufficient evidence to identify a significant trend at the specified level of significance.


Total Aluminum at WQ-06/LDG42/NF5
Total Aluminum (mg/L)
0.0486
0.0436
0.0386
0.0336
0.0286
0.0236
0.0186
0.0136
0.0086
0.0036
1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
Year
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.2111
Standardized Value of S -1.2156
Test Value (S) -28
Tabulated p-value 0.1140
Approximate p-value 0.1121
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0007
Theil-Sen Intercept 1.5027
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 12:14:40 PM
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Arsenic (mg/L)

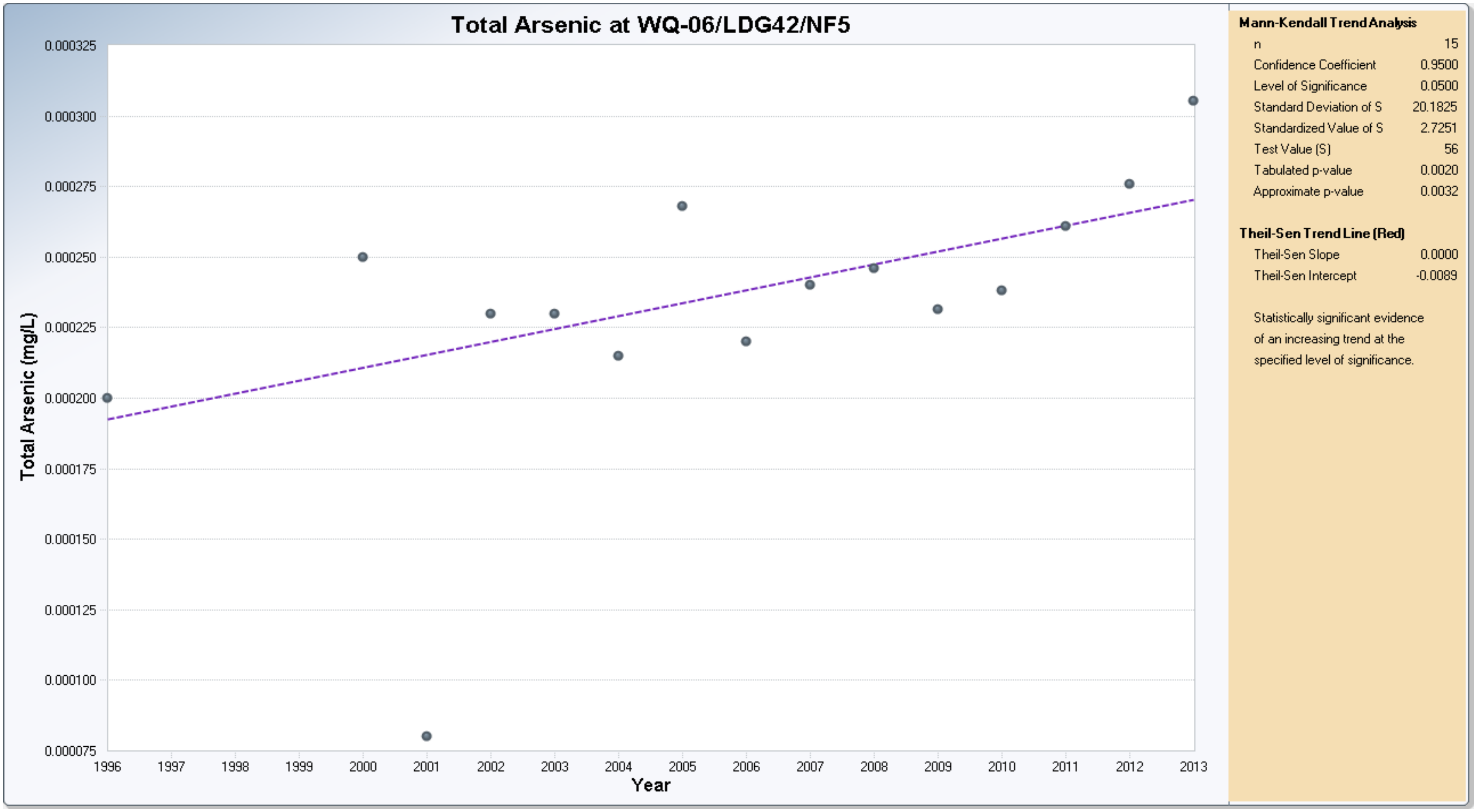
General Statistics

Period of Record	1996, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	8.0000E-5
Maximum	3.0533E-4
Mean	2.3271E-4
Geometric Mean	2.2500E-4
Median	2.3825E-4
Standard Deviation	4.9729E-5

Mann-Kendall Test

Test Value (S)	56
Tabulated p-value	0.002
Standard Deviation of S	20.18
Standardized Value of S	2.725
Approximate p-value	0.00321

Statistically significant evidence of an increasing trend at the specified level of significance.


Total Arsenic at WQ-06/LDG42/NF5
Total Arsenic (mg/L)
0.000325
0.000300
0.000275
0.000250
0.000225
0.000200
0.000175
0.000150
0.000125
0.000100
0.000075
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.1825
Standardized Value of S 2.7251
Test Value (S) 56
Tabulated p-value 0.0020
Approximate p-value 0.0032
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept -0.0089
Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 2:24:14 PM
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Iron (mg/L)

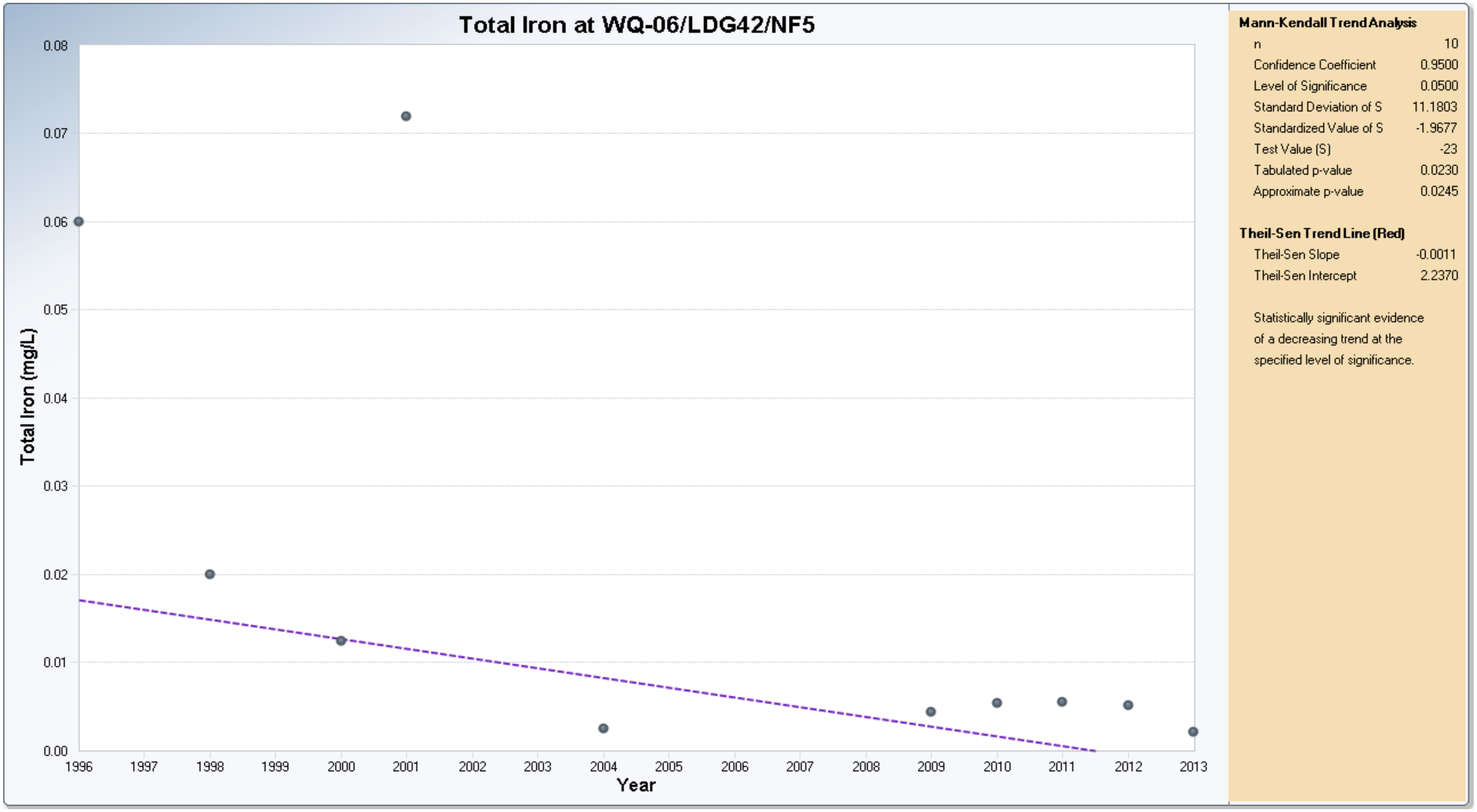
General Statistics

Period of Record	1996, 1998, 2000 - 2001, 2004, 2009–2013
Number of Events Reported (m)	20
Number of Missing Events	10
Number or Reported Events Used	10
Number Values Reported (n)	20
Number Values Missing	10
Number Values Used	10
Minimum	0.00217
Maximum	0.072
Mean	0.019
Geometric Mean	0.00913
Median	0.00545
Standard Deviation	0.0255

Mann-Kendall Test

Test Value (S)	-23
Tabulated p-value	0.023
Standard Deviation of S	11.18
Standardized Value of S	-1.968
Approximate p-value	0.0245

Statistically significant evidence of a decreasing trend at the specified level of significance.



Total Iron at WQ-06/LDG42/NF5
Total Iron (mg/L)
Year
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 11.1803
Standardized Value of S -1.9677
Test Value (S) -23
Tabulated p-value 0.0230
Approximate p-value 0.0245
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0011
Theil-Sen Intercept 2.2370
Statistically significant evidence
of a decreasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 12:17:39 PM
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Molybdenum (mg/L)

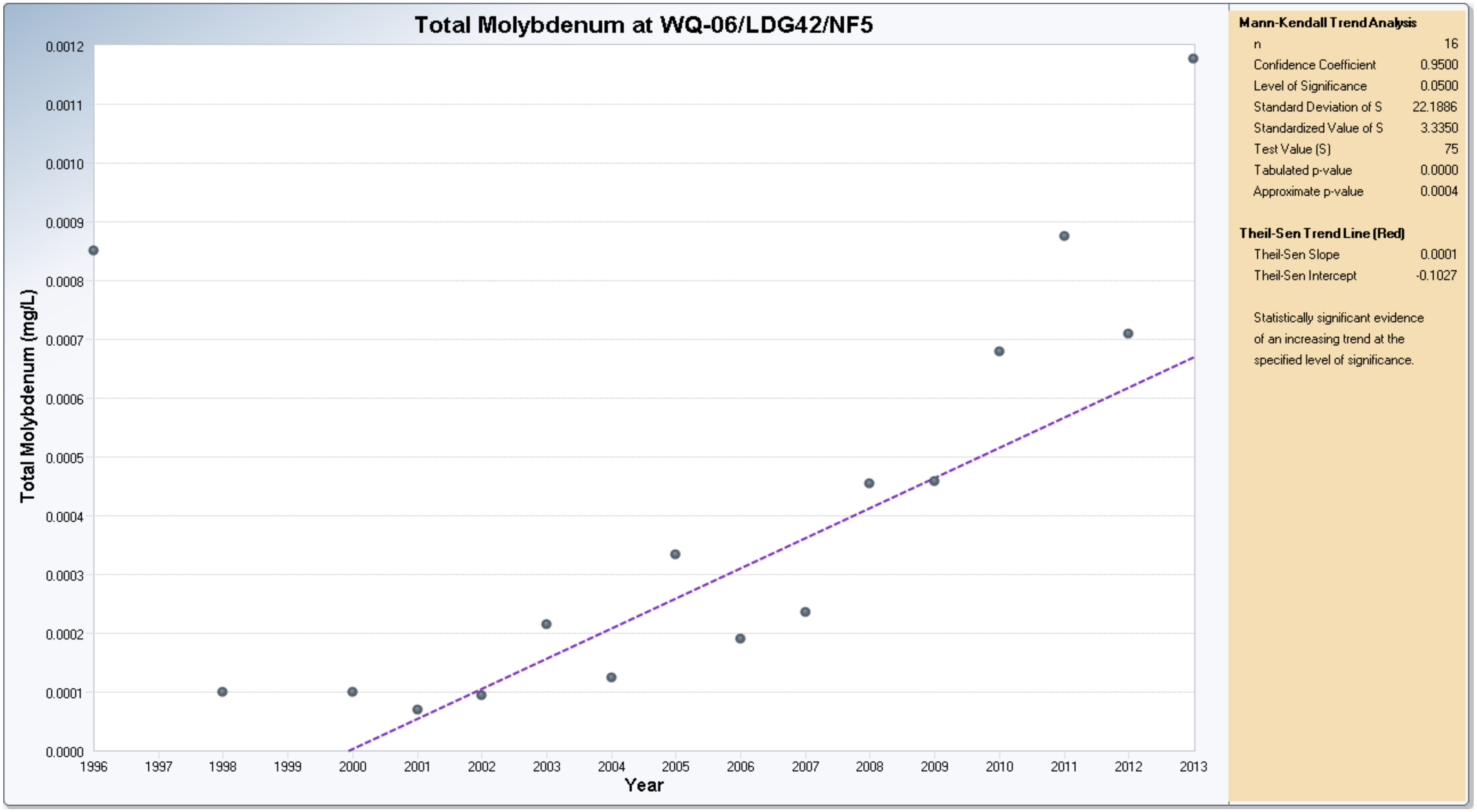
General Statistics

Period of Record	1996, 1998, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	4
Number or Reported Events Used	16
Number Values Reported (n)	20
Number Values Missing	4
Number Values Used	16
Minimum	7.0000E-5
Maximum	0.00118
Mean	4.1673E-4
Geometric Mean	2.8881E-4
Median	2.8450E-4
Standard Deviation	3.4401E-4

Mann-Kendall Test

Test Value (S)	75
Tabulated p-value	0
Standard Deviation of S	22.19
Standardized Value of S	3.335
Approximate p-value	4.2642E-4

Statistically significant evidence of an increasing trend at the specified level of significance.


Total Molybdenum at WQ-06/LDG42/NF5
Total Molybdenum (mg/L)
0.0012
0.0011
0.0010
0.0009
0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0.0000
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.1886
Standardized Value of S 3.3350
Test Value (S) 75
Tabulated p-value 0.0000
Approximate p-value 0.0004
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0001
Theil-Sen Intercept -0.1027
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 12:19:20 PM
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Nickel (mg/L)

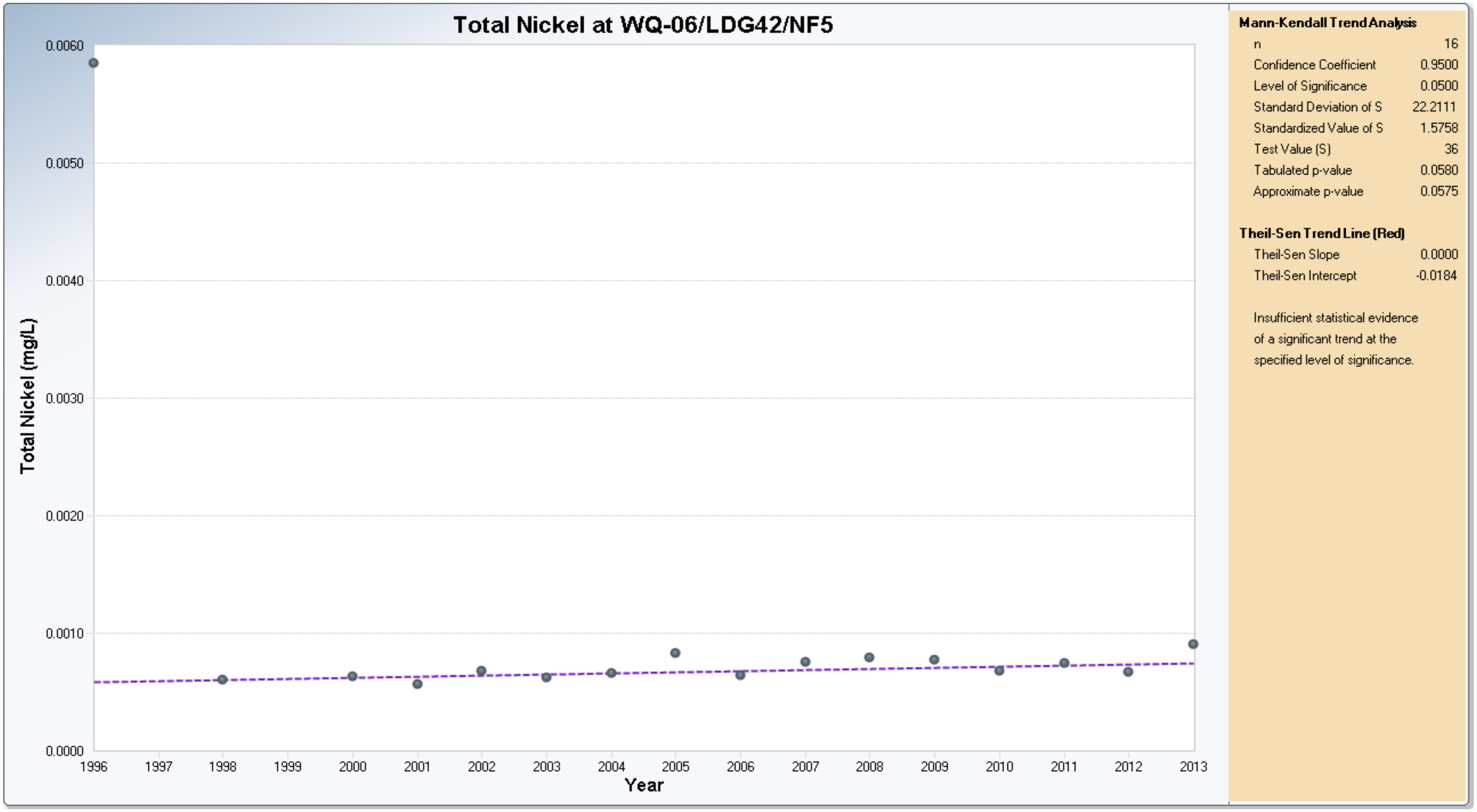
General Statistics

Period of Record	1996, 1998, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	4
Number or Reported Events Used	16
Number Values Reported (n)	20
Number Values Missing	4
Number Values Used	16
Minimum	5.7000E-4
Maximum	0.00585
Mean	0.00103
Geometric Mean	7.9758E-4
Median	6.7779E-4
Standard Deviation	0.00129

Mann-Kendall Test

Test Value (S)	36
Tabulated p-value	0.058
Standard Deviation of S	22.21
Standardized Value of S	1.576
Approximate p-value	0.0575

Insufficient evidence to identify a significant trend at the specified level of significance.


Total Nickel at WQ-06/LDG42/NF5
Total Nickel (mg/L)
0.0060
0.0050
0.0040
0.0030
0.0020
0.0010
0.0000
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.2111
Standardized Value of S 1.5758
Test Value (S) 36
Tabulated p-value 0.0580
Approximate p-value 0.0575
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept -0.0184
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 12:21:01 PM
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Strontium (mg/L)

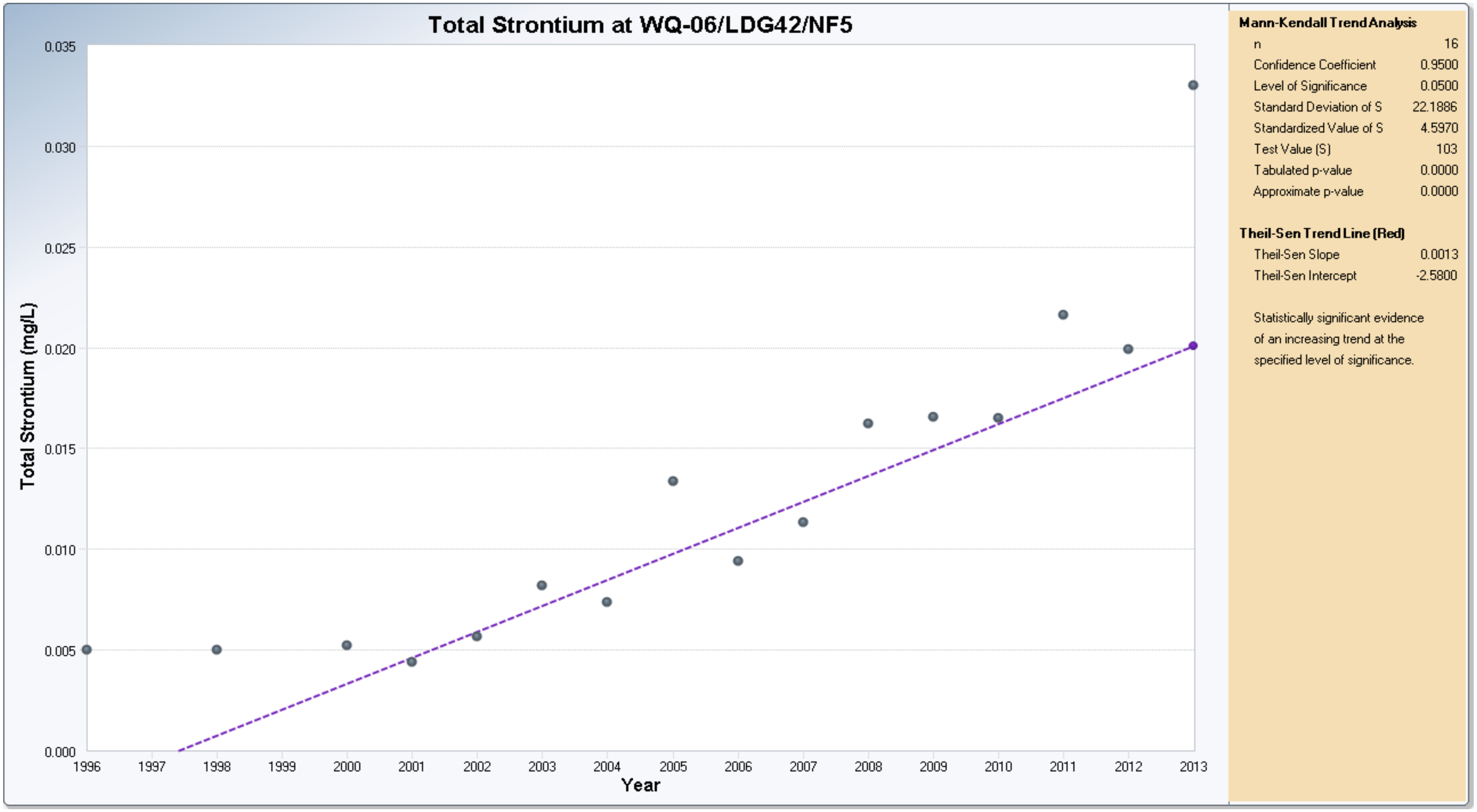
General Statistics

Period of Record	1996, 1998, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	4
Number or Reported Events Used	16
Number Values Reported (n)	20
Number Values Missing	4
Number Values Used	16
Minimum	0.0044
Maximum	0.033
Mean	0.0124
Geometric Mean	0.0104
Median	0.0104
Standard Deviation	0.00792

Mann-Kendall Test

Test Value (S)	103
Tabulated p-value	0
Standard Deviation of S	22.19
Standardized Value of S	4.597
Approximate p-value	2.1435E-6

Statistically significant evidence of an increasing trend at the specified level of significance.


Total Strontium at WQ-06/LDG42/NF5
Total Strontium (mg/L)
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
Year
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.1886
Standardized Value of S 4.5970
Test Value (S) 103
Tabulated p-value 0.0000
Approximate p-value 0.0000
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0013
Theil-Sen Intercept -2.5800
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 12:23:27 PM
From File	nf5_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Uranium (mg/L)

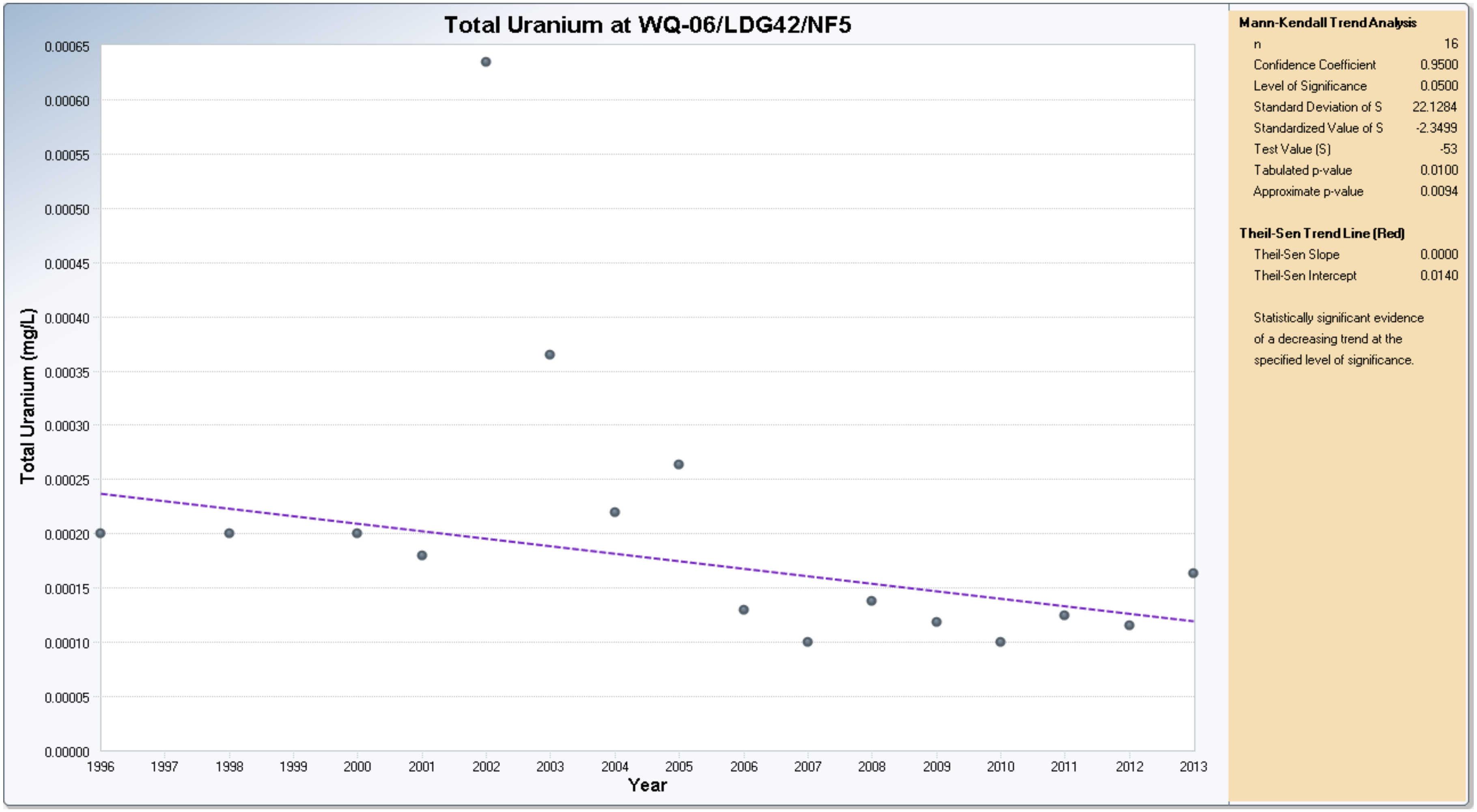
General Statistics

Period of Record	1996, 1998, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	4
Number or Reported Events Used	16
Number Values Reported (n)	20
Number Values Missing	4
Number Values Used	16
Minimum	9.9833E-5
Maximum	6.3500E-4
Mean	2.0343E-4
Geometric Mean	1.7755E-4
Median	1.7183E-4
Standard Deviation	1.3431E-4

Mann-Kendall Test

Test Value (S)	-53
Tabulated p-value	0.01
Standard Deviation of S	22.13
Standardized Value of S	-2.35
Approximate p-value	0.00939

Statistically significant evidence of a decreasing trend at the specified level of significance.


Total Uranium at WQ-06/LDG42/NF5
Total Uranium (mg/L)
0.00065
0.00060
0.00055
0.00050
0.00045
0.00040
0.00035
0.00030
0.00025
0.00020
0.00015
0.00010
0.00005
0.00000
1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
Year
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.1284
Standardized Value of S -2.3499
Test Value (S) -53
Tabulated p-value 0.0100
Approximate p-value 0.0094
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 0.0140
Statistically significant evidence
of a decreasing trend at the
specified level of significance.

WQ-06/LDG42/NF5
Baseline vs. Post-Baseline Trends for Select Parameters

Significant ($p < 0.05$) Trends at WQ-06/LDG42/NF5 for Select Parameters

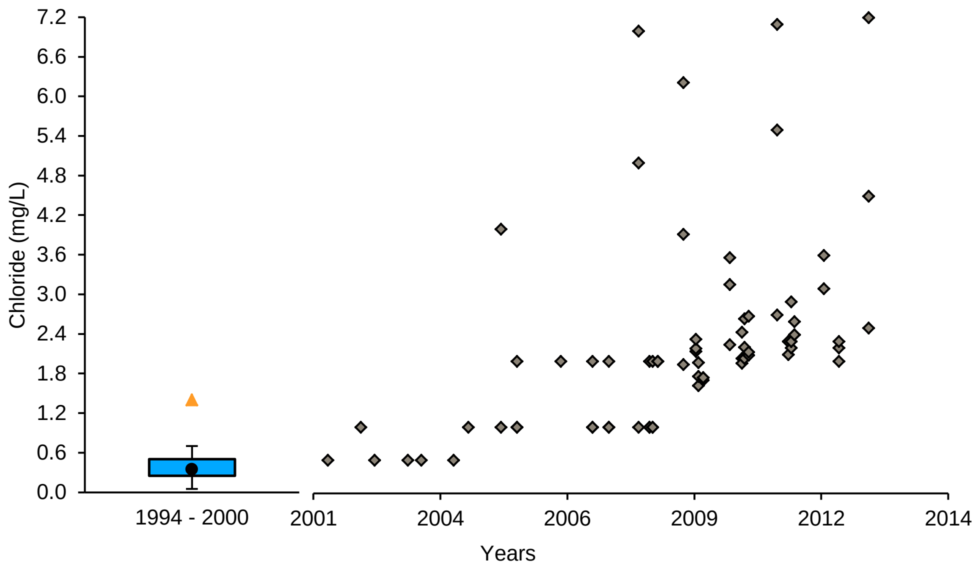


Figure D-1 Boxplot of the Baseline Condition for Chloride and Post-Baseline Chloride Values at WQ-06/LDG42/NF5; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

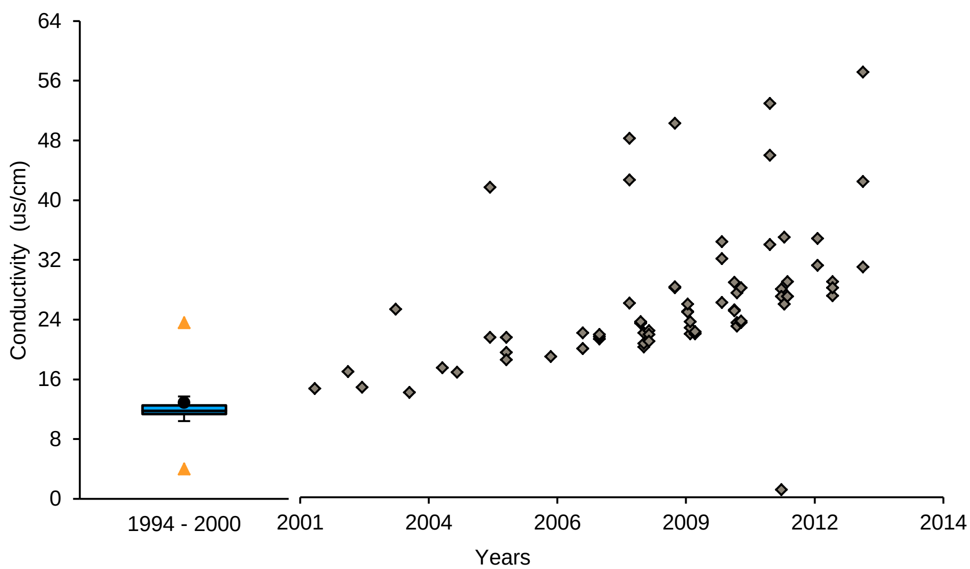


Figure D-2 Boxplot of the Baseline Condition for Conductivity and Post-Baseline Conductivity Values at WQ-06/LDG42/NF5; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

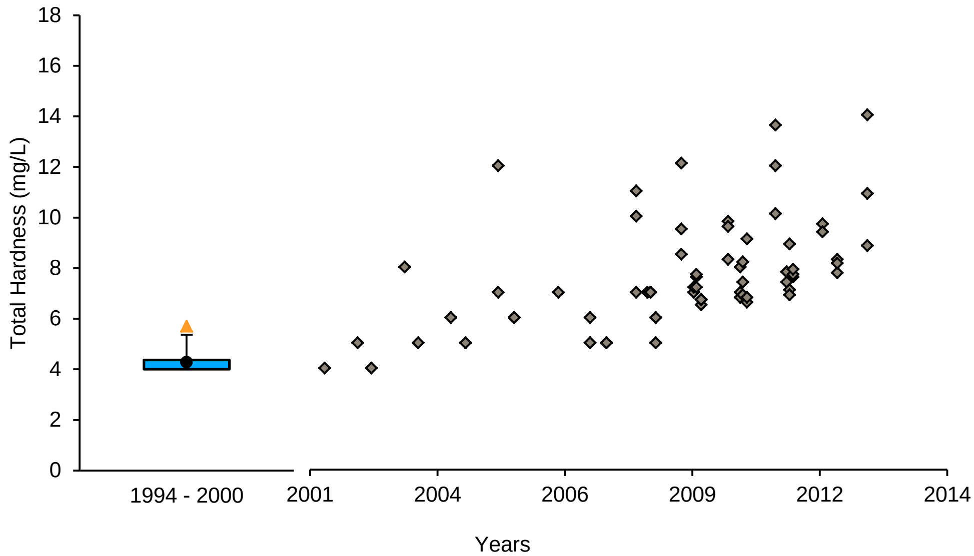


Figure D-3 Boxplot of the Baseline Condition for Hardness and Post-Baseline Hardness Values at WQ-06/LDG42/NF5; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

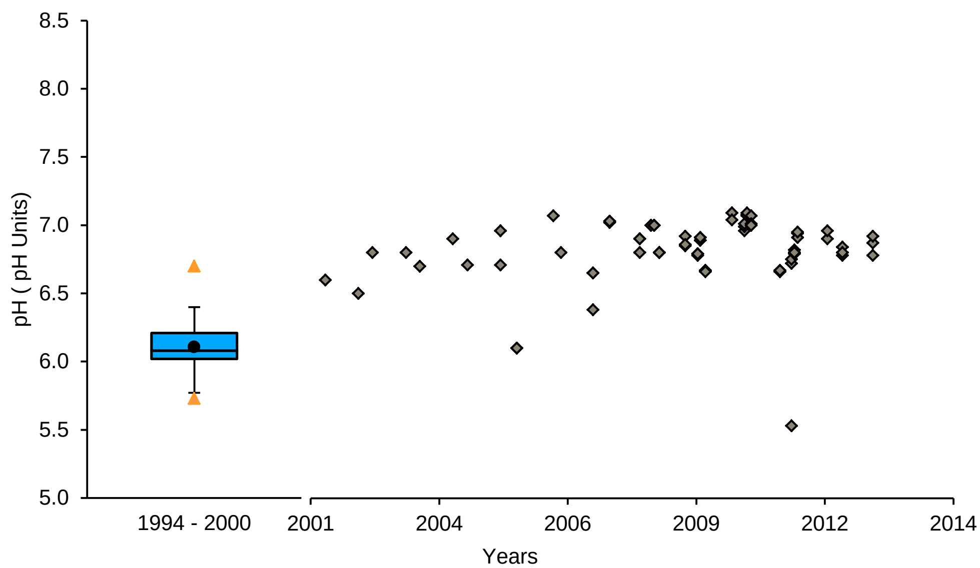


Figure D-4 Boxplot of the Baseline Condition for pH and Post-Baseline pH Values at WQ-06/LDG42/NF5; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

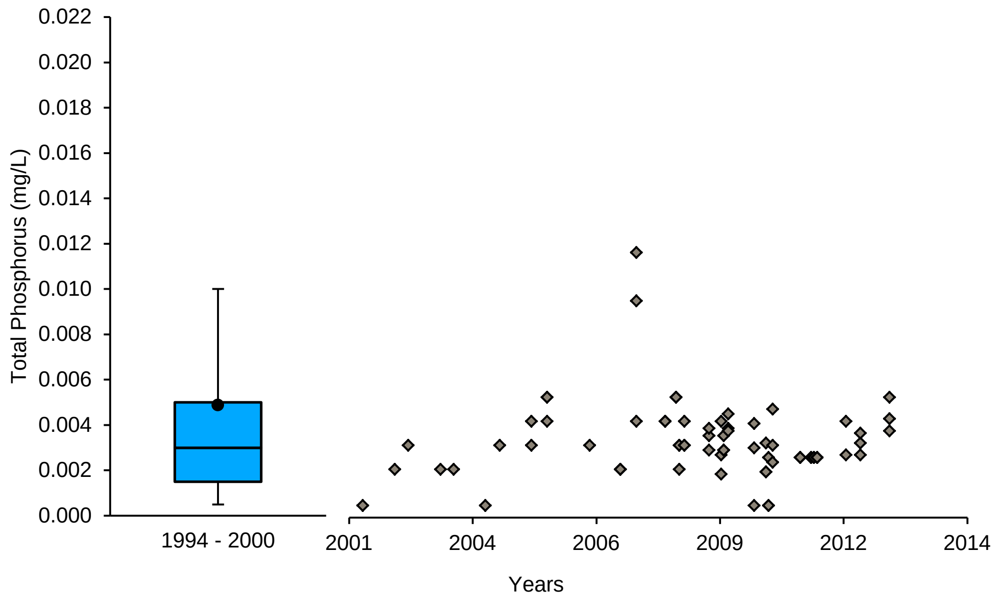


Figure D-5 Boxplot of the Baseline Condition for Total Phosphorus and Post-Baseline Total Phosphorus Values at WQ-06/LDG42/NF5; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

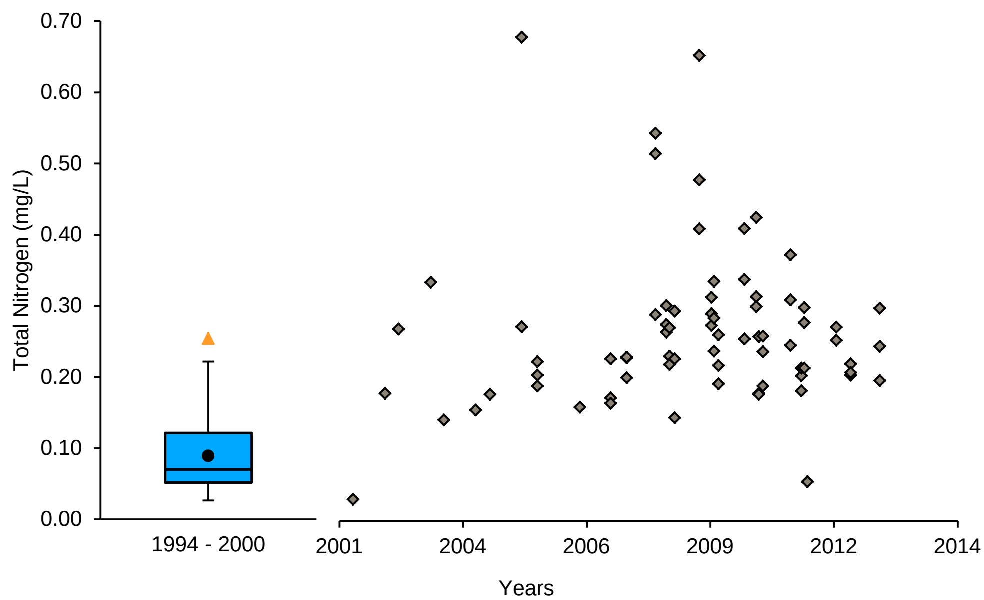


Figure D-6 Boxplot of the Baseline Condition for Total Nitrogen and Post-Baseline Total Nitrogen Values at WQ-06/LDG42/NF5; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

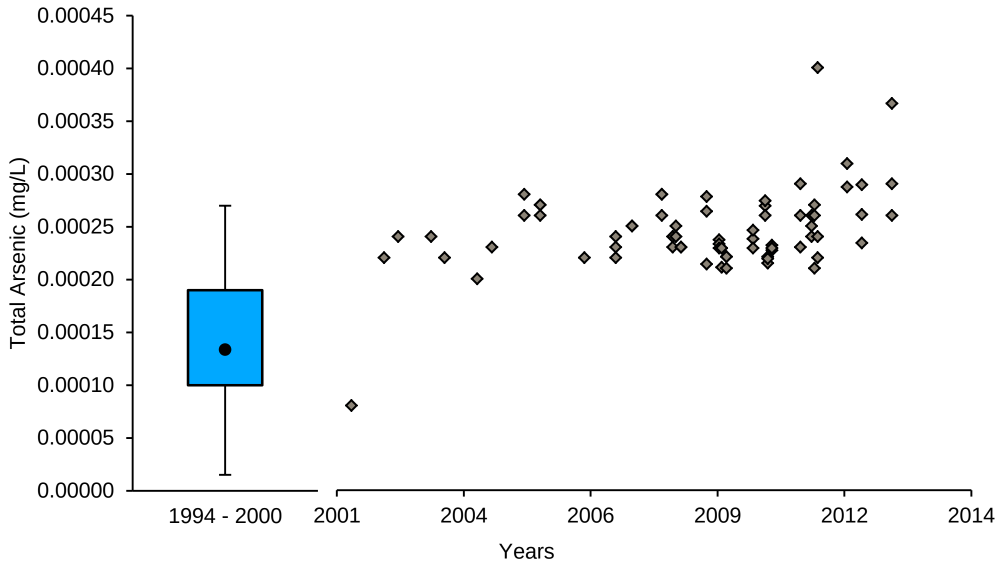


Figure D-7 Boxplot of the Baseline Condition for Total Arsenic and Post-Baseline Total Arsenic Values at WQ-06/LDG42/NF5; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

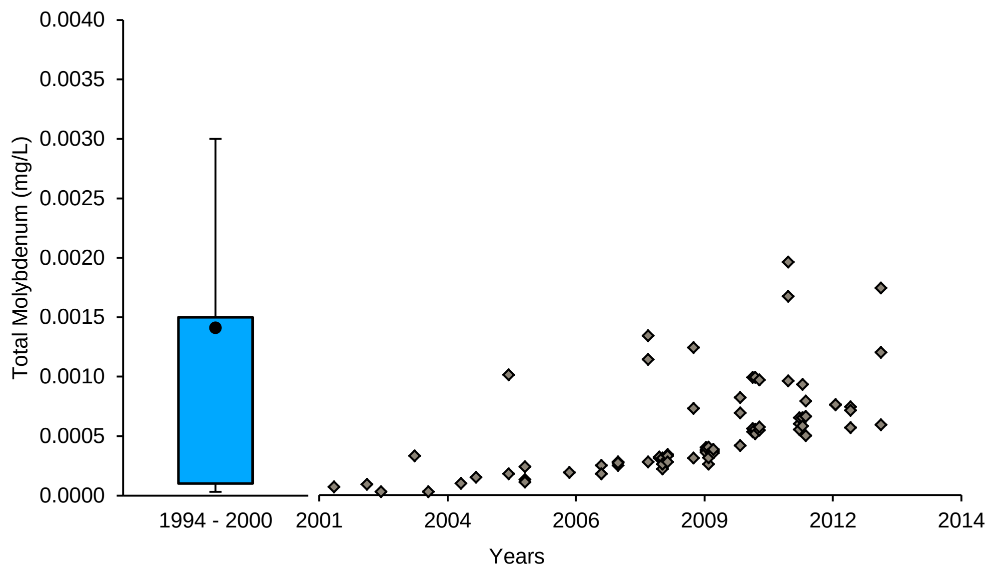


Figure D-8 Boxplot of the Baseline Condition for Total Molybdenum and Post-Baseline Total Molybdenum Values at WQ-06/LDG42/NF5; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

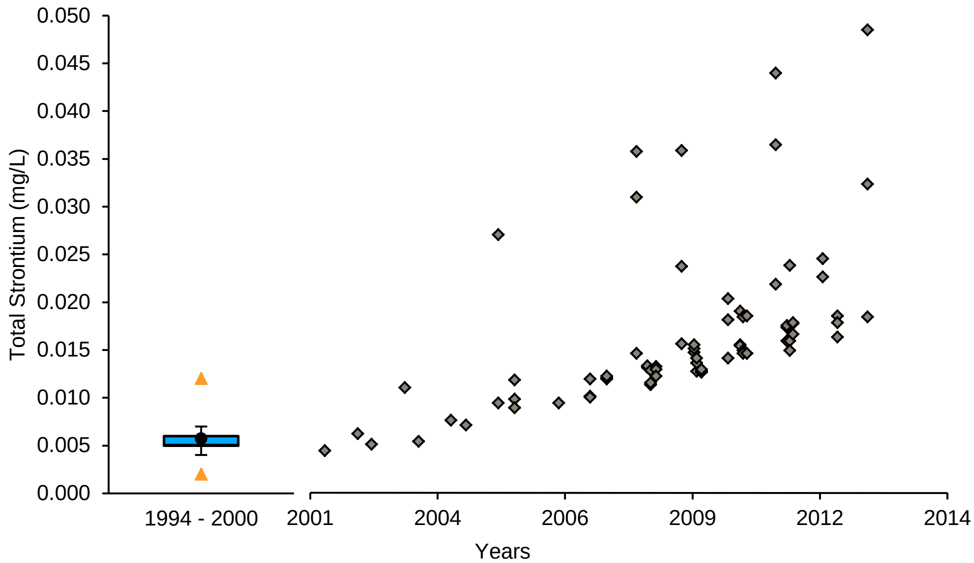


Figure D-9 Boxplot of the Baseline Condition for Total Strontium and Post-Baseline Total Strontium Values at WQ-06/LDG42/NF5; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

WQ-02/LDG19/MF1-3
ProUCL Trends Analysis Output

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 12:47:21 PM
From File	mf1-3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Chloride (mg/L)

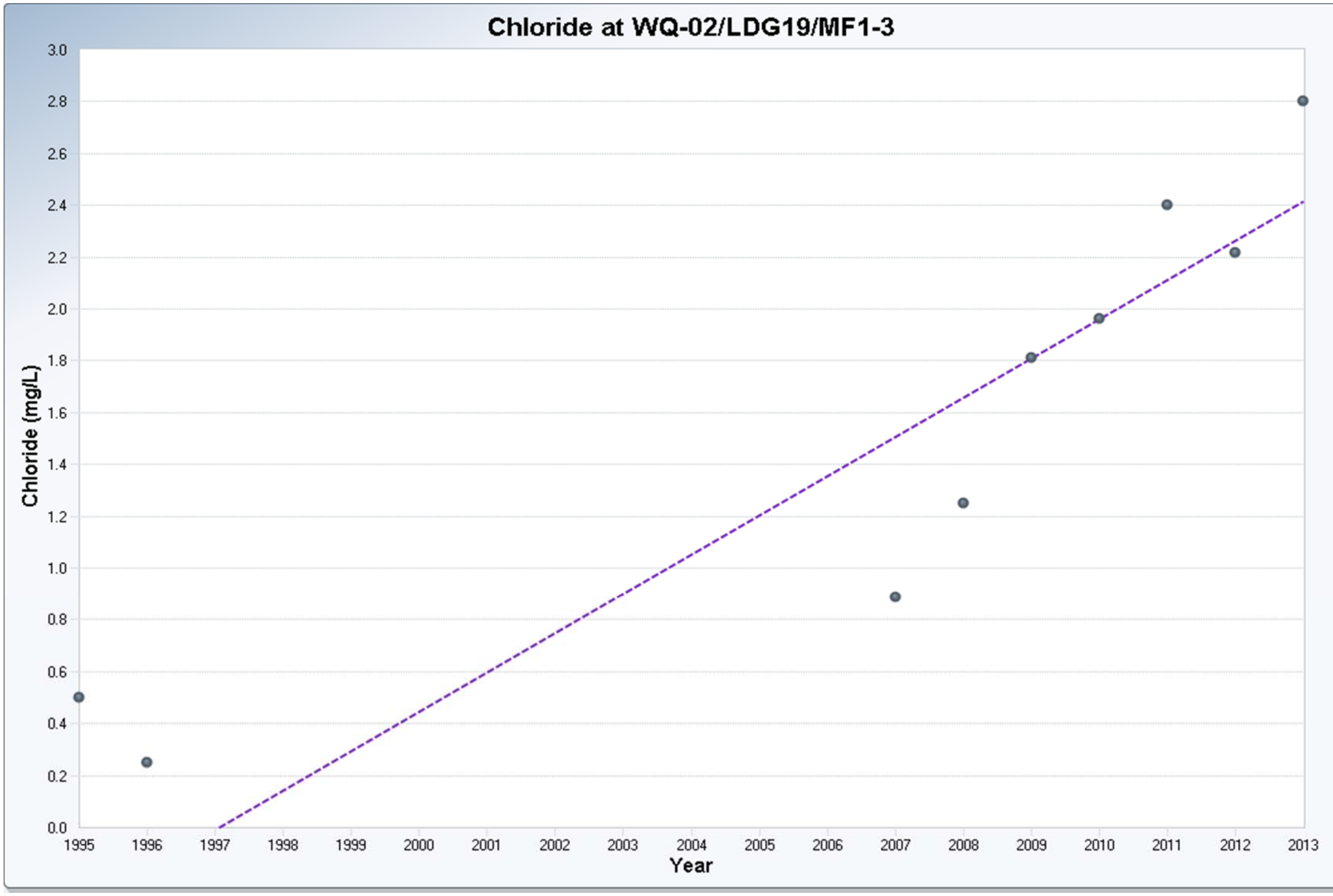
General Statistics

Period of Record	1995–1996, 2007–2013
Number of Events Reported (m)	20
Number of Missing Events	11
Number or Reported Events Used	9
Number Values Reported (n)	20
Number Values Missing	11
Number Values Used	9
Minimum	0.25
Maximum	2.8
Mean	1.564
Geometric Mean	1.248
Median	1.81
Standard Deviation	0.886

Mann-Kendall Test

Test Value (S)	32
Tabulated p-value	0
Standard Deviation of S	9.592
Standardized Value of S	3.232
Approximate p-value	6.1469E-4

Statistically significant evidence of an increasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	9
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	9.5917
Standardized Value of S	3.2320
Test Value (S)	32
Tabulated p-value	0.0000
Approximate p-value	0.0006

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.1518
Theil-Sen Intercept	-303.1927

Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 12:38:53 PM
From File	mf1-3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Conductivity (µs/cm)

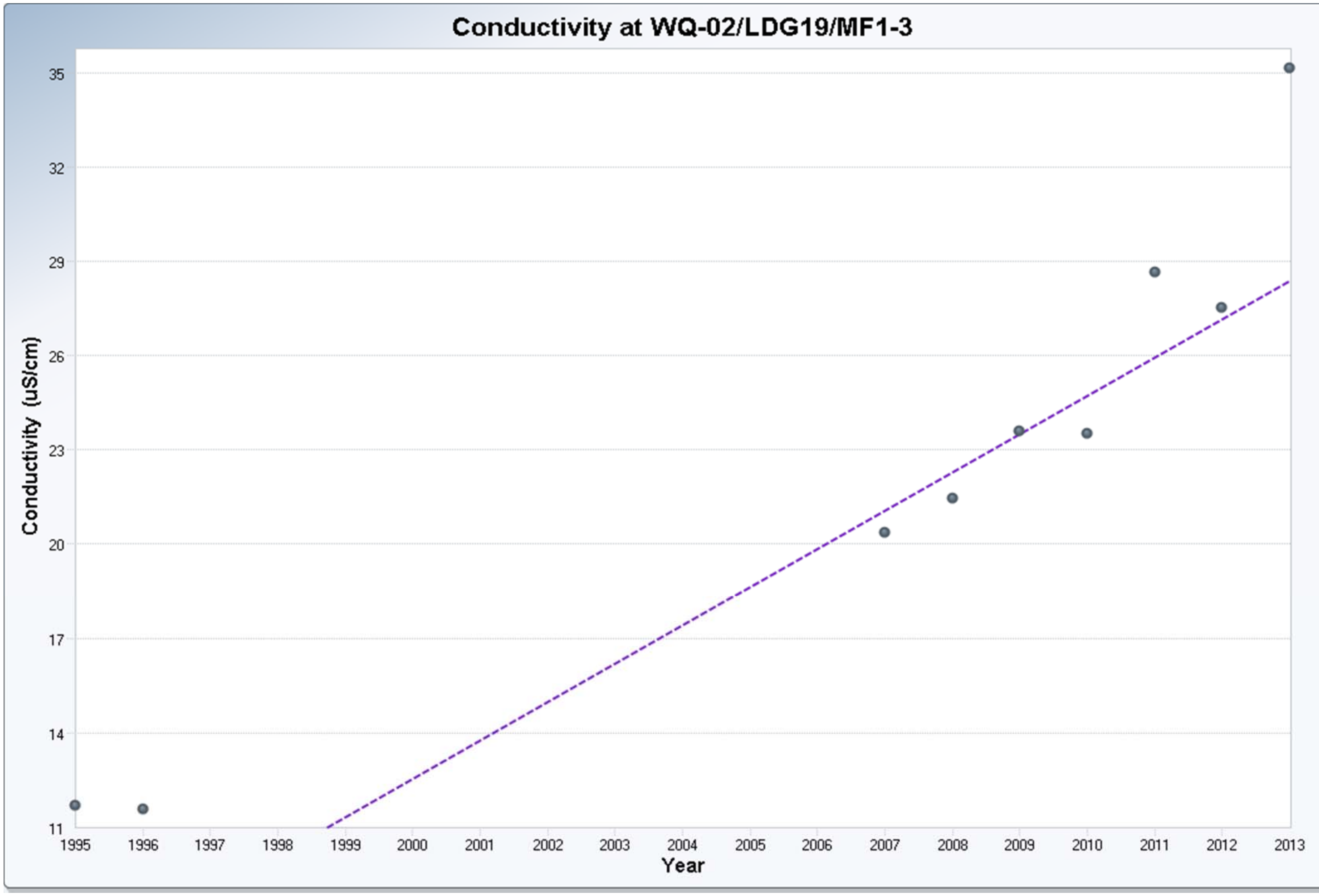
General Statistics

Period of Record	1995–1996, 2007–2013
Number of Events Reported (m)	20
Number of Missing Events	11
Number or Reported Events Used	9
Number Values Reported (n)	20
Number Values Missing	11
Number Values Used	9
Minimum	11.79
Maximum	35.33
Mean	22.81
Geometric Mean	21.54
Median	23.7
Standard Deviation	7.63

Mann-Kendall Test

Test Value (S)	30
Tabulated p-value	0
Standard Deviation of S	9.592
Standardized Value of S	3.023
Approximate p-value	0.00125

Statistically significant evidence of an increasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	9
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	9.5917
Standardized Value of S	3.0235
Test Value (S)	30
Tabulated p-value	0.0000
Approximate p-value	0.0012

Theil-Sen Trend Line (Red)

Theil-Sen Slope	1.2190
Theil-Sen Intercept	-2,425.3454

Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 12:41:07 PM
From File	mf1-3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Hardness-Total (mg/L)

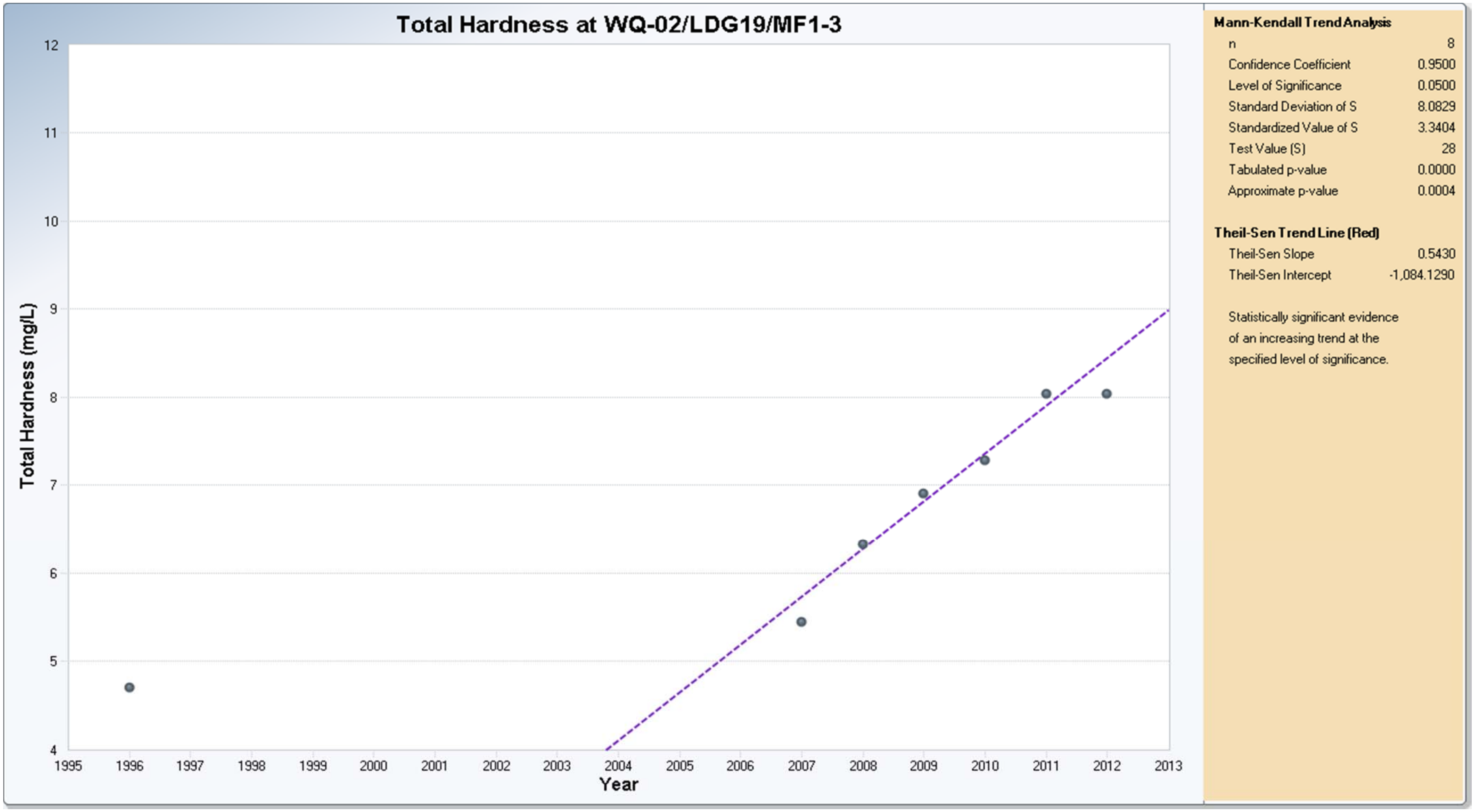
General Statistics

Period of Record	1996, 2007–2013
Number of Events Reported (m)	20
Number of Missing Events	12
Number or Reported Events Used	8
Number Values Reported (n)	20
Number Values Missing	12
Number Values Used	8
Minimum	4.7
Maximum	12.05
Mean	7.35
Geometric Mean	7.086
Median	7.095
Standard Deviation	2.233

Mann-Kendall Test

Test Value (S)	28
Tabulated p-value	0
Standard Deviation of S	8.083
Standardized Value of S	3.34
Approximate p-value	4.1831E-4

Statistically significant evidence of an increasing trend at the specified level of significance.



Total Hardness at WQ-02/LDG19/MF1-3
Total Hardness (mg/L)
Year
12
11
10
9
8
7
6
5
4
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 8
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 8.0829
Standardized Value of S 3.3404
Test Value (S) 28
Tabulated p-value 0.0000
Approximate p-value 0.0004
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.5430
Theil-Sen Intercept -1,084.1290
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 12:37:03 PM
From File	mf1-3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

pH (pH units)

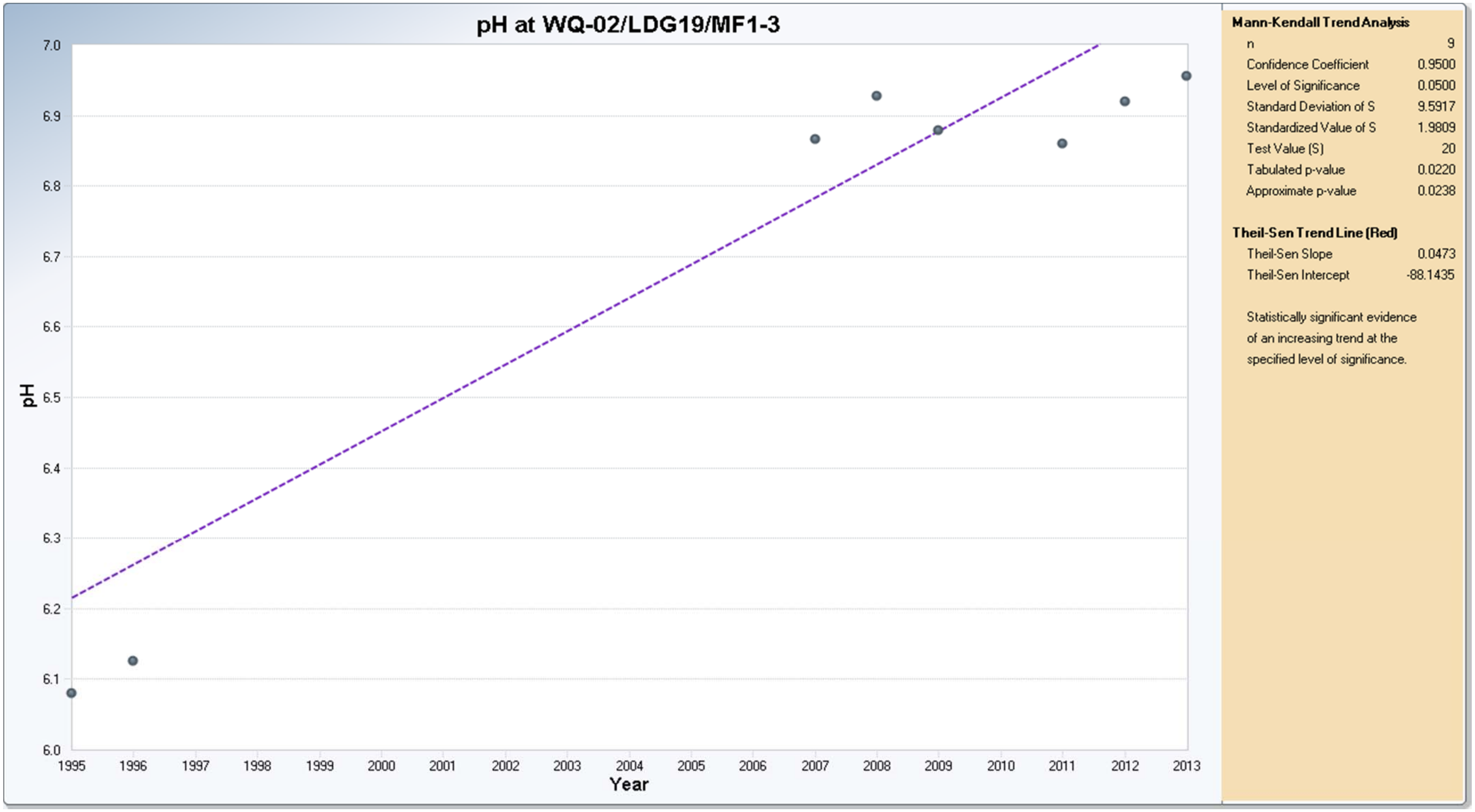
General Statistics

Period of Record	1995–1996, 2007–2013
Number of Events Reported (m)	20
Number of Missing Events	11
Number or Reported Events Used	9
Number Values Reported (n)	20
Number Values Missing	11
Number Values Used	9
Minimum	6.08
Maximum	7.005
Mean	6.735
Geometric Mean	6.726
Median	6.878
Standard Deviation	0.362

Mann-Kendall Test

Test Value (S)	20
Tabulated p-value	0.022
Standard Deviation of S	9.592
Standardized Value of S	1.981
Approximate p-value	0.0238

Statistically significant evidence of an increasing trend at the specified level of significance.


pH at WQ-02/LDG19/MF1-3
7.0
6.9
6.8
6.7
6.6
6.5
6.4
6.3
6.2
6.1
6.0
pH
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 9
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 9.5917
Standardized Value of S 1.9809
Test Value (S) 20
Tabulated p-value 0.0220
Approximate p-value 0.0238
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0473
Theil-Sen Intercept -88.1435
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 12:49:06 PM
From File	mf1-3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Sulphate (mg/L)

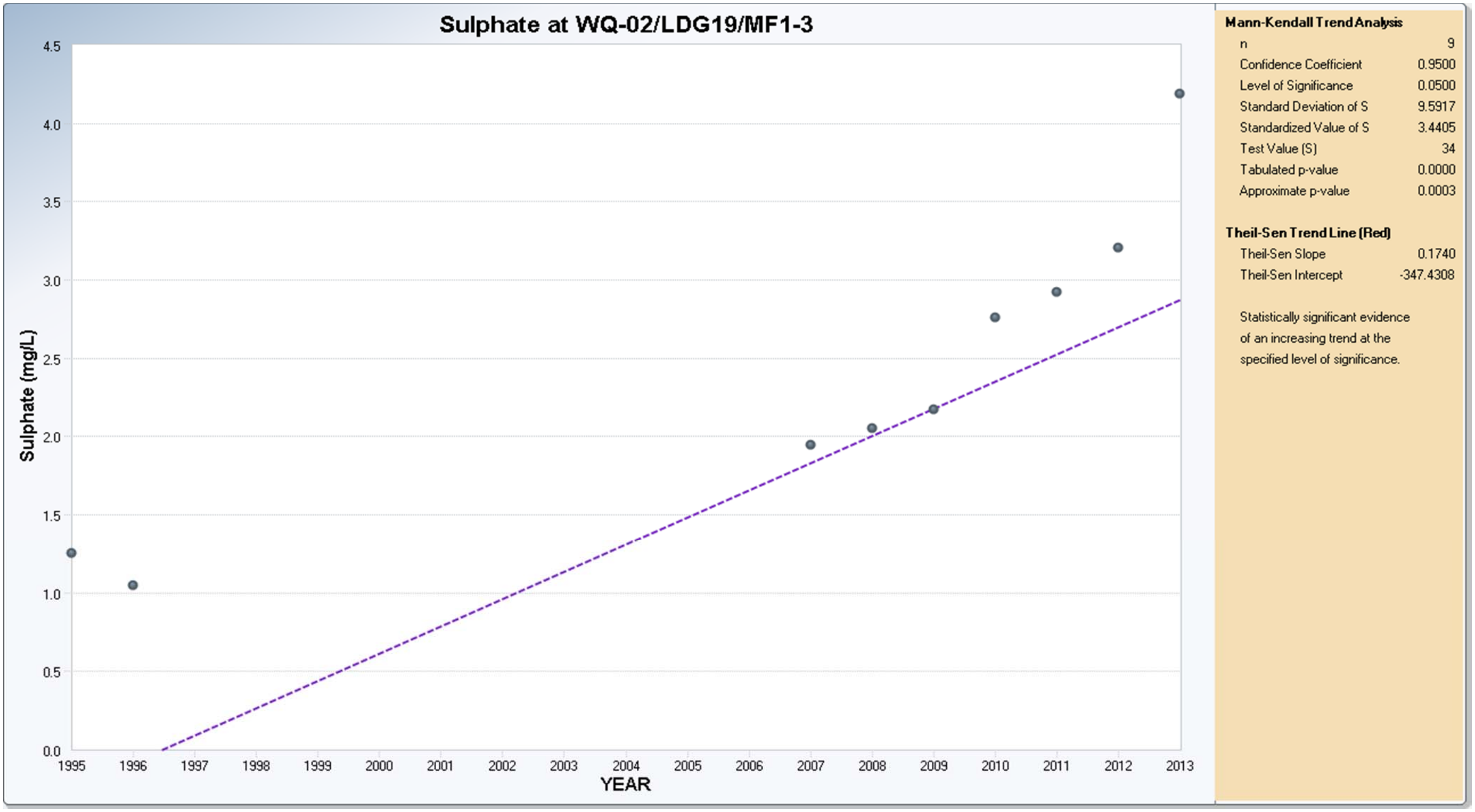
General Statistics

Period of Record	1995–1996, 2007–2013
Number of Events Reported (m)	20
Number of Missing Events	11
Number or Reported Events Used	9
Number Values Reported (n)	20
Number Values Missing	11
Number Values Used	9
Minimum	1.05
Maximum	4.19
Mean	2.395
Geometric Mean	2.206
Median	2.175
Standard Deviation	0.986

Mann-Kendall Test

Test Value (S)	34
Tabulated p-value	0
Standard Deviation of S	9.592
Standardized Value of S	3.44
Approximate p-value	2.9033E-4

Statistically significant evidence of an increasing trend at the specified level of significance.



Sulphate at WQ-02/LDG19/MF1-3
Sulphate (mg/L)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
YEAR
Mann-Kendall Trend Analysis
n 9
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 9.5917
Standardized Value of S 3.4405
Test Value (S) 34
Tabulated p-value 0.0000
Approximate p-value 0.0003
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.1740
Theil-Sen Intercept -347.4308
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	4/23/2015 11:07
From File	mf1-3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Nitrogen (mg/L)

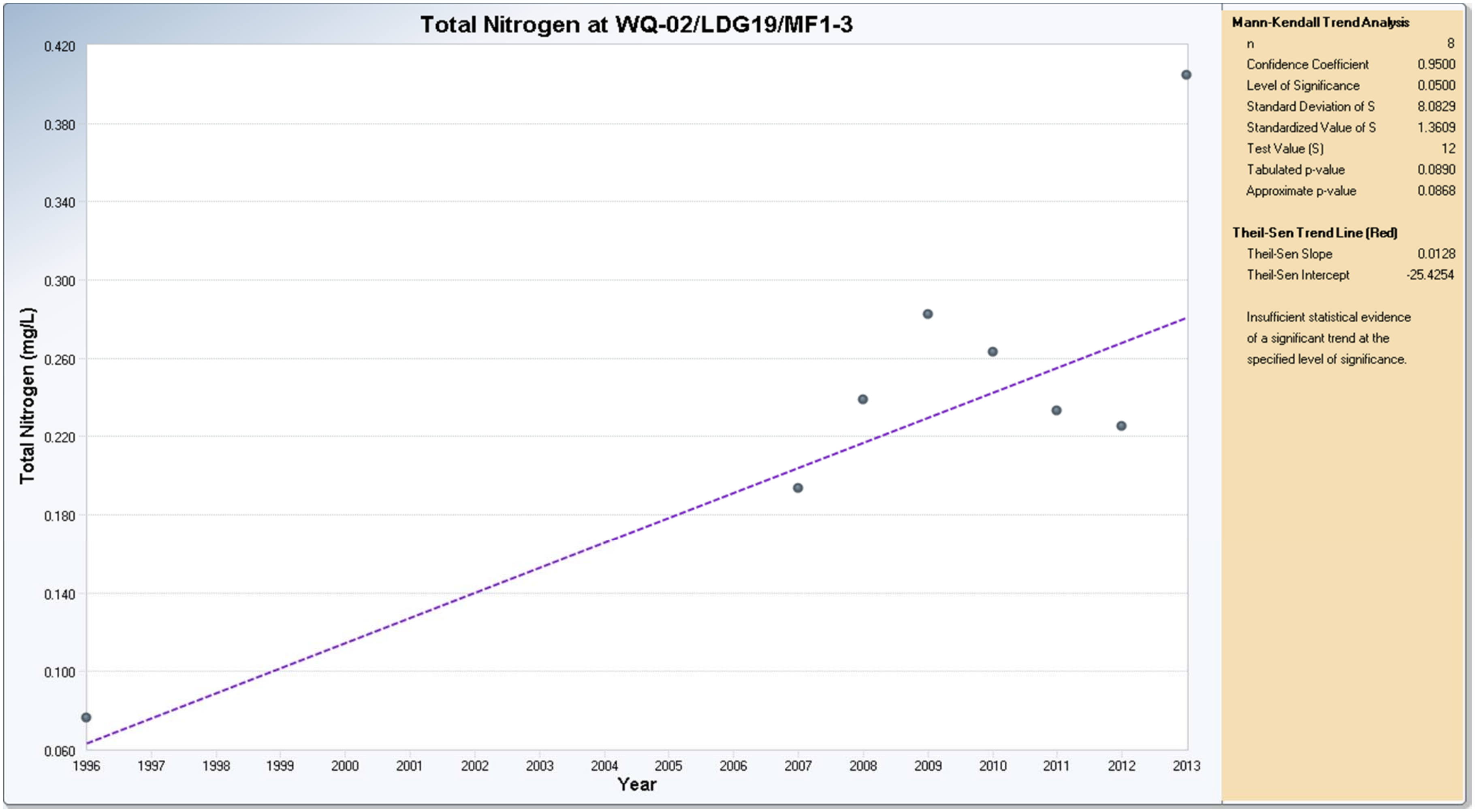
General Statistics

Period of Record	1996, 2007–2013
Number of Events Reported (m)	20
Number of Missing Events	12
Number or Reported Events Used	8
Number Values Reported (n)	20
Number Values Missing	12
Number Values Used	8
Minimum	0.0765
Maximum	0.405
Mean	0.24
Geometric Mean	0.22
Median	0.236
Standard Deviation	0.0916

Mann-Kendall Test

Test Value (S)	12
Tabulated p-value	0.089
Standard Deviation of S	8.083
Standardized Value of S	1.361
Approximate p-value	0.0868

Insufficient evidence to identify a significant trend at the specified level of significance.


Total Nitrogen at WQ-02/LDG19/MF1-3
Total Nitrogen (mg/L)
0.420
0.380
0.340
0.300
0.260
0.220
0.180
0.140
0.100
0.060
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 8
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 8.0829
Standardized Value of S 1.3609
Test Value (S) 12
Tabulated p-value 0.0890
Approximate p-value 0.0868
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0128
Theil-Sen Intercept -25.4254
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 2:37:33 PM
From File	mf1-3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Phosphorus (mg/L)

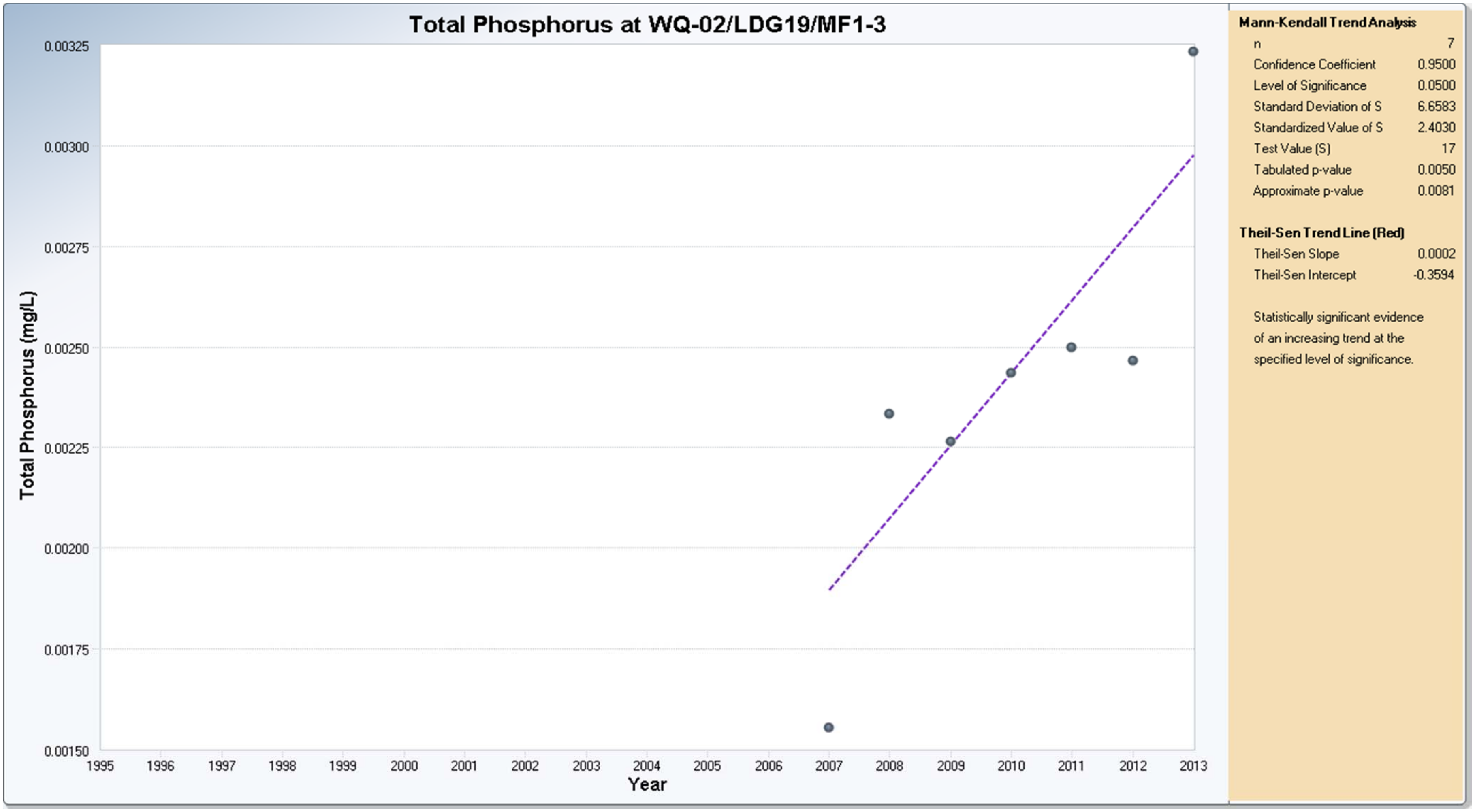
General Statistics

Period of Record	2007–2013
Number of Events Reported (m)	20
Number of Missing Events	13
Number or Reported Events Used	7
Number Values Reported (n)	20
Number Values Missing	13
Number Values Used	7
Minimum	0.00156
Maximum	0.00323
Mean	0.0024
Geometric Mean	0.00235
Median	0.00244
Standard Deviation	4.9097E-4

Mann-Kendall Test

Test Value (S)	17
Tabulated p-value	0.005
Standard Deviation of S	6.658
Standardized Value of S	2.403
Approximate p-value	0.00813

Statistically significant evidence of an increasing trend at the specified level of significance.


Total Phosphorus at WQ-02/LDG19/MF1-3
Total Phosphorus (mg/L)
0.00325
0.00300
0.00275
0.00250
0.00225
0.00200
0.00175
0.00150
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 7
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 6.6583
Standardized Value of S 2.4030
Test Value (S) 17
Tabulated p-value 0.0050
Approximate p-value 0.0081
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0002
Theil-Sen Intercept -0.3594
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 12:50:39 PM
From File	mf1-3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Arsenic-Total (mg/L)

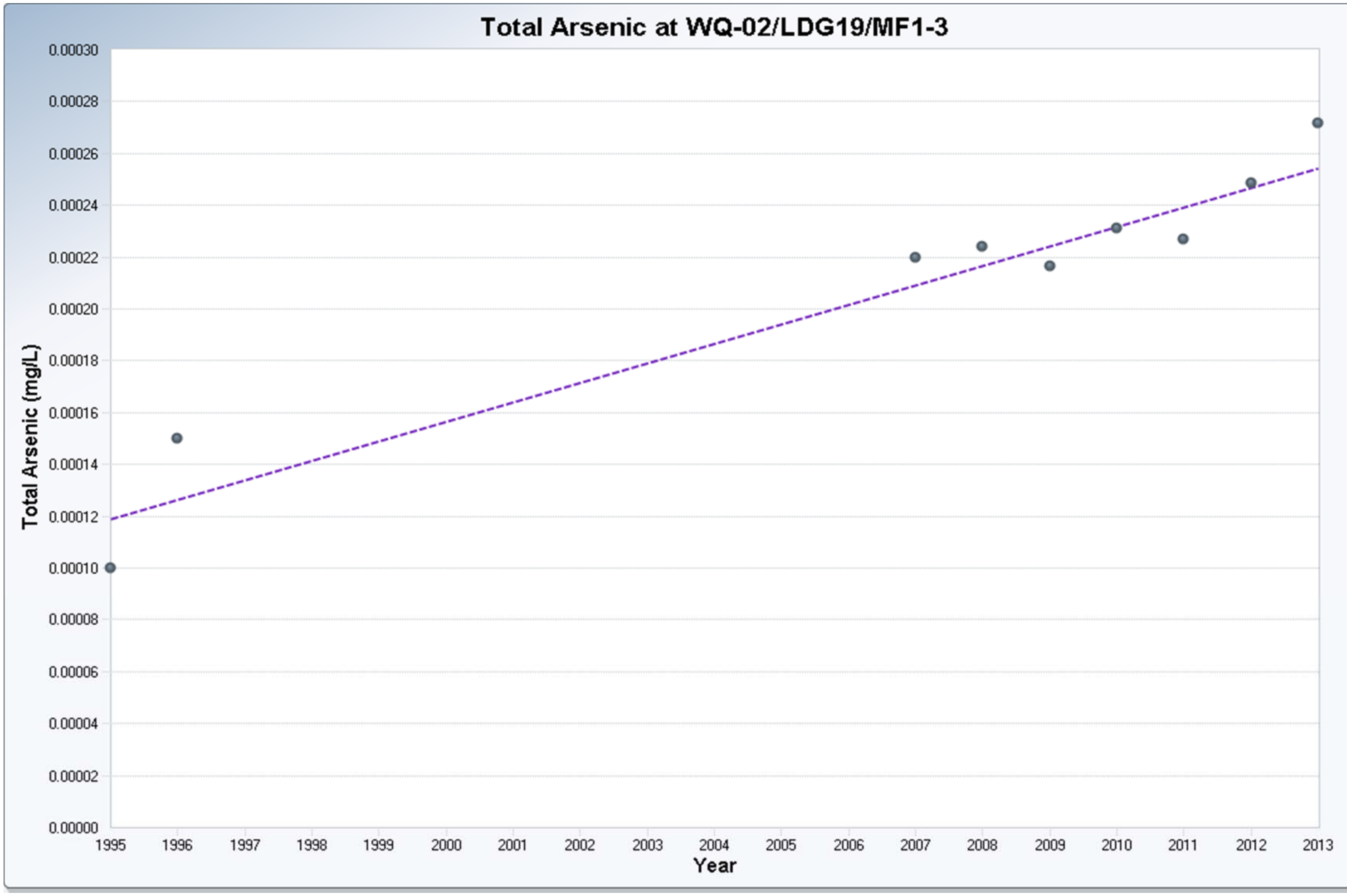
General Statistics

Period of Record	1995–1996, 2007–2013
Number of Events Reported (m)	20
Number of Missing Events	11
Number or Reported Events Used	9
Number Values Reported (n)	20
Number Values Missing	11
Number Values Used	9
Minimum	1.0000E-4
Maximum	2.7167E-4
Mean	2.0990E-4
Geometric Mean	2.0230E-4
Median	2.2417E-4
Standard Deviation	5.2527E-5

Mann-Kendall Test

Test Value (S)	30
Tabulated p-value	0
Standard Deviation of S	9.592
Standardized Value of S	3.023
Approximate p-value	0.00125

Statistically significant evidence of an increasing trend at the specified level of significance.



Mann-Kendall Trend Analysis	
n	9
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	9.5917
Standardized Value of S	3.0235
Test Value (S)	30
Tabulated p-value	0.0000
Approximate p-value	0.0012

Theil-Sen Trend Line (Red)	
Theil-Sen Slope	0.0000
Theil-Sen Intercept	-0.0149

Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 12:54:00 PM
From File	mf1-3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Iron-Total (mg/DL)

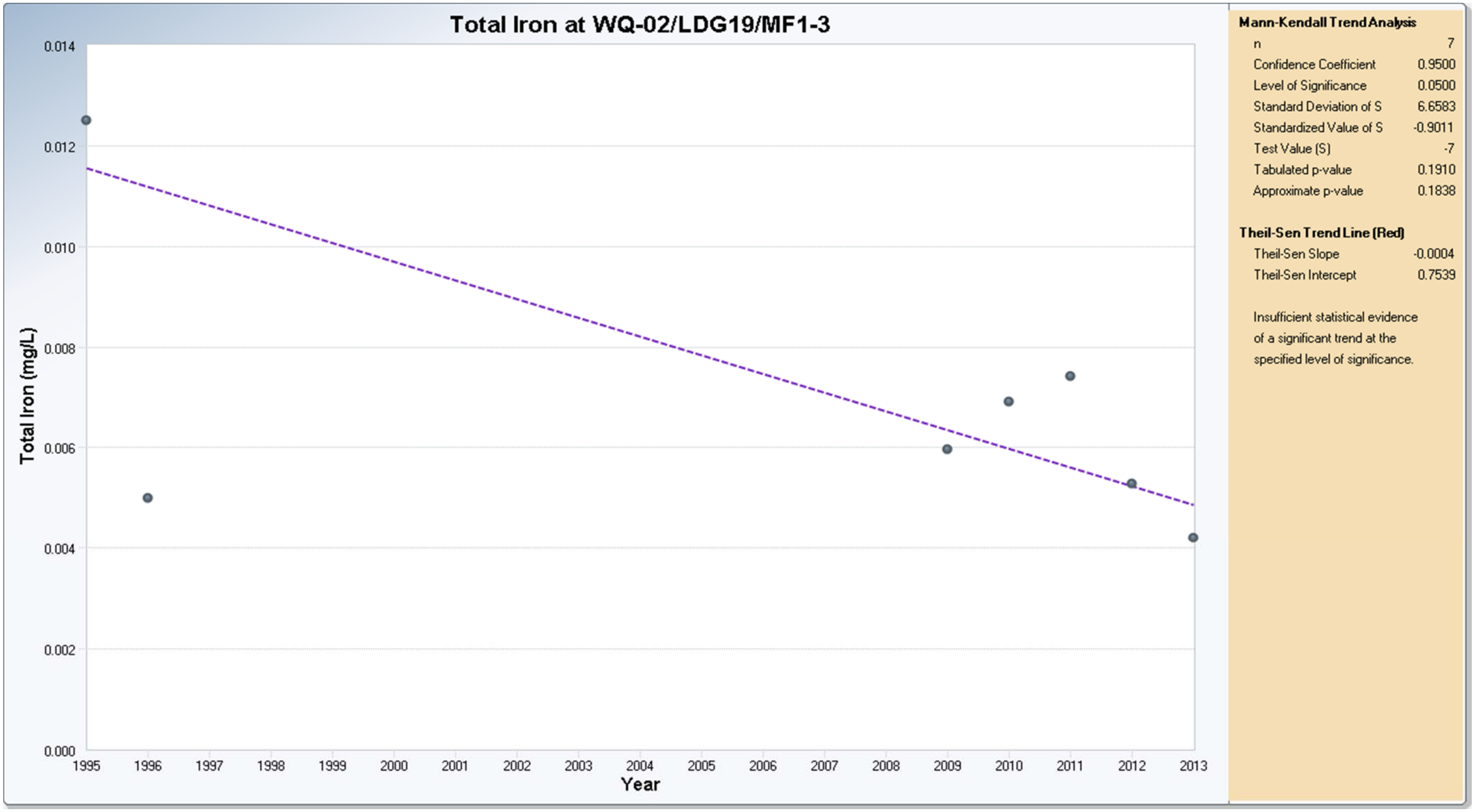
General Statistics

Period of Record	1995–1996, 2009–2013
Number of Events Reported (m)	20
Number of Missing Events	13
Number or Reported Events Used	7
Number Values Reported (n)	20
Number Values Missing	13
Number Values Used	7
Minimum	0.0042
Maximum	0.0125
Mean	0.00676
Geometric Mean	0.00637
Median	0.00597
Standard Deviation	0.00276

Mann-Kendall Test

Test Value (S)	-7
Tabulated p-value	0.191
Standard Deviation of S	6.658
Standardized Value of S	-0.901
Approximate p-value	0.184

Insufficient evidence to identify a significant trend at the specified level of significance.



Total Iron at WQ-02/LDG19/MF1-3
Total Iron (mg/L)
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 7
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 6.6583
Standardized Value of S -0.9011
Test Value (S) -7
Tabulated p-value 0.1910
Approximate p-value 0.1838
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0004
Theil-Sen Intercept 0.7539
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 12:56:54 PM
From File	mf1-3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Molybdenum-Total (mg/L)

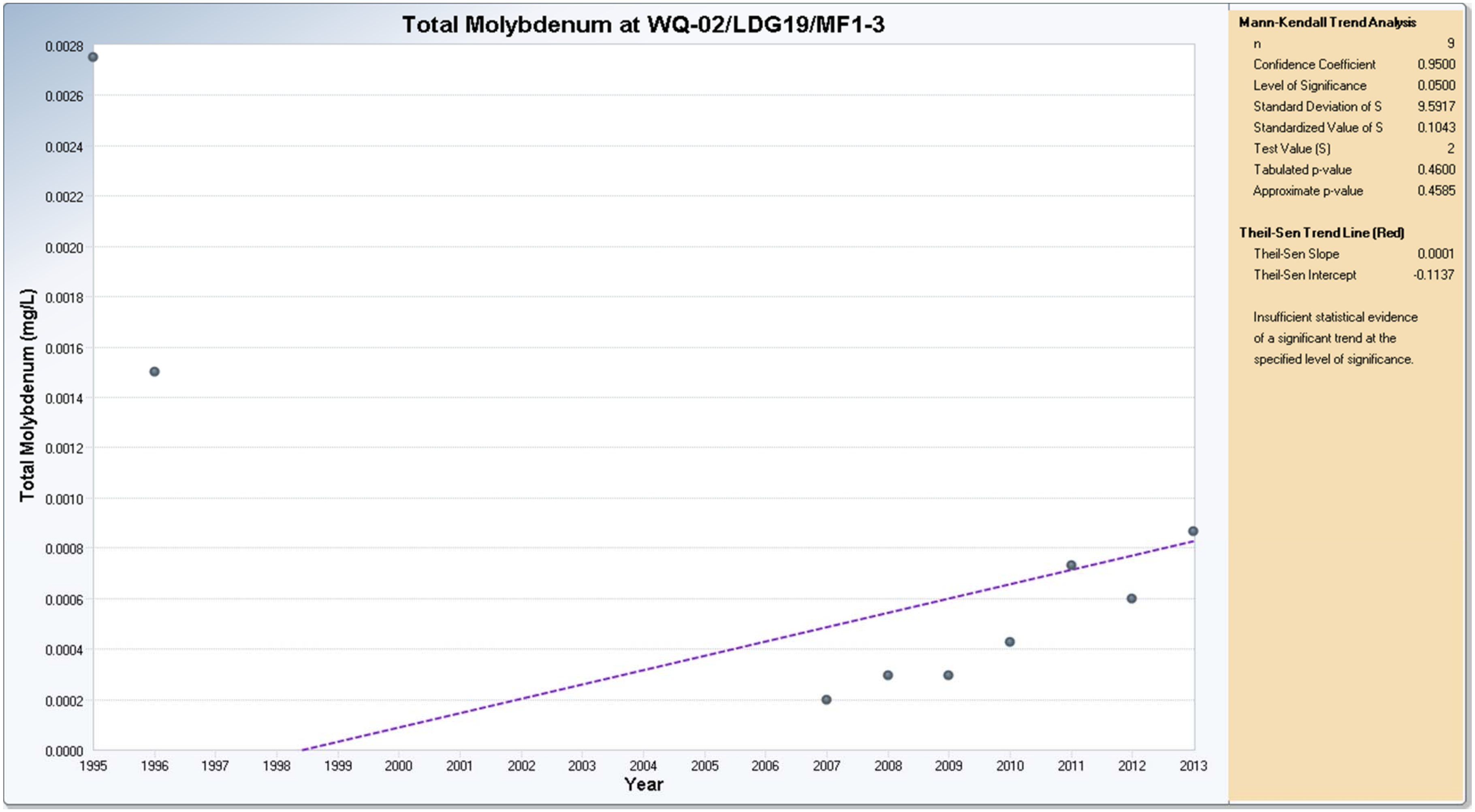
General Statistics

Period of Record	1995–1996, 2007–2013
Number of Events Reported (m)	20
Number of Missing Events	11
Number or Reported Events Used	9
Number Values Reported (n)	20
Number Values Missing	11
Number Values Used	9
Minimum	1.9889E-4
Maximum	0.00275
Mean	8.5120E-4
Geometric Mean	6.0875E-4
Median	5.9883E-4
Standard Deviation	8.1639E-4

Mann-Kendall Test

Test Value (S)	2
Tabulated p-value	0.46
Standard Deviation of S	9.592
Standardized Value of S	0.104
Approximate p-value	0.458

Insufficient evidence to identify a significant trend at the specified level of significance.



Total Molybdenum at WQ-02/LDG19/MF1-3
Total Molybdenum (mg/L)
0.0028
0.0026
0.0024
0.0022
0.0020
0.0018
0.0016
0.0014
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
Year
Mann-Kendall Trend Analysis
n 9
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 9.5917
Standardized Value of S 0.1043
Test Value (S) 2
Tabulated p-value 0.4600
Approximate p-value 0.4585
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0001
Theil-Sen Intercept -0.1137
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 4:43:18 PM
From File	mf1-3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Strontium (mg/L)

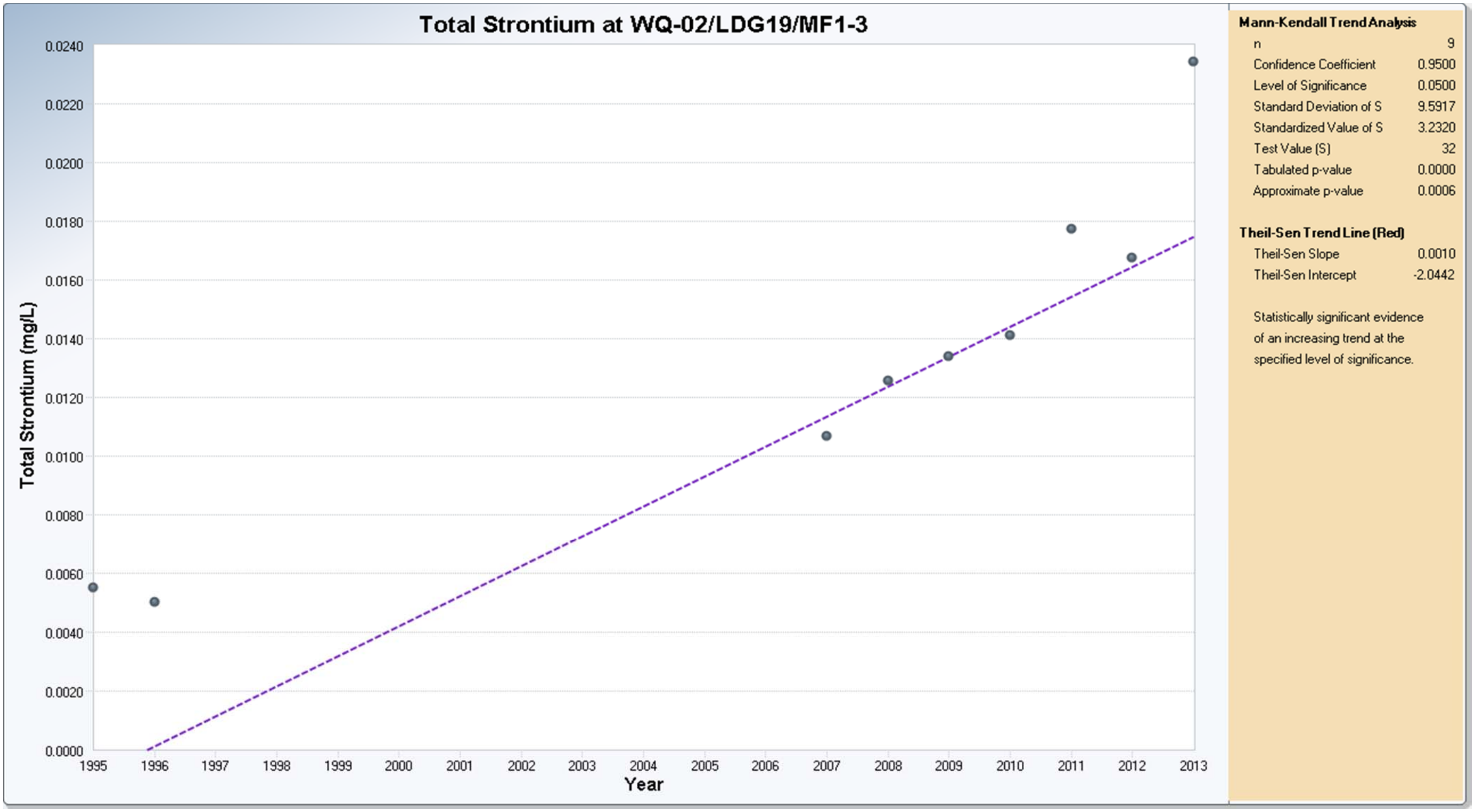
General Statistics

Period of Record	1995–1996, 2007–2013
Number of Events Reported (m)	20
Number of Missing Events	11
Number or Reported Events Used	9
Number Values Reported (n)	20
Number Values Missing	11
Number Values Used	9
Minimum	0.005
Maximum	0.0234
Mean	0.0132
Geometric Mean	0.0119
Median	0.0134
Standard Deviation	0.00583

Mann-Kendall Test

Test Value (S)	32
Tabulated p-value	0
Standard Deviation of S	9.592
Standardized Value of S	3.232
Approximate p-value	6.1469E-4

Statistically significant evidence of an increasing trend at the specified level of significance.



Total Strontium at WQ-02/LDG19/MF1-3
Total Strontium (mg/L)
0.0240
0.0220
0.0200
0.0180
0.0160
0.0140
0.0120
0.0100
0.0080
0.0060
0.0040
0.0020
0.0000
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 9
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 9.5917
Standardized Value of S 3.2320
Test Value (S) 32
Tabulated p-value 0.0000
Approximate p-value 0.0006
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0010
Theil-Sen Intercept -2.0442
Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 12:59:35 PM
From File	mf1-3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Uranium-Total (0.5DL)

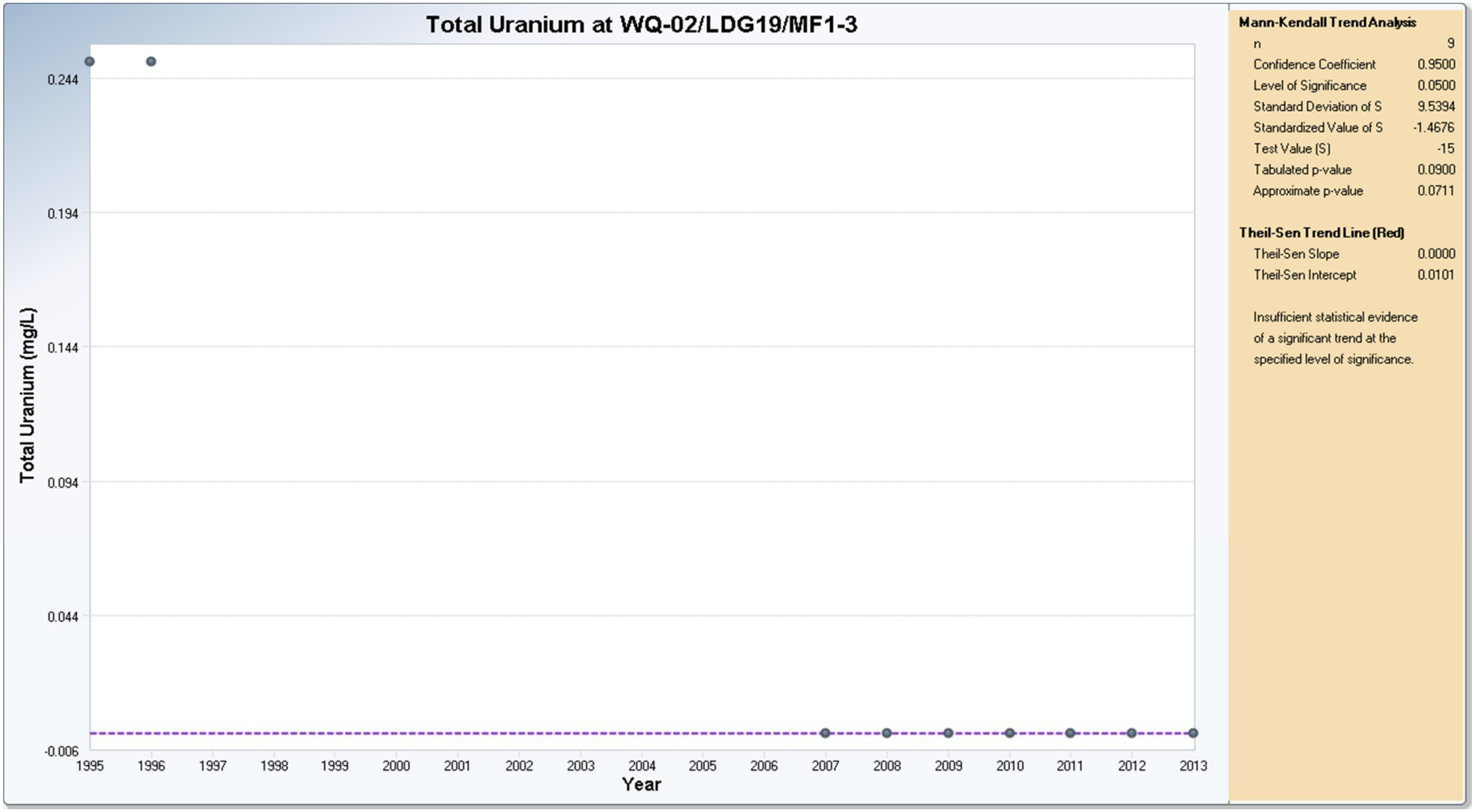
General Statistics

Period of Record	1995–1996, 2007–2013
Number of Events Reported (m)	20
Number of Missing Events	11
Number or Reported Events Used	9
Number Values Reported (n)	20
Number Values Missing	11
Number Values Used	9
Minimum	8.1636E-5
Maximum	0.25
Mean	0.0556
Geometric Mean	5.3935E-4
Median	9.5091E-5
Standard Deviation	0.11

Mann-Kendall Test

Test Value (S)	-15
Tabulated p-value	0.09
Standard Deviation of S	9.539
Standardized Value of S	-1.468
Approximate p-value	0.0711

Insufficient evidence to identify a significant trend at the specified level of significance.


Total Uranium at WQ-02/LDG19/MF1-3
Total Uranium (mg/L)
0.244
0.194
0.144
0.094
0.044
-0.006
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 9
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 9.5394
Standardized Value of S -1.4676
Test Value (S) -15
Tabulated p-value 0.0900
Approximate p-value 0.0711
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 0.0101
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

WQ-02/LDG19/MF1-3
Baseline vs. Post-Baseline Trends
for Select Parameters

Significant (p < 0.05) Trends at WQ-02/LDG19/MF1-3 for Select Parameters

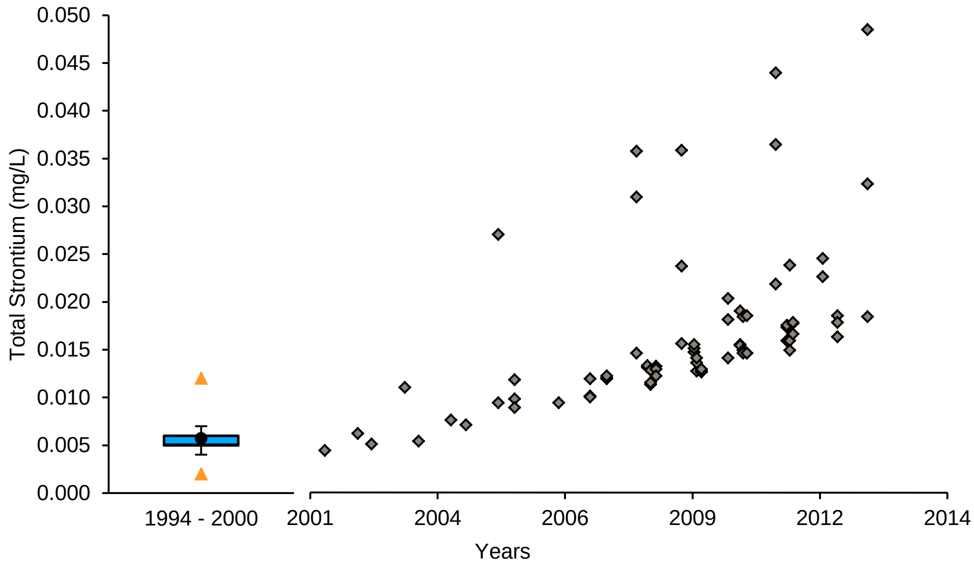


Figure D-10 Boxplot of the Baseline Condition for Chloride and Post-Baseline Chloride Values at WQ-02/LDG19/MF1-3; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

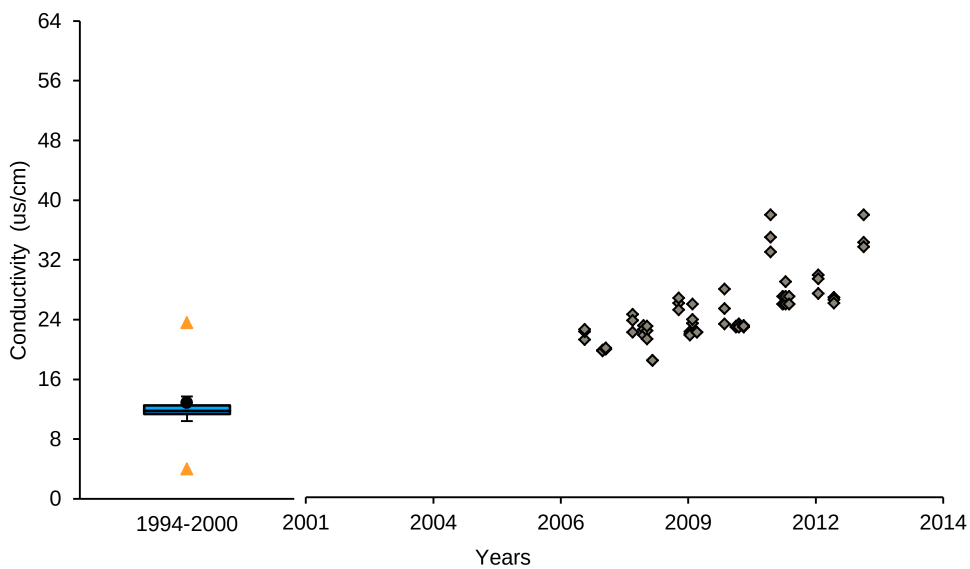


Figure D-11 Boxplot of the Baseline Condition for Conductivity and Post-Baseline Conductivity Values at WQ-02/LDG19/MF1-3; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

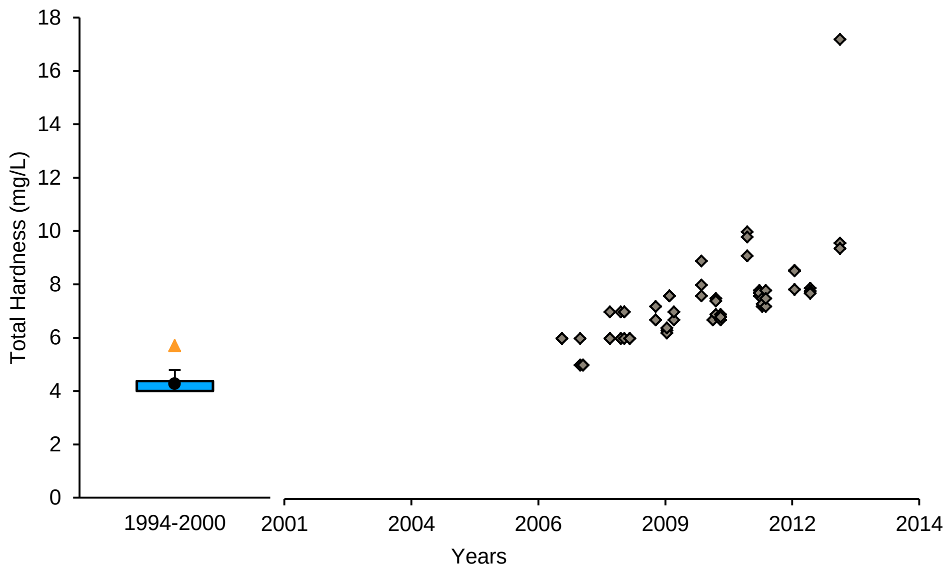


Figure D-12 Boxplot of the Baseline Condition for Hardness and Post-Baseline Hardness Values at WQ-02/LDG19/MF1-3; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

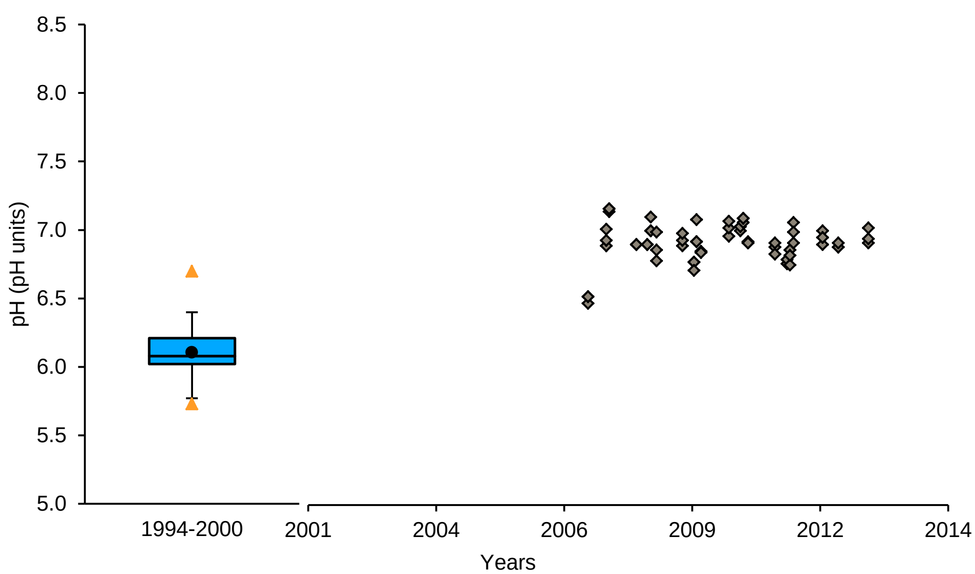


Figure D-13 Boxplot of the Baseline Condition for pH and Post-Baseline pH Values at WQ-02/LDG19/MF1-3; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

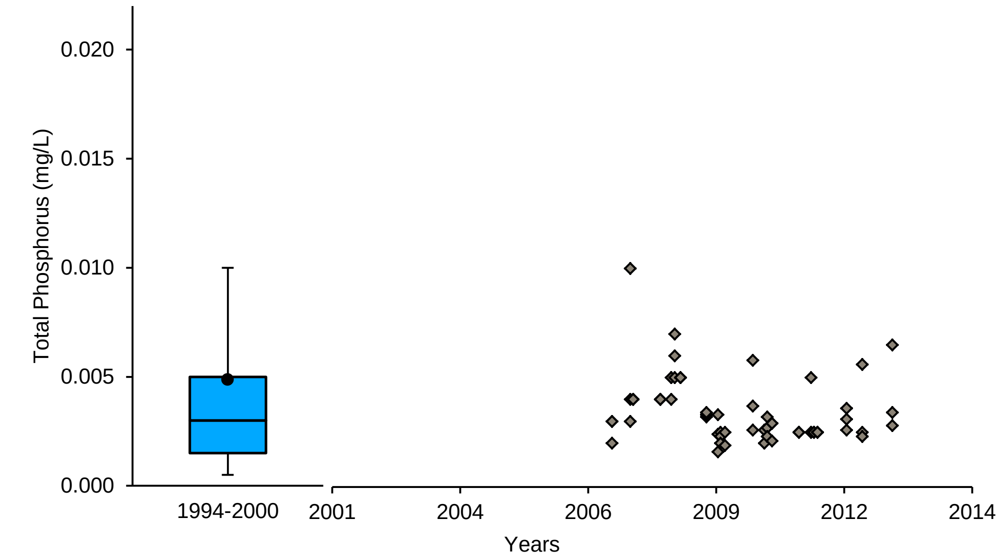


Figure D-14 Boxplot of the Baseline Condition for Total Phosphorus and Post-Baseline Total Phosphorus Values at WQ-02/LDG19/MF1-3; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

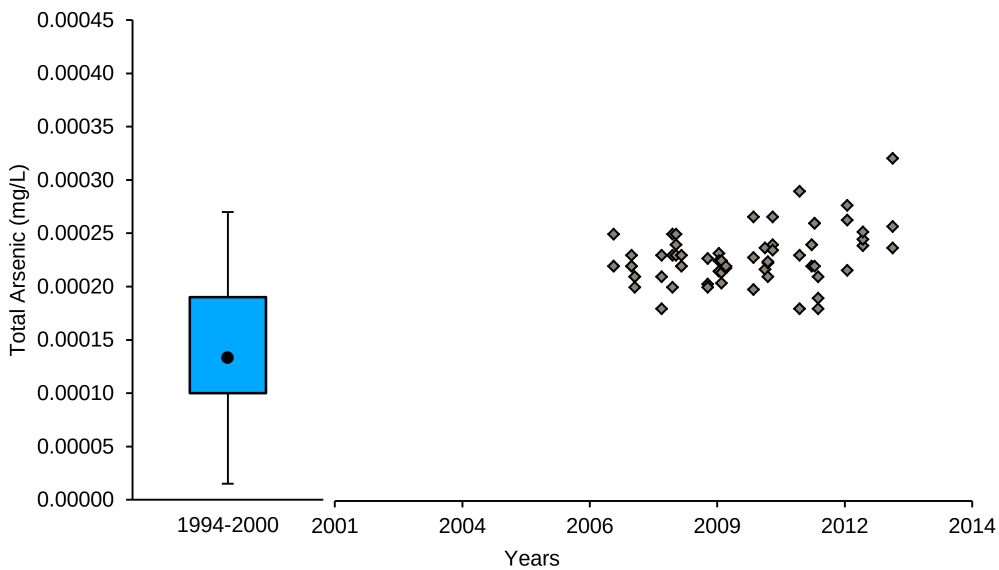


Figure D-15 Boxplot of the Baseline Condition for Total Arsenic and Post-Baseline Total Arsenic Values at WQ-02/LDG19/MF1-3; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

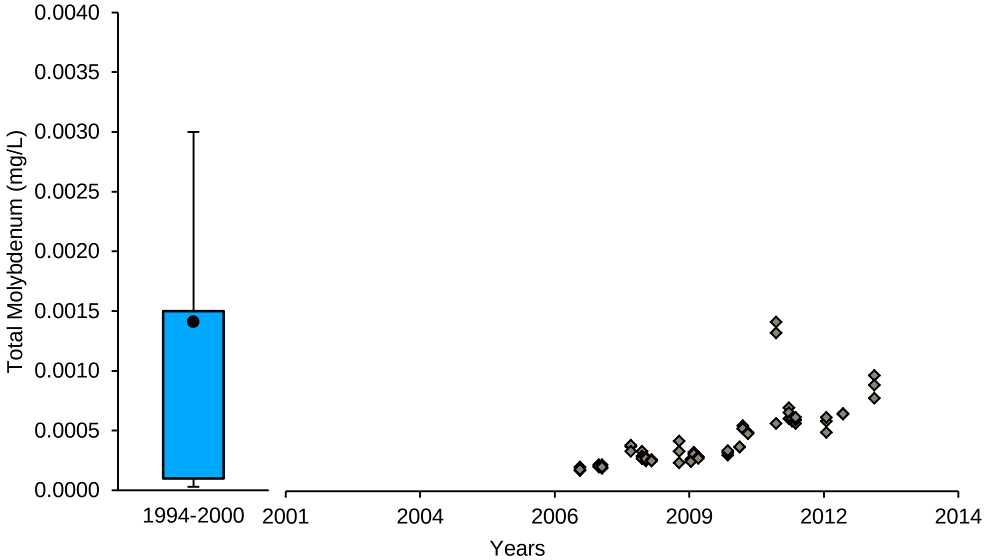


Figure D-16 Boxplot of the Baseline Condition for Total Molybdenum and Post-Baseline Total Molybdenum Values at WQ-02/LDG19/MF1-3; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

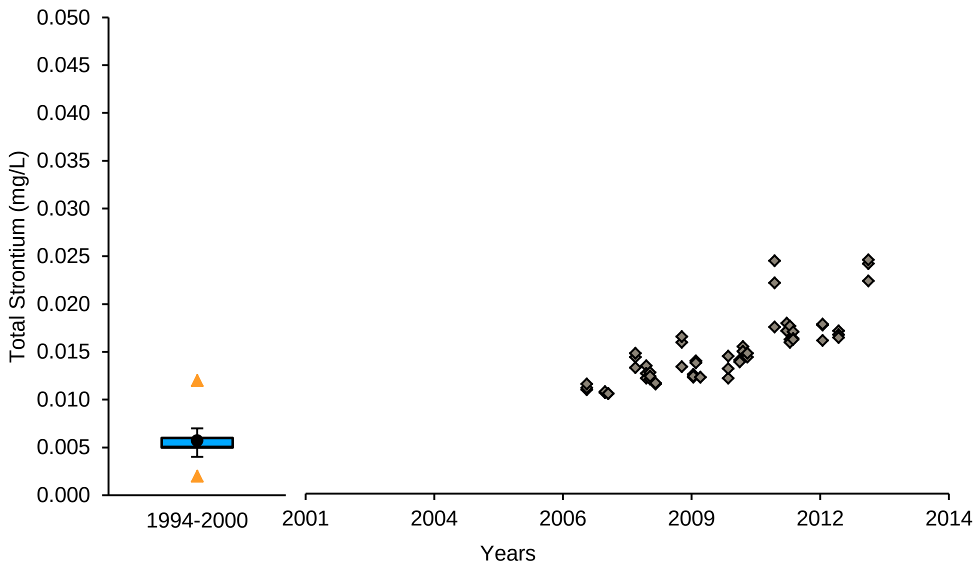


Figure D-17 Boxplot of the Baseline Condition for Total Strontium and Post-Baseline Total Strontium Values at WQ-02/LDG19/MF1-3; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

WQ-05/LDG41/MF3-4
ProUCL Trends Analysis Output

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 1:17:29 PM
From File	mf3-4_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Chloride (mg/L)

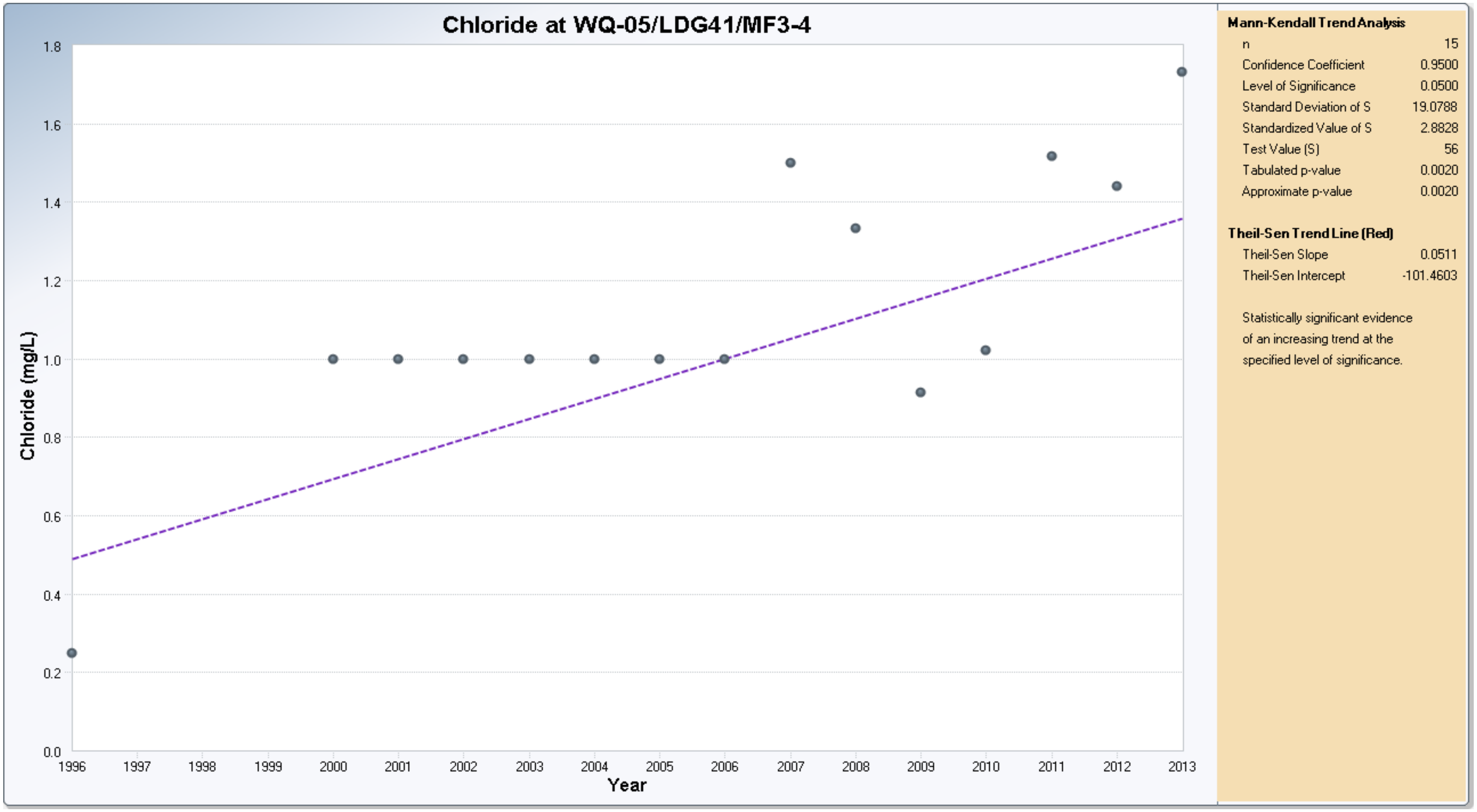
General Statistics

Period of Record	1996, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	0.25
Maximum	1.733
Mean	1.114
Geometric Mean	1.039
Median	1
Standard Deviation	0.352

Mann-Kendall Test

Test Value (S)	56
Tabulated p-value	0.002
Standard Deviation of S	19.08
Standardized Value of S	2.883
Approximate p-value	0.00197

Statistically significant evidence of an increasing trend at the specified level of significance.



Chloride at WQ-05/LDG41/MF3-4
Chloride (mg/L)
Year
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 19.0788
Standardized Value of S 2.8828
Test Value (S) 56
Tabulated p-value 0.0020
Approximate p-value 0.0020
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0511
Theil-Sen Intercept -101.4603
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 1:14:57 PM
From File	mf3-4_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Conductivity (µS/cm)

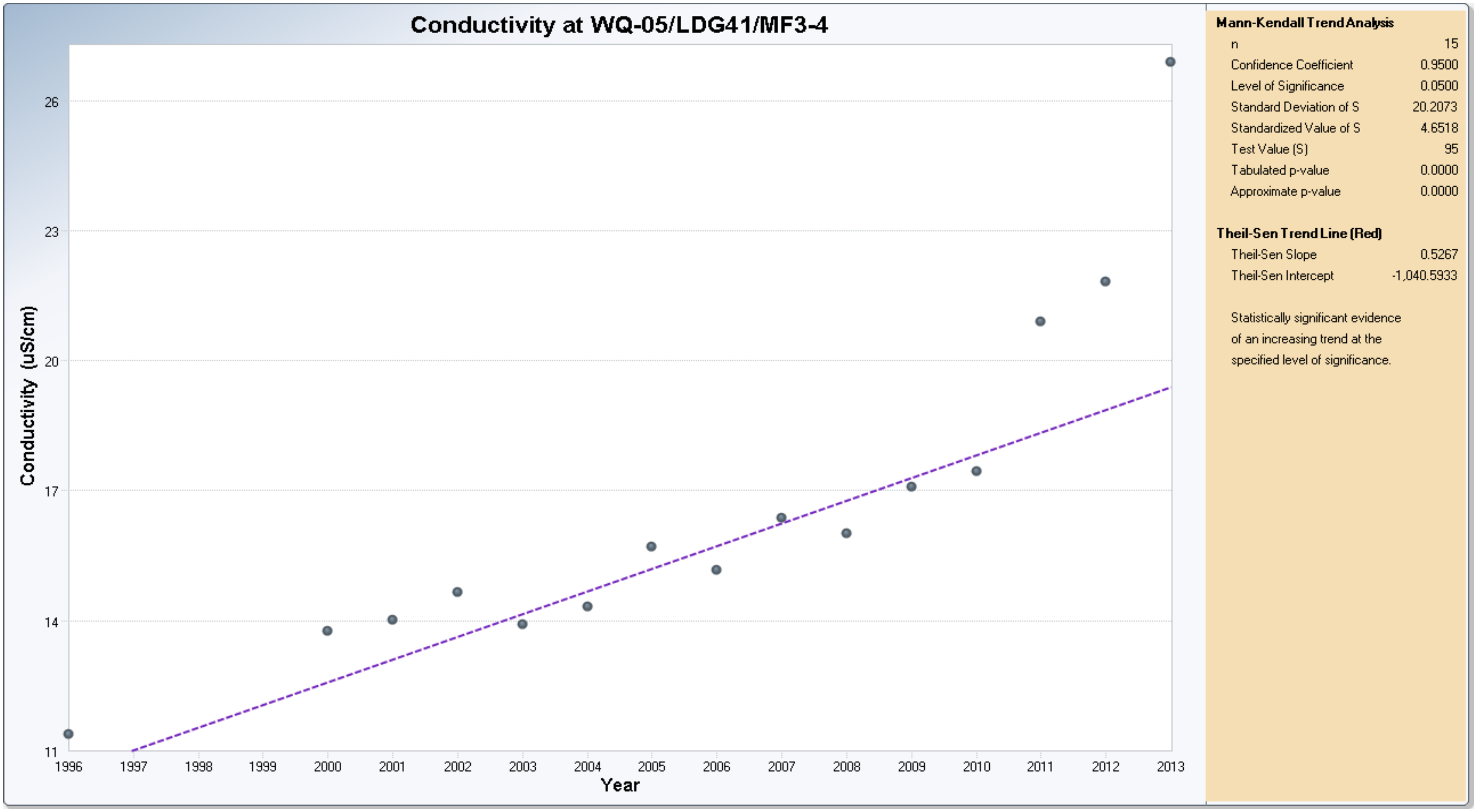
General Statistics

Period of Record	1996, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	11.57
Maximum	27.07
Mean	16.81
Geometric Mean	16.45
Median	15.9
Standard Deviation	3.907

Mann-Kendall Test

Test Value (S)	95
Tabulated p-value	0
Standard Deviation of S	20.21
Standardized Value of S	4.652
Approximate p-value	1.6453E-6

Statistically significant evidence of an increasing trend at the specified level of significance.


Conductivity at WQ-05/LDG41/MF3-4
Conductivity (uS/cm)
26
23
20
17
14
11
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.2073
Standardized Value of S 4.6518
Test Value (S) 95
Tabulated p-value 0.0000
Approximate p-value 0.0000
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.5267
Theil-Sen Intercept -1,040.5933
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 1:16:14 PM
From File	mf3-4_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Hardness (mg/L)

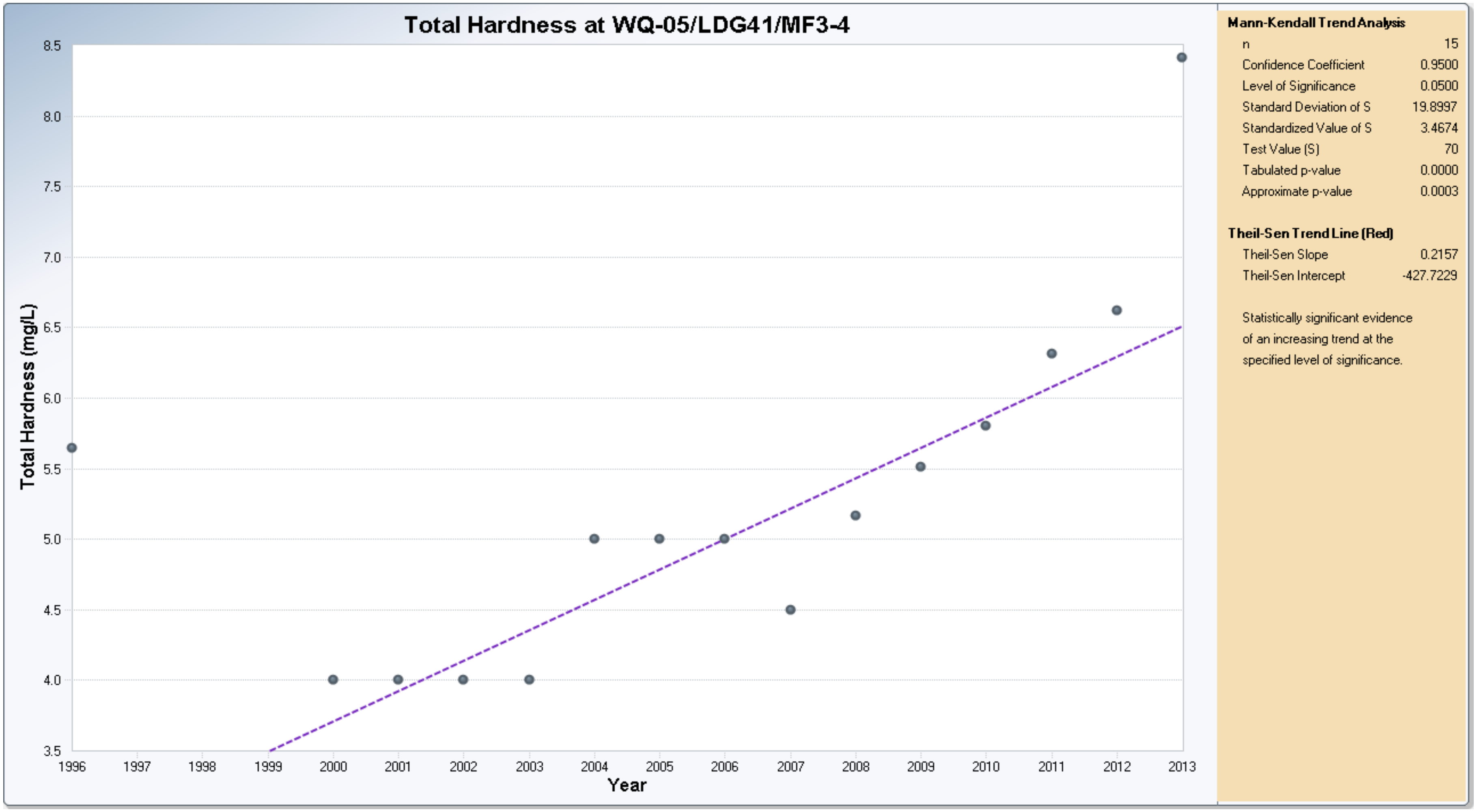
General Statistics

Period of Record	1996, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	4
Maximum	8.41
Mean	5.265
Geometric Mean	5.148
Median	5
Standard Deviation	1.211

Mann-Kendall Test

Test Value (S)	70
Tabulated p-value	0
Standard Deviation of S	19.9
Standardized Value of S	3.467
Approximate p-value	2.6278E-4

Statistically significant evidence of an increasing trend at the specified level of significance.


Total Hardness at WQ-05/LDG41/MF3-4
Total Hardness (mg/L)
Year
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 19.8997
Standardized Value of S 3.4674
Test Value (S) 70
Tabulated p-value 0.0000
Approximate p-value 0.0003
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.2157
Theil-Sen Intercept -427.7229
Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 1:12:26 PM
From File	mf3-4_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

pH (pH units)

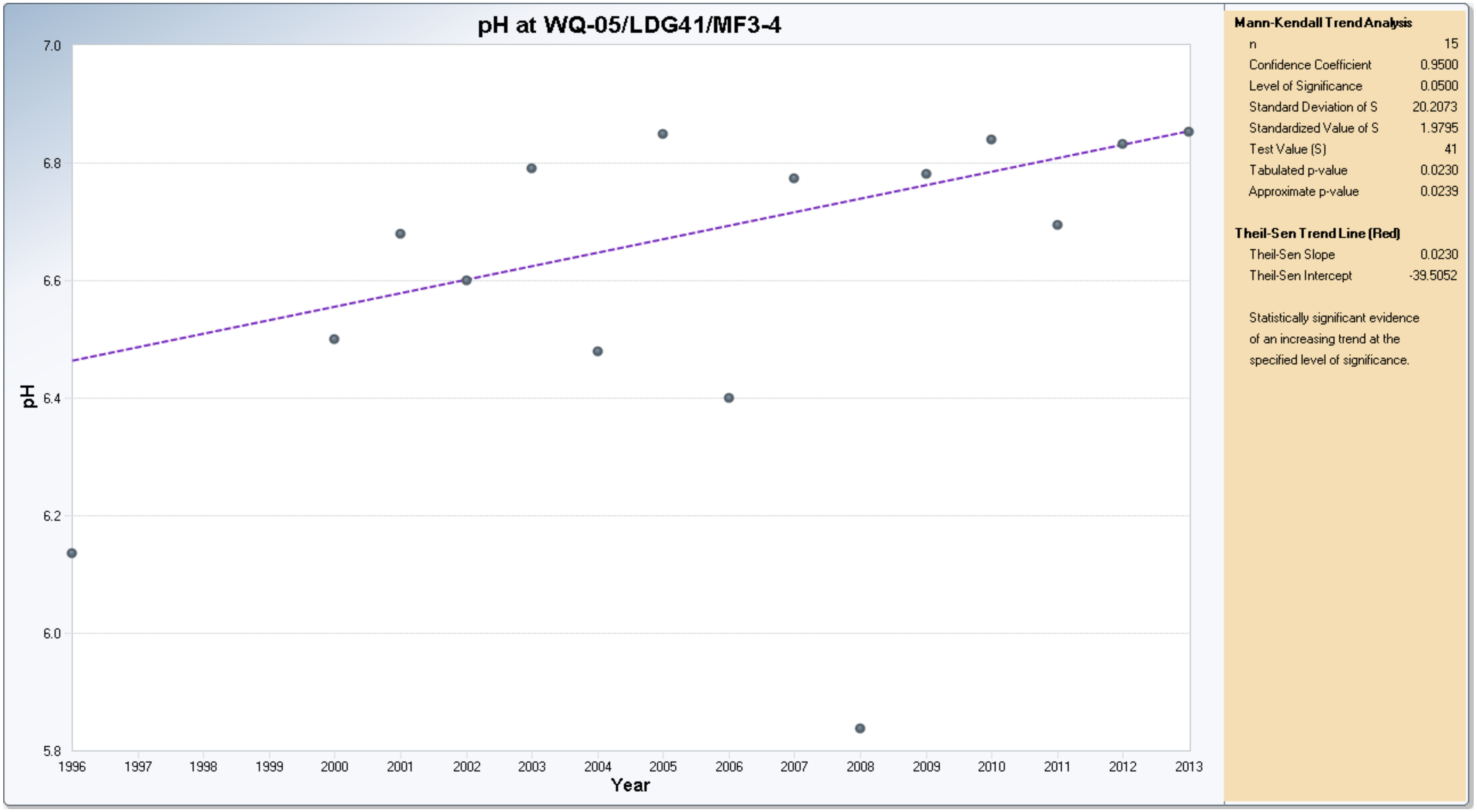
General Statistics

Period of Record	1996, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	5.837
Maximum	6.853
Mean	6.603
Geometric Mean	6.597
Median	6.694
Standard Deviation	0.295

Mann-Kendall Test

Test Value (S)	41
Tabulated p-value	0.023
Standard Deviation of S	20.21
Standardized Value of S	1.979
Approximate p-value	0.0239

Statistically significant evidence of an increasing trend at the specified level of significance.


pH at WQ-05/LDG41/MF3-4
7.0
6.8
6.6
6.4
6.2
6.0
5.8
pH
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.2073
Standardized Value of S 1.9795
Test Value (S) 41
Tabulated p-value 0.0230
Approximate p-value 0.0239
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0230
Theil-Sen Intercept -39.5052
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 1:18:57 PM
From File	mf3-4_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Sulphate (mg/L)

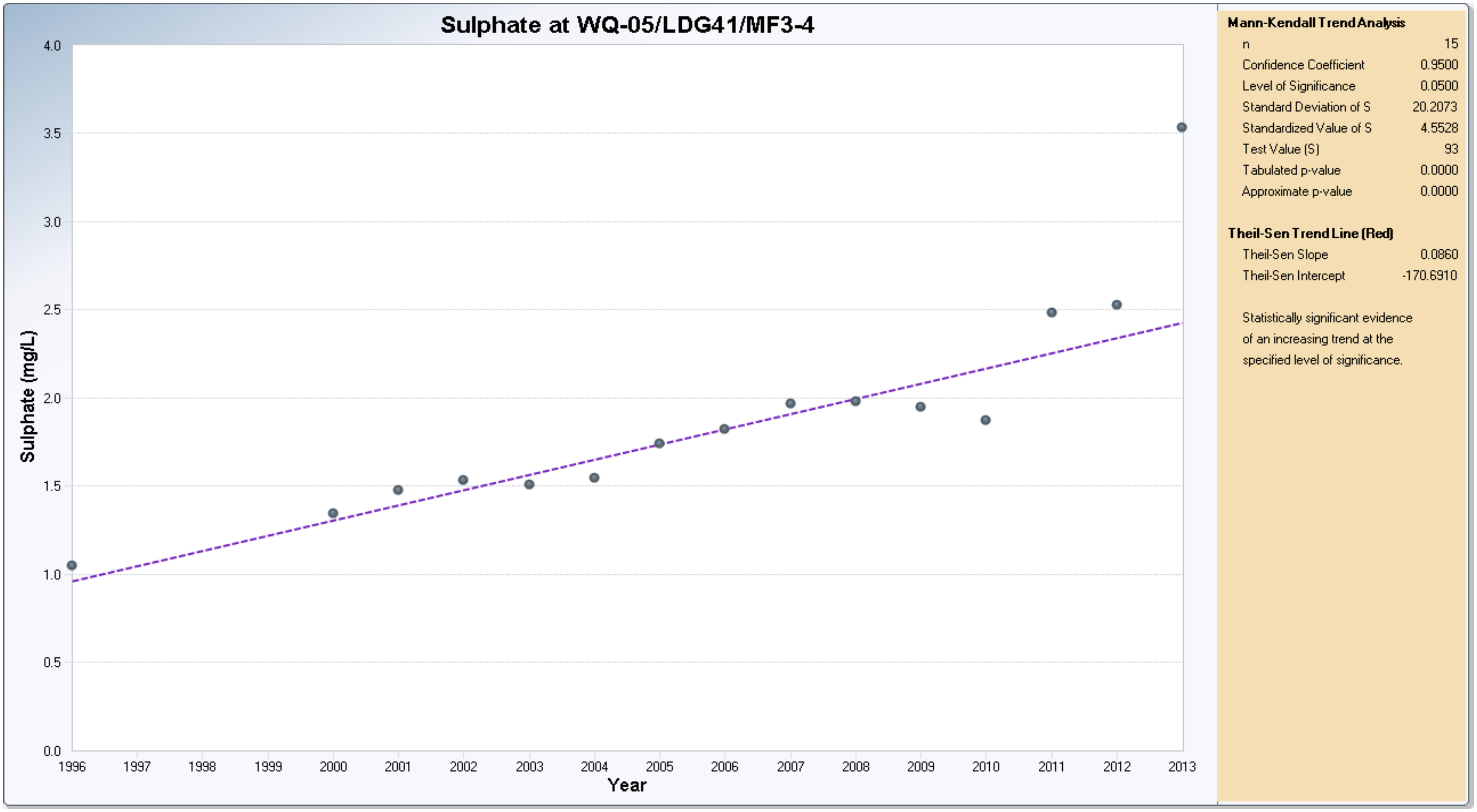
General Statistics

Period of Record	1996, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	1.05
Maximum	3.537
Mean	1.89
Geometric Mean	1.813
Median	1.825
Standard Deviation	0.602

Mann-Kendall Test

Test Value (S)	93
Tabulated p-value	0
Standard Deviation of S	20.21
Standardized Value of S	4.553
Approximate p-value	2.6466E-6

Statistically significant evidence of an increasing trend at the specified level of significance.


Sulphate at WQ-05/LDG41/MF3-4
Sulphate (mg/L)
Year
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.2073
Standardized Value of S 4.5528
Test Value (S) 93
Tabulated p-value 0.0000
Approximate p-value 0.0000
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0860
Theil-Sen Intercept -170.6910
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	4/23/2015 11:11
From File	mf3-4_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Nitrogen (mg/L)

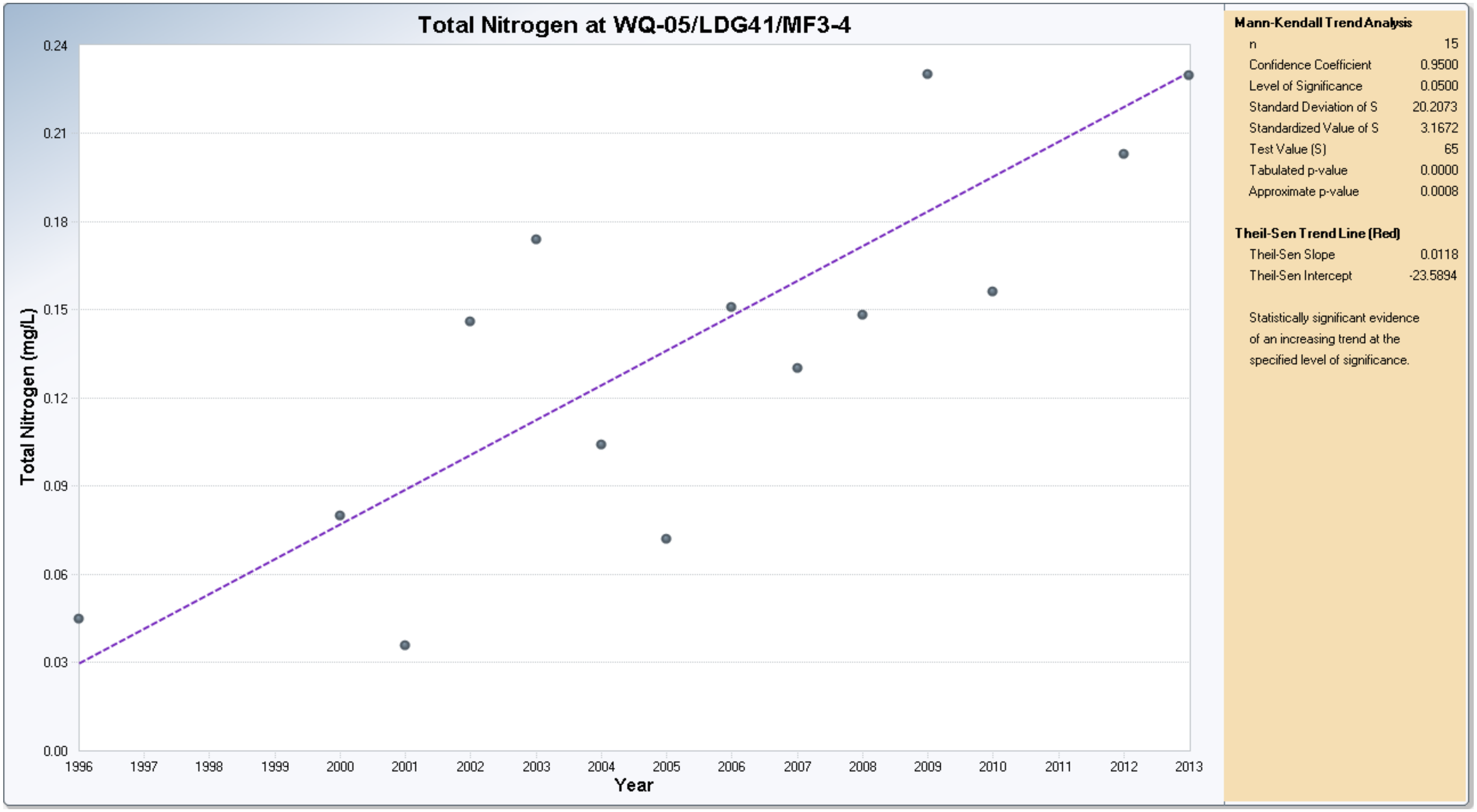
General Statistics

Period of Record	1996, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	0.036
Maximum	124.7
Mean	8.44
Geometric Mean	0.19
Median	0.148
Standard Deviation	32.16

Mann-Kendall Test

Test Value (S)	65
Tabulated p-value	0
Standard Deviation of S	20.21
Standardized Value of S	3.167
Approximate p-value	7.70E-04

Statistically significant evidence of an increasing trend at the specified level of significance.


Total Nitrogen at WQ-05/LDG41/MF3-4
Total Nitrogen (mg/L)
0.24
0.21
0.18
0.15
0.12
0.09
0.06
0.03
0.00
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.2073
Standardized Value of S 3.1672
Test Value (S) 65
Tabulated p-value 0.0000
Approximate p-value 0.0008
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0118
Theil-Sen Intercept -23.5894
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 2:58:59 PM
From File	mf3-4_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Phosphorus (mg/L)

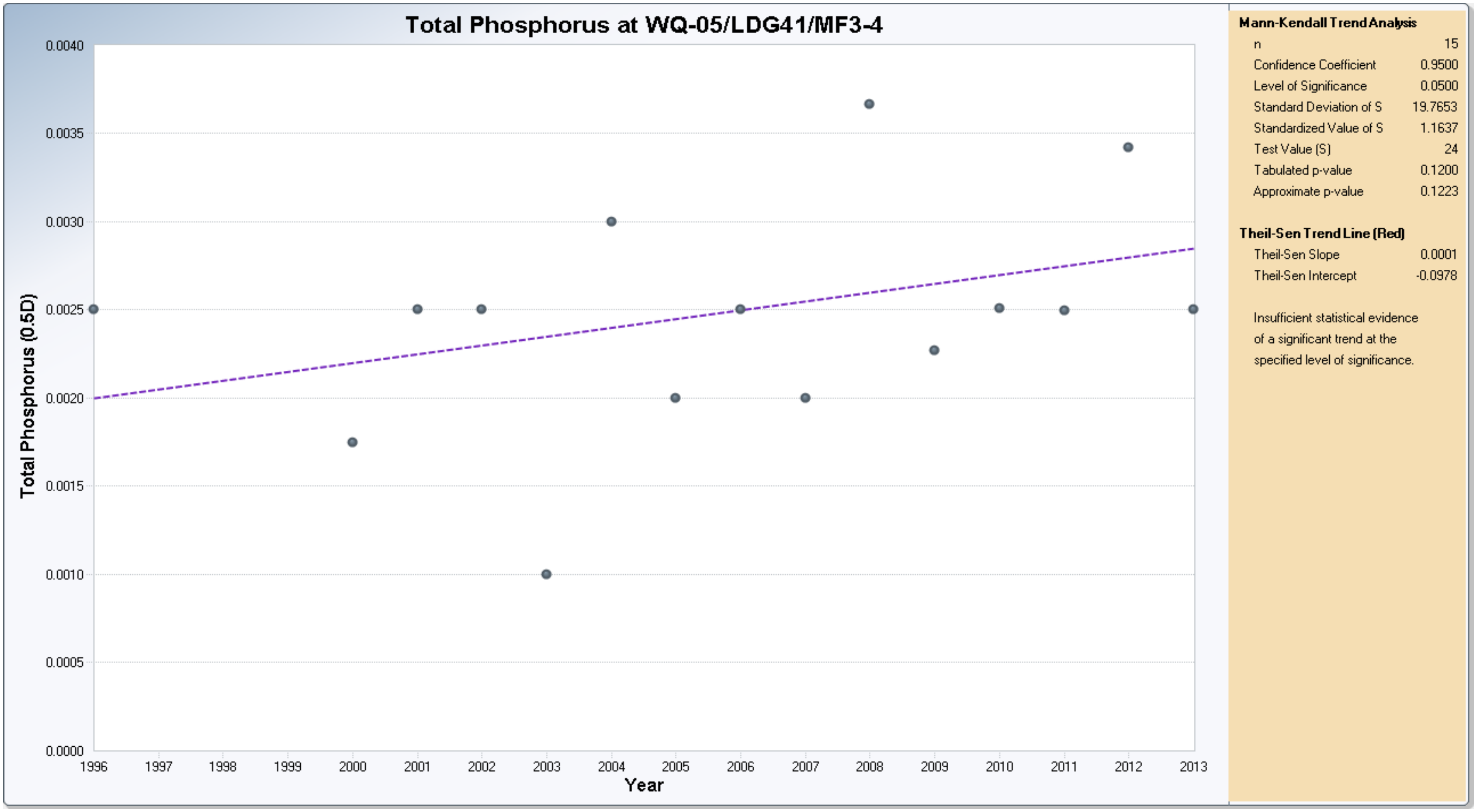
General Statistics

Period of Record	1996, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	0.001
Maximum	0.00367
Mean	0.00244
Geometric Mean	0.00235
Median	0.0025
Standard Deviation	6.4203E-4

Mann-Kendall Test

Test Value (S)	24
Tabulated p-value	0.12
Standard Deviation of S	19.77
Standardized Value of S	1.164
Approximate p-value	0.122

Insufficient evidence to identify a significant trend at the specified level of significance.


Total Phosphorus at WQ-05/LDG41/MF3-4
Total Phosphorus (0.5D)
0.0040
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 19.7653
Standardized Value of S 1.1637
Test Value (S) 24
Tabulated p-value 0.1200
Approximate p-value 0.1223
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0001
Theil-Sen Intercept -0.0978
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 1:20:19 PM
From File	mf3-4_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Arsenic (mg/L)

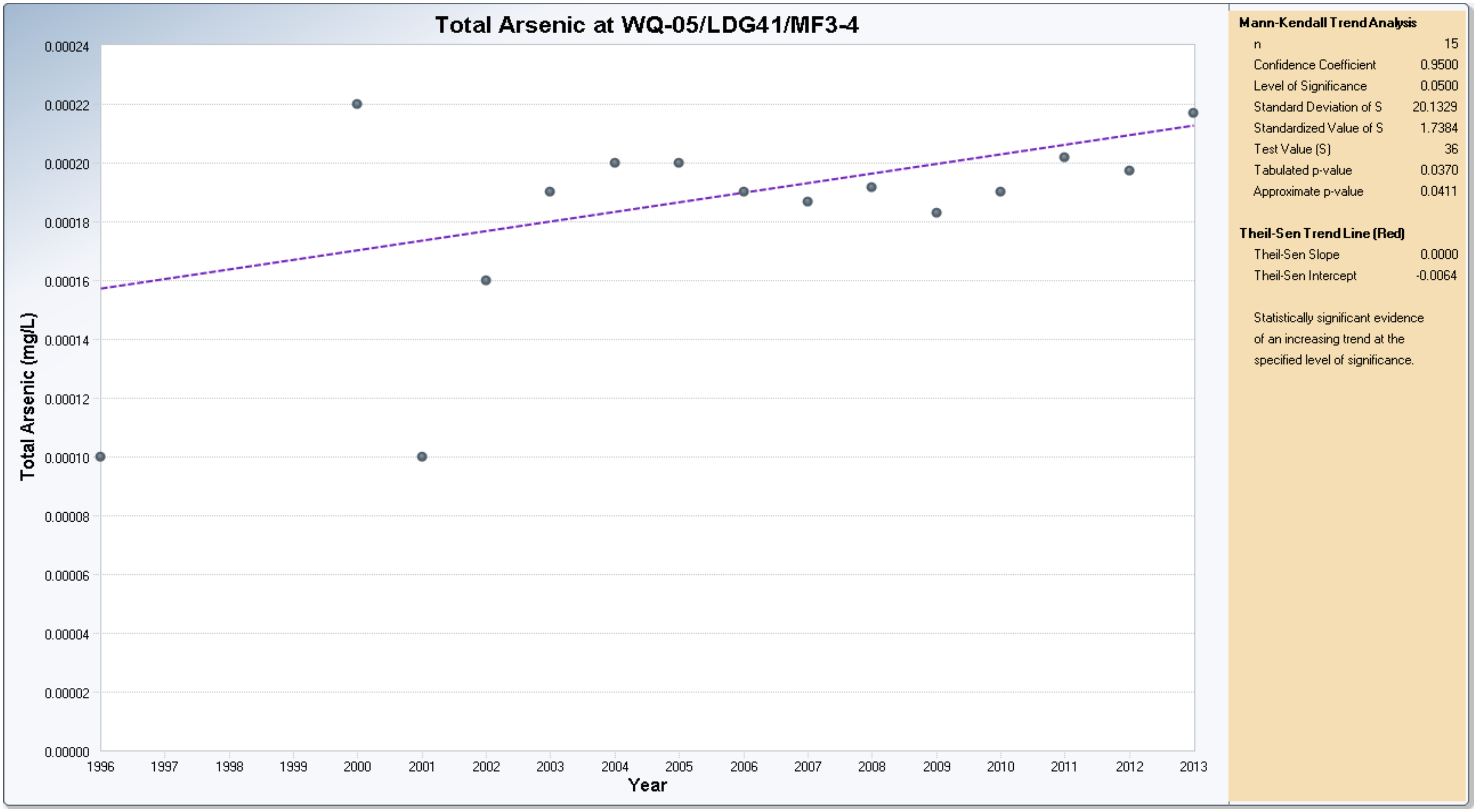
General Statistics

Period of Record	1996, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	1.0000E-4
Maximum	2.2000E-4
Mean	1.8182E-4
Geometric Mean	1.7748E-4
Median	1.9008E-4
Standard Deviation	3.6037E-5

Mann-Kendall Test

Test Value (S)	36
Tabulated p-value	0.037
Standard Deviation of S	20.13
Standardized Value of S	1.738
Approximate p-value	0.0411

Statistically significant evidence of an increasing trend at the specified level of significance.



Total Arsenic at WQ-05/LDG41/MF3-4
Total Arsenic (mg/L)
0.00024
0.00022
0.00020
0.00018
0.00016
0.00014
0.00012
0.00010
0.00008
0.00006
0.00004
0.00002
0.00000
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.1329
Standardized Value of S 1.7384
Test Value (S) 36
Tabulated p-value 0.0370
Approximate p-value 0.0411
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept -0.0064
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 1:24:01 PM
From File	mf3-4_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Iron (mg/L)

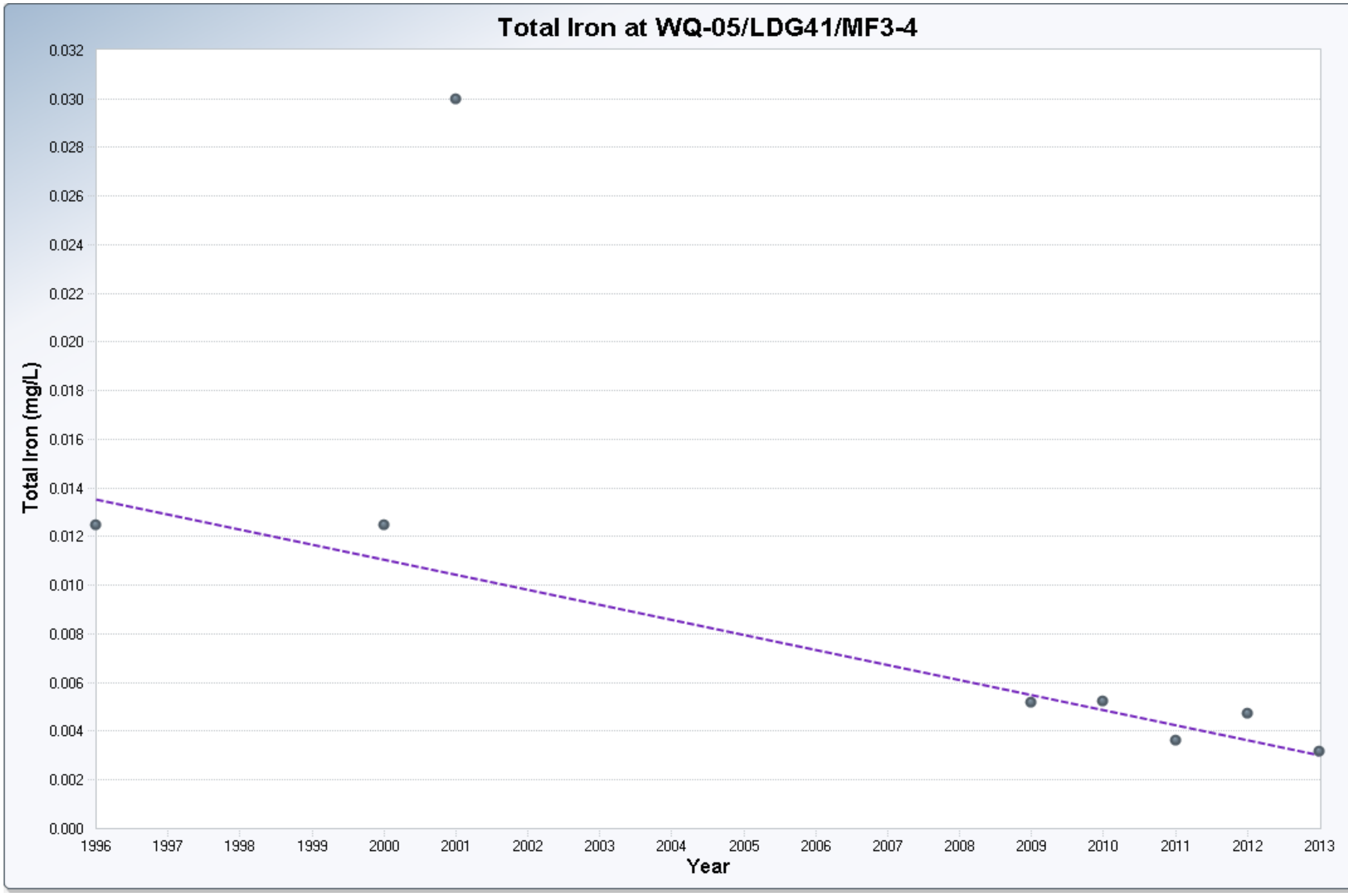
General Statistics

Period of Record	1996, 2000–2001, 2009–2013
Number of Events Reported (m)	20
Number of Missing Events	12
Number or Reported Events Used	8
Number Values Reported (n)	20
Number Values Missing	12
Number Values Used	8
Minimum	0.00317
Maximum	0.03
Mean	0.00961
Geometric Mean	0.00715
Median	0.00518
Standard Deviation	0.00905

Mann-Kendall Test

Test Value (S)	-19
Tabulated p-value	0.016
Standard Deviation of S	8.021
Standardized Value of S	-2.244
Approximate p-value	0.0124

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	8
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	8.0208
Standardized Value of S	-2.2442
Test Value (S)	-19
Tabulated p-value	0.0160
Approximate p-value	0.0124

Theil-Sen Trend Line (Red)

Theil-Sen Slope	-0.0006
Theil-Sen Intercept	1.2503

Statistically significant evidence of a decreasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 1:25:53 PM
From File	mf3-4_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Molybdenum (mg/L)

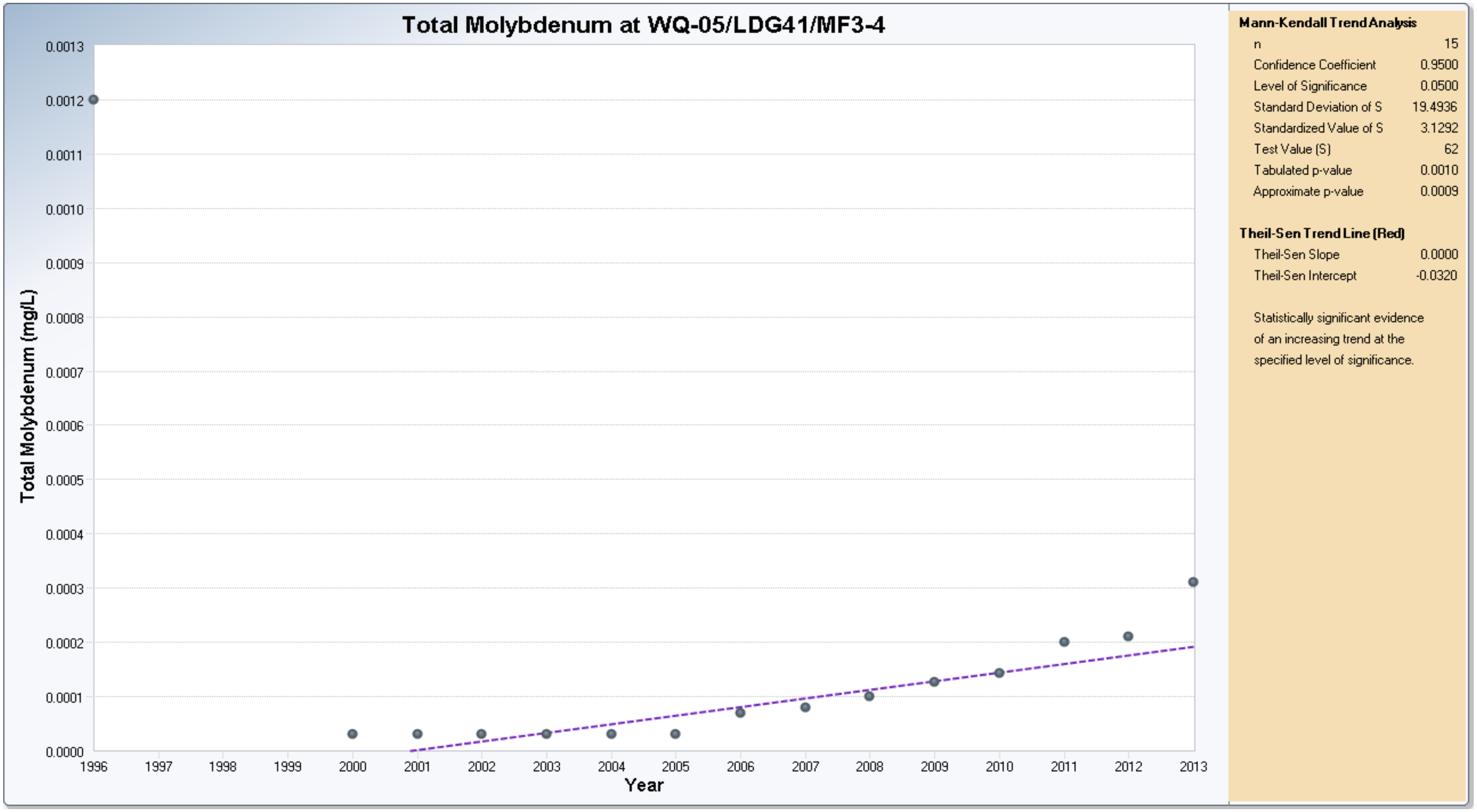
General Statistics

Period of Record	1996, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	3.0000E-5
Maximum	0.0012
Mean	1.7490E-4
Geometric Mean	8.6707E-5
Median	8.0000E-5
Standard Deviation	2.9597E-4

Mann-Kendall Test

Test Value (S)	62
Tabulated p-value	0.001
Standard Deviation of S	19.49
Standardized Value of S	3.129
Approximate p-value	8.7631E-4

Statistically significant evidence of an increasing trend at the specified level of significance.


Total Molybdenum at WQ-05/LDG41/MF3-4
Total Molybdenum (mg/L)
0.0013
0.0012
0.0011
0.0010
0.0009
0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0.0000
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 19.4936
Standardized Value of S 3.1292
Test Value (S) 62
Tabulated p-value 0.0010
Approximate p-value 0.0009
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept -0.0320
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 1:27:41 PM
From File	mf3-4_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Strontium (mg/L)

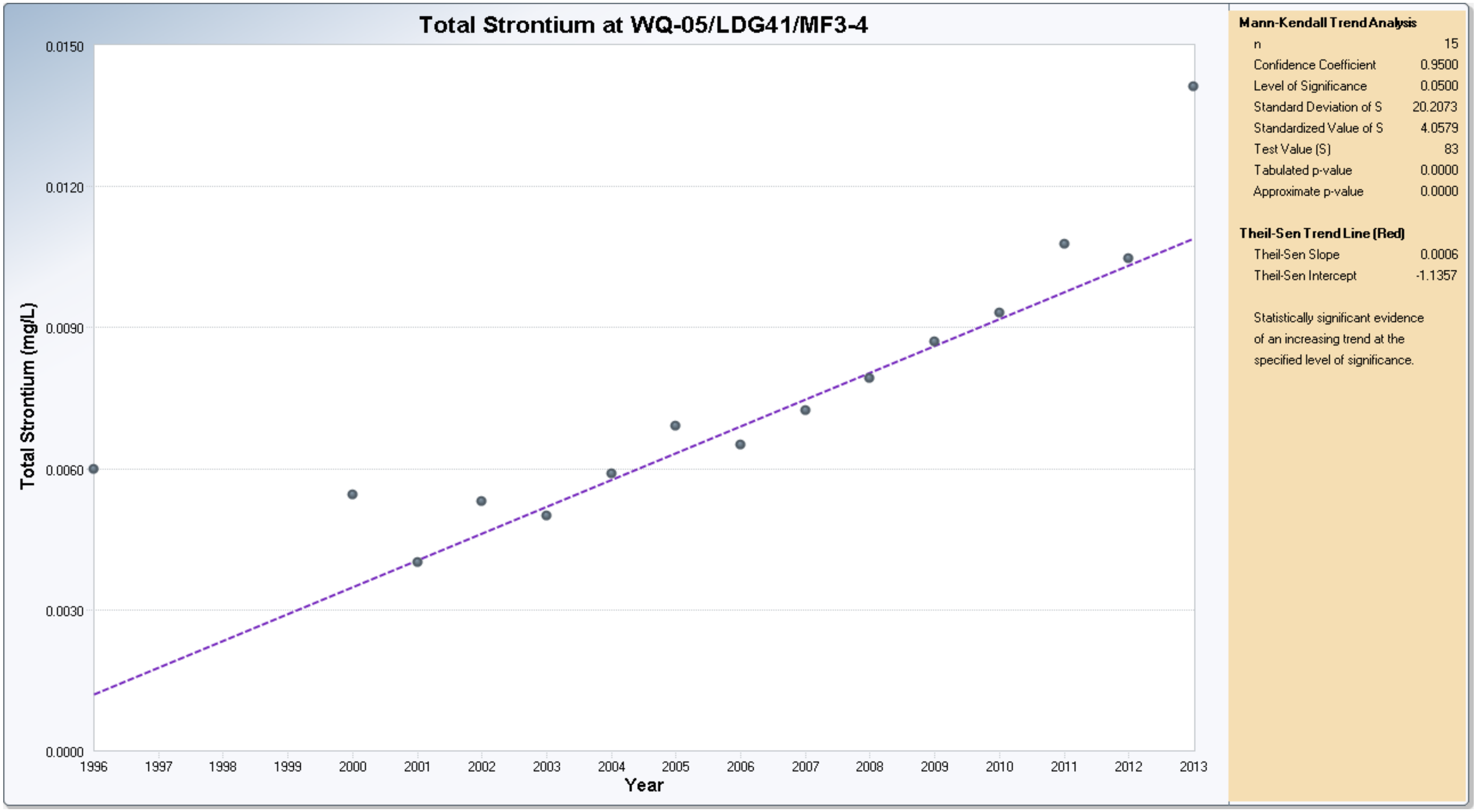
General Statistics

Period of Record	1996, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	0.004
Maximum	0.0141
Mean	0.00757
Geometric Mean	0.00717
Median	0.0069
Standard Deviation	0.0027

Mann-Kendall Test

Test Value (S)	83
Tabulated p-value	0
Standard Deviation of S	20.21
Standardized Value of S	4.058
Approximate p-value	2.4753E-5

Statistically significant evidence of an increasing trend at the specified level of significance.


Total Strontium at WQ-05/LDG41/MF3-4
Total Strontium (mg/L)
0.0150
0.0120
0.0090
0.0060
0.0030
0.0000
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.2073
Standardized Value of S 4.0579
Test Value (S) 83
Tabulated p-value 0.0000
Approximate p-value 0.0000
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0006
Theil-Sen Intercept -1.1357
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/4/2014 1:29:13 PM
From File	mf3-4_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Uranium (mg/L)

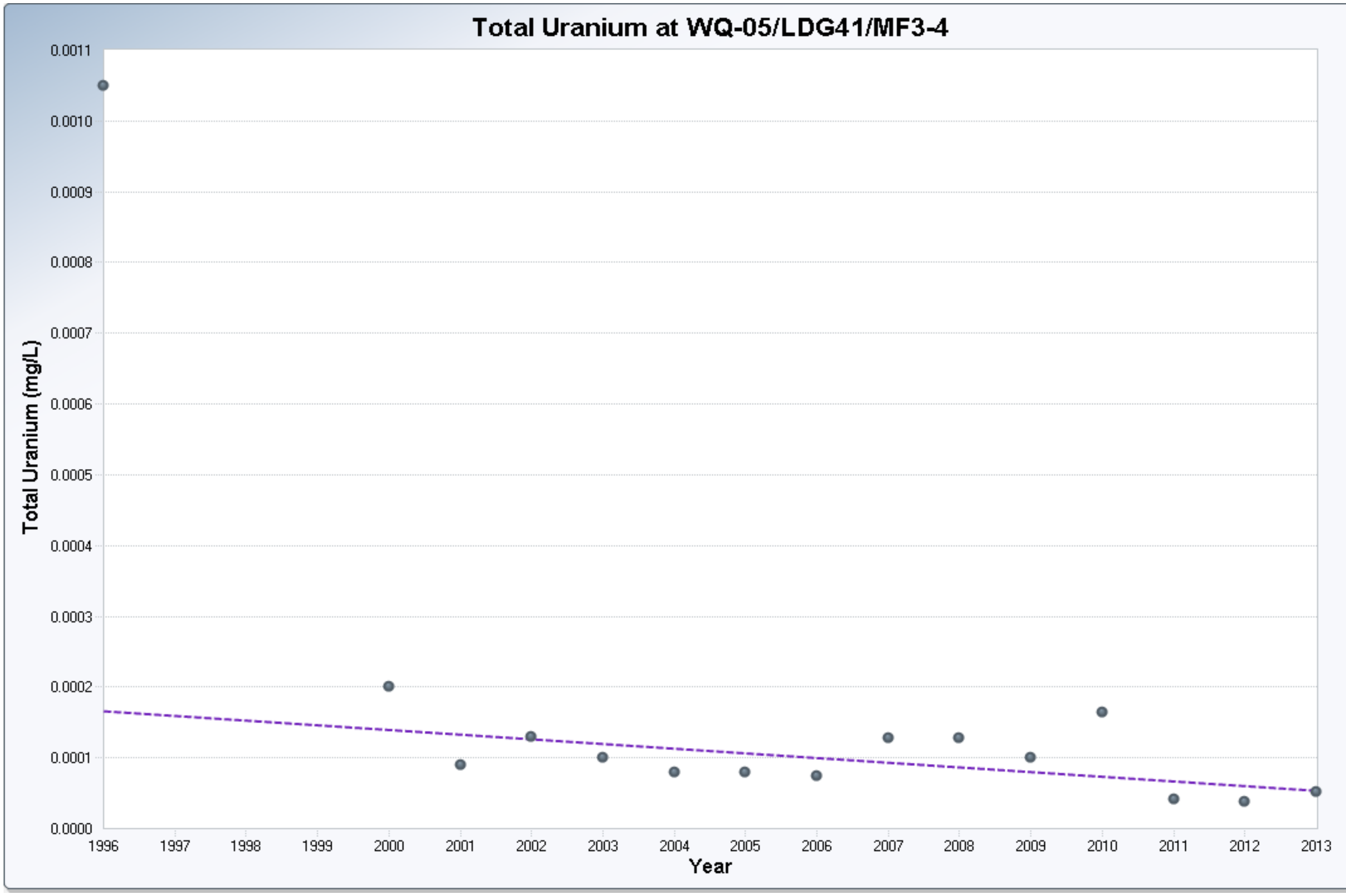
General Statistics

Period of Record	1996, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	3.8200E-5
Maximum	0.00105
Mean	1.6396E-4
Geometric Mean	1.0686E-4
Median	1.0000E-4
Standard Deviation	2.4911E-4

Mann-Kendall Test

Test Value (S)	-46
Tabulated p-value	0.01
Standard Deviation of S	20.18
Standardized Value of S	-2.23
Approximate p-value	0.0129

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.1825
Standardized Value of S	-2.2297
Test Value (S)	-46
Tabulated p-value	0.0100
Approximate p-value	0.0129

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.0000
Theil-Sen Intercept	0.0132

Statistically significant evidence of a decreasing trend at the specified level of significance.

WQ-05/LDG41/MF3-4
Baseline vs. Post-Baseline Trends
for Select Parameters

Significant ($p < 0.05$) Trends at WQ-05/LDG41/MF3-4 for Select Parameters

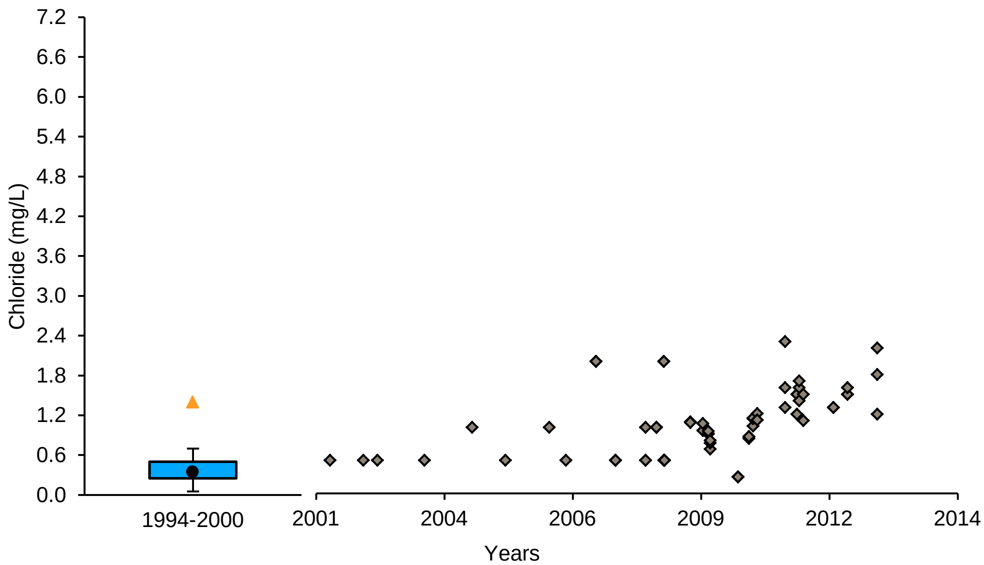


Figure D-18 Boxplot of the Baseline Condition for Chloride and Post-Baseline Chloride Values at WQ-05LDG41/MF3-4; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

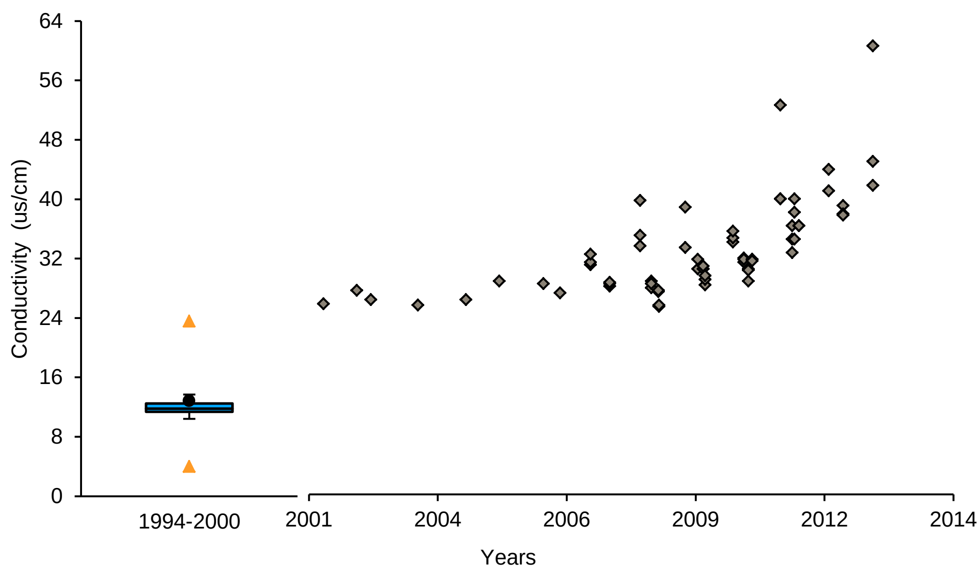


Figure D-19 Boxplot of the Baseline Condition for Conductivity and Post-Baseline Conductivity Values at WQ-05LDG41/MF3-4; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

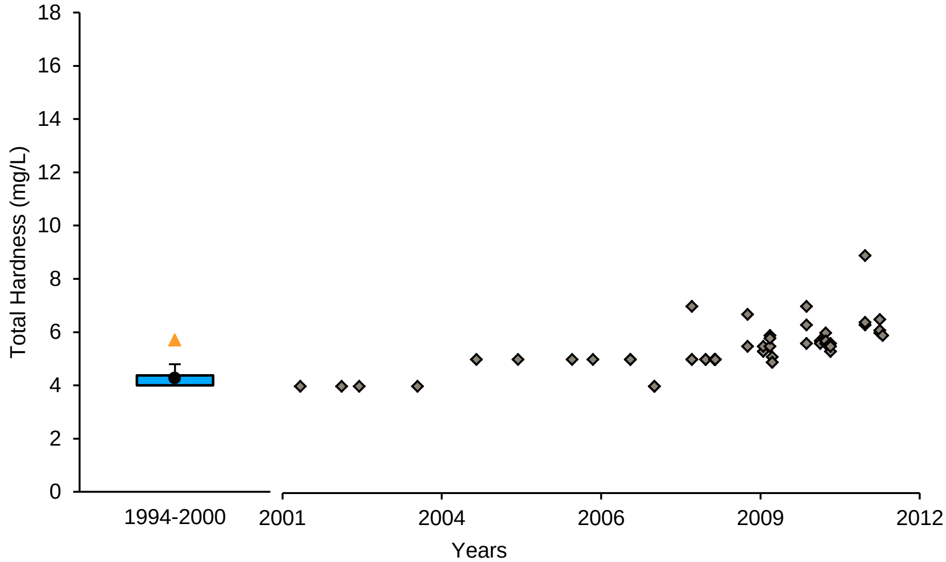


Figure D-20 Boxplot of the Baseline Condition for Hardness and Post-Baseline Hardness Values at WQ-05LDG41/MF3-43; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

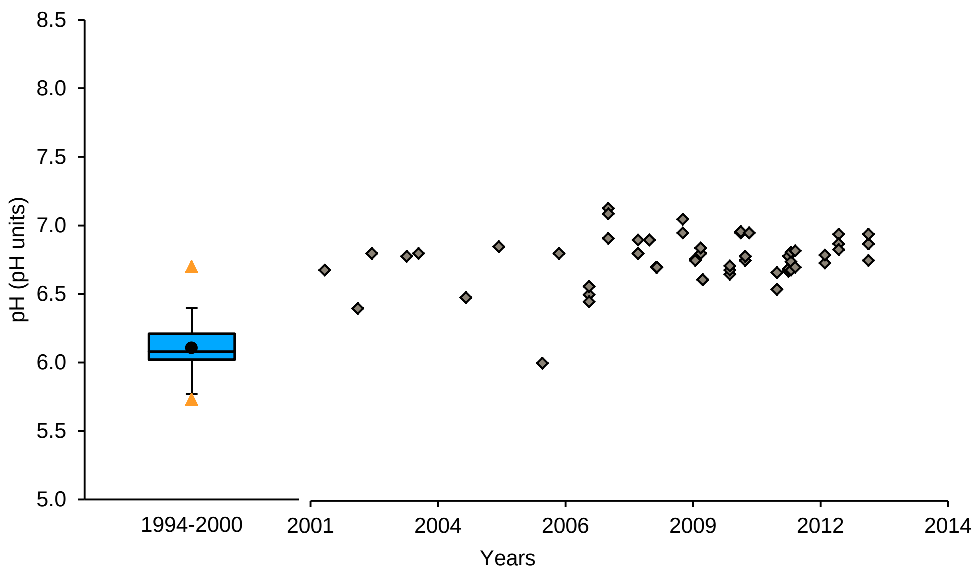


Figure D-21 Boxplot of the Baseline Condition for pH and Post-Baseline pH Values at WQ-05LDG41/MF3-4; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

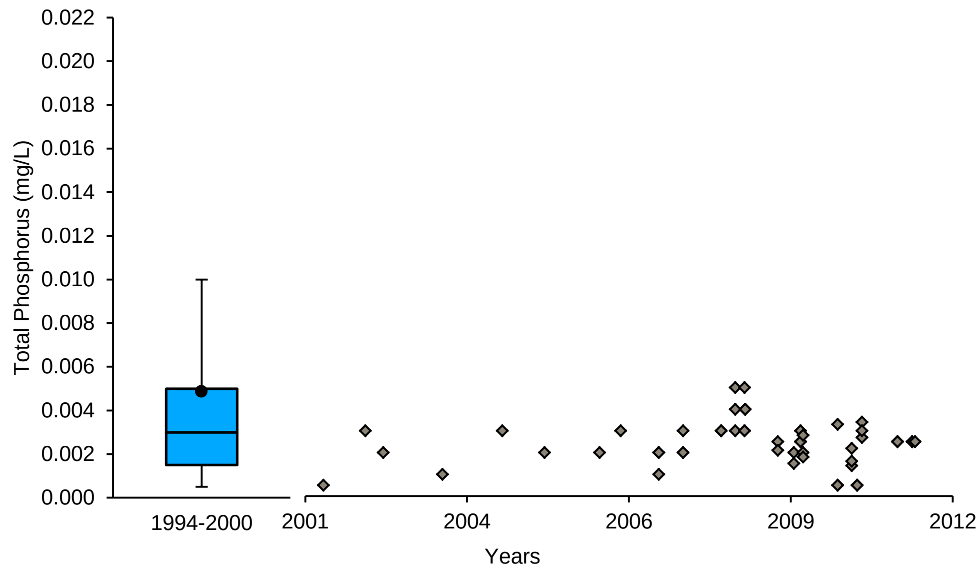


Figure D-22 Boxplot of the Baseline Condition for Total Phosphorus and Post-Baseline Total Phosphorus Values at WQ-05LDG41/MF3-4; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

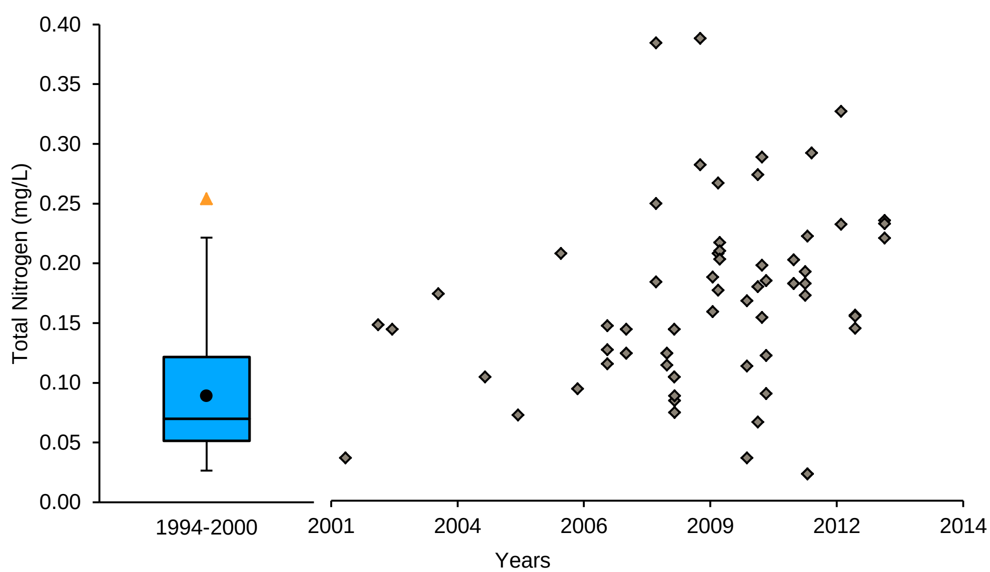


Figure D-23 Boxplot of the Baseline Condition for Total Nitrogen and Post-Baseline Total Nitrogen Values at WQ-05LDG41/MF3-4; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

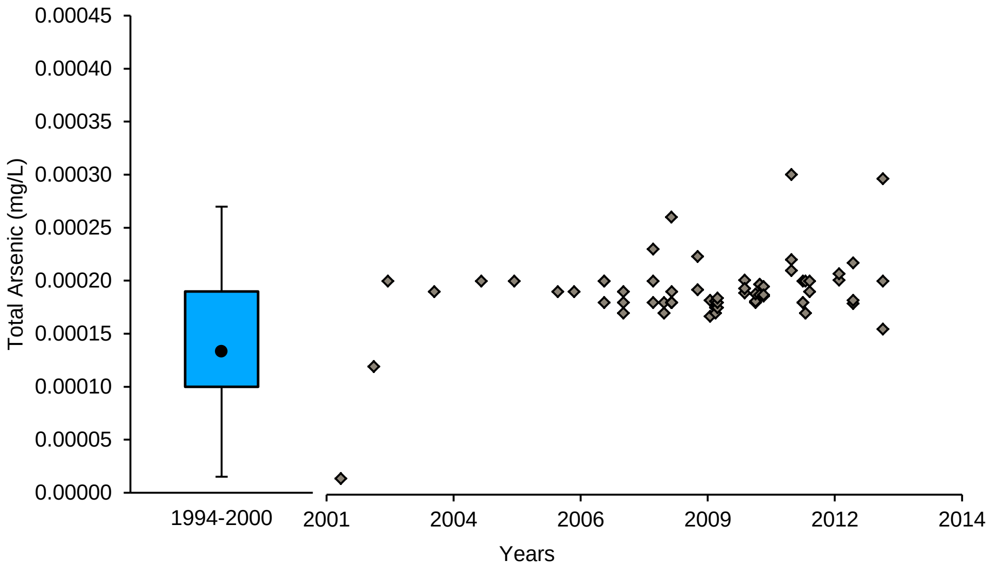


Figure D-24 Boxplot of the Baseline Condition for Total Arsenic and Post-Baseline Total Arsenic Values at WQ-05LDG41/MF3-4; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

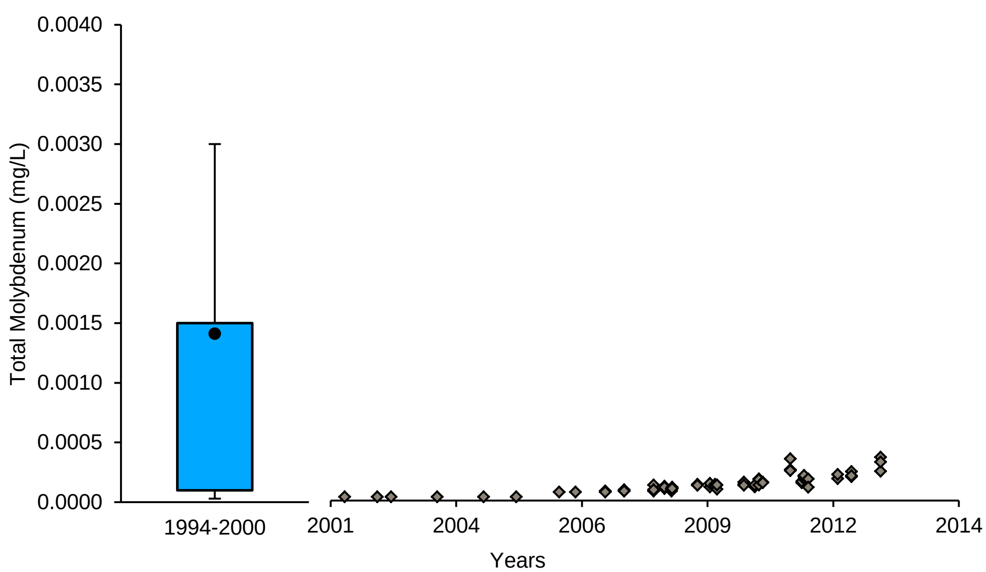


Figure D-25 Boxplot of the Baseline Condition for Total Molybdenum and Post-Baseline Total Molybdenum Values at WQ-05LDG41/MF3-4; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

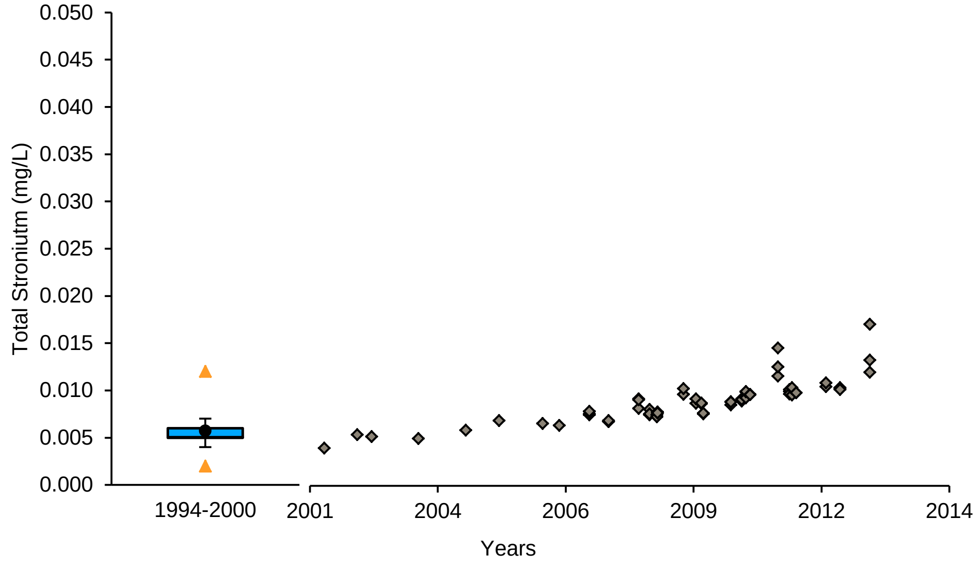


Figure D-26 Boxplot of the Baseline Condition for Total Strontium and Post-Baseline Total Strontium Values at WQ-05LDG41/MF3-4; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

LDG46/FFA

ProUCL Trends Analysis Output

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/18/2014 3:40:17 PM
From File	ffa_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Chloride (mg/L)

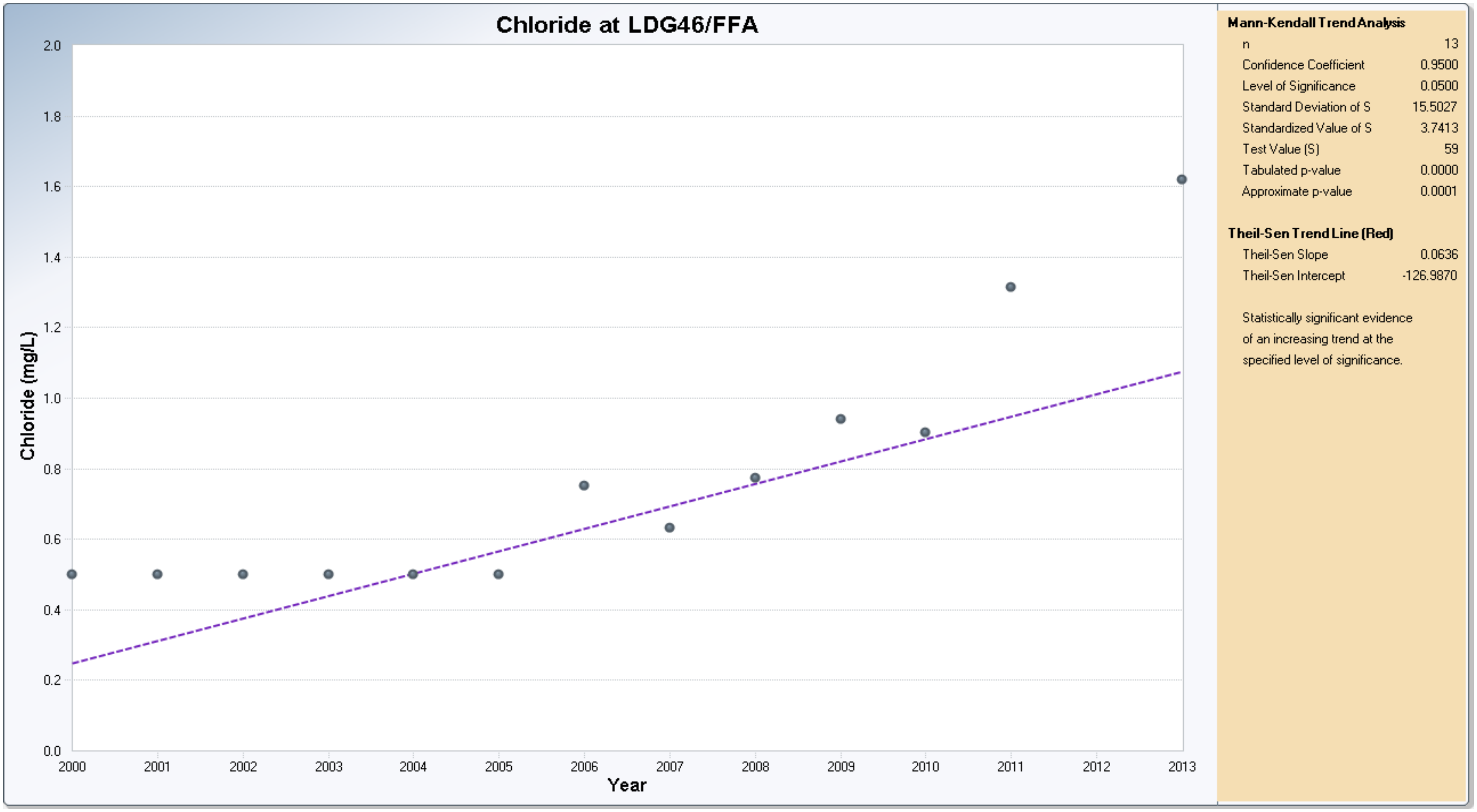
General Statistics

Period of Record	2000–2011, 2013
Number of Events Reported (m)	14
Number of Missing Events	1
Number or Reported Events Used	13
Number Values Reported (n)	14
Number Values Missing	1
Number Values Used	13
Minimum	0.5
Maximum	1.62
Mean	0.764
Geometric Mean	0.704
Median	0.632
Standard Deviation	0.356

Mann-Kendall Test

Test Value (S)	59
Tabulated p-value	0
Standard Deviation of S	15.5
Standardized Value of S	3.741
Approximate p-value	9.1540E-5

Statistically significant evidence of an increasing trend at the specified level of significance.



Chloride at LDG46/FFA
Chloride (mg/L)
Year
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 15.5027
Standardized Value of S 3.7413
Test Value (S) 59
Tabulated p-value 0.0000
Approximate p-value 0.0001
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0636
Theil-Sen Intercept -126.9870
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/18/2014 3:37:34 PM
From File	ffa_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Conductivity (µS/cm)

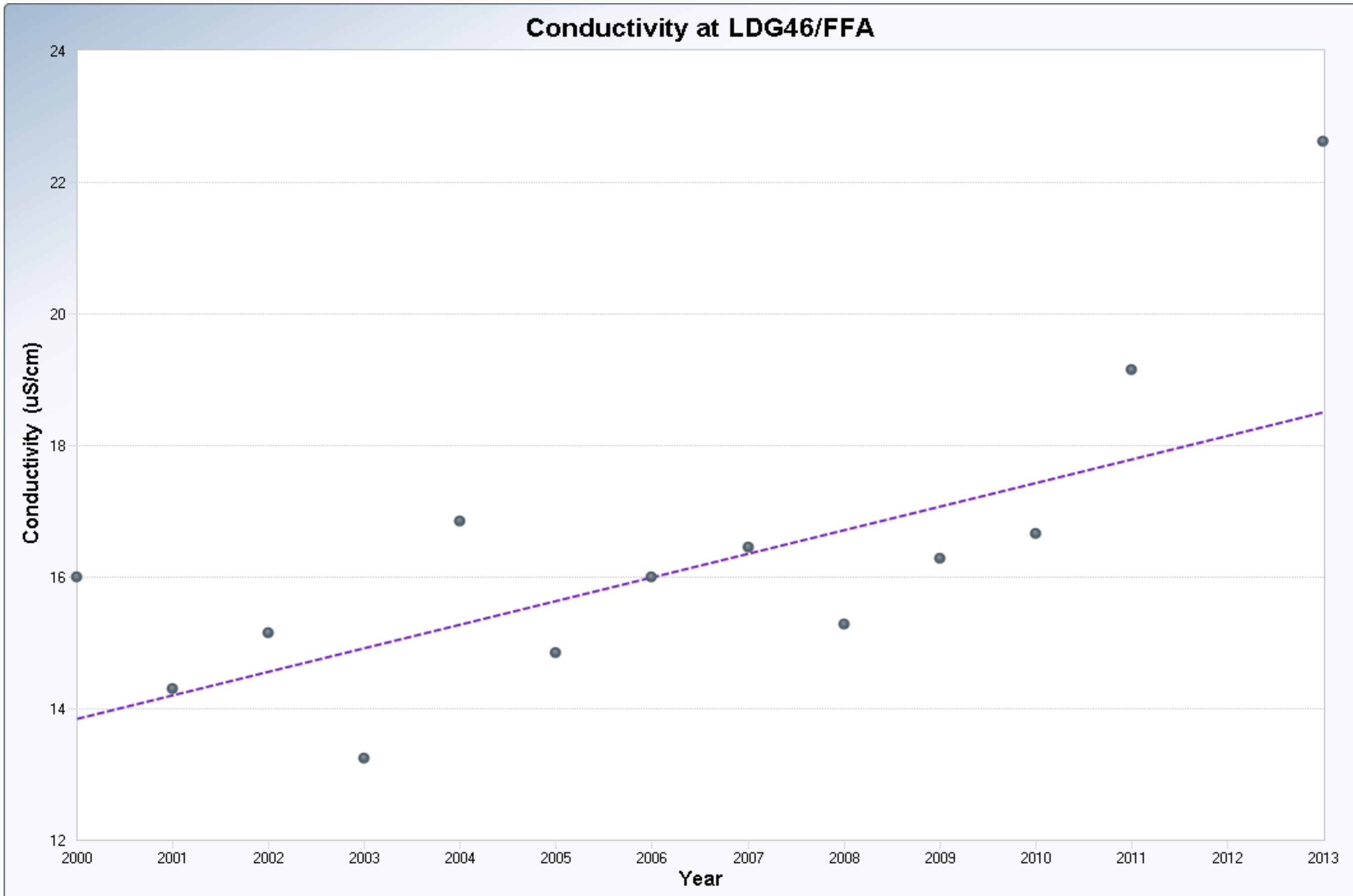
General Statistics

Period of Record	2000–2011, 2013
Number of Events Reported (m)	14
Number of Missing Events	1
Number or Reported Events Used	13
Number Values Reported (n)	14
Number Values Missing	1
Number Values Used	13
Minimum	13.25
Maximum	22.62
Mean	16.38
Geometric Mean	16.24
Median	16
Standard Deviation	2.353

Mann-Kendall Test

Test Value (S)	43
Tabulated p-value	0.005
Standard Deviation of S	16.36
Standardized Value of S	2.567
Approximate p-value	0.00513

Statistically significant evidence of an increasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	13
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	16.3605
Standardized Value of S	2.5672
Test Value (S)	43
Tabulated p-value	0.0050
Approximate p-value	0.0051

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.3598
Theil-Sen Intercept	-705.6761

Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/18/2014 3:38:55 PM
From File	ffa_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Hardness-Total (mg/L)

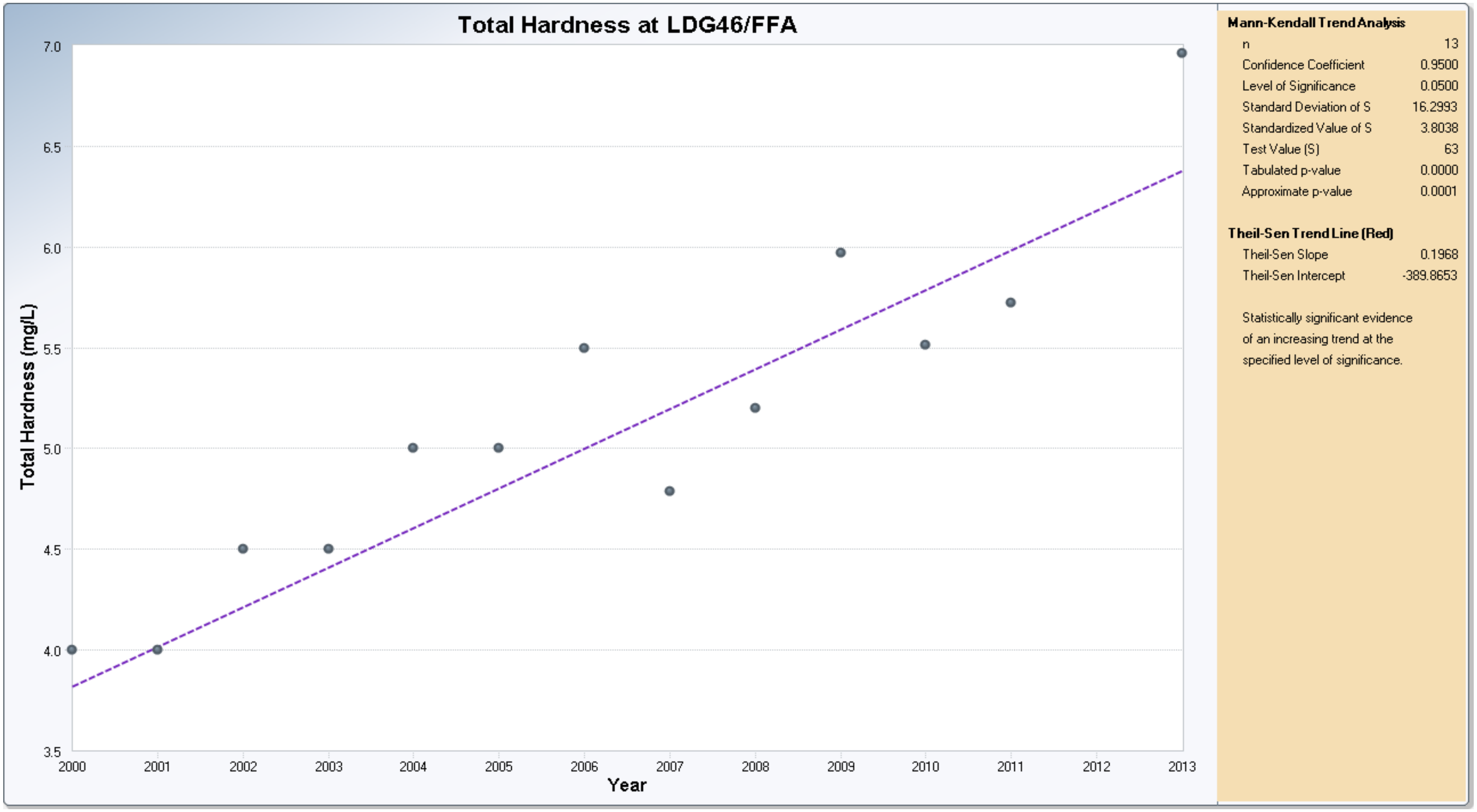
General Statistics

Period of Record	2000–2011, 2013
Number of Events Reported (m)	14
Number of Missing Events	1
Number or Reported Events Used	13
Number Values Reported (n)	14
Number Values Missing	1
Number Values Used	13
Minimum	4
Maximum	6.962
Mean	5.127
Geometric Mean	5.068
Median	5
Standard Deviation	0.826

Mann-Kendall Test

Test Value (S)	63
Tabulated p-value	0
Standard Deviation of S	16.3
Standardized Value of S	3.804
Approximate p-value	7.1233E-5

Statistically significant evidence of an increasing trend at the specified level of significance.



Total Hardness at LDG46/FFA
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
Total Hardness (mg/L)
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.2993
Standardized Value of S 3.8038
Test Value (S) 63
Tabulated p-value 0.0000
Approximate p-value 0.0001
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.1968
Theil-Sen Intercept -389.8653
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/18/2014 3:35:41 PM
From File	ffa_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

pH (pH units)

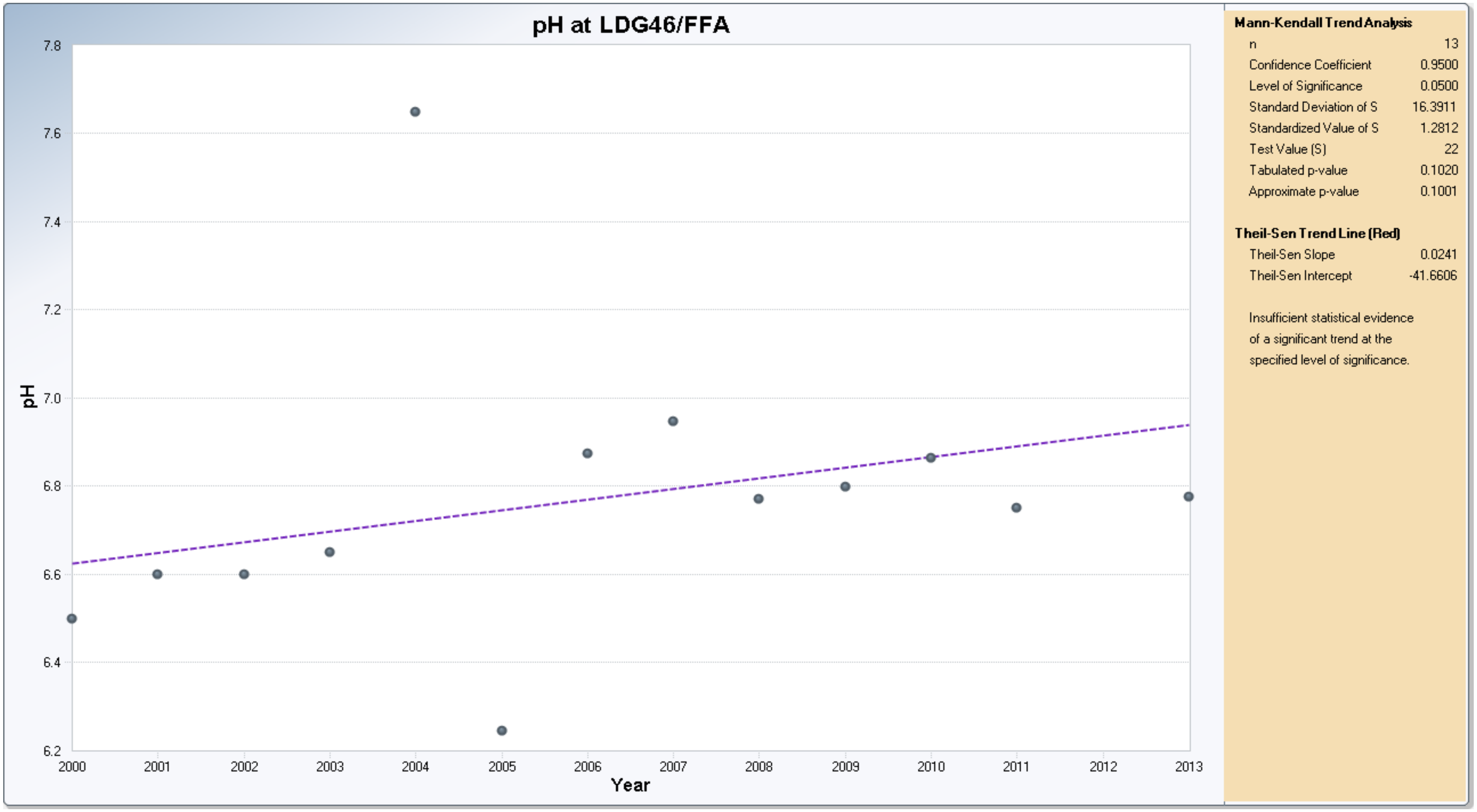
General Statistics

Period of Record	2000–2011, 2013
Number of Events Reported (m)	14
Number of Missing Events	1
Number or Reported Events Used	13
Number Values Reported (n)	14
Number Values Missing	1
Number Values Used	13
Minimum	6.245
Maximum	7.65
Mean	6.771
Geometric Mean	6.765
Median	6.77
Standard Deviation	0.322

Mann-Kendall Test

Test Value (S)	22
Tabulated p-value	0.102
Standard Deviation of S	16.39
Standardized Value of S	1.281
Approximate p-value	0.1

Insufficient evidence to identify a significant trend at the specified level of significance.


pH at LDG46/FFA
pH
Year
7.8
7.6
7.4
7.2
7.0
6.8
6.6
6.4
6.2
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3911
Standardized Value of S 1.2812
Test Value (S) 22
Tabulated p-value 0.1020
Approximate p-value 0.1001
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0241
Theil-Sen Intercept -41.6606
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/18/2014 3:41:24 PM
From File	ffa_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Sulphate (mg/L)

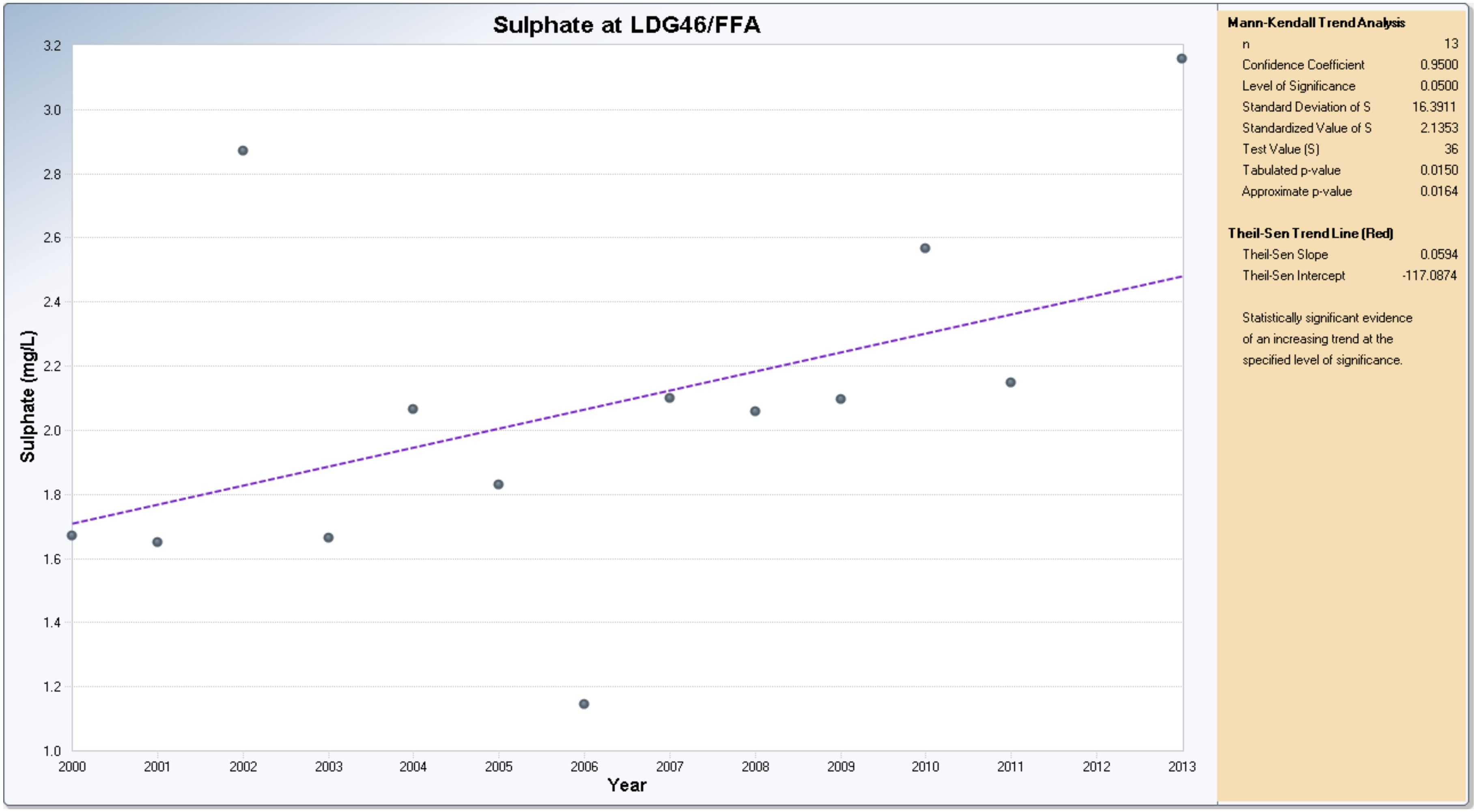
General Statistics

Period of Record	2000–2011, 2013
Number of Events Reported (m)	14
Number of Missing Events	1
Number or Reported Events Used	13
Number Values Reported (n)	14
Number Values Missing	1
Number Values Used	13
Minimum	1.145
Maximum	3.16
Mean	2.079
Geometric Mean	2.014
Median	2.065
Standard Deviation	0.54

Mann-Kendall Test

Test Value (S)	36
Tabulated p-value	0.015
Standard Deviation of S	16.39
Standardized Value of S	2.135
Approximate p-value	0.0164

Statistically significant evidence of an increasing trend at the specified level of significance.



Sulphate at LDG46/FFA
Sulphate (mg/L)
3.2
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3911
Standardized Value of S 2.1353
Test Value (S) 36
Tabulated p-value 0.0150
Approximate p-value 0.0164
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0594
Theil-Sen Intercept -117.0874
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/18/2014 3:46:18 PM
From File	ffa_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Nitrogen (N)-Total (mg/L)-CALC

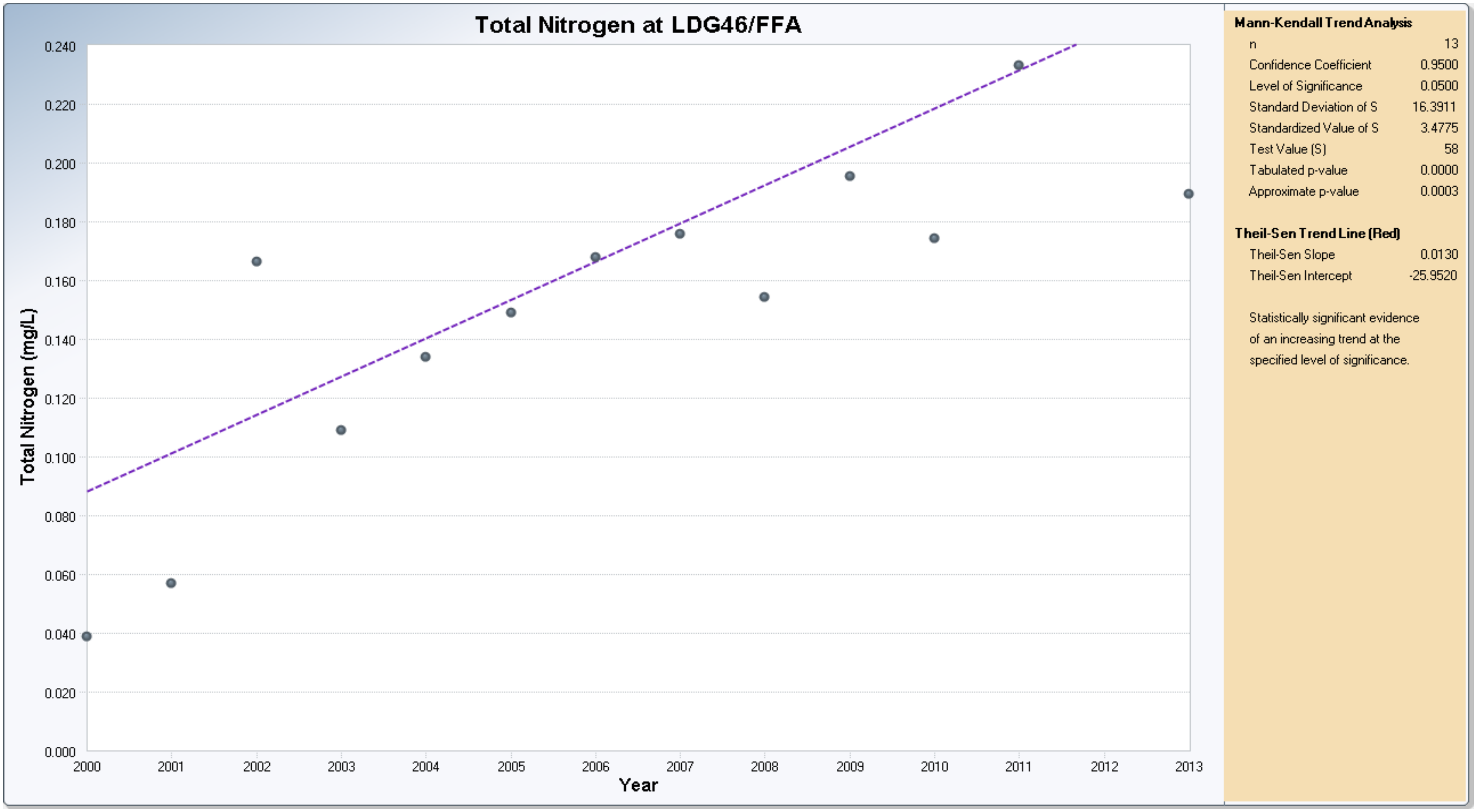
General Statistics

Period of Record	2000–2011, 2013
Number of Events Reported (m)	14
Number of Missing Events	1
Number or Reported Events Used	13
Number Values Reported (n)	14
Number Values Missing	1
Number Values Used	13
Minimum	0.039
Maximum	0.233
Mean	0.15
Geometric Mean	0.136
Median	0.167
Standard Deviation	0.0542

Mann-Kendall Test

Test Value (S)	58
Tabulated p-value	0
Standard Deviation of S	16.39
Standardized Value of S	3.478
Approximate p-value	2.5305E-4

Statistically significant evidence of an increasing trend at the specified level of significance.



Total Nitrogen at LDG46/FFA
Total Nitrogen (mg/L)
0.240
0.220
0.200
0.180
0.160
0.140
0.120
0.100
0.080
0.060
0.040
0.020
0.000
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3911
Standardized Value of S 3.4775
Test Value (S) 58
Tabulated p-value 0.0000
Approximate p-value 0.0003
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0130
Theil-Sen Intercept -25.9520
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/18/2014 3:48:29 PM
From File	ffa_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Phosphorus-Total (mg/L)

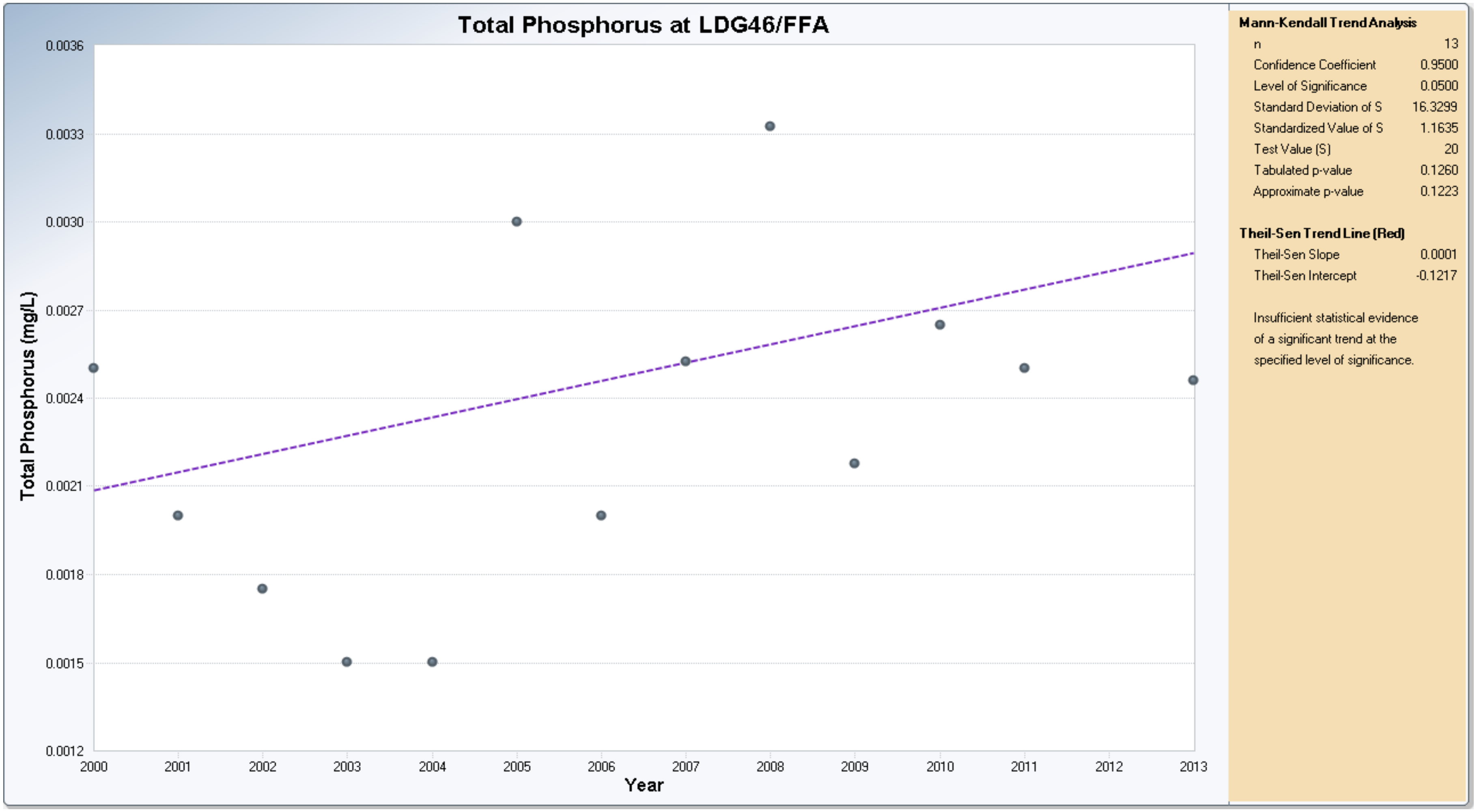
General Statistics

Period of Record	2000–2011, 2013
Number of Events Reported (m)	14
Number of Missing Events	1
Number or Reported Events Used	13
Number Values Reported (n)	14
Number Values Missing	1
Number Values Used	13
Minimum	0.0015
Maximum	0.00333
Mean	0.0023
Geometric Mean	0.00224
Median	0.00246
Standard Deviation	5.4736E-4

Mann-Kendall Test

Test Value (S)	20
Tabulated p-value	0.126
Standard Deviation of S	16.33
Standardized Value of S	1.164
Approximate p-value	0.122

Insufficient evidence to identify a significant trend at the specified level of significance.


Total Phosphorus at LDG46/FFA
Total Phosphorus (mg/L)
0.0036
0.0033
0.0030
0.0027
0.0024
0.0021
0.0018
0.0015
0.0012
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3299
Standardized Value of S 1.1635
Test Value (S) 20
Tabulated p-value 0.1260
Approximate p-value 0.1223
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0001
Theil-Sen Intercept -0.1217
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/18/2014 3:50:26 PM
From File	ffa_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Arsenic-Total (mg/L)

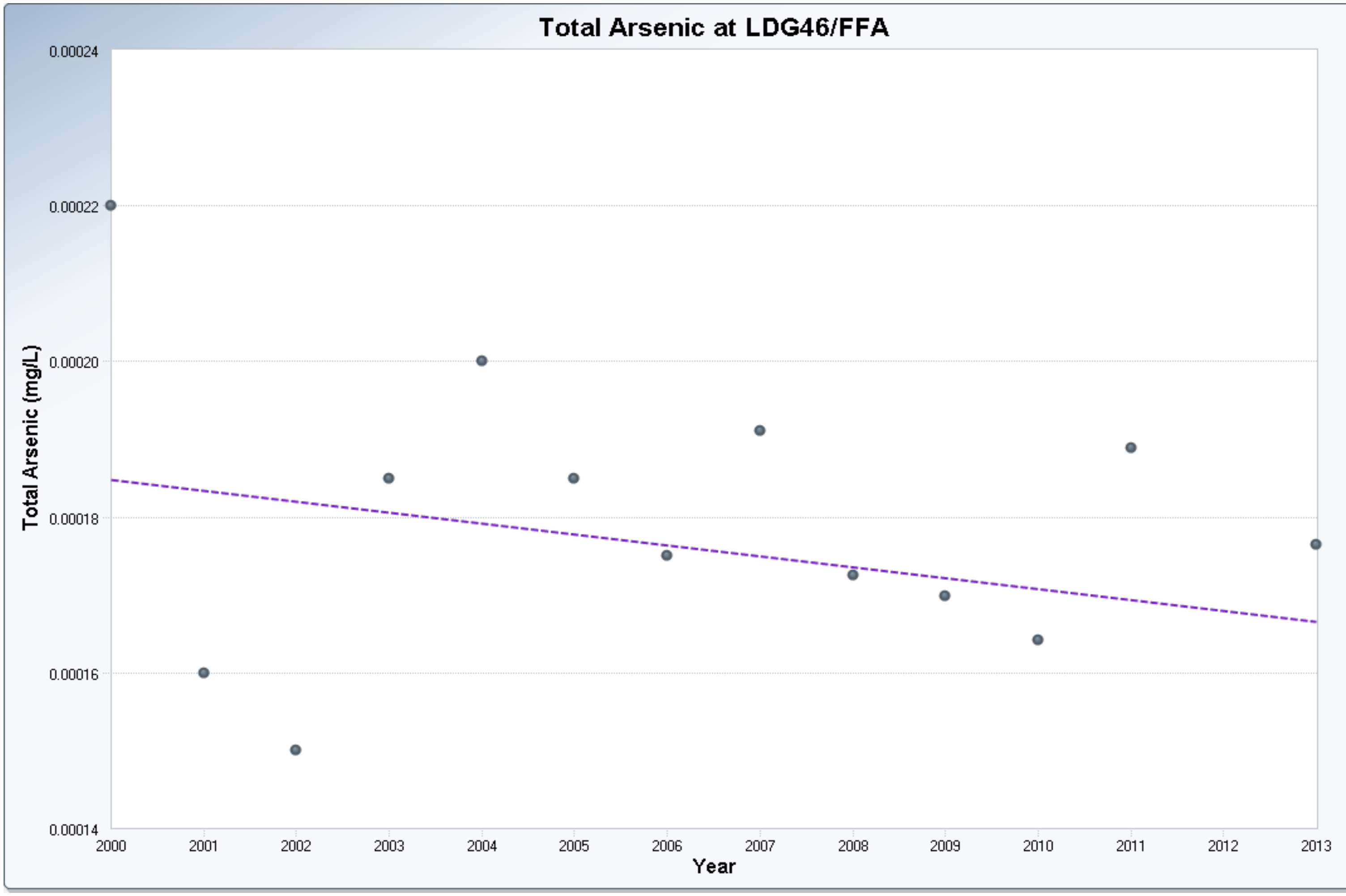
General Statistics

Period of Record	2000–2011, 2013
Number of Events Reported (m)	14
Number of Missing Events	1
Number or Reported Events Used	13
Number Values Reported (n)	14
Number Values Missing	1
Number Values Used	13
Minimum	1.5000E-4
Maximum	2.2000E-4
Mean	1.7985E-4
Geometric Mean	1.7901E-4
Median	1.7640E-4
Standard Deviation	1.8250E-5

Mann-Kendall Test

Test Value (S)	-9
Tabulated p-value	0.338
Standard Deviation of S	16.36
Standardized Value of S	-0.489
Approximate p-value	0.312

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	13
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	16.3605
Standardized Value of S	-0.4890
Test Value (S)	-9
Tabulated p-value	0.3380
Approximate p-value	0.3124

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.0000
Theil-Sen Intercept	0.0030

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/18/2014 3:52:16 PM
From File	ffa_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Iron-Total (mg/L)

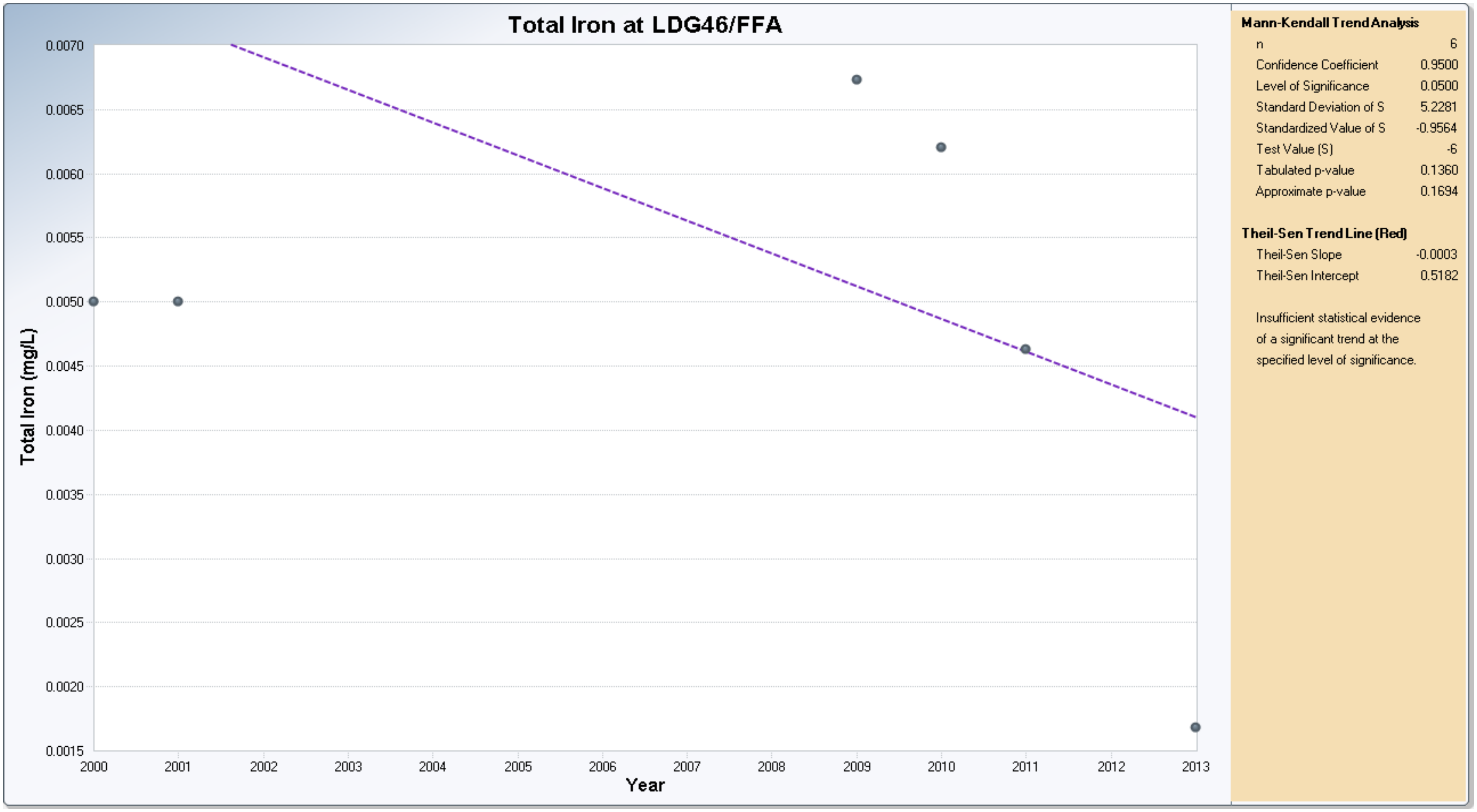
General Statistics

Period of Record	2000–2001, 2009–2013
Number of Events Reported (m)	14
Number of Missing Events	8
Number or Reported Events Used	6
Number Values Reported (n)	14
Number Values Missing	8
Number Values Used	6
Minimum	0.00168
Maximum	0.00673
Mean	0.00487
Geometric Mean	0.00448
Median	0.005
Standard Deviation	0.00176

Mann-Kendall Test

Test Value (S)	-6
Tabulated p-value	0.136
Standard Deviation of S	5.228
Standardized Value of S	-0.956
Approximate p-value	0.169

Insufficient evidence to identify a significant trend at the specified level of significance.


Total Iron at LDG46/FFA
Total Iron (mg/L)
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
0.0030
0.0025
0.0020
0.0015
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 6
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 5.2281
Standardized Value of S -0.9564
Test Value (S) -6
Tabulated p-value 0.1360
Approximate p-value 0.1694
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0003
Theil-Sen Intercept 0.5182
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/18/2014 3:54:00 PM
From File	ffa_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Molybdenum-Total (mg/L)

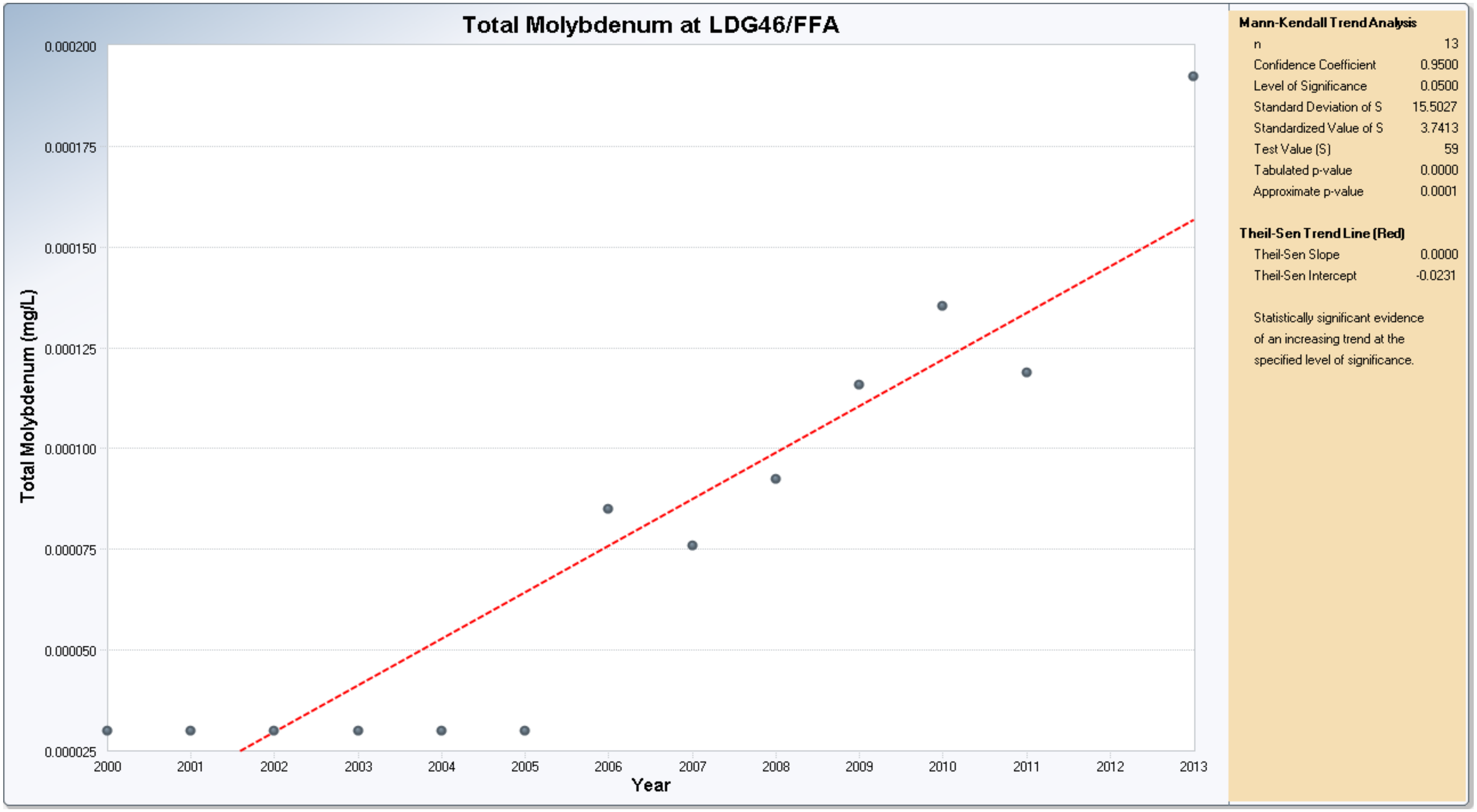
General Statistics

Period of Record	2000–2011, 2013
Number of Events Reported (m)	14
Number of Missing Events	1
Number or Reported Events Used	13
Number Values Reported (n)	14
Number Values Missing	1
Number Values Used	13
Minimum	3.0000E-5
Maximum	1.9240E-4
Mean	7.6587E-5
Geometric Mean	6.0815E-5
Median	7.5789E-5
Standard Deviation	5.2859E-5

Mann-Kendall Test

Test Value (S)	59
Tabulated p-value	0
Standard Deviation of S	15.5
Standardized Value of S	3.741
Approximate p-value	9.1540E-5

Statistically significant evidence of an increasing trend at the specified level of significance.



Total Molybdenum at LDG46/FFA
Total Molybdenum (mg/L)
0.000200
0.000175
0.000150
0.000125
0.000100
0.000075
0.000050
0.000025
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 15.5027
Standardized Value of S 3.7413
Test Value (S) 59
Tabulated p-value 0.0000
Approximate p-value 0.0001
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept -0.0231
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/18/2014 3:55:32 PM
From File	ffa_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Strontium-Total (mg/L)

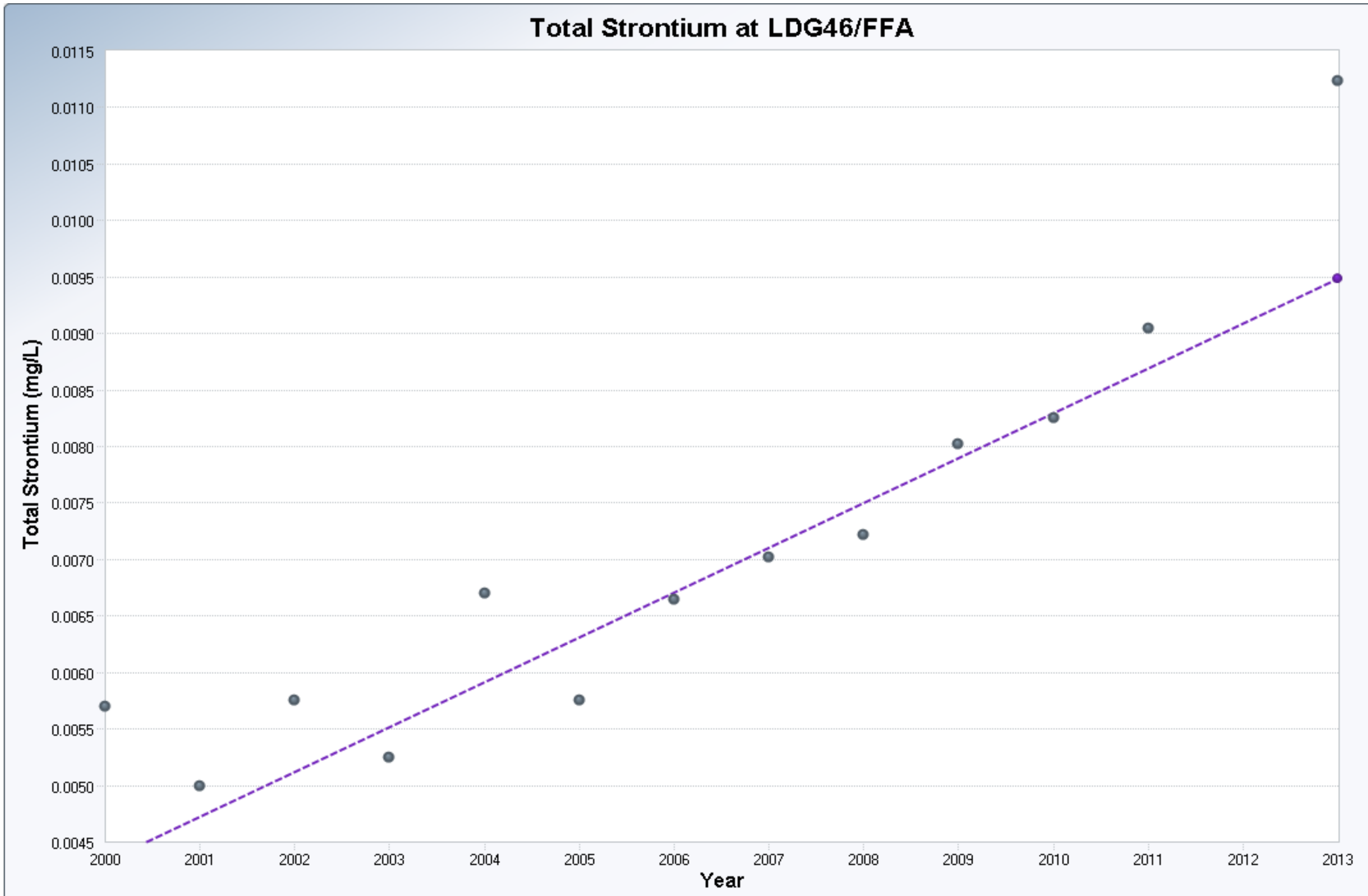
General Statistics

Period of Record	2000–2011, 2013
Number of Events Reported (m)	14
Number of Missing Events	1
Number or Reported Events Used	13
Number Values Reported (n)	14
Number Values Missing	1
Number Values Used	13
Minimum	0.005
Maximum	0.0112
Mean	0.00705
Geometric Mean	0.00686
Median	0.0067
Standard Deviation	0.00175

Mann-Kendall Test

Test Value (S)	67
Tabulated p-value	0
Standard Deviation of S	16.36
Standardized Value of S	4.034
Approximate p-value	2.7406E-5

Statistically significant evidence of an increasing trend at the specified level of significance.



Mann-Kendall Trend Analysis	
n	13
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	16.3605
Standardized Value of S	4.0341
Test Value (S)	67
Tabulated p-value	0.0000
Approximate p-value	0.0000

Theil-Sen Trend Line (Red)	
Theil-Sen Slope	0.0004
Theil-Sen Intercept	-0.7906

Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	6/18/2014 3:57:36 PM
From File	ffa_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Uranium-Total (mg/L)

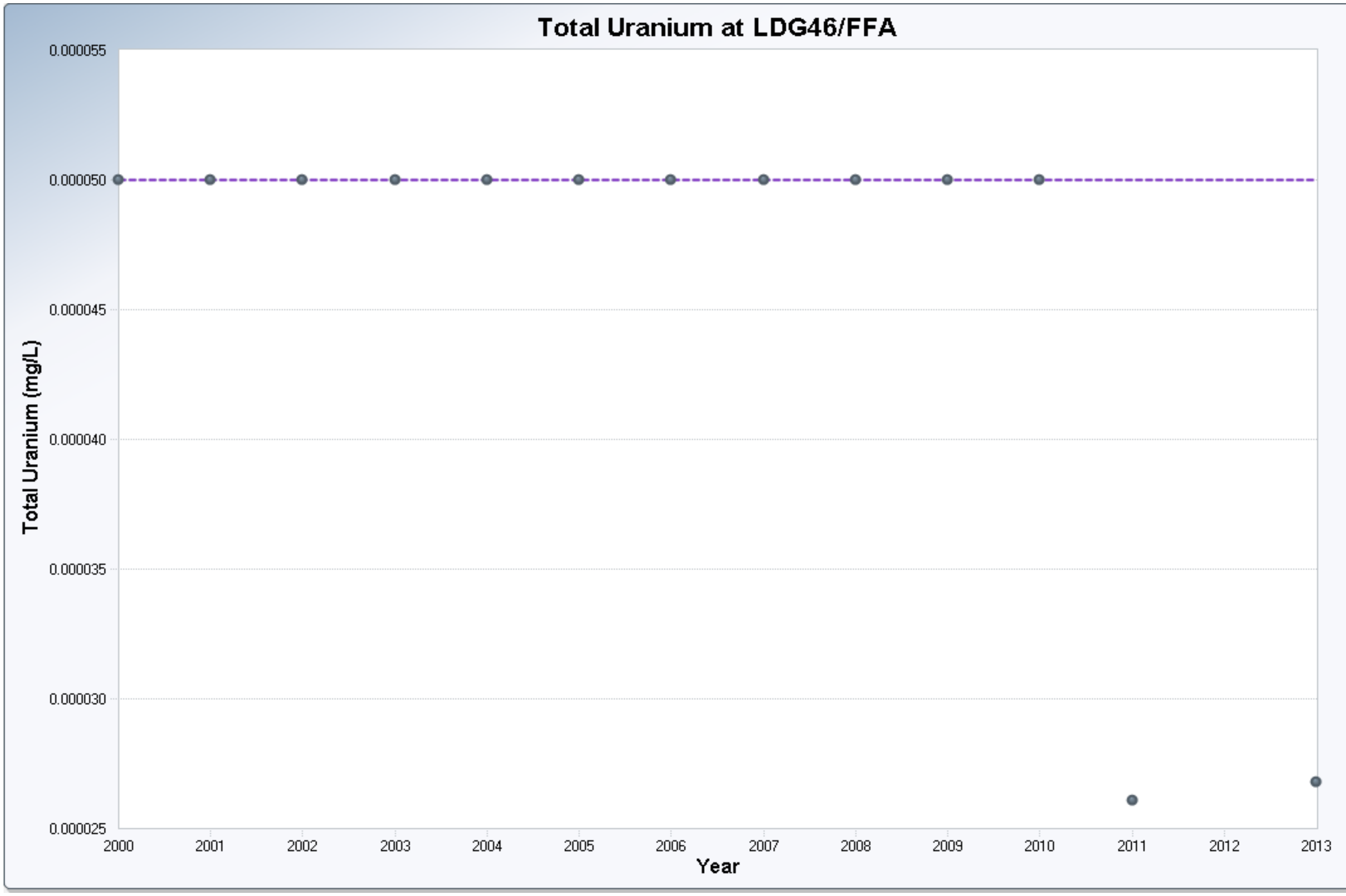
General Statistics

Period of Record	2000–2011, 2013
Number of Events Reported (m)	14
Number of Missing Events	1
Number or Reported Events Used	13
Number Values Reported (n)	14
Number Values Missing	1
Number Values Used	13
Minimum	2.6105E-5
Maximum	5.0000E-5
Mean	4.6377E-5
Geometric Mean	4.5334E-5
Median	5.0000E-5
Standard Deviation	8.8440E-6

Mann-Kendall Test

Test Value (S)	8
Tabulated p-value	0.338
Standard Deviation of S	14.85
Standardized Value of S	0.471
Approximate p-value	0.319

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis	
n	13
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	14.8549
Standardized Value of S	0.4712
Test Value (S)	8
Tabulated p-value	0.3380
Approximate p-value	0.3187

Theil-Sen Trend Line (Red)	
Theil-Sen Slope	0.0000
Theil-Sen Intercept	0.0001

Insufficient statistical evidence of a significant trend at the specified level of significance.

LDG46/FFA
Baseline vs. Post-Baseline Trends
for Select Parameters

Significant ($p < 0.05$) Trends at LDG46/FFA for Select Parameters

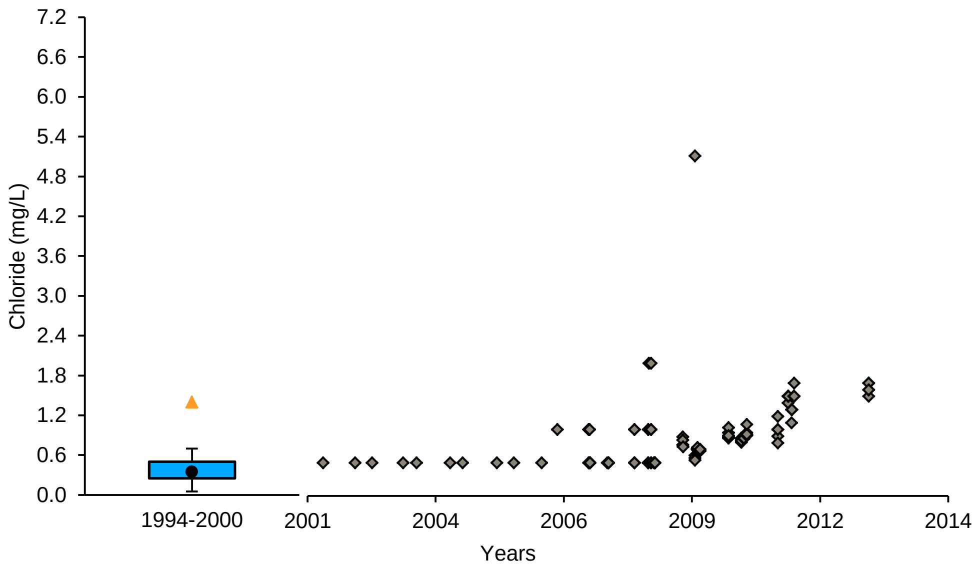


Figure D-27 Boxplot of the Baseline Condition for Chloride and Post-Baseline Chloride Values at LDG46/FFA; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

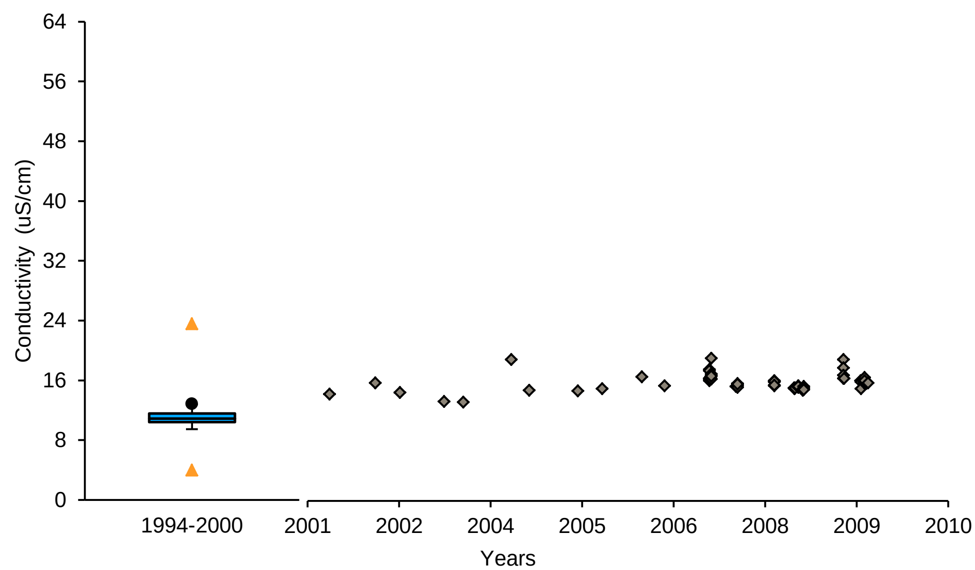


Figure D-28 Boxplot of the Baseline Condition for Conductivity and Post-Baseline Conductivity Values at LDG46/FFA; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

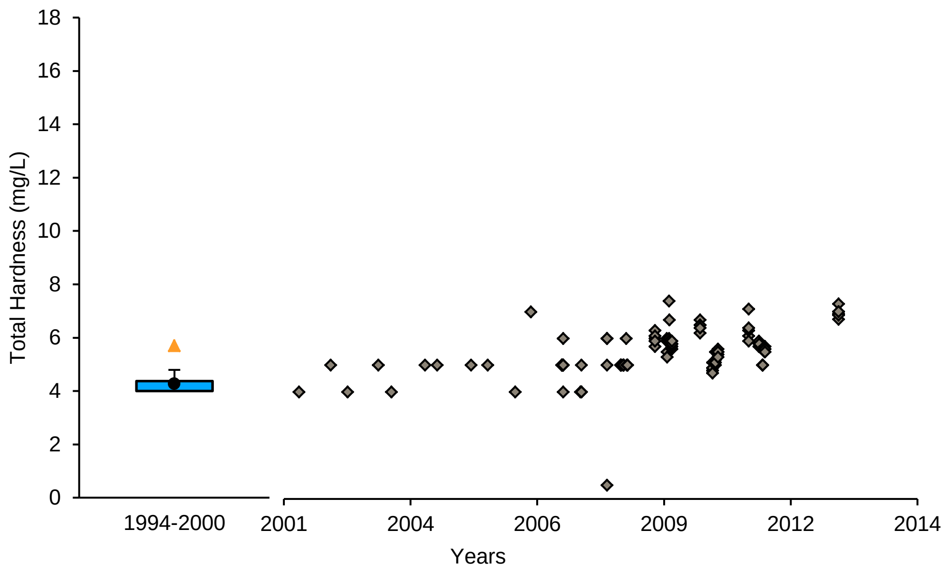


Figure D-29 Boxplot of the Baseline Condition for Hardness and Post-Baseline Hardness Values at LDG46/FFA; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

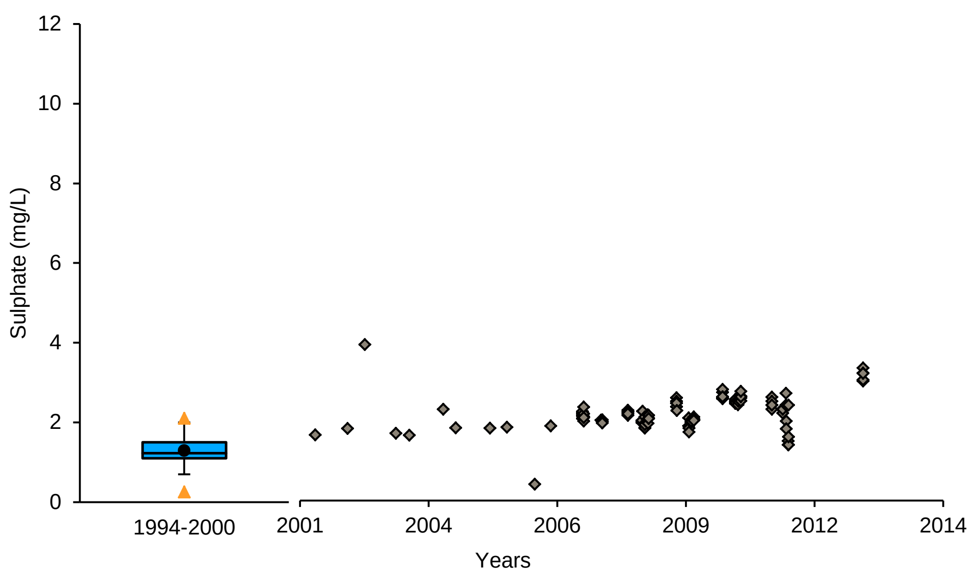


Figure D-30 Boxplot of the Baseline Condition for Sulphate and Post-Baseline Sulphate Values at LDG46/FFA; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

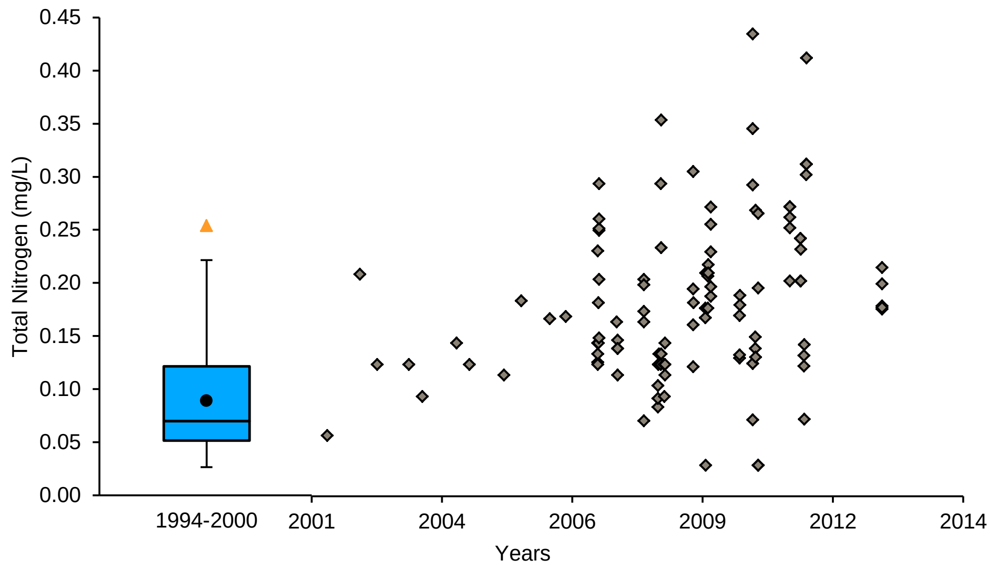


Figure D-31 Boxplot of the Baseline Condition for Total Nitrogen and Post-Baseline Total Nitrogen Values at LDG46/FFA; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

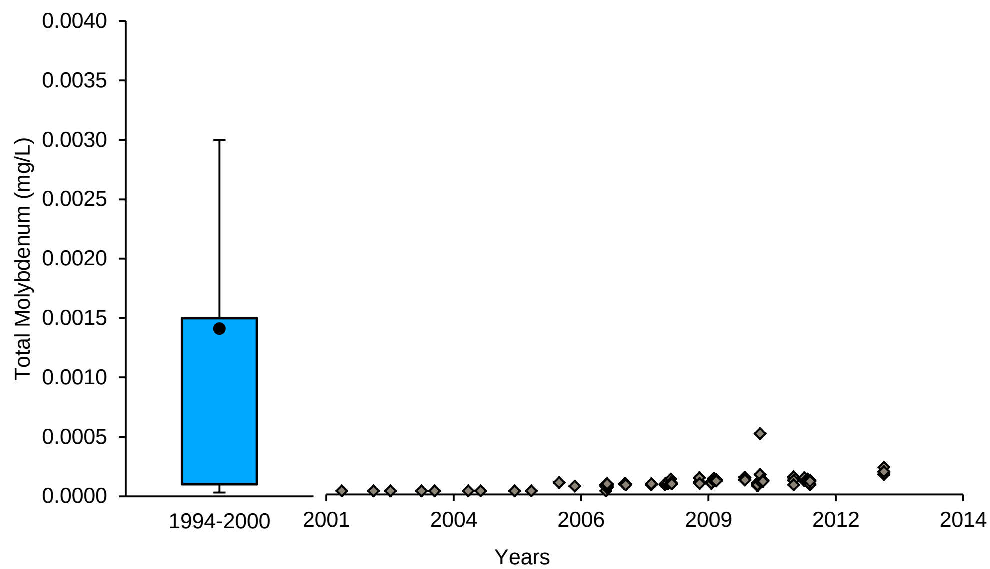


Figure D-32 Boxplot of the Baseline Condition for Total Molybdenum and Post-Baseline Total Molybdenum Values at LDG46/FFA; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

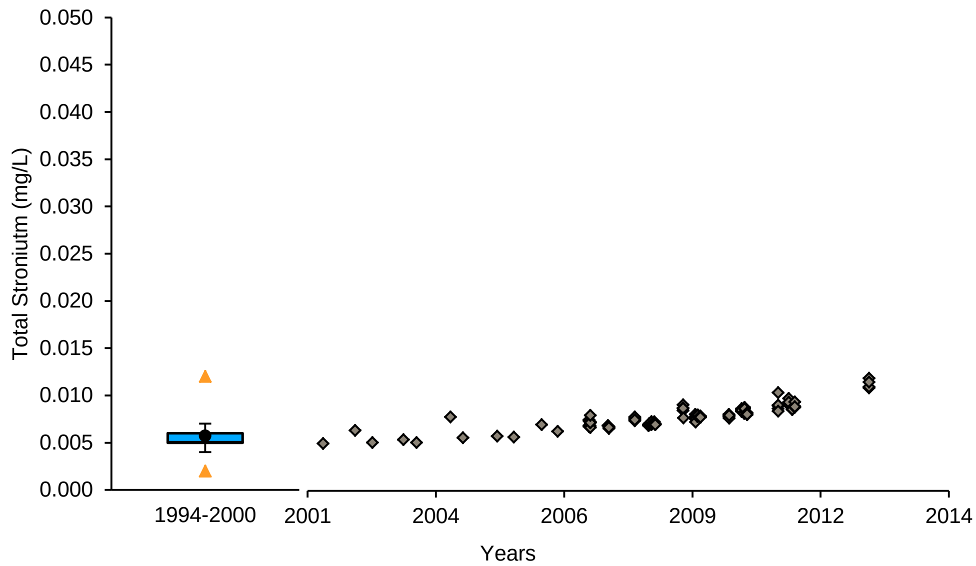


Figure D-33 Boxplot of the Baseline Condition for Total Strontium and Post-Baseline Total Strontium Values at LDG46/FFA; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

LDGS3
ProUCL Trends Analysis Output

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	3/22/2015 11:05:44 AM
From File	ldgs3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Conductivity (µS/cm)

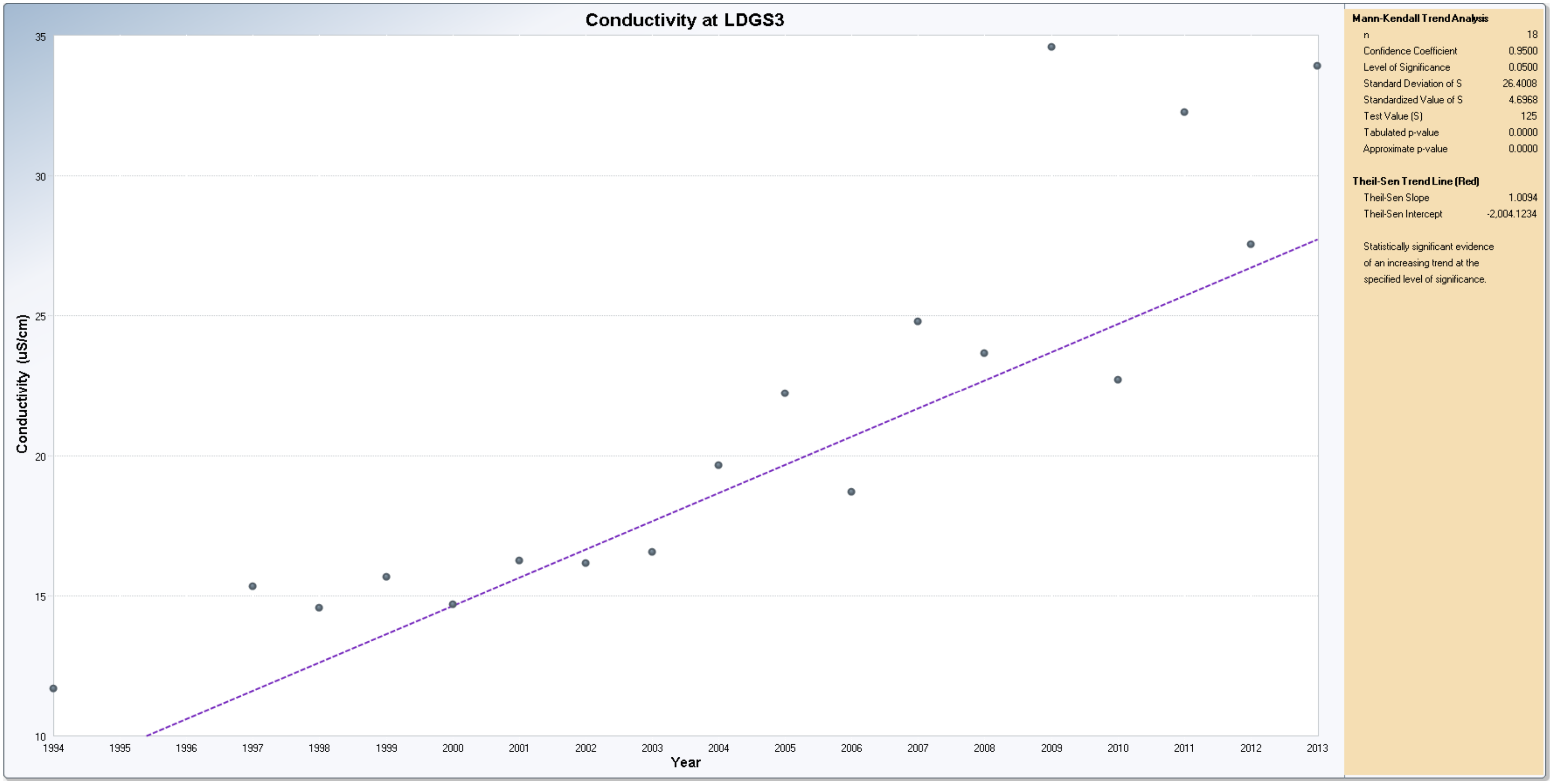
General Statistics

Period of Record	1994, 1997–2013
Number of Events Reported (m)	20
Number of Missing Events	2
Number or Reported Events Used	18
Number Values Reported (n)	20
Number Values Missing	2
Number Values Used	18
Minimum	11.7
Maximum	34.61
Mean	21.17
Geometric Mean	20.14
Median	19.17
Standard Deviation	7.067

Mann-Kendall Test

Test Value (S)	125
Tabulated p-value	0
Standard Deviation of S	26.4
Standardized Value of S	4.697
Approximate p-value	1.3211E-6

Statistically significant evidence of an increasing trend at the specified level of significance.


Conductivity at LDGS3
Conductivity (uS/cm)
35
30
25
20
15
10
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 18
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 26.4008
Standardized Value of S 4.6968
Test Value (S) 125
Tabulated p-value 0.0000
Approximate p-value 0.0000
Theil-Sen Trend Line (Red)
Theil-Sen Slope 1.0094
Theil-Sen Intercept -2,004.1234
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	3/22/2015 11:11:23 AM
From File	ldgs3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Dissolved Solids (mg/L)

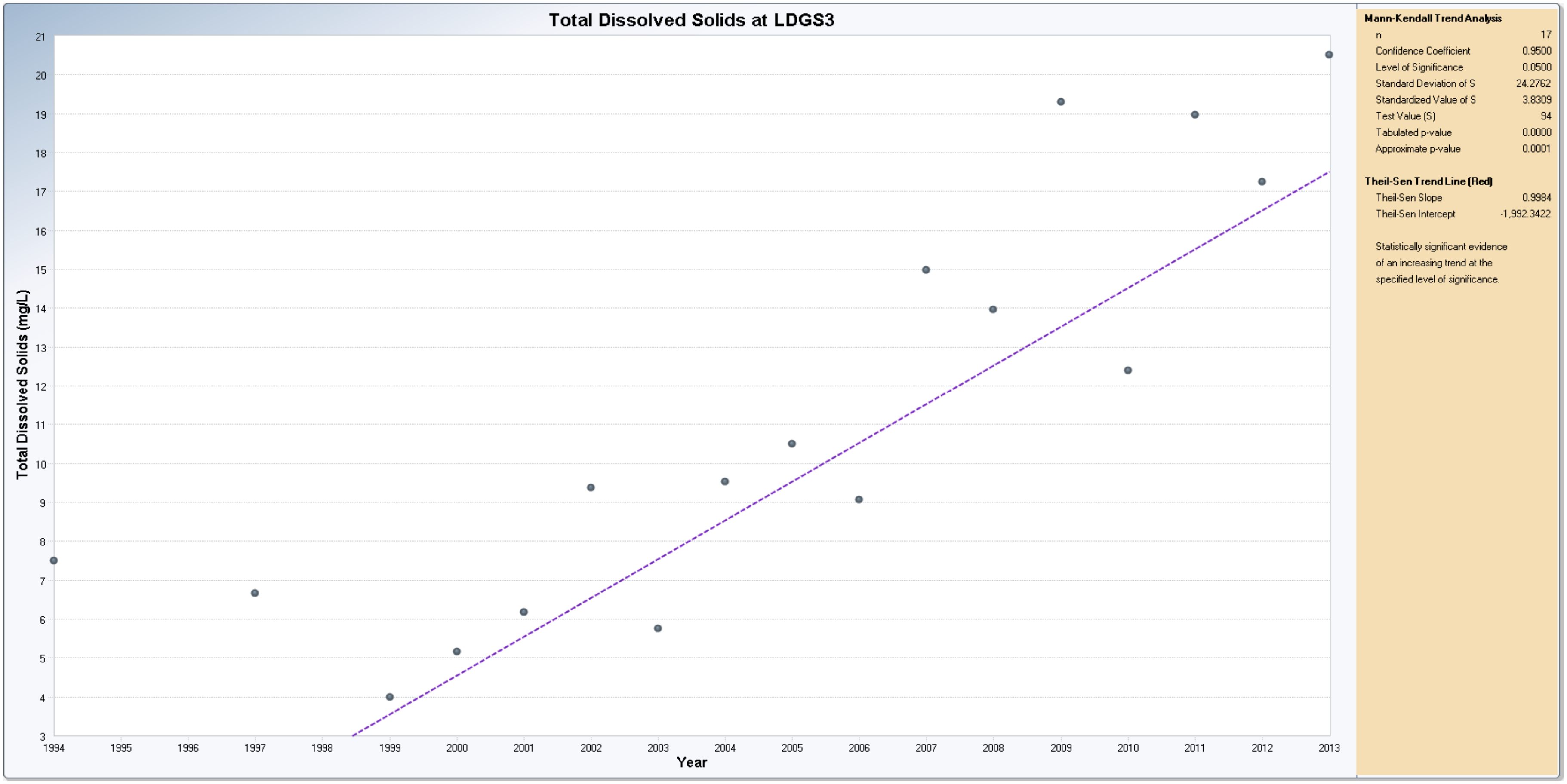
General Statistics

Period of Record	1994, 1997, 1999–2013
Number of Events Reported (m)	20
Number of Missing Events	3
Number or Reported Events Used	17
Number Values Reported (n)	20
Number Values Missing	3
Number Values Used	17
Minimum	4
Maximum	20.53
Mean	11.24
Geometric Mean	10.03
Median	9.525
Standard Deviation	5.372

Mann-Kendall Test

Test Value (S)	94
Tabulated p-value	0
Standard Deviation of S	24.28
Standardized Value of S	3.831
Approximate p-value	6.3834E-5

Statistically significant evidence of an increasing trend at the specified level of significance.


Total Dissolved Solids at LDGS3
Total Dissolved Solids (mg/L)
Year
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 17
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 24.2762
Standardized Value of S 3.8309
Test Value (S) 94
Tabulated p-value 0.0000
Approximate p-value 0.0001
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.9984
Theil-Sen Intercept -1,992.3422
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	3/22/2015 11:15:34 AM
From File	ldgs3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Alkalinity (mg/L)

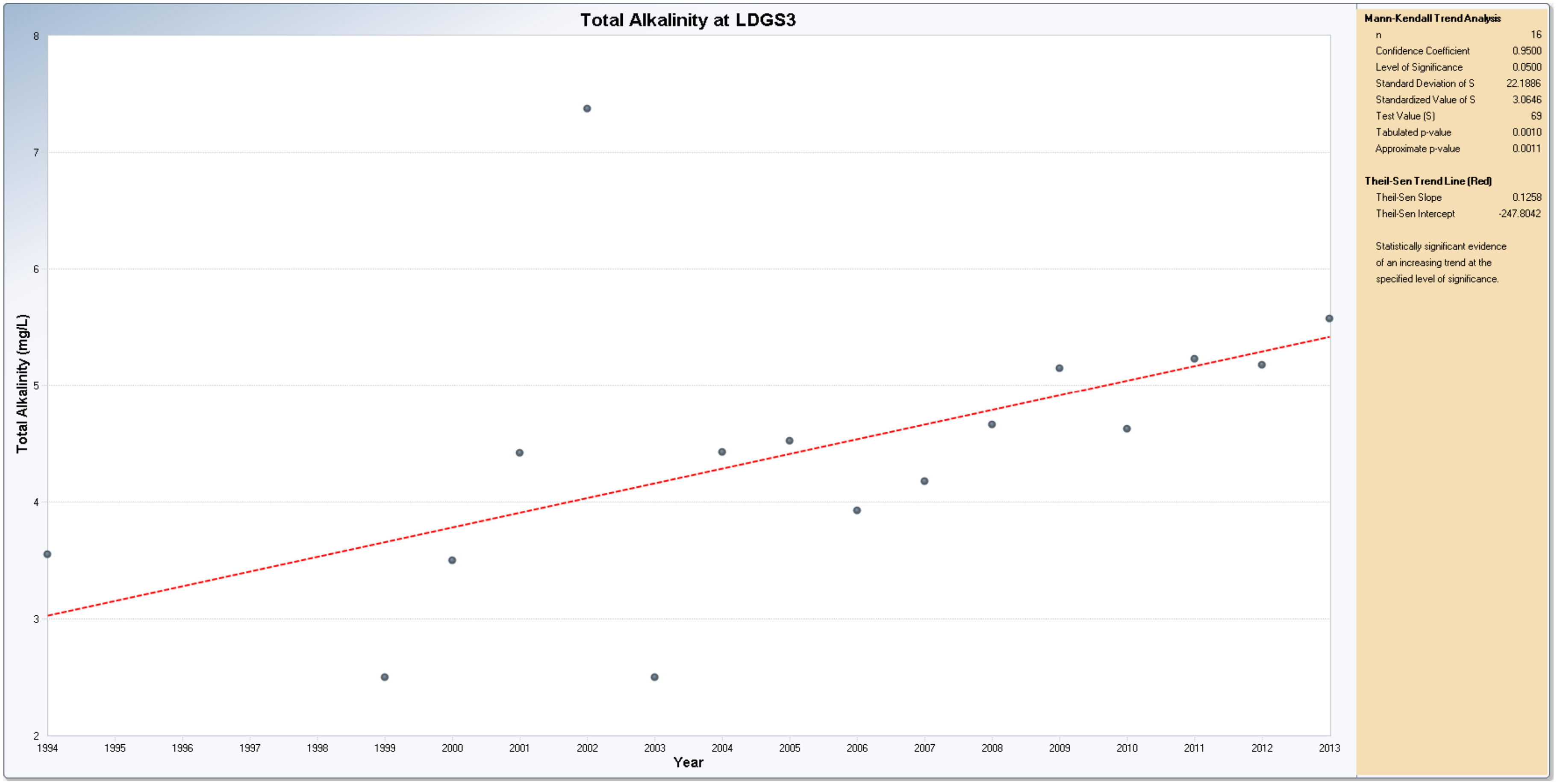
General Statistics

Period of Record	1994, 1999–2013
Number of Events Reported (m)	20
Number of Missing Events	4
Number or Reported Events Used	16
Number Values Reported (n)	20
Number Values Missing	4
Number Values Used	16
Minimum	2.5
Maximum	7.375
Mean	4.457
Geometric Mean	4.305
Median	4.475
Standard Deviation	1.189

Mann-Kendall Test

Test Value (S)	69
Tabulated p-value	0.001
Standard Deviation of S	22.19
Standardized Value of S	3.065
Approximate p-value	0.00109

Statistically significant evidence of an increasing trend at the specified level of significance.


Total Alkalinity at LDGS3
Total Alkalinity (mg/L)
Year
2
3
4
5
6
7
8
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.1886
Standardized Value of S 3.0646
Test Value (S) 69
Tabulated p-value 0.0010
Approximate p-value 0.0011
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.1258
Theil-Sen Intercept -247.8042
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	3/22/2015 11:18:35 AM
From File	ldgs3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Hardness (mg/L)

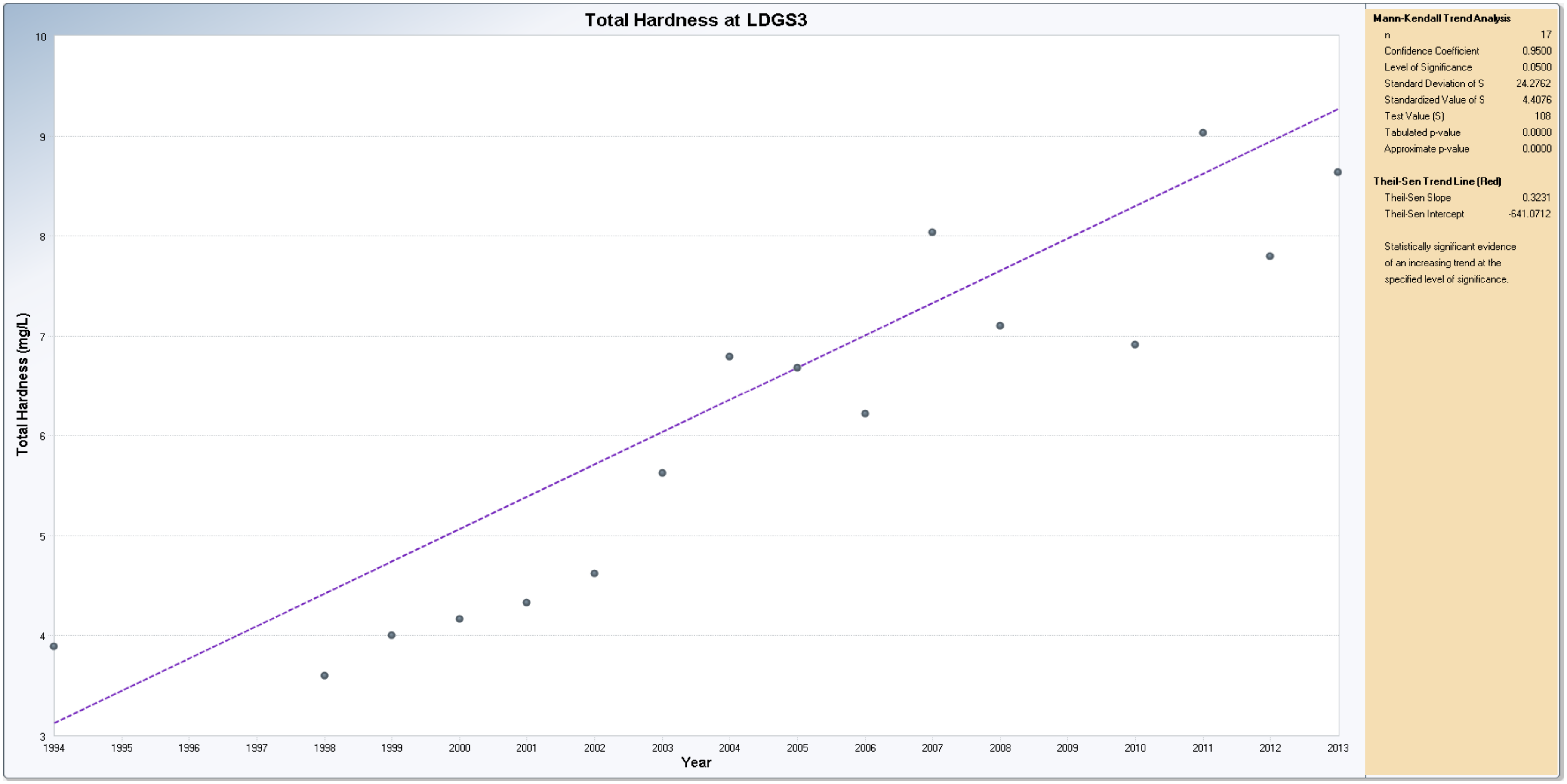
General Statistics

Period of Record	1994, 1998–2013
Number of Events Reported (m)	20
Number of Missing Events	3
Number or Reported Events Used	17
Number Values Reported (n)	20
Number Values Missing	3
Number Values Used	17
Minimum	3.6
Maximum	10.19
Mean	6.331
Geometric Mean	6.024
Median	6.683
Standard Deviation	2.01

Mann-Kendall Test

Test Value (S)	108
Tabulated p-value	0
Standard Deviation of S	24.28
Standardized Value of S	4.408
Approximate p-value	5.2258E-6

Statistically significant evidence of an increasing trend at the specified level of significance.



Total Hardness at LDGS3
Total Hardness (mg/L)
Year
10
9
8
7
6
5
4
3
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 17
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 24.2762
Standardized Value of S 4.4076
Test Value (S) 108
Tabulated p-value 0.0000
Approximate p-value 0.0000
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.3231
Theil-Sen Intercept -641.0712
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	3/22/2015 11:20:56 AM
From File	ldgs3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Chloride (mg/L)

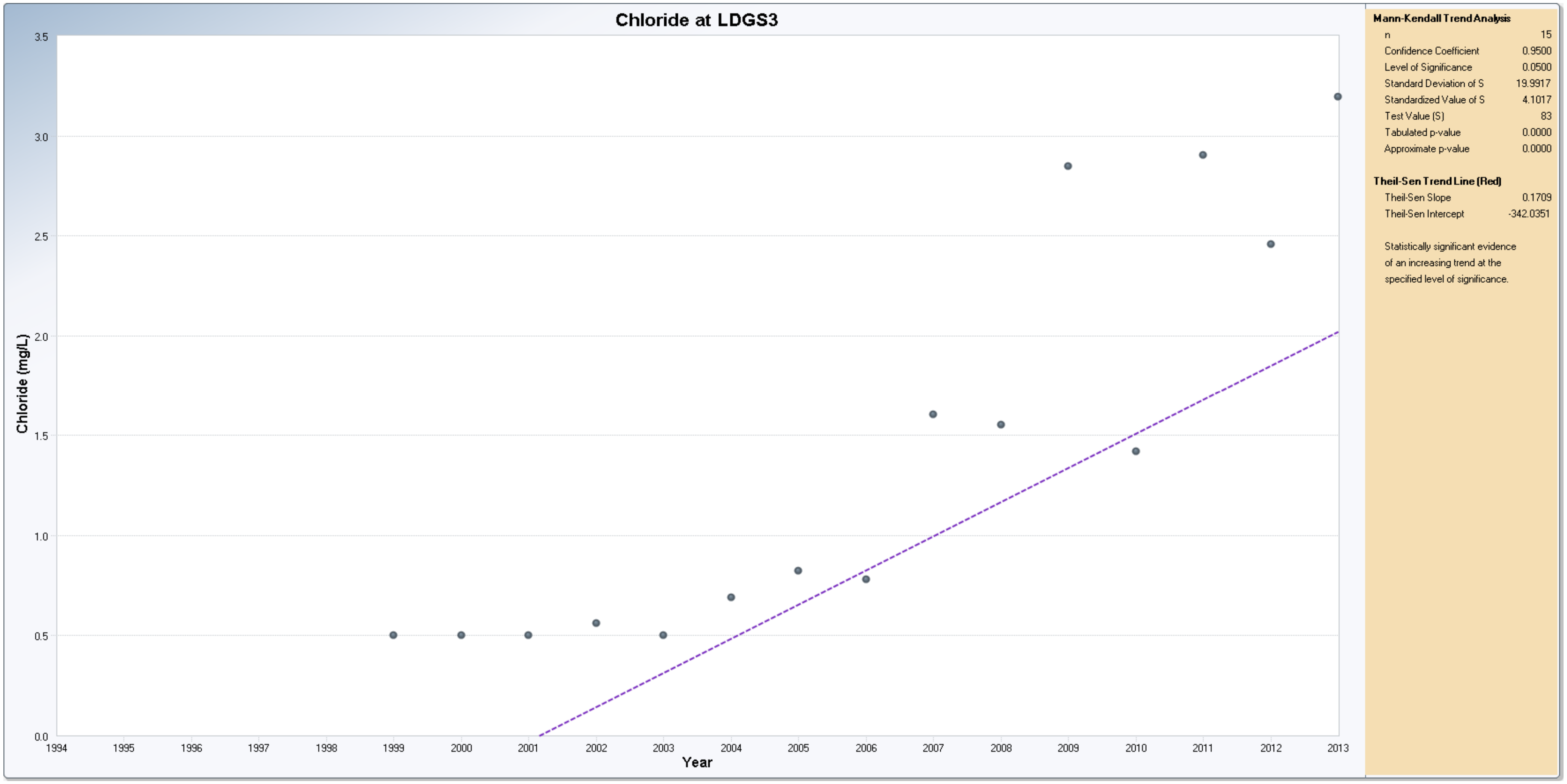
General Statistics

Period of Record	1999–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	0.5
Maximum	3.198
Mean	1.389
Geometric Mean	1.089
Median	0.824
Standard Deviation	0.997

Mann-Kendall Test

Test Value (S)	83
Tabulated p-value	0
Standard Deviation of S	19.99
Standardized Value of S	4.102
Approximate p-value	2.0505E-5

Statistically significant evidence of an increasing trend at the specified level of significance.



Chloride at LDGS3
Chloride (mg/L)
Year
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 19.9917
Standardized Value of S 4.1017
Test Value (S) 83
Tabulated p-value 0.0000
Approximate p-value 0.0000
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.1709
Theil-Sen Intercept -342.0351
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	3/22/2015 11:25:39 AM
From File	ldgs3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Sulphate (mg/L)

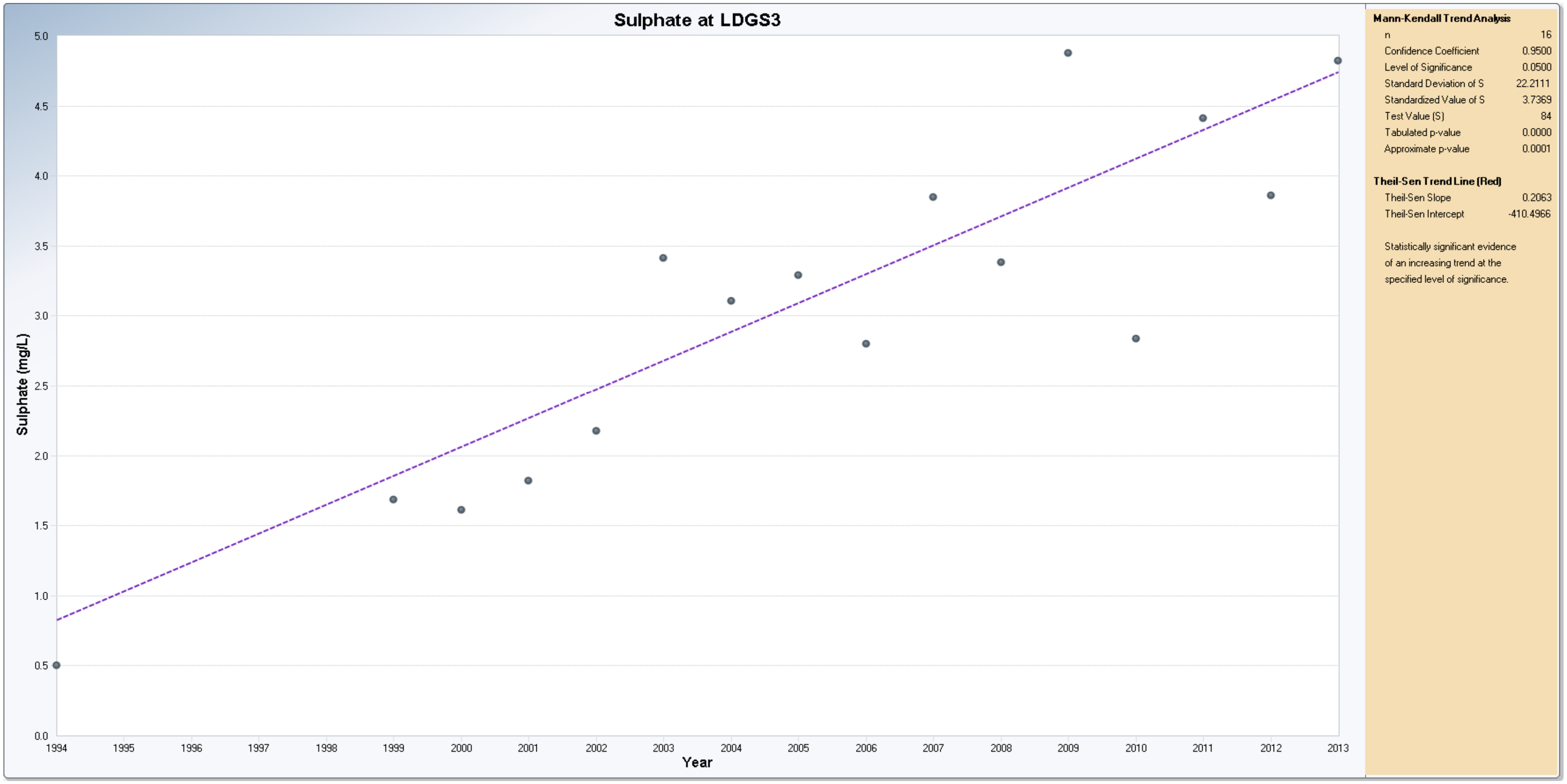
General Statistics

Period of Record	1994, 1999–2013
Number of Events Reported (m)	20
Number of Missing Events	4
Number or Reported Events Used	16
Number Values Reported (n)	20
Number Values Missing	4
Number Values Used	16
Minimum	0.5
Maximum	4.88
Mean	3.027
Geometric Mean	2.695
Median	3.198
Standard Deviation	1.232

Mann-Kendall Test

Test Value (S)	84
Tabulated p-value	0
Standard Deviation of S	22.21
Standardized Value of S	3.737
Approximate p-value	9.3163E-5

Statistically significant evidence of an increasing trend at the specified level of significance.



Sulphate at LDGS3
Sulphate (mg/L)
Year
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.2111
Standardized Value of S 3.7369
Test Value (S) 84
Tabulated p-value 0.0000
Approximate p-value 0.0001
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.2063
Theil-Sen Intercept -410.4966
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	3/22/2015 11:29:33 AM
From File	ldgs3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Nitrogen (mg/L)

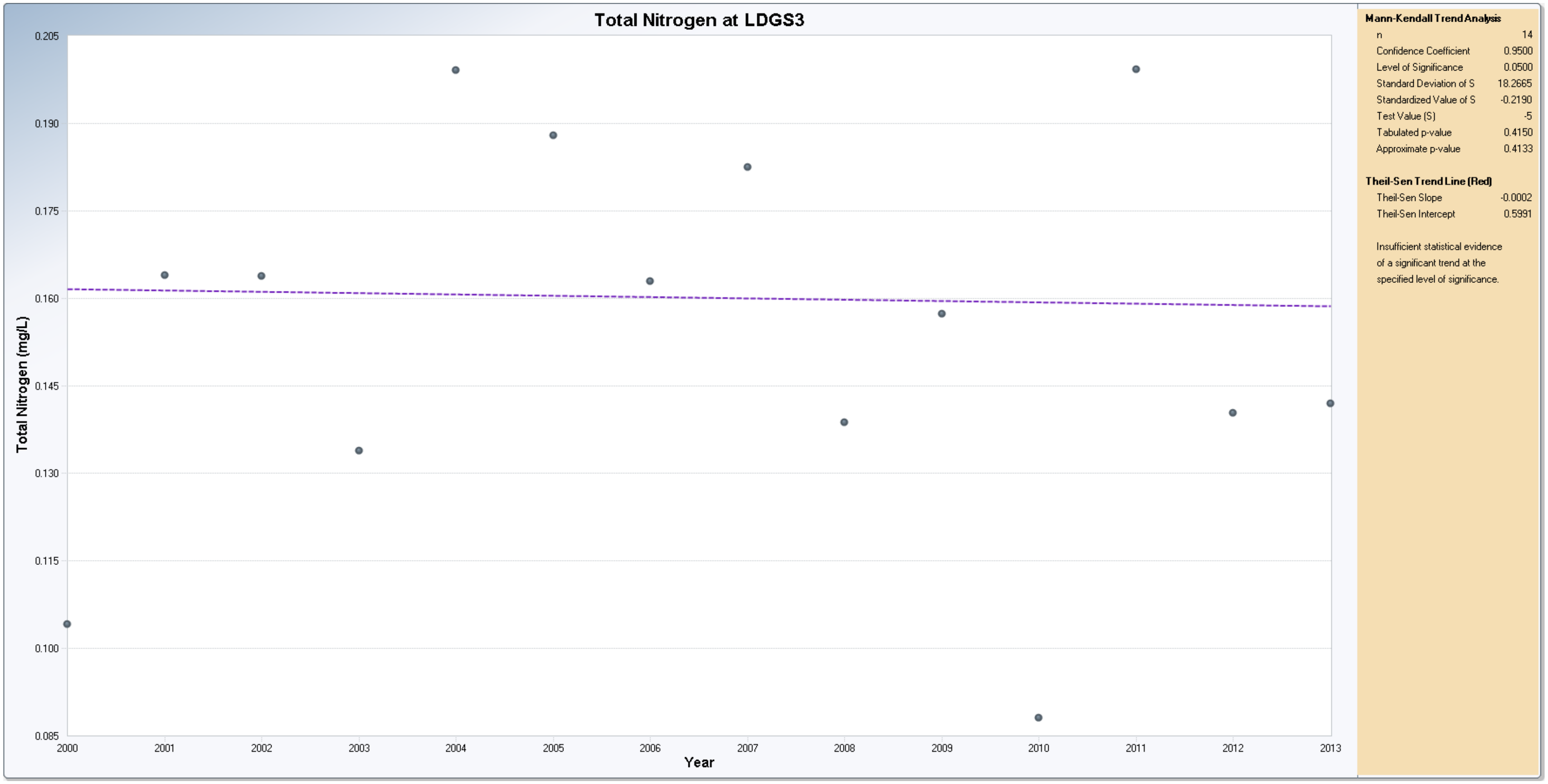
General Statistics

Period of Record	2000–2013
Number of Events Reported (m)	20
Number of Missing Events	6
Number or Reported Events Used	14
Number Values Reported (n)	20
Number Values Missing	6
Number Values Used	14
Minimum	0.0881
Maximum	0.199
Mean	0.155
Geometric Mean	0.151
Median	0.16
Standard Deviation	0.033

Mann-Kendall Test

Test Value (S)	-5
Tabulated p-value	0.415
Standard Deviation of S	18.27
Standardized Value of S	-0.219
Approximate p-value	0.413

Insufficient evidence to identify a significant trend at the specified level of significance.


Total Nitrogen at LDGS3
Total Nitrogen (mg/L)
Year
0.205
0.190
0.175
0.160
0.145
0.130
0.115
0.100
0.085
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.2665
Standardized Value of S -0.2190
Test Value (S) -5
Tabulated p-value 0.4150
Approximate p-value 0.4133
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0002
Theil-Sen Intercept 0.5991
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	3/22/2015 11:32:45 AM
From File	ldgs3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Phosphorus (mg/L)

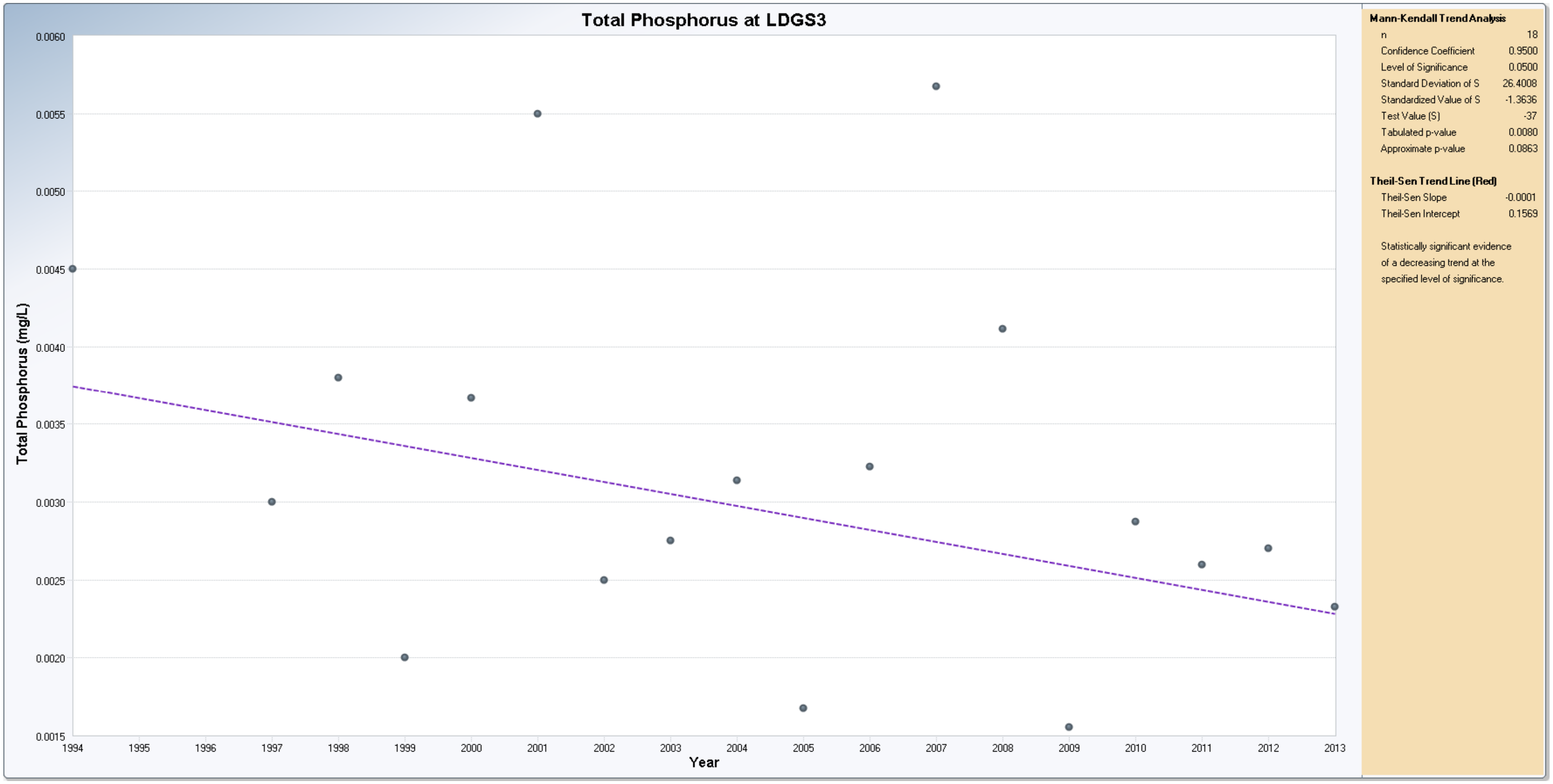
General Statistics

Period of Record	1994, 1997–2013
Number of Events Reported (m)	20
Number of Missing Events	2
Number or Reported Events Used	18
Number Values Reported (n)	20
Number Values Missing	2
Number Values Used	18
Minimum	0.00156
Maximum	0.00568
Mean	0.0032
Geometric Mean	0.00301
Median	0.00294
Standard Deviation	0.00117

Mann-Kendall Test

Test Value (S)	-37
Tabulated p-value	0.008
Standard Deviation of S	26.4
Standardized Value of S	-1.364
Approximate p-value	0.0863

Statistically significant evidence of a decreasing trend at the specified level of significance.



Total Phosphorus at LDGS3
Total Phosphorus (mg/L)
Year
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
0.0030
0.0025
0.0020
0.0015
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 18
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 26.4008
Standardized Value of S -1.3636
Test Value (S) -37
Tabulated p-value 0.0080
Approximate p-value 0.0863
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0001
Theil-Sen Intercept 0.1569
Statistically significant evidence of a decreasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	3/22/2015 11:36:13 AM
From File	ldgs3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Organic Carbon (mg/L)

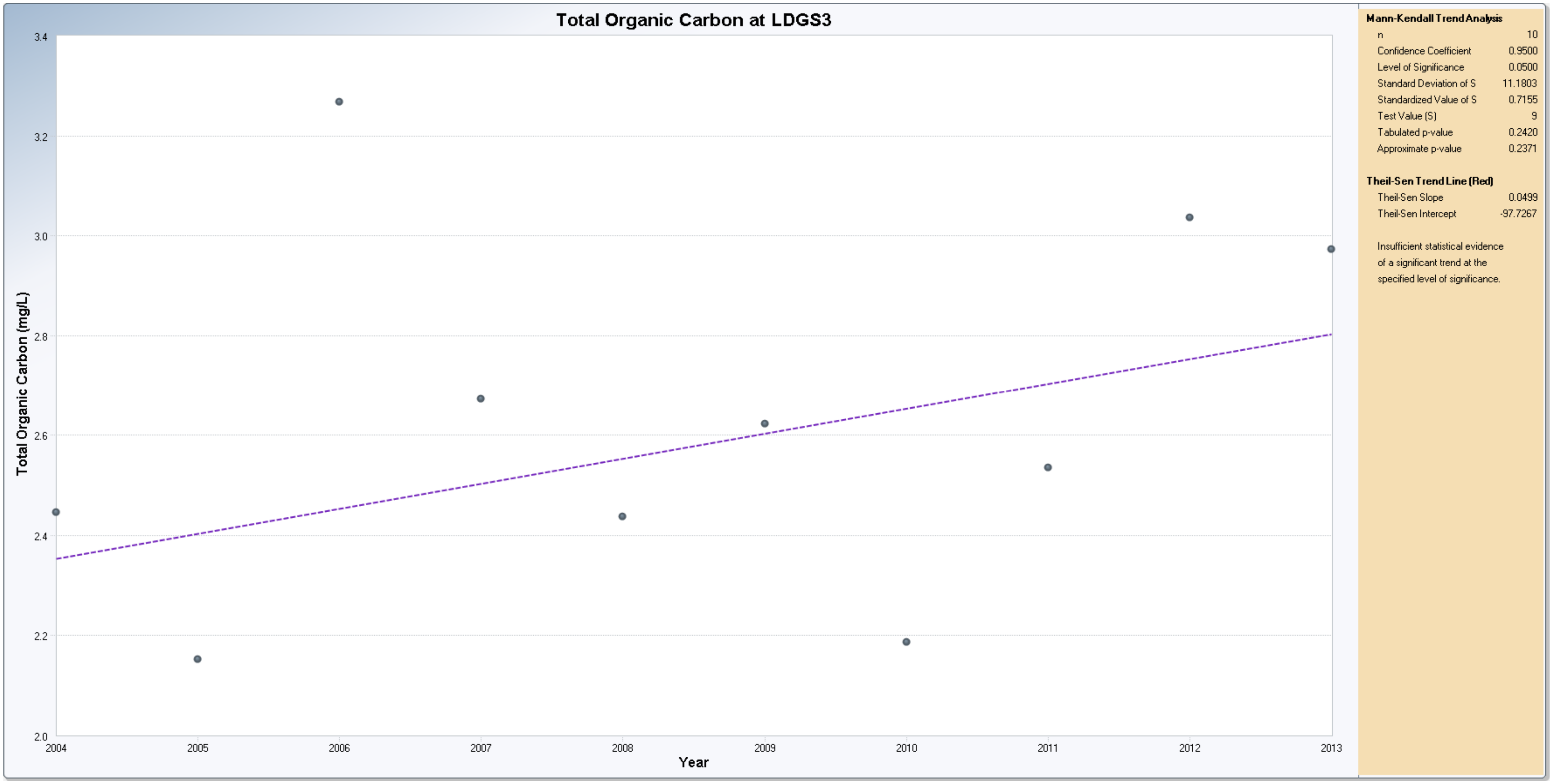
General Statistics

Period of Record	2004–2013
Number of Events Reported (m)	20
Number of Missing Events	10
Number or Reported Events Used	10
Number Values Reported (n)	20
Number Values Missing	10
Number Values Used	10
Minimum	2.153
Maximum	3.268
Mean	2.633
Geometric Mean	2.611
Median	2.579
Standard Deviation	0.364

Mann-Kendall Test

Test Value (S)	9
Tabulated p-value	0.242
Standard Deviation of S	11.18
Standardized Value of S	0.716
Approximate p-value	0.237

Insufficient evidence to identify a significant trend at the specified level of significance.



Total Organic Carbon at LDGS3
Total Organic Carbon (mg/L)
Year
3.4
3.2
3.0
2.8
2.6
2.4
2.2
2.0
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 10
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 11.1803
Standardized Value of S 0.7155
Test Value (S) 9
Tabulated p-value 0.2420
Approximate p-value 0.2371
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0499
Theil-Sen Intercept -97.7267
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	3/22/2015 11:39:08 AM
From File	ldgs3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Aluminum (mg/L)

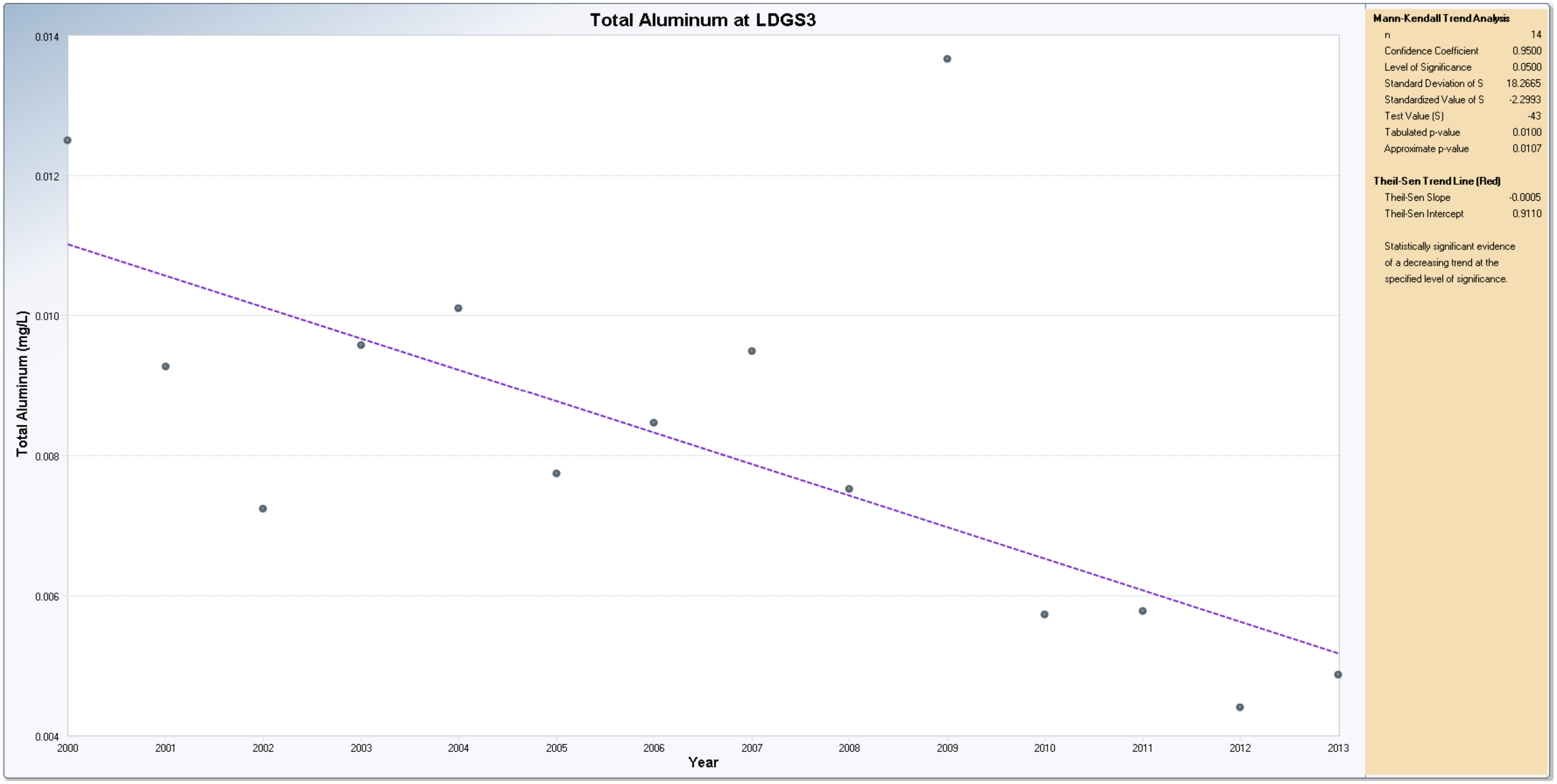
General Statistics

Period of Record	2000–2013
Number of Events Reported (m)	20
Number of Missing Events	6
Number or Reported Events Used	14
Number Values Reported (n)	20
Number Values Missing	6
Number Values Used	14
Minimum	0.0044
Maximum	0.0137
Mean	0.00831
Geometric Mean	0.0079
Median	0.0081
Standard Deviation	0.00271

Mann-Kendall Test

Test Value (S)	-43
Tabulated p-value	0.01
Standard Deviation of S	18.27
Standardized Value of S	-2.299
Approximate p-value	0.0107

Statistically significant evidence of a decreasing trend at the specified level of significance.


Total Aluminum at LDGS3
Total Aluminum (mg/L)
0.014
0.012
0.010
0.008
0.006
0.004
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.2665
Standardized Value of S -2.2993
Test Value (S) -43
Tabulated p-value 0.0100
Approximate p-value 0.0107
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0005
Theil-Sen Intercept 0.9110
Statistically significant evidence
of a decreasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	3/22/2015 11:43:26 AM
From File	ldgs3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Arsenic (mg/L)

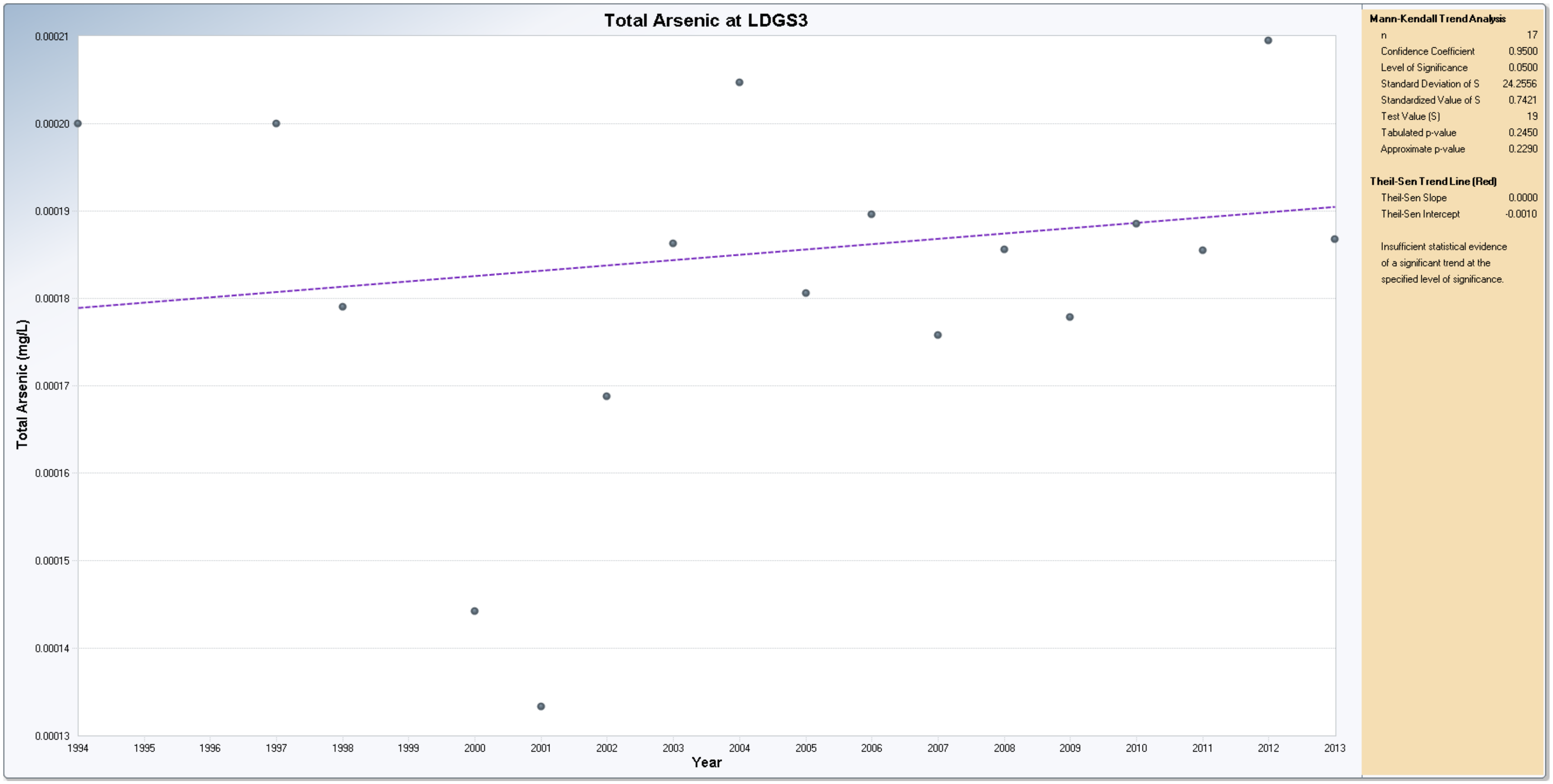
General Statistics

Period of Record	1994, 1997–1998, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	3
Number or Reported Events Used	17
Number Values Reported (n)	20
Number Values Missing	3
Number Values Used	17
Minimum	1.3333E-4
Maximum	2.0950E-4
Mean	1.8212E-4
Geometric Mean	1.8103E-4
Median	1.8563E-4
Standard Deviation	1.9574E-5

Mann-Kendall Test

Test Value (S)	19
Tabulated p-value	0.245
Standard Deviation of S	24.26
Standardized Value of S	0.742
Approximate p-value	0.229

Insufficient evidence to identify a significant trend at the specified level of significance.


Total Arsenic at LDGS3
Total Arsenic (mg/L)
Year
0.00021
0.00020
0.00019
0.00018
0.00017
0.00016
0.00015
0.00014
0.00013
1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
Mann-Kendall Trend Analysis
n 17
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 24.2556
Standardized Value of S 0.7421
Test Value (S) 19
Tabulated p-value 0.2450
Approximate p-value 0.2290
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept -0.0010
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	3/22/2015 11:46:19 AM
From File	ldgs3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Iron (mg/L)

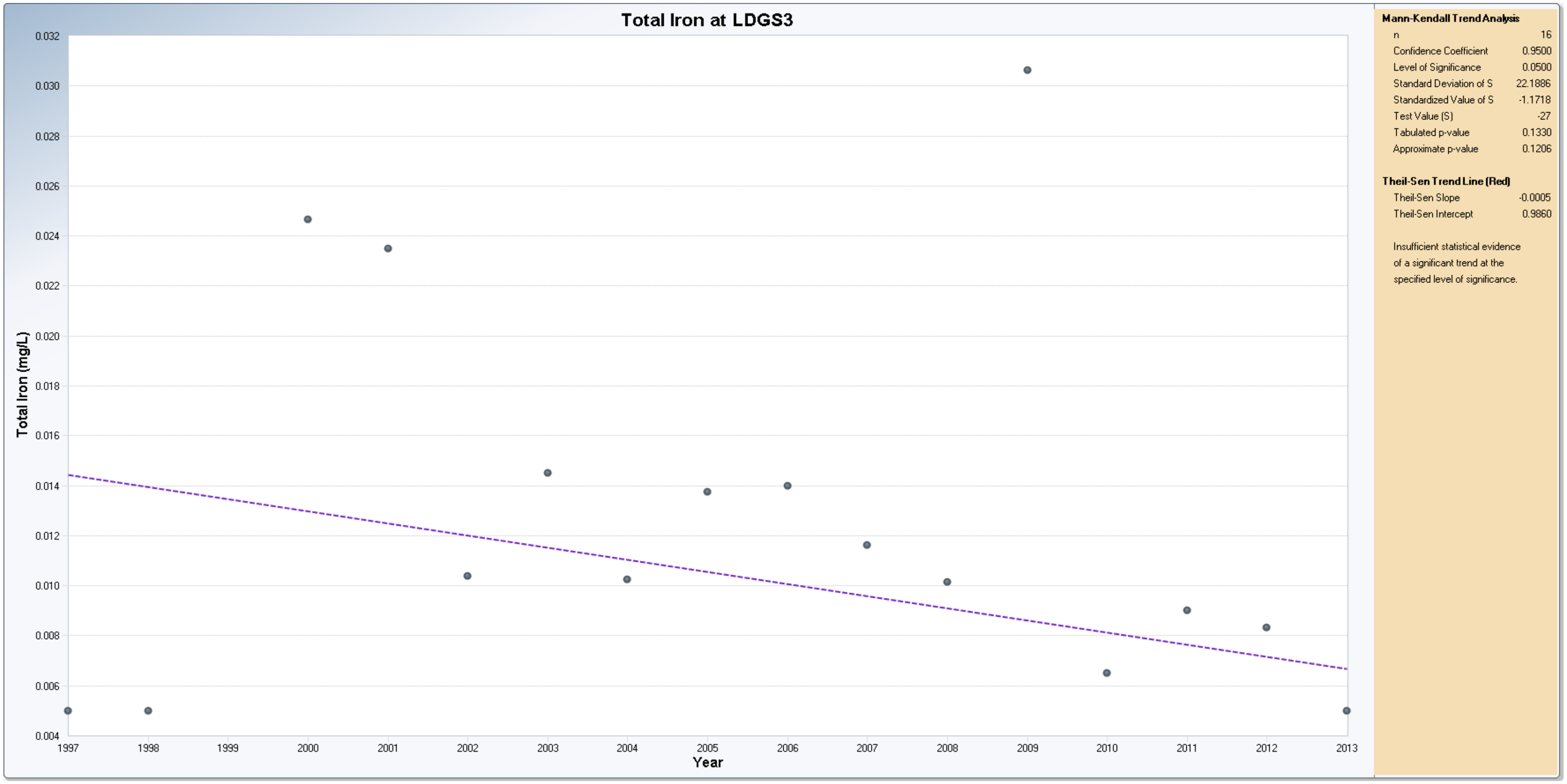
General Statistics

Period of Record	1997–1998, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	4
Number or Reported Events Used	16
Number Values Reported (n)	20
Number Values Missing	4
Number Values Used	16
Minimum	0.005
Maximum	0.0306
Mean	0.0126
Geometric Mean	0.0109
Median	0.0103
Standard Deviation	0.00755

Mann-Kendall Test

Test Value (S)	-27
Tabulated p-value	0.133
Standard Deviation of S	22.19
Standardized Value of S	-1.172
Approximate p-value	0.121

Insufficient evidence to identify a significant trend at the specified level of significance.


Total Iron at LDGS3
Total Iron (mg/L)
0.032
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.1886
Standardized Value of S -1.1718
Test Value (S) -27
Tabulated p-value 0.1330
Approximate p-value 0.1206
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0005
Theil-Sen Intercept 0.9860
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	3/22/2015 11:50:32 AM
From File	ldgs3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Molybdenum (mg/L)

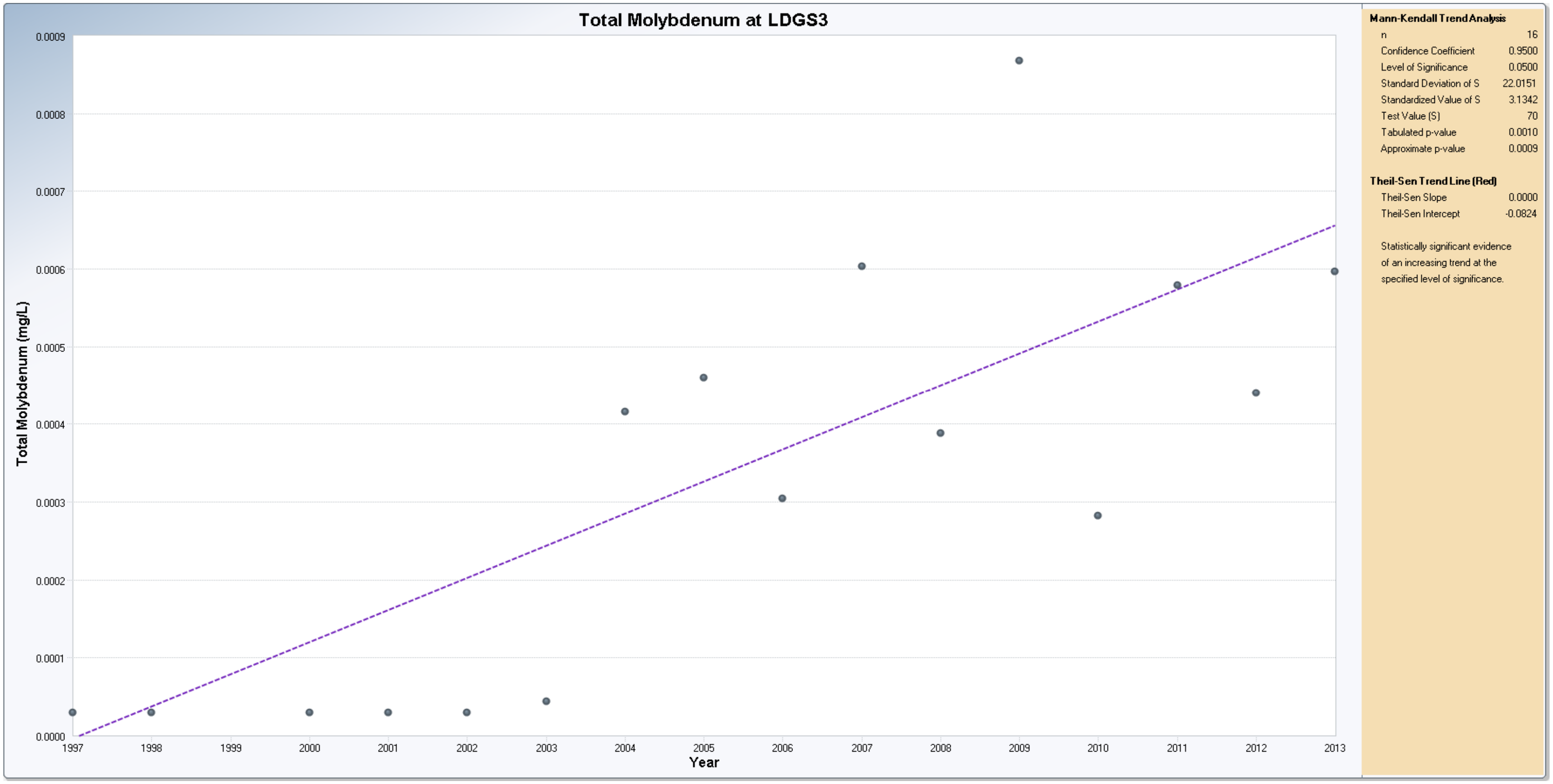
General Statistics

Period of Record	1997–1998, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	4
Number or Reported Events Used	16
Number Values Reported (n)	20
Number Values Missing	4
Number Values Used	16
Minimum	3.0000E-5
Maximum	8.6850E-4
Mean	3.2072E-4
Geometric Mean	1.7110E-4
Median	3.4619E-4
Standard Deviation	2.6720E-4

Mann-Kendall Test

Test Value (S)	70
Tabulated p-value	0.001
Standard Deviation of S	22.02
Standardized Value of S	3.134
Approximate p-value	8.6160E-4

Statistically significant evidence of an increasing trend at the specified level of significance.



Total Molybdenum at LDGS3
Total Molybdenum (mg/L)
0.0009
0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0.0000
1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
Year
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.0151
Standardized Value of S 3.1342
Test Value (S) 70
Tabulated p-value 0.0010
Approximate p-value 0.0009
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept -0.0824
Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	3/22/2015 11:55:34 AM
From File	ldgs3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Nickel (mg/L)

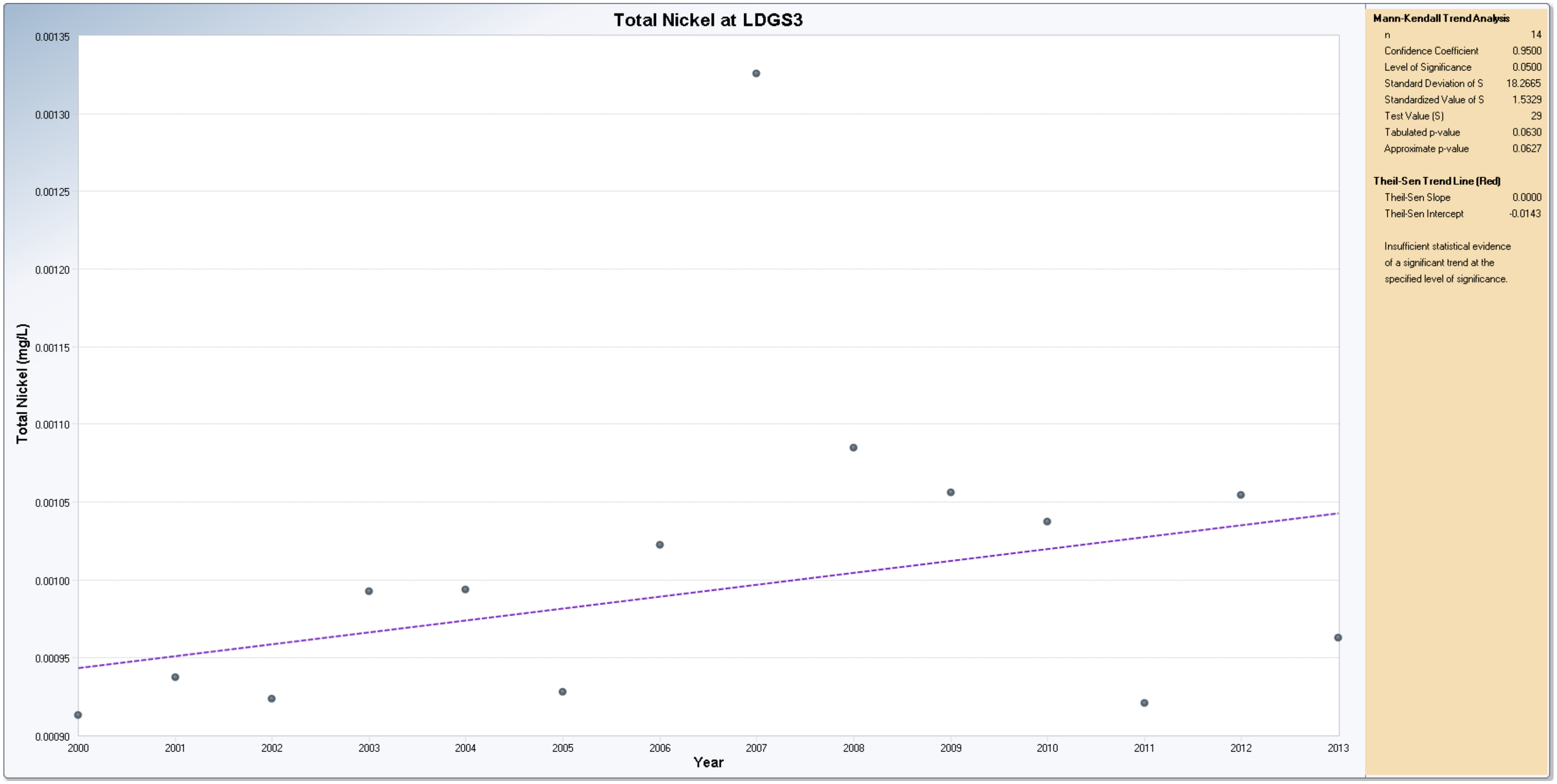
General Statistics

Period of Record	2000–2013
Number of Events Reported (m)	20
Number of Missing Events	6
Number or Reported Events Used	14
Number Values Reported (n)	20
Number Values Missing	6
Number Values Used	14
Minimum	9.1333E-4
Maximum	0.00133
Mean	0.00101
Geometric Mean	0.00101
Median	9.9313E-4
Standard Deviation	1.0734E-4

Mann-Kendall Test

Test Value (S)	29
Tabulated p-value	0.063
Standard Deviation of S	18.27
Standardized Value of S	1.533
Approximate p-value	0.0627

Insufficient evidence to identify a significant trend at the specified level of significance.


Total Nickel at LDGS3
Total Nickel (mg/L)
Year
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.2665
Standardized Value of S 1.5329
Test Value (S) 29
Tabulated p-value 0.0630
Approximate p-value 0.0627
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept -0.0143
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	3/22/2015 11:57:33 AM
From File	ldgs3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Strontium (mg/L)

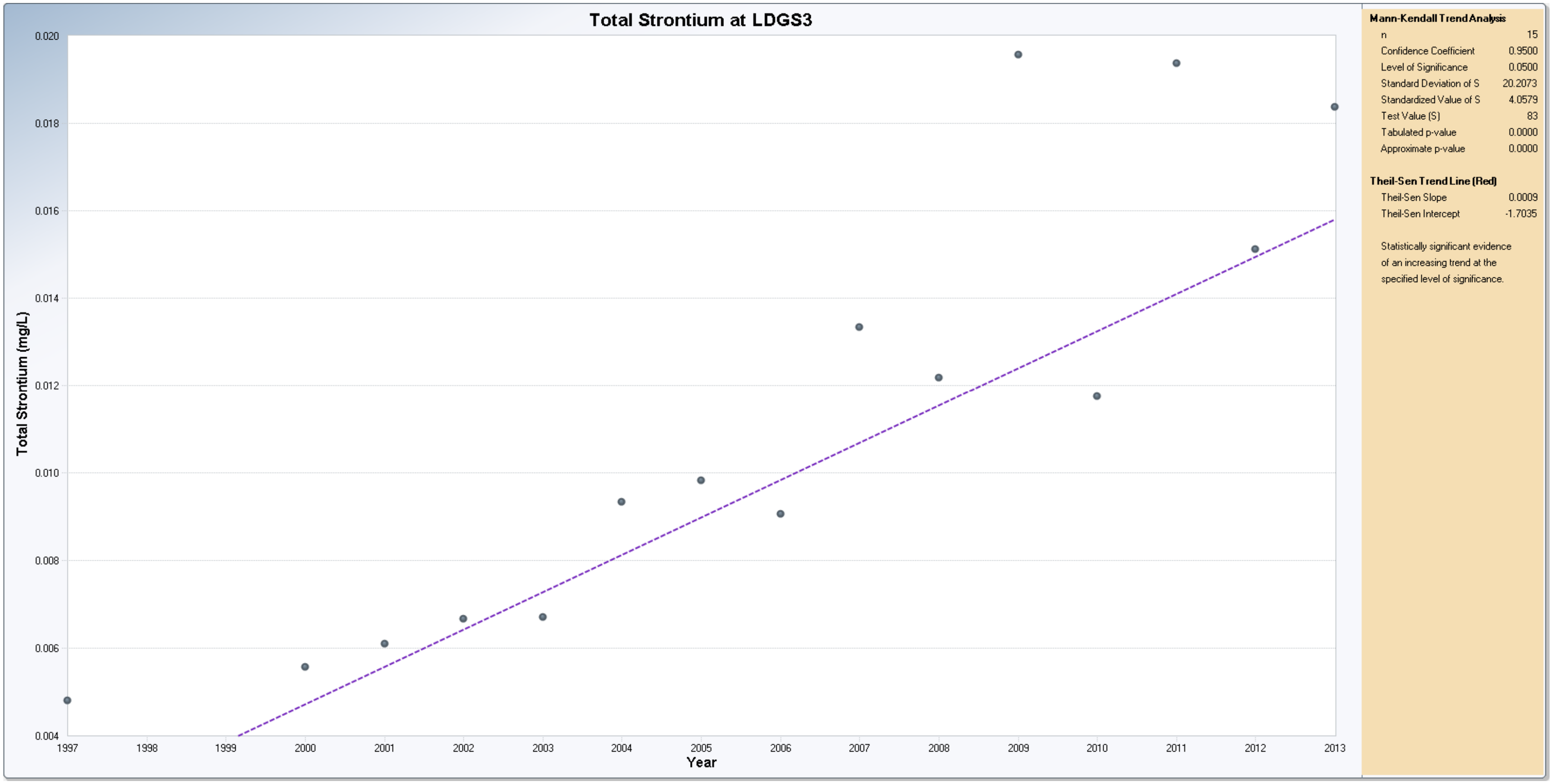
General Statistics

Period of Record	1997, 2000–2013
Number of Events Reported (m)	20
Number of Missing Events	5
Number or Reported Events Used	15
Number Values Reported (n)	20
Number Values Missing	5
Number Values Used	15
Minimum	0.0048
Maximum	0.0196
Mean	0.0112
Geometric Mean	0.0101
Median	0.00983
Standard Deviation	0.00506

Mann-Kendall Test

Test Value (S)	83
Tabulated p-value	0
Standard Deviation of S	20.21
Standardized Value of S	4.058
Approximate p-value	2.4753E-5

Statistically significant evidence of an increasing trend at the specified level of significance.


Total Strontium at LDGS3
Total Strontium (mg/L)
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.2073
Standardized Value of S 4.0579
Test Value (S) 83
Tabulated p-value 0.0000
Approximate p-value 0.0000
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0009
Theil-Sen Intercept -1.7035
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	3/22/2015 12:01:38 PM
From File	ldgs3_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Total Uranium (mg/L)

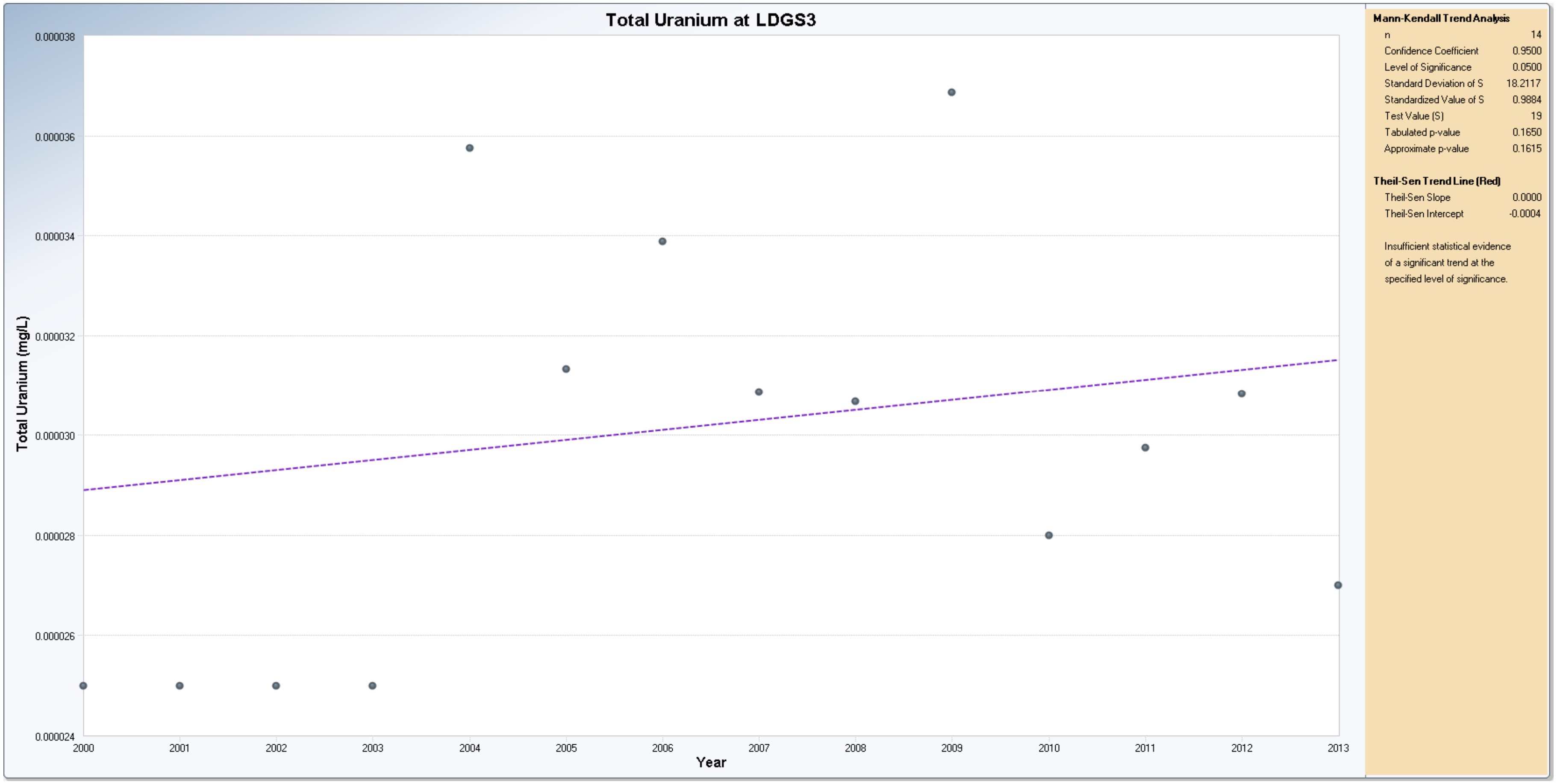
General Statistics

Period of Record	2000–2013
Number of Events Reported (m)	20
Number of Missing Events	6
Number or Reported Events Used	14
Number Values Reported (n)	20
Number Values Missing	6
Number Values Used	14
Minimum	2.5000E-5
Maximum	3.6875E-5
Mean	2.9639E-5
Geometric Mean	2.9390E-5
Median	3.0208E-5
Standard Deviation	4.0214E-6

Mann-Kendall Test

Test Value (S)	19
Tabulated p-value	0.165
Standard Deviation of S	18.21
Standardized Value of S	0.988
Approximate p-value	0.161

Insufficient evidence to identify a significant trend at the specified level of significance.



Total Uranium at LDGS3
Total Uranium (mg/L)
0.000038
0.000036
0.000034
0.000032
0.000030
0.000028
0.000026
0.000024
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.2117
Standardized Value of S 0.9884
Test Value (S) 19
Tabulated p-value 0.1650
Approximate p-value 0.1615
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept -0.0004
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

LDGS3
Baseline vs. Post-Baseline Trends for Select Parameters

Significant ($p < 0.05$) Trends at LDGS3 for Select Parameters

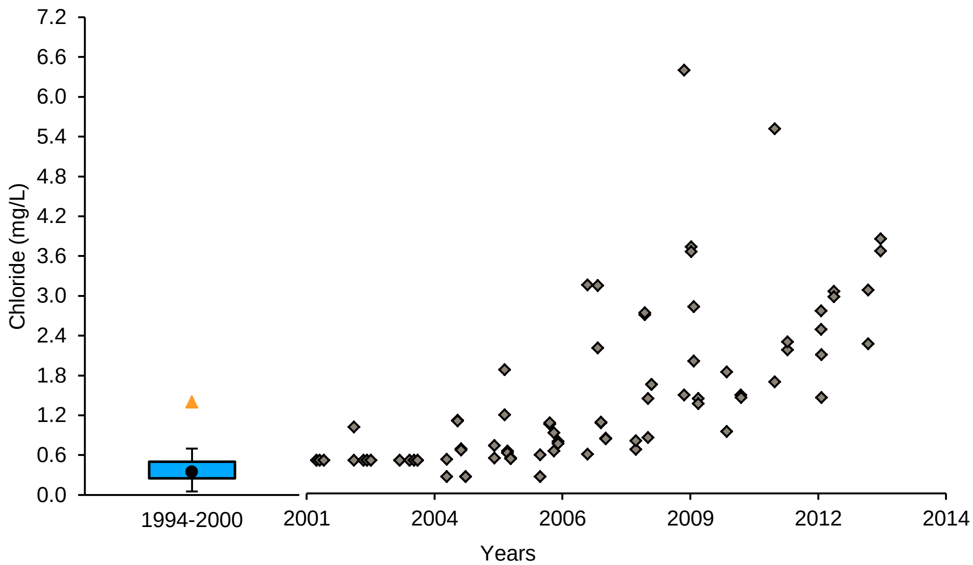


Figure D-34 Boxplot of the Baseline Condition for Chloride and Post-Baseline Chloride Values at LDGS3; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

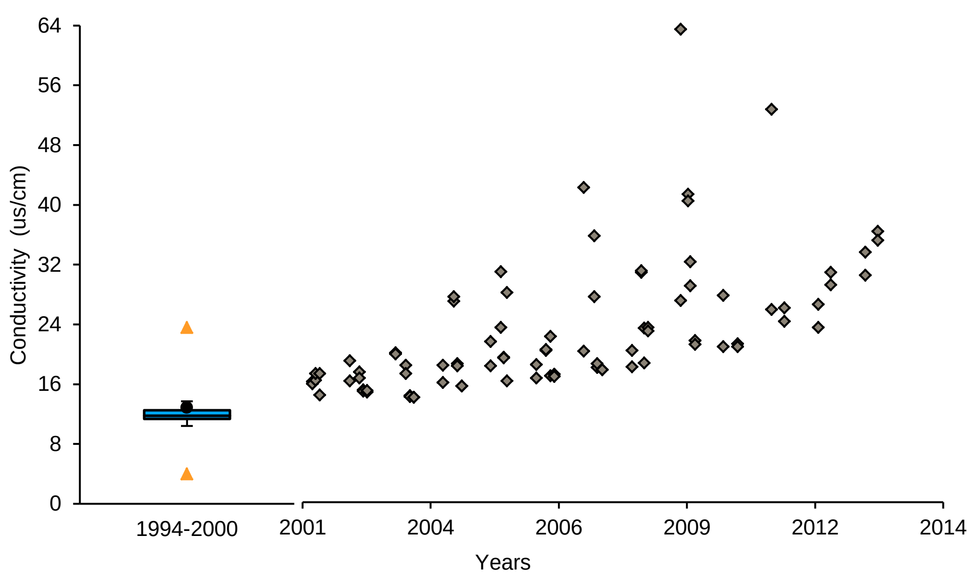


Figure D-35 Boxplot of the Baseline Condition for Conductivity and Post-Baseline Conductivity Values LDGS3; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

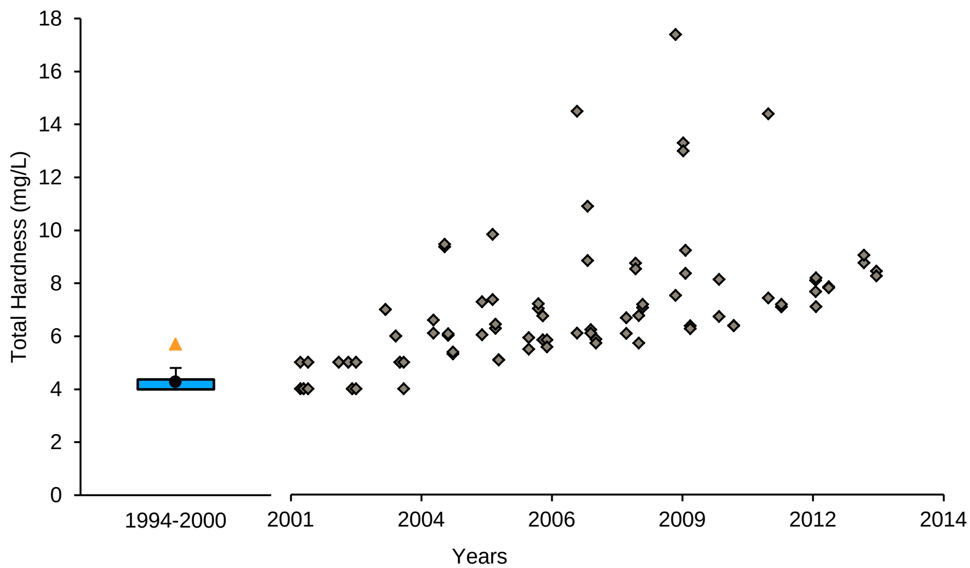


Figure D-36 Boxplot of the Baseline Condition for Hardness and Post-Baseline Hardness Values LDGS3; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

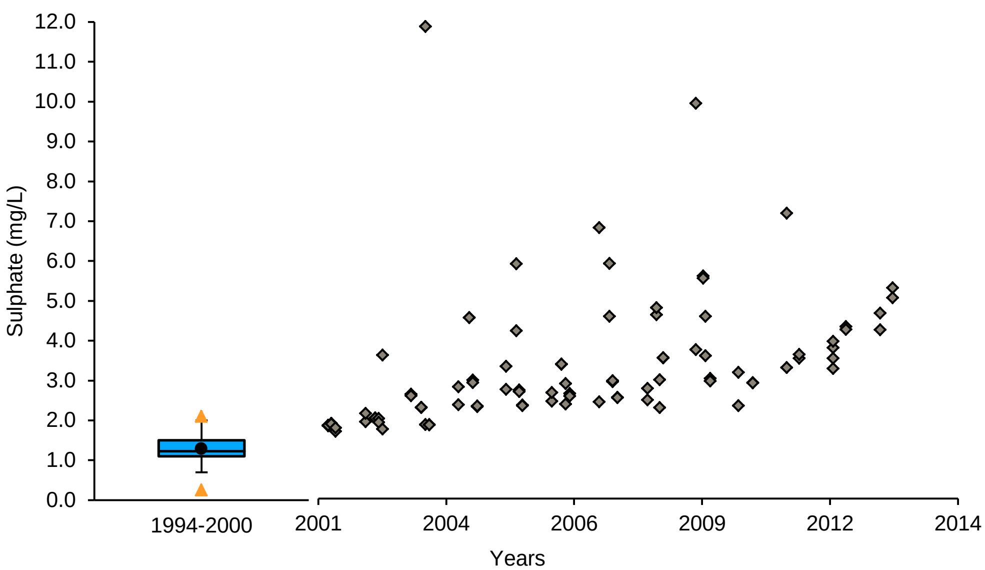


Figure D-37 Boxplot of the Baseline Condition for Sulphate and Post-Baseline Sulphate Values at LDGS3; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

Significant ($p < 0.05$) Trends at LDGS3 for Select Parameters

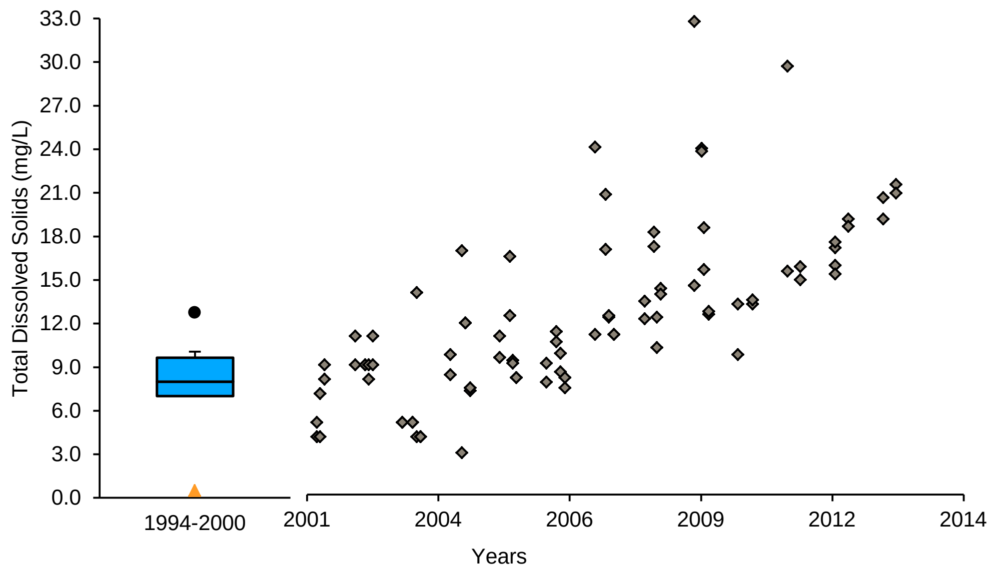


Figure D-38 Boxplot of the Baseline Condition for Total Dissolved Solids and Post-Baseline Total Dissolved Solids Values LDGS3; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

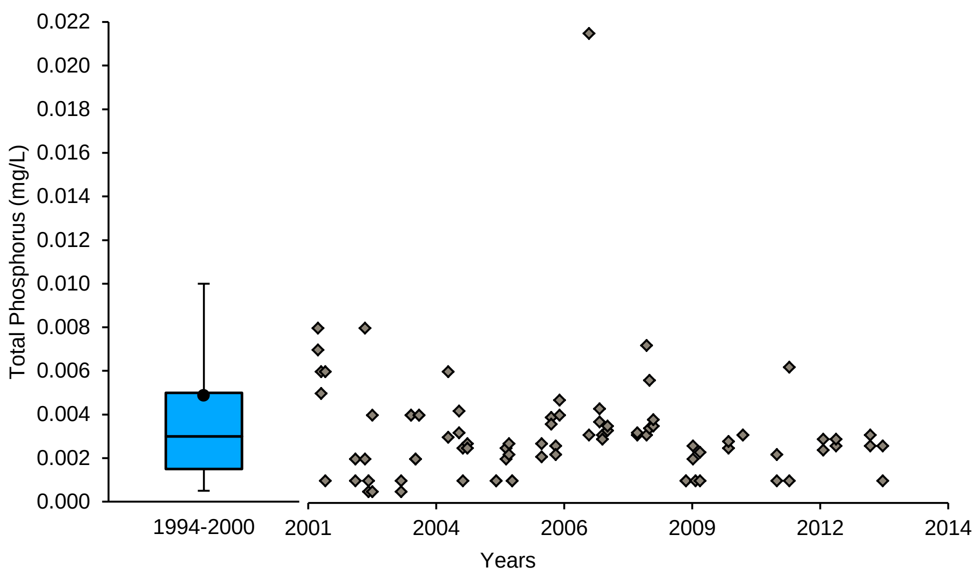


Figure D-39 Boxplot of the Baseline Condition for Total Phosphorus and Post-Baseline Total Phosphorus Values at LDGS3; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

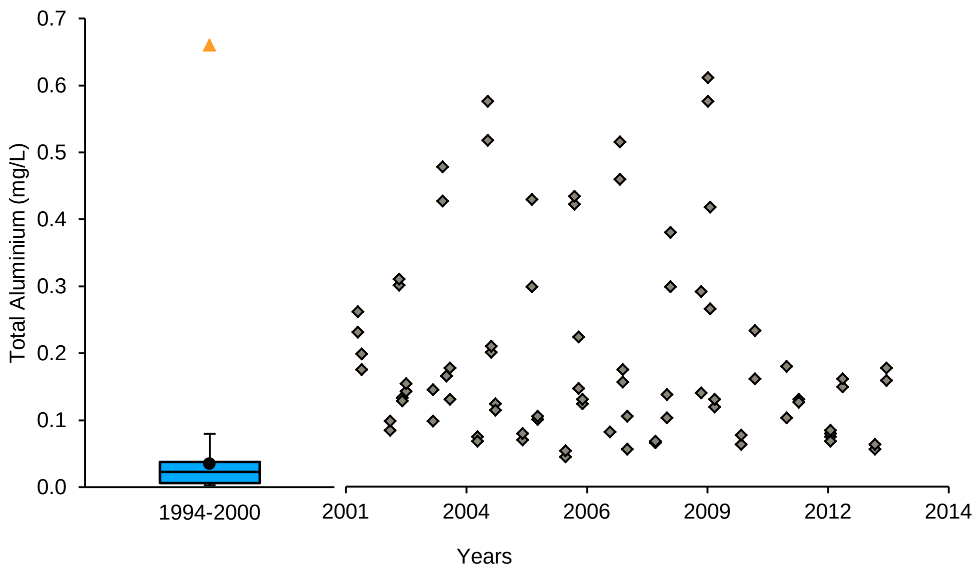


Figure D-40 Boxplot of the Baseline Condition for Total Aluminum and Post-Baseline Total Aluminum Values at LDGS3; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

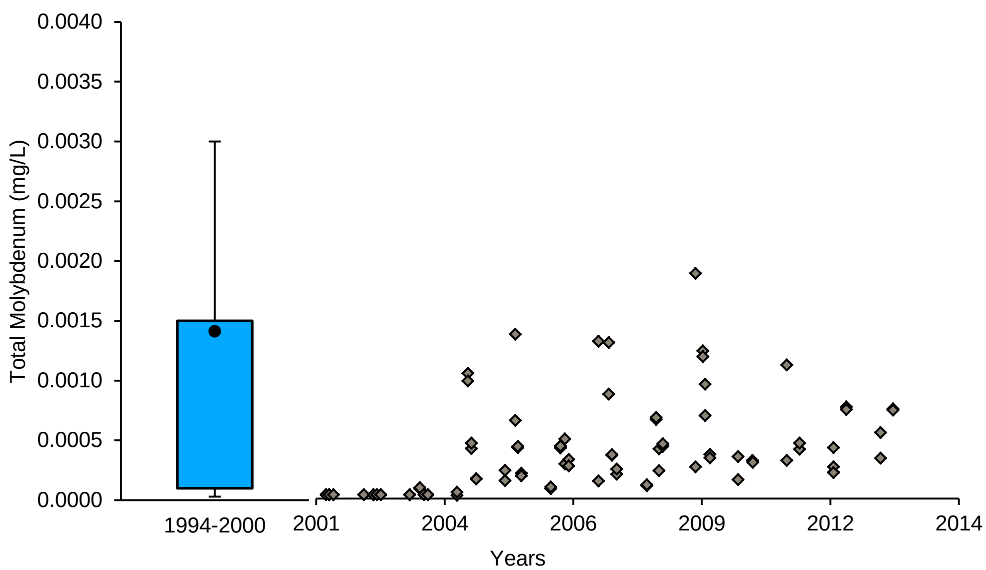


Figure D-41 Boxplot of the Baseline Condition for Total Molybdenum and Post-Baseline Total Molybdenum Values at LDGS3; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

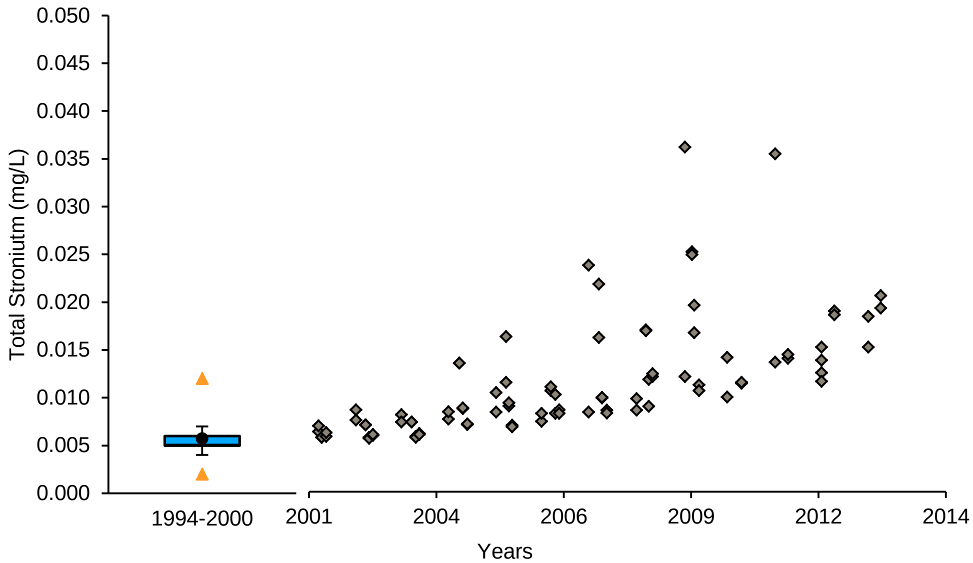


Figure D-42 Boxplot of the Baseline Condition for Total Strontium and Post-Baseline Total Strontium Values at LDGS3; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

WQ-01/LDGO/LDG48 (LDG Outlet)
ProUCL Trends Analysis Output

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	7/2/2014 10:26:35 AM
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Alkalinity (Total as CaCO3) (mg/L)

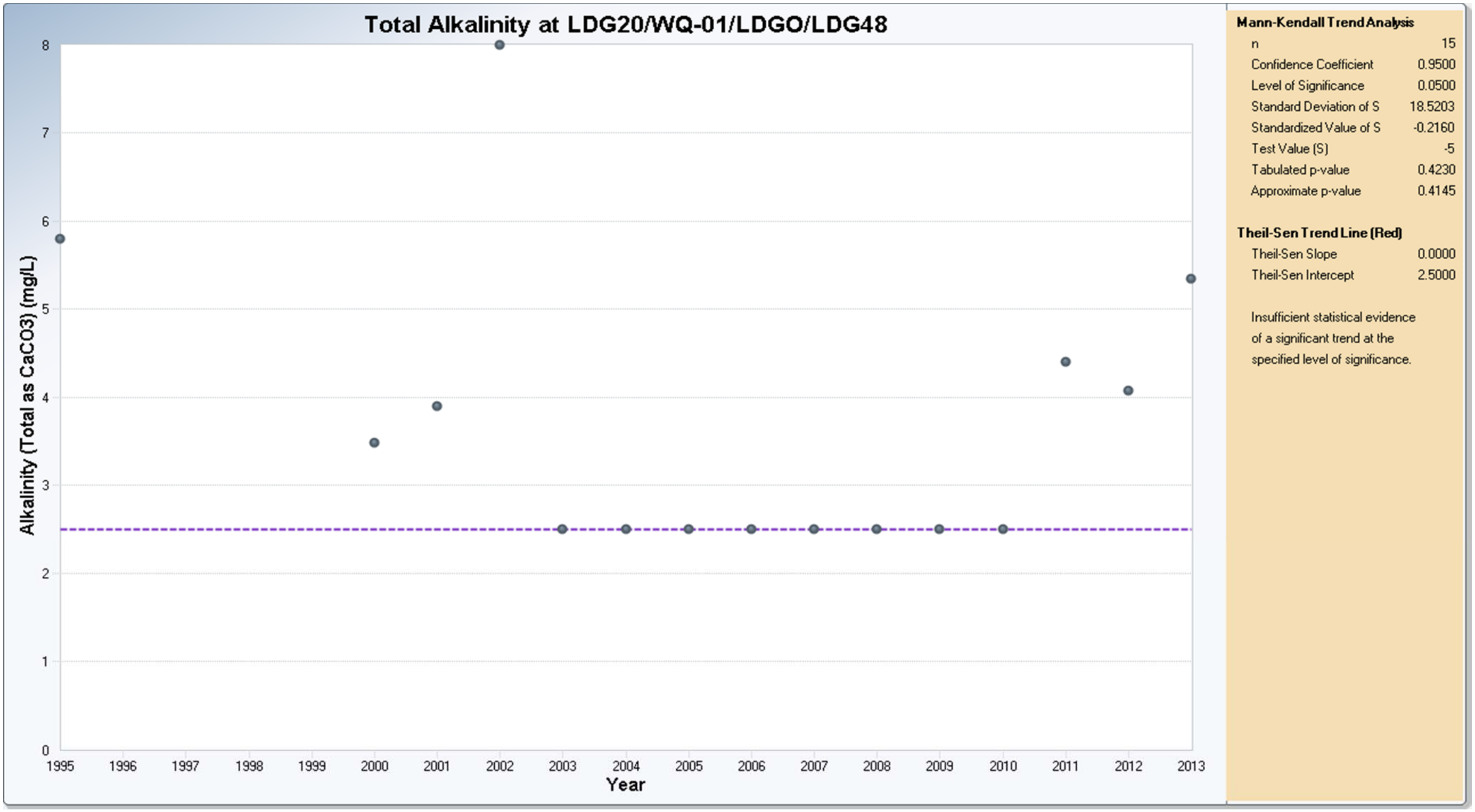
General Statistics

Period of Record	1995, 2000–2013
Number of Events Reported (m)	19
Number of Missing Events	4
Number or Reported Events Used	15
Number Values Reported (n)	19
Number Values Missing	4
Number Values Used	15
Minimum	2.5
Maximum	8
Mean	3.667
Geometric Mean	3.396
Median	2.5
Standard Deviation	1.644

Mann-Kendall Test

Test Value (S)	-5
Tabulated p-value	0.423
Standard Deviation of S	18.52
Standardized Value of S	-0.216
Approximate p-value	0.415

Insufficient evidence to identify a significant trend at the specified level of significance.


Total Alkalinity at LDG20/WQ-01/LDGO/LDG48
Alkalinity (Total as CaCO3) (mg/L)
0
1
2
3
4
5
6
7
8
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.5203
Standardized Value of S -0.2160
Test Value (S) -5
Tabulated p-value 0.4230
Approximate p-value 0.4145
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 2.5000
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	7/2/2014 10:31:35 AM
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Chloride (mg/L)

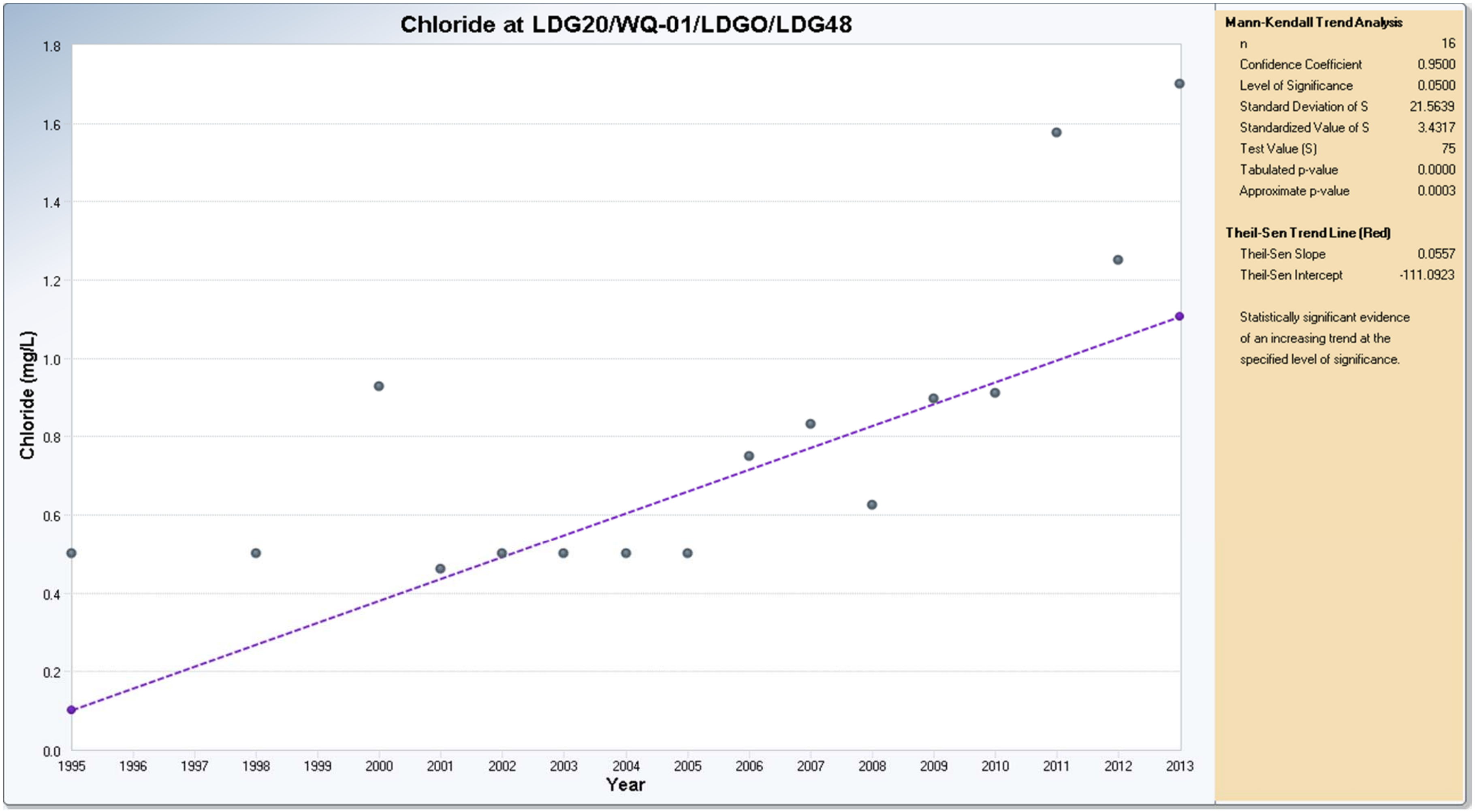
General Statistics

Period of Record	1995, 1998, 2000–2013
Number of Events Reported (m)	19
Number of Missing Events	3
Number or Reported Events Used	16
Number Values Reported (n)	19
Number Values Missing	3
Number Values Used	16
Minimum	0.46
Maximum	1.7
Mean	0.808
Geometric Mean	0.734
Median	0.688
Standard Deviation	0.395

Mann-Kendall Test

Test Value (S)	75
Tabulated p-value	0
Standard Deviation of S	21.56
Standardized Value of S	3.432
Approximate p-value	2.9994E-4

Statistically significant evidence of an increasing trend at the specified level of significance.


Chloride at LDG20/WQ-01/LDGO/LDG48
Chloride (mg/L)
Year
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 21.5639
Standardized Value of S 3.4317
Test Value (S) 75
Tabulated p-value 0.0000
Approximate p-value 0.0003
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0557
Theil-Sen Intercept -111.0923
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	7/2/2014 10:22:34 AM
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Conductivity (µS/cm)

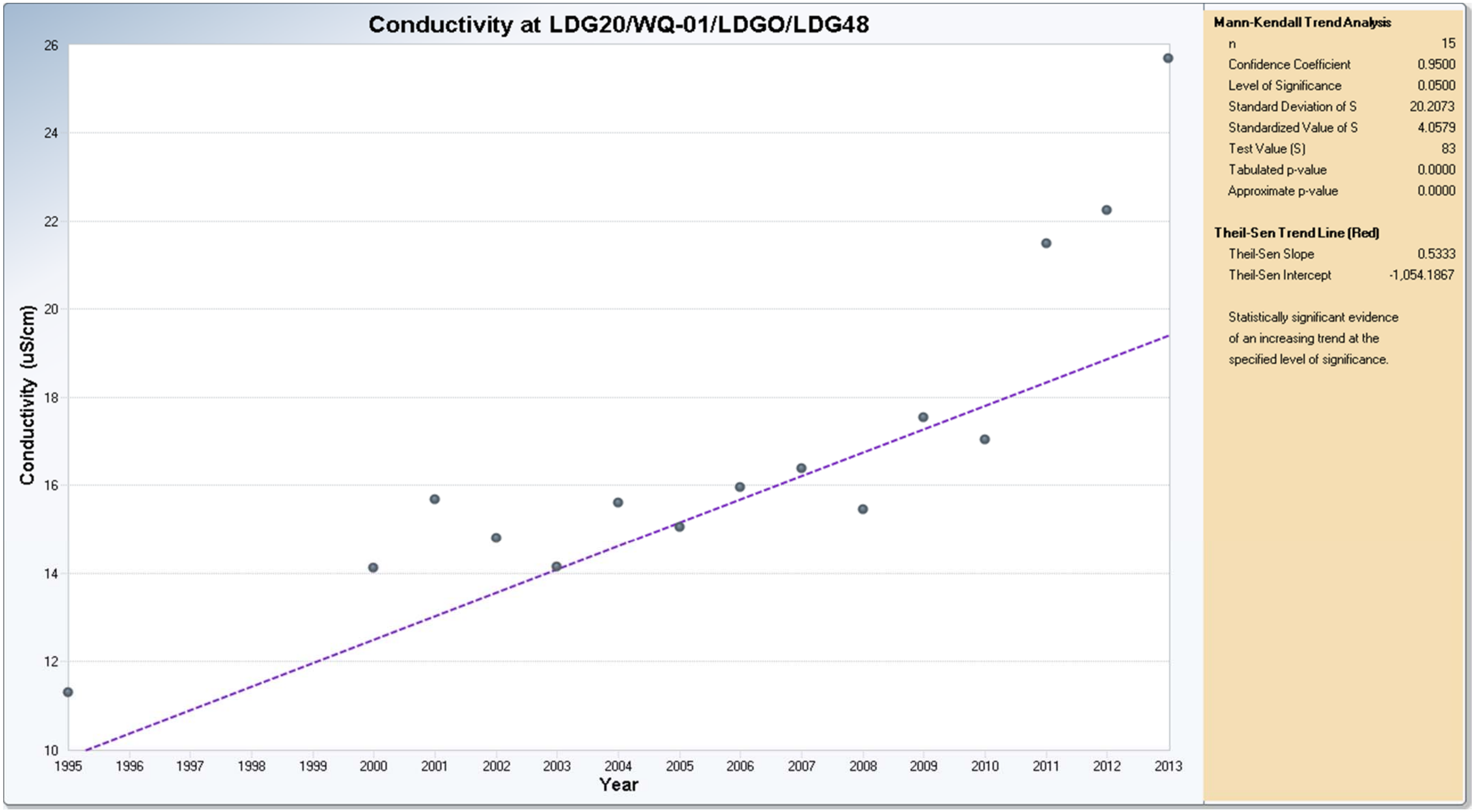
General Statistics

Period of Record	1995, 2000–2013
Number of Events Reported (m)	19
Number of Missing Events	4
Number or Reported Events Used	15
Number Values Reported (n)	19
Number Values Missing	4
Number Values Used	15
Minimum	11.3
Maximum	25.7
Mean	16.84
Geometric Mean	16.5
Median	15.68
Standard Deviation	3.67

Mann-Kendall Test

Test Value (S)	83
Tabulated p-value	0
Standard Deviation of S	20.21
Standardized Value of S	4.058
Approximate p-value	2.4753E-5

Statistically significant evidence of an increasing trend at the specified level of significance.


Conductivity at LDG20/WQ-01/LDGO/LDG48
Conductivity (uS/cm)
26
24
22
20
18
16
14
12
10
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.2073
Standardized Value of S 4.0579
Test Value (S) 83
Tabulated p-value 0.0000
Approximate p-value 0.0000
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.5333
Theil-Sen Intercept -1,054.1867
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	7/2/2014 10:33:39 AM
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Fluoride (F) (mg/L)

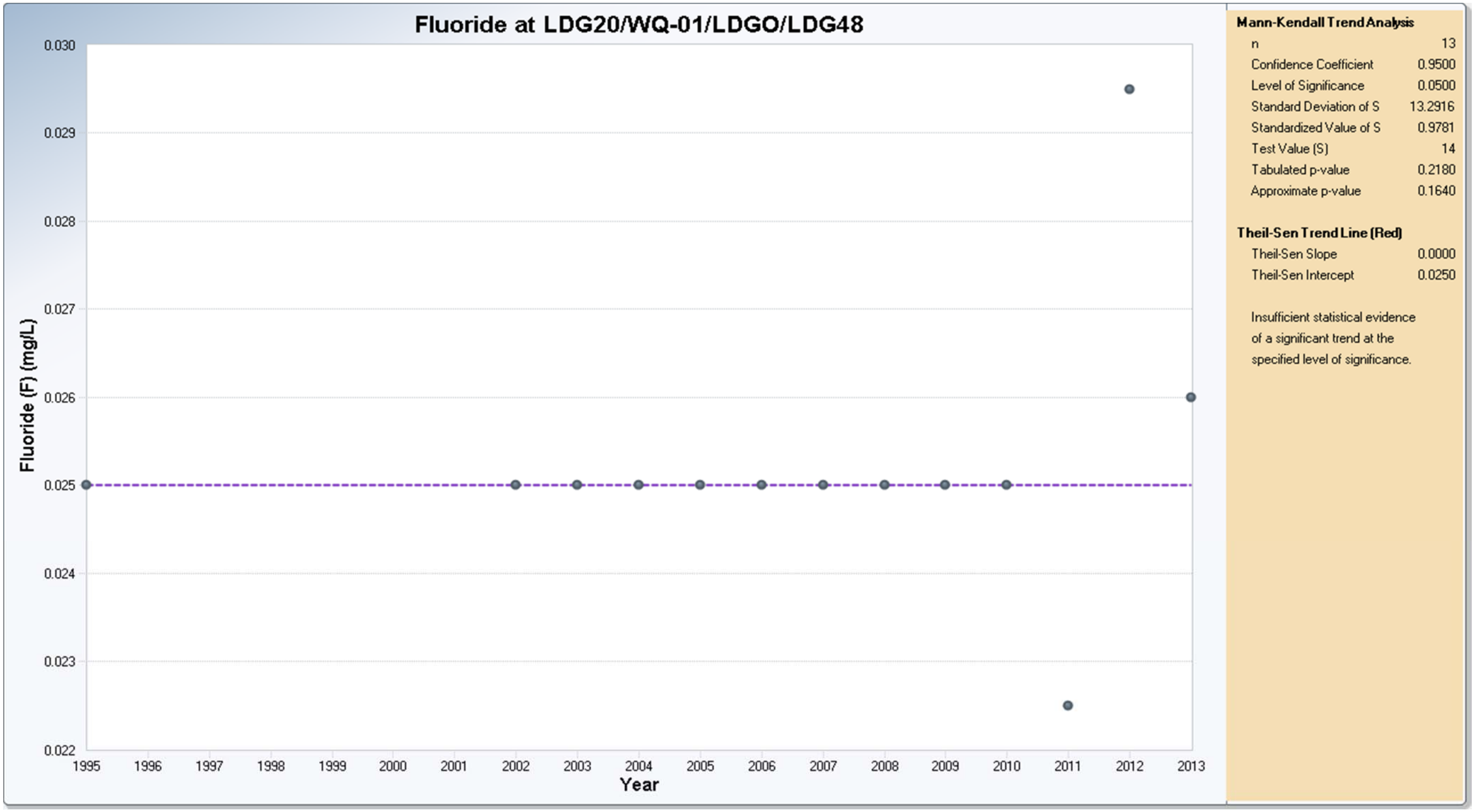
General Statistics

Period of Record	1995, 2000–2013
Number of Events Reported (m)	19
Number of Missing Events	6
Number or Reported Events Used	13
Number Values Reported (n)	19
Number Values Missing	6
Number Values Used	13
Minimum	0.0225
Maximum	0.0295
Mean	0.0252
Geometric Mean	0.0252
Median	0.025
Standard Deviation	0.00149

Mann-Kendall Test

Test Value (S)	14
Tabulated p-value	0.218
Standard Deviation of S	13.29
Standardized Value of S	0.978
Approximate p-value	0.164

Insufficient evidence to identify a significant trend at the specified level of significance.


Fluoride at LDG20/WQ-01/LDGO/LDG48
Fluoride (F) (mg/L)
Year
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 13.2916
Standardized Value of S 0.9781
Test Value (S) 14
Tabulated p-value 0.2180
Approximate p-value 0.1640
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 0.0250
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	7/2/2014 10:29:41 AM
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Hardness-Total (mg/L)

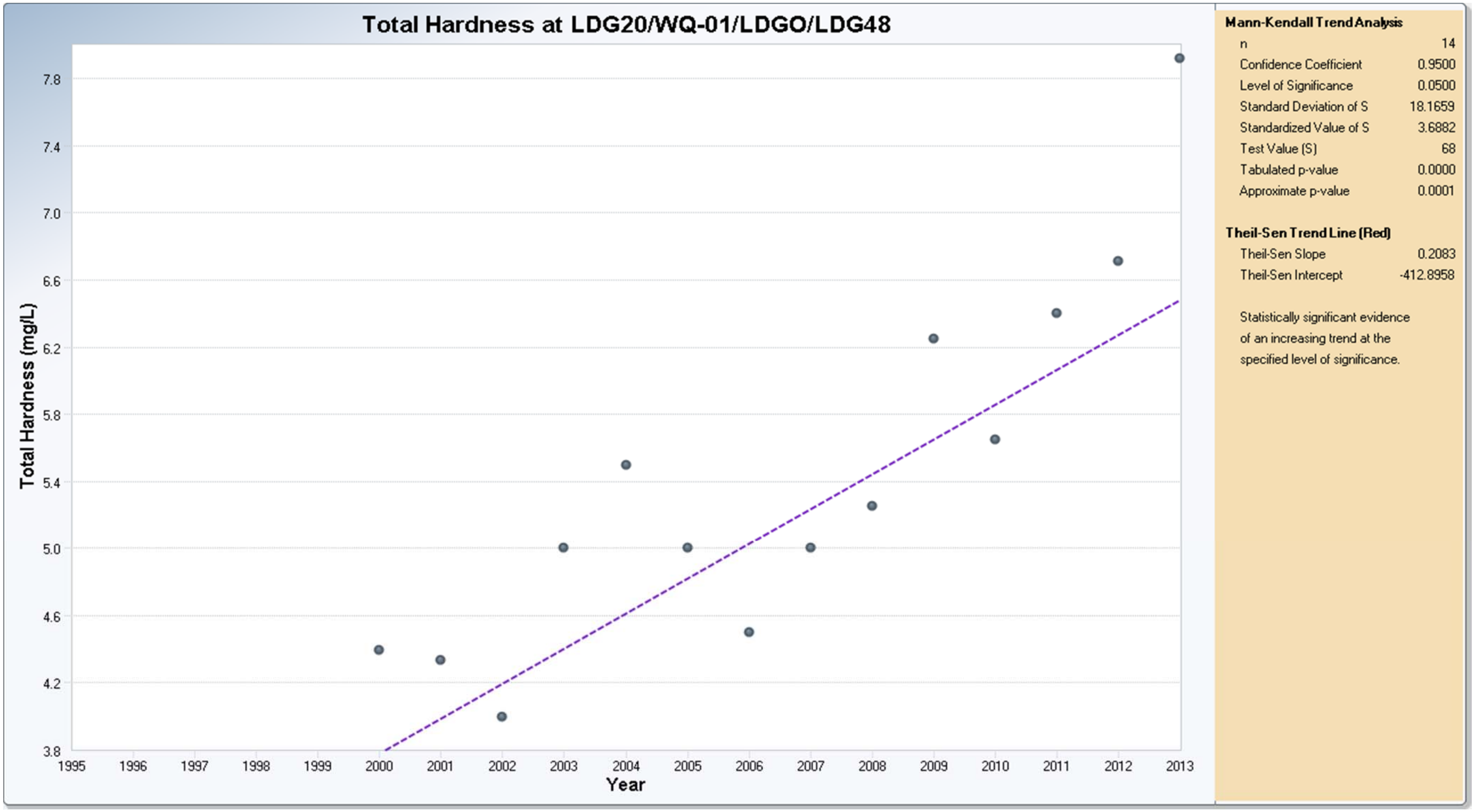
General Statistics

Period of Record	2000–2013
Number of Events Reported (m)	19
Number of Missing Events	5
Number or Reported Events Used	14
Number Values Reported (n)	19
Number Values Missing	5
Number Values Used	14
Minimum	4
Maximum	7.92
Mean	5.422
Geometric Mean	5.328
Median	5.125
Standard Deviation	1.084

Mann-Kendall Test

Test Value (S)	68
Tabulated p-value	0
Standard Deviation of S	18.17
Standardized Value of S	3.688
Approximate p-value	1.1291E-4

Statistically significant evidence of an increasing trend at the specified level of significance.


Total Hardness at LDG20/WQ-01/LDGO/LDG48
Total Hardness (mg/L)
Year
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.1659
Standardized Value of S 3.6882
Test Value (S) 68
Tabulated p-value 0.0000
Approximate p-value 0.0001
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.2083
Theil-Sen Intercept -412.8958
Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	7/2/2014 10:18:05 AM
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

pH (pH units)

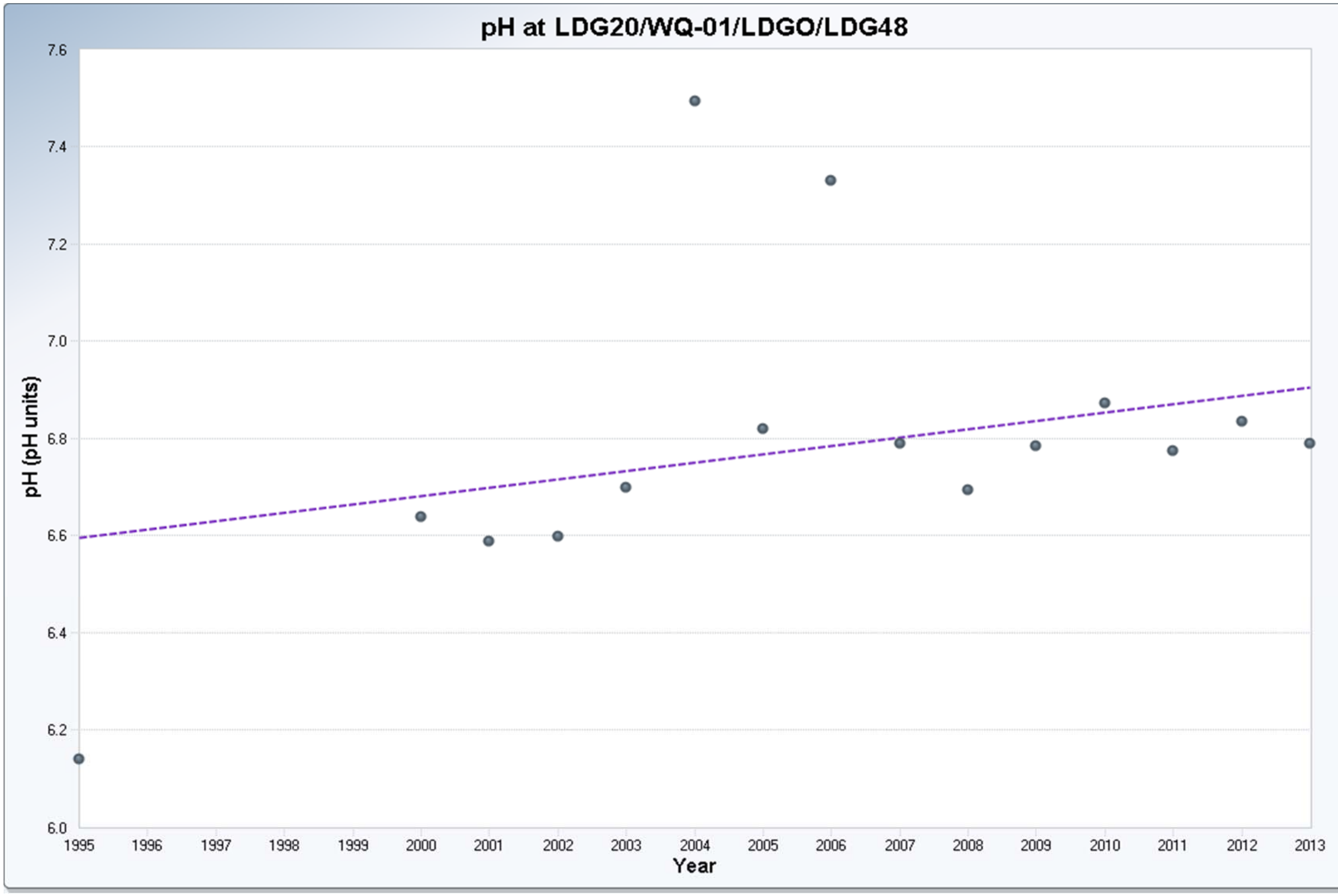
General Statistics

Period of Record	1995, 2000–2013
Number of Events Reported (m)	19
Number of Missing Events	4
Number or Reported Events Used	15
Number Values Reported (n)	19
Number Values Missing	4
Number Values Used	15
Minimum	6.14
Maximum	7.495
Mean	6.79
Geometric Mean	6.784
Median	6.785
Standard Deviation	0.309

Mann-Kendall Test

Test Value (S)	40
Tabulated p-value	0.023
Standard Deviation of S	20.18
Standardized Value of S	1.932
Approximate p-value	0.0267

Statistically significant evidence of an increasing trend at the specified level of significance.



Mann-Kendall Trend Analysis	
n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.1825
Standardized Value of S	1.9324
Test Value (S)	40
Tabulated p-value	0.0230
Approximate p-value	0.0267
Theil-Sen Trend Line (Red)	
Theil-Sen Slope	0.0173
Theil-Sen Intercept	-27.8641

Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	7/2/2014 10:35:25 AM
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Sulphate (mg/L)

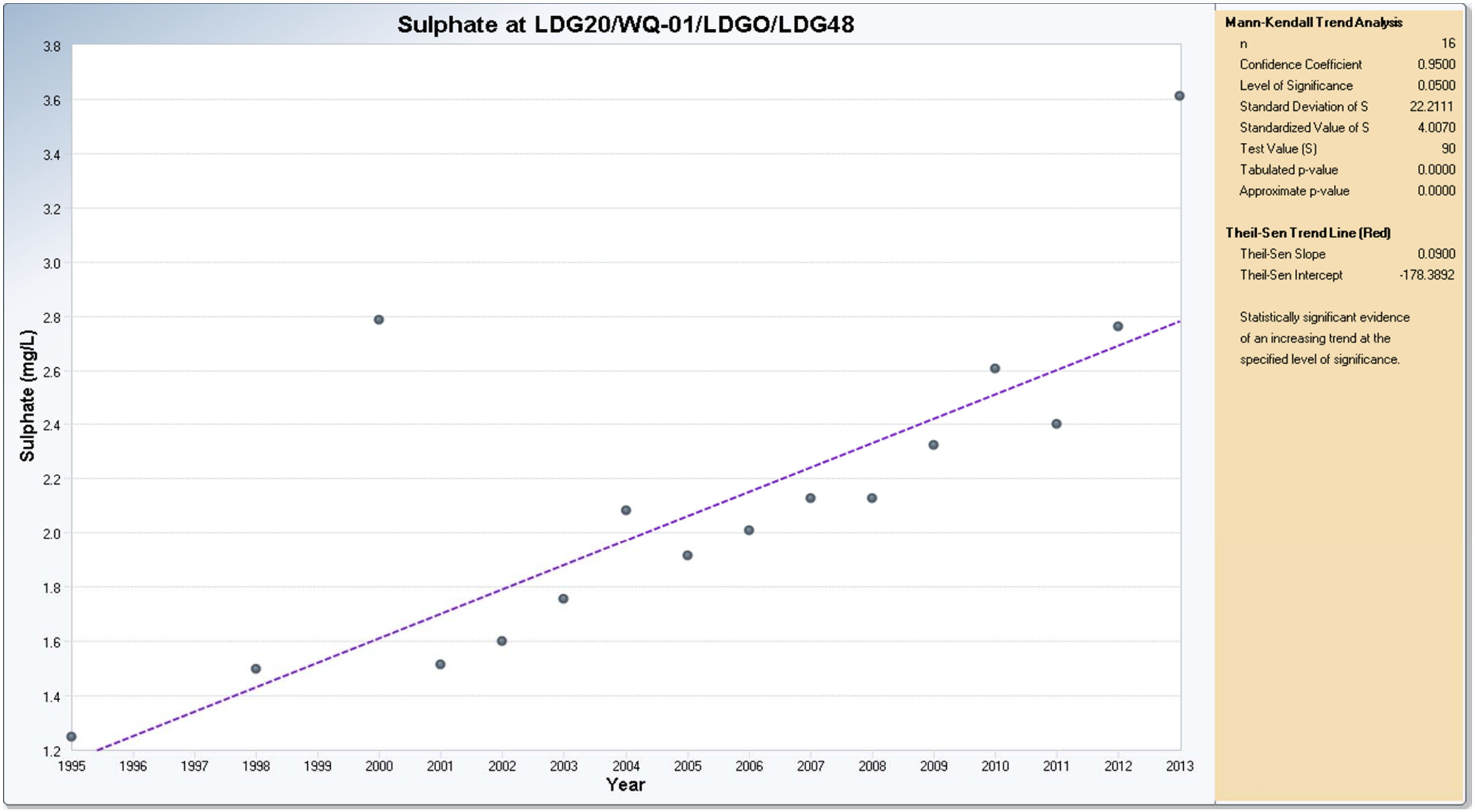
General Statistics

Period of Record	1995, 1998, 2000–2013
Number of Events Reported (m)	19
Number of Missing Events	3
Number or Reported Events Used	16
Number Values Reported (n)	19
Number Values Missing	3
Number Values Used	16
Minimum	1.25
Maximum	3.61
Mean	2.148
Geometric Mean	2.074
Median	2.106
Standard Deviation	0.599

Mann-Kendall Test

Test Value (S)	90
Tabulated p-value	0
Standard Deviation of S	22.21
Standardized Value of S	4.007
Approximate p-value	3.0747E-5

Statistically significant evidence of an increasing trend at the specified level of significance.


Sulphate at LDG20/WQ-01/LDGO/LDG48
Sulphate (mg/L)
Year
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.2111
Standardized Value of S 4.0070
Test Value (S) 90
Tabulated p-value 0.0000
Approximate p-value 0.0000
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0900
Theil-Sen Intercept -178.3892
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	7/2/2014 10:24:27 AM
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

TDS (mg/L)

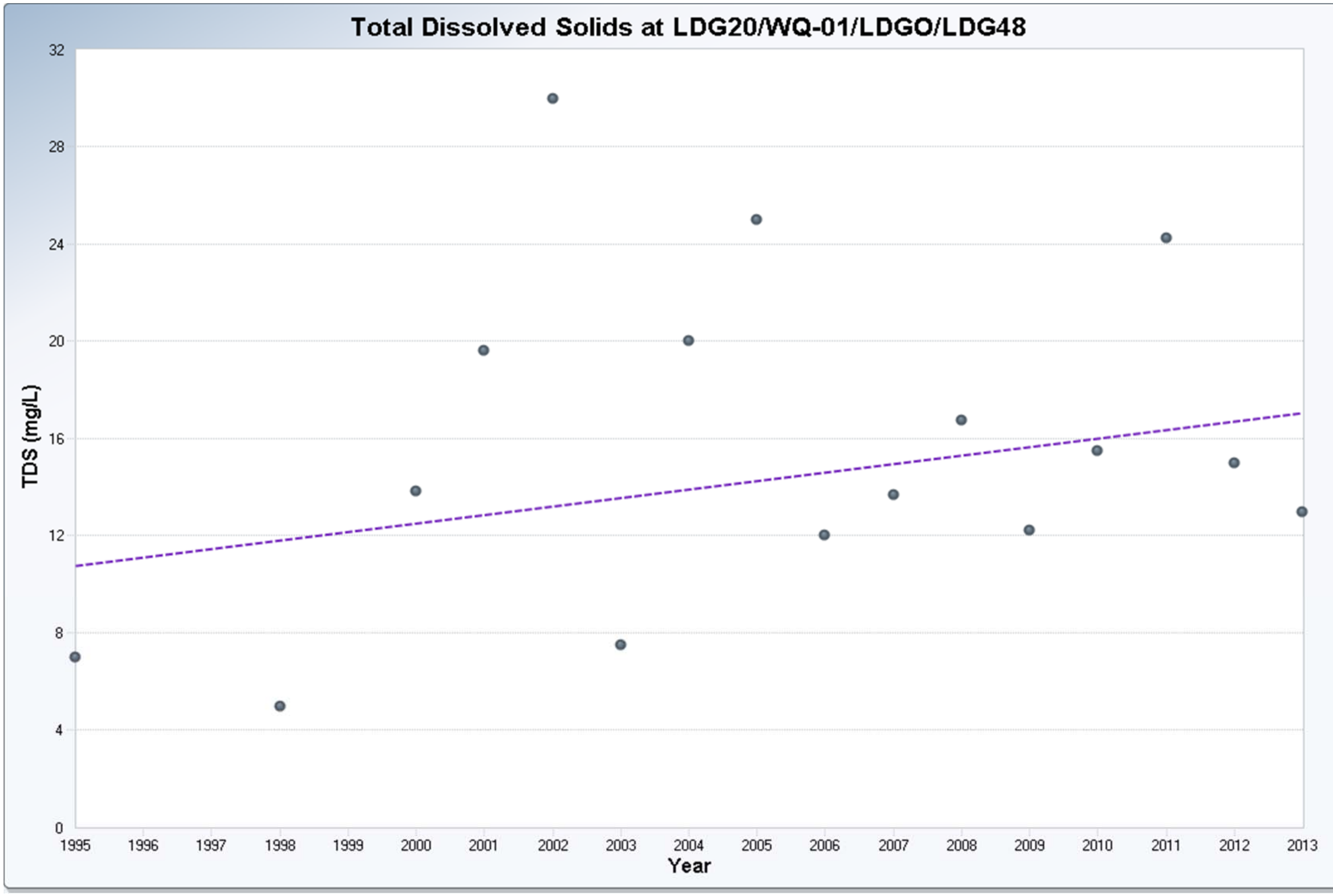
General Statistics

Period of Record	1995, 1998, 2000–2013
Number of Events Reported (m)	19
Number of Missing Events	3
Number or Reported Events Used	16
Number Values Reported (n)	19
Number Values Missing	3
Number Values Used	16
Minimum	5
Maximum	30
Mean	15.65
Geometric Mean	14.17
Median	14.42
Standard Deviation	6.818

Mann-Kendall Test

Test Value (S)	18
Tabulated p-value	0.225
Standard Deviation of S	22.21
Standardized Value of S	0.765
Approximate p-value	0.222

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis	
n	16
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	22.2111
Standardized Value of S	0.7654
Test Value (S)	18
Tabulated p-value	0.2250
Approximate p-value	0.2220

Theil-Sen Trend Line (Red)	
Theil-Sen Slope	0.3490
Theil-Sen Intercept	-685.4193

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	4/23/2015 11:15
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Nitrogen (N)-Total (mg/L)-CALC

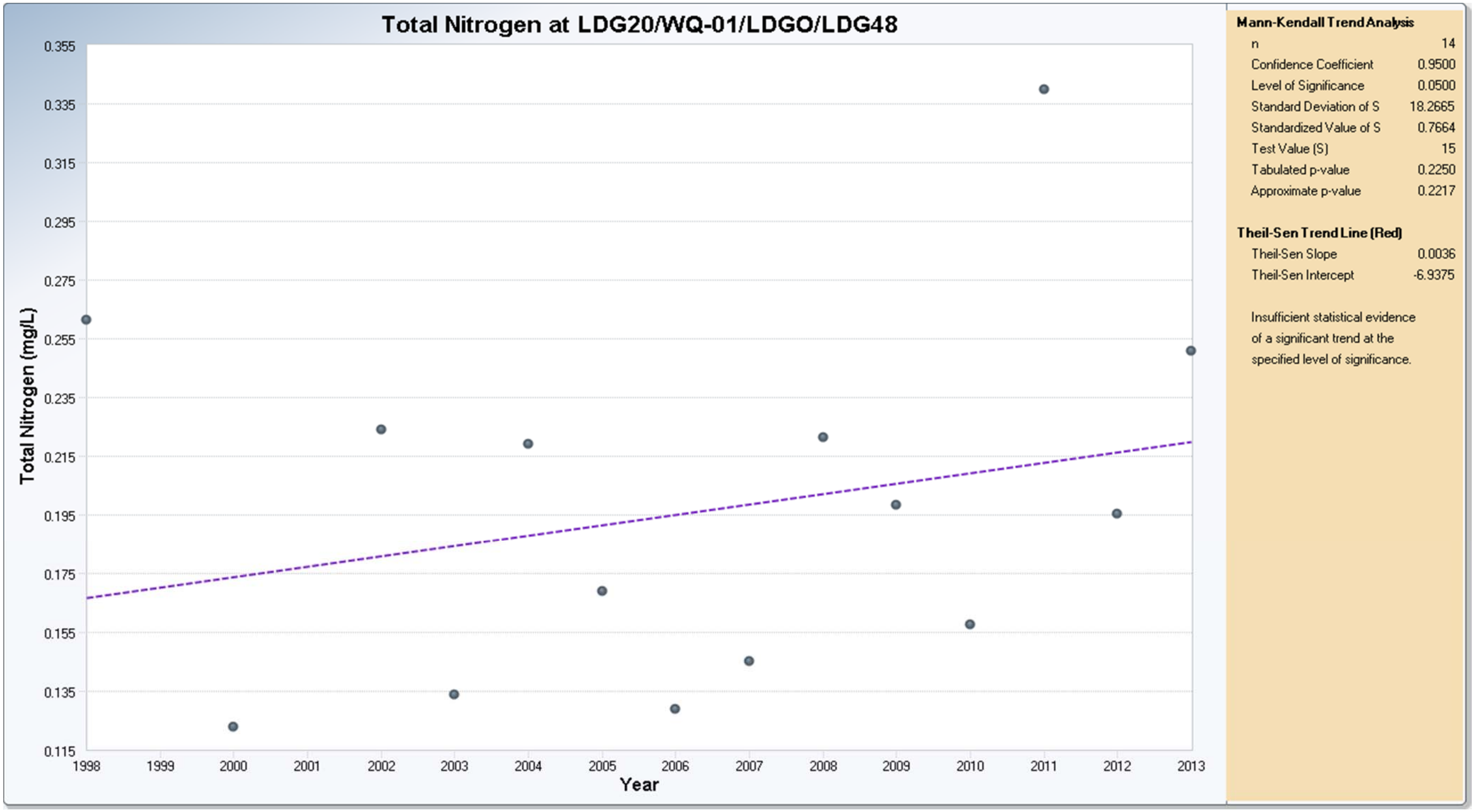
General Statistics

Period of Record	1998, 2000, 2002–2013
Number of Events Reported (m)	19
Number of Missing Events	5
Number or Reported Events Used	14
Number Values Reported (n)	19
Number Values Missing	5
Number Values Used	14
Minimum	0.123
Maximum	0.34
Mean	0.198
Geometric Mean	0.19
Median	0.197
Standard Deviation	0.061

Mann-Kendall Test

Test Value (S)	15
Tabulated p-value	0.225
Standard Deviation of S	18.27
Standardized Value of S	0.766
Approximate p-value	0.222

Insufficient evidence to identify a significant trend at the specified level of significance.


Total Nitrogen at LDG20/WQ-01/LDGO/LDG48
Total Nitrogen (mg/L)
0.355
0.335
0.315
0.295
0.275
0.255
0.235
0.215
0.195
0.175
0.155
0.135
0.115
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.2665
Standardized Value of S 0.7664
Test Value (S) 15
Tabulated p-value 0.2250
Approximate p-value 0.2217
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0036
Theil-Sen Intercept -6.9375
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	7/2/2014 10:39:31 AM
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Phosphorus-Total (mg/L)

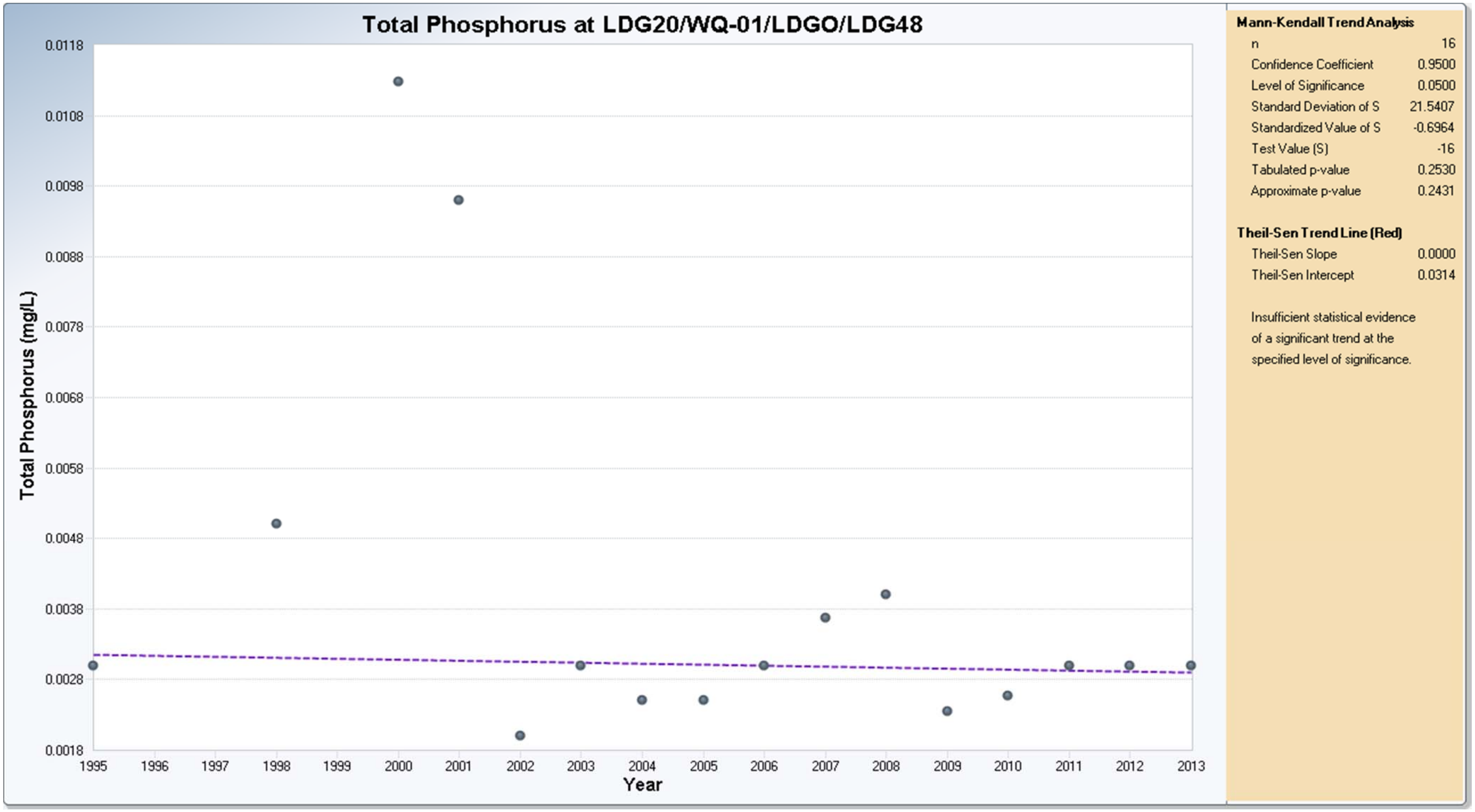
General Statistics

Period of Record	1995, 1998, 2000–2013
Number of Events Reported (m)	19
Number of Missing Events	3
Number or Reported Events Used	16
Number Values Reported (n)	19
Number Values Missing	3
Number Values Used	16
Minimum	0.002
Maximum	0.0113
Mean	0.00397
Geometric Mean	0.00347
Median	0.003
Standard Deviation	0.00264

Mann-Kendall Test

Test Value (S)	-16
Tabulated p-value	0.253
Standard Deviation of S	21.54
Standardized Value of S	-0.696
Approximate p-value	0.243

Insufficient evidence to identify a significant trend at the specified level of significance.


Total Phosphorus at LDG20/WQ-01/LDGO/LDG48
Total Phosphorus (mg/L)
0.0118
0.0108
0.0098
0.0088
0.0078
0.0068
0.0058
0.0048
0.0038
0.0028
0.0018
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 21.5407
Standardized Value of S -0.6964
Test Value (S) -16
Tabulated p-value 0.2530
Approximate p-value 0.2431
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 0.0314
Insufficient statistical evidence
of a significant trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	7/2/2014 10:42:34 AM
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

TOC (mg/L)

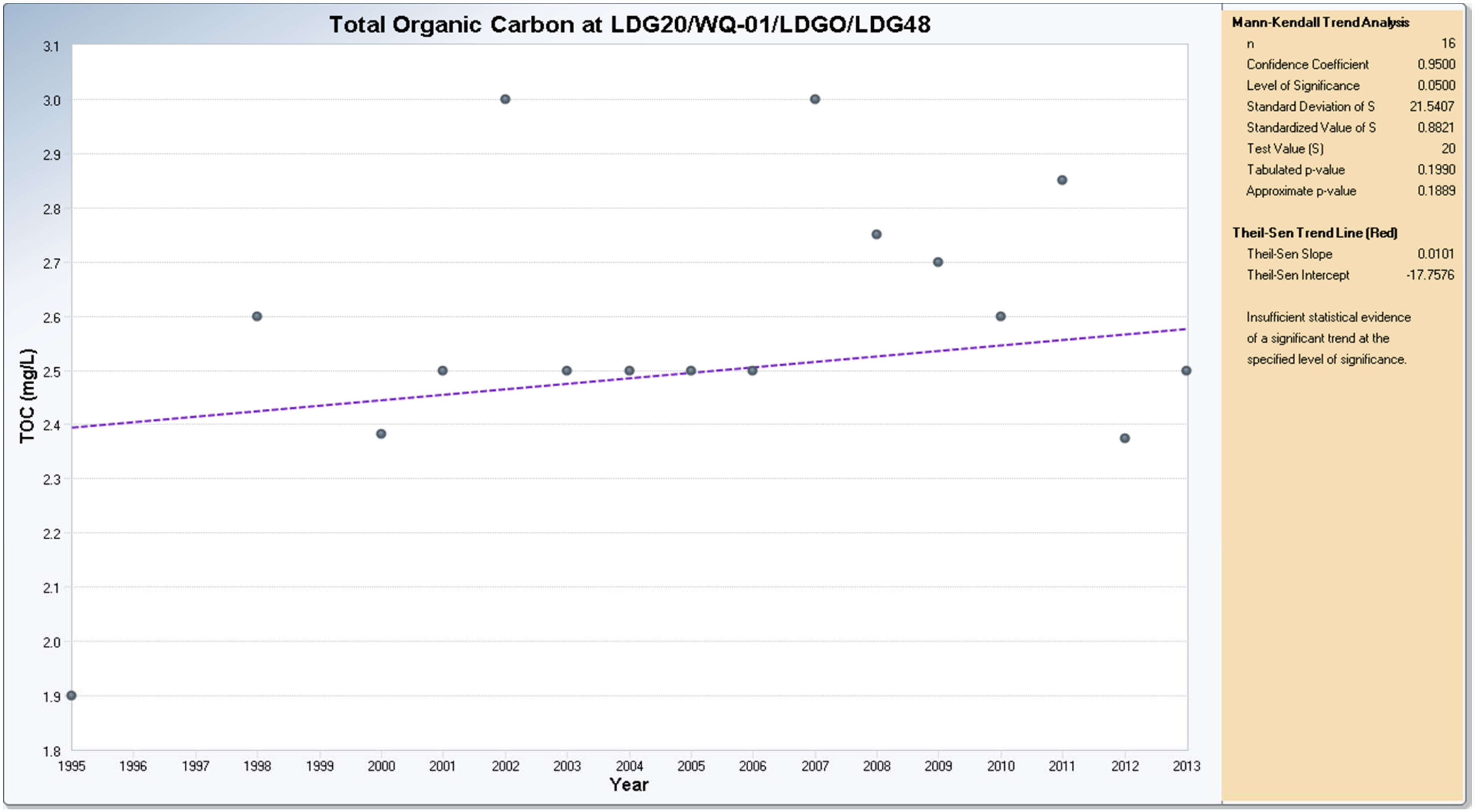
General Statistics

Period of Record	1995, 1998, 2000–2013
Number of Events Reported (m)	19
Number of Missing Events	3
Number or Reported Events Used	16
Number Values Reported (n)	19
Number Values Missing	3
Number Values Used	16
Minimum	1.9
Maximum	3
Mean	2.572
Geometric Mean	2.559
Median	2.5
Standard Deviation	0.265

Mann-Kendall Test

Test Value (S)	20
Tabulated p-value	0.199
Standard Deviation of S	21.54
Standardized Value of S	0.882
Approximate p-value	0.189

Insufficient evidence to identify a significant trend at the specified level of significance.



Total Organic Carbon at LDG20/WQ-01/LDGO/LDG48
TOC (mg/L)
3.1
3.0
2.9
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2.0
1.9
1.8
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
Year
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 21.5407
Standardized Value of S 0.8821
Test Value (S) 20
Tabulated p-value 0.1990
Approximate p-value 0.1889
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0101
Theil-Sen Intercept -17.7576
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	7/2/2014 10:44:17 AM
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Aluminum-Total (mg/L)

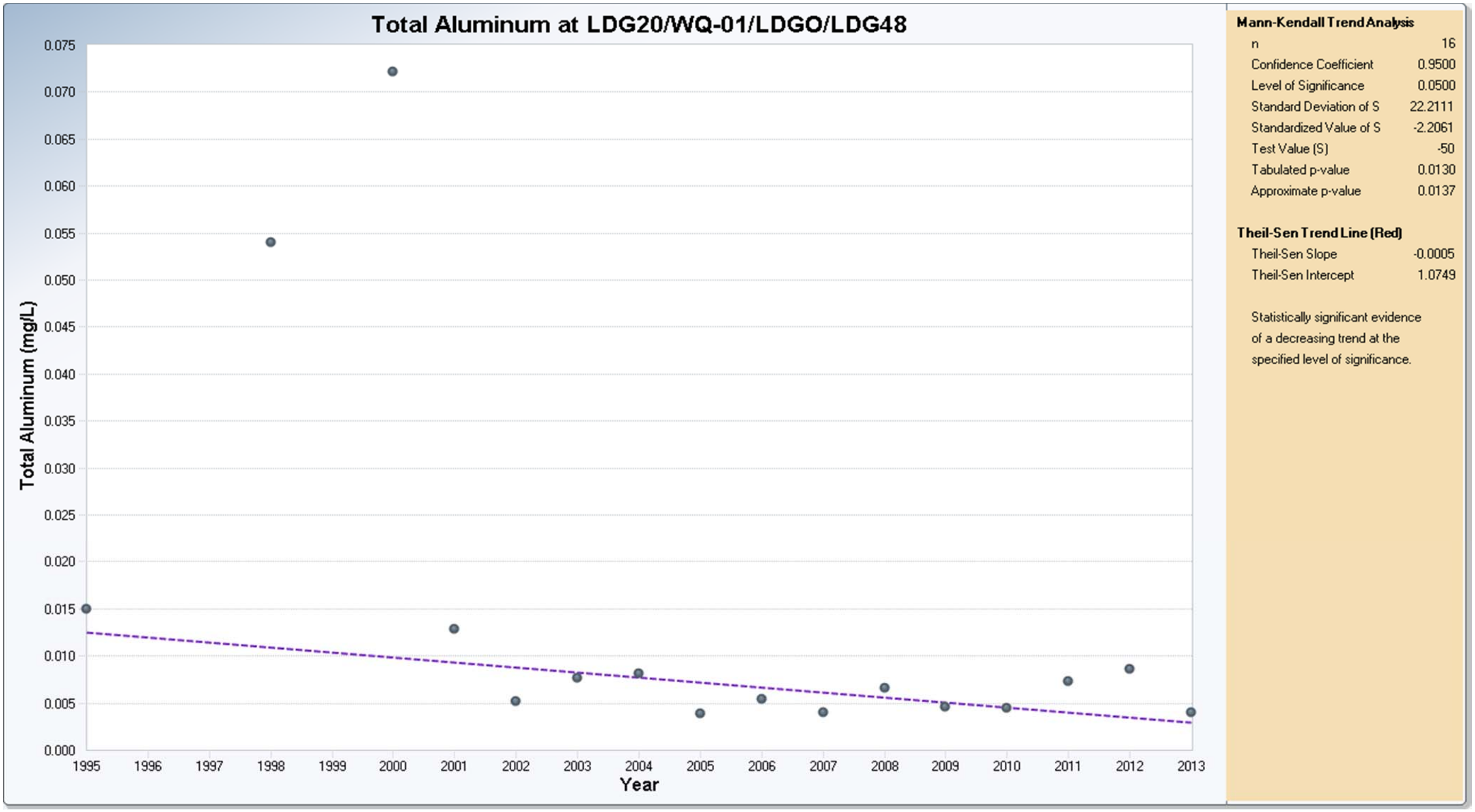
General Statistics

Period of Record	1995, 1998, 2000–2013
Number of Events Reported (m)	19
Number of Missing Events	3
Number or Reported Events Used	16
Number Values Reported (n)	19
Number Values Missing	3
Number Values Used	16
Minimum	0.00385
Maximum	0.0722
Mean	0.014
Geometric Mean	0.00846
Median	0.00695
Standard Deviation	0.0197

Mann-Kendall Test

Test Value (S)	-50
Tabulated p-value	0.013
Standard Deviation of S	22.21
Standardized Value of S	-2.206
Approximate p-value	0.0137

Statistically significant evidence of a decreasing trend at the specified level of significance.


Total Aluminum at LDG20/WQ-01/LDGO/LDG48
Total Aluminum (mg/L)
0.075
0.070
0.065
0.060
0.055
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
Year
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.2111
Standardized Value of S -2.2061
Test Value (S) -50
Tabulated p-value 0.0130
Approximate p-value 0.0137
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0005
Theil-Sen Intercept 1.0749
Statistically significant evidence
of a decreasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	7/2/2014 10:52:11 AM
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Arsenic-Total (mg/L)

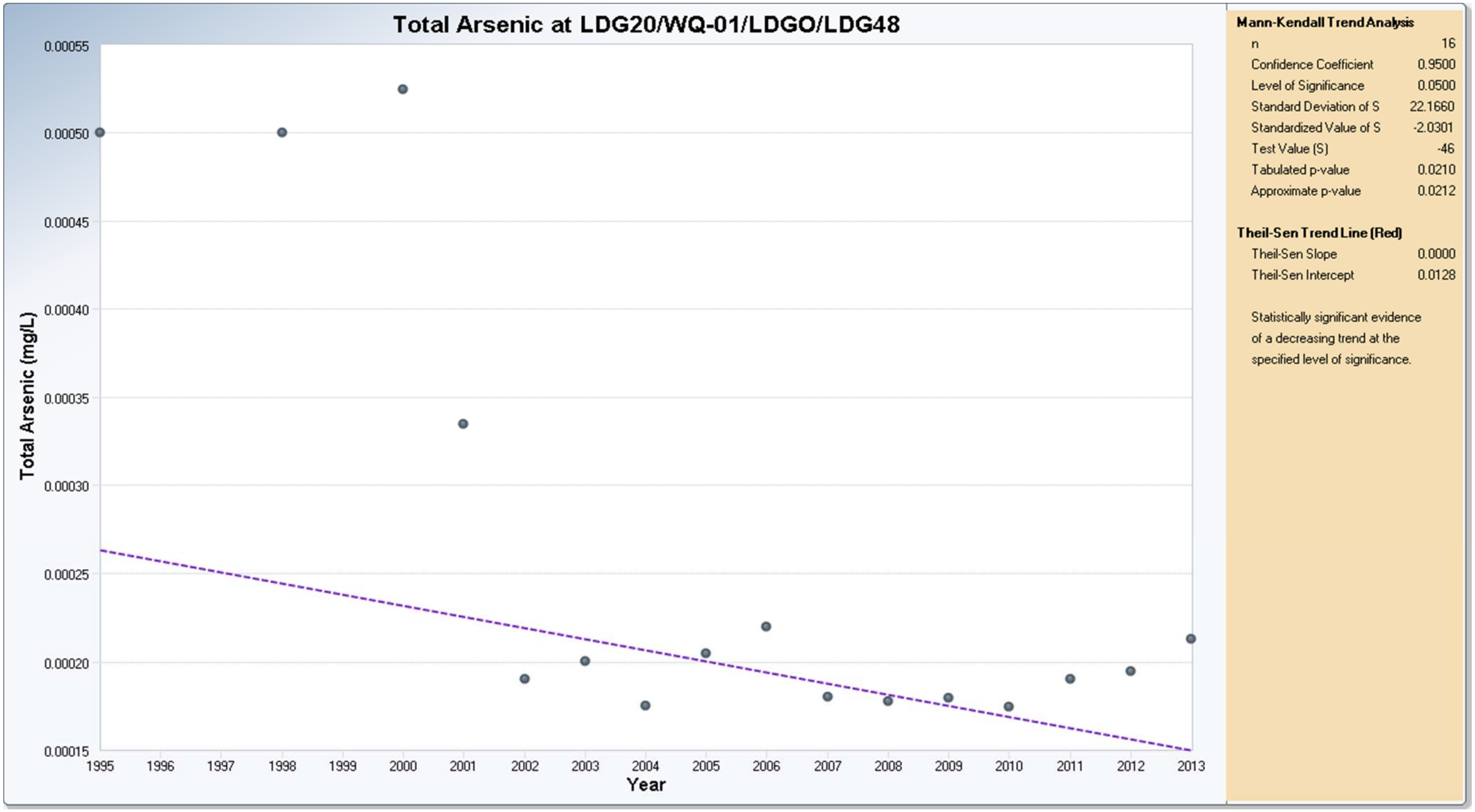
General Statistics

Period of Record	1995, 1998, 2000 –2013
Number of Events Reported (m)	19
Number of Missing Events	3
Number or Reported Events Used	16
Number Values Reported (n)	19
Number Values Missing	3
Number Values Used	16
Minimum	1.7450E-4
Maximum	5.2500E-4
Mean	2.5992E-4
Geometric Mean	2.3768E-4
Median	1.9725E-4
Standard Deviation	1.2906E-4

Mann-Kendall Test

Test Value (S)	-46
Tabulated p-value	0.021
Standard Deviation of S	22.17
Standardized Value of S	-2.03
Approximate p-value	0.0212

Statistically significant evidence of a decreasing trend at the specified level of significance.


Total Arsenic at LDG20/WQ-01/LDGO/LDG48
Total Arsenic (mg/L)
0.00055
0.00050
0.00045
0.00040
0.00035
0.00030
0.00025
0.00020
0.00015
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.1660
Standardized Value of S -2.0301
Test Value (S) -46
Tabulated p-value 0.0210
Approximate p-value 0.0212
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 0.0128
Statistically significant evidence
of a decreasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	7/2/2014 10:55:43 AM
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Iron-Total (mg/L)

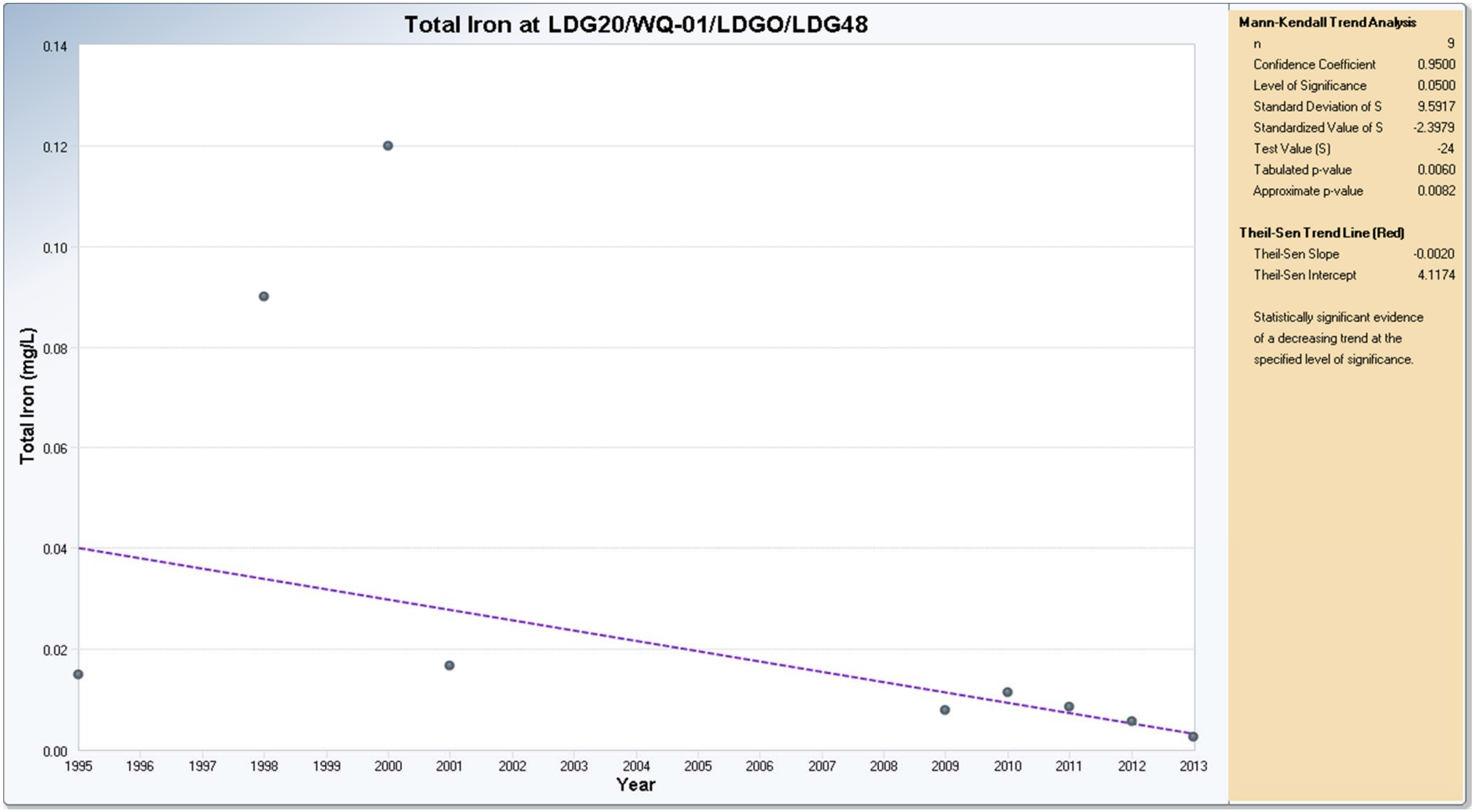
General Statistics

Period of Record	1995, 1998, 2000–2001, 2009–2013
Number of Events Reported (m)	19
Number of Missing Events	10
Number or Reported Events Used	9
Number Values Reported (n)	19
Number Values Missing	10
Number Values Used	9
Minimum	0.0026
Maximum	0.12
Mean	0.0309
Geometric Mean	0.0147
Median	0.0116
Standard Deviation	0.0429

Mann-Kendall Test

Test Value (S)	-24
Tabulated p-value	0.006
Standard Deviation of S	9.592
Standardized Value of S	-2.398
Approximate p-value	0.00824

Statistically significant evidence of a decreasing trend at the specified level of significance.



Total Iron at LDG20/WQ-01/LDGO/LDG48
Total Iron (mg/L)
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 9
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 9.5917
Standardized Value of S -2.3979
Test Value (S) -24
Tabulated p-value 0.0060
Approximate p-value 0.0082
Theil-Sen Trend Line (Red)
Theil-Sen Slope -0.0020
Theil-Sen Intercept 4.1174
Statistically significant evidence
of a decreasing trend at the
specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	7/2/2014 10:59:36 AM
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Molybdenum-Total (mg/L)

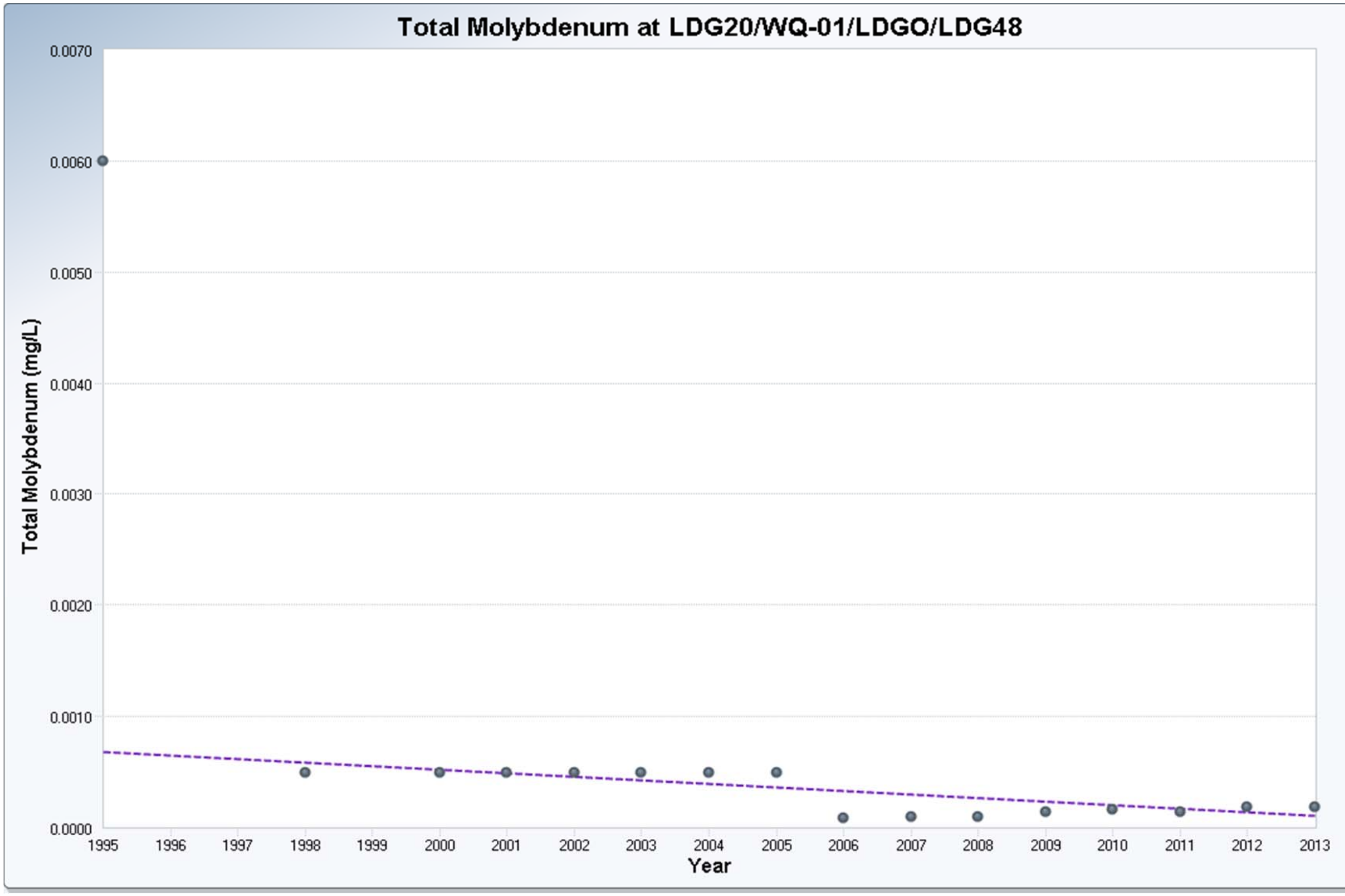
General Statistics

Period of Record	1995, 1998, 2000–2013
Number of Events Reported (m)	19
Number of Missing Events	3
Number or Reported Events Used	16
Number Values Reported (n)	19
Number Values Missing	3
Number Values Used	16
Minimum	9.0000E-5
Maximum	0.006
Mean	6.6362E-4
Geometric Mean	3.0293E-4
Median	3.4600E-4
Standard Deviation	0.00143

Mann-Kendall Test

Test Value (S)	-45
Tabulated p-value	0.026
Standard Deviation of S	21.19
Standardized Value of S	-2.076
Approximate p-value	0.0189

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	16
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	21.1896
Standardized Value of S	-2.0765
Test Value (S)	-45
Tabulated p-value	0.0260
Approximate p-value	0.0189

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.0000
Theil-Sen Intercept	0.0644

Statistically significant evidence of a decreasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	7/2/2014 11:01:48 AM
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Nickel-Total (mg/L)

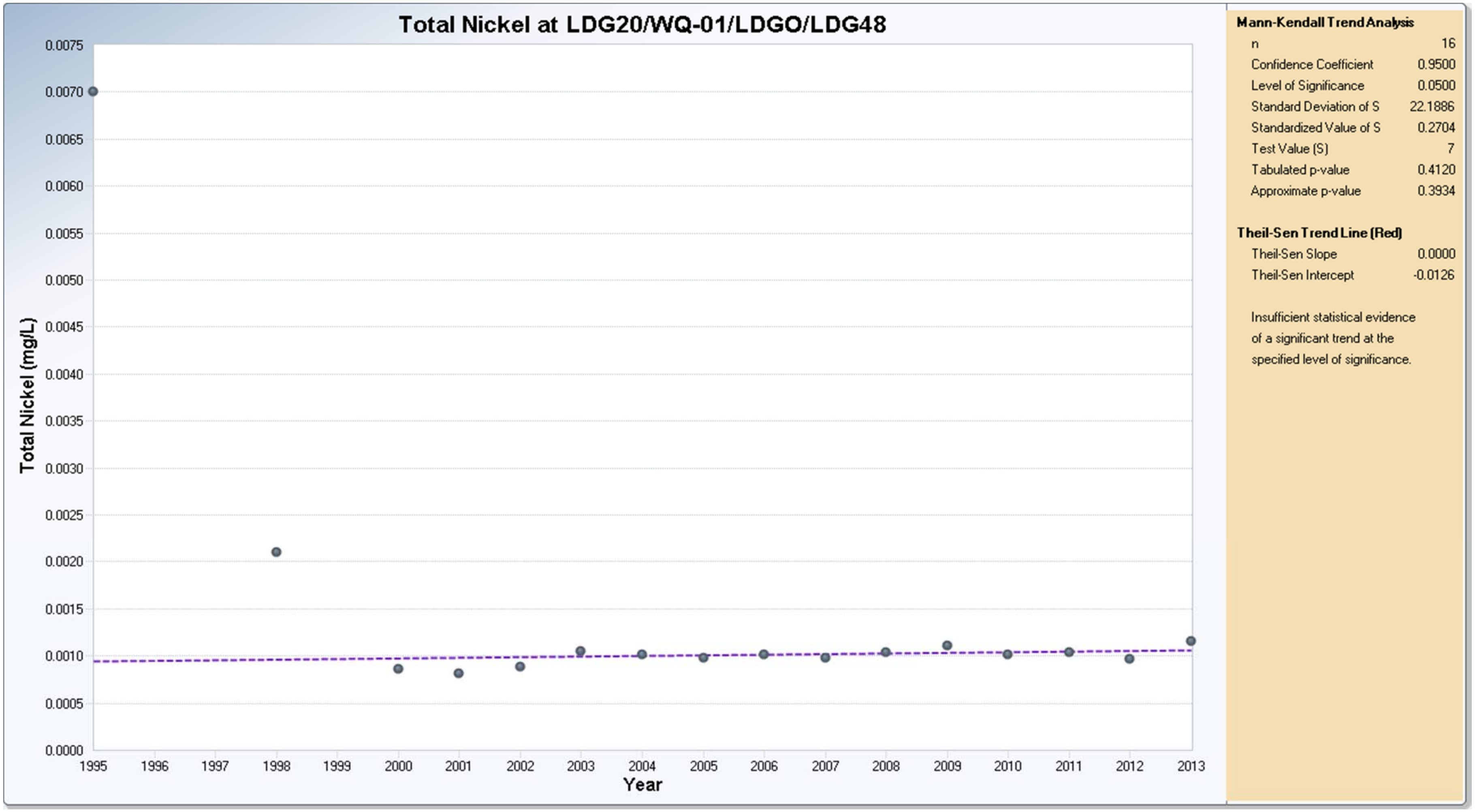
General Statistics

Period of Record	1995, 1998, 2000–2013
Number of Events Reported (m)	19
Number of Missing Events	3
Number or Reported Events Used	16
Number Values Reported (n)	19
Number Values Missing	3
Number Values Used	16
Minimum	8.1800E-4
Maximum	0.007
Mean	0.00144
Geometric Mean	0.00117
Median	0.00102
Standard Deviation	0.00151

Mann-Kendall Test

Test Value (S)	7
Tabulated p-value	0.412
Standard Deviation of S	22.19
Standardized Value of S	0.27
Approximate p-value	0.393

Insufficient evidence to identify a significant trend at the specified level of significance.


Total Nickel at LDG20/WQ-01/LDGO/LDG48
Total Nickel (mg/L)
0.0075
0.0070
0.0065
0.0060
0.0055
0.0050
0.0045
0.0040
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.1886
Standardized Value of S 0.2704
Test Value (S) 7
Tabulated p-value 0.4120
Approximate p-value 0.3934
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept -0.0126
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	7/2/2014 11:06:33 AM
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Strontium-Total (mg/L)

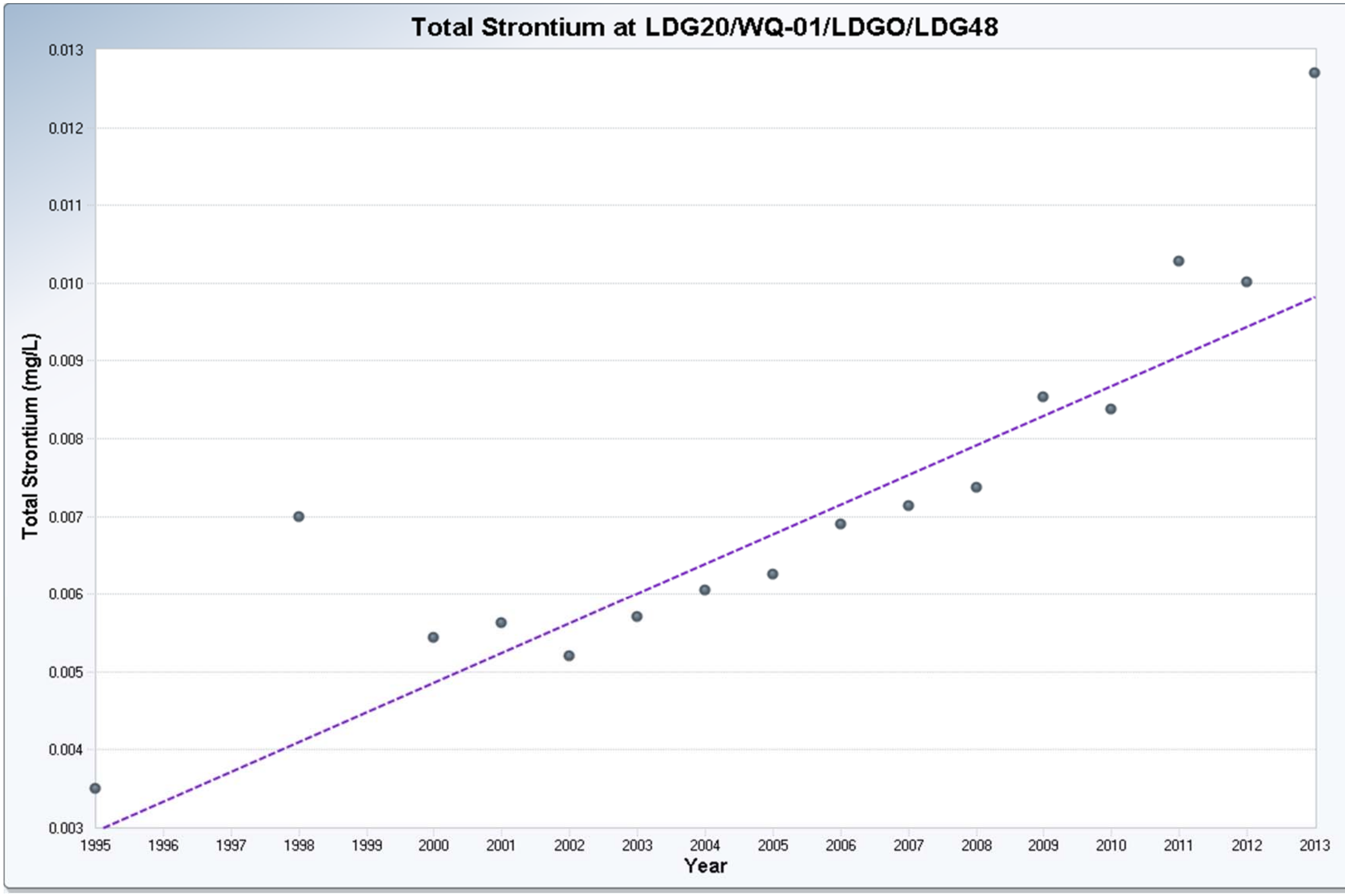
General Statistics

Period of Record	1995, 1998, 2000–2013
Number of Events Reported (m)	19
Number of Missing Events	3
Number or Reported Events Used	16
Number Values Reported (n)	19
Number Values Missing	3
Number Values Used	16
Minimum	0.0035
Maximum	0.0127
Mean	0.00725
Geometric Mean	0.00693
Median	0.00695
Standard Deviation	0.00229

Mann-Kendall Test

Test Value (S)	98
Tabulated p-value	0
Standard Deviation of S	22.21
Standardized Value of S	4.367
Approximate p-value	6.2929E-6

Statistically significant evidence of an increasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	16
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	22.2111
Standardized Value of S	4.3672
Test Value (S)	98
Tabulated p-value	0.0000
Approximate p-value	0.0000

Theil-Sen Trend Line (Red)

Theil-Sen Slope	0.0004
Theil-Sen Intercept	-0.7606

Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

User Selected Options	
Date/Time of Computation	7/2/2014 11:08:06 AM
From File	ldg_out_trends_data.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Uranium-Total (mg/L)

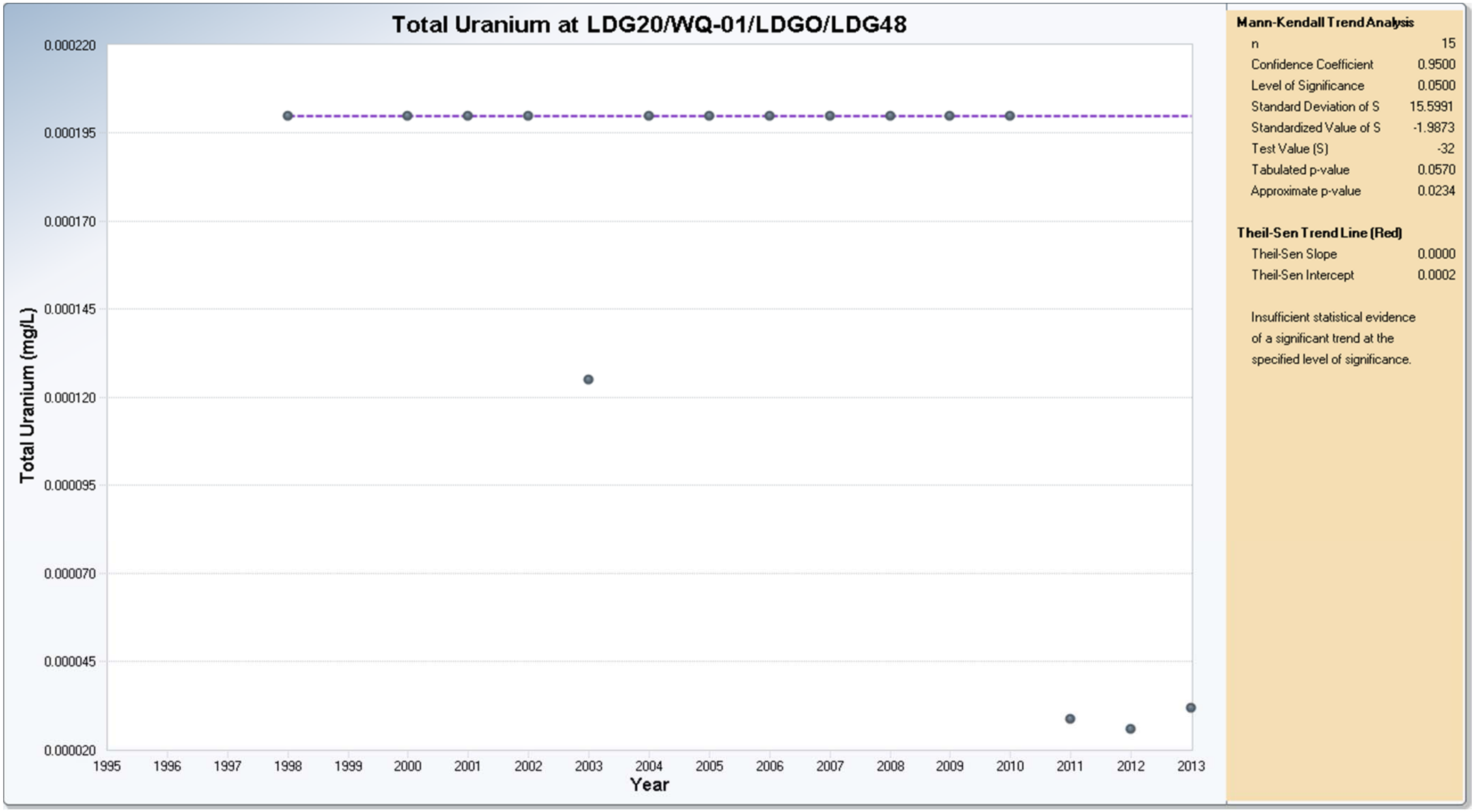
General Statistics

Period of Record	1995, 1998, 2000–2013
Number of Events Reported (m)	19
Number of Missing Events	4
Number or Reported Events Used	15
Number Values Reported (n)	19
Number Values Missing	4
Number Values Used	15
Minimum	2.6000E-5
Maximum	2.0000E-4
Mean	1.6078E-4
Geometric Mean	1.3156E-4
Median	2.0000E-4
Standard Deviation	7.0904E-5

Mann-Kendall Test

Test Value (S)	-32
Tabulated p-value	0.057
Standard Deviation of S	15.6
Standardized Value of S	-1.987
Approximate p-value	0.0234

Insufficient evidence to identify a significant trend at the specified level of significance.



Total Uranium at LDG20/WQ-01/LDGO/LDG48
Total Uranium (mg/L)
0.000220
0.000195
0.000170
0.000145
0.000120
0.000095
0.000070
0.000045
0.000020
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 15.5991
Standardized Value of S -1.9873
Test Value (S) -32
Tabulated p-value 0.0570
Approximate p-value 0.0234
Theil-Sen Trend Line (Red)
Theil-Sen Slope 0.0000
Theil-Sen Intercept 0.0002
Insufficient statistical evidence of a significant trend at the specified level of significance.

WQ-01/LDGO/LDG48 (LDG Outlet)
Baseline vs. Post-Baseline Trends
for Select Parameters

Significant ($p < 0.05$) Trends at LDG20/WQ-01/LDGO/LDG48 (LDG Outlet) for Select Parameters

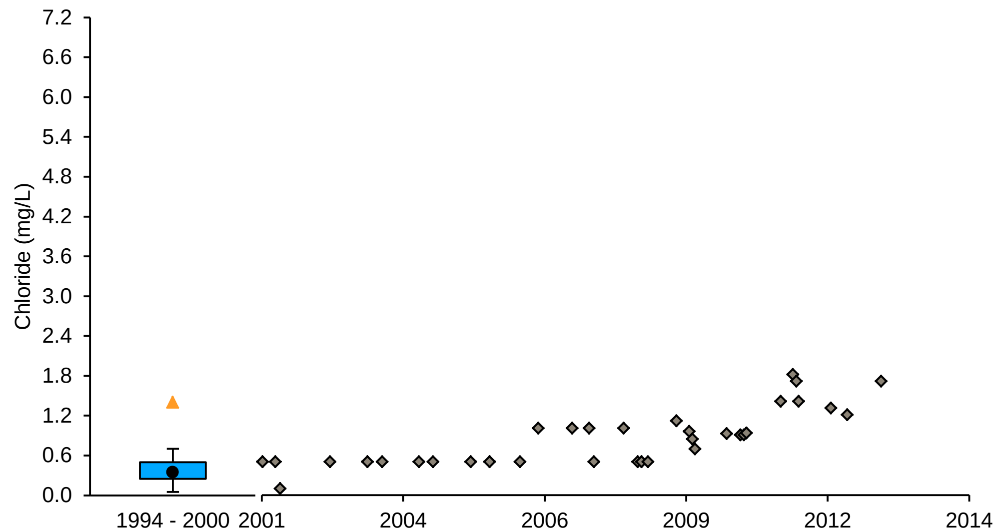


Figure D-43 Boxplot of the Baseline Condition for Chloride and Post-Baseline Chloride Values at LDG20/WQ-01/LDGO/LDG48; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

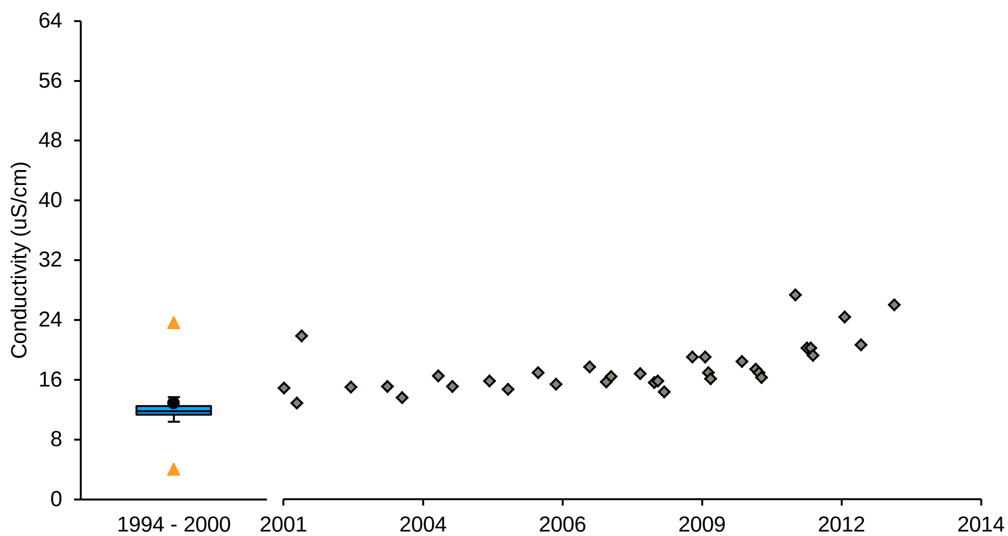


Figure D-44 Boxplot of the Baseline Condition for Conductivity and Post-Baseline Conductivity Values at WQ-01/LDGO/LDG48; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

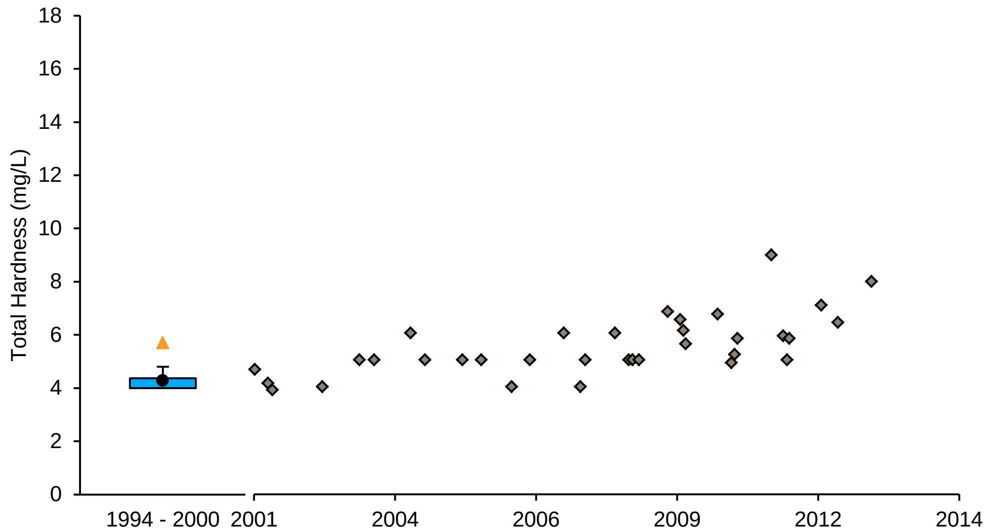


Figure D-45 Boxplot of the Baseline Condition for Hardness and Post-Baseline Hardness Values at LDG20/WQ-01/LDGO/LDG48; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

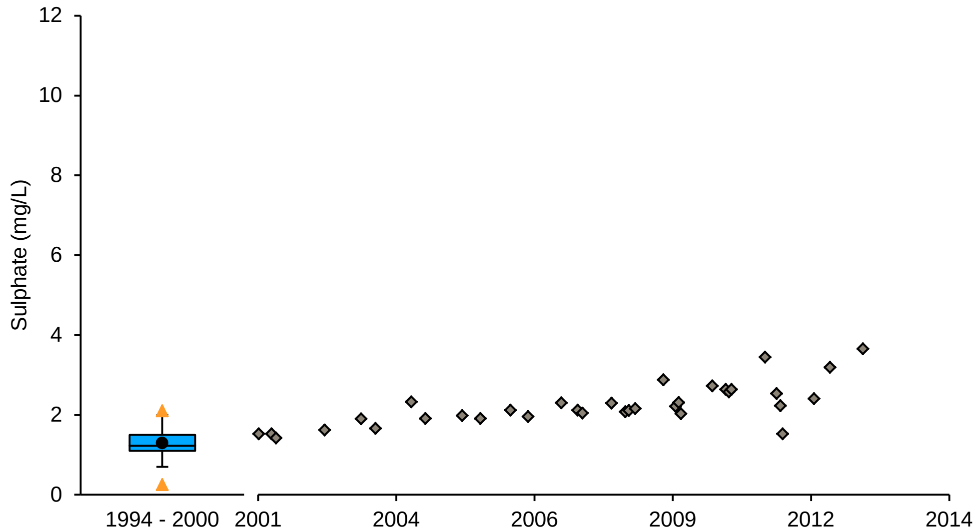


Figure D-46 Boxplot of the Baseline Condition for Sulphate and Post-Baseline Sulphate Values at LDG20/WQ-01/LDGO/LDG48; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

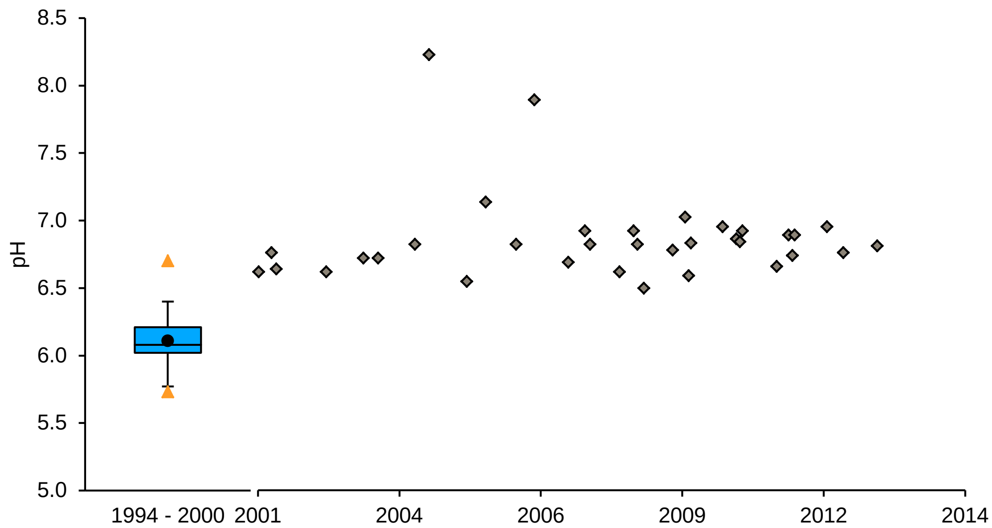


Figure D-47 Boxplot of the Baseline Condition for pH and Post-Baseline pH Values at LDG20/WQ-01/LDGO/LDG48; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

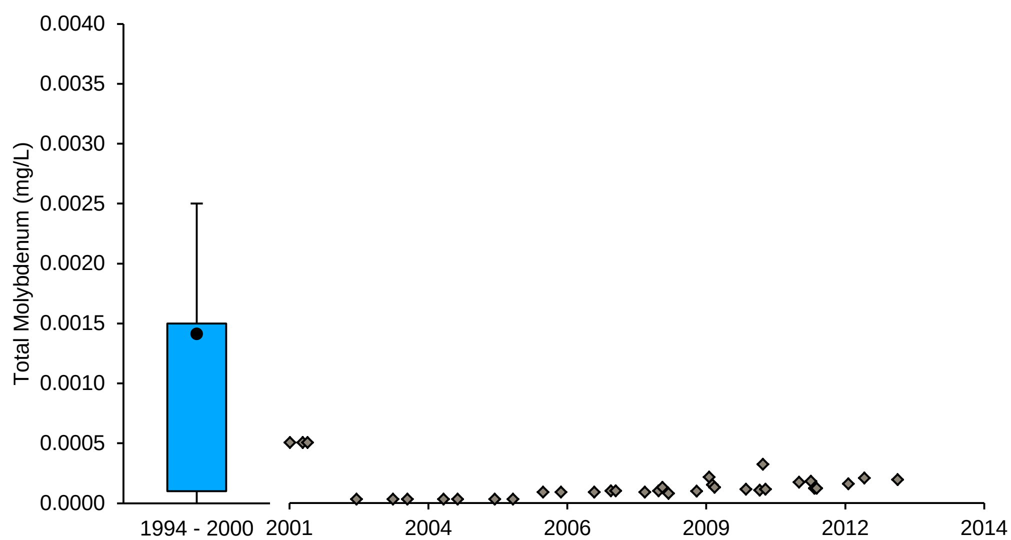


Figure D-48 Boxplot of the Baseline Condition for Total Molybdenum and Post-Baseline Total Molybdenum Values at LDG20/WQ-01/LDGO/LDG48; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

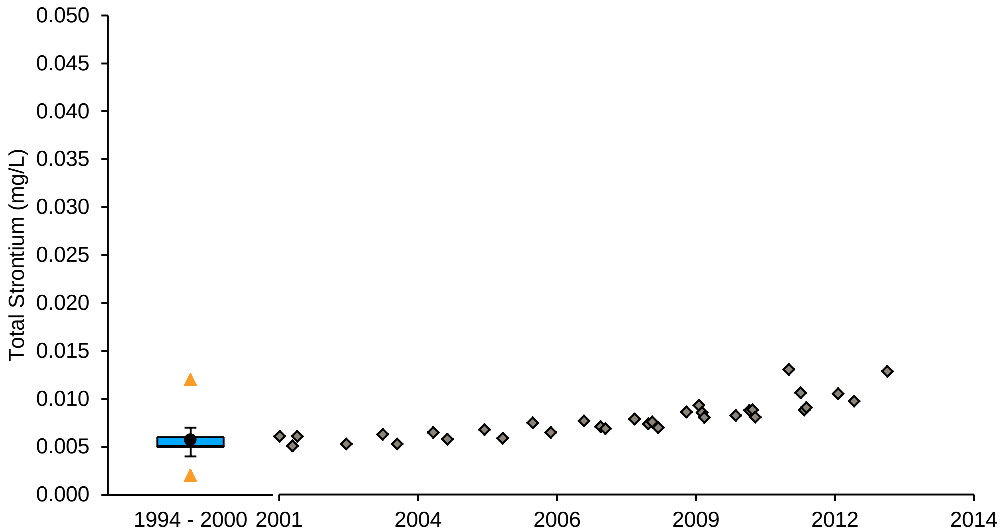


Figure D-49 Boxplot of the Baseline Condition for Total Strontium and Post-Baseline Total Strontium Values at LDG20/WQ-01/LDGO/LDG48; Lac de Gras, NT.

The box spans the 25th to 75th percentile; the line intersecting the box is the median. Error bars represent the high and low values (approximate 95th percentile of the data). The black circle is the mean and the orange triangles are outliers (minimum and maximum values). Not all outliers are shown.

APPENDIX E Relative Loadings from Diavik and Ekati to Lac de Gras

Table E1 Mean Annual Concentrations of Analytes of Potential Concern in Diavik and Ekati Effluent Discharges; Lac de Gras, NT

Year	Annual Effluent Volume (m^3)		Mean Annual Concentration (mg/L)																		
			Total Nitrogen		Nitrite		Nitrate		Ammonia		Total Phosphorus		Orthophosphate		Chloride		Fluoride		Sulphate	
	Diavik[1]	Ekati[2]	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati
2000	0	34,680,000	0	0.40	0.0000	0.0023	0.000	0.080	0.000	0.011	0	0.0057	0	0.0007	0	0.50	0	-	0	2.48
2001	0	35,970,000	0	0.15	0.0000	0.0055	0.000	0.046	0.000	0.022	0	0.0065	0	0.0033	0	0.50	0	-	0	2.57
2002	4,078,009	15,910,000	0.62	0.29	0.0043	0.0010	0.385	0.011	0.040	0.008	0.0067	0.0048	0.0018	0.0015	1.21	1.25	0.038	-	18.41	4.38
2003	6,821,444	17,460,000	5.91	0.20	0.0842	0.0010	3.443	0.012	0.944	0.003	0.0173	0.0063	0.0011	0.0005	29.15	0.67	0.060	-	26.22	4.62
2004	4,670,864	20,650,000	9.28	0.30	0.1386	0.0007	7.026	0.081	1.758	0.017	0.0197	0.0067	0.0008	0.0005	66.60	2.38	0.072	-	37.30	7.98
2005	5,600,586	21,130,000	10.69	0.25	0.1235	0.0007	8.164	0.077	2.167	0.019	0.0263	0.0037	0.0013	0.0005	94.51	5.07	0.074	-	24.29	13.47
2006	7,611,334	51,520,000	10.52	0.23	0.1697	0.0005	7.927	0.034	2.047	0.013	0.0487	0.0071	0.0015	0.0005	95.41	6.32	0.065	-	30.03	12.65
2007	7,661,542	17,050,000	8.54	0.39	0.2714	0.0009	5.688	0.230	2.316	0.014	0.0401	0.0130	0.0025	0.0005	99.09	11.43	0.074	-	38.88	18.05
2008	8,196,352	26,060,000	6.76	0.25	0.2193	0.0008	4.692	0.075	1.593	0.016	0.0308	0.0072	0.0028	0.0005	101.55	12.13	0.075	-	47.05	15.33
2009	10,990,705	17,770,000	4.19	0.33	0.0591	0.0005	2.870	0.129	0.680	0.017	0.0487	0.0053	0.0069	0.0007	87.28	14.56	0.067	-	51.78	17.77
2010	12,951,724	20,810,000	2.56	0.31	0.0370	0.0005	1.898	0.030	0.278	0.025	0.0392	0.0069	0.0038	0.0005	73.77	12.30	0.061	-	75.89	13.57
2011	12,490,689	12,883,277	3.06	0.18	0.0689	0.0005	2.234	0.016	0.323	0.011	0.0364	0.0062	0.0073	0.0005	77.87	14.83	0.101	-	60.36	14.85
2012	11,905,009	19,630,253	2.81	0.22	0.0556	0.0005	2.239	0.034	0.326	0.005	0.0575	0.0080	0.0228	0.0005	69.27	19.48	0.113	-	58.79	18.28
2013	12,601,229	22,151,750	3.21	0.36	0.0602	0.0008	2.847	0.080	0.267	0.008	0.0578	0.0075	0.0267	0.0005	75.04	27.73	0.106	-	69.97	26.83
Average	**8,798,291**	**23,833,949**	**5.68**	**0.28**	**0.1076**	**0.0013**	**4.118**	**0.073**	**1.062**	**0.015**	**0.0358**	**0.0068**	**0.0066**	**0.0009**	**72.56**	**6.10**	**0.076**	**-**	**44.91**	**10.26**

NOTES:

[1] Diavik effluent is released via a diffuser in Lac de Gras.

[2] Ekati effluent enters Lac de Gras from the Slipper Lake Outlet.

Table E1 Mean Annual Concentrations of Analytes of Potential Concern in Diavik and Ekati Effluent Discharges; Lac de Gras, NT

Year	Annual Effluent Volume (m^3)		Mean Annual Concentrations (mg/L)																			
			Total Aluminum		Total Arsenic		Total Copper		Total Iron		Total Manganese		Total Molybdenum		Total Nickel		Total Strontium		Total Uranium		Total Zinc	
	Diavik[1]	Ekati[2]	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati
2000	0	34,680,000	0	0.022	0	0.0002	0	0.0010	0	0.089	0	-	0	0.0001	0	0.0006	0	0.011	0	0.00006	0	0.0004
2001	0	35,970,000	0	0.047	0	0.0001	0	0.0011	0	0.116	0	-	0	0.0002	0	0.0007	0	0.009	0	0.00008	0	0.0009
2002	4,078,009	15,910,000	0	0.025	0.0006	0.0002	0.0032	0.0011	0.178	0.062	0.186	-	0.0011	0.0003	0.0040	0.0006	0.029	0.013	0.00069	0.00006	0.0072	0.0004
2003	6,821,444	17,460,000	0.615	0.025	0.0010	0.0003	0.0047	0.0010	0.118	0.073	0.201	-	0.0128	0.0005	0.0071	0.0006	0.179	0.013	0.00303	0.00005	0.0064	0.0004
2004	4,670,864	20,650,000	0.562	0.022	0.0012	0.0002	0.0028	0.0009	0.032	0.059	0.146	-	0.0270	0.0025	0.0134	0.0007	0.358	0.023	0.00572	0.00005	0.0040	0.0007
2005	5,600,586	21,130,000	0.466	0.023	0.0012	0.0002	0.0024	0.0008	0.025	0.048	0.218	-	0.0232	0.0045	0.0136	0.0007	0.483	0.036	0.00867	0.00005	0.0029	0.0011
2006	7,611,334	51,520,000	0.874	0.028	0.0018	0.0003	0.0024	0.0011	0.146	0.082	0.142	-	0.0300	0.0043	0.0163	0.0009	0.551	0.045	0.00672	0.00006	0.0062	0.0008
2007	7,661,542	17,050,000	0.701	0.041	0.0015	0.0002	0.0013	0.0010	0.033	0.067	0.075	-	0.0263	0.0060	0.0134	0.0012	0.535	0.075	0.00533	0.00008	0.0043	0.0010
2008	8,196,352	26,060,000	0.492	0.021	0.0014	0.0003	0.0009	0.0010	0.013	0.059	0.034	-	0.0263	0.0051	0.0102	0.0007	0.518	0.063	0.00354	0.00006	0.0040	0.0005
2009	10,990,705	17,770,000	0.341	0.020	0.0011	0.0002	0.0007	0.0012	0.017	0.057	0.044	-	0.0369	0.0055	0.0071	0.0009	0.494	0.086	0.00315	0.00007	0.0022	0.0012
2010	12,951,724	20,810,000	0.322	0.044	0.0012	0.0003	0.0005	0.0015	0.020	0.081	0.042	-	0.0471	0.0035	0.0053	0.0010	0.465	0.068	-	0.00008	0.0021	0.0011
2011	12,490,689	12,883,277	0.366	0.020	0.0012	0.0003	0.0004	0.0009	0.022	0.062	0.039	-	0.0339	0.0043	0.0057	0.0007	0.509	0.073	0.00465	0.00006	0.0008	0.0005
2012	11,905,009	19,630,253	0.281	0.024	0.0018	0.0003	0.0004	0.0010	0.022	0.069	0.031	-	0.0332	0.0064	0.0064	0.0008	0.491	0.095	0.00469	0.00007	0.0008	0.0008
2013	12,601,229	22,151,750	0.310	0.026	0.0015	0.0003	0.0005	0.0009	0.012	0.077	0.018	-	0.0362	0.0086	0.0113	0.0010	0.539	0.121	0.00234	0.00009	0.0013	0.0005
Average	**8,798,291**	**23,833,949**	**0.473**	**0.029**	**0.0013**	**0.0002**	**0.0017**	**0.0011**	**0.053**	**0.072**	**0.098**	**-**	**0.0278**	**0.0030**	**0.0095**	**0.0008**	**0.429**	**0.040**	**0.00441**	**0.00006**	**0.0035**	**0.0008**

NOTES:

[1] Diavik effluent is released via a diffuser in Lac de Gras.

[2] Ekati effluent enters Lac de Gras from the Slipper Lake Outlet.

Table E2 Mean Annual Loadings of Analytes of Potential Concern from Diavik and Ekati Effluent Discharges; Lac de Gras, NT

Year	Annual Effluent Volume (m^3)		Mean Annual Loadings (kg)																		
			Total Nitrogen		Nitrite		Nitrate		Ammonia		Total Phosphorus		Orthophosphate		Chloride		Fluoride		Sulphate	
	Diavik[1]	Ekati[2]	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati
2000	0	34,680,000	0	13,837	0	81	0	2,774	0	381	0	197	0	23	0	17,340	0	-	0	86,006
2001	0	35,970,000	0	5,443	0	180	0	1,127	0	552	0	216	0	117	0	17,985	0	-	0	96,879
2002	4,078,009	15,910,000	2,546	4,678	17	16	1,572	207	163	162	27	74	7	29	4,937	15,910	156	-	75,076	70,587
2003	6,821,444	17,460,000	40,311	3,434	574	17	23,484	215	6,441	44	118	111	8	9	198,825	11,640	407	-	178,842	80,607
2004	4,670,864	20,650,000	43,351	6,245	647	15	32,817	1,673	8,212	354	92	138	4	10	311,080	49,147	336	-	174,235	164,787
2005	5,600,586	21,130,000	59,883	5,342	692	15	45,720	1,621	12,135	394	147	77	7	11	529,305	107,129	412	-	136,016	284,551
2006	7,611,334	51,520,000	80,103	12,075	1,291	26	60,336	1,732	15,582	680	371	366	12	26	726,173	325,478	493	-	228,559	651,728
2007	7,661,542	17,050,000	65,427	6,602	2,079	13	43,576	2,656	17,745	238	307	180	19	9	759,211	186,754	566	-	297,864	287,577
2008	8,196,352	26,060,000	55,385	6,433	1,798	22	38,458	1,947	13,061	421	252	180	23	13	832,340	316,195	616	-	385,666	399,587
2009	10,990,705	17,770,000	46,003	5,805	650	9	31,545	2,283	7,476	308	535	97	76	12	959,232	258,790	740	-	569,071	315,714
2010	12,951,724	20,810,000	33,170	6,535	479	10	24,578	485	3,597	427	508	135	49	10	955,461	275,733	788	-	982,945	298,624
2011	12,490,689	12,883,277	38,230	2,357	861	6	27,900	147	4,037	122	454	99	91	6	972,645	203,341	1,267	-	753,960	202,482
2012	11,905,009	19,630,253	33,470	4,316	662	6	26,653	433	3,876	65	684	147	272	6	824,712	250,902	1,348	-	699,899	235,442
2013	12,601,229	22,151,750	40,411	7,914	758	10	35,871	1,034	3,366	101	729	168	337	6	945,565	357,189	1,337	-	881,732	345,594
Average	**8,798,291**	**23,833,949**	**44,857**	**6,948**	**876**	**30**	**32,709**	**1,310**	**7,974**	**303**	**352**	**156**	**75**	**21**	**668,290**	**170,967**	**706**	**-**	**446,989**	**251,440**
% of Total Average Loadings	**26%**	**74%**	**87%**	**13%**	**97%**	**3%**	**96%**	**4%**	**96%**	**4%**	**69%**	**31%**	**79%**	**21%**	**80%**	**20%**	**-**	**-**	**64%**	**36%**

NOTES:

[1] Diavik effluent is released via a diffuser in Lac de Gras.

[2] Ekati effluent enters Lac de Gras from the Slipper Lake Outlet.

Table E2 Mean Annual Loadings of Analytes of Potential Concern from Diavik and Ekati Effluent Discharges; Lac de Gras, NT

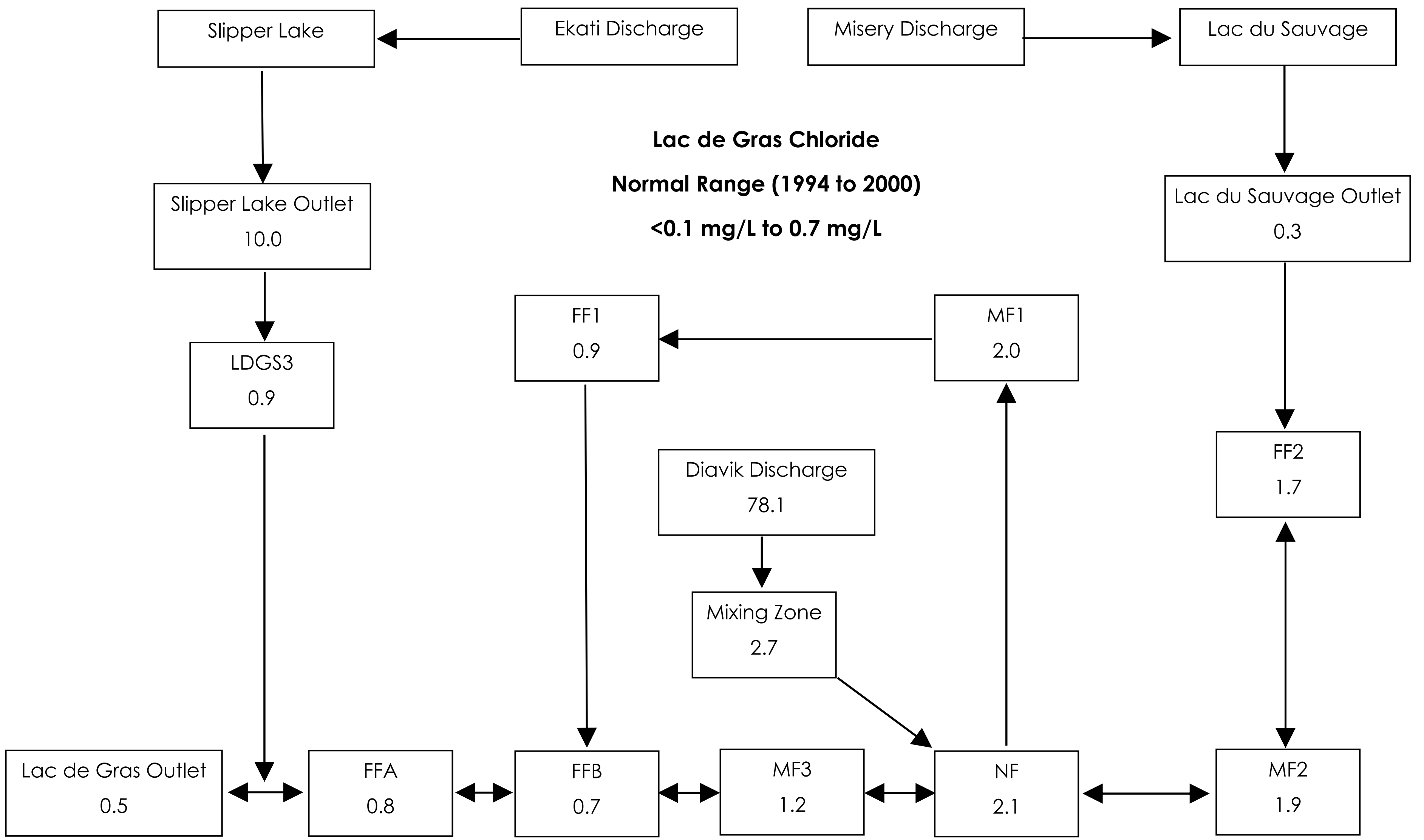
Year	Annual Effluent Volume (m^3)		Mean Annual Loadings (kg)																			
			Total Aluminum		Total Arsenic		Total Copper		Total Iron		Total Manganese		Total Molybdenum		Total Nickel		Total Strontium		Total Uranium		Total Zinc	
	Diavik[1]	Ekati[2]	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati	Diavik	Ekati
2000	0	34,680,000	0	773	0	6	0	36	0	3,075	0	-	0	4	0	21	0	365	0	2	0	14
2001	0	35,970,000	0	1,673	0	5	0	38	0	3,405	0	-	0	9	0	26	0	335	0	3	0	31
2002	4,078,009	15,910,000	1,433	418	2	4	13	17	727	997	758	-	5	5	16	11	120	208	3	1	29	6
2003	6,821,444	17,460,000	4,197	432	7	4	32	18	804	1,280	1,374	-	87	8	48	10	1,223	234	21	1	44	7
2004	4,670,864	20,650,000	2,624	461	5	5	13	19	152	1,225	680	-	126	52	62	14	1,672	484	27	1	19	14
2005	5,600,586	21,130,000	2,608	485	7	4	13	17	140	1,014	1,220	-	130	95	76	14	2,703	771	49	1	16	23
2006	7,611,334	51,520,000	6,650	1,445	14	16	18	56	1,113	4,199	1,080	-	228	220	124	45	4,191	2,307	51	3	47	40
2007	7,661,542	17,050,000	5,370	707	12	4	10	18	257	983	577	-	202	97	102	20	4,095	1,182	41	1	33	17
2008	8,196,352	26,060,000	4,034	535	12	7	7	25	106	1,546	276	-	216	132	84	19	4,243	1,641	29	2	33	13
2009	10,990,705	17,770,000	3,751	356	13	4	7	22	190	1,007	481	-	406	97	78	17	5,433	1,519	35	1	24	21
2010	12,951,724	20,810,000	4,174	909	15	5	7	31	265	1,509	541	-	611	82	69	21	6,017	1,446	-	2	27	24
2011	12,490,689	12,883,277	4,574	253	15	4	5	12	271	822	485	-	424	61	72	9	6,353	1,000	58	1	10	6
2012	11,905,009	19,630,253	3,345	309	22	4	5	13	266	883	364	-	396	83	76	11	5,848	1,223	56	1	10	16
2013	12,601,229	22,151,750	3,901	329	19	4	6	12	145	986	223	-	457	111	142	13	6,795	1,562	30	1	16	11
Average	**8,798,291**	**23,833,949**	**3,889**	**649**	**12**	**6**	**11**	**24**	**370**	**1,638**	**672**	**-**	**274**	**76**	**79**	**18**	**4,058**	**1,020**	**36**	**1**	**26**	**17**
% of Total Average Loadings	**26%**	**74%**	**86%**	**14%**	**68%**	**32%**	**32%**	**68%**	**18%**	**82%**	**-**	**-**	**78%**	**22%**	**82%**	**18%**	**80%**	**20%**	**96%**	**4%**	**60%**	**40%**

NOTES:

[1] Diavik effluent is released via a diffuser in Lac de Gras.

[2] Ekati effluent enters Lac de Gras from the Slipper Lake Outlet.

APPENDIX F Lac de Gras Flow Diagrams

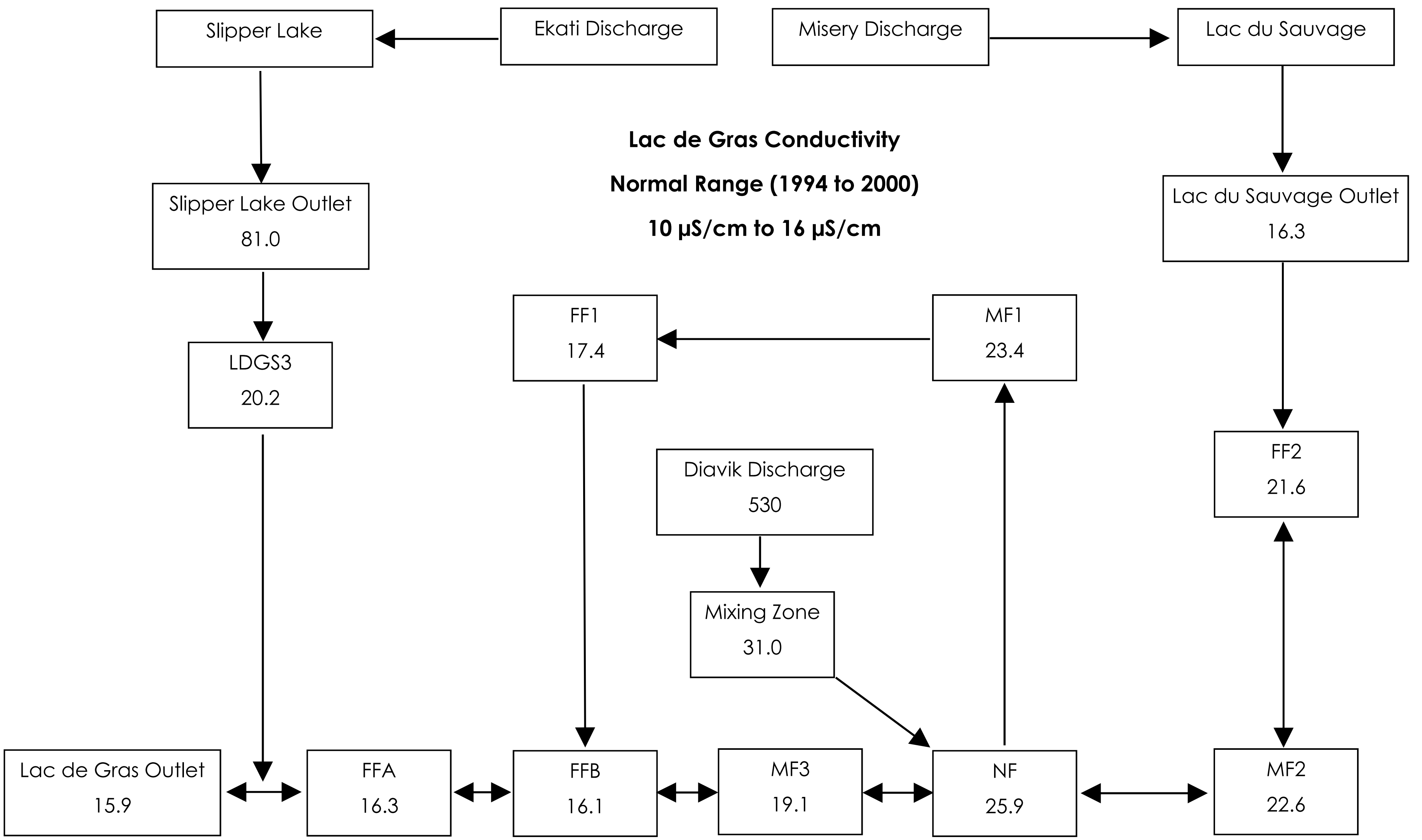


NOTE: Data are provided in mg/L for each site as the post-baseline 13-year median (2001 to 2013); mean value (n = 5) provided for the Lac du Sauvage outlet

Deton' Cho Stantec

Government of the Northwest Territories
Lac de Gras Water Chemistry, Spatial Variability, and Temporal Trends

Lac de Gras Flow Diagram & Median Chloride Concentrations from 2001 to 2013



NOTE: Data are provided in µS/cm for each site as the post-baseline 13-year median (2001 to 2013); mean value (n = 5) provided for the Lac du Sauvage outlet

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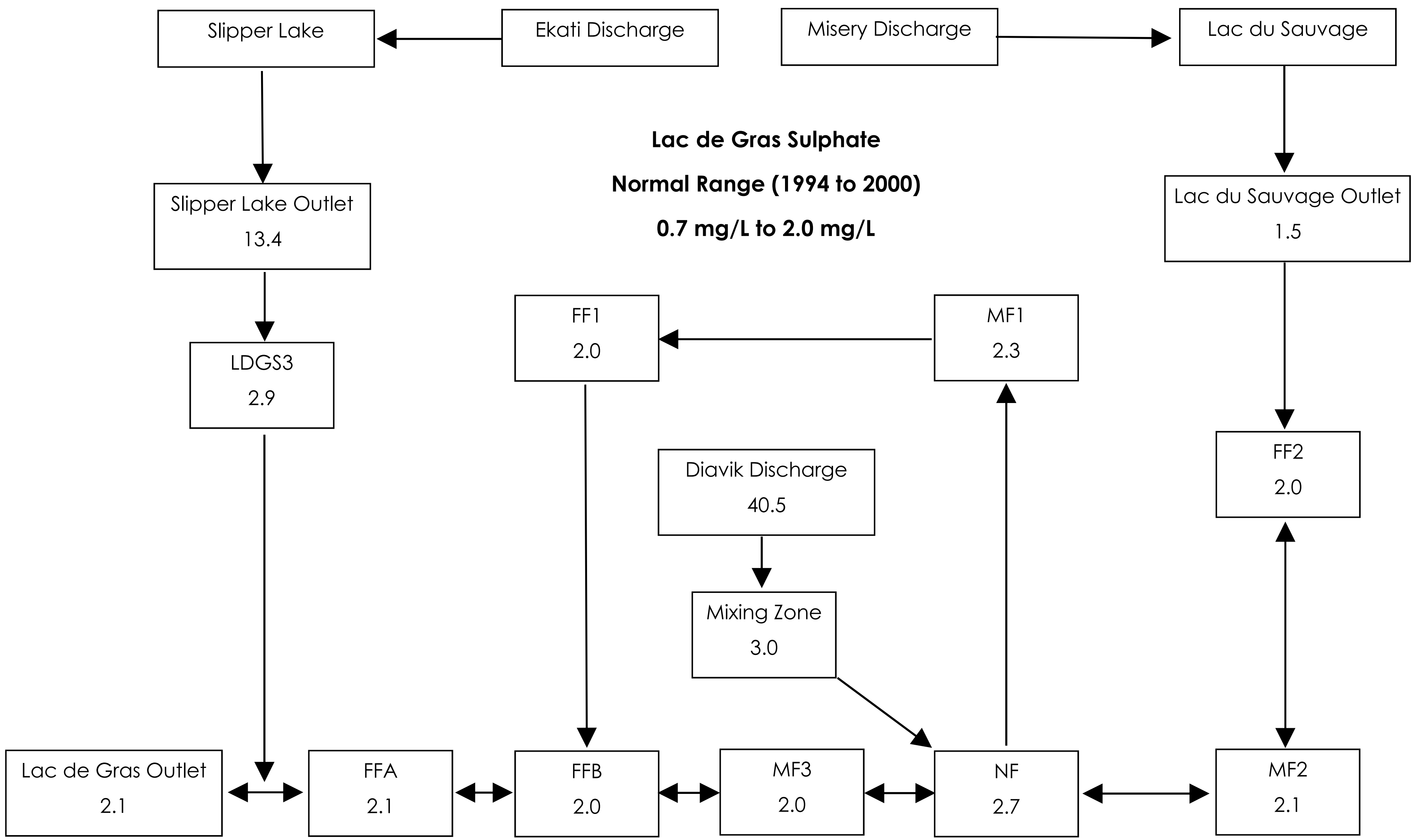
Government of the Northwest Territories

Lac de Gras Water Chemistry, Spatial Variability, and Temporal Trends

Lac de Gras Flow Diagram & Median Conductivity from 2001 to 2013



NOTE: Data are provided in mg/L for each site as the post-baseline 13-year median (2001 to 2013); mean value (n = 5) provided for the Lac du Sauvage outlet

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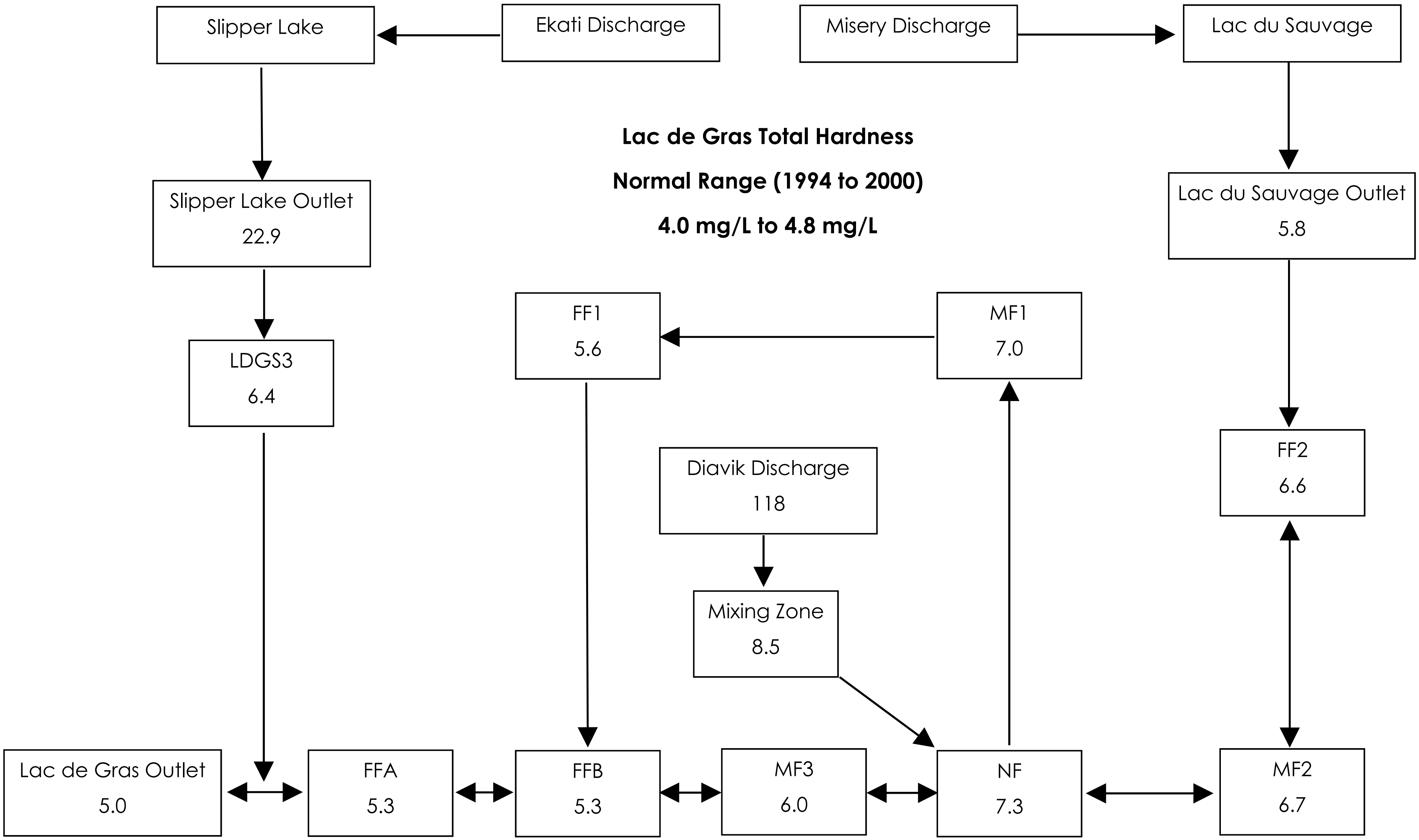
Government of the Northwest Territories

Lac de Gras Water Chemistry, Spatial Variability, and Temporal Trends

Lac de Gras Flow Diagram & Median Sulphate Concentrations from 2001 to 2013



NOTE: Data are provided in mg/L for each site as the post-baseline 13-year median (2001 to 2013); mean value (n = 5) provided for the Lac du Sauvage outlet

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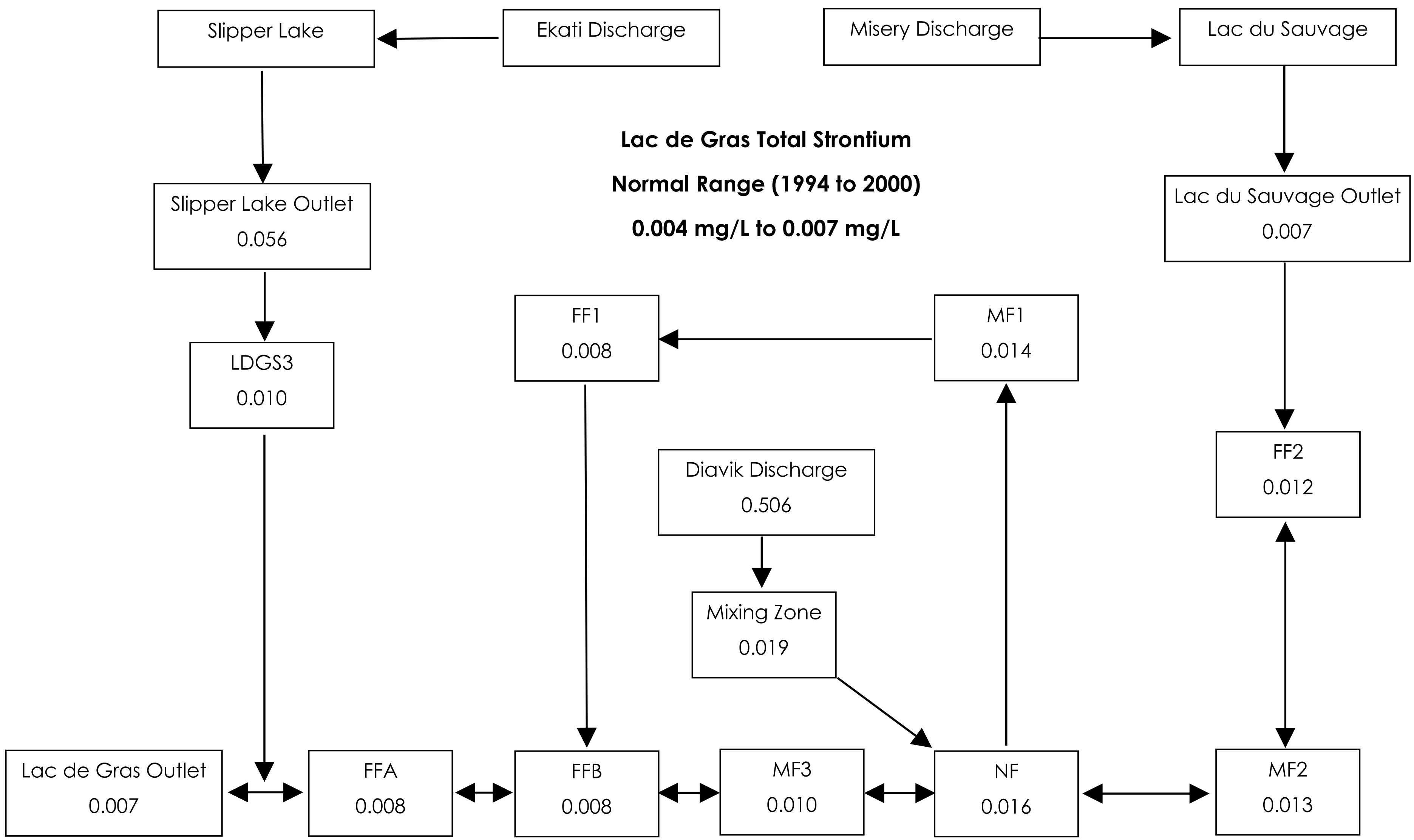
Lac de Gras Water Chemistry, Spatial Variability, and Temporal Trends

Lac de Gras Flow Diagram & Median Total Hardness from 2001 to 2013



NOTE: Data are provided in mg/L for each site as the post-baseline 13-year median (2001 to 2013); mean value (n = 5) provided for the Lac du Sauvage outlet

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Lac de Gras Water Chemistry, Spatial Variability, and Temporal Trends

Lac de Gras Flow Diagram & Median Total Strontium Concentrations from 2001 to 2013