

Status and Trends of Water Chemistry and Flow of Tributaries into Great Slave Lake

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EXECUTIVE SUMMARY

Tetra Tech Canada Inc. (Tetra Tech) is conducting a *Vulnerability Assessment of Great Slave Lake to Climate Change and Human Land Use Activities* ("Project"), which is comprised of two parts: (A) status and trends analysis of water chemistry and flow and (B) vulnerability assessment. The following report, a Status and Trends Report of the water chemistry and flow of tributaries into Great Slave Lake, completes Part A of the Project, and,

- Assesses the current status and trends of hydrology in the included tributaries to Great Slave Lake by examining temporal trends and seasonal variability;
- Assesses status and trends of water quality in the included tributaries to Great Slave Lake by examining spatial variability, long term trends, seasonal variability and comparison to relevant water quality guidelines; and
- Assesses the current and historic water quality monitoring programs to evaluate their suitability and effectiveness in detecting spatial and temporal changes.

Great Slave Lake and its tributaries is part of the Mackenzie River watershed. The underlying geology and ecological structure can have considerable influence on both the water chemistry and hydrological flows of a watercourse. Three geological provinces comprise the Great Slave Lake drainage area (Figure 4). The Interior Platform is younger sedimentary rock while the Slave Province and the Churchill Province are part of the Canadian Shield and are igneous and metamorphic rock. Three ecozones surround Great Slave Lake (Figure 3). The Taiga Plains are flat to slightly rolling with poor soils and open to dense mixed forests; the Taiga Shield is mostly flat with numerous lakes and wetlands; the Boreal Plains are gently rolling with thick soils, dense forests and scattered lakes.

Twelve hydrometric stations and 17 water quality monitoring sites were included in this report (Figure 1). Both the hydrology and water quality sites discussed in the report are well-distributed around Great Slave Lake and provide an encompassing representation of the complete drainage area.

HYDROLOGY

Data Compilation

Hydrometric data for twelve WSC hydrometric stations, covering eleven watercourses, was compiled and evaluated for inclusion within the hydrologic analysis. Periods of record at each hydrometric station varies from nine year (Tazin River) to 94 years (Slave River). Datasets were inspected for data gaps and minor data gaps occurring were manually synthesized through linear interpolation to maximize data available for analysis. Overall, data quality and quantity was good, and sufficiently allows for meaningful statistical analysis to be completed.

Statistical Analysis

Six primary statistical hydrometric parameters were derived for each year for each hydrometric station. These parameters included: mean and median annual flow, maximum and minimum annual flow, median seasonal flow, and median monthly flow. Seasons were derived for each hydrometric station through visual analysis of mean and median annual hydrographs. A three season approach was implemented which included: spring freshet, summer recession, and winter baseflow. With four annual values, three seasonal values, and twelve monthly values a total of 19 parameters were derived.

Seasonal and Spatial Variability

All examined watercourses exhibit strong seasonal trends. This is characterized by long periods of baseflow throughout the winter extending into late-April culminated with an abrupt transition to spring freshet.

Post winter break-up, watershed behaviour is heavily dependent on the amount of lake attenuation present within the watershed. In watersheds with minimal lake attenuation, the time between winter-breakup and freshet peak can range from three to six weeks and undergo dramatic changes in flow rate between winter baseflows and freshet peak. Three of the evaluated stations exhibited this behaviour, with median freshet flow rates peaking at least 250 times higher than median winter lows for all three stations. Each of these stations then undergoes a long and gradual period of summer recession. Conversely, in watersheds with a large amount of available lake storage, the time between the start of winter breakup and freshet peak can be 10 or more weeks with lower variation between winter baseflow and freshet peak. Six of the evaluated stations exhibited this behaviour, with median freshet flow rates peaking at most 5.5 times higher than median winter lows for all six stations. Summer recessions are generally shorter on these attenuated watercourses, and there is often less definition between the end of summer recession and the start of winter baseflow.

Though freshet and summer behaviour differs between watercourses, all watercourses were observed to enter winter baseflow in early to mid-November.

Trends Analysis

Hydrometric stations were assessed individually over two timeframes: the entire period of record of the station; and for the last decade (2005 – 2015); data permitting. Trends analyses were undertaken using the non-parametric Mann-Kendall test.

The following can be gathered from the trends analysis:

- No overarching trends exist in annual mean and median flow rates across the 11 evaluated watercourse's period-of-records. Flow rates today remain largely unchanged from flow rates of 20 to 50 years ago.
- Over each station's period-of-record, two of the eleven watercourses showed peak annual flows trending in a downward direction, while the remaining nine watercourses demonstrated no significant trends. Examining winter baseflows, five of the eleven watercourses trended in an upward direction with the remaining six watercourse revealing no trends. This could be indicative of a warmer climate, with more water managing to flow throughout the winter months, reducing the available water in summer months.
- In the last decade, zero trends in increasing flow were present across all seven hydrometric stations for all 19 parameters.
- Conversely, half of the stations have display downward trends in mean/median annual flow over the last decade. The majority of this decline has occurred during winter and freshet, throughout the months of December through July. The summer recession months of August to November also showed declining flow rates, but not to the same extent.

Evaluation of the Current Hydrology Program

The flow monitoring program of WSC is generally adequate. The useable period of record for most WSC hydrometric stations is quite good, especially when considering the hardships that can be incurred while monitoring flow rates on rural northern watersheds. Data gaps within the Little Buffalo River limit its value for an exercise such as this but still provide an indication of watershed seasonality. The dataset for Tazin River is also short (7 years), but this hydrometric station is still active and should eventually be of a sufficient length to conduct a meaningful statistical analysis with.

WATER QUALITY

Data from 17 monitoring sites was included in the assessment of water quality status and trends. Most of the water quality monitoring sites are located on lotic (moving) watercourses that contribute to Great Slave Lake. One site, *Great Slave Lake @ Taltheilei Narrows* is located in the lentic (still) water of Great Slave Lake, near the southwest end of Pethei Peninsula.

Comparison to Guidelines

Analyte concentrations were compared to the Canadian Council of Ministers of Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (FAL). Guideline exceedances, which were determined using non-detect values converted to values equal to the detection limit, ranged from 0% to over 94% but were generally less than 25%. Several parameters (pH, chloride, nitrate, aluminum, arsenic, boron, lead, molybdenum, nickel, thallium, uranium and zinc) exceeded guidelines less than 5% of the time. Only two analytes had greater than 50% guideline exceedances: cadmium and phosphorus.

Cadmium appeared to have 77.56% of samples exceed CCME FAL guidelines but laboratories often have detection limits lower than the guideline, making it difficult to accurately assess (Sanderson et al, 2012). Almost all (98.5%) of cadmium samples were non-detects so actual concentrations are likely low enough to not be a concern. Further, the range of mean concentrations at all WQ sites was within the typical range of cadmium in surface water for the Northwest Territories (<0.1 to 15.4 µg/L; CCME 2014b).

Exceedances of *phosphorus* were widespread; 94.17% of all samples had concentrations greater than the guidelines. Only 27.95% of the total phosphorus measurements were recorded as non-detects. Dissolved phosphorus was not typically analyzed at the WQ sites nor was orthophosphate, the inorganic, biologically available form of phosphorus. However, where it was analyzed, orthophosphate concentrations were typically very low or below detection limits. Additionally, Environment Canada Water Quality Monitoring Networks reports that several watercourses in the Great Slave Lake watershed had a typically low dissolved to total phosphorus ratio, indicating that lower proportion of phosphorus is readily available for uptake by plants (Environment and Climate Change Canada, 2015). Therefore, although phosphorus concentrations were high, it is not likely present in bioavailable forms and is not anticipated to contribute to decreased water quality at the WQ sites.

Spatial Analysis

Spatial analysis revealed that the Buffalo River, Hay River, Kakisa River, Little Buffalo River, Salt River, Slave River @ Fort Smith and Slave River @ Mouth sites, which are all part of the Interior Platform geological province, consistently shared distinct water quality characteristics compared to the other sites and often collectively exhibited concentrations of analytes higher than the other sites. The remaining sites are located within the Slave and Churchill geological provinces which are both part of the Canadian Shield. Salt River often displayed the highest concentrations of analysed water quality parameters while Thelon River, located in the Churchill Province, frequently showed the lowest.

Given the formational characteristics of each geological province, it is not unexpected that the watercourses in the Interior Platform collectively presented higher concentrations of analytes compared to the other sites. The underlying sedimentary rock of the Interior Platform is more easily eroded, unlike the harder, more resistant igneous and metamorphic rock of the Canadian Shield. Softer sedimentary rocks release more minerals which directly and indirectly influences water quality. Additionally, the Interior Platform is mostly within the Taiga Plains ecozone which has a thicker layer of well-sorted soils. In contrast, the Slave and Churchill Provinces are largely within the Taiga Shield ecozone which is characterized by shallow, coarse soils. This results in less opportunity for sedimentation (i.e., deposition of surface soils into the water) which, again, directly and indirectly influences water quality.

Long-term Trend Analysis

Long-term trend analysis (annual trends) was performed on the analytes of interest (AOI) for each WQ site to determine whether water quality conditions have changed over the period of record. A total of 425 Mann-Kendall trend tests were completed (25 AOIs times 17 sites) on the annual data. Trends across all WQ sites are summarized as:

- Of the 425 Mann-Kendall tests 49.6% were decreasing, 30.8% were increasing, 17.2% showed no trend and 2.3% were “NA” (analytes were not analyzed).
- A total of 160 trends (37.6%) were significant, with p-values ≤ 0.05 .
- Yellowknife River had the most significant trends, with 21 of the 25 AOIs (9 increasing, 12 decreasing). The Cameron River, Great Slave Lake and Lockhart River sites, all located within the Slave Province, also had a high number of significant trends.
- Watercourses within the Interior Platform generally showed the lowest number of significant trends.
- Most physical/inorganic analytes showed increasing significant trends.
- Significant nutrient trends were variable – nitrate-nitrate was almost evenly split between increasing and decreasing trends, total phosphorus was mostly increasing and total nitrogen had no significant trends.
- Total metals exhibited mostly decreasing trends, with 11 of the 14 metal AOIs having no increasing trend at all.

Seasonal Analysis

Seasonal analysis was not appropriate at all WQ sites. The small number of samples collected during a year for the period of record at most locations (i.e., Other Sites) did not adequately characterize seasonal patterns. Therefore, potential seasonality was assessed for the Local Rivers (Cameron River, Marian River and Yellowknife River) where sampling occurred on a near-monthly basis over the period of record. Three seasons – spring freshet, summer recession and winter baseline – were applied to each Local River based on their hydrological flow patterns.

Little seasonal variability was observed in either the physical/major ion or nutrient parameters. Total metals generally showed a slight increase in median concentration during spring freshet. At all three Local Rivers sites, aluminum, manganese and iron showed considerably higher median concentrations during spring freshet, which is expected given their association with turbidity and the usual increased sediment loads in that season. Copper, lead and nickel, which have a higher percentage of dissolved metals, showed increased median concentrations during summer recession.

The Local Rivers, for the period of record, the overall trends have been decreasing within each of the seasons (52% in spring freshet, 56% in summer recession and 61.3% in winter baseline). Over the three sites, a total of 48 significant decreasing trends were present, representing 37.7% of all decreasing trends. Twenty-eight increasing trends (33.7% of all increasing trends) were present.

Yellowknife River generally showed the least seasonal variability of the three Local Rivers. Marian River showed notably fewer significant trends than either Cameron River or Yellowknife River.

Evaluation of the Current Water Quality Program

The current water quality program appears to be well designed and implemented. The spatial distribution of the included sites adequately represents the tributaries to Great Slave Lake. The included sites also represent the various geological and ecological regions fairly equally. Therefore spatial analysis of trends can sufficiently be analyzed.

Though somewhat variable, the period of record generally ranged from 1982 to 2016, providing a sufficient period of time to conduct effective long-term trend analysis. However, at most sites sampling was typically conducted just twice per year which limits seasonal analysis. Near monthly monitoring has been conducted at Cameron River, Marian River and Yellowknife River.

Sampling was conducted by multiple agencies and personnel over the period of record. It is likely that sampling methodology was variable but that it generally conformed to acceptable standard practices. Taiga Environmental Laboratories was consistently used for analysis.

Water quality sampling included analysis of a broad range of common analytes, including physical parameters, ions, nutrients and metals. In the early years of monitoring, dissolved metals were often not included in laboratory analysis, therefore only a few years of dissolved metal data is available. Tetra Tech understands that dissolved metals, ultra-low mercury, chlorophyll a and other bacteriological and organic analyses, have recently been added to the water quality sampling program.

Overall the current water quality program is sufficient. However, to improve the water quality program, Tetra Tech recommends that:

- A standardized protocol be developed and recorded to ensure consistent sampling methodology;
- Conduct sampling more frequently to develop a data set robust enough to consider seasonal analysis. Ideally sampling would occur monthly but Tetra Tech recognizes that budgetary and access constraints may limit sampling opportunity; and
- Continue to include the recently added parameters (dissolved metals, ultra-low mercury chlorophyll a and other bacteriological and organic analyses) in laboratory analysis to supplement water quality data for a more comprehensive program.

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ACRONYMS & ABBREVIATIONS

Acronyms/Abbreviations	Definition
<DL	less than detection limit
=DL	equal to detection limit
1.5*IQR	1.5 times the interquartile range
AOI	analytes of interest
CCME AW	Canadian Council of Ministers of Environment Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life
EC	electroconductivity
GNWT	Government of Northwest Territories
GNWT-ENR	Government of Northwest Territories, Environment and Natural Resources
INAC	Indian and Northern Affairs Canada
IQR	interquartile range
QA/QC	quality assurance/quality control
RPD	replicate percent difference
TDS	total dissolved solids
WSC	Water Survey of Canada
WQ	water quality

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Government of Northwest Territories and their agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Government of Northwest Territories, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in Tetra Tech Canada Inc.'s Services Agreement. Tetra Tech's General Conditions are provided in Appendix K of this report.

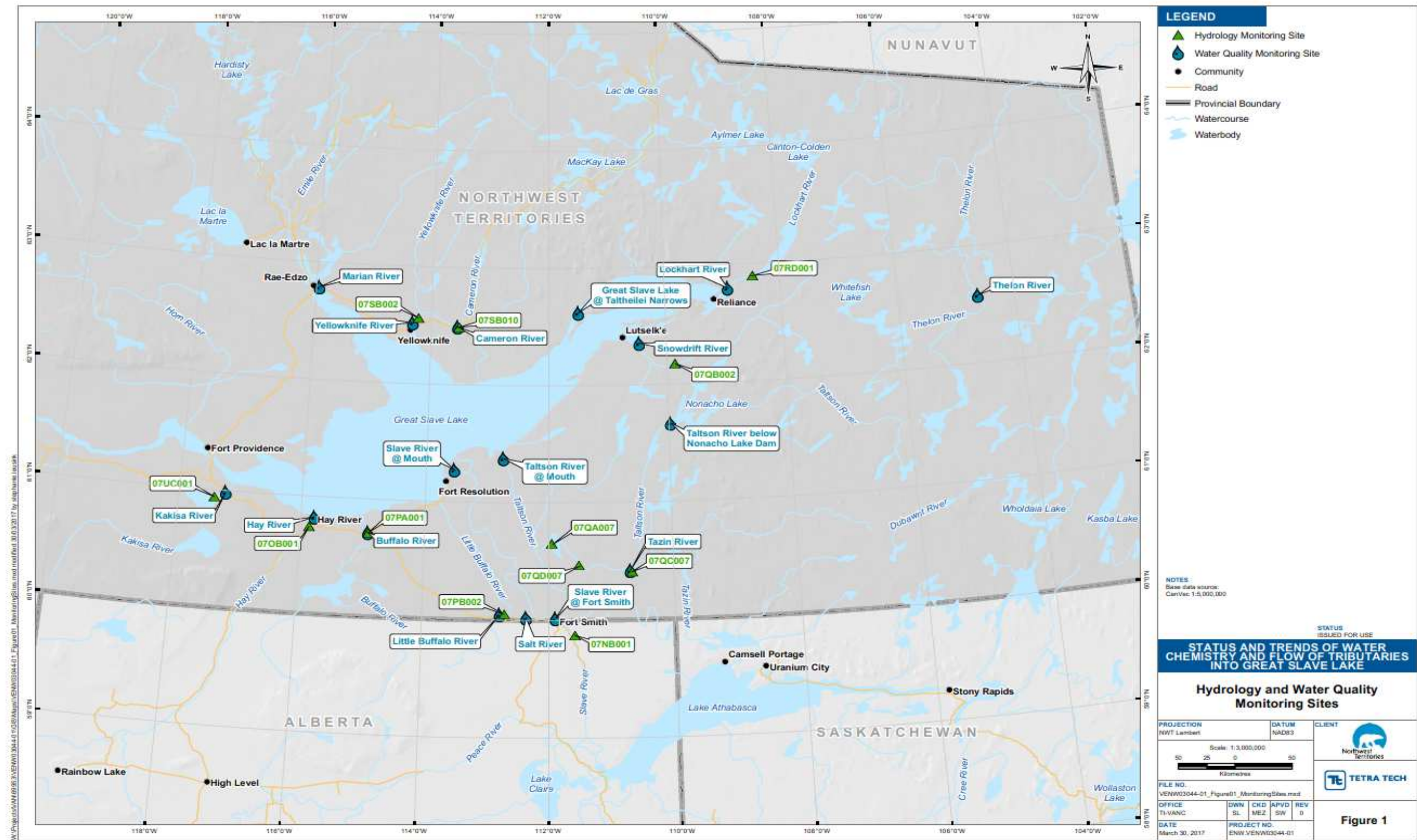
1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) has been retained by the Government of Northwest Territories (GNWT) to conduct a *Vulnerability Assessment of Great Slave Lake to Climate Change and Human Land Use Activities* ("Project"). The Project is comprised of two parts: (A) status and trends analysis of water chemistry and flow and (B) vulnerability assessment. Tetra Tech presents the following report to complete Part A of the Project, a Status and Trends Report of the water chemistry and flow of tributaries into Great Slave Lake ("Report").

This Report:

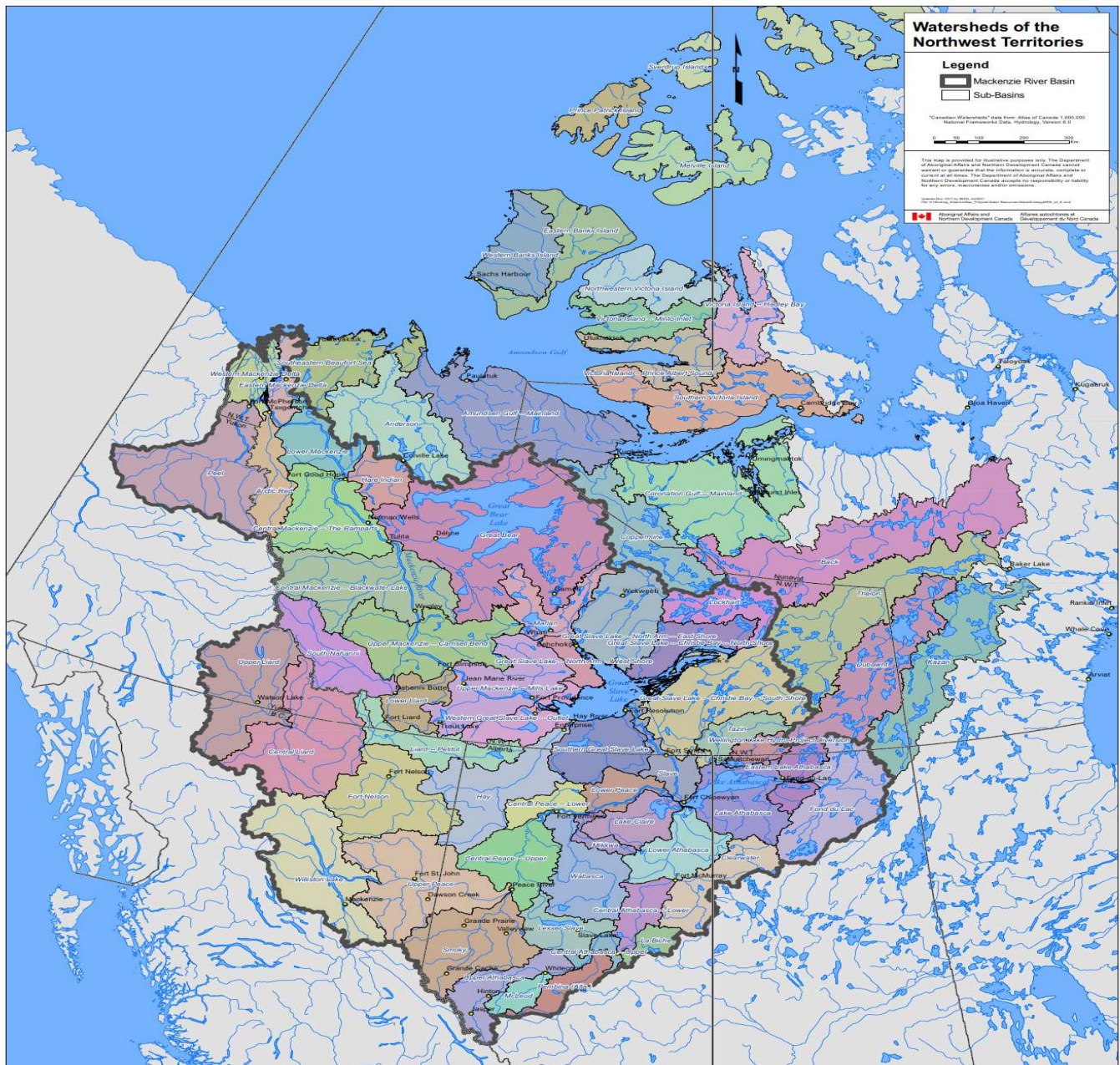
- Assesses the current hydrologic status and trends in the included tributaries to Great Slave Lake by examining temporal trends and seasonal variability;
- Assesses status and trends of water quality in the included tributaries to Great Slave Lake by examining spatial variability, long term trends, seasonal variability and comparison to relevant water quality guidelines; and
- Assesses the current and historic water quality monitoring programs to evaluate their suitability and effectiveness in detecting spatial and temporal changes.

Water quantity and water quality sites included in the Report are illustrated on Figure 1, *Water Quantity and Water Quality Monitoring Sites*, and in Tables 3.1.1 and 3.2.1, respectively.



2.0 BACKGROUND

Great Slave Lake is part of the Mackenzie River watershed which, at 1,805,200 km², is Canada's largest watershed (Figure 2; AANDC, 2011). Great Slave Lake is North America's fifth largest lake with an area of 28,570 km², and is the deepest at 614 m though the average depth is approximately 73 m (SENES, 2005). The Slave River contributes about 77% of the inflows to Great Slave Lake; the Taltson, Lockhart and Hay Rivers together contribute approximately 11% of inflows, while the remaining 12% is provided by 10 other drainage areas. (INAC, 2010).



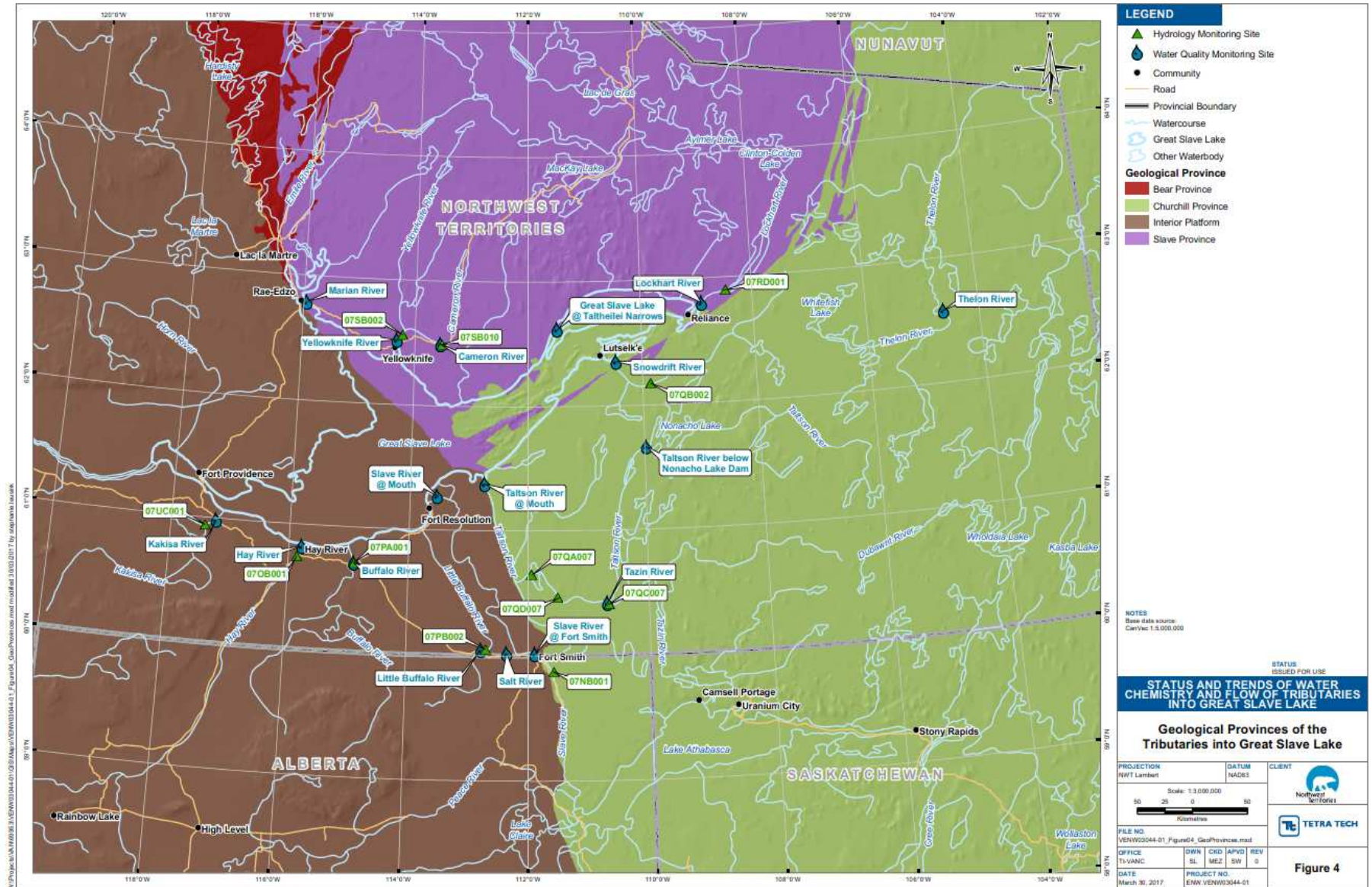
The geology of the Great Slave Lake watershed is divided into three geological provinces (Figure 4, “*Geological Provinces of the Tributaries into Great Slave Lake*”). The Interior Platform is horizontally layered younger, sedimentary rock overlaying older, consolidated rock (Government of Canada, 2010). The Slave Province lies between Great Slave Lake and Coronation Gulf. As part of the Canadian Shield it contains some of the oldest known igneous and metamorphic rocks on Earth. The Churchill Province is also part of the Canadian Shield and lies along most of the southern shore of Great Slave Lake. It is also comprised of igneous and metamorphic rock; differences between the Slave and Churchill Provinces are based on lithological associations, geochemical characteristics (Relf, 2000).

Three ecozones surround Great Slave Lake (Figure 3, “*Ecozones of Canada*”). The Taiga Plains ecozone is located on the western side of the lake. It is an area of flat to slightly rolling terrain with occasional interruptions of large river valleys, most notably the Mackenzie River. The Taiga Plains have poor soils with open to dense mixed forests interspersed with wetlands. The Taiga Shield is located over most of the eastern half of Great Slave Lake. It is generally flat with some rolling hills and is characterized by abundant lakes and wetlands. The shallow soils are coarse and poorly drained. Vegetation is sparse and forests are often stunted. The Boreal Plains ecozone represents a small portion around the lake, occupying an area on the southern shore between Buffalo River and Taltson River. It is characterized by gently rolling terrain with thick soils, scattered small lakes and thick forest.



Figure 3: Ecozones of Canada (Evergreen, 2017)

Great Slave Lake is entirely below the treeline, though the boundary approaches the lake on the northeast end near McLeod Bay. Presence of trees can affect runoff and other hydrologic features as well as water chemistry (Stantec 2015). All hydrometric stations and water quality (WQ) sites are located below the treeline, except for the Thelon River WQ site.



3.0 METHODOLOGY

3.1 Hydrologic Analysis

3.1.1 Monitoring Sites (location & period of record)

Hydrology data were compiled for twelve WSC hydrometric stations on eleven watercourses (two sites are on Talston River). These stations are located on tributaries of Great Slave Lake and were identified by the GNWT as being watercourses of interest for this study. Of the twelve hydrometric stations, four were discontinued in the 1990's, while the remaining eight remain active today. Table 3.1.1 presents the twelve WSC stations selected for inclusion in this analysis.

Table 3.1.1: Water Quantity Monitoring Sites

Monitoring Site	WSC Station ID	Latitude	Longitude	Watershed Area (km ²)
Buffalo River at Highway No. 5	07PA001	60.714	-114.904	18,500
Cameron River below Reid Lake	07SB010	62.491	-113.523	3,630
Hay River near Hay River	07OB001	60.743	-115.860	51,700
Kakisa River at Outlet of Kakisa Lake	07UC001	60.940	-117.422	15,600
Little Buffalo River below Highway No. 5	07PB002	60.050	-112.698	3,330
Lockhart River at Outlet of Artillery Lake	07RD001	62.894	-108.466	26,600
Slave River at Fitzgerald	07NB001	59.872	-111.583	606,000
Snowdrift River at Outlet of Siltaza Lake	07QB002	62.173	-109.861	9,110
Tazin River near the Mouth	07QC007	60.409	-110.664	16,530
Taltson River at Outlet of Tsu Lake	07QA001	60.650	-111.947	58,700
Taltson River below Hydro Dam	07QD007	60.467	-111.513	
Yellowknife River at Outlet of Prosperous Lake	07SB002	62.559	-114.220	16,300

The period of record for each hydrometric station varies from nine years (Tazin River) to 94 years (Slave River). Daily flow records for each hydrometric station are largely complete; however, periodic gaps are present in each dataset. To maximize the data available for statistical and trends analysis, years with data gaps were evaluated to determine their appropriateness for inclusion within the analysis. This entailed the manual examination of all years with 30 or fewer missing days of data. Flow values were synthesized where short data gaps occurred over periods of time expected to exhibit low flow fluctuations (i.e., late-summer recession or winter baseflow). If the data gaps of the year occurred during a period of high flow variability (i.e., freshet) the year of data was disregarded in the analysis. Table 3.1.1 outlines the useable period of record for each hydrometric station. For each station, the entire useable period of record was used for statistical and trends analysis.

Table 3.1.1: WSC Stations: Periods of Record

WSC Station Name:	WSC Station ID	Period of Record	Years of Useable Data
Buffalo River at Highway No. 5	07PA001	1969 - 1990	22
Cameron River below Reid Lake ¹	07SB010	1975 - 2015	39
Hay River near Hay River	07OB001	1964 - 2015	52
Kakisa River at Outlet of Kakisa Lake	07UC001	1964 – 2015 ²	29
Little Buffalo River below Highway No. 5	07PB002	1965 – 1994 ³	7
Lockhart River at Outlet of Artillery Lake	07RD001	1944 – 2015 ⁴	51
Slave River at Fitzgerald	07NB001	1921 – 2015 ⁵	55
Snowdrift River at Outlet of Siltaza Lake	07QB002	1976 – 1991	13
Tazin River near the Mouth ⁶	07QC007	2007 – 2015	7
Taltson River at Outlet of Tsu Lake	07QA001	1963 - 1996	31 ⁷
Taltson River below Hydro Dam	07QD007	1996 – 2015	20 ⁷
Yellowknife River at Outlet of Prosperous Lake	07SB002	1937 – 2015 ⁸	28

¹ The Cameron River is a tributary to the Yellowknife River. Both stations have been included within the analysis

² Hydrometric station was inactive between 1991 and 2013. No data is available over this period of time.

³ There are a significant number of data gaps over this 20 year period-of-record resulting in few complete years of data. Data gaps mainly occur in winter months.

⁴ Intermittent flow data was recorded for the Lockhart River between 1944 and 1967. Continuous data has been recorded since 1968.

⁵ Intermittent flow data was recorded for the Slave River between 1921 and 1960. Continuous data has been recorded since 1960.

⁶ The Tazin River is a tributary to the Taltson River. Both stations have been included within the analysis

⁷ Two hydrometric stations exist on the Taltson River with 30 km separation. Datasets from both of these stations were combined to produce one 51-year dataset.

⁸ Hydrometric station was inactive between 1940 and 1987. No data is available over this period of time.

3.1.2 Statistical Analysis

The hydrological year for each watercourse draining into Great Slave Lake was established as one year from the start of winter baseflow. For most watercourses this typically occurs in early-November. The approximately two month offset from the calendar year recognizes that precipitation occurring in November and December, typically snowfall will runoff the following spring in the form of snow melt. Streamflow statistics were derived for each watercourse based on the hydrological year.

Six statistical hydrometric parameters were derived for each year for hydrometric station. These parameters include:

- Mean annual flow;
- Median annual flow;
- Annual maximum daily flow;
- Annual minimum daily flow;
- Median seasonal flow (3 seasons); and
- Median monthly flow (12 months).

In order to assess seasonal trends, unique seasons were defined for each station through visual inspection of the long-term mean and median seasonal hydrographs. A three-season approach was implemented which includes: spring freshet, summer recession, and winter baseflow. In total, 19 parameters were evaluated for each watercourse.

3.1.3 Trends Analysis

Hydrometric stations were assessed individually. Trends in streamflow were examined over two timeframes: the entire period of record of the station; and for the last decade (2006 – 2015), data permitting. Trends analyses were undertaken using the non-parametric Mann-Kendall test. The non-parametric Mann-Kendall test was selected since exploratory data analysis indicated non-normal (skewed) data distributions. Additionally, data collection was not consistent, with gaps in annual and seasonal records.

Significance was indicated by a p-value of 0.05; p values of >0.05 were considered not significant. A null hypothesis of no trend was tested against three potential alternatives (negative, non-null, or positive trend in a series of data). The negative trend was identified as a “decreasing (-)” pattern in a data series. The positive trend was identified as an “increasing (+)” pattern in a data series. Hydrometric data from twelve hydrometric stations on tributaries to Great Slave Lake were analyzed for a trend in the time series based on the probability ($p \leq 0.05$) the null hypothesis could be rejected.

Trend analysis for individual hydrometric parameters at each of the sites identifies where statistically significant changes occurred over the time monitoring was conducted. Although some sites may show change in flow conditions, only those where $p \leq 0.05$ are considered statistically significant. The probability of identifying a trend when one does not exist is less than or equal to five percent (Type I Error). The consequence of committing a Type I Error means that when a hydrology trend is detected (either increasing or decreasing), the trend in hydrology is not likely.

Due to the large number of group trend tests to be completed (342), the likelihood of Type I Errors (where $p \leq 0.05$) occurring is high. The level of significance was refined into five sub-groups in order to better differentiate strong trends with a low probability of Type I Errors present, from trends where the presence of Type I Errors has a greater probability (~5%). The five categories were defined as follows:

- Not Significant: $p > 0.05$
- Marginally Significant: $0.005 < p \leq 0.05$
- Moderately Significant: $0.001 < p \leq 0.005$
- Highly Significant: $0.0001 < p \leq 0.001$
- Very Highly Significant: $0.0001 < p \leq 0.001$

3.1.4 Evaluation of Existing/Historical Monitoring Program

Tetra Tech assessed the adequacy of the existing hydrometric monitoring programs for detecting spatial and temporal changes in flow in major tributaries to Great Slave Lake. This included an evaluation of:

- The number and distribution of monitoring sites to adequately represent the watershed; and
- The period-of-record and presence of data-gaps.

3.2 Water Quality

3.2.1 Monitoring Sites & Period of Record

GNWT provided WQ monitoring data for 17 sites (Figure 1, “*Water Quality Monitoring Sites*”; Table 3.2.1). Period of record is variable among the sites but generally ranges from 1982 to 2016. Sampling frequency each year was also variable, both among the sites and within a specific site; for example, the Slave River @ Fort Smith site was sampled between 1982 and in 2016. This site was sampled 10 times in 1995 but only twice in 1990.

Three WQ sites, Cameron River; Marian River and Yellowknife River, are collectively referred to as the “Local Rivers” due to their proximity to the City of Yellowknife. These sites were monitored more frequently than the other 14 WQ sites (may be referred to as “Other Sites”) included in the Report.

Table 3.2.1: Water Quality Monitoring Sites and Period of Record for Provided Data

Monitoring Site	Latitude	Longitude	Period of Record
Buffalo River @ Hwy 5 Bridge	60.7161	-114.9069	1982-2010; 2012-2016
Cameron River*	62.49427	-113.5489	1983-2016
Great Slave Lake @ Taltheilei Narrows	62.6200	-111.4899	1982-2010; 2015
Hay River @ West Channel Bridge	60.8250	-115.7789	1982-2010; 2012-2016
Kakisa River @ Hwy 1 Bridge	60.9858	-117.2452	1982-2010; 2012-2016
Little Buffalo River @ Hwy 5 Bridge	60.0472	-112.7714	1987-1990, 1993-2010; 2013-2016
Lockhart River @ mouth	62.8002	-108.9057	1982-2010
Marian River*	62.78725	-115.94983	1987-2016
Salt River @ Hwy 5 Bridge	60.0211	-112.3508	1987-1990, 1993-2010; 2013-2016
Slave River @ Fort Smith	60.016111	-111.889722	1982-2010; 2012-2016
Slave River @ Mouth	61.2730	-113.5417	1982-2010
Snowdrift River @ mouth of Stark Lake	62.3553	-110.4594	1982-1986, 1988-2010; 2015
Taltson River @ mouth	61.3747	-112.7407	1982-2010; 2015-2016
Taltson River below Nonacho Lake dam	61.6641	-109.9700	1982-2010; 2013-2016
Tazin River @ mouth	60.4183	-110.6933	1982-2010; 2015-2016
Thelon River @ Catling Lake	62.5739	-104.6304	1983-2010; 2015-2016
Yellowknife River*	62.51996	-114.31997	1969, 1972, 1986-2016
*: “Local River” site			

3.2.2 Data Management

3.2.2.1 Data Rationalization

Data for each WQ monitoring site was received from GNWT as an Excel file. Tetra Tech uses ESdat, an environmental database system that allows for easy organization of data. ESdat can produce a variety of outputs including guideline comparisons, summary statistics, graphing and complex statistical analysis. In order to import the data into ESdat, the following data manipulation was required:

- Conversion of all sample dates to a standardized format.
- Replicate samples (duplicates and triplicates) were converted to a single value. In most cases (Other Sites) the median value was used. However, the mean value of replicates was used for the Local Rivers since this was the organization utilized by GNWT.
- Data received from GNWT for most locations (i.e., Other Sites) had data less than the detection limit (“non-detect”) reported as a value equal to the detection limit (=DL). Non-detects were color coded, indicated by blue font, in these data sets. Data for the Local Rivers was unaltered (i.e., non-detect values present). Tetra Tech converted Local Rivers data to =DL values.
 - For the purpose of calculating the majority of summary statistics the =DL values were utilized. However, in order to determine the number of non-detects for the summary statistics, having the “less than detection limit” values present is required. This information was available for the Local Rivers but conversion for the Other Sites was required. To do this, Tetra Tech conducted a “colour count” using an Excel Visual Basic module¹.
 - Guideline comparisons, spatial variance and long-term trend analysis were also conducted using the =DL values. Changing the =DL values in the data sets provided by GNWT to the non-detect values originally recorded by the laboratory would require manual manipulation that the current timeline/budget did not support. Therefore Tetra Tech made every attempt to provide clear interpretation and rationalization of results based on the data format available.

The data set for each WQ monitoring site was then uploaded into ESdat for processing and analysis.

3.2.2.2 Data Quality

The received data was processed by GNWT who performed numerous data validation checks such as blank comparisons, Replicate Percent Difference (RPD) checks and Total to Dissolved Metal ratios.

Data for the Local Rivers was validated by:

- Data that did not match data the requested detection limits were identified and re-run at lower detection limits.
- For trip and travel blank samples, any parameter that measured above detection limits was flagged and reviewed across the batch. Sample results above detection limits in the same batch were re-analyzed with blanks. *Data received by Tetra Tech did not include trip or travel blank samples; trip and travel blank analysis was completed by GNWT.*
- Parameters with a RPD greater than 15% were flagged and reviewed. Alternate protocols (i.e., >20% RPD) were applied to parameters with high variability (e.g., aluminum, iron, manganese, titanium).
- All flagged values were re-analyzed by lab if holding times allowed for it. However, professional judgment was used for values very close to the detection limits to determine whether they needed to be re-analyzed. Re-run values replaced original values.
- Outliers were flagged if one or more of the above tests failed and if value were outside of 1.5 times the interquartile range ($1.5 \times IQR$). The validator used professional judgment to remove outliers from the dataset if numerous validation tests failed, $n > 10$ and / or significant field sampling events (e.g., high wind, rain, no gloves) also took place (Robin Staples, pers. com. February 7, 2017).

¹ The data received had =DL values highlighted blue to indicate that they were previously non-detect. The “colour count” allows a user to determine how many cells in a range (e.g., column) are of the same colour formatting.

Data from the Other Sites was validated by applying a 1.5 multiplier of the interquartile range ($1.5 \times \text{IQR}$) and screening for transcription errors. Replicates and field blanks, as well as outliers, were included in the data set because of the small sample size.

Tetra Tech has not assessed data quality beyond that conducted by GNWT.

3.2.3 Comparison of Analytes to Relevant Water Quality Guidelines

All water quality parameters analyzed were compared to Canadian Council of Ministers of Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (FAL) (CCME, 2014a). These guidelines are the science-based benchmark for a nationally consistent level of protection for all forms of aquatic life in Canada, including the most sensitive life stage of the most sensitive species over the long-term. Guidelines may be over- or under-protective at sites with unique conditions but are generally conservative enough to be representative at the majority of sites in Canada (CCME, 2003a) but may not reflect specific local conditions, especially in sediment-laden northern aquatic ecosystems. Therefore, exceedances of the CCME FAL may occur within the natural range of variability and are not necessarily indicative of a concern. While calculating site-specific water quality guidelines that reflect natural background conditions is possible, it is beyond the scope of this assessment.

CCME FAL guidelines for long-term exposure were applied because:

- Long-term exposure guidelines identify benchmarks (i.e., maximum concentrations of substances or ranges for attributes) in the aquatic ecosystem that are intended to protect all forms of aquatic life (all species, all life stages) for indefinite exposure periods.
- Short-term exposure guidelines identify benchmarks (i.e., maximum concentrations of substances or ranges for attributes) in the aquatic ecosystem that protect only a specified fraction of individuals from severe effects such as lethality for a defined short-term exposure period. Therefore, by design and by definition, these guidelines do not fulfill the guiding principle of protecting all components of the aquatic ecosystem all the time. These guidelines are estimators of severe effects to the aquatic ecosystem and are intended to give guidance on the impacts of severe, but transient, situations (e.g., spill events to aquatic receiving environments and infrequent releases of short-lived/non-persistent substances) (CCME, 2007).

The long-term guidelines are typically more stringent than the short-term values and therefore provide a more conservative estimate of potential exceedances.

Summary statistics included calculation of the number and percentage of samples that exceeded the guideline (Section 4.2.1 and Appendix A).

3.2.4 Spatial Variability

3.2.4.1 Summary Statistics

Spatial variability of water quality among the WQ sites was examined by comparing summary statistics (Table 3.2.4a) for each parameter analyzed. Results that were reported as non-detects were converted to a value equal to the detection limit, as per Section 3.2.2.1. Scatterplots (Appendix B) visually depict the concentration distribution of each analyte of interest (AOI) at each WQ site while box plots (Appendix E) visually depict data dispersion and skewness and display the distribution of minimum and maximum values, median, 25th and 75th percentiles.

AOIs (Table 3.2.4b) were mutually determined by Tetra Tech and GNWT, based on a review of the data available, similar past projects and a cursory review of land use activities and potential contaminants of concern in the Great Slave Lake watershed.

As the number of non-detects increase the summary statistics become more imprecise. Summary statistics were reported for all samples but when non-detects were $\geq 50\%$ of the total samples, it was noted in the tables.

For the Other Sites replicates were combined into a median value for calculating the majority of the summary statistics but non-detects required unique, rather than blended, values. Therefore, where replicates were present, Tetra Tech applied the non-detect count to the first value reported on the table, which laboratories typically report as the "original" sample (e.g., if replicate samples were presented on rows 1 and 2 it was assumed that the sample on row 1 was the "original" sample).

Table 3.2.4a: Included Summary Statistics

PARAMETER	SYMBOL	DESCRIPTION
Number of Results	n	Total number of samples
Number of Detects	D	Number of samples with concentrations above detection limit
Number Non-Detects (#ND)	#ND	Number of samples reported as non-detects (or less than the detection limit) $(n-D)$
%ND	%ND	Percent of samples reported as non-detects (or less than the detection limit) $((\#ND/n)*100)$
Minimum Concentration	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
Lower Limit	LOW	The lowest observed value in the set of data still within 1.5 x IQR of the 25th percentile. $(Q1-(1.5*IQR))$
5th Percentile	5th	The 5 th percentile of the data set; comparable to the Lower Limit
25th Percentile	Q1	The 25 th percentile of the data set
Median Concentration	MEDIAN	The 50 th percentile of the data set
75th Percentile	Q3	The 75 th percentile of the data set
95th Percentile	95th	The 95 th percentile of the data set; comparable to the Upper Limit
Upper Limit	HIGH	The highest observed value in the set of data still within 1.5 x IQR of the 75th percentile. $(Q3+(1.5*IQR))$
Maximum 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
Average Concentration	MEAN	The average value (sum/n) of the set of data, including outliers
Standard Error	SE	The estimate of accuracy based on the standard deviation of the data set $(STD/\sqrt{N})$
Coefficient of Variation	CV	The measure of spread that describes the amount of variability relative to the mean $(MEAN/SD)$
Interquartile Range	IQR	75 th percentile minus the 25 th percentile $(Q3-Q1)$

PARAMETER	SYMBOL	DESCRIPTION
1.5 x IQR	1.5*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 (1.5*IQR)
Standard Deviation	SD	The amount of variation or dispersion in the data set
Number of Guideline Exceedances	#GE	Number of samples that exceed applicable guideline values
% Guideline Exceedances	%GE	Percentage of samples that exceed applicable guideline values ((#GE/n)*100)

Table 3.2.4b: Analytes of Interest

Physical/Inorganic	Nutrients	Metals (total)	
pH	Nitrate-nitrite	Aluminum	Lead
Conductivity	total Nitrogen	Arsenic	Nickel
Turbidity	total Phosphorus	Cadmium	Manganese
Total Dissolved Solids		Chromium	Mercury
Hardness (as CaCO ₃)		Cobalt	Selenium
Alkalinity		Copper	Strontium
Chloride		Iron	Zinc
Sulphate			

3.2.4.2 Percentage of Dissolved Metals Present

Some analytes, such as phosphorus and some total metals, can be associated with turbidity (or total suspended solids). Some metals are more soluble in water than others and, consequently, have total metal concentrations comprised of a high percentage of dissolved constituents (and conversely, a low percentage of particulate constituents). Metals such as aluminum, iron and manganese often predominantly favour the particulate fraction.

To better determine which total metal concentrations were affected by turbidity, Tetra Tech assessed each to determine its particulate versus dissolved constituent composition (Appendix I). Dissolved metal information was generally only available for sample dates in 2014 to 2016, so only a very narrow representation of metal-turbidity correlation can be provided. WQ Sites were grouped according to the geological province they were situated in and to establish which metals were dominated by the particulate fraction. Correlation between the particulate-dominant metals and turbidity was determined by calculating Pearson's *r*; Tetra Tech also calculated the correlation between turbidity and phosphorus. (see Table 4.4.2b).

3.2.5 Long-Term (Annual) Trend Analysis

Water quality data were assessed for long-term trends to determine whether water quality conditions have changed over the period of record (annual trends). Trends in time-series water quality data sets for the AOIs were identified using the non-parametric Mann-Kendall trends test. The non-parametric Mann-Kendall test was selected to examine temporal trends because simple exploratory data analysis indicated that many parameters had non-normal distribution² and because data collection was not consistent, with gaps in annual and seasonal dates. The Mann-Kendall test assesses if there is a monotonic upward or downward trend of the variable of interest over time. It does not require that data be normally distributed or that a trend, if present, be linear. It is also capable of handling missing values or values below detection limits.

Because the Mann-Kendall test requires that data be monotonic, only one value per time period is recognized. Therefore, where multiple values were recorded (e.g., duplicate or triplicate samples), the median or mean was used.³ As in the spatial analysis, values reported below detection limits were converted to a value equal to the detection limit. Significance was indicated by a p-value of 0.05; p values of >0.05 were considered not significant.

Results from trends test were generated by SYSTAT Version 12 using the Mann-Kendall option for trend analysis. The time series water quality data typically characterized conditions during two periods of the year (late spring and mid-fall at Other Sites) and represented by a single observation during each of these seasons within a year. The small number of samples collected during a year for the period of record at Other Sites did not adequately characterize seasonal patterns so all data were combined to provide *long-term* trend analysis. Long-term trend analysis did not use a seasonal option to account for intra-annual patterns. Long-term trend analysis was also conducted for the Local Rivers (Cameron River, Marian River and Yellowknife River) where sampling occurred more frequently. Seasonal trends were assessed separately for the Local Rivers (see Section 3.2.6).

A null hypothesis of no trend was tested against three potential alternatives (negative, non-null, or positive trend in a series of data). The negative trend was identified as a “decreasing (-)” pattern in a data series. The positive trend was identified as an “increasing (+)” pattern in a data series. Water quality data series from seventeen sampling locations were analyzed for a trend in the time series based on the probability ($p \leq 0.05$) the null hypothesis could be rejected.

Trend analysis for individual water quality parameters at each of the WQ sites identifies where statistically significant changes occurred over the time monitoring was conducted. Although some sites may show change in water quality conditions, only those where $p \leq 0.05$ are considered statistically significant. The probability of identifying a trend when one does not exist is less than or equal to five percent (Type I Error). The consequence of committing a Type I Error means that when a water quality trend is detected (either increasing or decreasing), the trend in water quality is not likely.

Error in trend identification can influence decision-making and what is interpreted about past and current water quality conditions. Identification of trends in the annual data set may be influenced by change over time in water quality conditions during individual seasons. Strong contrasts in water quality over long time periods and during select seasons of the year may occur. These strong patterns identified by trend analysis typically have to do with tributary drainage hydrology patterns. Trends detected using the annual data set means that one or more of the seasons show strong change over time. If only one of the seasons shows a strong change in water quality using the annual data set, the rate of committing a Type I Error is greater resulting from water quality observations sparsely scattered between a minimum and maximum range. When water quality observations are clustered tightly and show

² Summary statistics were compiled for each WQ site and the mean and median values of the AOIs were examined as a rudimentary indication of normality (in a normal distribution, the mean is equal to the median). Tetra Tech then used the “Normality Check/Outlier Analysis” Excel sheet (Brown, 2015) to create normal probability plots and run a D’Agostino-Pearson test, which uses skewness and kurtosis to test for normality.

³ Mean value was used for Local Rivers sites, median value was used at all other sites (Section 3.2.2).

a trend, as occurs with seasonal data, the rate of committing a Type I Error declines. A strong signal for change in water quality conditions over time can be visualized by a plot of observations that show less variability from a trendline. If the plotted observations vary a great distance from the same trendline, there is an equal to or less than five percent chance a trend does not exist even though there is central tendency to accept that change occurred.

3.2.6 Seasonal Analysis

As noted above in Section 3.2.5, seasonal analysis was not appropriate at all WQ sites. The small number of samples collected during a year for the period of record at Other Sites did not adequately characterize seasonal patterns. Therefore, potential seasonality was assessed only for the Local Rivers where sampling occurred on a near-monthly basis over the period of record. Three seasons – spring freshet, summer recession and winter baseline – were applied to each Local River based on their hydrological flow patterns⁴ (Table 3.2.6).

Table 3.2.6: Local Rivers Season Dates

Site	Beginning Date		
	Spring Freshet	Summer Recession	Winter Baseline
Cameron River	04-21	07-30	11-02
Marian River	04-21	07-30	11-02
Yellowknife River	05-3	09-22	12-6

Summary statistics for each of the seasons at each Local River were generated (Appendix G) using the same parameters described in Table 3.2.4a. Trends were tested in the same manner as the long-term trend analysis (see Section 3.2.5).

3.2.7 Evaluation of Existing/Historical Monitoring Program

Tetra Tech assessed the adequacy of the existing water quality monitoring programs for detecting spatial and temporal changes in water chemistry in major tributaries to Great Slave Lake. This included an evaluation of:

- Whether the number and distribution of monitoring sites adequately represents the watershed;
- The frequency of sampling;
- The sampling methodology (including QA/QC methods); and
- Whether the analytes assessed are appropriate and comprehensive.

⁴ Cameron River and Yellowknife River season dates are based on data from the hydrometric stations (Table 3.1.1). Marian River does not have hydrometric data, however visual inspection indicates that it likely behaves in a manner more similar to Cameron River because it does not have the same degree of lake attenuation that is present on Yellowknife River.

4.0 RESULTS AND DISCUSSION

4.1 Hydrology

4.1.1 Buffalo River (at Highway No. 5)

The Buffalo River at Highway No. 5 hydrometric station is located 50 km east of the town of Hay River and 20 km upstream of the mouth of the Buffalo River at Great Slave Lake. The station has watershed area of 18,500 km² and has daily flow data available from 1969 to 1990. The station was deactivated in 1990.

4.1.1.1 Seasonal Variability

The Buffalo River exhibits strong seasonal trends characterized by long periods of baseflow extending into late-April culminated with an abrupt transition to spring freshet. Post winter break-up, it typically takes five to six weeks for freshet flows to reach their peak in early June. The flow will then display a gradual summer recession by early July. Figure 5 depicts seasonal flow dynamics.

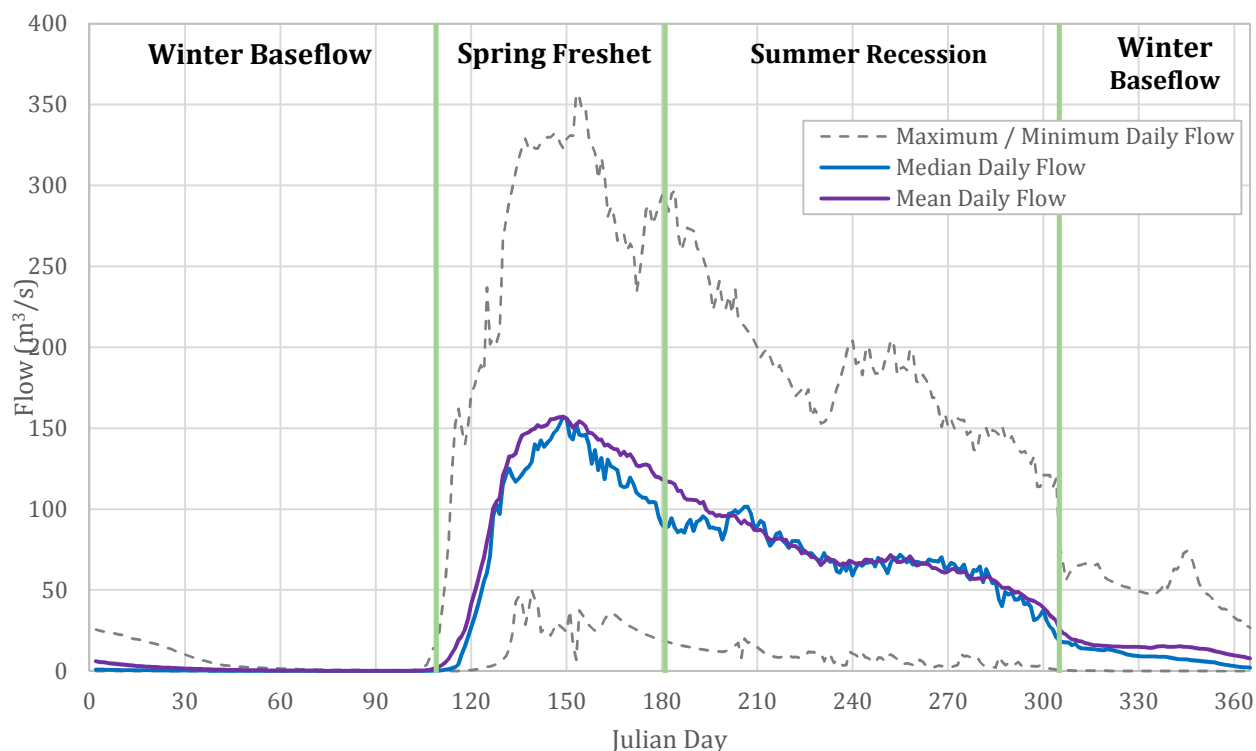


Figure 5: Maximum, Minimum, Mean, and Median Seasonal Flow Dynamics for Buffalo River at Highway No. 5

Seasons for the Buffalo River were determined visually from the above graph as follows:

- Spring Freshet: April 19th to June 29th;
- Summer Recession: June 30th to October 31st; and
- Winter Baseflow: November 1st to April 18th.

4.1.1.2 Trend Analysis

Temporal trends for each hydrological parameter of the Buffalo River were evaluated using the Mann-Kendall trend test. Table 4.1.1.2 presents the significance of any trends detected by these tests and clarification on trend direction (parameter increasing/decreasing). Graphical representations of each time-series have been presented in Appendix J.

Table 4.1.1.2: Results of Mann-Kendall Trends Analysis of Streamflow Data for the Buffalo River Watershed (p-values and trend direction)

Parameter	Buffalo River at Highway No.5			
	Period-of-Record (1969 – 1990)		Last Decade (2006 – 2015)	
Annual Flow (Hydrologic Year: Nov 1 st – October 31 st)				
Mean Flow	NS	-	n/a	-
Median Flow	NS	-	n/a	-
Annual Max Flow	NS	-	n/a	-
Annual Min Flow	0.007	Increasing	n/a	-
Seasonal Flow				
Spring Freshet (Apr 19 – June 29)	NS	-	n/a	-
Summer Recession (Jun 30 – Oct 31)	NS	-	n/a	-
Winter Baseflow (Nov 1 – Apr 18)	0.037	Increasing	n/a	-
Monthly Median Flow				
January	NS	-	n/a	-
February	0.050	Increasing	n/a	-
March	0.020	Increasing	n/a	-
April	NS	-	n/a	-
May	NS	-	n/a	-
June	NS	-	n/a	-
July	NS	-	n/a	-
August	NS	-	n/a	-
September	NS	-	n/a	-
October	NS	-	n/a	-
November	NS	-	n/a	-
December	NS	-	n/a	-
Significance Classification: Not Significant (NS): p > 0.05 Marginally Significant: 0.005 < p ≤ 0.05 Moderately Significant: 0.001 < p ≤ 0.005 Highly Significant: 0.0001 < p ≤ 0.001 Very Highly Significant: 0.0001 < p ≤ 0.001				

There have been no significant trends in annual median or mean flow for the entire period of record. Marginally significant trends are present in winter base flow, primarily in the months of February and March where flows were trending upwards (increasing) into the year 1990. Unfortunately no flow record exist past 1990 so it is unknown whether these trends continued, or if any other significant annual trends have developed over the past 26 years. The overall lack of trends indicates that the total volume of water flowing within the Buffalo River watershed, despite considerable annual variability, remains largely the same year to year.

4.1.2 Cameron River (below Reid Lake)

The Cameron River below Reid Lake hydrometric station is located 44 km east of the city of Yellowknife. It is 60 km upstream from the mouth at Great Slave Lake. The Cameron River flows through a series of small lakes before reaching its mouth at Prosperous Lake approximately 40 km downstream of the hydrometric station. From Prosperous Lake, flow continues as the Yellowknife River for the remaining 10 km to the mouth at Great Slave Lake. The station gauges a watershed area of 3,630 km² and has daily flow data available from 1975 to present.

4.1.2.1 Seasonal Variability

The Cameron River hydrometric station, located immediately downstream of Reid Lake, exhibits the characteristics expected of an attenuated watershed of this latitude. Seasonal flow patterns are characterized by distinct but relatively low fluctuations in annual flow. Freshet typically occurs in late-June, with flows reaching a median freshet flow of 8.4 m³/s, and gradually recedes throughout the remainder of summer and winter before achieving its typical annual low flow of 2.6 m³/s by mid-April. Figure 6 depicts the annual seasonal dynamics.

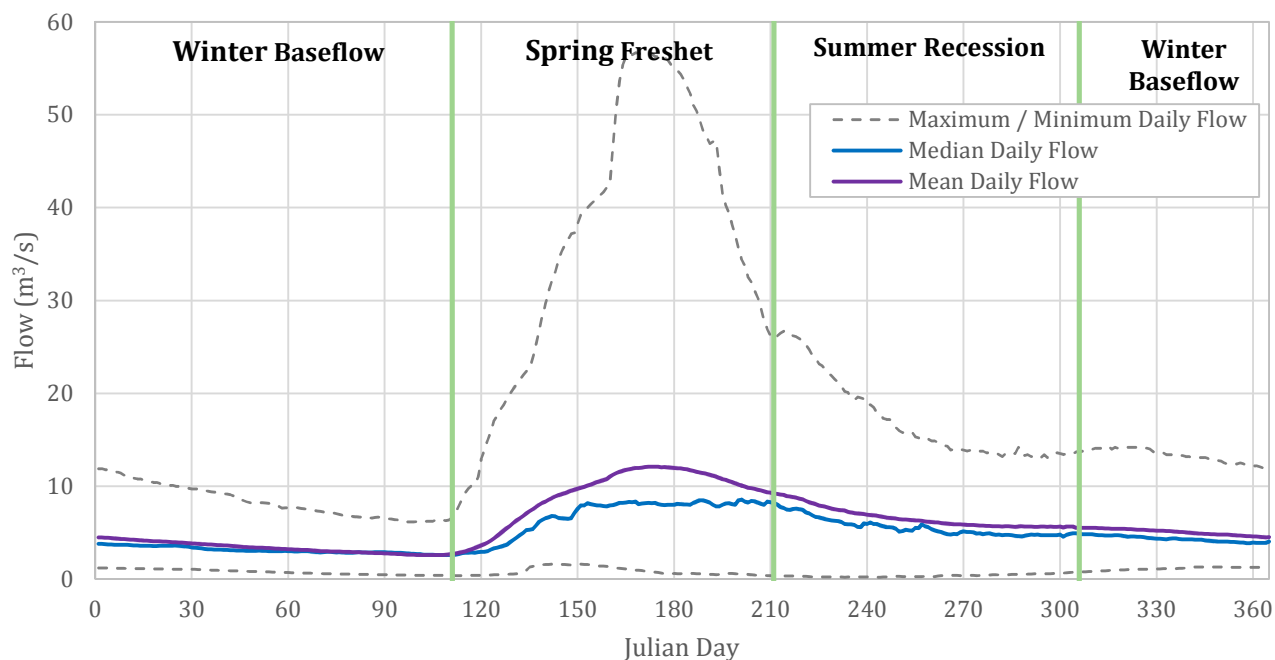


Figure 6: Maximum, Minimum, Mean, and Median Seasonal Flow Dynamics for Cameron River below Reid Lake

Hydrologic seasons for the Cameron River were assessed visually. They are:

- Spring Freshet: April 21st to July 29th;
- Summer Recession: July 30th to November 1st; and

- Winter Base flow: November 2nd to April 20th.

4.1.2.2 Trend Analysis

Temporal trends for each hydrological parameter of the Cameron River were evaluated through the use of a Mann-Kendall trend test. Table 4.1.2.2 presents the significance of any trends detected by these tests and clarification on trend direction (parameter increasing/decreasing). Graphical representations of each time-series are presented in Appendix J.

Table 4.1.2.2: Results of Mann-Kendall Trends Analysis of Streamflow Data for the Cameron River Watershed (p-values and trend direction)

Parameter	Cameron River below Reid Lake			
	Period-of-Record (1975 – 2015)		Last Decade (2006 – 2015)	
Annual Flow (Hydrologic Year: November 2 nd – November 1 st)				
Mean Flow	NS	-	0.005	Decreasing
Median Flow	NS	-	0.005	Decreasing
Annual Max Flow	NS	-	0.002	Decreasing
Annual Min Flow	0.036	Increasing	0.003	Decreasing
Seasonal Flow				
Spring Freshet (Apr 21 – Jul 29)	NS	-	0.005	Decreasing
Summer Recession (Jul 30 – Nov 1)	NS	-	0.009	Decreasing
Winter Base flow (Nov 2 – Apr 20)	NS	-	0.025	Decreasing
Monthly Median Flow				
January	NS	-	0.025	Decreasing
February	NS	-	0.009	Decreasing
March	NS	-	0.002	Decreasing
April	NS	-	0.002	Decreasing
May	NS	-	0.005	Decreasing
June	NS	-	0.002	Decreasing
July	NS	-	0.029	Decreasing
August	NS	-	0.017	Decreasing
September	NS	-	0.039	Decreasing
October	NS	-	0.029	Decreasing
November	NS	-	0.017	Decreasing
December	NS	-	0.029	Decreasing
Significance Classification: Not Significant (NS): $p > 0.05$ Marginally Significant: $0.005 < p \leq 0.05$ Moderately Significant: $0.001 < p \leq 0.005$ Highly Significant: $0.0001 < p \leq 0.001$ Very Highly Significant: $0.0001 < p \leq 0.001$				

While there have been no significant trends for any hydrological parameter over the entire period of record (barring a marginally significant trend in Annual Minimum Flow), there has been highly significant trends in multiple hydrological parameters over the last decade. As evidenced in the graphs presented in Appendix J, each of the 19 hydrometric parameters is trending in a downwards (decreasing) direction with the most noticeable reductions in flow occurring with the annual maximum during the spring freshet.

4.1.3 Hay River (near Hay River)

The Hay River near Hay River hydrometric station is located 18 km upstream from the mouth at Great Slave Lake. The station gauges a watershed area of 51,700 km² and has daily flow data available from 1964 to present.

4.1.3.1 Seasonal Variability

The Hay River hydrometric station, exhibits strong seasonal trends characterized by extended periods of baseflow extending into mid-April culminated with an abrupt transition to spring freshet. Post winter break-up, it typically takes only three to four weeks for freshet flows to reach their peak in early to mid May. Freshet subsides quickly into a long period of summer recession, entering winter baseflow conditions by early November. Figure 5 depicts seasonal flow dynamics.

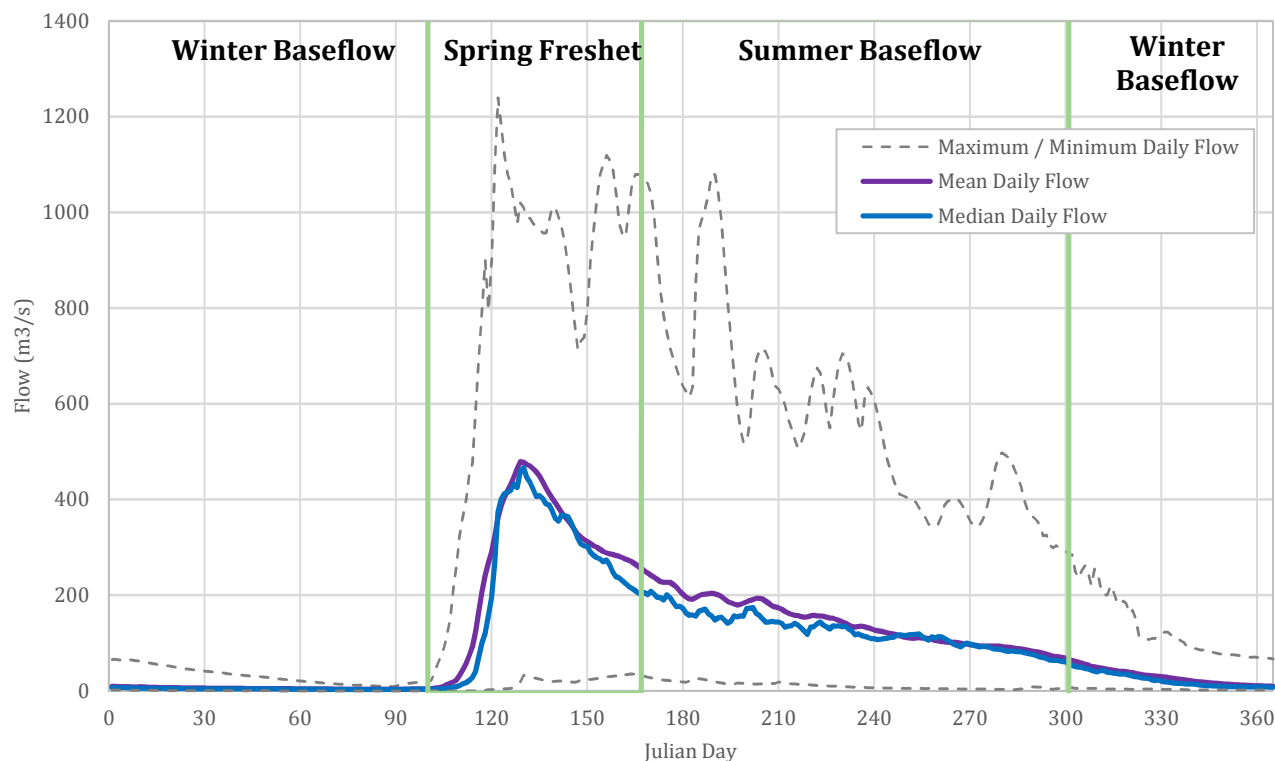


Figure 7: Maximum, Minimum, Mean, and Median Seasonal Flow Dynamics for Hay River near Hay River

Seasons for the Hay River were determined visually from the above graph as follows:

- Spring Freshet: April 10th to June 15th;
- Summer Recession: June 16th to October 27th; and
- Winter Base flow: October 28th to April 9th.

4.1.3.2 Trend Analysis

Temporal trends for each hydrological parameter of the Hay River were evaluated through the use of a Mann-Kendall trend test. Table 4.1.3.2 presents the significance of any trends detected by these tests and clarification on trend direction (parameter increasing/decreasing). Graphical representations of each time-series have been presented in Appendix J.

Table 4.1.3.2: Results of Mann-Kendall Trends Analysis of Streamflow Data for the Hay River Watershed (p-values and trend direction)

Parameter	Hay River near Hay River			
	Period-of-Record (1964 – 2015)		Last Decade (2006 – 2015)	
Annual Flow (Hydrologic Year: October 28 th – October 27 th)				
Mean Flow	NS	-	0.012	Decreasing
Median Flow	NS	-	NS	-
Annual Max Flow	NS	-	NS	-
Annual Min Flow	0.00013	Increasing	NS	-
Seasonal Flow				
Spring Freshet (Apr 10 – Jun 15)	NS	-	NS	-
Summer Recession (Jun 16 –Oct 27)	NS	-	0.020	Decreasing
Winter Base flow (Oct 28 – Apr 9)	0.00035	Increasing	NS	-
Monthly Median Flow				
January	0.00045	Increasing	NS	-
February	< 0.001	Increasing	NS	-
March	< 0.001	Increasing	NS	-
April	0.013	Increasing	NS	-
May	NS	-	NS	-
June	NS	-	NS	-
July	NS	-	0.020	Decreasing
August	NS	-	NS	-
September	NS	-	NS	-
October	NS	-	NS	-
November	0.031	Increasing	NS	-
December	0.006	Increasing	NS	-
Significance Classification:: Not Significant (NS): p > 0.05 Marginally Significant: 0.005 < p ≤ 0.05 Moderately Significant: 0.001 < p ≤ 0.005 Highly Significant: 0.0001 < p ≤ 0.001 Very Highly Significant: 0.0001 < p ≤ 0.001				

Over the forty-one year period of record, noticeable upward trends are occurring in each of the six winter months while flow rates remain largely unchanged during the remainder of the year. However, in recent years, a slight downward trend in summertime flows, particularly in July, has been observable. No other major trends were apparent in the data.

4.1.4 Kakisa River (at Outlet of Kakisa Lake)

The Kakisa River at Outlet of Kakisa Lake hydrometric station is located adjacent to the community of Kakisa at the outlet of Kakisa Lake (Lake Area of 330 km²). It is 24 km upstream of its confluence with the Mackenzie River which is immediately downstream of Great Slave Lake. The station gauges a watershed area of 15,600 km² and has daily flow data available from 1964 to 1990 and 2014 to present.

4.1.4.1 Seasonal Variability

Flows at the Kakisa River hydrometric station reflect that of an attenuated northern watershed. Winter breakup typically occurs towards the end of April with freshet flows typically reaching their median peak of 107 m³/s in mid-June. Freshet recession from the lake takes place over approximately six weeks, at which point a steady summer recession begins and progresses until the system enters winter baseflow conditions by early-November. Figure 8 depicts these annual seasonal dynamics through maximum, minimum, median, and mean daily flows.

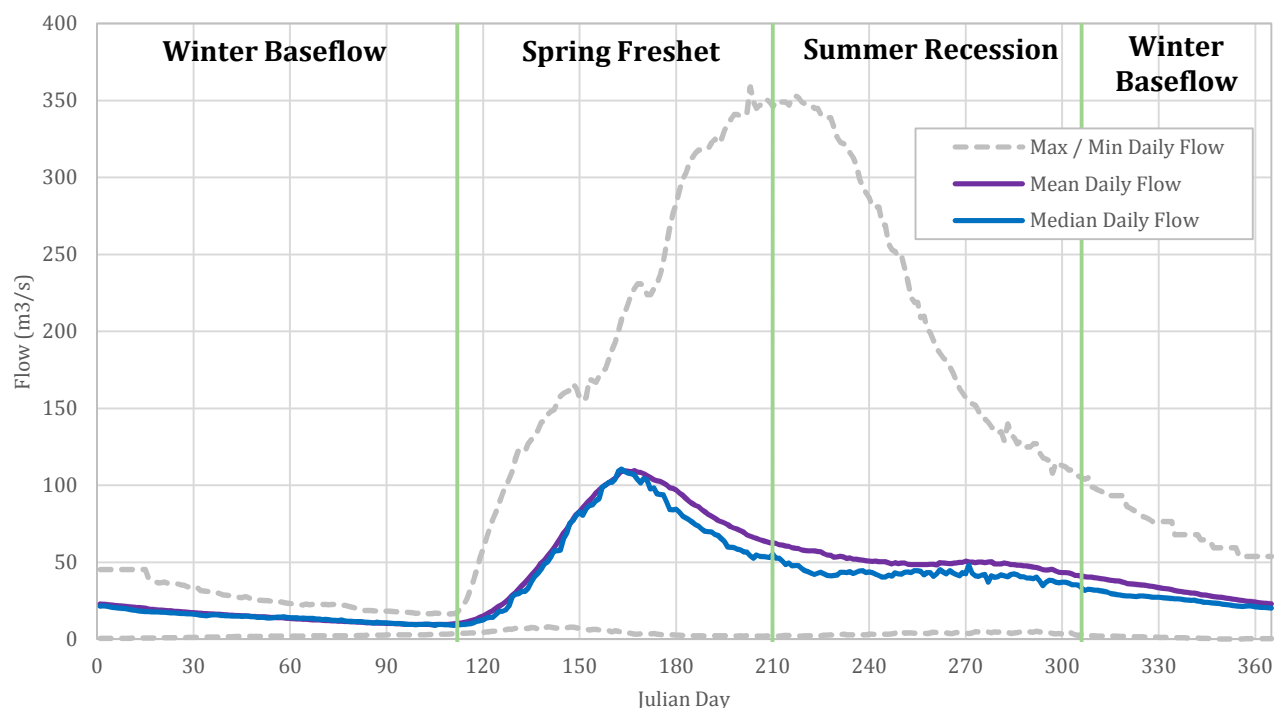


Figure 8: Maximum, Minimum, Mean, and Median Seasonal Flow Dynamics for Kakisa River at Outlet of Kakisa Lake

Hydrologic seasons for the Kakisa River were determined visually and are as follows:

- Spring Freshet: April 22nd to July 28th;
- Summer Recession: July 29th to November 1st; and
- Winter Base flow: November 2nd to April 21st.

4.1.4.2 Trend Analysis

Temporal trends for each hydrological parameter of the Kakisa River were evaluated through the use of a Mann-Kendall trend test. Table 4.1.4.2 presents the significance of any trends detected by these tests and clarification on trend direction (parameter increasing/decreasing). Graphical representations of each time-series are presented in Appendix J.

Table 4.1.4.2: Results of Mann-Kendall Trends Analysis of Streamflow Data for the Kakisa River Watershed (p-values and trend direction)

Parameter	Kakisa River at Outlet of Kakisa Lake			
	Period-of-Record (1964 – 2015)		Last Decade (2006 – 2015)	
Annual Flow (Hydrologic Year: November 2 nd to November 1 st)				
Mean Flow	NS	-	n/a	-
Median Flow	NS	-	n/a	-
Annual Max Flow	NS	-	n/a	-
Annual Min Flow	NS	-	n/a	-
Seasonal Flow				
Spring Freshet (Apr 22 – Jul 28)	NS	-	n/a	-
Summer Recession (Jul 29 – Nov 1)	NS	-	n/a	-
Winter Base flow (Nov 2 – Apr 21)	NS	-	n/a	-
Monthly Median Flow				
January	NS	-	n/a	-
February	NS	-	n/a	-
March	NS	-	n/a	-
April	NS	-	n/a	-
May	NS	-	n/a	-
June	NS	-	n/a	-
July	NS	-	n/a	-
August	NS	-	n/a	-
September	NS	-	n/a	-
October	NS	-	n/a	-
November	NS	-	n/a	-
December	NS	-	n/a	-
Significance Classification:: Not Significant (NS): p > 0.05 Marginally Significant: 0.005 < p ≤ 0.05 Moderately Significant: 0.001 < p ≤ 0.005 Highly Significant: 0.0001 < p ≤ 0.001 Very Highly Significant: 0.0001 < p ≤ 0.001				

No trends were detected in the period-of-record dataset. Analysis 2000-2014 was not possible since the hydrometric station was decommissioned during this period, and reinstalled in 2014.

4.1.5 Little Buffalo River (below Highway No. 5)

The Little Buffalo River below Highway No. 5 hydrometric station is located 5 km north of the Alberta-Northwest Territories on the eastern boarder of Wood Buffalo National Park. It located approximately 170 km upstream from the mouth at Great Slave Lake, entering the lake at Resolution Bay. The station gauges a watershed area of 3,330 km² and has complete daily flow data available from 1985, and 1989 to 1994.

4.1.5.1 Seasonal Variability

The Little Buffalo River hydrometric station, exhibits strong seasonal trends characterized by extended periods of baseflow extending into early-April culminated with an abrupt transition to spring freshet. Post winter break-up, it typically takes only three to four weeks for freshet flows to reach their peak in late-April. Freshet subsides over a period of six weeks and enters into a long period of summer recession. Winter baseflow conditions are typically observed starting in mid-November and can reach complete a completely frozen state. Figure 9 depicts seasonal flow dynamics.

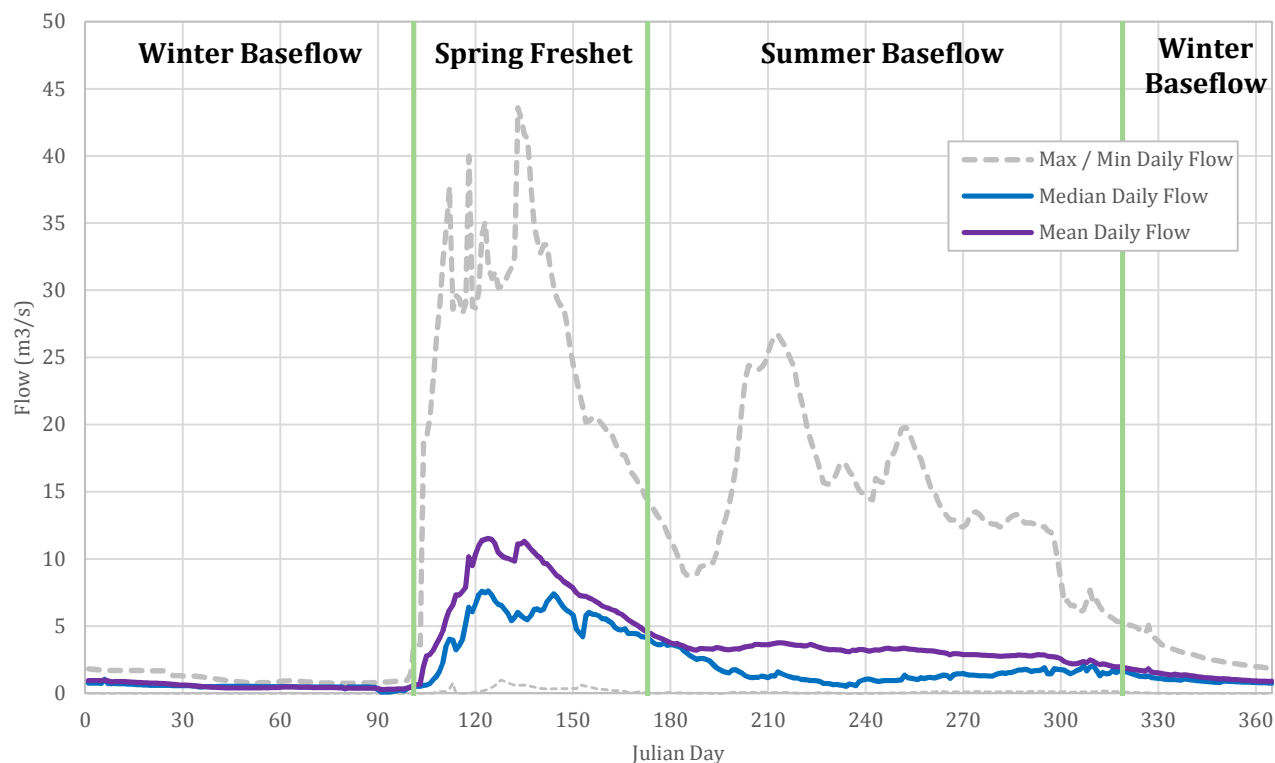


Figure 9: Maximum, Minimum, Mean, and Median Seasonal Flow Dynamics for Little Buffalo River below Highway No. 5

Seasons for the Little Buffalo River were determined visually from the above graph as follows:

- Spring Freshet: April 11th to June 21st;
- Summer Recession: June 22nd to November 14th; and
- Winter Base flow: November 15th to April 10th.

4.1.5.2 Trend Analysis

Temporal trends for each hydrological parameter of the Little Buffalo River were evaluated through the use of a Mann-Kendall trend test. Table 4.1.5.2 presents the significance of any trends detected by these tests and clarification on trend direction (parameter increasing/decreasing). Graphical representations of each time-series have been presented in Appendix J.

Table 4.1.5.2: Results of Mann-Kendall Trends Analysis of Streamflow Data for the Little Buffalo River Watershed (p-values and trend direction)

Parameter	Little Buffalo River below Highway No. 5			
	Period-of-Record (1985 - 1994)		Last Decade (2006 – 2015)	
Annual Flow (Hydrologic Year: November 15 th to November 14 th)				
Mean Flow	NS	-	n/a	-
Median Flow	NS	-	n/a	-
Annual Max Flow	NS	-	n/a	-
Annual Min Flow	NS	-	n/a	-
Seasonal Flow				
Spring Freshet (Apr 11 – Jun 21)	NS	-	n/a	-
Summer Recession (Jun 22 –Nov 14)	NS	-	n/a	-
Winter Base flow (Nov 15 – Apr 10)	NS	-	n/a	-
Monthly Median Flow				
January	NS	-	n/a	-
February	NS	-	n/a	-
March	NS	-	n/a	-
April	NS	-	n/a	-
May	NS	-	n/a	-
June	NS	-	n/a	-
July	NS	-	n/a	-
August	NS	-	n/a	-
September	NS	-	n/a	-
October	NS	-	n/a	-
November	NS	-	n/a	-
December	NS	-	n/a	-
Significance Classification:: Not Significant (NS): p > 0.05 Marginally Significant: 0.005 < p ≤ 0.05 Moderately Significant: 0.001 < p ≤ 0.005 Highly Significant: 0.0001 < p ≤ 0.001 Very Highly Significant: 0.0001 < p ≤ 0.001				

No trends were detectable in the period-of-record dataset; however, this should be largely attributed to the small sample size (seven years) of available data. No analysis of the last decade was possible as the station has been inactive since 1994.

4.1.6 Lockhart River (at Outlet of Artillery Lake)

The Lockhart River at Outlet of Artillery Lake (Lake Area of 500 km²) hydrometric station is located 29 km upstream from the mouth at Great Slave Lake. This station gauges the northernmost watershed included within this study. The station gauges a watershed area of 26,600 km² and has daily flow data available from 1946 to 1948 and 1968 to present.

4.1.6.1 Seasonal Variability

The Lockhart River hydrometric station, located immediately downstream of Artillery Lake exhibits the characteristics expected of an attenuated watershed of this latitude. Seasonal flow patterns are characterized by distinct but relatively low fluctuations in annual flow rate. Peak freshet typically occurs towards the end of August, with flows reaching a median freshet flow rate of 157 m³/s, and gradually recedes throughout the remainder of summer and winter before achieving its typical annual low flow rate of 82 m³/s by early-May. Figure 10 depicts these annual seasonal dynamics through maximum, minimum, median, and mean daily flows.

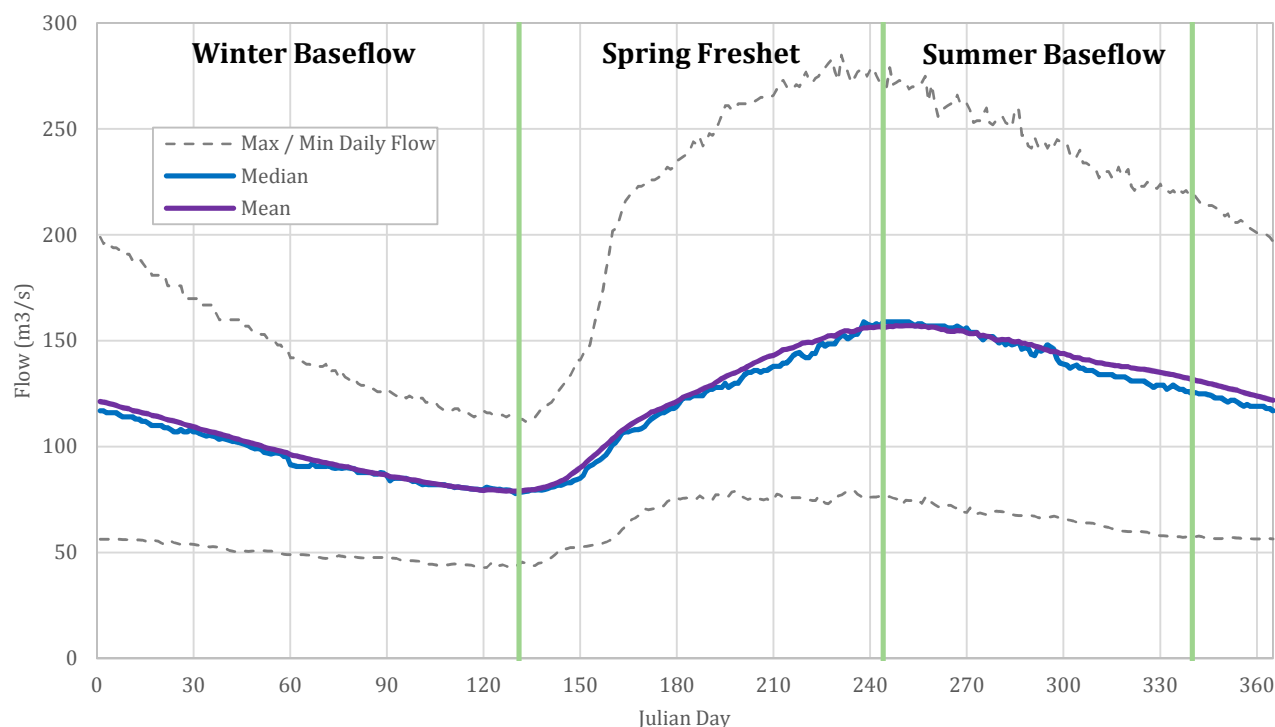


Figure 10: Maximum, Minimum, Mean, and Median Seasonal Flow Dynamics for Lockhart River at Outlet of Artillery Lake

Seasons for the Lockhart River were determined visually from the above graph as follows:

- Spring Freshet: May 11th to August 31st;
- Summer Recession: September 1st to December 5th; and
- Winter Base flow: December 6th to May 10th.

4.1.6.2 Trend Analysis

Temporal trends for each hydrological parameter of the Lockhart River were evaluated through the use of a Mann-Kendall trend test. Table 4.1.6.2 presents the significance of any trends detected by these tests and clarification on trend direction (parameter increasing/decreasing). Graphical representations of each time-series have been presented in Appendix J.

Table 4.1.6.2: Results of Mann-Kendall Trends Analysis of Streamflow Data for the Lockhart River Watershed (p-values and trend direction)

Parameter	Lockhart River at Outlet of Artillery Lake			
	Period-of-Record (1946 – 2015)		Last Decade (2006 – 2015)	
Annual Flow (Hydrologic Year: December 6 th – December 5 th)				
Mean Flow	NS	-	0.020	Decreasing
Median Flow	NS	-	0.002	Decreasing
Annual Max Flow	NS	-	NS	-
Annual Min Flow	NS	-	0.007	Decreasing
Seasonal Flow				
Spring Freshet (May 11 – Aug 31)	NS	-	NS	-
Summer Recession (Sept 1 – Dec 5)	NS	-	NS	-
Winter Base flow (Dec 6 – May 10)	NS	-	0.004	Decreasing
Monthly Median Flow				
January	NS	-	0.004	Decreasing
February	NS	-	0.004	Decreasing
March	NS	-	0.004	Decreasing
April	NS	-	0.007	Decreasing
May	NS	-	0.007	Decreasing
June	NS	-	0.049	Decreasing
July	NS	-	0.039	Decreasing
August	NS	-	NS	-
September	NS	-	NS	-
October	NS	-	NS	-
November	NS	-	NS	-
December	NS	-	0.004	Decreasing
Significance Classification: Not Significant (NS): $p > 0.05$ Marginally Significant: $0.005 < p \leq 0.05$ Moderately Significant: $0.001 < p \leq 0.005$ Highly Significant: $0.0001 < p \leq 0.001$ Very Highly Significant: $0.0001 < p \leq 0.001$				

No observable trends were present within the entire period-of-record (51 years of data). This is in agreement with an evaluation of hydrological trends on the Lockhart River completed in 2015 by Stantec (Stantec 2015). However, over the last decade, marginally and moderately significant detectable downward trends in flow rate are apparent in the months of December through July. No apparent trends in flow rate were observed during the months with the

highest flow rates (August through November). The downward trend in flows of December through July over the last decade has only developed recently as no trends were observed in Stantec's evaluation of Lockhart flow data over the decade of 2003 – 2013 (Stantec 2015).

4.1.7 Slave River (at Fitzgerald)

The Slave River at Fitzgerald hydrometric station is located immediately downstream of the community of Fitzgerald in the Province of Alberta. It is 300 km upstream from the mouth at Great Slave Lake and drains a watershed which includes portions of north-eastern British Columbia, north-western Saskatchewan, and the majority of Northern Alberta. The station gauges a total watershed area of 606,000 km² and has daily flow data available from 1960 to present.

A 73,100 km² portion of the Slave's watershed is regulated by the Bennett Dam on the Peace River in British Columbia. Construction of the Bennett Dam was completed in 1967, at which time filling of the reservoir took place until early-1971 (Sanderson et al 2012). The flow contribution from the Peace River to the Slave River is expected to be low over this period of time. Since 1971, outflows from the Bennett Dam have been regulated by BC Hydro.

4.1.7.1 Seasonal Variability

The Slave River hydrometric station's seasonal flow patterns are characterized by distinct but relatively low fluctuations in annual flow rate. Freshet typically begins in early-April, with flows reaching a median freshet flow rate of 5,500 m³/s by mid-June. Flows gradually recede throughout the remainder of summer and winter before achieving its typical annual low flow rate of 2,000 m³/s by late-March. Figure 11 depicts these annual seasonal dynamics through maximum, minimum, median, and mean daily flows.

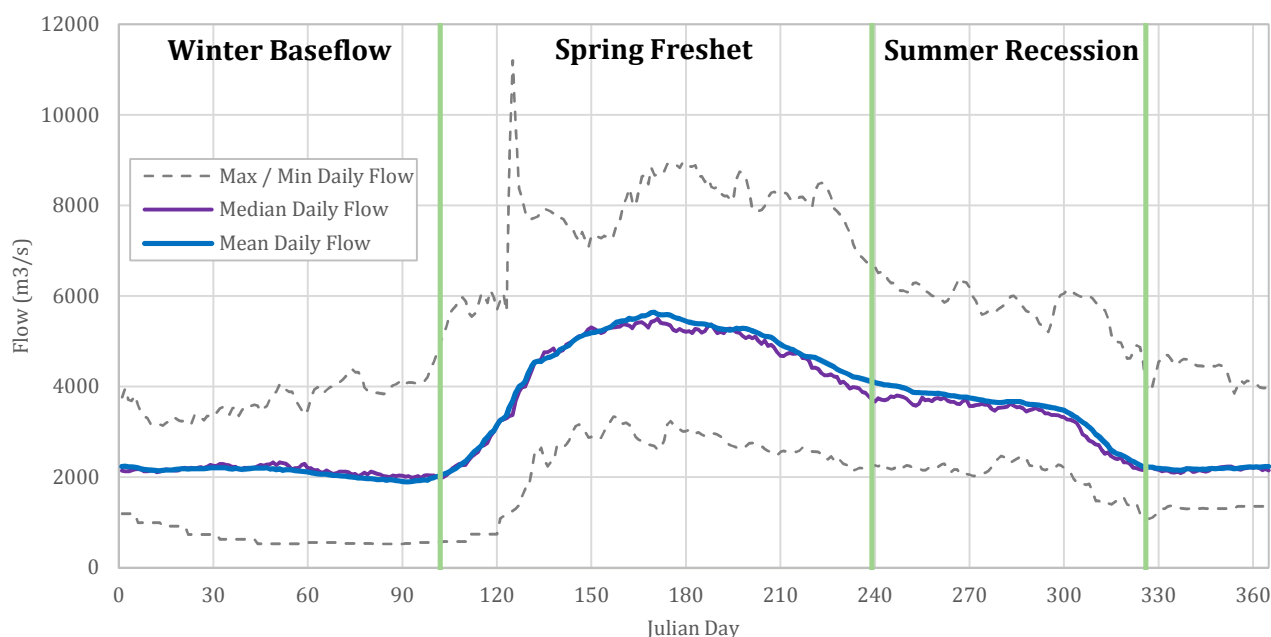


Figure 11: Maximum, Minimum, Mean, and Median Seasonal Flow Dynamics for Slave River at Fitzgerald

Seasons for the Slave River were determined visually from the above graph as follows:

- Spring Freshet: April 12th to August 26th;
- Summer Recession: August 27th to November 21st; and

- Winter Base flow: November 22nd to April 11th.

4.1.7.2 Trend Analysis

Temporal trends for each hydrological parameter of the Slave River were evaluated through the use of a Mann-Kendall trend test. Table 4.1.7.2 presents the significance of any trends detected by these tests and clarification on trend direction (parameter increasing/decreasing). Graphical representations of each time-series have been presented in Appendix J.

Table 4.1.7.2: Results of Mann-Kendall Trends Analysis of Streamflow Data for the Slave River Watershed (p-values and trend direction)

Parameter	Slave River at Fitzgerald			
	Period-of-Record (1946 – 2015)		Last Decade (2006 – 2015)	
Annual Flow (Hydrologic Year: November 22 nd to November 21 st)				
Mean Flow	0.023	Decreasing	NS	-
Median Flow	NS	-	NS	-
Annual Max Flow	< 0.0001	Decreasing	NS	-
Annual Min Flow	0.033	Increasing	NS	-
Seasonal Flow				
Spring Freshet (Apr 12 – Aug 26)	0.0002	Decreasing-	NS	-
Summer Recession (Aug 27 – Nov 21)	< 0.0001	Decreasing	NS	-
Winter Base flow (Nov 22 – Apr 11)	0.005	Increasing-	NS	-
Monthly Median Flow				
January	0.004	Increasing	NS	-
February	< 0.0001	Increasing	NS	-
March	< 0.0001	Increasing	NS	-
April	0.0001	Increasing	NS	-
May	NS	-	NS	-
June	0.0002	Decreasing-	NS	-
July	0.0002	Decreasing-	NS	-
August	0.0003	Decreasing-	NS	-
September	< 0.0001	Decreasing	NS	-
October	< 0.0001	Decreasing	NS	-
November	NS	-	NS	-
December	0.002	Increasing	NS	-
Significance Classification:: Not Significant (NS): p > 0.05 Marginally Significant: 0.005 < p ≤ 0.05 Moderately Significant: 0.001 < p ≤ 0.005 Highly Significant: 0.0001 < p ≤ 0.001 Very Highly Significant: 0.0001 < p ≤ 0.001				

The period-of-record dataset for the Slave River presents highly significant seasonal trends in flow rate. Over the past 60 years, winter baseflows have been steadily increasing while freshet and summer flows have been decreasing, lowering the overall seasonal variation of the watershed. No trends were observable in the transition months of May and November. These historical trends align with the results of a 2012 study of the Slave watershed “Water and Suspended Sediment Quality of the Transboundary Reach of the Slave River, NWT” (Sanderson et al. 2012). However, these long-term trends may have since ceased as no trends were detectable in data collected over the last decade.

4.1.8 Snowdrift River (at Outlet of Siltaza Lake)

The Snowdrift River at Outlet of Siltaza Lake hydrometric station is located 50 km southeast of the community of Lutselk’e, and is 60 km upstream from the mouth at Great Slave Lake. Siltaza Lake itself is small, with a Lake Area of 28 km². The station gauges a watershed area of 9,110 km² and has daily flow data available from 1977 to 1989.

4.1.8.1 Seasonal Variability

The Snowdrift River hydrometric station, exhibits strong seasonal trends characterized by extended periods of baseflow extending into early-May culminated with six week transition to peak freshet. Freshet subsides gradually into a long period of summer recession, entering winter baseflow conditions by early November. Figure 12 depicts seasonal flow dynamics.

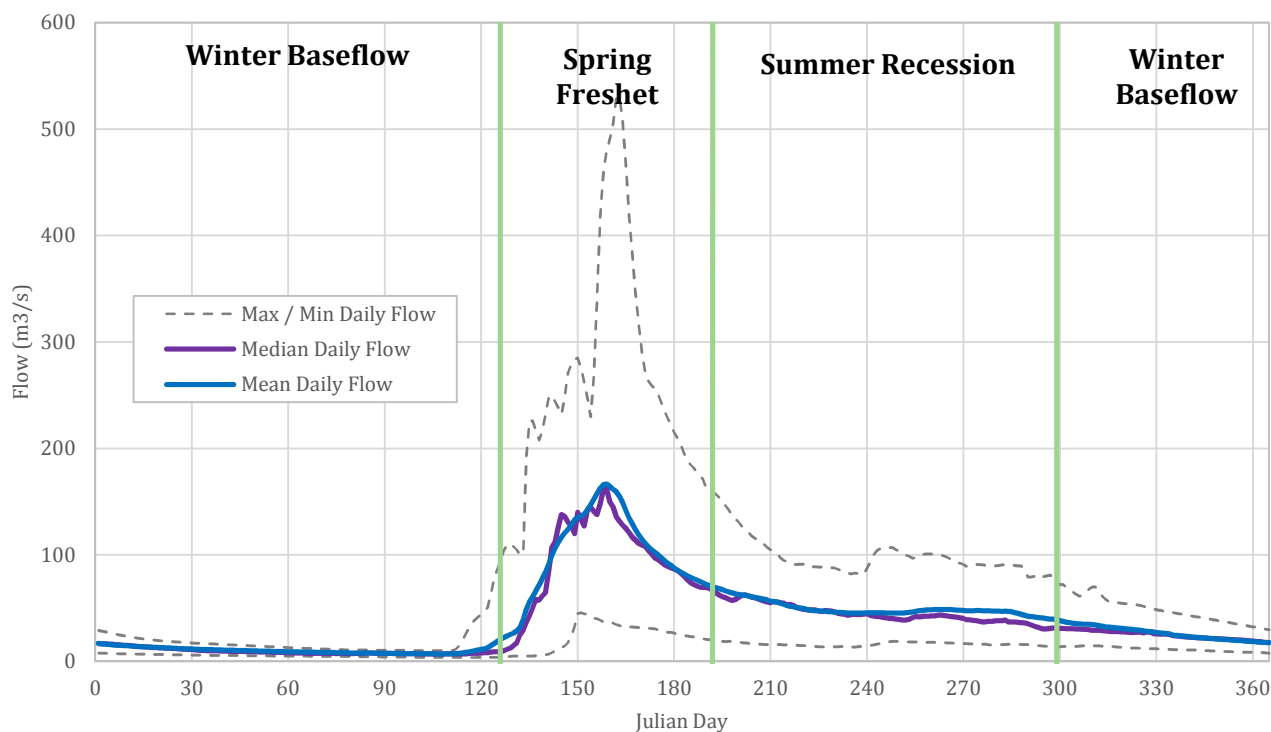


Figure 12: Maximum, Minimum, Mean, and Median Seasonal Flow Dynamics for Snowdrift River at Outlet of Siltaza Lake

Seasons for the Snowdrift River were determined visually from the above graph as follows:

- Spring Freshet: May 6th to July 10th;
- Summer Recession: July 11th to October 25th; and

- Winter Base flow: October 26th to May 5th.

4.1.8.2 Trend Analysis

Temporal trends for each hydrological parameter of the Snowdrift River were evaluated through the use of a Mann-Kendall trend test. Table 4.1.8.2 presents the significance of any trends detected by these tests and clarification on trend direction (parameter increasing/decreasing). Graphical representations of each time-series have been presented in Appendix J.

Table 4.1.8.2: Results of Mann-Kendall Trends Analysis of Streamflow Data for the Snowdrift River Watershed (p-values and trend direction)

Parameter	Snowdrift River at Outlet of Siltaza Lake			
	Period-of-Record (1977 – 1989)		Last Decade (2006 – 2015)	
Annual Flow (Hydrologic Year: October 26 th to October 25 th)				
Mean Flow	0.033	Increasing	n/a	-
Median Flow	0.014	Increasing	n/a	-
Annual Max Flow	NS	-	n/a	-
Annual Min Flow	0.012	Increasing	n/a	-
Seasonal Flow				
Spring Freshet (May 6 – Jul 10)	NS	-	n/a	-
Summer Recession (Jul 11 – Oct 25)	0.033	Increasing	n/a	-
Winter Base flow (Oct 26 – May 6)	NS	-	n/a	-
Monthly Median Flow				
January	NS	-	n/a	-
February	0.033	Increasing	n/a	-
March	0.033	Increasing	n/a	-
April	0.033	Increasing	n/a	-
May	NS	-	n/a	-
June	NS	-	n/a	-
July	0.044	Increasing	n/a	-
August	0.024	Increasing	n/a	-
September	0.033	Increasing	n/a	-
October	NS	-	n/a	-
November	NS	-	n/a	-
December	NS	-	n/a	-
Significance Classification:: Not Significant (NS): p > 0.05 Marginally Significant: 0.005 < p ≤ 0.05 Moderately Significant: 0.001 < p ≤ 0.005 Highly Significant: 0.0001 < p ≤ 0.001 Very Highly Significant: 0.0001 < p ≤ 0.001				

Over the 13 year period-of-record, marginally significant trends are present in both the baseflows of late-winter and the flow rates during summer recession. In both cases flow rates were trending higher into the year 1989. Unfortunately no flow record exist past 1990 so it is unknown whether these trends continued, or if any other significant annual trends have developed over the past 27 years.

4.1.9 Taltson River (at Outlet of Tsu Lake and below Hydro Dam)

The Taltson River has two hydrometric stations which were used in this study, Taltson River at Outlet of Tsu Lake (1952 – 1997), and Taltson River below Hydro Dam (1995 – present). The gauges are separated by 30 km but generally drain the same watershed area. From the lower station at the outlet of Tsu Lake, the Taltson meanders for approximately 150 km before reaching the mouth at Great Slave Lake. The stations gauge a watershed area of 58,700 km² and have daily flow data available from 1953 and 1964 to present.

4.1.9.1 Seasonal Variability

The Taltson River hydrometric stations, exhibits the characteristics expected of an attenuated watershed of this latitude. Seasonal flow patterns are characterized by distinct but relatively low fluctuations in annual flow rate. Freshet typically occurs in early-July, with flows reaching a median freshet flow rate of 240 m³/s, and gradually recedes throughout the remainder of summer and winter before achieving its typical annual low flow rate of 100 m³/s by mid-April. Figure 13 depicts these annual seasonal dynamics through maximum, minimum, median, and mean daily flows.

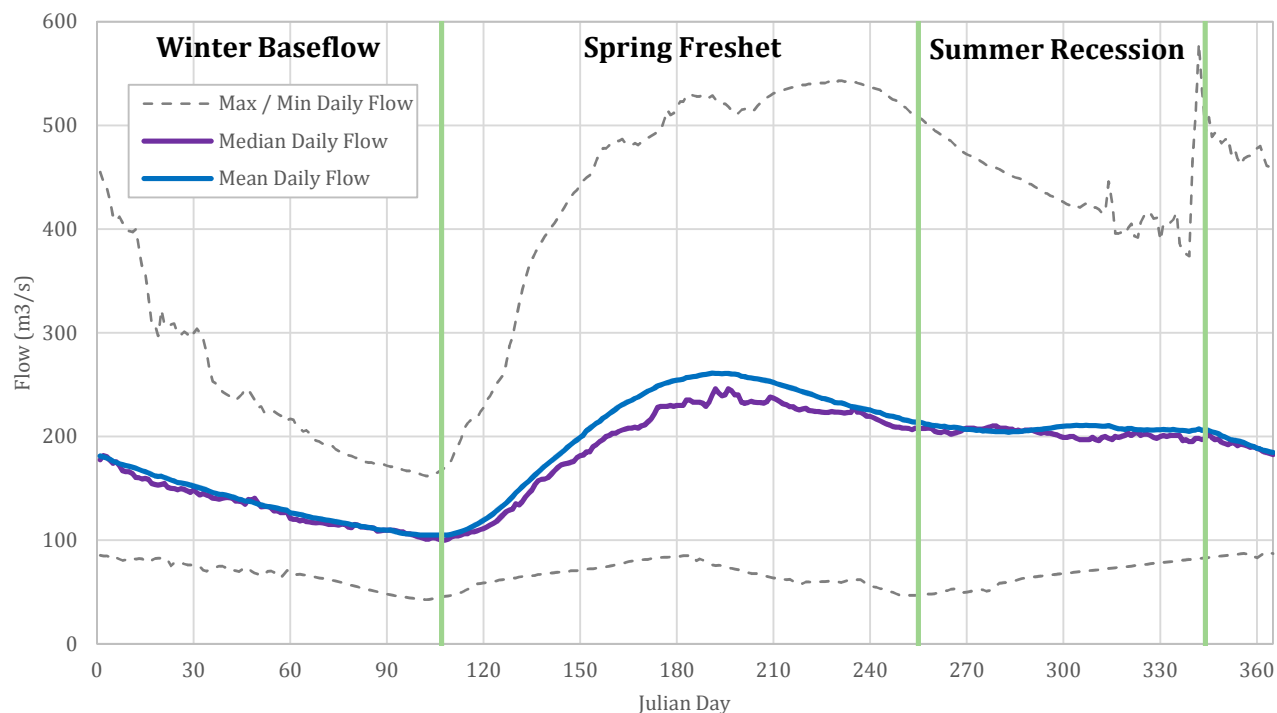


Figure 13: Maximum, Minimum, Mean, and Median Seasonal Flow Dynamics for Taltson River at Outlet of Tsu Lake and Taltson River below Hydro Dam

Seasons for the Taltson River were determined visually from the above graph as follows:

- Spring Freshet: April 17th to September 11th;
- Summer Recession: September 12th to December 9th; and

- Winter Base flow: December 10th to April 16th.

4.1.9.2 Trend Analysis

Temporal trends for each hydrological parameter of the Talston River were evaluated through the use of a Mann-Kendall trend test. Table 4.1.9.2 presents the significance of any trends detected by these tests and clarification on trend direction (parameter increasing/decreasing). Graphical representations of each time-series have been presented in Appendix J.

Table 4.1.9.2: Results of Mann-Kendall Trends Analysis of Streamflow Data for the Talston River Watershed (p-values and trend direction)

Parameter	Talston River at Outlet of Tsu Lake and Taltson River below Hydro Dam			
	Period-of-Record (1953 – 2015)		Last Decade (2006 – 2015)	
Annual Flow (Hydrologic Year: December 10 th to December 9 th)				
Mean Flow	NS	-	NS	-
Median Flow	NS	-	NS	-
Annual Max Flow	NS	-	NS	-
Annual Min Flow	NS	-	NS	-
Seasonal Flow				
Spring Freshet (Apr 17 – Sept 11)	NS	-	NS	-
Summer Recession (Sept 12 – Dec 9)	NS	-	NS	-
Winter Base flow (Dec 10 – Apr 16)	NS	-	NS	-
Monthly Median Flow				
January	NS	-	NS	-
February	NS	-	NS	-
March	NS	-	NS	-
April	NS	-	NS	-
May	NS	-	NS	-
June	NS	-	NS	-
July	NS	-	NS	-
August	NS	-	NS	-
September	NS	-	NS	-
October	NS	-	NS	-
November	NS	-	NS	-
December	NS	-	NS	-
Significance Classification:: Not Significant (NS): p > 0.05 Marginally Significant: 0.005 < p ≤ 0.05 Moderately Significant: 0.001 < p ≤ 0.005 Highly Significant: 0.0001 < p ≤ 0.001 Very Highly Significant: 0.0001 < p ≤ 0.001				

No trends were detectable in the period-of-record dataset nor within the dataset covering the last ten years. This suggests that the flows in the Taltson today remain largely unchanged from fifty years ago.

4.1.10 Tazin River (near the Mouth)

The Tazin River near the Mouth hydrometric station a remote hydrometric station located 58 km northwest of the Alberta/Saskatchewan/NWT border apex. The river itself meanders through lake-pocked bedrock for 60 km until reaching its confluence with the Taltson River. From there, water flows another 190 km in the Taltson to reach the mouth of Great Slave Lake. The Tazin station has a watershed area of 16,530 km², and has daily flow data available from 2007 to present.

4.1.10.1 Seasonal Variability

The Tazin River hydrometric station reflects that of an attenuated northern watershed, with a strong but gradual rise in flow rate over an eight week period in spring and a slow recession in flow rate throughout the summer months. A subsidence into winter baseflow is observed in mid-November, where flow rates continue to diminish appreciably throughout the remainder of winter, reaching annual lows in mid-April.

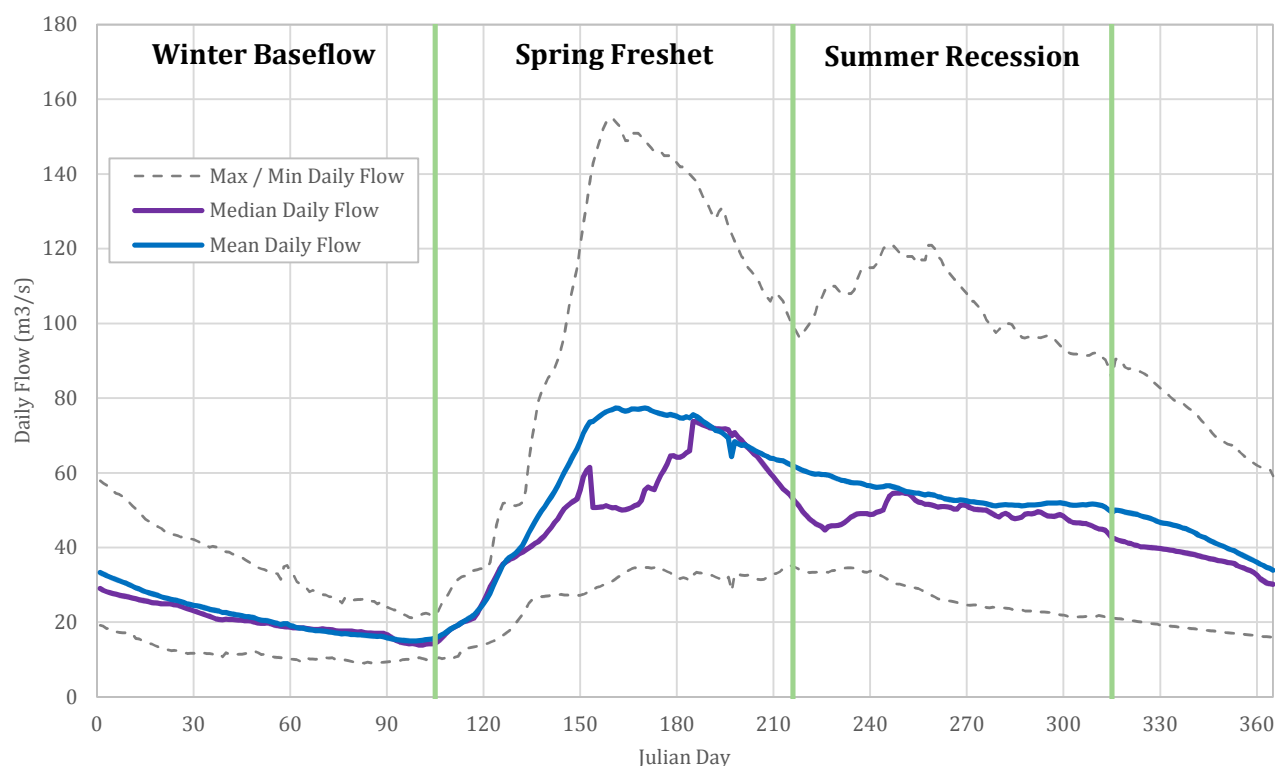


Figure 14: Maximum, Minimum, Mean, and Median Seasonal Flow Dynamics for Tazin River near the Mouth

Seasons for the Tazin River were determined visually from the above graph as follows:

- Spring Freshet: April 15th to August 3rd;
- Summer Recession: August 4th to November 10th; and
- Winter Base flow: November 11th to April 14th.

4.1.10.2 Trend Analysis

Temporal trends for each hydrological parameter of the Tazin River were evaluated through the use of a Mann-Kendall trend test. Table 4.1.10.2 presents the significance of any trends detected by these tests and clarification on trend direction (parameter increasing/decreasing). Graphical representations of each time-series have been presented in Appendix J.

Table 4.1.10.2: Results of Mann-Kendall Trends Analysis of Streamflow Data for the Tazin River Watershed (p-values and trend direction)

Parameter	Tazin River near the Mouth			
	Period-of-Record (2009 - 2015)		Last Decade (2006 – 2015)	
Annual Flow (Hydrologic Year: November 11 th to November 10 th)				
Mean Flow	NS	-	NS	-
Median Flow	NS	-	NS	-
Annual Max Flow	NS	-	NS	-
Annual Min Flow	NS	-	NS	-
Seasonal Flow				
Spring Freshet (Apr 15 – Aug 3)	NS	-	NS	-
Summer Recession (Aug 4 – Nov 10)	NS	-	NS	-
Winter Base flow (Nov 11 – Apr 14)	NS	-	NS	-
Monthly Median Flow				
January	NS	-	NS	-
February	NS	-	NS	-
March	NS	-	NS	-
April	NS	-	NS	-
May	NS	-	NS	-
June	NS	-	NS	-
July	NS	-	NS	-
August	NS	-	NS	-
September	NS	-	NS	-
October	NS	-	NS	-
November	NS	-	NS	-
December	NS	-	NS	-
Significance Classification:: Not Significant (NS): p > 0.05 Marginally Significant: 0.005 < p ≤ 0.05 Moderately Significant: 0.001 < p ≤ 0.005 Highly Significant: 0.0001 < p ≤ 0.001 Very Highly Significant: 0.0001 < p ≤ 0.001				

No trends were detectable in the period-of-record dataset; however, this should be largely attributed to the small sample size (seven years) of available data. No separate analysis was completed for last decade as it the period-of-record all falls within the last ten years.

4.1.11 Yellowknife River (at Outlet of Prosperous Lake)

The Yellowknife River at Outlet of Prosperous Lake hydrometric station is located 10 km north of the city of Yellowknife and also 10 km upstream from the mouth at Great Slave Lake. The station gauges a watershed area of 16,300 km² and has daily flow data available from 1988 to present. In 2012, construction of the Bluefish hydro dam was completed in the headwaters of the Yellowknife River, further attenuating the lake dominated watershed (NTPC 2014).

4.1.11.1 Seasonal Variability

The Yellow River hydrometric station, located immediately downstream of Prosperous Lake, exhibits the characteristics expected of an attenuated watershed of this latitude. Seasonal flow patterns are characterized by distinct but relatively low fluctuations in annual flow rate. Peak freshet typically occurs in early-August, with flows reaching a median freshet flow rate of 45.3 m³/s, and gradually recedes throughout the remainder of summer and winter before achieving its typical annual low flow rate of 19 m³/s by late-April. Figure 15 depicts these annual seasonal dynamics through maximum, minimum, median, and mean daily flows.

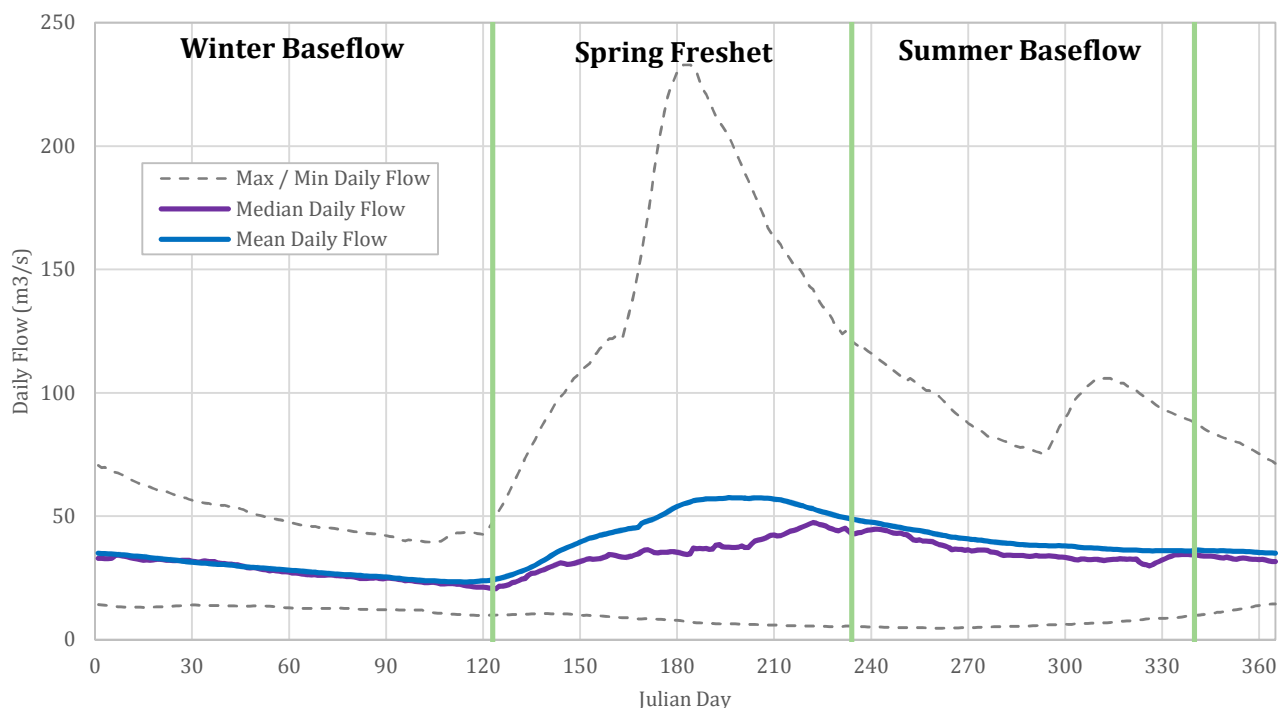


Figure 15: Maximum, Minimum, Mean, and Median Seasonal Flow Dynamics for Yellowknife River at Outlet of Prosperous Lake

Seasons for the Yellowknife River were determined visually from the above graph as follows:

- Spring Freshet: May 3rd to August 21st;
- Summer Recession: August 22nd to December 5th; and
- Winter Base flow: December 6th to May 2nd.

4.1.11.2 Trend Analysis

Temporal trends for each hydrological parameter of the Yellowknife River were evaluated through the use of a Mann-Kendall trend test. Table 4.1.11.2 presents the significance of any trends detected by these tests and clarification on trend direction (parameter increasing/decreasing). Graphical representations of each time-series have been presented in Appendix J.

Table 4.1.11.2: Results of Mann-Kendall Trends Analysis of Streamflow Data for the Yellowknife River Watershed (p-values and trend direction)

Parameter	Yellowknife River at Outlet of Prosperous Lake			
	Period-of-Record (1988 - 2015)		Last Decade (2006 – 2015)	
Annual Flow (Hydrologic Year: December 6 th to December 5 th)				
Mean Flow	NS	-	0.007	Decreasing
Median Flow	NS	-	0.020	Decreasing
Annual Max Flow	0.048	Decreasing	0.003	Decreasing
Annual Min Flow	NS	-	NS	-
Seasonal Flow				
Spring Freshet (May 3 – Aug 21)	NS	-	0.032	Decreasing
Summer Recession (Aug 22 – Dec 5)	NS	-	NS	-
Winter Base flow (Dec 6 – May 2)	NS	-	0.032	Decreasing
Monthly Median Flow				
January	NS	-	0.049	Decreasing
February	NS	-	0.032	Decreasing
March	NS	-	0.032	Decreasing
April	NS	-	0.020	Decreasing
May	NS	-	0.025	Decreasing
June	NS	-	0.020	Decreasing
July	NS	-	0.049	Decreasing
August	NS	-	NS	-
September	NS	-	NS	-
October	NS	-	0.032	Decreasing
November	NS	-	0.032	Decreasing
December	NS	-	0.049	Decreasing
Significance Classification:: Not Significant (NS): p > 0.05 Marginally Significant: 0.005 < p ≤ 0.05 Moderately Significant: 0.001 < p ≤ 0.005 Highly Significant: 0.0001 < p ≤ 0.001 Very Highly Significant: 0.0001 < p ≤ 0.001				

No observable trends were present within the entire period-of-record (28 years of data). However, over the last decade, marginally significant downward trends in flow rate are apparent in the months of October thru July. No apparent trends in flow rate were observed during the months with the highest flow rates (August and September).

4.1.12 Monitoring Program Evaluation

The twelve hydrometric sites across eleven watercourses included in this assessment are well distributed around Great Slave Lake and represent major tributaries to the lake. The assessed watercourses also represent the various geological and ecological zones present surrounding Great Slave Lake. Distribution is adequate to assess spatial variability in flows entering Great Slave Lake.

The monitoring program of WSC is generally adequate. The useable period of record for most WSC hydrometric stations is quite good, especially when considering the hardships that can be incurred while monitoring flow rates on rural northern watersheds.

Data gaps within the Little Buffalo River dataset limit its value for an exercise such as this, but still provide an indication of watershed seasonality. As the Little Buffalo River has a relatively small watershed area (3,330 km²), it is not expected to have a large influence on Great Slave Lake (971,000 km²) and therefore should not be reinstalled for the sake of this study. However, other unrelated benefits, including improvements to: local fishery/environmental permitting, floodplain mapping, and design of local hydraulic structures could be realized with the availability of more hydrometric data for watersheds of this size.

The dataset for Tazin River is also short (7 years), but this hydrometric station is still active and should eventually be of a sufficient length to conduct a meaningful statistical analysis with.

4.2 Water Quality

4.2.1 Guideline Comparison

For each site, all parameters that were analyzed were compared to the CCME FAL (Appendix A), which were updated in 2015. Total exceedances are summarized in Table 4.2.1. As noted in Section 3.2.3, CCME guidelines are developed on a national scale and are not necessarily representative of natural local conditions. Therefore exceedances should be regarded judiciously. Additionally, the guideline comparisons were based on raw data sets that had non-detect values changed to numbers equal to the detection limit (see Section 3.2.2.1) which can skew the apparent number and percentage of guideline exceedances.

Table 4.2.1: Total Number of Exceedances Across All Sites

Analyte	Guideline	Total n	Total # non-detects	Total % non-detects	Total # GE	% GE
pH	6.5 - 9	1645	1	0.06	24	1.46
Chloride	120 mg/L	1634	42	2.57	58	3.55
Fluoride	0.12 mg/L	428	140	32.71	42	9.81
Ammonia as N	0.021 mg/L	1530	660	43.14	382	24.97
Nitrate (as NO ₃ -N)	13 mg/L	300	106	35.33	0	0
Nitrite (as NO ₂ -N)	0.06 mg/L	349	280	80.23	7	2.01
Phosphorus ²	4 µg/L	1474	412	27.95	1388	94.17
Aluminum Total	5 µg/L @ pH < 6.5 100 µg/L @ ≥ 6.5	730	89	12.19	1	0.14
Arsenic	5 µg/L	1109	408	36.79	17	1.53

Table 4.2.1: Total Number of Exceedances Across All Sites

Analyte	Guideline	Total n	Total # non-detects	Total % non-detects	Total # GE	% GE
Boron - soluble	1500 µg/L	80	1	1.25	0	0
Cadmium	0.09 µg/L	1337	1323	b	1037	77.56
Copper	2 µg/L ¹	1562	340	21.77	225	14.40
Iron	300 µg/L	1573	175	11.20	525	33.38
Lead	1 µg/L ¹	1562	780	49.94	45	2.88
Mercury	0.026 µg/L	854	620	72.60	181	21.19
Molybdenum	73 µg/L	721	294	40.78	0	0
Nickel	25 µg/L ¹	1605	350	21.81	0	0
Selenium	1 µg/L	670	620	92.54	181	27.01
Silver	0.25 µg/L	701	578	82.45	124	17.69
Thallium	0.8 µg/L	678	630	92.92	5	0.74
Uranium	15 µg/L	676	87	12.87	0	0
Zinc	30 µg/L	1596	913	57.21	74	4.64

Bold indicates >50%

¹ Guideline is hardness dependent; range given.

² CCME FAL does not directly provide a guideline for phosphorus. Rather, Canadian Guidance Framework for Phosphorus is for developing phosphorus guidelines (does not provide guidance on other freshwater nutrients) for long term concentrations. It provides Trigger Ranges for Total Phosphorus (µg/L):

- ultra-oligotrophic <4 µg/L
- oligotrophic 4-10 µg/L
- mesotrophic 10-20 µg/L
- meso-eutrophic 20-35 µg/L
- eutrophic 35-100 µg/L
- hyper-eutrophic >100 µg/L

A conservative value of 4 µg/L has been applied.

Metals, including aluminum, copper, iron and zinc, exist in various chemical forms in water, depending on numerous characteristics of the water, so they may or may not be toxic to aquatic life depending on the form present (SENEC, 2005). Metal analysis was not speciated and the noted concentrations/exceedances are based on *total* metals.

Guideline exceedances ranged from 0% to almost 94% but were generally less than 25%. Several parameters (pH, chloride, nitrate, aluminum, arsenic, boron, lead, molybdenum, nickel, thallium, uranium and zinc) exceeded guidelines less than 5% of the time. As previously noted, guideline exceedances include non-detect values that were converted to =DL which can affect the reported percentage of exceedances. Because guidelines are scientific estimations of “no effect” levels, they may fall below the laboratory analysis capabilities for some parameters. Nitrite, cadmium, mercury, selenium, silver, thallium and zinc had overall percentages of non-detects greater than 50%. Except for cadmium these parameters also showed a low percentage of guideline exceedances.

Only two parameters had a percentage of guideline exceedances greater than 50%.

Cadmium appeared to have 77.56% of samples exceed CCME FAL guidelines but laboratories often have detection limits lower than the guideline, making it difficult to accurately assess (Sanderson et al, 2012). Since 98.95% of samples were non-detects it is likely that the concentrations of cadmium are not indicative of an issue. Further, CCME (2014b) reports that cadmium levels in the Northwest Territories generally range from <0.1 to 15.4 µg/L (mean = 0.4 µg/L). The mean concentration of cadmium at the WQ sites ranged from 0.057 to 0.44 µg/L which is within the typical range for Northwest Territories watercourses.

Exceedances of *phosphorus* were widespread; 94.17% of all samples had concentrations greater than the guidelines. Only 27.95% of the total phosphorus measurements were recorded as non-detects. Percentage of non-detects at each WQ site varied widely, ranging from 3.45% at Slave River @ Mouth to 59.65% at Lockhart River.

Phosphorus is non-toxic to aquatic organisms at levels and forms present in the environment but its secondary effects, such as eutrophication and oxygen depletion are serious concerns (CCME, 2004). The CCME FAL does not provide a guideline value for phosphorus but rather “trigger ranges” are applied (see Note 2 in Table 4.2.1). Phosphorus is typically the limiting nutrient for algal growth and excessive concentrations can cause eutrophication, which can be problematic. Environment Canada Water Quality Monitoring Networks indicate that several watercourses in the Great Slave Lake watershed are eutrophic to hyper-eutrophic and that both the total and dissolved phosphorus trends are increasing (Environment and Climate Change Canada, 2015). The watercourses reported by Environment Canada Water Quality Monitoring Network also had a typically low dissolved to total phosphorus ratio, indicating that a lower proportion of phosphorus is readily available for uptake by plants (i.e., not bound in sediments). Dissolved phosphorus was not typically analyzed at the WQ sites nor was orthophosphate, the inorganic, biologically available form of phosphorus. However, where it was analyzed, orthophosphate concentrations were typically very low or below detection limits. Therefore, although phosphorus concentrations were high, it is not likely present in bioavailable forms and is not anticipated to contribute to decreased water quality at the WQ sites.

4.2.2 Spatial Variability

Spatial variability of water quality was examined by comparing summary statistics of the AOIs at each WQ site (Appendix C). Total summary statistics (all seasons combined) of each WQ site are provided in Appendix D. Scatterplots (Appendix B) visually depict the concentration distribution of each AOI at each WQ site while box plots (Appendix E) illustrate data dispersion and skewness and display the distribution of minimum and maximum values, median, 25th and 75th percentiles.

Water chemistry characteristics were determined to be commonly similar among the WQ sites located within the same geological province (Table 4.2.2a; Figure 2). In general, the watercourses located within the Interior Platform geological province collectively had the highest median values of an analyte. Salt River most commonly had the highest recorded measurements while the Thelon River WQ site, located within the Churchill Province and most distant to Great Slave Lake, usually had the lowest.

Sedimentary rock, which is softer and more easily weathered, comprises the primary geology of the Interior Platform whereas the igneous and metamorphic rock of the Canadian Shield (Slave and Churchill Provinces) is more resilient to weathering. Notwithstanding other factors, water flowing over soft sedimentary rock will accumulate larger sediment loads and consequently have higher total and dissolved mineral components. Therefore, it is not unexpected that the watercourses within the Interior Platform consistently had higher analyte values.

Table 4.2.2a: Water Quality Sites and Associated Geological Province

Geological Province	Water Quality Site
Interior Platform	Buffalo River Hay River Kakisa River Little Buffalo River Slave River @ Fort Smith Slave River @ Mouth Salt River
Slave Province	Cameron River Great Slave Lake @ Taltheilei Narrows Lockhart River Marian River Yellowknife River
Churchill Province	Snowdrift River Taltson River @ Mouth Taltson River below Nonacho Dam Tazin River Thelon River

Tetra Tech calculated the dissolve fraction percentage of the total metal concentration for each WQ site (Appendix I). Since underlying geology is a principal contributor to both metal concentrations and turbidity, it is reasonable to assume that common geological composition would be a key factor in any apparent trends.

Total metals with <20% dissolved metals were considered to be particulate-dominant. Across all WQ sites, aluminum, iron, manganese and zinc appeared to be dominated by the particulate fraction (i.e., more than 50% of samples were particulate-dominant).

Tetra Tech noted several issues in calculating the dissolved fraction percentage. Because <DL had been converted to =DL it often appears that total and dissolved concentrations are equal (and therefore, dissolved comprises 100% of the total concentration). While this may not be entirely accurate, Tetra Tech does not consider this to be problematic in the scope of determining which metal concentrations may be affected by turbidity since those samples were non-detects anyway (i.e., it does not matter which constituent was dominant since the entire sample was non-detect).

A second irregularity encountered was instances where the dissolved concentration was greater than the total concentration; a total of 82 samples (3.4%) had dissolved metal concentrations reported higher than total metal concentrations. This may be the result of laboratory error, sampling procedures or natural variability. Acceptable and comparable results (i.e., within natural variability) can be indicated by a relative percent difference (RPD) $\leq 30\%$ (CCME, 2016). In most instances where dissolved metals were greater than the total metal concentration the RPD was $\leq 30\%$. However, there were examples where the RPD was significantly higher than generally acceptable. For example in the June 16, 2014 sample at Kakisa River, dissolved zinc was 5 µg/L compared to 0.4 µg/L total zinc which represents a 170% RPD.

Laboratory or sampling issues may occur in several ways. For example, if samples are field filtered, two separate bottles would be submitted for analysis. The sample for dissolved metals may have experienced the introduction of metals through sampling error. Or, because the bottles were likely collected at slightly different times a “slug” of different water quality may have passed through the sampling location between bottles. The June 20, 2014 sample at Kaskisa River is a good example of this as all detected dissolved metal concentrations were greater than the total metal concentration. Most of this second type of irregularity occurred as only one or two analytes within a discrete sample (e.g., only copper at the July 20, 2015 at Great Slave Lake sample). Additionally several metals, such as strontium and copper, more commonly had greater dissolved concentrations than others which suggests issues with laboratory methods/detection limits.

Correlation of total metals and phosphorus to turbidity was tested by calculating Pearson's r (Table 4.2.2b). The correlation coefficient ranges between +1 and -1 inclusive, where 1 is total positive linear correlation, 0 is no linear correlation, and -1 is total negative linear correlation. The correlation coefficient is to 0, the weaker the correlation. Interpretation of the resulting correlations are provided in the relevant subsections below.

Table 4.2.2b: Pearson's r for Particulate-Dominant Total Metals and Phosphorus

WQ Site	Phosphorus	Aluminum Total	Iron	Manganese	Zinc
Interior Platform					
Buffalo River	0.761	0.572	0.660	0.940	0.883
Hay River	0.657	0.991	0.8399	0.948	0.681
Kakisa River	0.725	0.977	0.723086982	0.696	0.059
Little Buffalo River	0.017	0.661	0.290	-0.177	0.069
Salt River	0.938	0.775	0.975	0.896	-0.012
Slave River @ Fort Smith	0.776	0.733	0.412	0.915	0.724
Slave River @ Mouth	0.937	NC	0.909	0.912	0.950
Slave Province					
Cameron River	0.0655	0.499955915	0.51663765	0.258970717	0.34119
Great Slave Lake	-0.217	NC	-0.03944201	-0.183471981	-0.08265
Lockhart River	-0.084	NC	0.226318962	-0.247161879	-0.03703
Marian River	0.696	0.821144189	0.891154908	0.870854078	0.292006
Yellowknife River	0.0657	0.871513345	0.877620464	0.626210738	0.027001
Churchill Province					
Snowdrift River	-0.115	NC	0.757	0.902	-0.056
Taltson River @ Mouth	0.092	0.857	0.261	0.340	-0.031
Taltson River @ Nonacho	0.394	-0.742	0.193	-0.249	0.483
Tazin River	0.233	0.847	0.458	0.069	0.225
Thelon River	-0.054	-1	0.304	1	0.110
Note: $r = <(-0.5)$ and $>(0.5)$ [i.e., approaching -1 or 1] NC = not calculable					

4.2.2.1 Physical/Major Ions

Physical/major ion AOIs included pH, electrical conductivity, hardness, alkalinity, chloride sulphate, total dissolved solids (*reported as “total solids (filtered)” by ESdat in tables*) and turbidity. Overall, measurements of each physical/major ion AOI were highly variable between the WQ sites.

pH: The pH of water is determined by the geology of the watershed and is influenced by the seasonal and daily variations in photosynthesis, respiration and decomposition (Sanderson et al, 2012). In the NWT, the water is slightly basic because of the geology (GNWT ENR, 2014). pH is an important water quality parameter as it affects the solubility and bioavailability of some nutrients and metals. For example, heavy metals tend to be more toxic in water with lower pH because they are more soluble (Michaud, 1991 in Sanderson et al, 2012, page 92).

Most pH measurements were within the CCME FAL guideline (6.5 to 9). Median pH for most sites was similar, with near-neutral values. The highest single pH value was recorded at Buffalo River (9) while the highest median value was on the Kakisa River (8.13) on the western side of the watershed. The lowest single pH value was recorded on the Slave River @ Fort Smith (4.15). The lowest median pH was at Thelon River (6.68) on the eastern side of the watershed. There does not appear to be a relationship to the distance from the tributary confluence with Great Slave Lake; WQ sites located near the confluence had similar pH values as those located nearer the headwaters.

Electrical Conductivity: EC is naturally variable and can fluctuate with changes in temperature and total dissolved solids (e.g., as temperature increases so does conductivity). It is an important water quality parameter as it is often an early indicator to changes in an aquatic ecosystem, including indications of pollution (Fondreist, 2016). No CCME FAL guideline is available for EC but natural waters vary between 50 and 1500 µS/cm (McNeely et al, 1979).

Median EC varied widely among sites ranging from 11.95 µS/cm at Thelon River to 11,450 µS/cm at Salt River. Watercourses within the Interior Platform had ECs about an order of magnitude greater than the WQ sites within the Slave or Churchill Provinces.

Hardness: The hardness of water is generally due to the presence of calcium and magnesium in the water. There is no CCME FAL guideline for hardness. However, the CCME FAL guidelines established for several water quality parameters, such as copper, lead and nickel, are hardness dependent. The toxicity of metals such as copper, lead and zinc can be reduced as hardness increases (BC MOE, 1998).

Hardness ranged from very soft (0 to 30 mg/L) to moderately soft (31 to 75 mg/L) for most of the WQ sites within the Slave and Churchill Provinces while sites in the Interior Platform were generally hard to very hard (76 to +180 mg/L; Health Canada, 2014; ESRD, 2014). Hardness at WQ sites within the Interior Platform were generally one to two orders of magnitude greater than at other locations. The lowest hardness values were recorded at Thelon River, the most eastern location from Great Slave Lake.

Alkalinity: Alkalinity is a measure of water's ability to neutralize acids; water with low alkalinity has a reduced capacity to buffer acids and is more susceptible to acidification (BC MOE, 1998). Geology is a prime determinant of alkalinity, especially rock that contains carbonate, bicarbonate, and hydroxide compounds. No CCME FAL guidelines for alkalinity have been established. However, natural waters rarely have levels that exceed 500 mg/L (BC MOE, 1998). Limestone is rich in carbonates, so waters flowing through limestone regions or bedrock containing carbonates generally have high alkalinity while areas rich in granites and some conglomerates and sandstones may have low alkalinity (Oram, 2014).

Alkalinity in watercourses within the Interior Platform was generally an order of magnitude higher than other WQ sites. Median alkalinity at Thelon River (3.6 mg/L) was distinctively the lowest among the sites while Salt River (215 mg/L) was the highest.

Chloride: Chloride is generally present at low concentrations in natural surface waters in Canada; concentrations are normally less than 10 mg/L and often less than 1 mg/L (Health Canada, 1987a). Higher chloride concentrations can reduce the toxicity of nitrite, which is toxic at relatively low concentrations, to aquatic life (BC MOE, 1998).

Median chloride concentrations were generally less than 5 mg/L with Little Buffalo River and Slave River @ Mouth slightly higher (12.1 mg/L and 7.95 mg/L, respectively). Chloride concentrations in Salt River were significantly higher than any other WQ site, with a median concentration of 3200 mg/L. Chloride concentrations were generally below the CCME FAL guideline of 120 mg/L, however two locations did record elevated measurements. Seven measurements at Little Buffalo River exceeded (13.46%, where n=52). All of the measurements taken at the Salt River WQ site exceeded the guideline. Salt River is known to be saline, largely because of the numerous brine springs that occur along it (Crockford, 1949).

Sulphate: Naturally occurring sulphate is often the result of decomposing organic material, underlying geology or, atmospheric deposition. Sulfur is an essential plant nutrient. The most common form of sulfur in well-oxygenated waters is sulfate, which is generally considered non-toxic. Elevated sulphate concentrations may have indirect effects on aquatic ecosystems by increasing phosphorus availability, increasing eutrophication potential and increasing mercury mobilization (Meays and Nordin, 2013). When sulphate is less than 0.5 mg/L, algal growth will not occur (Sanderson et al, 2012).

There is currently no national CCME FAL guideline for sulphate but the British Columbia Ministry of Environment has established a freshwater aquatic life guideline for sulphate of 100 mg/L (Meays and Nordin, 2013). The presence of sulphates in drinking water can result in noticeable tastes so taste threshold concentrations for various sulphate salts are at approximately 500 mg/L (Health Canada, 1987).

Concentrations of sulphate in river water in western Canada typically ranges from 1 to 3040 mg/L; most concentrations across the country are below 580 mg/L (Health Canada, 1994). Concentrations of sulphate normally vary from 10 to 80 mg/l in naturally occurring surface waters (CCREM, 1987). Sulphate concentrations at the WQ sites were within this range, with median values generally less than 20 mg/L. Watercourses within the Interior Platform had the highest sulphate concentrations, with median concentrations in Salt River approximately 50 to 300 times greater than others.

Total Dissolved Solids: TDS, commonly considered the mineral content of water, is a measure of the concentration of dissolved substances in water (bicarbonate, chloride, sulphate, calcium, magnesium, sodium and potassium) (CCREM, 1987). Concentrations of TDS in water vary because of the solubility of minerals differs with geological region. Average TDS levels have been measured at concentrations ranging from 7 to 265 mg/L in 20 different rivers monitored in the NWT (Environment Canada, 1990 in Sanderson et al, 2012, page 99). TDS is typically not considered a toxicological issue, but rather an aesthetic one. There is no CCME FAL guideline for TDS, however Health Canada (1991) has set an aesthetic guideline of <500mg/L for drinking water.

TDS was highly variable between the WQ sites though median values at watercourses within the Interior Platform were noticeably higher (2 to 300 times) than other sites, and most were higher than the upper limit of the average range noted above. TDS in Salt River was substantially greater than any other location, with a median value of 7530.5 mg/L.

Turbidity: Turbidity is an indirect measure of the amount of suspended particles in water, a measure of the relative clarity of water – the more suspended particulates present, the greater the interference with light transmittance. Inorganic silt and clay, as well as organic materials and micro-organisms, are the primary particulate contributors to water (Health Canada, 2012; BC MOE 1998). Some analytes, such as phosphorus and some total metals, can be associated with turbidity (or total suspended solids). Some metals are more soluble in water than others and, consequently, have total metal concentrations comprised of a high percentage of dissolved constituents (and

conversely, a low percentage of particulate constituents). Metals such as aluminum, iron and manganese often predominantly favour the particulate fraction. As such, turbidity is a key parameter to monitor water quality. There are no CCME FAL guidelines for turbidity. Turbidity levels typically exhibit large natural variations by season, local geology, flow levels and weather events; turbidity reading can increase dramatically during high precipitation events such as rainstorms and snowmelt (Fondreist Environmental Inc., 2016).

Turbidity was highly variable between the WQ sites with no distinguishable pattern. The highest mean turbidity measurements were found at Slave River @ Fort Smith, Slave River @ Mouth and Buffalo River (196, 145 and 81 NTU, respectively). However, the Buffalo River site had a maximum concentration much closer to its median than the Slave River sites. At Slave River @ Fort Smith and Slave River @ Mouth the maximum concentration was 15 times greater than the median. These concentrations reflect the highly variable nature of turbidity and may have been the result of runoff during freshet or following a large precipitation event.

4.2.2.2 Nutrients

Nutrient AOIs included nitrate-nitrate, total nitrogen and total phosphorus. Nitrate-nitrogen and total nitrogen concentrations were generally low but total phosphorus was high, often exceeding CCME FAL guidelines.

Total Nitrogen: Nitrogen is an essential nutrient for plants, but excessive amounts in water can cause decreased dissolved oxygen levels through increased eutrophication (excessive growth of aquatic plants and algae). No CCME FAL guideline is available for total nitrogen. However, an acceptable range of total nitrogen is 2 mg/L to 6 mg/L (US EPA, 2013).

Minimum and median concentrations of total nitrogen were relatively similar across all WQ sites and were generally less than 1 mg/L (median concentration at Hay River was 1.01 mg/L). Maximum concentrations were greatest in watercourses within the Interior Platform, ranging from 0.48 to 1.2 mg/L which was approximately 4 to 5 times higher than other sites.

Nitrate-Nitrite: Nitrate and nitrite are oxidized forms of nitrogen. There are no CCME FAL guidelines available for nitrate-nitrite but in British Columbia, the drinking water guideline for nitrate-nitrate (as N) is a maximum of 10 mg/L (Nordin and Pommen, 2009). Minimum and median concentrations of nitrate-nitrate were relatively similar across all WQ sites. Maximum concentrations were greatest in watercourses within the Interior Platform, showing values an order of magnitude greater than at other sites. Nitrate-nitrite concentrations were very low and none were greater than the British Columbia guideline for drinking water.

Total Phosphorus: This includes both organic and inorganic forms of phosphorus and can be present as dissolved or particulate matter. It is often the most limiting nutrient to plant growth in freshwater. It is not generally considered toxic to aquatic life or humans but excessive amounts of phosphorus typically result in eutrophication, which can reduce water quality.

Concentrations of total phosphorus often exceeded the CCME FAL guideline of 4 µg/L. Median concentrations of total phosphorus ranged from 2 µg/L to over 120 µg/L. Buffalo River, Slave River @ Fort Smith and Slave River @ Mouth had median values approximately 10 times greater than the other sites. Slave River, at both the mouth and Fort Smith locations also had extremely high maximum concentrations (1800 µg/L and 4400 µg/L, respectively) although Thelon River had the highest overall maximum concentration at 8000 µg/L, though this result is most likely an outlier or transcription error. The watercourses in the Interior Platform, have the highest mean total phosphorus and are considered meso-eutrophic to hyper eutrophic. WQ sites within the Slave and Churchill Province had much lower mean concentrations of phosphorus and are considered ultra-oligotrophic to oligotrophic (with the exception of Marian River, which is in the Slave Province and is considered meso-eutrophic with a mean total phosphorus concentration of 29.5 µg/L).

Orthophosphate, the biologically available form of phosphate, was not frequently analyzed at any site over the period of record. When it was analyzed, concentrations of orthophosphate generally comprised a very small portion (less than 1%) of total phosphorus.

4.2.2.3 Total Metals

Total metal AOIs included aluminum, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, strontium and zinc. Dissolved metals were not assessed as they were often not analyzed, particularly in samples collected prior to 2011. The upper and lower limits for arsenic, cadmium, chromium, cobalt, lead, selenium and zinc were indistinct because of a large percentage of non-detect data (i.e., number of non-detects greater than 50%).

Watercourses within the Interior Platform geologic province consistently had the highest metal concentrations while those in the Churchill Province, especially Thelon River, typically had the lowest.

Aluminum: Aluminum is generally found in concentrations of less than 1000 µg/L (BC MOE, 1998). The dissolved form of aluminum is more toxic than the particulate form, with the greatest toxicity occurring in waters with pH less than 6 (CCREM, 1987). Aluminum tends to favour the particulate form in water which means concentrations can be highly influenced by turbidity. A large fraction of total aluminum may not be bioavailable so toxicity may be overestimated, especially in highly turbid water (Butcher, 2001).

CCME FAL guidelines for aluminum vary with pH (5 µg/L at pH <6.5; 100 µg/L at pH ≥6.5). None of the samples for total aluminum exceeded CCME FAL guidelines. Median total aluminum concentrations were highly variable, ranging from 0.1 µg/L at Cameron River to 1780 µg/L at Slave River @ Mouth. No spatial pattern was evident for total aluminum.

Arsenic: Arsenic is a natural component of the earth's crust and is widely distributed throughout the environment in the air, water and land (WHO, 2016). It occurs naturally as a result of weathering of rock and soil. Levels of arsenic in natural source waters ranges between 2 and 50 µg/L (CCME, 2001). Arsenic is highly toxic in its inorganic form and long-term exposure can cause considerable health issues in humans. The CCME FAL guideline for total arsenic is 5 µg/L. Of the 1109 arsenic samples collected, 18 (1.6%) exceeded the CCME FAL.

Seven of WQ sites had total non-detects greater than 50%. Minimum and median arsenic concentrations were fairly consistent across all sites (generally approximately 0.2 µg/L for the minimum and 0.4 µg/L for the median). Cameron River had the highest minimum and median values, at 1 µg/L and 4.9 µg/L, respectively. Maximum concentrations showed much more variability. The two Taltson River sites had the lowest maximum concentration at 1 µg/L while the highest arsenic maximum concentration was recorded in Slave @ Fort Smith (15.7 µg/L). Watercourses in the Interior Platform had generally higher arsenic concentrations, which is not surprising given the high erodibility of the underlying geology.

Cadmium: Cadmium, which has been shown to bioaccumulate, is highly toxic in all its forms, though dissolved cadmium is more bioavailable. The toxicity of cadmium is highly influenced by water hardness; the toxicity increases with decreased water hardness (CCME, 2014a). Presence of other heavy metals like zinc and copper have been shown to increase cadmium's toxicity (BC MOE, 1998). Weathering of rock and forest fires are the most common natural pathways for cadmium to enter surface water therefore, cadmium may occur at higher concentrations naturally because of the underlying geology. Cadmium typically occurs at concentrations 0.1 to 10 µg/L in natural freshwaters (CCREM, 1987).

Cadmium can be difficult to assess because many laboratories have difficulty providing detection limits that are lower than the guideline (Sanderson et al, 2012). Although it appears that the majority of cadmium samples exceed CCME FAL of 0.09 µg/L, nearly all (98.95%) cadmium samples were at levels below detection limits. All WQ sites

had non-detects greater than 50% (and most were greater than 80%), except for Slave River @ Mouth, which was approximately 39% non-detects.

Chromium: Leaching from topsoil and rocks is the most important natural source of chromium entry into bodies of water (Agency for Toxic Disease and Substance Registry, 2008). However, more than 70% of chromium in the environment comes from anthropogenic sources, such as tanneries, electroplating, non-ferrous foundries, wood treatment facilities, urban storm water runoff, and discharges from thermal generating stations (Health Canada, 2015; BC MOE, 1998). There are no CCME FAL guidelines established for chromium. Chromium is generally present at low concentrations in Canadian surface waters with concentrations in Canadian rivers typically reported between 0.002 and 0.023 mg/L (2 to 23 µg/L; Health Canada, 1979).

Nearly half the WQ sites had more than 50% non-detects. Among the sites with <50% non-detects all were within the normal range for Canadian rivers. Sites located within the Interior Platform had the highest overall median and maximum concentrations of cadmium. Sites in the Slave and Churchill Provinces generally had median cadmium concentrations less than 1 µg/L and maximum concentrations of approximately 1 µg/L.

Cobalt: Cobalt is found in a number of different rock types, including granite, basalt, shale, limestone and sandstone. Background levels of chromium in surface water and groundwater are a direct function of regional geology, mineral weathering processes, sediment loading rates and precipitation patterns (Nagpal, 2004). The concentration of total cobalt in uncontaminated freshwater is generally less than 1 µg/L (Nagpal, 2004); CCREM (1987) reports that natural concentrations range from 0.1 to 47 µg/L. Its toxicity is depends on the form of the compound, its oxidation state and the route of exposure.

Nine of the 17 WQ sites, all located on the eastern half of Great Slave Lake within the Slave and Churchill Provinces, had non-detects greater than 50%. There are no CCME FAL guidelines available for cobalt, but measured concentrations of cobalt were within the natural range reported by CCREM (1987). Median cobalt concentrations at the remaining sites ranged from 0.2 µg/L to 1.35 µg/L. Maximum concentrations ranged from 1 µg/L at most sites to 16 µg/L at Slave @ Mouth. Tributaries on the western end of Great Slave Lake had higher overall concentrations of cobalt.

Copper: Copper is a natural constituent of most rock types, with igneous rock containing the highest concentrations, followed by sedimentary rocks such as shale, sandstone and limestone (Singleton, 1987). Bertine and Goldberg (1971, in Singleton, 1987, page 6) estimated that 40 to 67% of total copper inputs are the result of natural weathering). Copper is acutely toxic to most forms of aquatic life at relatively low concentrations but is generally found in freshwater at trace concentrations ranging from 1-10 µg/L (BC MOE, 1998) but can be as high as 50 µg/L (CCREM, 1987). The toxicity of copper is highly influenced by water hardness, increasing with decreased hardness.

Forty-two to 62% of samples at Buffalo River, Hay River, Salt River, Slave River @ Fort Smith and Slave River @ Mouth exceeded the CCME FAL guideline (2 to 4 µg/L, hardness dependent). Salt River had 19.61% non-detects, which may have influenced the percentage of guideline exceedances, however the other four sites had non-detects of less than 8%. Median concentrations of copper were highly variable, ranging from 0.5 µg/L at Thelon River to 27 µg/L at Cameron River. Maximum concentrations were also highly variable with Thelon River at 2 µg/L and Cameron River at 397 µg/L. Unlike other metal parameters, spatial characteristics of copper concentrations did not appear to correspond to the geological provinces.

Iron: Iron is a common element and is occurs naturally through weathering of sulphide ores and leaching of sandstones (CCREM, 1987). Iron can be a significant constituent of soils, especially clays (Phippen et al, 2008). Anthropogenic sources are often related to mining. It is a requirement for all lifeforms but can be toxic at high concentrations. The concentrations of iron in Canadian surface waters are generally below 10 mg/L (Health Canada, 1978).

Iron concentrations were highly variable among the sites and no distinct spatial pattern was apparent. Slave River @ Fort Smith, Slave River @ Mouth, Buffalo River and Hay River had extremely high iron content (median values of 3310 µg/L, 3270 µg/L, 2780 µg/L and 1795 µg/L, respectively and maximum values of 43,400 µg/L, 24,800 µg/L, 10,500 µg/L and 24,000 µg/L, respectively). These concentrations are approximately 6 to 11 times greater than the CCME FAL guideline of 300 µg/L, with 96 to 98% of samples at these locations exceeding the guideline. Most WQ sites had a low percentage of non-detects, from 0 to 11%. Four sites had higher percentages of non-detects – Cameron River (33.33%), Great Slave Lake @ Taltheilei Narrows (28.07%), Lockhart River (37.5%) and Taltson River @ Mouth (29.51%).

Lead: Lead has been observed in natural waters ranging from trace levels up to 40 µg/L, in both the soluble and particulate forms (McNeely et al., 1979 in Sanderson et al, 2012, page 174) and in regions with sulphide ores in the underlying geology, concentrations can reach 800 µg/L (BC MOE, 1998). The toxicity of lead is dependent on the hardness, pH, alkalinity, and dissolved oxygen content of the water; toxicity increases as hardness decreases (CCREM, 1987).

Nine of the 17 WQ sites had non-detects greater than 50%. Relatively few samples exceeded the CCME FAL guideline of 1 µg/L (0 to 17%). Median concentrations were within the observed range noted above and were comparable across the sites. However, concentrations in Cameron River, Slave River @ Fort Smith and Slave River @ Mouth – all located within the Interior Platform were approximately double that observed at other locations.

Manganese: Soils, sediments, metamorphic and sedimentary rocks are the primary natural sources of manganese (CCREM, 1987). Manganese is only slightly to moderately toxic to aquatic organisms in excessive amounts (Reimer, 1999). Soluble manganese is considered more toxic as it is readily bioavailable; typically, 90% to 95% of the total manganese in water is associated with the particulate matter (Reimer, 1999). No CCME FAL guideline has been established for manganese. However, manganese is typically naturally present in water at concentrations less than 200 µg/L and is rarely found above 1000 µg/L (CCREM, 1987).

Most WQ sites have a very low percentage of non-detects (0 to 6.98%) for manganese. However two sites were notably higher – Great Slave Lake had 47.52% and Lockhart River had 61.90% non-detects. Median concentrations ranged from 0.01 µg/L at Cameron River to 66.4 µg/L at Slave River @ Mouth. Median manganese concentrations were generally an order of magnitude greater in watercourses located in the Interior Platform, except for Salt River which was more similar to other sites. The two Slave River sites had the highest maximum concentrations (482 µg/L @ Fort Smith and 477 µg/L @ Mouth).

Mercury: Mercury is found in the environment naturally from the weathering of rocks but atmospheric deposition is a major pathway to aquatic systems (Sanderson et al, 2012). Methyl mercury (the organic form) is a concern in natural surface waters because it is acutely and chronically toxic and is known to bioaccumulate (CCME, 2003b).

Mercury occurs naturally in water at only trace amounts, typically 0.001-0.002 µg/L (BC MOE, 1998). Because of this low concentration, it is often difficult to detect by standard laboratory analytical techniques; seven of the WQ sites had non-detects greater than 50% and six sites had non-detects between 38% and 48%. Although a large number of mercury samples appear to have exceeded the CCME FAL guideline of 0.026 µg/L, the high percentage of non-detects likely skews that assessment.

Median concentrations were fairly similar across most sites, ranging from 0.01 to 0.03 µg/L. Cameron River and Salt River had the highest median concentrations at 0.1 and 0.095 µg/L, respectively. Maximum concentrations of mercury were variable but were generally between 0.1 µg/L and 1.4 µg/L. However, the maximum concentration at Taltson River @ Mouth was considerably higher, with a value of 22 µg/L. This measurement is likely an outlier, which were retained because of the small data set.

Nickel: Most nickel in water is the result of geological weathering. It is usually insoluble but can form a number of compounds of varying solubilities with sulphate, nitrate, chloride, hydroxide and carbonate (CCME, 2015). Nickel does not tend to bioaccumulate in animals but there is evidence of uptake and accumulation in certain plants (Agency for Toxic Substances and Disease Registry, 2005).

All nickel samples analyzed were below the CCME FAL guideline of 25 µg/L. WQ Sites within the Slave and Churchill Provinces had a much higher percentage of non-detects (generally 25 to 77%, although Marian River was 8.25%) than those in the Interior Platform. Median nickel concentrations were variable across the sites with WQ sites in the Interior Platform having the highest concentrations. The lowest median concentrations were at Cameron River, Tazin River and Yellowknife River (all 0.5 µg/L) while the highest median occurred at Slave River @ Mouth (5.95 µg/L).

Selenium: Selenium occurs naturally in sedimentary rocks, shales, coal and phosphate deposits and soils and generally occurs together with sulfides of metals such as copper, zinc and lead (US EPA, 2016). Selenium is bioaccumulative and can be toxic to aquatic life. "Although waters seeping from seleniferous deposits may result in selenium concentrations as high as 400 µg/L, surface waters in most areas contain less than 1.0 µg/L" (Lakin and Davidson, 1967 in CCREM, 1987 page 412). Concentrations of selenium in central Canadian waters typically range from 0.1-4 µg/L (CCREM, 1987).

Twenty selenium samples (3% of total) exceeded the CCME FAL guideline of 1 µg/L. Thirteen of the sites had non-detects greater than 50%, with five sites having 100% non-detect. Because of high percentage of non-detect, median concentrations of selenium appear to be fairly uniform across the sites. Selenium was not measured at two locations (Lockhart River and Slave River @ Mouth). Selenium was measured and non-detects were less than 50% at Salt River and Slave River @ Fort Smith. At these locations median concentrations were 1.55 µg/L and 0.66 µg/L, respectively.

Strontium: Little information regarding strontium in Canadian surface waters is available. It occurs in all surface water though probably seldom naturally occurs in concentrations which might be harmful (Skougastadt and Horr, 1960). Skougastadt and Horr report that strontium is present in nearly all freshwater at concentrations less than 1 ppm (1000 µg/L). No CCME FAL guideline is available for strontium.

Most WQ sites had no or very few non-detects (0 to 4.76%) among the strontium samples, except at Tazin River where 100% (n=3) of the samples were non-detects. Median concentrations of strontium were relatively similar across most sites. However, concentrations at Little Buffalo River and Salt River were two orders of magnitude greater than other sites, with measurements of 3130 µg/L and 3845 µg/L, respectively.

Zinc: Although relatively non-toxic to terrestrial organisms, zinc can be both acutely and chronically toxic to aquatic organisms (BC MOE, 1998). Several factors such as water hardness, salinity, temperature, and the presence of other contaminants influence zinc toxicity in aquatic environments (Nagpal, 1999). Its toxicity decreases with increasing hardness, increases with increasing temperature, and increases with decreasing dissolved oxygen (BC MOE (1998). Natural concentrations range from 1 to 96 µg/L but do not typically exceed 40 µg/L in river water (Environment Canada 1984 in Health Canada, 1987b, page 2). Environment Canada observed zinc concentrations at the upper limit of the natural range in the Slave River (Environment Canada 1984 in Health Canada, 1987b, page 2). In certain waters, such as in mining areas or acidic waters, concentrations 10-1000 times greater can be found (CCREM, 1987).

Over all WQ sites, 75 zinc samples exceeded CCME FAL of 30 µg/L, representing 4.7% of the total samples (n= 1596). A total of 913 zinc samples analyzed (57.21%) were non-detects; thirteen sites had greater than 50% non-detects. The four WQ sites with <50% non-detects were all located within the Interior Platform. Slave River @

Fort Smith and Slave River @ Mouth had the highest percentage of guideline exceedances (26.47% and 34.48%, respectively) but had the lowest percentage of non-detects (15.69% and 17.24%).

Median concentrations of zinc were greatest in the watercourses within the Interior Platform, with Slave River @ Mouth and Slave River @ Fort Smith recording the highest values (17.25 µg/L and 16.2 µg/L, respectively). Cameron River has the lowest median concentration at 0.4 µg/L.

4.2.3 Long-Term (Annual) Trend Analysis

In looking for trends in water quality, some increasing or decreasing patterns, especially over short time periods, may not be true trends. Water quality parameters often exhibit natural variability because of environmental factors such as flow or temperature; changes in sampling schedules, field methods or laboratory practices may also cause shifts in data that could be erroneously interpreted as trends (Meals et al, 2011). Effective trend analysis requires a long period of data collected at a fixed location, collected by consistent methods, with few long gaps.

Long-term trend analysis (annual trends) was performed on the AOIs for each WQ site to determine whether water quality conditions have changed over the period of record (Table 4.2.3; Appendix F). A total of 425 Mann-Kendall trend tests were completed (25 AOIs times 17 sites) on the annual data. Long-term trends were considered statistically significant if the p-value was ≤ 0.05, which represents a 95% confidence level.

Table 4.2.3: Summary of Mann-Kendall Trend Analysis (Annual/Long-Term)

Analyte of Interest	Trend “Up”		# Trend “Down”		“No Trend”	# NA (no data)
	#	# significant	#	# significant	#	#
Physical/Major Ions						
Alkalinity (total as CaCO ₃)	13	9	2	0	1	1
Chloride	11	4	5	3	1	0
Electrical Conductivity (EC)	14	7	2	0	1	0
Hardness as CaCO ₃	15	11	2	0	0	0
pH	15	12	1	0	1	0
Sulphate	9	4	8	4	0	0
Total Dissolved Solids	4	2	12	4	1	0
Turbidity	7	0	10	2	0	0
Nutrients						
Nitrate and Nitrite (as N) (mg/L)	8	4	7	3	2	0
Nitrogen (Total)	1	0	0	0	14	2
Phosphorus	5	2	10	5	1	1
Total Metals						
Aluminum	0	0	3	2	12	2
Arsenic	3	1	13	11	1	0
Cadmium	0	0	17	17	0	0
Chromium	1	0	16	15	0	0
Cobalt	3	0	13	7	1	0

Table 4.2.3: Summary of Mann-Kendall Trend Analysis (Annual/Long-Term)

Analyte of Interest	Trend “Up”		# Trend “Down”		“No Trend”	# NA (no data)
	#	# significant	#	# significant	#	#
Copper	1	0	16	7	0	0
Iron	6	3	8	3	3	0
Lead	1	0	16	13	0	0
Manganese	8	1	4	3	5	0
Mercury	0	0	10	6	7	0
Nickel	0	0	17	15	0	0
Selenium	0	0	4	4	11	2
Strontium	3	3	1	0	11	2
Zinc	3	0	14	8	0	0
Total	131	63	211	132	73	10
Shaded cells indicate the dominant trend observed.						

Of the 425 Mann-Kendall tests 49.6% showed a decreasing trend, 30.8% showed an increasing trend and 17.2% showed no trend. Ten AOI samples, or 2.4%, did not have data and are represented in Appendix F as “NA”. A total of 195 trends (45.9%) were significant, with p-values ≤ 0.05 .

Yellowknife River had the most significant trends, with 21 of the 25 AOIs (9 increasing, 12 decreasing). Overall, watercourses in the Slave and Churchill Provinces had more significant trends than those within the Interior Platform which generally showed the lowest number of significant trends.

4.2.3.1 Physical/Major Ions

Across all sites, most trends were predominantly increasing for most physical/major ion parameters except for total dissolved solids and turbidity, which were predominantly decreasing. Of the total 88 increasing trends, 55.7% were significant while only 30.9% of total decreasing trends were significant. No Trend was found in 3.7% of these parameters.

4.2.3.2 Nutrients

Nitrate-nitrate showed a total of 8 increasing and 7 decreasing trends. Of the 7 total significant trends for nitrate-nitrate 42.9% were decreasing and 57.1% were increasing. Total phosphorus trends were mostly decreasing (58.8% of total) and of those 5 (50%) were significant. Total nitrogen showed almost entirely no trends (82.4% of total); one non-significant increasing trend was present for total nitrogen.

4.2.3.3 Total Metals

Most total metal parameters showed decreasing trends (63.9% of total metal trends across all sites were decreasing). Of the decreasing trends, 73% were significant. Aluminum, manganese, mercury, selenium and strontium showed predominantly no trend. Whereas most total metals showed a distinguishable dominant significant trend or no trend, iron was even with three significant increasing, three significant decreasing and three no trends.

4.2.4 Seasonal Analysis of Local Rivers

4.2.4.1 Summary Statistics (Spatial Trends)

Summary statistics for AOIs in each season at the Local Rivers are provided in Appendix G.

Physical/Major Ions

Little seasonal variability was observed in physical/major ion parameters at the Local Rivers. Yellowknife River showed the least variability in these parameters which is likely influenced by its lake attenuation.

Nutrients

Most nutrients showed minimal seasonal variation. Phosphorus concentrations were highest in Marian River and Yellowknife River during spring freshet and lowest during summer recession. Marian River showed a dramatic decrease in median phosphorus concentrations between spring freshet and summer recession (from 33 µg/L to 1 µg/L) but Yellowknife River was more stable (8.33 µg/L to 5 µg/L). Cameron River had highest median phosphorus concentration during summer recession at 13.35 µg/L and its lowest during winter baseline (6.55 µg/L).

Total Metals

Total metals generally showed increased median concentrations during spring freshet, though not usually by substantial amounts. At all three Local Rivers aluminum, manganese and iron showed considerably higher median concentrations during spring freshet. This result is not unexpected given the typically increased sediment loads that occur at that time. Some metals, such as copper, lead and nickel, which have a higher percentage of dissolved metals, showed increased median concentrations during summer recession.

Yellowknife River showed the least overall variability for total metals while Marian River typically presented the most variability. Marian River showed distinct variability within the turbidity associated total metals. For example, median concentrations of aluminum ranged from 889.5 µg/L in spring freshet to 0.05 µg/L during summer recession and 253 µg/L during winter baseline.

Seven of the 14 total metal AOI had frequent non-detect percentages greater than 50% in all three seasons: cadmium, chromium, cobalt, lead, mercury, selenium and zinc.

4.2.4.2 Mann-Kendall Trends (Temporal Trends)

Mann-Kendall trends for each season at the Local Rivers are summarized in Appendix F. The Local Rivers tended towards decreasing trends in all seasons. Between all three Local Rivers sites, 52% of spring freshet, 56% of summer recession and 61.3% of winter baseline trends were decreasing. Over the three sites a total of 48 significant decreasing trends and 28 increasing trends were present.

Marian River showed notably fewer significant trends than either Cameron River or Yellowknife River (Table 4.2.4.2). At all three Local River sites, the percentage of significant trends decreased during summer recession.

Table 4.4.4.2: Percentage of Significant Trends by Season at Local Rivers

Site		Cameron River		Marian River		Yellowknife River	
Season	Trend Direction	#Up (# significant)	# Down (# significant)	#Up (# significant)	# Down (# significant)	#Up (# significant)	# Down (# significant)
Spring Freshet		9 (8)	15 (13)	11 (0)	12 (5)	11 (9)	12 (8)
		88.9%	86.7%	0%	41.7%	81.8%	66.7%
Summer Recession		8 (6)	16 (12)	10 (2)	12 (3)	8 (6)	14 (9)
		75%	75%	20%	25%	75%	64.3%
Winter Baseline		10 (8)	14 (13)	5 (3)	19 (11)	11 (8)	13 (12)
		80%	92.9%	60%	57.9%	72.7%	92.3%

4.2.5 Water Quality Monitoring Program Evaluation

The 17 WQ sites included in this assessment are well distributed around Great Slave Lake and represent major tributaries to the lake. The assessed watercourses also represent the various geological and ecological zones present surrounding Great Slave Lake. Distribution is adequate to assess spatial variability in water quality entering Great Slave Lake.

Water quality monitoring has been conducted at the 17 assessed sites under a variety of programs. GNWT Aquatic Quality Scientist, Mr. Robin Staples (Pers. Comm., email February 16, 2017) reports that:

- Data for the Slave River at Smith has been collected under 3 programs. 1) Annual / Biannual Sampling by Inspectors based out of Ft. Smith; 2) As part of the intensive Slave River Environmental Quality Monitoring Program (SREQMP, 1990-1995); 3) Transboundary Monitoring Program (Suspended Sediment and Grab Samples).
- The Local Rivers Program has, for the most part been carried out by various staff of the Water Resources Division (INAC pre-April 2014; GNWT-ENR since April 2014 following devolution). Cameron and Marion Rivers were exclusively sampled by INAC / GNWT, but the Yellowknife river pre-2001 was also sampled by Environment Canada (samples with letters in lab sample Id column). From 2002 to present, the program has been carried out by the Water Resources Division.
- Other than the Slave River at Ft. Smith site (discussed above), all other sites where data was previously provided has been sampled by inspectors based in the Ft. Smith regional office. Wayne Starling took the bulk of these samples (1982-2010). Wendy Bidwell replaced him and has carried out the majority of the sampling from 2012-2017. These were INAC inspectors and similar to Waters staff also devolved to the GNWT in April 2014.

Given the long period of sample collection, coupled with the multiple agencies/personnel involved, sampling methodology was likely variable. However, Mr. Staples confirmed that Taiga Environmental Laboratory was consistently used for analysis. Mr. Staples also confirmed that quality control sampling (e.g., replicates) accounted for 10% of samples for most sites and more than 20% for Local Rivers. Tetra Tech recommends developing a written protocol to ensure long-term standardized sampling methodology.

Although somewhat variable among the sites, sampling was generally conducted twice per year between 1982 and 2010, then again two to three times per year from 2012 to 2016. Sample collection at the Local Rivers sites occurred more frequently, on a near-monthly basis. Frequent sampling, ideally monthly, is recommended to obtain a robust data set for future trend analyses.

Water quality sampling included analysis of a broad range of common analytes, including physical parameters, ions, nutrients and metals. In the early years of monitoring, dissolved metals were often not included in laboratory analysis, therefore only a few years of dissolved metal data is available. Total phosphorus was analyzed as a metal, but should also be analyzed as a nutrient. Sample collection and field preservation is often different for metals versus nutrients (i.e., total phosphorus often requires preservation with sulfuric acid while total metals requires nitric acid). Tetra Tech recommends that, moving forward, dissolved metals consistently be included in laboratory analysis. In general, the parameters analyzed in the most recent monitoring events (i.e., 2012 forward) should be continued.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions and Recommendations

5.1.1 Hydrology

The twelve hydrometric stations on eleven watercourses selected for analysis include a large range of watershed areas: 3,330 to 606,000 km² and a range of levels of natural attenuation due to the presence of lakes. Table 5.1.1 summarizes general hydrologic statistics for each evaluated watershed.

Table 5.1.1: Hydrologic Statistics of Watercourses of Interest

Watercourse	Watershed Area (km ²)	Average Annual Runoff (mm)	Median Peak Flow (m ³ /s)	Median Low Flow (m ³ /s)	Factor Between Peak and Low
Buffalo River at Highway No. 5	18,500	85.5	169	0	Inf.
Cameron River below Reid Lake	3,630	52.4	11.9	2.32	5.1
Hay River near Hay River	51,700	66.6	675	2.66	254.2
Kakisa River at Outlet of Kakisa Lake	15,600	84.0	117	7.85	14.9
Little Buffalo River below Highway No. 5	3,330	33.4	17.2	0.003	5733.3
Lockhart River at Outlet of Artillery Lake	26,600	142.3	168	74.8	2.2
Slave River at Fitzgerald	606,000	174.1	6130	1540	4.0
Snowdrift River at Outlet of Siltaza Lake	9,110	143.0	204	6.04	33.8
Taltson River	58,700	100.4	317	94.9	3.3
Tazin River near the Mouth	16,530	84.7	74.4	13.7	5.4
Yellowknife River at Outlet of Prosperous Lake	16,300	74.0	63.0	19.4	3.3

Flows within these large northern watersheds are highly seasonal. Winter freeze-up and summer break-up dates are relatively constant across the subject watersheds; however, dates of peak freshet flow is variable between stations and is largely influenced by both the size of the watershed and the presence of upstream lakes within the watershed.

Watercourses lacking lake attenuation undergo dramatic differences in maximum and minimum annual flow rates. The Hay River, Little Buffalo River, and Buffalo River all undergo 250+ fold differences in flow rate between winter low and freshet peak in an average year. Conversely, in the evaluated watersheds with significant lake presence, freshet peak flows are typically only 2 to 5 times the winter baseflow lows.

The presence of trends in watershed performance were evaluated for all 11 watercourses with Mann-Kendall trend tests. A total of 19 parameters were evaluated for each watercourse over two different durations: the complete period-of-record for the hydrometric station, and the last decade (data permitting).

Table 5.1.2 provides a summary of the results of the trends tests over the period of record for all eleven stations, and over the last decade for the seven stations with available data. The period of record differs from station to station, thus the period of record comparison is not ideal, but does allow for general conclusions to be drawn.

Table 5.1.2: Count of Stations Exhibiting Increasing, Decreasing, or No Trend in Flow

Parameter	Period of Record (varies)			Last Decade (2006 – 2015)		
	11 Stations Evaluated			7 Stations Evaluated		
	# Decreasing	# Unchanged	# Increasing	# Decreasing	# Unchanged	# Increasing
Annual Flow (Hydrologic Year)						
Mean Flow	1	9	1	4	3	0
Median Flow	0	10	1	3	4	0
Annual Max Flow	2	9	0	2	5	0
Annual Min Flow	0	6	5	2	5	0
Seasonal Flow						
Spring Freshet	1	10	0	2	5	0
Summer Recession	1	9	1	2	5	0
Winter Base flow	0	7	3	3	4	0
Monthly Median Flow						
January	0	9	2	3	4	0
February	0	7	4	3	4	0
March	0	7	4	3	4	0
April	0	8	3	3	4	0
May	0	10	0	3	4	0
June	1	10	0	3	4	0
July	1	9	1	4	3	0
August	1	9	1	1	6	0
September	1	9	1	1	6	0
October	1	10	0	2	5	0
November	0	10	1	2	5	0
December	0	9	2	3	4	0

The following can be gathered from the trends analysis:

- No general trends exist in annual mean and median flow rates over each station's period-of-record. Flow rates today remain largely unchanged from flow rates of 20 to 50 years ago.

- Over each station's period-of-record: Two of the eleven stations showed peak annual flows trending in a downwards direction and five of the eleven stations showed winter baseflows trending in an upward direction. In both cases, the remaining stations indicated no change. This could be indicative of a warmer climate, with more water managing to flow throughout the winter months, reducing the available water in summer months.
- In the last decade, zero trends in increasing flow were present across all seven hydrometric stations for all 19 parameters.
- Conversely, half of the stations have display downward trends in mean/median annual flow over the last decade. The majority of this decline has occurred during winter and freshet, throughout the months of December through July. The summer recession months of August to November also showed declining flow rates, but not to the same extent.
- The flow monitoring program of WSC is generally adequate. The useable period of record for most WSC hydrometric stations is quite good, especially when considering the hardships that can be incurred while monitoring flow rates on rural northern watersheds. Data gaps within the Little Buffalo River limit its value for an exercise such as this but still provide an indication of watershed seasonality. The dataset for Tazin River is also short (7 years), but this hydrometric station is still active and should eventually be of a sufficient length to conduct a meaningful statistical analysis with.

5.1.2 Water Quality

- Geology is the primary factor influencing water quality and contributes to the distribution of analyte concentrations at the various WQ sites. As per Table 4.2.2, the WQ sites are found in the following geological provinces:
 - *Interior Platform*: Buffalo River, Hay River, Kakisa River, Little Buffalo River, Slave River @ Fort Smith, Slave River @ Mouth and Salt River;
 - *Slave Province*: Cameron River, Great Slave Lake @ Taltheilei Narrows, Lockhart River, Marian River and Yellowknife River; and
 - *Churchill Province*: Snowdrift River, Taltson River @ Mouth, Taltson River below Nonacho Dam, Tazin River and Thelon River.
- Median analyte concentrations were generally higher in watercourses located within the Interior Platform. The underlying soft sedimentary rocks facilitate greater erosion and suspension and dissolution of mineral particles, which directly and indirectly causes increased analyte measurements. Geology on the eastern half of Great Slave Lake, within the Slave and Churchill Provinces, is underlain by the igneous and metamorphic rocks of the Canadian Shield which are more resistant to weathering.
- Water throughout the watershed generally had neutral pH. Water in the Interior Platform sites was hard to very hard while the Slave and Churchill Province sites were soft to moderately soft.
- Nitrate-nitrite and total nitrogen concentrations were relatively similar across all sites. The watercourses in the Interior Platform, had the highest mean total phosphorus and were considered meso-eutrophic to hyper eutrophic; WQ sites within the Slave and Churchill Province had much lower mean concentrations of phosphorus and were considered ultra-oligotrophic to oligotrophic (with the exception of Marian River, which is in the Slave Province and was considered meso-eutrophic).
- Total metals concentrations varied across the sites. The upper and lower limits for arsenic, cadmium, chromium, cobalt, lead, selenium and zinc were indistinct because of a large percentage of non-detect data. In general, sites within the Interior Platform shared similar metal characteristics and often had the highest concentrations. Thelon River, located within the Churchill Province, often had the lowest metal concentrations.

- In general, significant long-term (annual) temporal trends in physical parameters were increasing while significant trends for total metals were decreasing. Nitrate-nitrate trends were almost evenly split between increasing and decreasing trends, total phosphorus showed increasing trends and total nitrogen showed no trend.
- Little seasonal variation was observed in physical/major ion or nutrient parameters at the Local Sites. Total metals generally showed increased median concentrations during spring freshet. Although most metal concentrations showed only slight increases at spring freshet, aluminum, manganese and iron showed considerably higher concentrations. Metals that proportionally favored the dissolved fraction, such as copper, lead and nickel, had higher concentrations during summer recession.
- The water quality monitoring program is generally adequate. Older laboratory analysis (i.e., pre-2010) was not consistent and often did not include dissolved metals; analysis from 2012 forward generally included a more complete suite of parameters, including dissolved metals. The parameters analyzed in most recent monitoring (i.e., 2012 to 2016) events should be continued to allow to a more comprehensive assessment of water quality. Tetra Tech understands that parameters such as ultra-low mercury, chlorophyll a, as well as bacteriological and additional organic parameters, have also recently been included in laboratory analysis. The period of record for these additional parameters was not sufficient to include in this Report but should be included in future assessments.

5.1.3 Loading

Due to little seasonal variation in concentrations of ions and nutrients, seasonal fluctuations in the loading of these parameters to Great Slave Lake is expected to be proportional to flow in each watercourse. We expect that the lowest ion and nutrient loadings to the lake will occur during the winter months (December to April), while peak loadings are expected to take place throughout during freshet (June). The freshet loadings are estimated to be five times greater than winter minimums. The Slave River exerts the largest influence on the quantity and timing of loadings to the lake. It is responsible for approximately half of the annual inflow to Great Slave Lake.

Total metal concentrations exhibit seasonal patterns. They marginally increase during freshet and decrease during winter baseflow. As with ion and nutrient concentrations, total metal loadings to the lake are dictated by concentration and flow in the Slave River.

6.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
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APPENDIX A

CCME WATER QUALITY GUIDELINES, ALL PARAMETERS

Notes:

- ¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)
- ² Guideline varies with pH
- ³ Guideline varies with hardness. Range given.
- ⁴ Guideline varies with pH and temperature. Most stringent given.
- ⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline
BOLD - Greater than Guideline
 Blank - Not analyzed

Table A.1: CCME Water Quality Guidelines - Buffalo River @ Hwy 5, All Parameters

			Sampled Date Time		5/27/1992	10/7/1992	6/15/1993	10/21/1993	5/31/1994	10/20/1994	5/30/1995	10/26/1995	6/12/1996	10/31/1996	5/15/1997	10/15/1997	5/19/1998	10/22/1998	6/14/1999	10/6/1999	5/29/2000	10/18/2000	5/15/2001	10/30/2001	5/28/2002	10/17/2002	5/20/2003	10/22/2003
			Sample Code	Buffalo River@HWY 5_27 May 92	Buffalo River@HWY 5_07 Oct 92	Buffalo River@HWY 5_15 Jun 93	Buffalo River@HWY 5_21 Oct 93	Buffalo River@HWY 5_31 May 94	Buffalo River@HWY 5_20 Oct 94	Buffalo River@HWY 5_30 May 95	Buffalo River@HWY 5_26 Oct 95	Buffalo River@HWY 5_12 Jun 96	Buffalo River@HWY 5_31 Oct 96	Buffalo River@HWY 5_15 May 97	Buffalo River@HWY 5_15 Oct 97	Buffalo River@HWY 5_19 May 98	Buffalo River@HWY 5_22 Oct 98	Buffalo River@HWY 5_14 Jun 99	Buffalo River@HWY 5_06 Oct 99	Buffalo River@HWY 5_29 May 00	Buffalo River@HWY 5_18 Oct 00	Buffalo River@HWY 5_15 May 01	Buffalo River@HWY 5_30 Oct 01	Buffalo River@HWY 5_28 May 02	Buffalo River@HWY 5_17 Oct 02	Buffalo River@HWY 5_20 May 03	Buffalo River@HWY 5_22 Oct 03	
Chem_Group	ChemName	output	CCME FAL ¹																									
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Organic Carbon(TOC)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units	6.5-9	7.73	7.84	7.66	7.93	7.77	8.03	7.66	8.16	7.8	7.99	8.04	9	8.02	7.98	7.91	8.1	7.92	8	7.94	7.92	8.25	7.9	7.66	8.15	
	Electrical Conductivity (EC)	µS/cm	NG	126	200	161	205	157.5	243	208	271	150	250	317	187	208	231	194	205	183	194	253	192	285	234	289	248	
	Total Suspended Solids (TSS)	mg/L	NG	-	204	-	152	209	204	47	20	212	29	33	85	112	261	154	190	104	108	50	34	19	64	38	100	
	Hardness as CaCO3	mg/L	NG	60	97	67	93	68.3	116	99.3	125	68.8	114	-	93.6	112	-	91	99.9	87.9	103	-	-	138	-	88.8	108	
	Alkalinity (total as CaCO3)	mg/L	NG	51.8	71	54.7	74.5	56	87	65.6	98.7	53.9	98	119	76.7	80.9	91.1	78.8	76.2	69.3	78.3	100	96.6	113	94.6	89.4	93.2	
	Calcium	mg/L	NG	17.1	22.5	18	25.2	17.8	31	29.2	33.2	19.2	31.9	41.7	25.3	32.1	29.8	25	26.9	24.2	29.1	31.7	27.5	35.7	28.4	22.8	29.7	
	Magnesium	mg/L	NG	4.2	8.1	5.4	7.4	5.8	9.33	6.37	10.3	5.06	8.41	12	7.38	7.66	8.55	6.97	7.96	6.66	7.47	9.63	8.5	11.9	9.28	7.75	8.94	
	Potassium	mg/L	NG	0.9	1.2	1	1.39	1.1	1.81	1.16	1.23	1.11	0.88	1.08	1.12	1.27	1.2	0.77	1.06	0.88	0.79	0.88	1.03	1.1	1.3	1.76	1.06	
	Sodium	mg/L	NG	3.3	6.5	4.3	5.5	5.09	5.83	5.27	8.09	4.46	7.11	9.44	5.77	6.27	7.2	5.74	6.83	5.95	5.78	7.29	6.76	9.43	7.17	5.26	6.16	
	Chloride	mg/L	120	2.2	2.8	2.65	2.81	2.08	2.32	2.77	3.41	2.5	4.98	4.89	4.6	6.6	5.8	4.7	3.9	3.9	2.8	3.2	3	5.3	2.8	3.1	2.9	
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sulphate	mg/L	NG	11	16.8	19	21	14	25	21	36	19	26	32	13	17	29.8	37	24	23	22	20	19	24	21	30	24	
	Colour	TCU	NG	100	300	80	120	80	80	55	50	35	80	55	120	90	800	60	120	80	350	80	120	120	95	80	55	
	Dissolved Organic Carbon (DOC)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Solids (Filtered)	mg/L	NG	104	156	103	164	141	177	143	192	126	196	241	171	163	178	150	187	144	142	200	187	265	202	128	146	
	Turbidity	NTU	NG	27	185	110	150	172	123	33.3	27.7	132.7	43.6	28.2	93.7	107	255	143	189	100	112	33.6	44.2	18.7	67.9	37.8	119	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.016	0.055	0.025	0.055	0.025	0.085	0.021	0.022	0.007	0.02	0.02	0.022	0.026	0.19	0.1	0.014	0.024	0.032	0.005	0.01	0.019	0.014	0.032	0.005	
	Total Kjeldahl Nitrogen (TKN)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.1	0.018	0.008	0.008	0.012	0.01	0.008	0.017	0.008	0.033	0.008	0.036	0.008	0.015	0.05	0.018	0.017	0.025	0.008	0.016	0.038	0.008	0.008	0.012	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Phosphorus	µg/L	4	44	357	166	370	273	229	109	60	287	85	58	136	207	408	109	382	269	186	60	59	64	181	100	330	
	Phosphorus (filtered) (Filtered)	mg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Metals ⁵	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Antimony	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5	2.2	1.5	0.7	3.6	3.3	2.5	0.8	0.8	2.6	1.2	0.7	3.4	-	6.1	-	-	-	-	-	-	-	-	-	-	
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Barium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	0.09	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.1	0.1	
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L	NG	1	13	10	16	17.2	11.9	2.5	1.6	12	3.1	3.3	13.7	10.4	17.5	13	13	8	8.2	3	3	3	3	1.3	2.8	
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cobalt	µg/L	NG	-	-	1	2	2.4	1.6	0.5	0.5	2	0.4	0.7	1.4	1.3	3.5	2	2	2	1	1	1	1	1	2.5	1.8	
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Copper	µg/L	2 - 4 ³	1	9	5	8	7.1	5.8	2.2	3.3	6.1	4.5	3.4	7.8	4.9	10.1	5	8	4</								

Physical/Major Ions	ChemName

Cyanide	Cyanide Total	mg/L	NG	-	0.001	0.002	0.002	0.002	-	0.005	0.004	0.002	0.001	0.001	0.004	0.003	0.001	0.001	0.002	0.002	0.001
Physical/Major Ions	Temperature	°C	NG	-	-	-	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chlorophyll A	µg/L	NG	-	-	-	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units	6.5-9	7.37	-	7.51	7.13	7.61	7.47	7.33	-	6.92	7.34	7.31	7.38	7.32	7.61	6.97	7.33	7.44	7.4
	Electrical Conductivity (EC)	µS/cm	NG	77.4	-	72.8	59.1	60	60	59	67	70	60	62	61.5	81.2	76.1	78.4	58.2	63.9	64.7
	Total Suspended Solids (TSS)	mg/L	NG	9	-	2.4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	Hardness as CaCO3	mg/L	31,76658	29,07154	-	24,42512	33,46668	24,87183	24,11292	29,12601	28,266	23,30565	24,11262	29,8592	29,44414	27,37358	29,44414	30,47469	23,805	26,0623	26,0623
	Alkalinity (total as CaCO3)	mg/L	NG	28.9	-	24.6	20.9	21.1	24	21	27	19.6	26.6	20.7	29	31.2	26.7	27.2	19.6	22.4	22
	Calcium	mg/L	NG	8.5	-	7.8	6.5	9.8	6.5	6.2	7.7	7.8	6.2	6.6	8	7.12	8	8.23	5.7	6.4	7.3
	Magnesium	mg/L	NG	2.56	-	2.33	1.99	2.17	2.1	2.2	2.4	2.4	1.9	2	2.4	2.38	2.3	2.41	1.7	1.9	1.9
	Potassium	mg/L	NG	1.15	-	1.28	0.92	0.91	1.2	0.8	1.2	0.91	1.2	1.1	1.12	1.1	1.25	0.9	1.01	0.76	0.76
	Sodium	mg/L	NG	2.34	-	1.74	1.87	2.34	1.8	2.1	2.8	2.1	2.1	2.1	2.2	2.08	2.3	2.23	1.71	1.45	1.45
	Chloride	mg/L	120	1.8	-	2.5	2.4	1.7	2.1	1.8	2.1	2.3	1.86	2.1	1.74	1.72	1.98	2.6	1.82	1.19	1.19
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sulphate	mg/L	NG	3.6	-	3	2.4	7.4	3	3.1	6	5	5	3	6	4	4.1	4	3	4	3
	Colour	TCU	NG	-	-	-	-	-	7	-	5	-	10	-	8	8	-	10	-	9	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	6.81	-	6.36	7.39	8.21	8.46	-	-	-	-	-	-	-	-	9	7	5	9
	Total Organic Carbon (TOC)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Solids (Filtered)	mg/L	NG	-	-	-	-	-	-	44	37	55	47	46	55	53	56	63	53	47	41
	Turbidity	NTU	NG	0.21	-	0.46	0.56	0.99	0.6	1	1.3	0.9	0.5	0.7	0.9	0.3	0.3	0.6	0.8	0.7	2.4
Nutrients	Ammonia as N	mg/L	0.021 ⁴	-	-	-	-	-	0.007	-	0.007	0.014	0.006	0.004	0.008	0.014	0.004	0.002	0.021	0.014	0.004
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrite (as NO2-N)	mg/L	0.061	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	-	-	-	-	-	0.04	0.04	-	0.076	0.008	0.008	0.008	0.008	-	0.051	0.056	0.008	0.008
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Total) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L	4	-	-	-	-	-	0.005	0.005	0.001	-	-	0.002	0.002	0.002	-	0.002	0.002	0.003	0.002
	Phosphorus (Filtered)	µg/L	4	-	-	-	-	-	0.005	0.005	0.001	-	-	0.002	0.002	0.002	-	0.002	0.002	0.003	0.002
	Phosphorus (Filtered) (Filtered)	mg/l	4	-	-	-	-	-	-	-	-	-	-	11	-	12	-	5	9	12	11
	Phosphorus (Filtered) (Filtered)	mg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biological	Total Coliforms	MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E. Coli	MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Antimony	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.2	-	-	-
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	-	-	-	-	-	-	0.5	0.3	0.5	-	-	-	-	-	-	-	-	-
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	0.5	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.3	1.7	0.4	0.3
	Barium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	-
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	0.09	-	-	-	-	-	-	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	-
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG	-	-	-	-	-	-	1	1	1	1	1	1	1	1	0.3	0.5	0.2	0.3
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG	-	-	-	-	-	-	1	1	1	1	1	1	1	1	0.1	0.1	0.1	0.1
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³	-	-	-	-	-	-	1	1	1	1	1	1	1	-	0.5	0.7	0.1	0.6
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron	µg/L	300	-	-	-	-	-	-	21	28	23	17	20	22	20	8	20	27	71	20
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	µg/L	1-7 ³	-	-	-	-	-	-	1	1	0.7	0.7	0.7	0.7	0.7	-	0.1	0.2	0.2	0.2
	Lead (Filtered)	µg/L	1-7 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lithium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9	0.8	-
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Manganese	µg/L	NG	-	-	-	-	-	-	-	-	-	-	6	6	5	-	3.5	-	5.4	10.3
	Manganese (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mercury	µg/L	0.026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	0.02
	Mercury (Filtered)	µg/L	0.026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Molybdenum	µg/L	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	-
	Molybdenum (Filtered)	µg/L	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nickel	µg/L	25-150 ³	2.2	2.8	1.8	0.6	2.4	1	1	2	1	1	1	1	1	-	0.8	0.6	0.1	0.5
	Nickel (Filtered)	µg/L	25-150 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rubidium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.4	1.6	-
	Rubidium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Selenium	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Selenium (Filtered)	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silver	µg/L	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	-
	Silver (Filtered)	µg/L	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Strontium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29	19.4	-
	Strontium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	µg/L	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	-	
Thallium (Filtered)	µg/L	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Tin	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Tin (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Titanium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Titanium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Uranium	µg/L	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3	-	
Uranium (Filtered)	µg/L	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vanadium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2</			

Appendix A Standards_Annual All Parameters1.xls

Table A.2a: CCME Water Quality Guidelines - Cameron River, All Parameters

			Location	Code	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL
			Sampled Date	Time	1/24/1995	4/13/1995	6/9/1995	8/10/1995	10/19/1995	1/5/1996	4/4/1996	6/10/1996	7/23/1996	10/13/1996	1/8/1997	6/14/1997	9/11/1997	10/30/1997	5/15/1998	6/4/1998	7/10/1998	8/7/1998	
			Site ID		GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	
			SampleCode		Cameron_River_DL_24 Jan 95	Cameron_River_DL_13 Apr 95	Cameron_River_DL_09 Jun 95	Cameron_River_DL_10 Aug 95	Cameron_River_DL_19 Oct 95	Cameron_River_DL_05 Jan 96	Cameron_River_DL_04 Apr 96	Cameron_River_DL_10 Jun 96	Cameron_River_DL_23 Jul 96	Cameron_River_DL_13 Oct 96	Cameron_River_DL_08 Jan 97	Cameron_River_DL_14 Aug 97	Cameron_River_DL_11 Sep 97	Cameron_River_DL_30 Oct 97	Cameron_River_DL_15 May 98	Cameron_River_DL_04 Jun 98	Cameron_River_DL_10 Jul 98	Cameron_River_DL_07 Aug 98	
			CCME FAL ¹																				
Physical/Major Ions	ChemName	Output unit																					
Cyanide	Cyanide Total	mg/L		NG	0.002	0.001	-	-	0.001	0.001	0.004	0.001	0.001	0.004	0.001	0.003	0.004	0.004	-	0.004	0.004	0.001	0.002
Physcial/Major Ions	Temperature	°C		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chlorophyll A	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units		6.5-9	7.3	6.86	6.93	7.67	7.49	7.29	7.26	7.55	7.55	7.52	7.42	7.51	7.52	7.62	7.33	7.53	7.58	7.29	
	Electrical Conductivity (EC)	µS/cm		NG	81.1	84.2	70.4	60	61.3	67.2	74.6	60.3	60.6	62	71.2	61	59.8	60.9	55	63.2	67.5	66.2	
	Total Suspended Solids (TSS)	mg/L		NG	4.3	3	6	3	3	3	3	3	3	4	3	3	5.7	3	3	3	3	3	
	Hardness as CaCO3	mg/L		NG	27.17382	28.45343	21.7925	22.60996	23.6149	29.47679	31.59482	25.2602	25.50296	26.14211	26.87811	24.48009	25.31155	24.61994	24.34075	24.07312	25.72466	26.96178	
	Alkalinity (total as CaCO3)	mg/L		NG	31	27.8	22.7	22.6	27.8	22.5	23.2	22.8	23.3	22.9	22.1	21.9	24.1	20.2	23.1	24.1	25	25	
	Calcium	mg/L		NG	7.04	7.47	5.66	5.74	6.06	7.35	8.86	7.27	7.07	6.98	6.39	6.69	6.73	6.38	6.74	6.26	6.74	7.12	
	Magnesium	mg/L		NG	2.33	2.38	1.86	2.01	2.06	2.58	2.3	1.89	1.9	1.94	2.24	2.07	2.09	2.11	1.83	2.05	2.16	2.23	
	Potassium	mg/L		NG	1.13	0.97	1.03	0.96	1.09	1.23	0.92	1.1	0.91	1.04	0.93	0.94	0.94	0.841	0.961	1.01	1.03	1.03	
	Sodium	mg/L		NG	2.01	2.66	1.63	1.98	1.74	1.92	2.04	1.62	1.69	1.7	1.87	1.75	1.74	1.83	1.84	1.88	1.87	1.87	
	Chloride	mg/L		120	1.55	1.61	1.98	2.05	1.64	1.75	1.87	2.11	2.19	1.69	1.53	1.78	2.05	1.78	1.87	2.02	1.7	2.1	
	Fluoride	mg/L		0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sulphate	mg/L		NG	4.2	5	3	3	3	5	5	4	3	4	5	7	4	3	3	3	3	3	
	Colour	TCU		NG	5	5	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Organic Carbon (TOC)	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Solids (Filtered)	mg/L		NG	52	49	39	40	82	67	42	45	49	54	38	29	47.7	10	44	47	56	51	
	Turbidity	NTU		NG	0.3	1.3	0.8	0.3	0.6	0.5	0.2	1	0.5	1.2	0.3	0.6	0.6	0.4	0.6	0.7	0.7	0.8	
Nutrients	Ammonia as N	mg/L		0.021 ⁴	0.047	0.005	0.006	0.015	0.006	0.025	0.002	0.009	0.011	0.008	0.028	0.003	0.013	0.013	0.028	0.006	0.005	0.014	
	Nitrate (as NO3-N)	mg/L		13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrite (as NO2-N)	mg/L		0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L		NG	0.009	0.079	0.008	0.008	0.008	0.008	0.074	0.008	0.021	0.008	0.018	0.008	0.008	0.008	0.008	0.008	0.008	0.008	
	Nitrogen (Total)	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Total) (Filtered)	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L		NG	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	
	Phosphorus	µg/L		4	9	8	10	7	6	8	17	7	9	14	8	14	9	7	14	11	11	18	
	Phosphorus (Filtered) (Filtered)	µg/L		4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Biochemical Oxygen Demand (BOD)	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Demand Parameters	Total Coliforms	MPN/100mL		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	E. Coli	MPN/100mL		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Metals ¹	Aluminum (Filtered)	µg/L		5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L		5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	2.3	13.8	13.1	9.8	11.9	13.4	28	4.4	24	14.3	10.9	10.9	
	Antimony	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.2	0.3	1.2	0.2	0.6	
	Antimony (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L		5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.9	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
	Arsenic (Filtered)	µg/L		5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Barium	µg/L		NG	-	-	-	-	-	-	5.1	3.8	3.1	3.8	4.4	3.4	3.7	3.9	3.3	3.4	3.2	3.3	
	Barium (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L		NG	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.13	0.1	0.1	0.1	0.1	
	Beryllium (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L		NG	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.5	0.1	0.1	0.1	
	Bismuth (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L		1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L		1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L		0.09	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Cadmium (Filtered)	µg/L		0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L		NG	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	
	Cesium (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L		NG	0.6	1	0.7	0.3	0.5	0.2	1	0.2	0.8	0.2	0.2	1.6	2	0.3	2	0.2	0.3	0.2	
	Chromium (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cobalt	µg/L		NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.63	0.1	0.1	0.1	0.		

Table A.2a: CCME Water Quality Guidelines - Cameron River, All Parameters

[illegible]

Table A.2a: CCME Water Quality Guidelines - Cameron River, All Parameters

			Location Code	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL
			Sampled Date Time	7/24/2002	9/5/2002	9/24/2002	10/24/2002	11/21/2002	12/19/2002	2/24/2003	3/31/2003	5/5/2003	6/5/2003	7/7/2003	7/31/2003	8/22/2003	10/1/2003	10/31/2003	12/6/2003	1/6/2004
			Site ID	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ
			SampleCode	Cameron River_DL_24 Jul 02	Cameron River_DL_05 Sep 02	Cameron River_DL_24 Sep 02	Cameron River_DL_24 Oct 02	Cameron River_DL_21 Nov 02	Cameron River_DL_19 Dec 02	Cameron River_DL_24 Feb 03	Cameron River_DL_31 Mar 03	Cameron River_DL_05 May 03	Cameron River_DL_05 Jun 03	Cameron River_DL_07 Jul 03	Cameron River_DL_31 Jul 03	Cameron River_DL_22 Aug 03	Cameron River_DL_01 Oct 03	Cameron River_DL_31 Oct 03	Cameron River_DL_05 Dec 03	Cameron River_DL_06 Jan 04
			CCME FAL ¹																	
Physical/Major Ions	ChemName	Output unit																		
Physical/Major Ions	Cyanide Total	mg/L	NG	0.003	-	-	0.003	0.003	0.003	0.003	0.003	-	0.003	0.003	0.003	0.003	0.003	0.01	0.01	0.01
	Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	0.5	0.62	0.61	0.55	-	-	-	-	-	0.51	-	0.52	-	-	-	-	-
	pH	pH Units	6.5-9	7.51	7.42	7.48	7.56	7.38	7.3	7.25	7.58	7.25	7.57	7.6	7.51	7.47	7.51	7.51	7.51	7.35
	Electrical Conductivity (EC)	µS/cm	NG	68.2	69.4	68.9	70.4	53.8	79.6	85.4	92.2	70.9	67.6	75.6	76.9	75.8	80.8	78.4	89.7	68.6
	Total Suspended Solids (TSS)	mg/L	NG	3	3	4	5	3	4	3	-	3	3	3	3	3	4	3	3	3
	Hardness as CaCO3	mg/L	NG	29.3	28.9	28.1	28.6	29.8	32.3	36.1	36.9	32.4	22.2	26.9	27.4	29	32.0333333333333	31.6	33.8	36
	Alkalinity (total as CaCO3)	mg/L	NG	25.5	25.4	25	25.9	18.4	29.2	32.6	34.1	31.1	25.3	26.7	27.3	27.7	27.5	30.1	30.7	31
	Calcium	mg/L	NG	7.61	7.58	7.43	7.57	5.15	8.7	9.88	10.3	8.81	5.53	7.3	7.37	7.79	8.43	9.13	9.29	9.7
	Magnesium	mg/L	NG	2.49	2.42	2.32	2.36	1.93	2.56	2.78	2.72	2.52	2.03	2.1	2.18	2.31	2.54333333333333	2.53	2.64	2.9
	Potassium	mg/L	NG	1.17	1.13	1.1	0.77	1.02	1.26	1.39	1.24	1.08	1.08	1.24	1.06	1.08	1.18	1.21	1.25	1.26
	Sodium	mg/L	NG	2.01	1.96	1.89	1.98	1.88	2.29	2.49	2.58	2.3	1.71	1.9	1.84	1.93	2.15666666666667	2.22	2.26	2.3
	Chloride	mg/L	120	2.2	1.5	1.7	1.7	1.8	2.2	3	2.9	2.2	1.8	1.7	1.6	1.8	1.7	2	-	2.4
	Fluoride	mg/L	0.12	0.07	0.06	0.06	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sulphate	mg/L	NG	5	5	12	9	3.9	4	-	6	6	4	6	7	-	6.33333333333333	-	4	6
	Colour	TCU	NG	20	10	15	15	10	10	20	5	20	10	10	5	10	11.6666666666667	-	-	5
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	8.5	8.2	6.1	6.4	-	-	7.1	-	8	7.7	7.9	7.4	-	-	6.4	-	-
	Total Organic Carbon (TOC)	mg/L	NG	8.2	8.6	6.3	6	-	-	7.4	-	8	7.6	7.9	7.3	-	-	6.4	-	-
	Total Solids (Filtered)	mg/L	NG	52	47	52	51	60	60	54	74	52	48	62	46	42	47.3333333333333	32	52	66
Turbidity	NTU	NG	0.6	1	0.9	0.5	1.8	0.6	0.4	0.2	1.3	1.5	1.5	0.7	1.4	0.96666666666667	1	0.66	0.72	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.005	0.005	0.016	0.005	0.005	0.023	0.018	0.012	0.005	0.005	0.005	0.009	0.009	0.005	0.016	0.022	0.87
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	0.044	0.082	0.046	0.008	0.008	0.008	-	0.008	0.008	0.008	0.02
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	0.008	0.009	0.009	0.009	0.009	0.009	-	0.009	0.009	0.009	0.01
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.008	0.008	0.01	0.008	0.044	0.029	-	-	-	0.008	-	0.008	-	0.008	0.008	0.008	0.02
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Total) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
	Phosphorus	µg/L	4	17	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
	Phosphorus (Filtered) (Filtered)	mg/L	4	-	0.064	0.067	0.055	0.074	0.098	0.007	0.004	0.008	0.013	0.004	0.007	0.011	0.004	0.01	0.01	0.01
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biological	Total Coliforms	MPN/100mL	NG	2	1	1	2	2	1	2	2	1	1	1	1	1	1	1	1	1
	E. Coli	MPN/100mL	NG	2	1	1	2	2	1	2	2	1	1	1	1	1	1	1	1	1
Metals ¹	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	30	30	30	30	41	30	30	6.06	30	30	30	30	30	30	30	30	30
	Antimony	µg/L	NG	0.7	0.6	0.8	1.1	0.8	1.1	-	0.874	-	-	0.3	0.6	0.7	0.8	0.7	0.7	0.3
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	1	1	1.7	1	1.5	1	1	0	1	1	1	1	1	1	1	1	1
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	4	4	8	4	5	5	6	5.47	5.2	4.1	4.2	4.1	3	4.6	5.1	5.3	5.4
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	2	2	2	2	2	2	2	0.1	0.02	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	0.09	0.3	0.3	0.3	0.3	0.3	0.3	0.1	0.02	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG	0.4	0.4	0.4	-	0.4	0.4	0.1	0.008	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	3	3	3	3	3	3	3	1	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.6	0.3	0.3
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	1	1	1	1	1	1	1	-	0.172	0.5	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.2
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³	2	2	2	2	-	-	1	0.14	1	0.4	1	1.8	-	1.43333333333333			

Table A.2a: CCME Water Quality Guidelines - Cameron River, All Parameters

		Location_Code	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL		
		Sampled_Date_Time	3/1/2004	4/15/2004	5/6/2004	6/10/2004	7/8/2004	8/16/2004	9/9/2004	10/18/2004	12/21/2004	2/1/2005	3/9/2005	4/7/2005	5/2/2005	6/2/2005	7/7/2005	8/4/2005	9/6/2005	10/25/2005		
		Site_ID	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ		
		SampleCode	Cameron River_DL_01_Mar_04	Cameron River_DL_15_Apr_04	Cameron River_DL_06_May_04	Cameron River_DL_10_Jun_04	Cameron River_DL_08_Jul_04	Cameron River_DL_16_Aug_04	Cameron River_DL_09_Sep_04	Cameron River_DL_18_Oct_04	Cameron River_DL_21_Dec_04	Cameron River_DL_01_Feb_05	Cameron River_DL_03_Mar_05	Cameron River_DL_03_Mar_05	Cameron River_DL_07_Apr_05	Cameron River_DL_02_May_05	Cameron River_DL_02_Jun_05	Cameron River_DL_07_Jul_05	Cameron River_DL_04_Aug_05	Cameron River_DL_06_Sep_05	Cameron River_DL_25_Oct_05	
		CCME_FAL_1																				
Physical/Major Ions	ChemName	Output Unit																				
Physical/Major Ions	Cyanide Total	mg/L	NG	0.01	0.005	-	0.001	-	0.001	-	-	0.002	-	-	-	-	0.002	-	-	-	-	
	Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units	6.5-9	7.51	7.56	7.47	7.45	7.62	7.68	7.48	7.61	7.44	7.38	7.38	7.55	7.45	7.61	7.61	7.67	7.64	7.34	
	Electrical Conductivity (EC)	µS/cm	NG	85.8	85.3	81.8	63.6	72.8	71.4	73.6	76.4	86	89.6	90.6	88.3	87.6	71.6666666666667	73.7	73.6	74.2	74	
	Total Suspended Solids (TSS)	mg/L	NG	4	3	3	2	3	3	3	3	3	3	3	3	3	3	3	4	3	3	
	Hardness as CaCO3	mg/L	NG	35	38.7	38.3	28	39.6	29.4	42.1	29.4	35.3	37	37.5	36.7	35.4	29.7666666666667	32	30.6	34	32	
	Alkalinity (total as CaCO3)	mg/L	NG	31.4	31.8	31.5	23.4	26.7	26.8	27.2	29.4	32.8	34.1	33.6	33.2	33	27.5666666666667	28.3	27.3	28	27.2	
	Calcium	mg/L	NG	9.4	10.4	10.3	7.7	8.1	8.1	8.7	7.9	9.5	10	9.9	9.9	9.5	8.13333333333333	8.8	8.3	9.6	8.2	
	Magnesium	mg/L	NG	2.8	3.1	3	2.2	2.5	2.2	2.6	2.4	2.8	2.9	3.1	2.9	2.8	2.3	2.4	2.4	2.5	2.8	
	Potassium	mg/L	NG	1.3	1.38	1.38	1	1.1	1.1	1.1	1	1.4	1.41	1.38	1.29	1.26	1.14	1.1	1.13	0.9	0.9	
	Sodium	mg/L	NG	2.4	2.7	2.6	1.9	2	2.08	2.1	1.7	2.6	2.7	2.6	2.5	2.4	2.03333333333333	2	1.9	1.8	1.8	
	Chloride	mg/L	120	-	2.6	-	-	1.9	-	1.9	2.3	2.9	2.6	2.6	2.7	2.6	2.13333333333333	2.1	2.1	2.1	2.3	
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	
	Sulphate	mg/L	NG	4.6	4.6	4.6	-	3.9	4.2	4	4	5	4	4	4	7	4	4	4	4	4	
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	6.3	5.9	6.7	-	7.2	6.7	6.3	6.8	6.4	7.1	6.6	6.2	6.4	6.93333333333333	7.8	9.6	7.1	7.6	
	Total Organic Carbon (TOC)	mg/L	NG	6.3	-	6.9	-	6.6	7.5	6.5	6.5	-	7	-	-	-	-	7.2	10	7.5	-	
	Total Solids (Filtered)	mg/L	NG	40	54	48	53	46	42	62	42	58	30	42	56	46	37	46	46	46	48	
Turbidity	NTU	NG	-	0.86	0.81	1.15	2.1	0.78	0.97	1.61	0.79	0.59	0.35	0.26	0.29	0.773333333333333	0.85	0.76	0.82	1.31		
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
	Nitrate (as NO3-N)	mg/L	13	0.03	0.1	0.1	0.1	0.1	0.1	0.01	0.01	0.01	0.02	-	0.06	0.01	-	-	-	-	0.01	
	Nitrite (as NO2-N)	mg/L	0.06	0.03	0.05	0.05	0.05	0.05	0.05	0.01	0.01	0.01	0.01	-	-	0.01	-	-	-	-	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.01	0.2	0.2	0.2	0.2	0.2	0.01	0.01	-	0.06	-	0.06	-	-	-	-	-	-	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Total) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	0.002	0.002	0.002	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Phosphorus	µg/L	4	-	10	10	10	10	10	90	-	50	-	70	10	10	10	10	10	10	10	
	Phosphorus (Filtered) (Filtered)	mg/L	0.01	0.01	0.01	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Coliforms	MPN/100mL	NG	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1
	Biological	E. Coli	MPN/100mL	NG	1	1	1	1	2	1	1	1	1	1	1	1	1	1	4.1	1	-	-
		Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	30	30	30	30	30	30	30	30	30	30	12	30	30	30	13.3	30	11.3	8.1
	Metals ¹	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	30	30	30	30	30	30	30	30	30	30	12	30	30	30	13.3	30	11.3	8.1
Antimony		µg/L	NG	0.2	0.1	0.1	0.2	0.3	0.7	0.2	0.3	0.2	0.4	0.7	2.17	0.1	0.466666666666667	0.8	0.1	0.1	0.1	
Antimony (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Arsenic		µg/L	5	1	1	1	1	1	1	1	0.4	0.4	0.4	0.4	0.5	0.333333333333333	0.4	0.8	0.9	0.4		
Arsenic (Filtered)		µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Barium		mg/L	NG	5.4	5.6	5.6	4	4	3.9	4	4.8	4.5	6.1	5.3	5.2	5.8	5.4	4.43333333333333	4.5	4.6	4.5	4.6
Barium (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Beryllium		µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Beryllium (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bismuth		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bismuth (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron - soluble		µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron - soluble (Filtered)		µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cadmium		µg/L	0.09	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.05	0.1	0.05	0.05	
Cadmium (Filtered)		µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cesium		mg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Cesium (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chromium		µg/L	2.4	NG	0.3	0.5	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.1	0.4	0.3	0.3	0.3	0.4	
Chromium (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cobalt		mg/L	NG	0.1	0.1	0.1	0.1	0.														

Table A.2a: CCME Water Quality Guidelines - Cameron River, All Parameters

[illegible]

Notes:

² Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

³ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Physical/Major Ions	ChemName	output unit

[illegible]

Appendix A Standards_Annual All Parameters1.xls

Table A.2a: CCME Water Quality Guidelines - Cameron River, All Parameters

		Location_Code	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	Cameron River_DL	
		Sampled_Date_Time	11/30/2010	12/21/2010	1/26/2011	2/24/2011	3/21/2011	4/26/2011	5/30/2011	6/15/2011	7/13/2011	8/15/2011	9/22/2011	10/19/2011	11/23/2011	12/21/2011	1/26/2012	2/29/2012	3/28/2012	4/26/2012	
		Site_ID	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	
		SampleCode	Cameron River_DL_30 Nov 10	Cameron River_DL_21 Dec 10	Cameron River_DL_26 Jan 11	Cameron River_DL_24 Feb 11	Cameron River_DL_21 Mar 11	Cameron River_DL_26 Apr 11	Cameron River_DL_30 May 11	Cameron River_DL_24 Jun 11	Cameron River_DL_13 Jul 11	Cameron River_DL_15 Aug 11	Cameron River_DL_22 Sep 11	Cameron River_DL_19 Oct 11	Cameron River_DL_23 Nov 11	Cameron River_DL_21 Dec 11	Cameron River_DL_26 Jan 12	Cameron River_DL_29 Feb 12	Cameron River_DL_28 Mar 12	Cameron River_DL_26 Apr 12	
			CCME FAL ¹																		
Physical/Major Ions	ChemName	Output unit																			
Physical/Major Ions	Cyanide Total	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Temperature	°C	NG	-	-	-	-	-	-	12.17	-	15.42	-	21.58	-	17.13	-	11.78	-	4.46	
	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-0.05	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units	7.7	7.64	7.52	7.425	7.53	7.54	7.47	7.75	7.87	7.77	7.75	7.66	7.54	7.39	7.39	7.48	7.4	7.43	
	Electrical Conductivity (EC)	µS/cm	NG	88.6	87.7	94.5	90.15	90.2	74	71.5	71.5	72.6	80.4	71.8	73.1	82.2	85.1	90.9	91	89	
	Total Suspended Solids (TSS)	mg/L	NG	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
	Hardness as CaCO3	mg/L	NG	38.1	39.1	39.7	41.1	40.4	42.5	32.6	35.9	32.1	35.7	33.3	35.7	36.9	38.3	37.6	38.2	37.6	
	Alkalinity (total as CaCO3)	mg/L	NG	34.5	36.4	37.1	37.15	37.6	37.2	27.05	29.9	29.4	31.1	30	29.4	30.5	30.8	31.8	33.2	33.1	
	Calcium	mg/L	NG	10.3	10.7	10.9	11.2	11.1	11.5	8.75	8.9	9.7	8.8	9.9	8.9	9.3	9.6	10	10.3	10.2	
	Magnesium	mg/L	NG	3	3	3.1	3.2	3.1	3.3	2.5	2.5	2.8	2.5	2.5	2.5	2.8	2.9	3.1	3	3.1	
	Potassium	mg/L	NG	1.3	1.4	1.4	1.4	1.4	1.4	1.05	1.1	1.2	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.3	
	Sodium	mg/L	NG	2.7	2.7	2.9	3	3.1	3	2.25	2.3	2.5	2.1	2.5	2.2	2.5	2.5	2.7	2.8	2.9	
	Chloride	mg/L	120	2.9	2.9	3	2.9	3	3	2.45	2.2	2.6	2.3	2.5	2.2	2.3	2.6	2.7	3.1	3.1	
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sulphate	mg/L	NG	4	5	5	5	5	5	4	4	4	4	4	4	4	5	5	5	5	
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	7	6.7	6.6	7.05	6.5	6.8	5.3	6.1	5.7	6.6	5.9	5.6	5.3	5.9	6.6	6.8	6.4	
	Total Organic Carbon (TOC)	mg/L	NG	7.3	7	6.7	7.45	6.7	6.8	6.35	6.5	5.9	6.6	6.3	6	5.9	6.3	6.3	6.9	6.8	
	Total Solids (Filtered)	mg/L	NG	54	52	52	62	54	60	49	50	52	42	50	42	50	44	56	58	72	
Turbidity	NTU	NG	0.33	0.37	0.26	0.26	0.25	0.44	0.475	0.64	0.48	0.48	0.49	0.43	0.33	0.34	0.48	0.36	0.32		
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.01	0.02	0.06	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.03	0.02	0.01	
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.06	0.01	0.07	0.075	0.15	0.03	0.01	0.05	0.04	0.01	0.01	0.01	0.01	0.02	0.04	0.07	0.05	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Total) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Phosphorus	µg/L	4	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	3	
	Phosphorus (Filtered) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Coliforms	MPN/100mL	NG	1	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1	
	Biological	E. Coli	MPN/100mL	NG	1	1	1	1	1	1	1	1	1	7.5	1	1	1	1	1	1	1
		Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	5.1	6	5	5.7	5.2	3.9	13.5	14	12.5	9	10.8	9.6	9	4	10	6	7
	Metals ¹	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	5.1	6	5	5.7	5.2	3.9	13.5	14	12.5	9	10.8	9.6	9	4	10	6	7
		Antimony	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.3	0.2	0.1	0.4
		Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Arsenic	µg/L	5	0.5	0.5	0.4	0.45	0.4	0.4	0.4	0.3	0.4	0.4	0.7	0.5	0.4	0.4	0.5	0.4	0.4
		Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Barium	µg/L	NG	5	5.9	5.3	6	5.8	6	4.8	3.7	6	4.7	4	4.2	4.5	4.8	5.3	5.2	5.7
		Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Beryllium	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Beryllium (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bismuth		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bismuth (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron - soluble		µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron - soluble (Filtered)		µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cadmium		µg/L	0.09	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.1	0.05	0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.05	
Cadmium (Filtered)		µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cesium		µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Cesium (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chromium		µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	
Chromium (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cobalt		µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Cobalt (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Copper		µg/L	2 - 4 ³	0.6	0.5	0.6	2.4	0.6	0.6	0.65	0.6	0.6	1	0.6	0.2	0.8	0.9	0.2	1	0.6	
Copper (Filtered)		µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Iron		µg/L	300	11	12	11	11.5	11	10	20	20	14	13	72	50	15	12	18	17	21	
Iron (Filtered)		µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lead		µg/L	1.7 ³	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Lead (Filtered)		µg/L	1.7 ³	-																	

Table A.2a: CCME Water Quality Guidelines - Cameron River, All Parameters

[illegible]

Notes:

² Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

^a Guideline varies with hardness. Range given.

* Guideline varies with pH and temperature. Most stringent given

CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Table A.2a: CCME Water Quality Guidelines - Cameron River, All Parameters

[illegible]

Notes:

² Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH.

^a Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given

^a CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.2a: CCME Water Quality Guidelines - Cameron River, All Parameters

[illegible]

Notes:

² Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given

³ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for

illustrative purposes
 NC: No guidelines

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.2a: CCME Water Quality Guidelines - Cameron River, All Parameters

			Location Code	Cameron River_DL
			Sampled Date Time	12/13/2016
			Site ID	GNWT_GSL_WQ
			SampleCode	Cameron River_DL_13 Dec 16
			CCME FAL ¹	
Physical/Major Ions	ChemName	Output unit		
Cyanide	Cyanide Total	mg/L	NG	-
Physical/Major Ions	Temperature	°C	NG	-
	Chlorophyll A	µg/L	NG	1
	Bicarbonate as CaCO3	mg/L	NG	-
	Silica	mg/L	NG	0.746
	pH	pH Units	6.5-9	7.51
	Electrical Conductivity (EC)	µS/cm	NG	91.8
	Total Suspended Solids (TSS)	mg/L	NG	3
	Hardness as CaCO3	mg/L	NG	39
	Alkalinity (total as CaCO3)	mg/L	NG	36.1
	Calcium	mg/L	NG	10.4
	Magnesium	mg/L	NG	3.2
	Potassium	mg/L	NG	1.5
	Sodium	mg/L	NG	3
	Chloride	mg/L	120	3.2
	Fluoride	mg/L	0.12	0.1
	Sulphate	mg/L	NG	6
	Colour	TCU	NG	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	6.6
	Total Organic Carbon (TOC)	mg/L	NG	9.9
	Total Solids (Filtered)	mg/L	NG	48
	Turbidity	NTU	NG	0.32
Nutrients	Ammonia as N	mg/L	0.021 ²	0.007
	Nitrate (as NO3-N)	mg/L	13	0.005
	Nitrite (as NO2-N)	mg/L	0.06	0.001
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.0051
	Nitrogen (Total)	mg/L	NG	0.347
	Nitrogen (Total) (Filtered)	mg/L	NG	0.344
	Orthophosphate (as P)	mg/L	NG	0.001
	Phosphorus (Filtered)	µg/L	4	2
	Phosphorus (Filtered) (Filtered)	mg/L	4	0.0024
Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG	-
Biological	Total Coliforms	MPN/100mL	NG	1
	E. Coli	MPN/100mL	NG	1
Metals ³	Aluminum (Filtered)	µg/L	5 @ pH < 6.5 100 @ > 6.5 ²	1
	Aluminum Total	µg/L	5 @ pH < 6.5 100 @ > 6.5 ²	3.9
	Antimony	µg/L	NG	0.1
	Antimony (Filtered)	µg/L	NG	0.1
	Arsenic	µg/L	5	0.4
	Arsenic (Filtered)	µg/L	5	0.4
	Barium	µg/L	NG	5.3
	Barium (Filtered)	µg/L	NG	5.1
	Beryllium	µg/L	NG	0.1
	Beryllium (Filtered)	µg/L	NG	0.1
	Bismuth	µg/L	NG	0.2
	Bismuth (Filtered)	µg/L	NG	0.2
	Boron - soluble	µg/L	1500	7.2
	Boron - soluble (Filtered)	µg/L	1500	7.2
	Cadmium	µg/L	0.09	0.05
	Cadmium (Filtered)	µg/L	0.09	0.05
	Cesium	µg/L	NG	0.1
	Cesium (Filtered)	µg/L	NG	0.1
	Chromium	µg/L	NG	0.1
	Chromium (Filtered)	µg/L	NG	0.1
	Cobalt	µg/L	NG	0.1
	Cobalt (Filtered)	µg/L	NG	0.1
	Copper	µg/L	2 - 4 ²	0.2
	Copper (Filtered)	µg/L	2 - 4 ²	0.2
	Iron	µg/L	300	9
	Iron (Filtered)	µg/L	300	5
	Lead	µg/L	1-7 ²	0.1
	Lead (Filtered)	µg/L	1-7 ²	0.1
	Lithium	µg/L	NG	2.1
	Lithium (Filtered)	µg/L	NG	2.2
	Manganese	µg/L	NG	7.2
	Manganese (Filtered)	µg/L	NG	0.5
	Mercury	µg/L	0.026	0.01
	Mercury (Filtered)	µg/L	0.026	0.01
	Molybdenum	µg/L	73	0.1
	Molybdenum (Filtered)	µg/L	73	0.1
	Nickel	µg/L	25-150 ³	0.4
	Nickel (Filtered)	µg/L	25-150 ³	0.3
	Rubidium	µg/L	NG	2.8
	Rubidium (Filtered)	µg/L	NG	2.8
	Selenium	µg/L	1	0.3
	Selenium (Filtered)	µg/L	1	0.3
	Silver	µg/L	0.25	0.1
	Silver (Filtered)	µg/L	0.25	0.1
	Strontium	µg/L	NG	39.2
	Strontium (Filtered)	µg/L	NG	38.4
	Thallium	µg/L	0.8	0.1
	Thallium (Filtered)	µg/L	0.8	0.1
	Tin	µg/L	NG	0.1
	Tin (Filtered)	µg/L	NG	0.1
	Titanium	µg/L	NG	0.1
	Titanium (Filtered)	µg/L	NG	0.1
	Uranium	µg/L	15	0.3
	Uranium (Filtered)	µg/L	15	0.3
	Vanadium	µg/L	NG	0.1
	Vanadium (Filtered)	µg/L	NG	0.1
	Zinc	µg/L	30	0.4
	Zinc (Filtered)	µg/L	30	0.4

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.2b: CCME Water Quality Guidelines - Cameron River, All Parameters with <DL

			Sampled Date/Time	7/18/1983	8/12/1983	8/29/1983	9/26/1983	4/25/1984	4/8/1985	7/11/1985	8/14/1985	11/7/1985	12/4/1985	2/28/1986	4/28/1986	5/16/1986	6/9/1986	7/4/1986	8/13/1986	9/19/1986	12/17/1986	1/13/1987
			SampleCode	Cameron River_18 Jul 83	Cameron River_12 Aug 83	Cameron River_29 Aug 83	Cameron River_26 Sep 83	Cameron River_25 Apr 84	Cameron River_08 Apr 85	Cameron River_11 Jul 85	Cameron River_14 Aug 85	Cameron River_07 Nov 85	Cameron River_04 Dec 85	Cameron River_28 Feb 86	Cameron River_28 Apr 86	Cameron River_16 May 86	Cameron River_09 Jun 86	Cameron River_04 Jul 86	Cameron River_13 Aug 86	Cameron River_19 Sep 86	Cameron River_17 Dec 86	Cameron River_13 Jan 87
			CCME FAL ¹																			
Chem_Group	ChemName	output unit																				
Physical/Major Ions	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	<0.001	0.002	0.001	0.001	0.001	0.002	0.001	0.001
	Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units	6.5-9	7.5	7.2	7.2	7.4	7	7.3	7.5	7.5	7.5	7.5	7.4	7.33	7.4	7.35	7.32	7.37	7.7	7.1	7.4
	Electrical Conductivity (EC)	µS/cm	NG	66	62	63	63	82	83.9	57.9	60	62.4	66.9	71.1	75	76.3	58	59.3	59	60.4	73.1	73.1
	Total Suspended Solids (TSS)	mg/L	NG	-	-	-	-	-	<3	2	1	1	1	<3	<3	1	1	1	1	1	1	<3
	Hardness as CaCO3	mg/L	NG	25.20291	25.88455	25.6274	25.5398	31.2698	36.7501	27.5374	24.4665	25.6274	23.9671	29.9468	29.9468	28.5362	24.3044	22.8938	22.8938	24.0547	28.948	30.7704
	Alkalinity (total as CaCO3)	mg/L	NG	20	21	21	22	27	31.7	23	23.9	22.5	23.2	27.6	29.6	25.1	20.7	22.5	22.5	24.2	27.6	27.3
	Calcium	mg/L	NG	6.63	6.87	6.8	6.6	8.4	10.1	7.4	6.5	6.8	6.3	8.2	8.2	7.8	6.6	6.2	6.2	6.5	7.8	8.2
	Magnesium	mg/L	NG	2.1	2.12	2.1	2.2	2.5	2.8	2.2	2	2.1	2	2.3	2.3	2.2	1.9	1.8	1.8	1.9	2.3	2.5
	Potassium	mg/L	NG	0.98	0.98	1.1	1.1	1.2	1.3	1.01	0.98	0.94	1	1.23	1.2	1.1	0.92	0.89	0.87	0.91	1.21	1.17
	Sodium	mg/L	NG	1.89	-	1.9	2	2.3	2.5	1.8	1.9	1.8	1.9	2.3	2.3	2.2	1.7	1.7	1.6	1.8	2.33	2.3
	Chloride	mg/L	120	-	-	2.5	2.4	2.5	2.5	3.3	2.6	1.7	2	1.6	1.9	2.4	2.77	1.9	1.8	1.6	1.8	2.1
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sulphate	mg/L	NG	3.5	4.5	3.8	3.9	3.2	4.5	4.7	3.3	2.3	3.6	3.3	4	3	3.2	2.8	2.3	2.1	3.5	3.6
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	-	-	-	-	-	6.5	6.9	6	6.4	6.4	7.1	6.2	6.7	6.8	7.3	6.8	6.7	6.6	6.5
	Total Organic Carbon (TOC)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Solids (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Turbidity	NTU	NG	-	-	-	-	-	0.8	0.4	0.4	0.4	0.4	0.3	0.5	0.4	0.8	1.6	0.5	0.6	0.4	0.3
Nutrients	Ammonia as N	mg/L	0.021 ⁴	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Total) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L	4	-	-	-	-	-	-	8	14	7	5	13	6	3	-	-	-	-	-	-
	Phosphorus (filtered) (Filtered)	mg/l	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Demand Parameters	Total Coliforms	MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E. Coli	MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Antimony	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	-	<1	<1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	0.09	-	0.07	0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG	0.7	<0.5	0.6	1.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 ³	<1	<0.5	0.8	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper (Filtered)	µg/L	2 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A.2b: CCME Water Quality Guidelines - Cameron River, All Parameters with <DL

			Sampled Date	Time	1/9/1991	5/28/1991	7/15/1991	8/25/1992	10/2/1992	1/22/1993	4/16/1993	7/6/1993	9/3/1993	10/22/1993	1/24/1994	2/4/1994	4/20/1994	6/2/1994	8/18/1994	10/6/1994	1/24/1995	4/13/1995	6/9/1995	
			SampleCode		Cameron River 09 Jan 91	Cameron River 28 May 91	Cameron River 15 Jul 91	Cameron River 25 Aug 92	Cameron River 02 Oct 92	Cameron River 22 Jan 93	Cameron River 16 Apr 93	Cameron River 06 Jul 93	Cameron River 03 Sep 93	Cameron River 22 Oct 93	Cameron River 24 Jan 94	Cameron River 04 Feb 94	Cameron River 20 Apr 94	Cameron River 02 Jun 94	Cameron River 18 Aug 94	Cameron River 06 Oct 94	Cameron River 24 Jan 95	Cameron River 13 Apr 95	Cameron River 09 Jun 95	
				CCME FAL ¹																				
Chem_Group	ChemName	output unit																						
Physical/Major Ions	Cyanide Total	mg/L	NG		0.002	0.002	0.002	-	<0.005	<0.004	0.002	<0.001	<0.001	0.004	0.003	<0.001	0.001	0.002	0.002	<0.001	0.002	<0.001	-	
	Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	µS/cm	6.5-9	7.51	7.13	7.61	7.47	7.33	-	6.92	7.34	7.31	7.38	7.32	7.61	6.97	7.33	7.44	7.4	7.3	6.86	6.93		
	Electrical Conductivity (EC)	µS/cm	NG	72.8	59.1	60	60	59	67	70	60	62	61.5	61.2	76.1	79.4	58.2	63.9	64.7	81.1	84.2	70.4		
	Total Suspended Solids (TSS)	mg/L	NG	2.4	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	4	<3	<3	3	4.3	<3	6	
	Hardness as CaCO3	mg/L	NG	29.07154	24.42532	33.40666	24.8783	24.1292	29.1101	29.3598	23.3056	24.7162	29.8592	27.37358	29.4474	30.47469	21.2335	23.805	26.0523	27.17382	28.45343	21.7925		
	Alkalinity (total as CaCO3)	mg/L	NG	24.6	20.9	21.1	24	21	27	26.6	19.6	20.7	26.2	31.2	26.7	28	27.2	22.4	22	31	27.7	22.7		
	Calcium	mg/L	NG	7.8	6.5	9.8	6.5	6.2	7.7	7.8	6.2	6.6	8	7.12	8	8.23	5.7	6.4	7.3	7.04	7.47	5.66		
	Magnesium	mg/L	NG	2.33	1.99	2.17	2.1	2.33	2.4	1.9	2.4	2.33	2.3	2.41	1.7	2.3	1.9	1.9	2.33	2.38	1.86			
	Potassium	mg/L	NG	1.28	0.92	0.91	1.2	0.8	1.2	0.91	1.1	1.2	1.12	1.1	1.25	0.9	1.01	0.76	1.13	1.2	0.97			
	Sodium	mg/L	NG	2.34	1.74	1.87	1.8	2.1	2.2	2.1	3	1.7	2.2	2.03	2.05	2.23	1.4	1.71	1.45	2.01	2.66	1.63		
	Chloride	mg/L	120	2.4	-	2.4	1.7	2.1	1.8	2.1	2.3	-	1.86	1.74	1.72	2.3	1.98	2.6	1.82	1.19	1.55	1.61	1.98	
	Fluoride	mg/L	0.12	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sulphate	mg/L	NG	-	2.4	7.4	6	3.1	5	5	5	5	4	4.1	6	4	3	4.2	5	4.3	5	<3		
	Colour	TCU	NG	-	-	-	7	5	5	5	10	8	8	8	10	9	7	4	5	9	5	5	8	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	7.39	8.21	8.46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Organic Carbon (TOC)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total Solids (Filtered)	mg/L	NG	-	-	-	44	37	55	80	47	46	55	53	56	63	53	47	41	52	49	39			
Turbidity	NTU	NG	0.56	0.99	0.6	1	1.3	0.9	0.5	0.7	0.4	0.9	0.3	0.3	0.6	0.8	0.7	2.4	0.3	1.3	0.8			
Nutrients	Ammonia as N	mg/L	0.021 ⁴	-	-	-	<0.007	<0.007	0.014	0.006	0.004	0.008	0.014	0.046	0.004	<0.002	0.021	0.014	0.004	0.047	0.005	0.006		
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	-	-	-	0.04	<0.04	-	0.076	<0.008	<0.008	<0.008	-	0.051	0.056	<0.008	<0.008	<0.008	0.009	0.079	<0.008		
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Nitrogen (Total) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Orthophosphate (as P)	mg/L	NG	-	-	-	<0.005	<0.005	<0.001	-	<0.002	<0.002	<0.002	-	<0.002	0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002		
Phosphorus	µg/L	4	-	-	30	-	-	-	-	11	5	18	-	5	9	12	11	6	9	8	10			
Phosphorus (filtered) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Biological	Total Coliforms	MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	E. Coli	MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	5.2	-	-	-	-	-		
	Antimony	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Arsenic	µg/L	5	-	-	-	<0.5	<0.3	0.5	-	0.3	<0.3	<0.3	<0.3	-	<0.3	<0.3	1.7	0.4	<0.3	<0.3	<0.3	0.3	
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Barium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-		
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Beryllium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-		
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-		
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-		
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Cadmium	µg/L	0.09	-	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L	NG	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	0.3	0.5	<0.2	0.3	<0.2	0.6	1	0.7
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cobalt	µg/L	NG	-	-	-	<1	-	-	-	-	1	<1	<1	<1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Copper	µg/L	2 ³	-	-	-	1	1	<1	<1	<1	<1	<1	<1	1	-	0.5	0.7	0.1	0.6	-	0.5	0.7	<1
	Copper (Filtered)	µg/L	2 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Iron	µg/L	300	-	-	-	21	28	23	17	20	22	22	<20	8	<20	27	71	20	20	8	9	<20	
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lead	µg/L	1 ³	-	-	-	<1	<1	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	-	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	0.6	<0.2
	Lead (Filtered)	µg/L	1 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lithium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9	0.8	-	-	-	-	
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Manganese	µg/L	NG	-	-	-	-	-	-	-	-	6	6	6	5	-	3.5	3	5.4	10.3	8.7	3.3	2.6	5.3
	Manganese (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Mercury	µg/L	0.026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	<0.02	<0.02	-	0.02	<0.02	
	Mercury (Filtered)	µg/L	0.026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Molybdenum	µg/L	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	<0.1	-	-	-	-	
	Molybdenum (Filtered)	µg/L	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nickel	µg/L	25 ¹	1.8	0.6	2.4	<1	<1	2	1	<1	<1	<1	<1	1	-	0.8	0.6	<0.1	0.5	0.5	0.6	0.6	0.7
	Nickel (Filtered)	µg/L	25 ¹	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Rubidium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.4	1.6	-	-	-	-	
	Rubidium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Selenium	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	
	Selenium (Filtered)	µg/L	1	-																				

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.2b: CCME Water Quality Guidelines - Cameron River, All Parameters with <DL

[illegible]

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.2b: CCME Water Quality Guidelines - Cameron River, All Parameters with <DL

			Sampled Date	Time	5/6/1999	6/11/1999	7/9/1999	8/6/1999	9/14/1999	10/27/1999	1/27/2000	2/29/2000	3/23/2000	4/28/2000	5/26/2000	6/28/2000	7/31/2000	8/18/2000	9/21/2000	10/18/2000	11/27/2000	1/10/2001	4/18/2001
			SampleCode		Cameron River_06 May 99	Cameron River_11 Jun 99	Cameron River_09 Jul 99	Cameron River_06 Aug 99	Cameron River_14 Sep 99	Cameron River_27 Oct 99	Cameron River_27 Jan 00	Cameron River_29 Feb 00	Cameron River_23 Mar 00	Cameron River_28 Apr 00	Cameron River_26 May 00	Cameron River_28 Jun 00	Cameron River_31 Jul 00	Cameron River_18 Aug 00	Cameron River_21 Sep 00	Cameron River_18 Oct 00	Cameron River_27 Nov 00	Cameron River_10 Jan 01	Cameron River_18 Apr 01
			CCME FAL ¹																				
Chem_Group	ChemName	output unit																					
Physical/Major Ions	Cyanide	Cyanide Total	mg/L	NG	<0.003	<0.003	0.008	<0.003	<0.003	<0.003	<0.001	0.002	0.001	<0.001	<0.002	<0.002	<0.002	<0.002	0.006	<0.002	<0.002	<0.002	0.005
	Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	0.387	-	0.418	-	-	-	0.664	0.42	0.31	0.59	0.51	0.6	0.63	0.81	0.97	0.91	
	pH	pH Units	6.5-9	7.51	7.41	7.42	7.38	7.74	7.35	7.42	7.44	7.28	7.4	7.24	7.61	7.69	7.63	7.53	7.46	7.35	7.37	7.2	
	Electrical Conductivity (EC)	µS/cm	NG	76.6	67.1	65.1	68.5	67.9	69	79.3	82.4	80.6	81.6	59.7	69.5	67.1	68.1	66.4	66.1	70.9	79.6	85.4	
	Total Suspended Solids (TSS)	mg/L	NG	4	<3	<3	<3	5	<3	<3	<3	<3	<3	<3	3	4	<3	<3	<3	<3	<3	<3	<3
	Hardness as CaCO3	mg/L	NG	29.98757	27.6846	26.45886	27.46732	28.39866	27.76696	32.12844	33.10489	33.08696	37.12072	26.18419	29.1828	30.90442	30.01778	29.78077	32.09553	28.82667	32.37069	34.69642	
	Alkalinity (total as CaCO3)	mg/L	NG	27.5	24	23	24.3	24.45	23.7	27.1	33.6	28.9	28.4	21.5	24.4	25.2	22.6	23.2	23.4	25.1	28.2	30.3	
	Calcium	mg/L	NG	7.87	7.36	7.1	7.24	7.58	7.36	8.48	8.97	8.6	10.1	6.99	7.96	8.6	8.08	8.15	9.11	7.57	8.61	9.36	
	Magnesium	mg/L	NG	2.51	2.26	2.12	2.28	2.3	2.28	2.66	2.6	2.82	2.89	2.12	2.29	2.39	2.29	2.27	2.41	2.64	2.75		
	Potassium	mg/L	NG	1.18	1.19	1.07	1.1	1.22	1.09	1.35	1.38	1.38	1.34	0.99	1.06	1.23	1.14	1.1	1.05	1.17	1.32	1.37	
	Sodium	mg/L	NG	2.18	1.85	1.76	1.86	1.95	1.87	2.19	2.4	2.4	2.37	1.78	1.85	2.04	1.92	1.96	1.97	2.05	2.26	2.44	
	Chloride	mg/L	120	3	3.1	2.7	2.25	2.1	2	1.88	2.48	2.41	2.5	2.8	2.5	1.9	2.3	1.9	2	1.8	1.8	1.9	
	Fluoride	mg/L	0.12	-	0.07	0.07	0.08	-	0.08	0.09	-	-	0.14	0.11	0.08	0.1	0.1	0.08	0.08	0.08	0.08	0.08	
	Sulphate	mg/L	NG	3	<3	5	4	5.5	5	<3	<3	3	9	4	4	4	<3	5	8	5	7	3	
	Colour	TCU	NG	5	10	10	5	7.5	5	5	5	5	10	10	5	5	5	5	10	10	10	5	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	-	8.5	7.1	7.3	7.15	-	7	7	6.2	7.2	7.4	7	8.4	7.4	7	7.8	7.4	7.9	8.2	
	Total Organic Carbon (TOC)	mg/L	NG	-	8.5	7.2	7.3	7.3	-	7	7	6.2	7.2	7.8	7.4	8.3	8	8.9	7.9	7.7	7.5	8.2	
	Total Solids (Filtered)	mg/L	NG	53	57	66	59	-	36	51	56	59	58	44	45	41	74	47	36	<10	62	73	
	Turbidity	NTU	NG	2	2.8	0.7	0.6	0.8	0.8	0.3	2.5	0.9	0.9	0.9	1	0.3	0.4	1.4	0.9	0.4	0.4	1	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.008	<0.005	0.023	0.005	0.0035	0.004	0.034	0.017	0.01	0.016	<0.005	0.016	0.024	0.007	0.028	0.041	-	0.041	<0.005	
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.041	<0.008	<0.008	<0.008	0.008	<0.008	0.035	0.08	0.065	0.055	<0.008	<0.008	<0.008	<0.008	<0.008	0.023	<0.008	0.026	0.094	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Total) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	0.004	<0.002	<0.002	<0.002	0.002	0.002	<0.002	<0.002	<0.002	<0.002	0.002	0.002	0.003	0.005	<0.004	<0.002	<0.002	<0.004	<0.002	
	Phosphorus	µg/L	4	10	15	10	11	8	13	33	10	4	7	69	8	17	5	11	4	132	11	10	
	Phosphorus (Filtered) (Filtered)	mg/l	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2	-	<2	
Demand Parameters	Total Coliforms	MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	<1	
	E. Coli	MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2	-	<2	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	<30	<30	<30	<30	42.9	<30	<30	<30	<30	<30	<30	31	<30	<30	<30	<30	<30	<30	<30	
	Antimony	µg/L	NG	0.4	<0.5	0.5	0.5	2.45	0.9	0.6	0.7	1.3	0.8	<0.5	<0.5	1.7	0.9	1.3	1.1	2	1.2	0.9	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5	<0.2	<0.2	<0.2	0.4	0.3	<0.2	<0.2	1.2	<0.2	<0.2	<2	<2	<1	0.5	<1	<1	<1	<1	<1	
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Barium	µg/L	NG	2.8	4.8	4	<1	5.25	4.3	5	5.8	5.5	5	4	4	4	4	4	4	5	5	6	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L	NG	<0.1	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L	NG	<0.1	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	3.9	<0.4	<10	<10	<10	<5	<10	<10	<5	<5	<0.4	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble																						

Table A.2b: CCME Water Quality Guidelines - Cameron River, All Parameters with <DL

			Sampled Date	Time	5/23/2001	6/28/2001	8/1/2001	8/30/2001	10/2/2001	11/7/2001	12/3/2001	1/14/2002	2/20/2002	3/13/2002	4/22/2002	5/21/2002	6/19/2002	7/24/2002	9/5/2002	9/24/2002	10/24/2002	11/21/2002	12/19/2002
			SampleCode		Cameron River_23 May 01	Cameron River_28 Jun 01	Cameron River_01 Aug 01	Cameron River_30 Aug 01	Cameron River_02 Oct 01	Cameron River_07 Nov 01	Cameron River_03 Dec 01	Cameron River_14 Jan 02	Cameron River_20 Feb 02	Cameron River_13 Mar 02	Cameron River_22 Apr 02	Cameron River_21 May 02	Cameron River_19 Jun 02	Cameron River_24 Jul 02	Cameron River_05 Sep 02	Cameron River_24 Sep 02	Cameron River_24 Oct 02	Cameron River_21 Nov 02	Cameron River_19 Dec 02
			CCME FAL ¹																				
Chem_Group	ChemName	output unit																					
Physical/Major Ions	Cyanide Total	mg/L	NG	0.006	<0.003	<0.003	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	<0.003	<0.003	<0.003	<0.003
	Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	1.12	0.46	0.39	0.54	0.67	0.66	-	0.84	0.84	0.85	0.79	0.82	0.49	0.5	0.62	0.61	0.55	-	-	-
	pH	pH Units	6.5-9	7.21	7.52	7.55	7.55	7.54	7.37	7.34	7.54	7.26	-	7.08	7.27	7.27	7.48	7.51	7.42	7.48	7.56	7.38	7.3
	Electrical Conductivity (EC)	µS/cm	NG	75.8	66	69.5	68.4	69.1	69.5	77.7	80	81.8	89.4	85	80.3	67.4	68.2	69.4	68.9	70.4	53.8	79.6	-
	Total Suspended Solids (TSS)	mg/L	NG	-	<3	<3	3	<3	<3	<3	<3	<3	<3	<3	<3	<3	3	3	3	4	5	<3	4
	Hardness as CaCO3	mg/L	NG	-	-	-	27.5	-	31	-	-	-	-	35.8	32.4	21.9	29.3	28.9	28.1	28.6	20.8	32.3	-
	Alkalinity (total as CaCO3)	mg/L	NG	26.8	23.6	24.8	24	25.2	31.1	33.2	31	32.1	33.1	33	30.4	25.6	25.5	25.4	25	25.9	18.4	29.2	-
	Calcium	mg/L	NG	8.26	7.96	7.83	7.29	7.45	8.4	8.25	8.99	9.92	9.6	9.6	8.62	5.24	7.61	7.58	7.43	7.57	5.15	8.7	-
	Magnesium	mg/L	NG	2.6	2.22	2.32	2.27	2.32	2.43	2.52	2.55	3.02	2.76	2.87	2.63	2.14	2.49	2.32	2.42	2.32	2.36	1.93	2.56
	Potassium	mg/L	NG	1.39	1.12	1.17	1.19	1.1	1.24	1.41	1.26	1.45	1.41	1.4	1.38	1.37	1.1	1.17	1.13	1.1	0.77	1.02	1.26
	Sodium	mg/L	NG	1.99	1.82	2.06	2.08	2.41	2.13	2.26	2.4	2.47	2.79	2.56	2.42	1.83	2.01	1.95	1.89	1.98	1.88	2.29	-
	Chloride	mg/L	120	2.3	2.4	2	2.1	2	2.1	2.2	2.3	2.5	1.9	4.9	2.9	2.5	1.6	2.2	1.5	1.7	1.7	1.8	2.2
	Fluoride	mg/L	0.12	0.05	0.07	0.07	0.06	0.07	0.06	0.08	0.08	0.08	0.07	0.07	0.08	0.08	0.08	0.07	0.07	0.06	-	0.06	0.08
	Sulphate	mg/L	NG	4	5	6	3.3	4.1	3.8	4	6	7	5	5	5	5	5	5	12	9	3.9	4	-
	Colour	TCU	NG	20	10	10	5	20	5	<5	10	10	10	10	10	20	20	20	10	15	15	10	10
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	-	8.5	7.5	7	7.6	7.1	7.4	7.9	8.1	7.4	7.7	7.7	8.5	8.2	6.1	6.4	-	-	-	-
	Total Organic Carbon (TOC)	mg/L	NG	-	8.5	9.7	7.2	8.1	7.9	7.9	7.9	7.8	7.9	7.3	7.8	7.2	8.2	8.6	6.3	6	-	-	-
	Total Solids (Filtered)	mg/L	NG	52	49	63	51	54	37	83	55	46	76	73	76	55	50	47	52	51	60	60	-
Turbidity	NTU	NG	2.2	0.8	0.9	0.6	0.9	1.7	0.6	2.5	0.4	2.1	1.1	1.6	0.8	0.6	1	0.9	0.5	1.8	0.6	-	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	<0.005	<0.005	0.019	<0.005	<0.005	0.006	0.023	0.025	0.01	0.011	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.016	<0.005	<0.005	0.023
	Nitrate (as NO3-N)	mg/L	13	-	<0.008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrite (as NO2-N)	mg/L	0.06	-	<0.008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.028	-	<0.008	0.023	0.008	<0.008	0.014	0.028	0.066	0.084	0.071	0.049	<0.008	<0.008	<0.008	0.01	<0.008	0.044	0.029	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Total) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	0.012	<0.002	<0.002	0.002	-	<0.002	0.003	0.003	<0.002	0.005	0.008	0.002	<0.004	<0.002	0.003	0.002	<0.002	<0.002	<0.002	<0.002
	Phosphorus	µg/L	4	31	<4	18	13	13	<4	9	7	8	33	14	7	8	17	65	64	75	65	65	-
	Phosphorus (filtered) (Filtered)	mg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.064	0.067	0.055	0.074	0.098
	Biochemical Oxygen Demand (BOD)	mg/L	NG	5	<2	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	-	-	-	-	-	-
Biological	Total Coliforms	MPN/100mL	NG	<1	<1	-	<1	4	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	1	<2	<2	<1	
	E. Coli	MPN/100mL	NG	<1	<1	-	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<2	<2	<1	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	<30	<30	<30	<30	<30	46	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	41	<30
	Antimony	µg/L	NG	1.1	<0.5	0.7	0.6	<1	2.2	0.7	0.8	<0.5	0.9	<0.5	<0.5	<0.5	0.7	0.6	0.8	1.1	0.8	1.1	-
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	<1	<1	1.7	<1	<1	-	<1	<1	2	<1	0.3	<1	<1	<1	<1	1.7	<1	1.5	<1	-
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	3	5	3	4	4	5	5	5	6	6	6	6	5	5	4	4	6	4	5	5
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	<5	<5	<5	1.1	<5	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-															

Table A.2b: CCME Water Quality Guidelines - Cameron River, All Parameters with <DL

			Sampled Date/Time	2/24/2003	3/3/2003	5/5/2003	5/5/2003	5/5/2003	7/7/2003	7/31/2003	8/22/2003	10/1/2003	10/31/2003	12/5/2003	1/6/2004	2/11/2004	3/1/2004	4/15/2004	5/6/2004	6/10/2004	7/8/2004	8/16/2004	9/9/2004
			SampleCode	Cameron River_24 Feb 03	Cameron River_31 Mar 03	Cameron River_05 May 03	Cameron River_05 Jun 03	Cameron River_07 Jul 03	Cameron River_31 Jul 03	Cameron River_22 Aug 03	Cameron River_01 Oct 03	Cameron River_31 Oct 03	Cameron River_05 Dec 03	Cameron River_06 Jan 04	Cameron River_11 Feb 04	Cameron River_01 Mar 04	Cameron River_15 Apr 04	Cameron River_06 May 04	Cameron River_10 Jun 04	Cameron River_08 Jul 04	Cameron River_16 Aug 04	Cameron River_09 Sep 04	
			CCME FAL ¹																				
Chem_Group	ChemName	output unit																					
Cyanide	Cyanide Total	mg/L	NG	<0.003	<0.003	-		<0.003	<0.003	<0.003	<0.003	<0.003	<0.01	<0.01	<0.01	<0.01	<0.01	0.005	-	0.001	-	0.001	-
Physical/Major Ions	Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	-	-	-	0.51	-	0.52	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units	6.5-9	7.25	7.58	7.25	7.57	7.6	7.51	7.47	7.51	7.51	7.51	7.35	7.28	7.51	7.56	7.47	7.45	7.62	7.68	7.48	
	Electrical Conductivity (EC)	µS/cm	NG	85.4	92.2	70.9	67.6	75.6	76.9	75.8	80.8	78.4	89.7	82.1	68.6	85.8	85.3	81.8	63.6	72.8	71.4	73.6	
	Total Suspended Solids (TSS)	mg/L	NG	<3	-	<3	<3	<3	<3	<3	4	<3	<3	<3	<3	4	<3	<3	<2	<3	<3	<3	
	Hardness as CaCO3	mg/L	NG	36.1	36.9	32.4	22.2	26.9	27.4	29	32.0333333333333	31.5	33.7	34.1	36	35	38.7	38.3	28	39.6	29.4	42.1	
	Alkalinity (total as CaCO3)	mg/L	NG	32.6	34.1	31.1	25.3	26.7	27.3	27.7	27.7	30.1	30.1	34.1	31	31.4	31.8	31.5	23.4	26.7	26.8	27.2	
	Calcium	mg/L	NG	9.88	10.3	8.81	5.53	7.3	7.37	7.79	8.63	8.43	9.13	9.29	9.7	9.4	10.4	10.3	7.7	8.1	8.1	8.7	
	Magnesium	mg/L	NG	2.78	2.72	2.52	2.03	2.1	2.18	2.31	2.54333333333333	2.53	2.64	2.66	2.9	2.8	3.1	2.2	2.2	2.5	2.2	2.6	
	Potassium	mg/L	NG	1.39	1.21	1.24	1.08	1.24	1.06	1.08	1.18	1.21	1.25	1.26	-	1.3	1.38	1.38	1	1.1	1.1	1.1	
	Sodium	mg/L	NG	2.49	2.58	2.3	1.71	1.9	1.84	1.93	2.15666666666667	2.22	2.26	2.3	-	2.4	2.7	2.6	1.9	2	2.08	2.1	
	Chloride	mg/L	120	3	2.9	2.2	1.8	1.7	1.6	1.8	1.7	1.7	2	-	2.4	2.6	-	-	1.9	2	-	1.9	
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sulfate	mg/L	NG	6	6	6	4	6	7	-	6.33333333333333	-	4	6	-	4.6	4.6	4.6	-	3.9	4.2	4	
	Colour	TCU	NG	20	<5	20	10	10	5	10	11.6666666666667	-	-	-	5	-	-	-	-	-	-	-	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	7.1	-	8	7.7	7.9	7.4	-	6.4	-	-	-	6.3	-	5.9	6.7	-	7.2	6.7	6.3	
	Total Organic Carbon (TOC)	mg/L	NG	7.4	-	8	7.6	7.9	7.3	-	6.4	-	-	-	-	6.3	-	6.9	6.6	7.5	7.5	6.5	
	Total Solids (Filtered)	mg/L	NG	54	74	52	48	62	46	42	47.3333333333333	32	52	42	66	40	54	48	53	46	42	62	
	Turbidity	NTU	NG	0.4	0.2	1.3	1.5	1.5	0.7	1.4	0.966666666666667	1	0.66	0.72	0.87	-	0.86	0.81	1.15	2.1	0.78	0.97	
	Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.018	0.012	<0.005	<0.005	<0.005	<0.005	0.009	<0.005	<0.005	0.016	0.022	-	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
		Nitrate (as NO3-N)	mg/L	13	0.044	0.082	0.046	<0.008	<0.008	<0.008	-	<0.008	<0.008	0.02	0.02	0.02	<0.1	<0.1	-	<0.1	<0.1	<0.1	
Nitrite (as NO2-N)		mg/L	0.06	<0.008	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.03	<0.05	<0.05	-	<0.05	<0.05		
Nitrate and Nitrite (as N) (mg/L)		mg/L	NG	-	-	-	<0.008	-	<0.008	<0.008	<0.008	<0.008	0.02	0.02	0.02	<0.1	<0.2	<0.2	<0.2	<0.2	<0.1		
Nitrogen (Total)		mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Nitrogen (Total) (Filtered)		mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Orthophosphate (as P)		mg/L	NG	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	-	-	
Phosphorus		µg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus (Filtered) (Filtered)		mg/L	NG	0.007	<0.004	0.008	0.013	0.004	0.007	0.011	<0.004	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Demand Parameters		Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Biological	Total Coliforms	MPN/100mL	NG	<2	<2	<2	<1	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
	E. Coll	MPN/100mL	NG	<2	<2	<2	1	<1	<1	1	<1	<1	<1	<1	<1	<1	1	<1	1	2	<1		
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	<30	6.06	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	
	Antimony	µg/L	NG	-	0.874	-	-	0.3	0.6	0.7	0.8	0.7	0.3	0.2	0.4	0.2	<0.1	<0.1	0.2	0.3	0.7	0.2	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5	<1	0	1	<1	<1	<1	1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Barium	µg/L	NG	6	5.47	5.2	4.1	4.2	4.1	3	4.96666666666667	4.6	5.1	5.3	5.4	5.4	5.6	5.6	4	4	3.9	4.8	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L	NG	<0.1	<0.02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	0.09	<0.1	<0.02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG	<0.1	<0.008	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L	NG	1	0.4	<0.3	<0.3	<0.3	<0.3	2.3	<0.3	<0.3	0.6	0.3	<0.3	<0.3	2.4	0.3	0.5	0.6	<0.3	<0.3	
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cobalt	µg/L	NG	-	0.172	0.5	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Copper	µg/L	73	1	0.14	1	0.4	1	1.8	-	1.43333333333333	1	0.8	<0.2	2.3	0.7	0.9	1.1	0.8	0.5	0.8	1.2	
	Copper (Filtered)	µg/L	2 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Iron	µg/L	300	<30	36	<30	136	<50	30	<30	34	<50	<50	<50	<50	69	<50	<50	<50	<50	<50	<50	
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lead	µg/L	1 ³	1	1.08	<0.1	0.1	0.8	0.5	1	0.6	0.6	0.6	0.6	0.6	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Lead (Filtered)	µg/L	1 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lithium	µg/L	NG	2	2.21	2.2	1.5	1.3	1.6	2	1.76666666666667	1	1.9	1.8	1.9	1.8	2.1	1.9	1.4	1.5	1.5	1.1	
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Manganese	µg/L	NG	5	3.4	9.7	6.2	8.1	9.6	11	16.0666666666667	7.8	5.4	5.9	4.9	4.5	2.8	2.7	16.8	6.7	8.3	8.4	
	Manganese (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Mercury	µg/L	0.025	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
	Mercury (Filtered)	µg/L	0.025	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Molybdenum	µg/L	73	-	0.09	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	0.3	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	
	Molybdenum (Filtered)	µg/L	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.2b: CCME Water Quality Guidelines - Cameron River, All Parameters with <DL

			Sampled_Date Time	10/18/2004	12/21/2004	2/1/2005	3/3/2005	4/7/2005	5/2/2005	6/2/2005	7/7/2005	8/4/2005	9/6/2005	10/25/2005	12/8/2005	1/5/2006	2/8/2006	3/15/2006	4/5/2006	5/3/2006	7/2/2006	8/10/2006
			SampleCode	Cameron River_18 Oct 04	Cameron River_21 Dec 04	Cameron River_01 Feb 05	Cameron River_03 Mar 05	Cameron River_07 Apr 05	Cameron River_02 May 05	Cameron River_02 Jun 05	Cameron River_07 Jul 05	Cameron River_04 Aug 05	Cameron River_06 Sep 05	Cameron River_25 Oct 05	Cameron River_08 Dec 05	Cameron River_05 Jan 06	Cameron River_08 Feb 06	Cameron River_15 Mar 06	Cameron River_05 Apr 06	Cameron River_03 May 06	Cameron River_27 Jul 06	Cameron River_10 Aug 06
			CCME FAL ¹																			
Chem_Group	ChemName	output unit																				
Physical/Major Ions	Cyanide Total	mg/L	NG	-	0.002	-	-	-	-	<0.002	-	-	-	-	-	-	-	-	-	-	-	-
	Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	6.5-9		7.61	7.44	7.38	7.38	7.55	7.45	7.61	7.61	7.67	7.64	7.34	7.44	7.4	7.4	7.43	7.47	7.31	7.87	7.76
	Electrical Conductivity (EC)	µS/cm	NG	76.4	86	89.6	90.6	88.3	87.6	71.6666666666667	73.7	73.6	74.2	74	78.7	82.1	84.9	87.6	87.7	83	73.4	76.2666666666667
	Total Suspended Solids (TSS)	mg/L	NG	<3	<3	<3	2	<3	<3	<3	<3	4	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
	Hardness as CaCO3	mg/L	NG	29.4	35.3	37	37.5	36.7	35.4	29.7666666666667	32	30.6	34	32	34.8	34.5	35.5	37	35.1	30.4	33.5	34.5666666666667
	Alkalinity (total as CaCO3)	mg/L	NG	29.4	32.8	34.1	33.6	33.2	33	27.5666666666667	28.3	27.3	28	27.2	29.6	30.4	31.5	32.3	32.3	30.8	27.7	27.7333333333333
	Calcium	mg/L	NG	7.9	9.5	10	9.9	9.9	9.5	8.13333333333333	8.8	8.3	9.6	8.2	9.4	9.4	9.6	10	9.5	8.3	9	9.16666666666667
	Magnesium	mg/L	NG	2.4	2.8	2.9	3.1	2.9	2.8	2.3	2.4	2.5	2.8	2.7	2.8	2.7	2.8	2.8	2.8	2.3	2.7	2.83333333333333
	Potassium	mg/L	NG	1	1.4	1.41	1.38	1.29	1.26	1.14	1.1	1.13	0.9	1.28	1.24	1.24	1.4	1.3	1.1	1.1	1.1	1.03333333333333
	Sodium	mg/L	NG	1.7	2.6	2.7	2.6	2.5	2.4	2.03333333333333	2	2	1.9	1.8	2.4	2.4	2.4	2.8	2.6	2.3	2.1	2.13333333333333
	Chloride	mg/L	120	2.3	2.9	2.6	2.6	2.7	2.6	2.13333333333333	2.1	2.1	2.1	2.3	2.3	2.3	2.8	2.9	2.6	2.2	2.2	2.3
	Fluoride	mg/L	0.12	-	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sulphate	mg/L	NG	4	5	4	4	4	7	4	4	4	4	4	4	4	5	5	5	4	4	4
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	6.8	6.4	7.1	6.6	6.2	6.4	6.93333333333333	7.8	9.6	7.1	7.6	6.7	6.8	7.1	7.3	7.6	7.3	6.4	6.43333333333333
	Total Organic Carbon (TOC)	mg/L	NG	-	-	7	-	-	-	-	7.2	10	7.5	-	6.9	7.1	7.2	6.9	7.5	7.3	6.9	6.83333333333333
	Total Solids (Filtered)	mg/L	NG	42	58	30	42	56	46	37	46	46	46	48	46	50	<10	48	54	72	50	50
	Turbidity	NTU	NG	1.61	0.79	0.59	0.35	0.26	0.29	0.773333333333333	0.85	0.76	0.82	1.31	0.4	1.43	0.38	0.42	0.38	0.78	0.74	0.85
Nutrients	Ammonia as N	mg/L	0.021 ⁴	<0.005	0.022	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	0.015	0.016	0.005	<0.005	<0.005	<0.005	0.0056666666666667
	Nitrate (as NO3-N)	mg/L	13	<0.01	0.02	-	-	-	0.06	<0.01	-	-	-	<0.01	-	-	-	0.05	0.05	-	<0.01	<0.01
	Nitrite (as NO2-N)	mg/L	0.06	<0.01	<0.01	-	-	-	<0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	<0.01	-	0.05	-	-	0.06	-	-	-	-	-	0.02	0.02	0.03	0.05	0.05	0.04	<0.01	<0.01
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Total) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L	4	-	<50	-	70	<10	<10	10	<10	10	10	10	40	<10	<10	<10	<10	<10	<10	10
	Phosphorus (filtered) (Filtered)	mg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biological	Total Coliforms	MPN/100mL	NG	<1	<1	<1	<1	<1	<1	<1	1	<1	1	<1	<1	<1	<1	<1	1	<1	<1	1
	E. Coli	MPN/100mL	NG	<1	-	<1	<1	<1	<1	<1	1	4.1	<1	<1	<1	<1	<1	<1	<1	<1	5.2	1
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	<30	<30	<30	<30	12	<30	<30	13.3	<30	11.3	8.1	6.8	6.1	<30	6.1	6.7	9.6	17.8	-
	Antimony	µg/L	NG	0.3	0.2	0.4	0.7	2.17	0.1	0.466666666666667	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	-
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	<1	0.4	0.4	0.4	0.4	0.5	0.333333333333333	0.4	0.8	0.9	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.5	0.533333333333333
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	4.5	6.1	5.3	5.2	5.8	5.4	4.43333333333333	4.5	4.6	4.5	4.6	4.6	4.9	5.9	5.5	5.4	5.2	8.8	-
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	0.09	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05				

Table A.2b: CCME Water Quality Guidelines - Cameron River, All Parameters with <DL

			Sampled Date Time		9/5/2006	11/1/2006	12/20/2006	1/24/2007	3/21/2007	4/26/2007	5/15/2007	6/28/2007	7/25/2007	8/30/2007	9/17/2007	10/24/2007	11/29/2007	1/14/2008	2/18/2008	3/27/2008	4/29/2008	5/22/2008	6/11/2008
			SampleCode		Cameron River_05 Sep 06	Cameron River_01 Nov 06	Cameron River_20 Dec 06	Cameron River_24 Jan 07	Cameron River_21 Mar 07	Cameron River_26 Apr 07	Cameron River_15 May 07	Cameron River_28 Jun 07	Cameron River_25 Jul 07	Cameron River_30 Aug 07	Cameron River_17 Sep 07	Cameron River_24 Oct 07	Cameron River_29 Nov 07	Cameron River_14 Jan 08	Cameron River_18 Feb 08	Cameron River_27 Mar 08	Cameron River_29 Apr 08	Cameron River_22 May 08	Cameron River_11 Jun 08
			CCME FAL ¹																				
Chem_Group	ChemName	output unit																					
Physical/Major Ions	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	6.5-9	7.7	7.66	7.61	7.5	7.43	7.53	7.55	7.75	7.84	7.67	7.7	7.67	7.53	7.57	7.46	7.315	7.54	7.52	7.66		
	Electrical Conductivity (EC)	µS/cm	NG	74.2	74.1	81.7	70.1	95.5	92	56.4	75.2	74.5	77.3	78.4	77.3	85.6	92.3	94.3	97.15	92.3	70.6	72.7	
	Total Suspended Solids (TSS)	mg/L	NG	<3	<3	<3	<3	3	3	<3	<3	<3	4	<3	<3	<3	<3	<3	<3	<3	<3	8	
	Hardness as CaCO3	mg/L	NG	34.1	26.9	38.4	38.1	41.5	37.7	38.5	35.1	38.9	37.1	36.6	35.2	39.2	30	42.5	39.65	45.3	37.8	37.8	
	Alkalinity (total as CaCO3)	mg/L	NG	28.8	29	32.3	32.9	33.9	34	20.7	28.1	29.4	29.1	29.8	29.5	32.5	35.3	35.4	35.7	36	27.8	29.5	
	Calcium	mg/L	NG	8.9	8.4	10.4	10.3	10.8	9.9	10.1	9.3	10.4	9.8	9.7	9.3	10.5	11.4	10.5	11.4	10.5	11.4	10	10.1
	Magnesium	mg/L	NG	2.9	1.5	3	3	3.5	3.1	3.2	2.9	3.1	3.1	3	2.9	3.1	2.3	3.4	3.25	4.1	3.1	3.1	
	Potassium	mg/L	NG	1	0.8	1.4	1.4	1.4	1.3	1.3	1.2	0.9	1.1	1.1	1.1	1.3	1.5	1.35	1.5	1.2	1.2	1.2	
	Sodium	mg/L	NG	2	1.8	2.7	2.7	2.7	2.7	2.5	2.2	2.3	2.3	2.3	2.5	2.5	2.8	2.7	2.8	2.2	2.3	2.3	
	Chloride	mg/L	120	2.3	2.5	2.9	3	2.9	3	2.8	2.4	2.3	2.4	2.4	2.8	2.4	3.1	3.2	3.6	2.3	2.3	2.3	
	Fluoride	mg/L	0.12	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	0.2	0.1	<0.1	<0.1	0.1	
	Sulphate	mg/L	NG	3	4	4	4	4	4	4	4	4	4	4	4	4	4	5	5	6	3	4	
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	6.3	5.8	5.8	6.5	6.7	6.5	6.5	6.1	6.7	6.7	6.7	6.8	6.8	7.1	6.45	6.7	7.4	6.8	6.8	
	Total Organic Carbon (TOC)	mg/L	NG	-	6.1	6	7	6.7	6.8	7	7.1	7.1	6.8	7.1	6.2	6.7	7	6.9	7.2	7	7.2	7.2	
	Total Solids (Filtered)	mg/L	NG	60	48	36	-	54	-	50	46	<10	61	35	35	50	56	48	50	46	41	61	61
	Turbidity	NTU	NG	0.65	0.59	0.75	0.4	0.55	0.78	4.05	0.57	0.56	0.57	0.9	1.18	0.44	0.31	0.41	0.32	0.78	0.64	0.78	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	<0.005	<0.005	0.02	0.021	<0.005	<0.005	0.013	<0.005	<0.005	0.005	<0.005	<0.005	0.014	0.029	0.011	<0.005	<0.005	<0.005	<0.005	<0.005
	Nitrate (as NO3-N)	mg/L	13	<0.01	<0.01	-	0.02	0.05	0.04	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.05	0.05	0.02	0.01	-	-
	Nitrite (as NO2-N)	mg/L	0.06	<0.01	<0.01	-	0.02	0.05	0.04	0.02	0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.05	0.05	0.02	<0.01	<0.01	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Total) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L	4	<10	<10	<10	<10	<10	<10	<10	10	<10	<10	20	<10	10	10	<10	<50	10	10	10	10
	Phosphorus (filtered) (Filtered)	mg/l	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biological	Total Coliforms	MPN/100mL	NG	<1	<1	<1	<1	<1	<1	2	1	1	488	<1	<1	<2	<1	<1	<1	<1	<1	1	1
	E. Coli	MPN/100mL	NG	<1	<1	<1	<1	<1	<1	6.3	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	1
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	12.1	<30	4.7	5.5	6.4	8.9	11.9	11.6	<30	9	<30	<30	7.3	6.2	4.6	<30	17	-	-	-	-
	Antimony	µg/L	NG	<0.1	<0.1	<0.1	<0.1	0.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.1	<0.1	0.1	<0.1	0.4	<0.1	1.2	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	0.5	0.9	0.4	0.5	0.4	0.4	0.4	0.4	0.4	<0.3	0.4	1	0.4	0.4	0.5	0.5	0.6	0.3	0.4	
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	4.4	4.3	4.8	5	5	5.5	-	3.7	3.6	3.8	4.4	4.8	5.7	5.6	5.1	5.35	5.7	5.2	4.9	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-																

Table A.2b: CCME Water Quality Guidelines - Cameron River, All Parameters with <DL

			Sampled_Date_Time	7/16/2008	8/20/2008	9/22/2008	10/15/2008	11/12/2008	12/17/2008	1/15/2009	2/26/2009	3/30/2009	4/22/2009	5/27/2009	7/8/2009	8/6/2009	9/3/2009	10/6/2009	11/26/2009	12/21/2009	1/18/2010	2/11/2010
			SampleCode	Cameron River_16 Jul 08	Cameron River_20 Aug 08	Cameron River_22 Sep 08	Cameron River_15 Oct 08	Cameron River_12 Nov 08	Cameron River_17 Dec 08	Cameron River_15 Jan 09	Cameron River_26 Feb 09	Cameron River_30 Mar 09	Cameron River_22 Apr 09	Cameron River_27 May 09	Cameron River_08 Jul 09	Cameron River_06 Aug 09	Cameron River_03 Sep 09	Cameron River_06 Oct 09	Cameron River_26 Nov 09	Cameron River_21 Dec 09	Cameron River_18 Jan 10	Cameron River_11 Feb 10
			CCME FAL ¹																			
Chem_Group	ChemName	output unit																				
Physical/Major Ions	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	16.18	18.91	15.32	7.37	-0.1	-	-	-
	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units	6.5-9	7.75	7.74	7.72	7.685	7.67	7.44	7.41	7.3	7.33	7.335	7.43	7.73	7.74	7.64	7.6	7.53	7.385	7.35	7.4
	Electrical Conductivity (EC)	µS/cm	NG	74.5	78.3	79.4	73.5	73.8	76.5	78.6	80.4	85.3	85.5	76	66.2	70.5	75.4	69.7	75.2	74.45	77.7	80.2
	Total Suspended Solids (TSS)	mg/L	NG	<3	<3	8	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	8	<3	<3	6
	Hardness as CaCO3	mg/L	NG	40.2	35.2	42.8	38.7	32.5	34.3	33.2	44.7	36.1	37.8	34.3	35.6	16	32	22.9	23.4	25.3	21.9	13.9
	Alkalinity (total as CaCO3)	mg/L	NG	29.3	31.2	30.6	29.3	28.8	29.1	30.5	31.6	32.6	33.8	29.9	27.6	30.1	27.3	27.8	30	30.25	31.4	31.7
	Calcium	mg/L	NG	10.6	10.7	13	11.75	9.3	10.4	9.5	10.2	10.2	10.55	9.7	10	4.3	7.7	6.5	7	6.95	6.5	4.4
	Magnesium	mg/L	NG	3.3	2	2.5	2.3	2.2	2.3	2.6	2.3	2.6	2.8	2.5	2.6	1.3	3.1	1.7	1.9	1.35	1.4	0.7
	Potassium	mg/L	NG	1.2	1.2	1.2	1.2	1.1	1.2	1.1	1.3	1.4	1.4	1.3	1.2	0.9	0.9	0.8	0.9	0.9	0.9	0.9
	Sodium	mg/L	NG	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.7	2.9	3	2.6	2.5	1.8	2	1.8	1.9	1.8	2.1	2
	Chloride	mg/L	120	2.5	2.4	2.4	2.4	2.3	2.4	2.9	2.9	3	3.2	2.6	2.3	2.9	2.4	2.2	2.3	2.4	2.6	2.7
	Fluoride	mg/L	0.12	0.1	0.2	0.1	0.1	<0.1	<0.1	0.1	<0.1	0.1	0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Sulphate	mg/L	NG	4	4	4	4	4	4	4	5	4	4	5	4	4	5	4	4	4	5	5
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	7.8	7.4	6.8	6.75	6.5	6.4	6.6	6.9	6.6	6.9	8.5	7.3	8.2	7.1	6.3	6.3	7.05	6.9	6
	Total Organic Carbon (TOC)	mg/L	NG	7.7	7	7.8	7.25	5.9	6.4	9.2	7.5	7	7.1	8.2	8.6	8	7.5	6.8	6.7	6.85	7.3	6.4
Total Solids (Filtered)	mg/L	NG	42	52	24	13	39	38	41	44	48	32	68	22	30	52	50	42	53.5	54	50	
Turbidity	NTU	NG	0.8	0.92	0.95	0.915	1.07	0.61	0.48	0.48	0.38	0.29	0.54	0.66	0.55	0.56	1	0.43	0.375	-	0.3	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	<0.005	<0.005	<0.005	<0.005	0.011	0.019	0.026	0.014	<0.005	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.016	<0.01
	Nitrate (as NO3-N)	mg/L	13	-	<0.01	0.02	0.03	0.03	0.03	0.04	0.01	0.05	0.06	<0.01	<0.01	<0.01	0.04	0.05	0.07	0.07	0.08	0.11
	Nitrite (as NO2-N)	mg/L	0.06	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.04	<0.01	0.01	0.03	0.03	0.03	0.04	0.01	0.05	<0.01	<0.01	<0.01	<0.01	0.04	0.05	0.06	0.07	0.08	0.1
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Total) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	0.004	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L	4	30	20	10	10	<10	10	10	10	<10	20	<10	10	<10	10	<10	<10	<10	<10	<10
	Phosphorus (Filtered) (Filtered)	mg/l	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biological	Total Coliforms	MPN/100mL	NG	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	
	E. Coli	MPN/100mL	NG	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	20	12	5.5	-	7	11	8	4.8	-	5.4	11	12.4	11.3	7.8	10	4.7	4.9	21.5	4.8
	Antimony	µg/L	NG	0.4	0.7	0.5	-	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	1.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	0.5	0.7	0.5	-	0.4	0.4	0.3	0.4	0.5	0.4	0.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	5.4	4.4	4.3	-	4.9	5	5.4	5.6	-	5.65	5.1	5.2	3.9	3.7	4.6	4.8	5.45	5.2	5.3
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	0.09	<0.1	0.1	0.06	-	<0.1	<0.1	<0.05	<0.05	<0.1	<0.05									

Notes:

- ¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)
- ² Guideline varies with pH
- ³ Guideline varies with hardness. Range given.
- ⁴ Guideline varies with pH and temperature. Most stringent given.
- ⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.2b: CCME Water Quality Guidelines - Cameron River, All Parameters with <DL

			Sampled Date/Time	10/19/2011	11/23/2011	12/21/2011	1/26/2012	2/29/2012	3/28/2012	4/26/2012	5/23/2012	6/11/2012	6/12/2012	8/20/2012	9/19/2012	11/6/2012	12/13/2012	1/16/2013	2/21/2013	3/13/2013	4/17/2013
			SampleCode	Cameron River_19 Oct 11	Cameron River_23 Nov 11	Cameron River_21 Dec 11	Cameron River_26 Jan 12	Cameron River_29 Feb 12	Cameron River_28 Mar 12	Cameron River_26 Apr 12	Cameron River_23 May 12	Cameron River_11 Jun 12	Cameron River_12 Jun 12	Cameron River_20 Aug 12	Cameron River_19 Sep 12	Cameron River_06 Nov 12	Cameron River_13 Dec 12	Cameron River_16 Jan 13	Cameron River_21 Feb 13	Cameron River_13 Mar 13	Cameron River_17 Apr 13
			CCME FAL ¹																		
Chem_Group	ChemName	output unit																			
Physical/Major Ions	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cyanide Temperature	°C	NG	4.46	-0.17	-0.27	-	-	-	0.86	5.87	15.71	20.31	18.56	11.56	0.53	-0.01	-	-	-	0.97
	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	µS/cm	NG	6.5-9	7.66	7.54	7.39	7.48	7.4	7.43	7.4	7.63	7.69	7.82	7.805	7.55	7.56	7.52	7.42	7.39	7.4
	Electrical Conductivity (EC)	µS/cm	NG	71.8	73.1	82.2	85.1	90.9	91	89	68.2	73	75.5	79.8	76.95	80	85.8	86.4	89.35	88.7	92.5
	Total Suspended Solids (TSS)	mg/L	NG	<3	<3	4	<3	<3	6	<3	<3	<3	<3	<3	3.5	4	<3	<3	<3	<3	<3
	Hardness as CaCO3	mg/L	NG	32.5	33.3	35.7	36.9	38.3	37.6	38.2	29.55	31.3	36.8	35.3	40.6	40.4	43.1	41.2	46.4	45.9	45.1
	Alkalinity (total as CaCO3)	mg/L	NG	29.4	30.5	30.8	33.1	33.2	34.2	25.9	27.6	29.4	29.8	30.2	29.7	34.1	34.4	35.05	35.7	34.9	34.9
	Calcium	mg/L	NG	8.9	9.3	9.6	10	10.3	10.1	10.2	7.95	8.5	10.3	9.7	11.25	11	11.8	11.4	12.75	12.6	12.3
	Magnesium	mg/L	NG	2.5	2.5	2.8	2.9	3.1	3	3.1	2.4	2.4	2.7	2.7	3.05	3.1	3.3	3.1	3.5	3.5	3.5
	Potassium	mg/L	NG	1	1.1	1.2	1.2	1.2	1.2	1.3	1	1	1.1	1.1	1.1	1.1	1.3	1.3	1.4	1.4	1.4
	Sodium	mg/L	NG	2.2	2.2	2.5	2.5	2.7	2.8	2.9	2.1	2.2	2.4	2.3	2.35	2.4	2.6	2.7	3	3	3
	Chloride	mg/L	120	2.2	2.3	2.6	2.7	3.1	3.1	3.1	2.3	2.4	2.4	2.5	2.55	2.6	2.7	2.8	3.2	3.4	3.4
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sulphate	mg/L	NG	4	4	5	5	5	5	5	4	4	4	4	4	4	4	4	5	5	5
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5.6	5.3	5.9	5.9	6.6	6.8	6.4	7.5	7.8	8.4	8.7	8.1	7	8.6	7.7	7.05	7.2	7.5
	Total Organic Carbon (TOC)	mg/L	NG	6	5.9	6.3	6.3	6.9	6.8	6.3	8.35	9.1	8.4	9	7.1	7.6	8.5	6.8	7.1	7.6	7.8
	Total Solids (Filtered)	mg/L	NG	50	26	47	44	56	58	72	43	58	46	20	25	<10	74	47	59	48	58
	Turbidity	NTU	NG	0.43	0.33	0.34	0.48	0.36	0.32	0.34	0.69	0.6	0.51	0.6	0.675	1.45	0.56	0.85	0.355	0.29	0.31
	Nutrients	Ammonia as N	mg/L	0.021 *	<0.01	0.01	0.02	0.03	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.015	0.013	0.027	0.036	<0.005	0.007
Nitrate (as NO3-N)		mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0.07	0.11	0.1	0.09
Nitrite (as NO2-N)		mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	<0.01	0.01	<0.01	<0.01
Nitrate and Nitrite (as N) (mg/L)		mg/L	NG	<0.01	<0.01	0.02	0.04	0.07	0.05	0.06	0.015	<0.01	<0.01	<0.01	<0.01	0.05	0.05	0.07	0.12	0.1	0.09
Nitrogen (Total)		mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen (Total) (Filtered)		mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate (as P)		mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Demand Parameters	Phosphorus	µg/L	4	10	<10	20	10	<10	6	<3	4.5	6	5	6	<10	11	6	13	7.5	6	3
	Phosphorus (Filtered) (Filtered)	mg/l	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biological	Total Coliforms	MPN/100mL	NG	<1	<1	<1	1	<1	<1	<1	<1	2	2	1	1.5	<1	1	<1	<1	<1	<1
	E. Coli	MPN/100mL	NG	<1	<1	<1	<1	<1	<1	<1	<1	1	2	2	1	<1	1	<1	<1	<1	<1
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5[100 @ ≥ 6.5 *	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5[100 @ ≥ 6.5 *	9.6	9	4	10	6	6	7	18.55	26	10.9	8	13.3	6.7	6	4.5	5.5	5.2	4.8
	Antimony	µg/L	NG	<0.1	0.4	0.4	0.3	0.2	<0.1	0.4	0.2	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.2
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.5
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	4.2	4.5	4.8	5.3	5.2	5.2	5.7	4.7	4.7	3.9	3.7	4.3	5	5.1	5	5.45	5.1	5.6
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG	<0.1	0.1	0.2	<0.1	0.1	0.1	0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.1
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.			

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.2b: CCME Water Quality Guidelines - Cameron River, All Parameters with <DL

			Sampled Date	Time	5/22/2013	6/24/2013	7/24/2013	8/12/2013	9/16/2013	10/23/2013	11/28/2013	12/17/2013	1/14/2014	2/19/2014	3/12/2014	4/15/2014	5/22/2014	6/19/2014	7/23/2014	8/26/2014	9/26/2014	10/22/2014	11/27/2014
			SampleCode		Cameron River_22 May 13	Cameron River_24 Jun 13	Cameron River_24 Jul 13	Cameron River_12 Aug 13	Cameron River_16 Sep 13	Cameron River_23 Oct 13	Cameron River_28 Nov 13	Cameron River_17 Dec 13	Cameron River_14 Jan 14	Cameron River_18 Feb 14	Cameron River_12 Mar 14	Cameron River_15 Apr 14	Cameron River_22 May 14	Cameron River_18 Jun 14	Cameron River_23 Jul 14	Cameron River_26 Aug 14	Cameron River_26 Sep 14	Cameron River_22 Oct 14	Cameron River_27 Nov 14
			CCME FAL ¹																				
Chem_Group	ChemName	output unit																					
Physical/Major Ions	Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Temperature	TC	mg/L	NG	5.91	21.27	18.88	21.35	13.21	3.17	-	-	-	-	-	-	6.39	19.09	-	15.6	8.71	2.82	-
	Chlorophyll A	TC	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	TC	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	TC	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units	µS/cm	NG	7.44	7.685	7.66	7.69	7.58	7.54	7.55	7.46	7.505	7.47	7.27	7.42	7.59	7.8	7.86	7.735	7.58	7.56	7.45
	Electrical Conductivity (EC)	µS/cm	NG	77.2	73.45	75.3	74.9	75.6	76.75	85	88.4	91.9	94.5	57.7	94.7	77.7	76.7	76.4	77.3	78.4	77.6	83.3	
	Total Suspended Solids (TSS)	mg/L	NG	<3	5.5	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	4	<3	<3	<3	<3	<3
	Hardness as CaCO3	mg/L	NG	35.5	34.95	37.1	35.7	37.9	38.35	39.7	43	44.05	46	27.1	40.4	32.5	31.6	31.9	33.35	32.9	33.2	35.2	
	Alkalinity (total as CaCO3)	mg/L	NG	28.4	27.1	27.3	28	28.2	28.4	31.6	33.1	34.4	37	25	35.7	30.3	28.8	29.2	29.95	29.6	29.3	31.4	
	Calcium	mg/L	NG	9.7	9.5	10.1	9.6	10.5	10.6	10.9	11.8	12.1	12.6	6.9	10.7	8.6	8.2	8.7	9.05	8.8	9	9.5	
	Magnesium	mg/L	NG	2.8	2.75	2.9	2.9	2.8	2.9	3	3.3	3.35	3.5	2.4	3.4	2.7	2.7	2.5	2.6	2.6	2.6	2.8	
	Potassium	mg/L	NG	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.3	1.4	1.4	1.1	1.4	1.1	1.1	1.1	1.1	1.1	1.1	1.2	
	Sodium	mg/L	NG	2.4	2.4	2.3	2.4	2.4	2.5	2.7	2.9	2.3	3.1	2.3	3.1	2.5	2.4	2.5	2.4	2.5	2.5	2.6	
	Chloride	mg/L	120	2.6	2.5	2.5	2.5	2.6	2.6	2.9	3.1	3.2	3.4	1.9	3.4	2.5	2.6	2.6	2.6	2.5	2.7	2.8	
	Fluoride	mg/L	0.12	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sulphate	mg/L	NG	4	4	4	4	4	4	4	5	5	5.5	6	4	5	4	4	4	4	4	4	5
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	7.2	7.1	7.1	7.1	7.2	6.7	7.1	6.4	7.3	7.1	5.4	7.3	7.3	6.9	7.2	7.35	6.6	6.3	7.1	
	Total Organic Carbon (TOC)	mg/L	NG	7.1	8.4	7.4	7.3	7.6	7.25	7.6	7.1	7.65	7.5	5.8	7.4	7.8	7.9	7.3	7.55	6.8	6.6	7.4	
Total Solids (Filtered)	mg/L	NG	44	41	52	54	50	50	52	62	57	56	38	56	36	44	60	47	60	50	50		
Turbidity	NTU	NG	0.44	1.19	0.77	0.05	0.47	0.44	0.35	0.34	0.39	0.62	0.53	0.51	0.55	0.57	0.55	0.57	0.79	0.38			
Nutrients	Ammonia as N	mg/L	0.021 *	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	0.008	<0.005	0.024	0.031	<0.005	0.005	<0.005	<0.005	0.008	<0.005	<0.005	<0.005	<0.005	<0.005
	Nitrate (as NO3-N)	mg/L	13	-	0.065	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrite (as NO2-N)	mg/L	0.06	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.06	0.065	0.05	0.04	0.08	0.075	0.1	0.1	0.13	0.16	0.1	0.13	0.06	<0.01	0.06	0.06	0.06	0.07	0.08	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Total) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Phosphorus	µg/L	4	6	11.5	2	8	7	4.5	14	13	<2	8	20	7	8	5	20	2.5	<2	2	7	
	Phosphorus (Filtered) (Filtered)	mg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Demand Parameters	Total Coliforms	MPN/100mL	NG	<1	6	1	3	3	<1	<1	<1	<1	<1	<1	<1	<1	1	1	<1	<1	<1	<1	
	E. Coli	MPN/100mL	NG	<1	6.85	1	4.1	2	<1	<1	<1	<1	<1	<1	<1	<1	1	3.1	1.5	<1	<1	<1	
Biological	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	1.5	8.4	5.3	11	4.85	1.3	0.9	1
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	21	16.5	15	11	11	6.5	6.3	5.2	6	4.1	20.6	7	15.6	15	11.7	9.85	8.8	7	10.4	
Metals ⁵	Antimony	µg/L	NG	0.2	0.1	<0.1	<0.1	0.4	0.45	0.3	0.3	0.25	0.2	0.3	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	0.2	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Arsenic	µg/L	5	0.4	0.5	0.7	0.7	0.6	0.6	0.6	0.8	0.8	0.4	0.5	0.4	0.2	0.3	0.4	0.4	0.4	0.4	0.4	
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	0.4	<0.2	0.2	0.4	0.4	0.4	0.4	0.2	
	Barium	µg/L	NG	-	4.1	3.5	3.4	5.8	4.1	5.2	4.5	4.45	5.2	3.9	5.8	4.9	4.2	3.6	3.9	4.5	4.6	5.1	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	5.6	4.6	4	3.65	4	4.5	5	
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Cesium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chromium	µg/L	NG	<0.1	0.55	0.5	0.5	0.7	2.1	0.2	0.2	0.2	<0.1	0.3	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cobalt	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Copper	µg/L	2 ³	<0.2	<0.2	<0.2	0.5	0.7	0.45	0.3	0.6	0.45	0.3	0.6	0.4	0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
	Copper (Filtered)	µg/L	2 ³	-	-	-	-	-	-	-	-	-	-	-	-	0.3	<0.2	<0.2	<0.2	0.4	<0.2	0.4	0.7
	Iron	µg/L	300	26	54.5	30	15	18	21.5	30	14	58.5	11	30	31	20	17	12	13.5	19	12	11	11
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	<5	<5	<5	<5	<5	<5	<5	<5
	Lead	µg/L	1 ³	<0.1	<0.1	<0.1	<0.1	0.5	0.15	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Lead (Filtered)	µg/L	1 ³	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2
	Lithium	µg/L	NG	2.2	1.7	1.9	2.1	2.2	2.4	2.1	2.2	2.1	2.3	1.9	2.5	1.9	1.9	1.9	1.85	1.6	1.9	2.3	
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	2.4	1.9	1.8	1.85	1.8	2	1.9	
	Manganese	µg/L	NG	7.1	7.35	6.7	6.9	9.2	9.45	6.4	4.8	4.15	3.6	1	3.7	7.6	8.9	11	14.5	9.2	5.6		
	Manganese (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	1.2	0.2	0.1	0.15	0.1	<0.1	0.2		
	Mercury	µg/L	0.026	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	-	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01
	Mercury (Filtered)	µg/L	0.026	-	-	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Molybdenum	µg/L	73																				

Notes:

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² Guideline varies with pH

³ Guideline varies with hardness. Range given.

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BOLD - Greater than Guideline

Blank - Not analyzed

Table A.2b: CCME Water Quality Guidelines - Cameron River, All Parameters with <DL

			Sampled Date	Time	12/15/2014	1/29/2015	2/18/2015	3/9/2015	4/9/2015	5/28/2015	6/25/2015	7/22/2015	8/28/2015	9/23/2015	10/21/2015	11/26/2015	12/15/2015	1/27/2016	2/24/2016	3/16/2016	4/21/2016	5/11/2016	6/28/2016
			SampleCode		Cameron River_15 Dec 14	Cameron River_29 Jan 15	Cameron River_18 Feb 15	Cameron River_09 Mar 15	Cameron River_09 Apr 15	Cameron River_28 May 15	Cameron River_25 Jun 15	Cameron River_22 Jul 15	Cameron River_28 Aug 15	Cameron River_23 Sep 15	Cameron River_21 Oct 15	Cameron River_26 Nov 15	Cameron River_15 Dec 15	Cameron River_27 Jan 16	Cameron River_24 Feb 16	Cameron River_16 Mar 16	Cameron River_21 Apr 16	Cameron River_11 May 16	Cameron River_28 Jun 16
			CCME FAL ¹																				
Chem_Group	ChemName	output unit																					
Physical/Major Ions	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Temperature	°C	NG	-	-	-	-	-	-	12.48	20.25	18.76	15.69	7.27	0.803	1.24	0.155	-	-	-	-	6.87	19.64
	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	2.54	2.29	3.37	2.04	0.929	1.12	1.83	2.45	-	<0.001
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	29.9	30	31.1	30.9	32	32.4	33.4	34.6	34.5	35.6	34.9	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	0.437	0.459	0.673	0.38	0.384	0.428	0.395	0.49	0.567	0.562	0.556	0.523	0.527	0.327
	pH	pH Units	6.5-9	7.44	7.4	7.36	7.32	7.46	7.64	7.87	8.04	7.71	7.63	7.54	7.46	7.44	7.47	7.4	7.43	7.54	7.55	7.95	7.95
	Electrical Conductivity (EC)	µS/cm	NG	85.3	88.4	92.7	94.2	94.6	74.8	77	77.9	83.6	82.7	82.3	85.5	88.6	92.6	93.4	93	91.8	81.3	80.8	80.8
	Total Suspended Solids (TSS)	mg/L	NG	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	5	<3	<3	<3	<3	<3	<3	<3	<3	<3
	Hardness as CaCO3	mg/L	NG	34.8	37.75	40.2	39.3	41.2	34.9	38.7	33.5	35	34.3	34.6	37.3	38.9	40	41.8	42.5	40.4	35.2	43.7	43.7
	Alkalinity (total as CaCO3)	mg/L	NG	31.8	33.35	34.4	35.8	37.2	28.6	29.9	30	31.1	30.9	32	32.4	33.4	34.6	34.5	35.6	34.9	31.7	30.9	30.9
	Calcium	mg/L	NG	9.4	10.2	10.8	10.6	11.1	9.5	10.3	9	9.5	9.5	9.3	9.5	10.1	10.4	10.9	11.1	11.6	10.8	9.3	10.8
	Magnesium	mg/L	NG	2.7	2.95	3.2	3.1	3.2	2.7	3.2	2.7	2.7	2.7	2.6	3	3.2	3.4	3.4	3.3	3.3	2.9	4.1	4.1
	Potassium	mg/L	NG	1.2	1.3	1.3	1.3	1.4	1.2	1.3	1.2	1.1	1.2	1.2	1.3	1.3	1.4	1.5	1.5	1.4	1.2	1.3	1.3
	Sodium	mg/L	NG	2.7	2.8	2.9	2.9	3	2.5	2.8	2.5	2.5	2.5	2.5	2.6	2.6	2.8	2.9	3.1	3.1	3	2.6	2.6
	Chloride	mg/L	120	3	3.1	3.1	3.2	3.4	2.9	3	3	3.1	3	3.2	2.9	3.2	3.5	3.4	3.7	3.4	3.1	2.8	2.8
	Fluoride	mg/L	0.12	-	-	-	-	-	-	<0.1	<0.1	0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Sulphate	mg/L	NG	5	5	5	5	5	5	4	5	5	5	5	5	5	5	6	5	6	5	6	6
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	6.62	6.95	6.5	6.6	6.4	7.1	6.6	5.8	7.1	6.7	6.5	6.6	7.2	6.4	6.8	6.7	5.6	6.3	6	6
	Total Organic Carbon (TOC)	mg/L	NG	6.91	7.1	7	7.3	6.9	8.4	7.3	6.5	7.2	7.5	7.2	7	7.2	7.2	6.6	6.6	6.1	6.6	6.3	6.3
Total Solids (Filtered)	mg/L	NG	60	52	58	<10	63	41	46	55	49	43	61	49	56	46	58	48	63	46	30	30	
Turbidity	NTU	NG	0.54	0.175	0.27	0.21	0.22	0.59	0.66	0.55	0.71	0.92	0.98	0.59	0.35	0.37	0.2	0.2	0.31	0.64	0.64	0.64	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.0232	0.02815	0.0193	0.014	<0.005	<0.005	0.005	<0.005	0.008	0.006	0.006	0.01	0.01	0.026	<0.005	0.007	<0.005	<0.005	<0.005	<0.005
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0104	0.046	0.0626	0.0464	0.0095	<0.005	<0.005
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.08	0.09	0.08	0.09	0.12	<0.01	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	0.0104	0.0473	0.0626	0.0464	0.0095	<0.0051	<0.0051	<0.0051
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	0.325	0.365	0.34	0.365	0.365	0.338	0.342	0.361	0.358	0.352	0.352	0.312	0.355	0.355
	Nitrogen (Total) (Filtered)	mg/L	NG	-	-	-	-	-	-	0.256	0.334	0.324	0.376	0.364	0.35	0.34	0.375	0.351	0.355	0.345	0.317	0.391	0.391
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	<0.001	<0.001	0.0012	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Phosphorus	µg/L	4	<2	<2	5	4	6	<2	8.5	<2	5.1	6.1	5.6	4.4	4.5	3.3	2.4	<2	10	4	8	8
	Phosphorus (Filtered) (Filtered)	mg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	0.0035	0.0035
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Demand Parameters	Total Coliforms	MPN/100mL	NG	<1	<1	-	<1	<1	<1	3	6	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	E. Coli	MPN/100mL	NG	<1	<1	-	<1	<1	<1	1	6.3	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	8.4
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	1.6	0.95	<0.6	<0.6	0.7	2	5.4	6.4	4.5	2.8	1.1	0.9	<0.6	2	2.3	1.7	0.9	5.7	4.3	4.3
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	12.2	4.2	4.4	4.4	2.5	20.1	10.1	9.9	13.4	4.8	7.2	5.2	4.8	2.1	2.3	3.1	4.4	48.6	13.1	13.1
	Antimony	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Antimony (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Arsenic	µg/L	5	0.4	0.35	0.4	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4
	Arsenic (Filtered)	µg/L	5	0.4	0.35	0.4	0.4	0.4	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4
	Barium	µg/L	NG	4.9	5.65	5.5	5.6	5.4	4.2	4.4	3.2	4.4	4.8	4.8	5.6	5.7	6.1	5.9	6	5.9	6	4.2	4.2
	Barium (Filtered)	µg/L	NG																				

Table A.2b: CCME Water Quality Guidelines - Cameron River, All Parameters with <DL

			Sampled_Date_Time	7/26/2016	8/23/2016	9/29/2016	10/26/2016	11/24/2016	12/13/2016
			SampleCode	Cameron River_26 Jul 16	Cameron River_23 Aug 16	Cameron River_29 Sep 16	Cameron River_26 Oct 16	Cameron River_24 Nov 16	Cameron River_13 Dec 16
			CCME FAL ¹						
Chem_Group	ChemName	output unit							
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-
Physical/Major Ions	Temperature	°C	NG	18.73	19.37	6.74	3.25	-	-
	Chlorophyll A	µg/L	NG	0.5	1.3	1.2	7	3.3	<1
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-
	Silica	mg/L	NG	0.438	0.612	0.653	0.702	0.646	0.746
	pH		6.5-9	8.1	7.9	7.6	7.6	7.53	7.51
	Electrical Conductivity (EC)	µS/cm	NG	84.4	85.9	84.2	85.3	88.5	91.8
	Total Suspended Solids (TSS)	mg/L	NG	<3	<3	8	<3	<3	<3
	Hardness as CaCO3	mg/L	NG	41.4	30.5	37.4	39	34.3	39
	Alkalinity (total as CaCO3)	mg/L	NG	32	32.8	32.7	33.2	33.9	36.1
	Calcium	mg/L	NG	9.9	7.5	9.9	10.7	9.1	10.4
	Magnesium	mg/L	NG	4.1	2.9	3	3	2.8	3.2
	Potassium	mg/L	NG	1.1	1.1	1.4	1.5	1.3	1.5
	Sodium	mg/L	NG	2.4	2.2	2.7	2.7	2.6	3
	Chloride	mg/L	120	2.8	2.6	2.6	2.9	2.9	3.2
	Fluoride	mg/L	0.12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Sulphate	mg/L	NG	5	5	5	5	6	6
	Colour	TCU	NG	-	-	-	-	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	7.1	6.3	6.1	6.2	6.4	6.6
	Total Organic Carbon (TOC)	mg/L	NG	6.7	6.6	6.7	6.9	6.6	6.9
	Total Solids (Filtered)	mg/L	NG	69	54	42	40	50	48
	Turbidity	NTU	NG	0.46	0.68	2.06	0.45	0.41	0.32
Nutrients	Ammonia as N	mg/L	0.021 ⁴	<0.005	<0.005	<0.005	<0.005	<0.005	0.007
	Nitrate (as NO3-N)	mg/L	13	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Nitrite (as NO2-N)	mg/L	0.06	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051
	Nitrogen (Total)	mg/L	NG	0.368	0.345	0.353	0.32	0.365	0.347
	Nitrogen (Total) (Filtered)	mg/L	NG	0.324	0.328	0.314	0.354	0.329	0.344
	Orthophosphate (as P)	mg/L	NG	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Phosphorus	µg/L	4	9	4	11	5	6	<2
	Phosphorus (Filtered) (Filtered)	mg/l	4	0.0031	0.001	0.0022	0.007	0.0028	0.0024
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-
Demand Parameters	Total Coliforms	MPN/100mL	NG	1	<1	<1	15	<1	<1
	E. Coli	MPN/100mL	NG	7.5	8.5	2	12.2	<1	<1
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5;100 @ ≥ 6.5 ²	7.2	13.3	1.8	1.5	1.3	1
	Aluminum Total	µg/L	5 @ pH < 6.5;100 @ ≥ 6.5 ²	10.6	10.5	154	4	3.2	3.9
	Antimony	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Antimony (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Arsenic	µg/L	5	0.5	0.5	0.5	0.5	0.5	0.4
	Arsenic (Filtered)	µg/L	5	0.4	0.4	0.4	0.4	0.4	0.4
	Barium	µg/L	NG	4	4.2	7.1	4.7	5.1	5.3
	Barium (Filtered)	µg/L	NG	3.9	3.8	4.9	4.6	5.2	5.1
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Beryllium (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Bismuth	µg/L	NG	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Bismuth (Filtered)	µg/L	NG	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Boron - soluble	µg/L	1500	6.9	7.2	7.1	7.1	9.7	7.2
	Boron - soluble (Filtered)	µg/L	1500	7	7.2	6.6	6.8	9.7	7.2
	Cadmium	µg/L	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Cadmium (Filtered)	µg/L	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Cesium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cesium (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chromium	µg/L	NG	<0.1	<0.1	0.7	<0.1	<0.1	<0.1
	Chromium (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cobalt	µg/L	NG	<0.1	<0.1	0.1	<0.1	<0.1	<0.1
	Cobalt (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Copper	µg/L	2 ³	<0.2	0.4	0.4	<0.2	0.7	<0.2
	Copper (Filtered)	µg/L	2 ³	<0.2	0.4	0.3	<0.2	<0.2	<0.2
	Iron	µg/L	300	13	18	207	10	8	9
	Iron (Filtered)	µg/L	300	<5	<5	<5	<5	<5	<5
	Lead	µg/L	1 ³	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Lead (Filtered)	µg/L	1 ³	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Lithium	µg/L	NG	1.9	2	2.5	2	2	2.1
	Lithium (Filtered)	µg/L	NG	1.9	1.7	1.9	1.9	1.9	2.2
	Manganese	µg/L	NG	10.7	15.8	20.1	7.1	7.7	7.2
	Manganese (Filtered)	µg/L	NG	0.2	0.2	<0.1	0.3	0.2	0.5
	Mercury	µg/L	0.026	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Mercury (Filtered)	µg/L	0.026	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
	Molybdenum	µg/L	73	<0.1	<0.1	0.1	<0.1	<0.1	0.1
	Molybdenum (Filtered)	µg/L	73	0.1	<0.1	0.1	<0.1	<0.1	0.1
	Nickel	µg/L	25 ³	0.4	0.4	0.6	0.3	0.3	0.4
	Nickel (Filtered)	µg/L	25 ³	0.3	0.3	0.4	0.3	0.4	0.3
	Rubidium	µg/L	NG	2.5	2.6	9	2.6	2.7	2.8
	Rubidium (Filtered)	µg/L	NG	2.5	2.4	2.7	2.6	2.7	2.8
	Selenium	µg/L	1	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
	Selenium (Filtered)	µg/L	1	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
	Silver	µg/L	0.25	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Silver (Filtered)	µg/L	0.25	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Strontium	µg/L	NG	34.2	35.5	35.4	34.7	39.2	39.2
	Strontium (Filtered)	µg/L	NG	33.6	32.7	34.4	34.7	38.7	38.4
	Thallium	µg/L	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Thallium (Filtered)	µg/L	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Tin	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Tin (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Titanium	µg/L	NG	0.2	0.1	9.2	0.1	<0.1	<0.1
	Titanium (Filtered)	µg/L	NG	<0.1	<0.1	1.1	<0.1	<0.1	<0.1
	Uranium	µg/L	15	0.4	0.4	0.3	0.3	0.3	0.3
	Uranium (Filtered)	µg/L	15	0.4	0.3	0.3	0.3	0.3	0.3
	Vanadium	µg/L	NG	0.1	<0.1	0.5	<0.1	<0.1	<0.1
	Vanadium (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Zinc	µg/L	30	<0.4	<0.4	0.7	0.4	<0.4	<0.4
	Zinc (Filtered)	µg/L	30	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

⁵ CCME FAL Guidelines developed for total metals only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.3: CCME Water Quality Guidelines - Great Slave Lake @ Talthei'et Narrows, All Parameters

			Sampled_Date_Time		7/29/1982	9/28/1982	6/30/1983	9/15/1983	6/12/1984	9/4/1984	7/16/1985	9/20/1985	6/27/1986	7/2/1987	9/17/1987	6/28/1988	10/4/1988	7/6/1989	10/3/1989	7/2/1990	9/28/1990	7/17/1991	9/21/1991	7/21/1992	9/22/1992	7/2/1993	9/13/1993	6/24/1994	9/23/1994	7/10/1995	9/25/1995	7/4/1996	9/18/1996	6/30/1997	9/30/1997	7/2/1998	9/22/1998	6/29/1999	9/21/1999	7/28/2000	#####	7/3/2001	9/24/2001	7/3/2002	9/27/2002	7/28/2003	9/26/2003	7/12/2004	9/28/2004	9/20/2005		
			SampleCode		Gr Slave Lake_29 Jul 82	Gr Slave Lake_28 Sep 82	Gr Slave Lake_30 Jun 83	Gr Slave Lake_15 Sep 83	Gr Slave Lake_12 Jun 84	Gr Slave Lake_04 Sep 84	Gr Slave Lake_16 Jul 85	Gr Slave Lake_20 Sep 85	Gr Slave Lake_27 Jun 86	Gr Slave Lake_02 Jul 87	Gr Slave Lake_17 Sep 87	Gr Slave Lake_28 Jun 88	Gr Slave Lake_04 Oct 88	Gr Slave Lake_06 Jul 89	Gr Slave Lake_03 Oct 89	Gr Slave Lake_02 Jul 90	Gr Slave Lake_28 Sep 90	Gr Slave Lake_17 Jul 91	Gr Slave Lake_21 Sep 91	Gr Slave Lake_02 Jul 92	Gr Slave Lake_22 Sep 92	Gr Slave Lake_02 Jul 93	Gr Slave Lake_13 Sep 93	Gr Slave Lake_24 Jun 94	Gr Slave Lake_23 Sep 94	Gr Slave Lake_10 Jul 95	Gr Slave Lake_25 Sep 95	Gr Slave Lake_04 Jul 96	Gr Slave Lake_18 Sep 96	Gr Slave Lake_30 Jun 97	Gr Slave Lake_30 Sep 97	Gr Slave Lake_02 Jul 98	Gr Slave Lake_22 Sep 98	Gr Slave Lake_29 Jun 99	Gr Slave Lake_21 Sep 99	Gr Slave Lake_28 Jul 00	Gr Slave Lake_11 Oct 00	Gr Slave Lake_03 Jul 01	Gr Slave Lake_24 Sep 01	Gr Slave Lake_03 Jul 02	Gr Slave Lake_27 Sep 02	Gr Slave Lake_28 Jul 03	Gr Slave Lake_26 Sep 03	Gr Slave Lake_12 Jul 04	Gr Slave Lake_28 Sep 04	Gr Slave Lake_20 Sep 05		
			CCME FAL ¹																																																	
Chem_Group	ChemName	output unit																																																		
Routine / Major Ions Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Organic Carbon(TOC)	mg/L	NG	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.04	0.005	0.007	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005		
	pH	µH Units	6.5-9	6.7	7.2	7	7.2	7	7.2	7	7.2	6.8	6.8	6.5	7.4	6.5	6.6	6.8	6.7	7.58	7.68	6.94	8	6.9	7.18	7.01	7.24	6.95	7.34	7.29	7.19	7.33	7.45	7.22	7.19	7.16	6.85	7.51	7.31	7.24	7.11	7.2	7.58	6.96	7.19	7.25	7.28	7.25	7.51			
	Electrical Conductivity (EC)	µS/cm	NG	33	39	37	36	40	50	110	37	36	32	38	34	35	31	33	35	30	30	34	33	36	35.3	45	36.6	41.2	46.3	34.2	41.3	36.7	35.7	32.8	33.8	32.7	36.2	33.4	38.9	32.6	36	62.9	32.6	35.7	35.7	37.1	38.5	38.1	55.8	3	3	
	Total Suspended Solids (TSS)	mg/L	NG	5	5	5	5	5	5	0.2	5	5	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
	Hardness as CaCO3	mg/L	NG	15.5	15.9	15.2	14.2	12.8	18	45	13	16	13	15	14	11	17	13	15	12	13	12.9	13	12	13.4	17	14.2	15.2	20.2	14.2	16.8	13.4	-	12.8	-	-	12.9	13	14.5	14.1	13.7	23.9	13	9.03	13	15.3	25.8	5.2	26.4			
	Alkalinity (Total as CaCO3)	mg/L	NG	13	12	12	12	13	15	35	11	12	11	13	12	12	11.8	11.4	12	10.5	10.8	12	12	11	9.5	13.5	12.1	13	16	12.4	14.3	12.6	13.1	11.3	11.4	12.5	11.7	10.8	12.7	11.3	12.7	21.5	11.3	11.8	12.7	13	13.2	14.4	20.2			
	Calcium	mg/L	NG	4.03	4.26	4	3.7	3	4.9	13	3.4	3.8	3.4	4	3.6	2.4	4.8	3.4	4	3	3	3.2	3.4	3.1	3.4	4.6	3.7	4.1	5.92	3.9	4.74	3.58	3.64	3.33	2.97	3.13	3.37	3.31	3.86	3.73	3.53	6.53	3.34	1.77	3.65	4.02	5.1	0.1	6.5			
	Magnesium	mg/L	NG	1.32	1.3	1.27	1.2	1.3	1.4	3.1	1.1	1.5	1.2	1.2	1.2	1.3	1.2	1.2	1.2	1.1	1.2	1.1	1.1	1.1	1.2	1.3	1.2	1.2	1.33	1.08	1.21	1.08	1.2	1.1	1.08	1.09	1.1	1.15	1.18	1.15	1.18	1.84	1.13	1.12	1.01	1.29	1.9	1.3	2.5			
	Potassium	mg/L	NG	0.42	-	-	-	-	-	0.6	-	-	-	-	-	-	0.5	0.5	0.5	0.6	0.5	0.4	0.6	0.4	0.6	0.2	0.05	0.46	0.4	0.3	0.65	0.38	0.43	0.42	0.462	0.451	0.432	0.43	0.6	0.46	0.43	0.41	0.43	0.51	0.44	0.39	0.57	0.46	0.6	0.4	0.4	
	Sodium	mg/L	NG	1.13	-	-	-	-	-	0.5	-	-	-	-	-	-	1.8	1.5	0.9	0.9	1.1	0.9	1	1.1	1	1.2	2.2	1.3	0.95	0.94	1.37	1.05	1.13	1	1.09	0.99	0.94	0.93	1.07	0.96	1.05	1	1.08	1.92	1.03	1	0.92	1.1	1.4	1.1	1.7	
	Chloride	mg/L	120	0.9	1.3	1.2	1.2	1.1	1.6	3.5	1.1	1.3	1.2	0.9	0.8	1	1.1	1.2	1.2	0.9	1	1	1	1	1	0.99	1.24	0.94	0.98	1.37	1.05	1.19	1.32	1.02	0.9	0.92	0.84	0.7	0.78	2.42	1.1	1.6	2	1	1.4	0.9	0.9	1.2	2.1	2		
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sulphate	mg/L	NG	1.7	1.8	2.8	2.8	2.8	4.4	7.2	2.6	3.6	2.1	1.4	3.2	2.4	3	3	2	-1	3	8	3	2	3	2	3	5	3	3	3	3	3	4	3	4	4	3	3	3	3	7	3	5	4.7	3	3	3	2.4	3	4	
	Colour	TCU	NG	5	5	5	5	5	5	5	5	40	5	7	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Solids (Filtered)	mg/L	NG	34	23	30	32	28	38	67	8.4	22	23	32	16	21	29	22	32	28	68	30	39	14	13	26	37	36	28	20	24	18	-10	56	-10	22	-	12	23	30	17	10	30	22	10	10	28	18	24			
	Turbidity	NTU	NG	0.64	0.45	1	1	0.2	0.45	1.3	0.62	0.4	0.27	0.4	0.3	0.4	-	0.4	0.5	0.4	-	0.8	1.2	1.3	0.6	0.6	1	1.4	0.8	0.5	0.5	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.05	0.03	0.0																																														

Table A.3: CCME Water Quality Guidelines - Great Slave Lake @ Taltheilei Narrows, All Parameters

Chem. Group	ChemName	output unit	Sampled_Date_Time		7/4/2006	9/26/2006	7/12/2007	10/1/2007	7/7/2008	9/28/2008	7/14/2009	10/1/2009	7/10/2010	7/12/2010	7/20/2015
			SampleCode		Gr Slave Lake_04 Jul 06	Gr Slave Lake_26 Sep 06	Gr Slave Lake_12 Jul 07	Gr Slave Lake_01 Oct 07	Gr Slave Lake_07 Jul 08	Gr Slave Lake_28 Sep 08	Gr Slave Lake_14 Jul 09	Gr Slave Lake_01 Oct 09	Gr Slave Lake_10 Jul 10	Gr Slave Lake_12 Jul 10	Gr Slave Lake_20 Jul 15
			CCME FAL ¹												
Routine / Major Ions Physical/Major Ions	Chlorophyll A	µg/L	NG		-	-	-	-	-	-	-	-	-	-	83.35
	Bicarbonate as CaCO3	mg/L	NG		-	-	-	-	-	-	-	-	-	-	14.65
	Nitrogen (Organic) (Filtered)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	0.166
	Silica	mg/L	NG		-	-	-	-	-	-	-	-	-	-	0.5885
	Total Organic Carbon(TOC)	µg/L	NG		0.008	0.005	0.005	0.009	0.008	0.007	0.009	0.007	0.005	0.006	0.0021
	pH	pH Units	6.5-9		7.46	7.14	7.49	7.94	7.41	7.49	7.35	7.51	7.45	7.39	7.49
	Electrical Conductivity (EC)	µS/cm	NG		35.2	34.7	45.1	174	38.8	40.2	36	43	44.7	38.7	44.6
	Total Suspended Solids (TSS)	mg/L	NG		-	-	-	3	-	-	3	-	-	-	3
	Hardness as CaCO3	mg/L	NG		18.5	16.6	21.6	76.3	22.4	14.1	21.9	12.6	18.5	16.2	19.4
	Alkalinity (total as CaCO3)	mg/L	NG		13.4	12.3	16.3	59.6	13.2	13.6	12.7	21.5	16.1	13.1	14.65
	Calcium	mg/L	NG		4.8	4.5	5.6	21.6	6	4.5	6.2	3.4	5	4.3	5.1
	Magnesium	mg/L	NG		1.6	1.3	1.8	5.4	1.8	0.7	1.5	1	1.4	1.3	1.6
	Potassium	mg/L	NG		0.4	0.4	0.4	0.8	0.5	0.5	0.5	0.4	0.4	0.5	0.5
	Sodium	mg/L	NG		1.1	1	1.4	5.6	1.3	1.3	1.4	1.1	1.2	1.3	1.45
	Chloride	mg/L	120		1	1	1.4	5.5	1.3	1.2	1.2	1.3	1.4	1.1	1.6
	Fluoride	mg/L	0.12		-	-	-	-	-	-	-	-	-	-	0.1
	Sulphate	mg/L	NG		2	2	3	16	7	3	3	3	3	3	4
	TCU	mg/L	NG		8	5	5	9	8	7	9	6	6	6	6
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	2.3
	Total Solids (Filtered)	mg/L	NG		28	24	12	100	48	10	10	16	24	10	45
	Turbidity	NTU	NG		-	-	-	-	-	0.72	-	-	-	-	1.065
Nutrients	Ammonia as N	mg/L	0.021 ⁴		0.005	0.005	0.005	0.005	0.005	0.005	0.01	0.01	0.005	0.01	0.005
	Total Kjeldahl Nitrogen (TKN)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-
	Nitrate (as NO3-N)	mg/L	13		-	-	-	-	-	-	-	-	-	-	0.08335
	Nitrite (as NO2-N)	mg/L	0.06		-	-	-	-	-	-	-	-	-	-	0.001
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG		0.06	0.05	0.06	0.04	0.42	0.09	0.07	0.07	0.07	0.17	0.08335
	Nitrogen (Total)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	0.166
	Orthophosphate (as P)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	0.001
	Phosphorus	µg/L	4		10	10	10	20	10	10	10	10	10	10	2
Metals ⁵	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²		-	-	-	-	-	-	-	-	-	-	38.9
	Aluminum Total (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²		-	-	-	-	-	-	-	-	-	-	2.45
	Antimony	µg/L	NG		-	-	-	-	-	-	-	-	-	-	0.1
	Antimony (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	0.1
	Arsenic	µg/L	5		-	-	-	-	-	-	-	-	-	-	0.25
	Arsenic (Filtered)	µg/L	5		-	-	-	-	-	-	-	-	-	-	0.2
	Barium	µg/L	NG		-	-	-	-	-	-	-	-	-	-	9.85
	Barium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	8.96
	Beryllium	µg/L	NG		-	-	-	-	-	-	-	-	-	-	0.1
	Beryllium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	0.1
	Cadmium	µg/L	0.09		0.05	0.05	0.05	0.1	0.05	0.1	0.05	0.1	0.05	0.05	0.1
	Cadmium (Filtered)	µg/L	0.09		-	-	-	-	-	-	-	-	-	-	0.09
	Cesium	µg/L	NG		-	-	-	-	-	-	-	-	-	-	0.1
	Cesium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	0.15
	Chromium	µg/L	NG		0.1	0.6	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.6
	Chromium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	0.1
	Cobalt	µg/L	NG		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Cobalt (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	0.1
	Copper	µg/L	2-4 ³		0.7	0.7	0.5	1.1	0.4	-	0.2	0.7	0.9	0.5	0.4
	Copper (Filtered)	µg/L	2-4 ³		-	-	-	-	-	-	-	-	-	-	0.85
	Iron	µg/L	300		50	71	50	50	8	6	20	23	50	16	37.5
	Iron (Filtered)	µg/L	300		-	-	-	-	-	-	-	-	-	-	5
	Lead	µg/L	1-7 ³		0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.2
	Lead (Filtered)	µg/L	1-7 ³		-	-	-	-	-	-	-	-	-	-	0.1
	Lithium	µg/L	NG		-	-	-	-	-	-	-	-	-	-	1.46
	Lithium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	1.15
	Manganese	µg/L	NG		0.4	1	0.3	0.3	0.4	0.2	0.4	0.6	0.5	0.4	0.8
	Manganese (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	0.2
	Mercury	µg/L	0.026		-	-	-	-	-	-	-	-	-	-	0.01
	Mercury (Filtered)	µg/L	0.026		-	-	-	-	-	-	-	-	-	-	0.01
	Molybdenum	µg/L	73		-	-	-	-	-	-	-	-	-	-	0.15
	Molybdenum (Filtered)	µg/L	73		-	-	-	-	-	-	-	-	-	-	0.1
	Nickel	µg/L	25-150 ³		0.4	0.6	0.4	0.9	0.4	0.4	0.3	0.5	0.4	0.4	0.4
	Nickel (Filtered)	µg/L	25-150 ³		-	-	-	-	-	-	-	-	-	-	0.3
	Rubidium	µg/L	NG		-	-	-	-	-	-	-	-	-	-	0.95
	Rubidium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	1
	Selenium	µg/L	1		-	-	-	-	-	-	-	-	-	-	0.3
	Selenium (Filtered)	µg/L	1		-	-	-	-	-	-	-	-	-	-	0.3
	Silver	µg/L	0.25		-	-	-	-	-	-	-	-	-	-	0.1
	Silver (Filtered)	µg/L	0.25		-	-	-	-	-	-	-	-	-	-	0.1
	Strontium	µg/L	NG		-	-	-	-	-	-	-	-	-	-	22.25
	Strontium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	21.55
	Thallium	µg/L	0.8		-	-	-	-	-	-	-	-	-	-	0.1
	Thallium (Filtered)	µg/L	0.8		-	-	-	-	-	-	-	-	-	-	0.1
	Titanium	µg/L	NG		-	-	-	-	-	-	-	-	-	-	1.9
	Titanium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	0.1
	Uranium	µg/L	15		-	-	-	-	-	-	-	-	-	-	0.2
	Uranium (Filtered)	µg/L	15		-	-	-	-	-	-	-	-	-	-	0.1
	Vanadium	µg/L	NG		-	-	-	-	-	-	-	-	-	-	0.1
	Vanadium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	0.1
	Zinc	µg/L	30		0.4	0.4	0.4	10	0.4	5	0.4	5	2.3	0.4	0.76
	Zinc (Filtered)	µg/L	30		-	-	-	-	-	-	-	-	-	-	0.4

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

⁵ CCME FAL Guidelines developed for total metals only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.4: CCME Water Quality Guidelines - Hay River @ West Channel Bridge, All Parameters

			Sampled Date Time	10/21/2004	5/17/2005	10/18/2005	5/25/2006	10/18/2006	6/4/2007	10/17/2007	5/26/2008	10/27/2008	5/21/2009	10/21/2009	5/31/2010	10/24/2010	5/30/2012	10/6/2013	6/16/2014	8/20/2014	5/20/2015	7/27/2015	9/24/2015	7/4/2016	10/25/2016	
			SampleCode	Hay River WCB_21 Oct 04	Hay River WCB_17 May 05	Hay River WCB_18 Oct 05	Hay River WCB_25 May 06	Hay River WCB_18 Oct 06	Hay River WCB_04 Jun 07	Hay River WCB_17 Oct 07	Hay River WCB_26 May 08	Hay River WCB_27 Oct 08	Hay River WCB_21 May 09	Hay River WCB_21 Oct 09	Hay River WCB_31 May 10	Hay River WCB_24 Oct 10	Hay River WCB_30 May 12	Hay River WCB_06 Oct 13	Hay River WCB_16 Jun 14	Hay River WCB_20 Aug 14	Hay River WCB_20 May 15	Hay River WCB_27 Jul 15	Hay River WCB_24 Sep 15	Hay River WCB_04 Jul 16	Hay River WCB_25 Oct 16	
Chem_Group	ChemName	output unit	CCME - FAL ¹																							
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,300	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.893	0.972	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.13	5.62	
	Total Organic Carbon(TOC)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0296	0.03	
	pH	pH Units	6.5-9	7.9	7.84	8.19	8.13	8.34	8.05	8.04	7.84	8.1	7.9	8.07	8.08	8.08	7.96	8.03	7.97	8.29	7.93	8.31	8.05	7.96	8.08	
	Electrical Conductivity (EC)	µS/cm	NG	224	260	397	324	511	306	368	251	382	211	393	305	385	280	405	330	397	305	394	374	300	414	
	Total Suspended Solids (TSS)	mg/L	NG	4	132	10	30	3	132	24	174	36	204	40	49	22	68	22	124	8	22	4	5	197	6	
	Hardness as CaCO3	mg/L	NG	101	116	179	144	242	138	170	119	176	97.2	199	148	185	123	204	151	192	142	181	172	169	201	
	Alkalinity (total as CaCO3)	mg/L	NG	73.7	63.6	110	80.4	181	68.2	102	67.4	113	56	120	84.6	122	80.1	120	72.1	122	74.7	112	113	78.1	122	
	Calcium	mg/L	NG	28.5	32.8	46.7	38.7	78.7	37.1	44.1	31.9	50	27.9	49.4	39.6	48.2	-	54.6	39.7	51.2	38.1	48.9	46.6	43.9	53.3	
	Magnesium	mg/L	NG	7.2	8.3	15.3	11.5	11	11	14.5	9.6	12.4	6.7	18.5	11.9	15.8	9.6	16.4	12.6	15.4	11.3	14.3	13.4	14.3	16.4	
	Potassium	mg/L	NG	0.7	1.8	1	2	2.8	2	1.5	2.1	2.6	2	1.5	2.1	1.6	1.7	2	1.6	1.6	2.4	1.5	1	1.2	1.5	
	Sodium	mg/L	NG	8.4	9.8	14.9	14.4	21.2	11.9	14.9	11.6	14.6	9	14.9	14.2	18.8	10.5	15.7	12.4	14.5	11.4	15.9	14.6	12.9	16.6	
	Chloride	mg/L	120	1.6	1.9	4.8	3.1	9.4	2	4	2.8	4	1.6	3.4	2.3	4.6	2	3.2	1.6	2.5	2.8	8.2	4.5	1.8	6	
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	-	-	-	-	-	0.1	0.1	
	Sulphate	mg/L	NG	32	59	86	74	81	74	73	1	73	46	72	70	78	55	85	86	81	80	75	71	77	82	
	Colour	TCU	NG	100	200	150	286	147	291	226	490	289	786	208	252	284	189	209	474	115	218	90	191	-	-	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27.3	27.9	
	Total Solids (Filtered)	mg/L	NG	168	202	304	272	344	224	276	215	316	190	268	220	272	226	300	254	282	219	272	290	269	394	
	Turbidity	NTU	NG	15.4	98.1	12.6	30.1	8.43	106	25.3	135	24.8	171	21.6	38.8	19.9	56.5	20.5	94.1	7.83	23.5	3.71	9.27	174	12.5	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.006	0.006	0.011	0.019	0.008	0.021	0.009	0.005	0.016	0.18	0.09	0.01	0.01	-	0.005	0.011	0.01	0.005	0.005	0.007	0.01	0.005	
	Total Kjeldahl Nitrogen (TKN)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.23	-	-	-	-	-	0.0481	0.0522	
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	-	0.001	0.001	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.11	0.01	0.01	0.01	0.01	0.01	0.06	0.21	0.26	0.01	0.22	0.22	0.19	0.04	0.23	0.03	0.2	0.01	0.14	0.16	0.0481	0.0522	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.07	1.15	0.83	0.72	0.79	1.2	1.01	-	
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0103	0.0027	
	Phosphorus	µg/L	4	50	320	50	80	30	80	50	360	90	280	130	80	80	220	66	171	25	63	21	24	245	38	
	Phosphorus (Filtered)	µg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0177	0.0914	
	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ > 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.5	4.3	6	3.2	17.4	12.6	10.1	
Metals ⁵	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ > 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	174	1750	90.1	356	57.5	116	2600	108
	Antimony	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	
	Arsenic	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	2.4	1.2	1.3	0.8	0.8	3.5	0.9
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	0.9	0.5	0.7	0.6	1.8	0.5	
	Barium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.6	79.8	49.9	50.9	40.4	43.4	118	40.6	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36.9	43	34	36.1	38.4	39.8	35.8	
	Beryllium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.2	0.1	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.2	0.2	0.3	0.2	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.2	0.2	0.2	0.2	
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36.4	34.5	47.8	30.3	42	28	
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36.3	30.9	42.7	29.4	35.5	27.3	
	Boron (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36.3	30.9	42.7	29.4	35.5	27.3	-	
	Calcium	µg/L	0.09	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.17	0.1	0.2	0.1	0.1	0.1	0.1	0.04	0.04	0.04	0.04	0.04	0.04	0.04	
	Calcium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0.05	0.05	0.07	0.05	0.05	0.05	
	Cesium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.5	0.1	0.1	0.1	0.8	0.1	
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	
	Chromium	µg/L	NG	0.5	3.1	0.6	1.5	0.3	1.5	0.8	1.6	0.3	3.5	0.8	1.1	0.6	1.3	1.1	3.1	0.6	0.8	0.3	0.3	4.1	0.4	
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	
	Cobalt	µg/L	NG	0.1	1.9	0.3	0.7	0.2	1.4	0.7	1.7	0.6	2.7	0.6	0.7	0.4	1	0.2	1.7	0.2	0.5	0.1	0.2	2.8	0.3	
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.2	
	Copper	µg/L	2 - 4 ³	2.9	6.1	2	3.3	1.5	4.4	1.5	5	1.8	8.7	1.9	3.3	1.5	3.4	1.2	4.2	1.9	3.2	1.7	2	7.5	1.1	
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	1.5	1.8	1.4	1.7	2.8	0.8	
	Iron	µg/L	300	1100	4700	1320	1860	1030	2530	1820	3370	1580	5720	1960	1980	1310	2210	973	4340	418	1270	280	790	5970	1070	
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90	47	113	26	159	165	256	
	Lead	µg/L	1-7 ³	0.3	2.6	0.4	3.5	0.1	1.7	0.6	1.8	0.														

Table A.5: CCME Water Quality Guidelines - Kakisa River @ Hwy 1 Bridge, All Parameters

			Sampled Date			6/14/1982	9/21/1982	5/26/1983	10/19/1983	5/31/1984	10/23/1984	6/19/1985	10/30/1985	5/15/1986	5/14/1987	10/21/1987	4/29/1988	5/15/1989	10/24/1989	5/23/1990	10/29/1990	6/15/1991	10/22/1991	5/26/1992	10/8/1992	2/15/1993	4/28/1993	6/14/1993	5/30/1994	10/25/1994	12/20/1994	5/21/1995	6/12/1995	10/25/1995	1/9/1996	5/21/1996	10/30/1996	
			SampleCode	Kakisa River @ HWY 1_14 Jun 82	Kakisa River @ HWY 1_21 Sep 82	Kakisa River @ HWY 1_26 May 83	Kakisa River @ HWY 1_19 Oct 83	Kakisa River @ HWY 1_31 May 84	Kakisa River @ HWY 1_23 Oct 84	Kakisa River @ HWY 1_19 Jun 85	Kakisa River @ HWY 1_30 Oct 85	Kakisa River @ HWY 1_15 May 86	Kakisa River @ HWY 1_14 May 87	Kakisa River @ HWY 1_21 Oct 87	Kakisa River @ HWY 1_29 Apr 88	Kakisa River @ HWY 1_15 May 89	Kakisa River @ HWY 1_24 Oct 89	Kakisa River @ HWY 1_23 May 90	Kakisa River @ HWY 1_29 Oct 90	Kakisa River @ HWY 1_15 Jun 91	Kakisa River @ HWY 1_22 Oct 91	Kakisa River @ HWY 1_26 May 92	Kakisa River @ HWY 1_08 Oct 92	Kakisa River @ HWY 1_15 Feb 93	Kakisa River @ HWY 1_28 Apr 93	Kakisa River @ HWY 1_14 Jun 93	Kakisa River @ HWY 1_30 May 94	Kakisa River @ HWY 1_25 Oct 94	Kakisa River @ HWY 1_20 Dec 94	Kakisa River @ HWY 1_21 May 95	Kakisa River @ HWY 1_12 Jun 95	Kakisa River @ HWY 1_25 Oct 95	Kakisa River @ HWY 1_09 Jan 96	Kakisa River @ HWY 1_21 May 96	Kakisa River @ HWY 1_30 Oct 96			
Chem_Group	ChemName	output	CCME FAL ¹																																			
	Physical/Major Ions																																					
	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Organic Carbon (TOC)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units	6.5-9	8	8.3	8.1	7.9	8.2	8	8	8.2	7.8	7.7	7.8	7.9	8	7.9	8	8.01	8.21	7.7	8	7.8	8.01	7.13	8.11	8.24	8.17	8.22	6.95	7.88	8.1	8.24	8.06	7.64	8.18		
	Electrical Conductivity (EC)	µS/cm	NG	243	240	210	250	250	285	280	240	210	280	230	250	220	230	250	250	230	230	178	200	260	268	244	274.2	260.8	290	339	287	263	315	401	274			
	Total Suspended Solids (TSS)	mg/L	NG	13	5	27	30	15	29	16	5	15	7	68	4	8	13	8	13	8	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hardness as CaCO3	mg/L	NG	130	118	167	110	118.6	135	132	130	122	130	110	120	111	121	129	132	121	115	108	108	120	120	110	125	144.7	127.6	69	183	152	130	149	238	130		
	Alkalinity (total as CaCO3)	mg/L	NG	100	100	130	95	99	100	100	94.4	92	110	110	110	107	98.4	106.6	106	119	96.2	101	81.5	88	112	109	97.9	110.6	109.1	134	128	117	117	143	185	115		
	Calcium	mg/L	NG	38.9	34.8	51.2	32	35.8	37.3	40	39	36	40	33	36	33	36	38	39	36	33.9	26.9	32	36	35.4	32.4	36.7	45.22	37.5	58.1	48	38.2	45	75.3	39.6			
	Magnesium	mg/L	NG	8.42	7.61	9.4	7.2	7.1	10.2	7.89	7.4	7.9	8.3	7	7.6	7	7.6	8.1	8.4	7.5	7.3	9.8	6.8	7.6	7.7	7.1	8.2	7.72	8.25	9.29	7.9	8.5	8.88	12.1	7.68			
	Potassium	mg/L	NG	-	-	1.9	-	1.9	-	-	-	-	-	-	1.1	1.3	1.5	1	1.6	1.2	1.5	1.9	1.1	0.8	3.7	1	1.5	1	1.39	1.76	1.36	1.18	1.28	1.44	1.84	1.23		
	Sodium	mg/L	NG	-	-	5.7	-	3.9	-	-	-	-	-	-	4.4	4.7	3.3	3.6	4.4	4.6	4.4	4.1	3.3	4	6.5	4	4	4.6	4.94	5.3	5.79	4.66	4.8	5.98	7.55	6.21		
	Chloride	mg/L	120	2.3	2	2.9	1.9	2	2	1.8	1.1	1.8	1.5	1.8	1.4	1.4	3.2	1.8	1.7	1.9	1.4	1.4	1.5	5.3	1.54	1.27	1.38	1.51	2.2	2.31	1.66	1.84	2.35	3.38	2.28			
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sulphate	mg/L	NG	26	21	33	23	18	22	17	17	18	18	16	19	16.1	12	15	19	17	16	12	15	18	23	20	19.3	19	23	27.5	20	24	26	30	23			
	Colour	TCU	NG	10	15	35	60	30	100	35	60	60	25	70	20	44	50	18	20	75	50	50	100	20	30	10	25	18	15	5	15	20	10	5	30			
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total Solids (Filtered)	mg/L	NG	200	180	230	180	220	190	190	160	180	190	160	172	170	184	174	187	179	167	150	148	180	158	163	199	169	159	-	163	178	231	251	186				
Turbidity	NTU	NG	20	6.4	35	28	16	45	8	7.9	85	5	60	2	2.3	27	3.1	11	32	40	10	0.12	0.02	0.077	0.01	0.002	0.015	0.015	0.008	0.047	0.008	0.014	0.025	0.047	0.01			
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.05	0.03	0.03	0.03	0.03	0.02	0.03	0.02	0.03	0.03	0.03	0.03	0.01	0.03	0.03	0.005	0.007	0.005	0.017	0.012	0.02	0.077	0.01	0.002	0.005	0.015	0.063	0.047	0.008	0.014	0.025	0.047	0.01		
	Total Kjeldahl Nitrogen (TKN)	mg/L	NG	-	0.44	0.27	0.4	0.55	0.3	0.33	0.34	-	0.78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.04	0.04	0.04	0.18	0.04	0.04	0.04	0.04	0.04	0.04	0.02	0.04	0.04	-	0.02	0.01	0.01	0.02	0.02	0.1	0.02	0.09	0.008	0.008	0.008	0.008	0.047	0.049	0.008	0.008	0.024	0.065	0.009		
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Phosphorus	µg/L	4	50	50	50	50	50	50	50	50	50	50	50	50	120	16	17	49	13	22	39	56	20	74	13	20	2	36	29	102	18	11	16	15	11	36	
	Phosphorus (filtered) (Filtered)	mg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum Total		µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Antimony		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Antimony (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Arsenic		µg/L	5	1	1	2.5	7.4	1	1	1	0.9	0.5	1	2	1	0.5	0.3	1	1	1	1	1.5	0.5	1	0.3	0.7	0.3	0.7	0.4	2.6	0.6	0.5	0.5	3.4	0.3	0.9		
Arsenic (Filtered)		µg/L	NG	-																																		

Table A.6: CCME Water Quality Guidelines - Little Buffalo River @ Hwy 5 Bridge, All Parameters

				Sampled Date Time		SampleCode		5/14/1987	10/22/1987	5/13/1988	10/21/1988	5/16/1989	10/25/1989	5/23/1990	10/30/1990	6/15/1993	10/21/1993	5/31/1994	10/19/1994	5/30/1995	10/26/1995	6/12/1996	10/31/1996	5/15/1997	10/22/1997	5/19/1998	10/22/1998	6/14/1999	10/6/1999	5/29/2000	10/18/2000	5/15/2001	10/31/2001	5/28/2002	10/17/2002	5/20/2003	10/22/2003	6/2/2004	10/21/2004	5/17/2005	10/18/2005	5/25/2006	10/19/2006	6/4/2007	10/17/2007	5/26/2008	10/27/2008	5/21/2009	10/21/2009	5/31/2010	10/24/2010
Chem_Group	ChemName	output unit	CCME FAL ¹	LittleBuffaRiv@HWY5_14 May 87	LittleBuffaRiv@HWY5_22 Oct 87	LittleBuffaRiv@HWY5_13 May 88	LittleBuffaRiv@HWY5_21 Oct 88	LittleBuffaRiv@HWY5_16 May 89	LittleBuffaRiv@HWY5_25 Oct 89	LittleBuffaRiv@HWY5_30 Oct 90	LittleBuffaRiv@HWY5_15 Jun 93	LittleBuffaRiv@HWY5_21 Oct 93	LittleBuffaRiv@HWY5_31 May 94	LittleBuffaRiv@HWY5_19 Oct 94	LittleBuffaRiv@HWY5_30 May 95	LittleBuffaRiv@HWY5_26 Oct 95	LittleBuffaRiv@HWY5_12 Jun 96	LittleBuffaRiv@HWY5_31 Oct 96	LittleBuffaRiv@HWY5_15 May 97	LittleBuffaRiv@HWY5_22 Oct 97	LittleBuffaRiv@HWY5_19 May 98	LittleBuffaRiv@HWY5_22 Oct 98	LittleBuffaRiv@HWY5_14 Jun 99	LittleBuffaRiv@HWY5_08 Oct 99	LittleBuffaRiv@HWY5_29 May 00	LittleBuffaRiv@HWY5_18 Oct 00	LittleBuffaRiv@HWY5_15 May 01	LittleBuffaRiv@HWY5_31 Oct 01	LittleBuffaRiv@HWY5_28 May 02	LittleBuffaRiv@HWY5_17 Oct 02	LittleBuffaRiv@HWY5_20 May 03	LittleBuffaRiv@HWY5_22 Oct 03	LittleBuffaRiv@HWY5_02 Jun 04	LittleBuffaRiv@HWY5_21 Oct 04	LittleBuffaRiv@HWY5_17 May 05	LittleBuffaRiv@HWY5_18 Oct 05	LittleBuffaRiv@HWY5_25 May 06	LittleBuffaRiv@HWY5_19 Oct 06	LittleBuffaRiv@HWY5_04 Jun 07	LittleBuffaRiv@HWY5_17 Oct 07	LittleBuffaRiv@HWY5_26 May 08	LittleBuffaRiv@HWY5_27 Oct 08	LittleBuffaRiv@HWY5_21 May 09	LittleBuffaRiv@HWY5_21 Oct 09	LittleBuffaRiv@HWY5_31 May 10	LittleBuffaRiv@HWY5_24 Oct 10					
Physical/Major Ion	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Organic Carbon(TOC)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units	6.5-9	7.4	7.8	7.7	7.9	8	7.9	7.82	7.99	7.97	8.04	7.83	8.06	7.84	8.23	8.13	7.79	7.91	7.82	8.07	8.05	8.08	8.16	8.14	8.12	7.97	7.89	7.86	7.96	8	8.12	7.84	7.95	7.9	8.05	8.16	8.15	8.17	8.11	8	8.05	7.84	7.88	8.06	7.94				
	Electrical Conductivity (EC)	µS/cm	NG	570	1400	670	970	820	2200	1040	2400	709	708	491	1520	747	1520	716	779	499	612	561	921	830	676	629	723	482	700	609	757	539	2040	999	2240	621	758	968	1780	880	1390	667	956	494	1130	807	917				
	Total Suspended Solids (TSS)	mg/L	NG	9	9	18	4	13	2	15	-	-	11	23	10	8	3	15	6	3	13	13	3	12	9	7	3	22	7	17	16	12	3	4	8	8	8	8	3	14	3	8	8	16	3	12	10				
	Hardness as CaCO3	mg/L	NG	250	730	350	430	443	1260	563	1290	344	363	217	1657.1	362	907	381	441	334	315	-	374	413	350	460	-	318	318	256	1110	508	1430	306	326	525	878	452	763	360	497	254	731	467	521						
	Alkalinity (total as CaCO3)	mg/L	NG	300	220	114	170	124	244.5	132	235	121	134	120.5	204.7	122	224	140	150	98.5	132	124	164	144	138	137	137	102	155	109	141	112	220	146	219	95.8	127	147	213	133	215	112	154	85.3	171	148	163				
	Calcium	mg/L	NG	77	230	110	130	146	407	183	410	107	112.1	65.6	528.1	118	292	125	139	82	101	102	174	121	130	111	141	81.4	157	101	140	80.5	347	166	456	96.2	107	170	230	143	238	113	160	80.3	232	146	162				
	Magnesium	mg/L	NG	14	36	18	28	19.1	59.8	25.7	67	18.6	20.1	13	82.2	16.4	43.3	16.7	22.7	12.7	19.8	14.7	25.6	17.3	21.4	17.6	26.5	13.9	21.4	16.1	24.2	13.4	59.7	22.5	71.1	16.1	14.4	24.4	37.6	22.7	40.5	18.7	23.6	13.1	36.6	25.1	28.4				
	Potassium	mg/L	NG	-	3	3	2.2	3.4	3.4	3	3.2	1.3	1.51	1.48	1.52	1.82	2.37	2.02	1.43	1.75	1.23	1.8	1.65	1.76	1.11	1.52	1.13	1.8	1.3	2.56	1.28	2.4	2.84	2.91	3.1	0.1	1.1	1.1	2	2.7	1.8	2.3	1.9	1.5	1.5	1.3	2.3	1.8			
	Sodium	mg/L	NG	-	22	7.8	14	8.6	45	14.1	59	10.9	10.7	7.64	28.5	8.88	23.3	11.6	13.4	6.61	10.4	8.06	15.6	11.1	12.8	10.2	13	5.85	12	7.65	13.7	7.8	49.9	14.6	64.3	11.8	13	17.4	45.6	15.6	31.5	10.7	17.8	8.2	18	15.2	15.8				
	Chloride	mg/L	120	5.7	18	6.7	15	8.5	48	12.5	57.6	9.97	8.86	3.91	26.6	7.63	19.9	10.1	11.7	5.31	7.33	6.5	13.3	8.7	9.3	7.5	10	3.5	8.7	5.5	10.3	6.1	52.7	14	66.8	7.6	10.7	14.5	49.5	13.2	30.3	8.5	15.2	5.1	16.9	10.8	13.1				
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sulphate	mg/L	NG	37	600	230	390	316	1120	728	1030	245	239	126	707	254	725	260	250	147	54	145	343	262	184	172	219	56	264	200	334	163	1160	390	1	218	271	376	828	310	527	237	346	165	451	305	348				
	Colour	TCU	NG	80	50	60	100	58	15	65	10	70	60	70	45	60	40	55	80	40	60	70	85	60	100	80	70	70	80	80	70	80	20	55	20	90	80	-	45	86	64	116	93	147	83	108	115				
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Solids (Filtered)	mg/L	NG	390	-	549	-	805	620	1970	837	2160	564	557	474	1277	556	1301	613	631	376	508	414	756	456	540	510	572	356	606	514	618	362	1570	727	1840	468	594	764	1490	632	1070	492	730	362	896	622	694			
	Turbidity	NTU	NG	6.5	3	5	2.8	2.7	3.3	7.8	3.3	4.5	4.3	17.2	3.6	8.1	2.8	7.6	6	11.5	7.6	9.7	4.5	12.5	4	7.1	5.6	12.2	5.1	14.7	5.9	7.7	15	7.15	3.5	8.98	5.72	7.08	2.42	11.8	2.63	7.19	45.9	10.6	3.44	7.84	4.28				
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.03	0.03	0.07	0.34	0.02	0.03	0.046	0.025	0.003	0.01	0.003	0.007	0.011	0.008	0.012	0.01	0.025	0.018	0.012	0.016	0.011	0.008	0.013	0.05	0.005	0.005	0.014	0.005	0.011	0.005	0.005	0.005	0.008	0.008	0.007	0.005	0.011	0.005	0.011	0.005	0.02	0.02	0.01	0.01				
	Total Kjeldahl Nitrogen (TKN)	mg/L	NG	0.29	-	-	-	-	-	-	-	-	-																																						

Table A.6: CCME Water Quality Guidelines - Little Buffalo River @ Hwy 5 Bridge, All Parameters

Chem_Group	ChemName	Output Unit	Sampled Date Time Sample Code	8/28/2013	6/16/2014	8/20/2014	5/20/2015	7/27/2015	9/24/2015	7/4/2016	10/25/2016
				LittleBuffaloRiv@HWY5_28 Aug 13	LittleBuffaloRiv@HWY5_16 Jun 14	LittleBuffaloRiv@HWY5_20 Aug 14	LittleBuffaloRiv@HWY5_20 May 15	LittleBuffaloRiv@HWY5_27 Jul 15	LittleBuffaloRiv@HWY5_24 Sep 15	LittleBuffaloRiv@HWY5_04 Jul 16	LittleBuffaloRiv@HWY5_25 Oct 16
			CCME FAL ¹								
Physical/Major Ion	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	1000
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	1.05
	Silica	mg/L	NG	-	-	-	-	-	-	-	7.89
	Total Organic Carbon(TOC)	µg/L	NG	0.0209	-	-	-	-	-	-	0.0224
	pH	pH Units	6.5-9	7.95	7.94	8	7.91	7.97	7.82	7.99	7.91
	Electrical Conductivity (EC)	µS/cm	NG	954	1850	3190	2270	4540	4450	2280	2380
	Total Suspended Solids (TSS)	mg/L	NG	8	22	16	12	17	19	3	5
	Hardness as CaCO3	mg/L	NG	508	862	1330	1090	1750	1580	1160	1200
	Alkalinity (Total as CaCO3)	mg/L	NG	152	154	179	153	163	171	182	243
	Calcium	mg/L	NG	161	276	438	358	546	502	381	372
	Magnesium	mg/L	NG	25.6	41.7	57.6	48.7	93.4	79.4	50.2	65.2
	Potassium	mg/L	NG	1.5	2.1	2.1	3	3.3	3.4	2.6	2.3
	Sodium	mg/L	NG	20	97.3	271	117	457	411	155	140
	Chloride	mg/L	120	17.5	140	424	195	751	621	231	206
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	0.4
	Sulphate	mg/L	NG	346	680	1140	1070	1580	1340	1	844
	Colour	TCU	NG	-	91	57	46	38	58	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	30.2	-	-	-	-	-	-	25.1
	Total Solids (Filtered)	mg/L	NG	724	1400	2620	1850	3490	3460	1930	2000
	Turbidity	NTU	NG	4.42	4.85	2.27	3.99	4.11	4.88	3.99	4.11
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.005	0.005	0.005	0.005	0.005	0.014	0.01	0.015
	Total Kjeldahl Nitrogen (TKN)	mg/L	NG	-	-	-	-	-	-	-	-
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	0.1
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	0.02
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.01	0.1	0.01	0.22	0.34	0.1	0.1	0.1
	Nitrogen (Total)	mg/L	NG	-	0.93	0.8	0.66	0.7	0.61	1.13	0.94
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	0.0021	0.0017
	Phosphorus	µg/L	4	37	24	9	16	21	9	24	17
	Phosphorus (filtered) (Filtered)	µg/L	4	0.022	-	-	-	-	-	0.0083	0.0074
	Aluminum (Filtered)	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	-	0.7	0.8	0.7	1.8	1.1	2.9	1.3
Metals ⁵	Aluminum Total	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	74	88.5	38.4	66.9	49.7	110	67.8	72.2
	Antimony	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Antimony (Filtered)	µg/L	NG	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Arsenic	µg/L	5	1.9	0.6	1.1	0.9	1.2	0.9	1	0.5
	Arsenic (Filtered)	µg/L	5	-	0.5	0.8	0.5	1.1	0.7	0.8	0.5
	Barium	µg/L	NG	33.3	21.2	31	21.4	26	24.1	27.3	22.2
	Barium (Filtered)	µg/L	NG	19.3	19.3	25.8	19.8	24.5	23.3	26.3	21.1
	Beryllium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Beryllium (Filtered)	µg/L	NG	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Bismuth	µg/L	NG	-	-	0.2	0.2	0.2	0.2	0.3	0.2
	Bismuth (Filtered)	µg/L	NG	-	-	0.2	0.2	0.2	0.2	0.2	0.2
	Boron - soluble	µg/L	1500	-	-	287	216	404	435	260	179
	Boron - soluble (Filtered)	µg/L	1500	-	-	269	285	407	409	236	186
	Cadmium	µg/L	0.09	0.1	0.1	0.1	0.1	0.09	0.1	0.1	0.1
	Cadmium (Filtered)	µg/L	0.09	-	0.05	0.05	0.05	0.09	0.05	0.05	0.05
	Cesium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Cesium (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Chromium	µg/L	NG	0.4	0.9	0.6	0.3	0.1	0.2	0.1	0.2
	Chromium (Filtered)	µg/L	NG	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Cobalt	µg/L	NG	0.2	0.1	0.1	0.2	0.1	0.2	0.2	0.2
	Cobalt (Filtered)	µg/L	NG	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Copper	µg/L	2 - 4 ³	0.2	0.2	0.2	0.8	0.4	0.7	0.6	0.2
	Copper (Filtered)	µg/L	2 - 4 ³	-	0.2	0.4	0.4	0.4	0.4	0.4	0.2
	Iron	µg/L	300	206	286	213	217	215	384	273	238
	Iron (Filtered)	µg/L	300	-	55	22	22	12	24	73	66
	Lead	µg/L	1-7 ³	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Lead (Filtered)	µg/L	1-7 ³	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Lithium	µg/L	NG	13.5	14.5	23.4	17.1	26	40.9	19.1	19.9
	Lithium (Filtered)	µg/L	NG	13.3	20.5	17.4	25.5	39.9	17.6	19.9	19.9
	Manganese	µg/L	NG	34.1	38.9	18	35.1	69.4	30.2	55	24.5
	Manganese (Filtered)	µg/L	NG	-	32.4	11.3	22.2	57.7	25.4	38.1	21.2
	Mercury	µg/L	0.026	0.01	0.01	0.01	0.03	0.06	0.01	0.01	0.01
	Mercury (Filtered)	µg/L	0.026	-	0.01	0.01	0.03	0.06	0.02	0.01	0.01
	Molybdenum	µg/L	73	0.1	0.6	0.9	0.5	1	1.2	0.5	0.6
	Molybdenum (Filtered)	µg/L	73	-	0.4	0.8	0.5	0.9	1	0.5	0.5
	Nickel	µg/L	25-150 ³	1.1	0.6	1.4	1.2	1.5	1.8	1.1	1.2
	Nickel (Filtered)	µg/L	25-150 ³	-	0.4	1.1	1.1	1.3	1.5	0.9	1
	Rubidium	µg/L	NG	1.7	2	2	1.8	2.2	2	2.1	1.6
	Rubidium (Filtered)	µg/L	NG	-	1.8	1.6	1.8	1.9	1.9	1.9	1.5
	Selenium	µg/L	1	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.5
	Selenium (Filtered)	µg/L	1	-	0.3	0.5	0.5	0.3	0.4	0.3	0.3
	Silver	µg/L	0.25	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Silver (Filtered)	µg/L	0.25	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Strontium	µg/L	NG	972	2380	3790	2940	5120	5030	3210	3050
	Strontium (Filtered)	µg/L	NG	2270	2270	3270	2870	4940	4910	3120	3110
	Thallium	µg/L	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Thallium (Filtered)	µg/L	0.8	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Tin	µg/L	NG	0.3	-	1	1.4	0.1	0.4	0.1	0.1
	Tin (Filtered)	µg/L	NG	-	-	0.1	0.1	0.1	0.2	0.1	0.1
	Titanium	µg/L	NG	2.6	2.8	1.2	2.1	1	3.8	2.2	2.7
	Titanium (Filtered)	µg/L	NG	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Uranium	µg/L	15	0.2	0.5	0.8	0.6	0.8	1.1	0.5	1.3
	Uranium (Filtered)	µg/L	15	-	0.5	0.8	0.7	0.8	1	0.5	1.2
	Vanadium	µg/L	NG	2	0.4	0.4	0.3	0.3	0.5	0.5	0.3
	Vanadium (Filtered)	µg/L	NG	0.1	0.2	0.2	0.1	0.2	0.2	0.3	0.1
	Zinc	µg/L	30	5	5	5	5	0.4	5	5	5
	Zinc (Filtered)	µg/L	30	-	0.4	0.4	0.4	0.5	0.4	0.4	0.8

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015), Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

⁵ CCME FAL Guidelines developed for total metals only. Guideline has been applied to dissolved metals for illustrative purposes only.
NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.7: CCME Water Quality Guidelines - Lockhart River @ Mouth, All Parameters

		Sampled Date Time		SampleCode		7/29/1982	9/28/1982	6/29/1983	9/15/1983	6/11/1984	9/11/1984	7/16/1985	9/20/1985	6/27/1986	7/2/1987	9/17/1987	6/28/1988	10/4/1988	7/6/1989	10/3/1989	7/2/1990	9/28/1990	7/17/1991	9/17/1991	7/2/1992	9/22/1992	7/2/1993	8/26/1993	6/24/1994	8/16/1994	7/10/1995	9/8/1995	7/4/1996	
		Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	Lockhart	
		River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	River@Mo	
		uth_29	uth_28	uth_29	uth_11	uth_29	uth_11	uth_29	uth_11	uth_29	uth_11	uth_16	uth_20	uth_27	uth_02	uth_17	uth_28	uth_04	uth_06	uth_03	uth_02	uth_28	uth_17	uth_02	uth_22	uth_02	uth_26	uth_24	uth_16	uth_10	uth_08	uth_04		
		Jul 82	Aug 82	Jun 83	Sep 83	Jun 84	Sep 84	Jul 85	Sep 85	Jun 86	Sep 87	Jun 88	Oct 88	Jul 89	Oct 89	Jun 90	Sep 90	Oct 90	Jul 91	Sep 91	Jul 92	Sep 92	Jul 93	Aug 93	Jun 94	Aug 94	Jul 95	Sep 95	Jul 96					
Chem_Group	ChemName	output unit	CCME FAL ¹																															
Physical/Major Ions	pH	pH Units	6.5-9	6.9	6.8	6.9	7	6.8	6.9	6.5	6.3	6.6	6.5	7.1	6.4	6.2	6.6	6.4	7.29	7.45	7.38	7.82	7	6.78	6.67	6.76	6.65	6.84	6.85	6.85	6.99			
	Electrical Conductivity (EC)	µS/cm	NG	17	18	21	18	21	26	38	17	19	19	18	22	16.2	16	15.8	18.1	16	18.3	15.3	20	16	21.3	19.1	19	17.4	19	16.7	18.9			
	Total Suspended Solids (TSS)	mg/L	NG	5	5	5	5	5	5	0.7	5	5	2	10	2	2	2	2	3								3		9	4	4			
	Hardness as CaCO3	mg/L	NG	8.2	5.85	11.9	6.9	6.2	7.8	6.9	5.3	7.6	7.5	6.6	9.6	4.3	9	6	7	8	7	6.1	8	5	8	6.9	8.4	7	11.1	6.6	7.6			
	Alkalinity (total as CaCO3)	mg/L	NG	6	5.6	79	5.5	6.7	3.1	5.1	9.5	6.1	5.6	5.4	8	5	5.5	5.1	6	5.3	6.1	5	7	5	4.8	41	5.6	5	7.9	5.1	6.5			
	Calcium	mg/L	NG	1.83	1.25	2.12	1.5	1	1.8	1.6	1.1	1.3	1.7	1.4	2.1	1	2.4	1.3	2	2	2	1.3	1.7	1	1.7	1.6	1.4	1.8	3.16	1.51	1.73			
	Magnesium	mg/L	NG	0.88	0.67	-	0.8	0.9	0.8	0.7	0.64	1	0.8	0.75	1.1	0.86	0.7	0.7	0.8	0.8	0.8	0.7	0.9	0.6	0.9	0.7	1.2	0.6	0.79	0.69	0.8			
	Potassium	mg/L	NG	-	-	0.39	-	0.6	0.9	-	-	-	-	-	0.4	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.2	0.6	0.4	0.38	0.42	0.6	0.46	0.41		
	Sodium	mg/L	NG	-	-	0.48	-	-	0.1	-	-	-	-	-	0.8	0.6	0.4	0.4	0.4	0.4	0.4	0.4	1.1	0.6	0.6	1.8	0.5	0.32	0.27	0.39	0.63	0.46		
	Chloride	mg/L	120	0.6	0.5	1	0.5	0.5	0.7	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.3	0.4	0.4	0.5	0.5	0.4	0.4	0.59	0.37	0.76	0.64	0.68	0.46	0.42		
	Sulphate	mg/L	NG	1	1.4	1	1.5	2	1.9	1	1.9	2.2	2.5	3.5	1	1.8	2	3	2	1	4	9	3	2	3	3	3	-	3	4	3	3		
	Colour	TCU	NG	5	5	5	5	5	5	5	5	5	7	5	10	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5		
	Total Solids (Filtered)	mg/L	NG	19	18	14	20	14	22	20	10	13	18	21	18	6	22	13	23	27	39	5	24	10	10	11	26	26	11	20	14	14		
	Turbidity	NTU	NG	0.62	0.01	1	1	1	0	1.4	0.12	0.5	0.3	0.23	1.1	0.4	0.4	-	0.2	0.2	0.5	-	0.3	1.4	0.59	0.7	0.4	0.7	0.3	1.3	0.4	3.3		
Nutrients	Ammonia as N	mg/L	0.021 ³	0.05	0.04	0.03	0.03	0.58	0.02	0.03	0.04	0.03	0.03	0.03	0.013	0.007	0.03	0.03	0.005	0.007	0.005	0.005	0.005	0.007	0.005	0.012	0.002	0.007	0.008	0.008	0.007			
	Total Kjeldahl Nitrogen (TKN)	mg/L	NG	0.0043	0.24	0.08	0.08	0.6	0.15	0.2	0.09	0.25	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.04	0.04	0.04	0.28	0.18	0.04	0.04	0.04	0.04	0.02	0.04	0.04	0.02	0.02	0.02	0.02	0.01	0.04	0.04	0.02	0.02	0.04	0.013	0.013	0.024	0.008	0.017	0.021	0.024		
	Phosphorus	µg/L	4	50	50	50	50	50	50	50	50	50	50	50	5	5	5	5	5	5	5	5	5	5	5	5	4	5	2	8	4	10		
Metals	Arsenic	µg/L	5	5	2	1	2	1	1	0.5	0.5	1	1	1	1	1	1	1	0.05	1	1	0.5	0.5	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3		
	Cadmium	µg/L	0.09	10	0.1	0.05	0.2	0.2	5.6	0.2	0.1	0.7	0.5	0.5	0.7	1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.09	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
	Chromium	µg/L	NG	-	-	-	0.5	2.9	0.5	1.73	0.6	0.5	1	62	1	1	1	1	1	4	1	1	1	1	1	1	0.51	1	0.2	0.4	0.3	0.2	0.8	
	Cobalt	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03	1	0.1	0.1	0.1	0.1	0.1		
	Copper	µg/L	2 - 4 ²	40	1	1	0.9	1.2	5.9	0.5	0.5	2.1	1	1	1	1	1	1	2	6	1	1	1	1	2	3	0.66	1	0.4	0.6	0.3	0.5	1	
	Iron	µg/L	300	-	3	5	5	9.1	15	11.2	10.1	15.7	14	4.5	40	15	5	18	36	13	11	10	30	22	57	20	3	20	61	5	67			
	Lead	µg/L	1.7 ²	-	0.5	0.2	0.1	0.7	3.6	0.7	0.9	0.5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.1	0.4	0.5	0.4	0.5	0.2	
	Manganese	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Mercury	µg/L	0.01	0.01	0.01	0.11	0.03	0.06	0.045	0.05	0.912	0.13	0.12	0.05	0.17	0.05	0.02	0.03	0.03	0.03	-	-	-	-	-	-	-	-	-	-	-	-		
	Nickel	µg/L	25-150 ²	-	1	1	1	1	1.3	10	10	7.9	1	1	1	1	1	1	0.6	1	4	1	1	1	1	1	1	0.4	1	0.3	0.6	0.5	0.4	0.5
	Zinc	µg/L	30	30	19	5	12	10	18	15	15	15	10	10	3	4	0.6	1	11	1	1	1	1	1	1	1	1	1	2	0.5	0.5	0.5	1.5	

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015).
Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with hardness. Range given.

³ Guideline varies with pH and temperature. Most stringent given.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.7: CCME Water Quality Guidelines - Lockhart River @ Mouth, All Parameters

			Sampled Date Time	9/10/1996	6/30/1997	9/17/1997	7/2/1998	9/22/1998	6/29/1999	9/21/1999	6/28/2000	8/22/2000	7/3/2001	9/24/2001	7/3/2002	9/11/2002	7/8/2003	8/29/2003	7/12/2004	9/28/2004	7/10/2005	9/2/2005	7/4/2006	9/26/2006	7/13/2007	10/1/2007	7/7/2008	9/28/2008	7/14/2009	9/1/2009	7/12/2010	9/17/2010	
			SampleCode	Lockhart River@Mouth_10 Sep 96	Lockhart River@Mouth_30 Jun 97	Lockhart River@Mouth_17 Sep 97	Lockhart River@Mouth_02 Jul 98	Lockhart River@Mouth_22 Sep 98	Lockhart River@Mouth_29 Jun 99	Lockhart River@Mouth_21 Sep 99	Lockhart River@Mouth_28 Jun 00	Lockhart River@Mouth_22 Aug 00	Lockhart River@Mouth_03 Jul 01	Lockhart River@Mouth_24 Sep 01	Lockhart River@Mouth_03 Jul 02	Lockhart River@Mouth_11 Sep 02	Lockhart River@Mouth_08 Jul 03	Lockhart River@Mouth_29 Aug 03	Lockhart River@Mouth_12 Jul 04	Lockhart River@Mouth_28 Sep 04	Lockhart River@Mouth_10 Jul 05	Lockhart River@Mouth_02 Sep 05	Lockhart River@Mouth_04 Jul 06	Lockhart River@Mouth_26 Sep 06	Lockhart River@Mouth_12 Jul 07	Lockhart River@Mouth_01 Oct 07	Lockhart River@Mouth_07 Jul 08	Lockhart River@Mouth_28 Sep 08	Lockhart River@Mouth_14 Jul 09	Lockhart River@Mouth_01 Sep 09	Lockhart River@Mouth_12 Jul 10	Lockhart River@Mouth_17 Sep 10	
Chem_Group	ChemName	output unit	CCME FAL ¹																														
Physical/Major Ions	pH	pH Units	6.5-9	6.98	6.95	6.89	6.92	6.62	6.99	6.98	7.01	6.97	6.91	6.91	6.86	7.05	6.94	6.82	7.03	6.9	7.19	7.14	7.24	6.83	7.19	7.03	7.18	7.2	7.11	7.03	7.18	6.97	
	Electrical Conductivity (EC)	µS/cm	NG	3	19	16.5	18.6	19.8	20.6	17.4	3	3	16.7	18.7	16.9	20.9	19.8	20	18.2	23.2	21.9	19.7	18.4	22	19.5	20.2	3	19.9	18.7	20.6	20	20	
	Total Suspended Solids (TSS)	mg/L	NG	3	-	-	-	-	3	3	3	3	3	3	3	33	3	3	3	3	3	3	-	3	3	3	3	3	3	3	3	3	3
	Hardness as CaCO3	mg/L	NG	5.7	-	6.23	-	-	7.48	6.5	7.66	6.45	7.2	5.81	8.61	9.58	6.7	6.78	13.4	7.1	10.9	11.8	12	11.3	11.6	11.8	14.4	8.4	14.7	7.6	9.5	10.6	
	Alkalinity (total as CaCO3)	mg/L	NG	5.2	7.5	5.2	6.2	7.2	7.2	5.4	6.8	4.8	6.3	5.2	7.5	6.7	7.5	7.4	7.4	7.3	9.4	9	8.1	6.7	11.8	7.5	7.1	6.5	7.2	8.9	7.1	5.7	
	Calcium	mg/L	NG	1.25	1.66	1.36	1.35	1.57	1.66	1.4	1.7	1.38	1.57	1.24	1.88	1.71	1.53	1.56	2.4	1.6	2.5	2.7	2.7	2.6	2.5	2.7	3.3	2.4	3.7	1.5	2.1	2.4	
	Magnesium	mg/L	NG	0.62	0.87	0.688	0.724	0.83	0.81	0.73	0.83	0.73	0.8	0.66	0.95	1.29	0.7	0.7	1.4	0.8	1.1	1.2	1.2	1.2	1.3	1.2	1.5	0.6	1.3	0.9	1	1.1	
	Potassium	mg/L	NG	0.44	0.424	0.439	0.42	0.46	0.43	0.41	0.41	0.39	0.4	0.41	0.47	0.52	0.53	0.6	0.4	0.4	0.4	0.3	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.3	0.5	0.4	
	Sodium	mg/L	NG	0.44	0.45	0.47	0.45	0.46	0.47	0.45	0.49	0.46	0.45	0.49	0.49	0.52	0.45	0.42	0.6	0.5	0.5	0.4	0.5	0.4	0.5	0.5	0.5	0.6	0.6	0.4	0.6	0.5	
	Chloride	mg/L	120	0.34	0.36	0.37	0.38	0.41	0.2	0.2	0.3	0.2	0.4	0.5	0.2	0.4	0.3	0.4	0.4	0.6	0.9	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
	Sulphate	mg/L	NG	3	4	3	3	3	3	4	3	15	5	0.9	3	3	3	3	3	1.3	1	1	1	1	1	1	1	3	1	1	1	2	1
	Colour	TCU	NG	5	5	5	5	5	5	5	-	5	5	-	5	10	5	5	5	5	5	10	5	6	5	5	5	6	6	6	5	5	5
	Total Solids (Filtered)	mg/L	NG	74	10	21	10	30	30	10	15	38	28	10	23	40	10	14	14	10	16	12	18	16	10	12	20	10	10	76	10	10	10
	Turbidity	NTU	NG	0.2	-	0.6	0.7	-	1	-	-	2.3	0.2	0.5	0.3	0.2	0.3	0.2	0.3	0.77	-	0.34	1.25	-	0.32	0.35	0.23	0.4	0.52	0.05	0.23	0.38	-
Nutrients	Ammonia as N	mg/L	0.021 ²	0.019	0.005	0.008	0.013	0.002	0.005	0.006	0.013	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.003	0.005	0.005	0.005	0.007	0.005	0.005	0.005	0.005	0.005	0.01	0.01	0.01	
	Total Kjeldahl Nitrogen (TKN)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.019	0.027	0.008	0.008	0.014	0.02	0.015	0.032	0.008	0.008	0.018	0.026	0.019	0.013	0.011	0.2	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.23	0.01	0.02	0.02	0.12	0.08
	Phosphorus	µg/L	4	2	15	4	6	14	4	5	4	4	4	4	4	26	68	7	3	10	50	10	10	10	10	10	20	10	10	30	10	10	10
Metals	Arsenic	µg/L	5	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	0.09	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.05
	Chromium	µg/L	NG	0.2	0.6	0.2	2	2	0.3	1	3	3	3	3	3	3	3	0.3	0.3	0.3	0.3	0.1	0.5	0.1	1.4	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1
	Cobalt	µg/L	NG	0.1	0.1	0.1	0.6	0.1	1	1	1	1	1	1	1	1	1	0.3	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Copper	µg/L	2 - 4 ³	0.5	1.3	0.8	1	0.7	2	2	2	2	2	2	2	2	3	1.1	0.9	1	0.4	0.8	0.5	0.6	0.6	0.5	0.5	0.4	0.2	0.2	0.4	0.5	0.7
	Iron	µg/L	300	6	22	15	41	20	20	30	30	30	30	30	41	30	45	34	50	50	50	50	50	125	50	50	7	5	8	5	7	5	5
	Lead	µg/L	1-7 ⁴	0.8	0.4	0.2	0.3	0.2	1	1	1	1	1	1	1	2	0.1	0.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.7	0.1	0.1
	Manganese	µg/L	NG	-	-	-	-	-	-	-	-	-	-	1	1	2	1	1.1	1.8	0.8	0.5	1.1	0.7	0.9	1.9	0.6	0.6	1.1	0.8	0.8	0.6	0.8	0.4
	Mercury	µg/L	0.026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nickel	µg/L	25-150 ²	0.4	0.8	0.4	0.9	0.5	1	1	1	1	1	1	1	1	1	0.4	0.6	0.3	0.4	0.4	0.5	0.5	1	0.4	0.5	0.5	0.4	0.4	0.4	0.6	0.7
	Zinc	µg/L	30	0.5	1.6	19	5	10	10	10	10	12	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Notes:
¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)
² Guideline varies with hardness. Range given.
³ Guideline varies with pH and temperature. Most stringent given.
NG - No guideline
BOLD - Greater than Guideline
Blank - Not analyzed

Table A.8a: CCME Water Quality Guidelines - Marian River, All Parameters

			Sampled Date Time	8/22/1997	10/1/1997	3/3/1998	5/15/1998	6/4/1998	7/10/1998	8/7/1998	11/4/1998	3/19/1999	4/16/1999	5/4/1999	6/11/1999	7/9/1999	8/6/1999	9/10/1999	10/21/1999	1/27/2000
			SampleCode	Marian River_DL_22 Aug 97	Marian River_DL_01 Oct 97	Marian River_DL_03 Mar 98	Marian River_DL_15 May 98	Marian River_DL_04 Jun 98	Marian River_DL_10 Jul 98	Marian River_DL_07 Aug 98	Marian River_DL_04 Nov 98	Marian River_DL_19 Mar 99	Marian River_DL_16 Apr 99	Marian River_DL_04 May 99	Marian River_DL_11 Jun 99	Marian River_DL_09 Jul 99	Marian River_DL_06 Aug 99	Marian River_DL_10 Sep 99	Marian River_DL_21 Oct 99	Marian River_DL_27 Jan 00
Chem_Group	ChemName	output unit	CCME FAL ¹																	
Cyanide	Cyanide Total	mg/L	NG	0.001	-	-	0.004	0.001	0.001	0.004	0.005	0.001	-	0.001	-	0.003	0.003	0.003	0.001	0.003
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	3.18	-	-	-	-	-	2.72	-	-	-	-	0.991	-	1.89	-
	pH	pH Units	6.5-9	7.6	7.48	7.69	7.72	7.72	7.96	7.87	7.77	7.73	7.86	8.03	7.44	7.31	7.34	7.6	7.91	7.7
	Electrical Conductivity (EC)	µS/cm	NG	96.7	49.6	199	142	108	153	213	220	192	180	140	89.3	57.5	71.8	58.9	196	197
	Total Suspended Solids (TSS)	mg/L	NG	19.3	18	3	22	12	18	28	17	5	5	4	37	21	8	39	3	4
	Hardness as CaCO3	mg/L	NG	42.66823	21.55336	93.5163	70.02912	46.6157	65.96916	103.4519	103.13778	86.43784	88.52828	66.5614	39.75624	24.07361	30.77048	25.22927	93.94194	93.5163
	Alkalinity (total as CaCO3)	mg/L	NG	34.7	17.5	84.7	53.8	39.2	59.4	88.9	58.7	80.5	77.3	59.9	28.8	21	25.1	19.5	61.6	80.8
	Calcium	mg/L	NG	9.65	5.02	20.3	16.6	11	14.1	22.3	27.6	18.9	20.1	14.7	10.1	5.65	7.26	5.75	22.4	20.3
	Magnesium	mg/L	NG	4.51	2.19	10.4	6.94	4.65	7.47	11.6	8.31	9.53	9.31	7.25	3.53	2.42	3.07	2.64	9.23	10.4
	Potassium	mg/L	NG	1.07	0.891	1.27	1.05	1.16	1.39	1.26	1.44	1.28	1.3	1.1	1.4	1.09	1.2	1.49	1.3	1.29
	Sodium	mg/L	NG	1.68	1.28	2.23	1.7	1.56	2.11	2.51	2.47	2.19	2.17	1.74	1.78	1.47	1.45	1.49	2.03	2.12
	Chloride	mg/L	120	1.22	1.04	1.5	1.2	1.2	1.9	2.1	1.8	1.7	1.29	1.84	1.3	1.23	1.5	1.6	1.52	1.52
	Fluoride	mg/L	0.12	-	-	0.17	-	-	-	-	-	0.12	-	-	0.07	0.06	0.07	-	-	0.14
	Sulphate	mg/L	NG	9.3	7	12	12	12	16	42	4	10	6	21	9	8	13.4	33	13.1	13.1
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	6.4	5.6	6.6	6.1	5.6	4.8	9.5	6.2	6.2
	Total Organic Carbon (TOC)	mg/L	NG	-	-	-	-	-	-	-	-	-	5.8	6.6	5.9	6.6	5.5	9.5	6.2	6.2
	Total Solids (Filtered)	mg/L	NG	-	46	97	103	83	113	146	148	109	117	83	80	63	50	65	136	118
	Turbidity	NTU	NG	26.9	29.5	2.9	29	22	31.7	45.7	41.1	3.7	6.4	47.7	28.4	19.6	50	26.8	4.4	4.4
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.01	0.008	0.018	0.034	0.019	0.036	0.031	0.036	0.03	0.024	0.033	0.037	0.034	0.04	0.081	0.024	0.014
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.019	0.008	0.083	0.008	0.008	0.008	0.008	0.011	0.074	0.051	0.014	0.008	0.008	0.008	0.008	0.025	0.063
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	0.002	0.002	-	0.004	0.005	0.008	0.038	0.009	0.004	0.002	0.006	0.006	-	0.002	0.007	-	0.002
Phosphorus	µg/L	4	41	32	9	42	39	51	65	27	21	181	23	16	20	33	35	12	12	
Biological	Total Coliforms	MPN/100mL	NG	-	1	1	-	8	30	16	1	-	4	2	8	2	-	4	2	2
	E. Coli	MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	2357	1680	243	1490	1740	573	3750	3350	237	338	399	2190	1570	2010	2700	1090	348
	Antimony	µg/L	NG	0.27	0.4	0.5	0.3	0.1	0.5	0.6	0.5	0.5	0.5	0.4	0.5	0.7	0.5	1	0.8	0.8
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	0.77	0.3	0.2	0.2	0.5	0.3	0.6	0.2	0.2	0.2	0.4	0.3	0.9	0.6	0.3	0.2	0.2
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	-	27.8	23.2	27.2	26.9	37	53.1	46.1	24.4	25.1	19	32.7	24	26	34.2	41	29
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	2	2	2	2	2	2
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.4	0.4	0.4	0.4	0.4
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.3	0.3
	Cadmium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG	0.1	0.2	0.1	0.1	0.4	0.1	0.3	0.2	0.1	-	0.1	0.4	0.4	0.4	0.4	0.4	0.4
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG	2	2.6	1	2.3	2.1	2	3.6	2	2	2	2	4	3	3	3	3	3
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG	0.4	0.4	0.1	0.1	0.3	0.6	0.9	0.6	0.2	0.1	0.1	1	1	1	1	1	1
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³	2.2	2.2	1.3	1.4	1.9	4.7	2.4	2.7	1.6	0.1	0.5	2	2	4	8.8	3	2
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron	µg/L	300	1340	1170	188	1130	939	1020	1680	1490	260	220	300	740	1050	1240	1570	790	270
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	µg/L	1-7 ³	0.93	1.2	0.2	0.7	0.7	2	1.1	0.8	0.5	0.2	0.2	1	1	1	1	1	1
	Lead (Filtered)	µg/L	1-7 ³	-	-															

Table A.8a: CCME Water Quality Guidelines - Marian River, All Parameters

			Sample Code	2/29/2000	3/23/2000	4/28/2000	5/26/2000	6/28/2000	7/31/2000	8/19/2000	9/21/2000	10/18/2000	11/27/2000	1/10/2001	4/18/2001	5/23/2001	6/28/2001	8/1/2001	8/30/2001	10/2/2001	11/7/2001
			SampleCode	Marian River_DL_29 Feb 00	Marian River_DL_23 Mar 00	Marian River_DL_28 Apr 00	Marian River_DL_26 May 00	Marian River_DL_28 Jun 00	Marian River_DL_31 Jul 00	Marian River_DL_18 Aug 00	Marian River_DL_21 Sep 00	Marian River_DL_18 Oct 00	Marian River_DL_27 Nov 00	Marian River_DL_10 Jan 01	Marian River_DL_18 Apr 01	Marian River_DL_23 May 01	Marian River_DL_28 Jun 01	Marian River_DL_01 Aug 01	Marian River_DL_30 Aug 01	Marian River_DL_02 Oct 01	Marian River_DL_07 Nov 01
Chem_Group	ChemName	output unit	CCME FAL ¹																		
Cyanide	Cyanide Total	mg/L	NG	0.002	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.005	0.003	0.003	0.003	0.01	0.003	0.0046
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	1.92	0.73	1.04	3.04	1.95	2.8	2.32	2.8	2.66	2.45	1.19	1.53	0.93	1.6	1.78	2.18333333333333
	pH	pH Units	6.5-9	7.92	7.66	7.86	7.26	7.75	8.06	7.98	8.04	7.98	7.86	7.59	7.56	7.75	7.81	7.24	7.86	7.84	7.66
	Electrical Conductivity (EC)	µS/cm	NG	195	193	153	57.4	98	176	204	226	246	246	193	167	94.8	154	49.7	130	140	188.666666666667
	Total Suspended Solids (TSS)	mg/L	NG	3	4	4	18	22	26	35	142	70	12	3	5	11	15	16	25	30	17.6666666666667
	Hardness as CaCO3	mg/L	NG	102.5538	94.353	79.00186	26.32132	46.2477	95.2773	65.6804	106.9256	120.3218	126.9237	94.90742	82.06228	43.79188	71.78038	19.67136	61.56552	66.80398	130.066666666667
	Alkalinity (total as CaCO3)	mg/L	NG	96.8	85	64.6	17.3	63.3	75.4	61	65.5	69.5	80.1	62.6	69.8	35.7	44.5	17	44.5	45.9	70.1333333333333
	Calcium	mg/L	NG	22.6	20.8	18	6.88	11.1	21.5	19	26	31.2	31.7	23.1	18.5	10.1	19	4.86	14.2	16.1	38.2333333333333
	Magnesium	mg/L	NG	11.2	10.3	8.27	2.22	4.5	10.1	9.28	10.2	10.3	11.6	9.04	8.71	4.51	5.91	1.83	6.34	6.46	8.40666666666667
	Potassium	mg/L	NG	1.23	1.22	1.46	0.97	1.36	1.62	1.44	1.52	1.25	1.27	1.16	1.15	1.06	1.43	1.05	1.26	1.53	1.31
	Sodium	mg/L	NG	2.09	2.13	1.85	1.27	1.78	2.33	2.22	2.37	2.4	2.52	2.09	1.92	1.7	1.5	1.28	1.88	1.97	2.3
	Chloride	mg/L	120	1.33	1.41	1.3	1.4	1.3	1.4	1.5	1.7	1.4	1.5	1.2	1.4	2.2	1.1	1.5	2.14	1.1	2.4
	Fluoride	mg/L	0.12	-	-	0.18	0.09	0.08	0.17	0.15	0.13	0.13	0.13	0.13	0.12	0.06	0.1	0.06	0.09	0.09	0.12
	Sulphate	mg/L	NG	3	13	14	9	11	17	13	27	43	38	16	12	8	28	10	16	22	36
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5.7	5.8	5.5	5.9	6.5	8	7.3	6.5	6.7	8.1	7.5	6.6	7.3	8.8	5.8	6	6.9	7.86666666666667
	Total Organic Carbon (TOC)	mg/L	NG	5.7	5.4	5.6	5.5	6.5	8.1	7.5	7.9	6.9	8.1	7.4	6.9	7.8	8.8	5.8	6.3	6.7	7.7
	Total Solids (Filtered)	mg/L	NG	115	129	96	45	76	146	154	135	136	102	144	111	38	110	58	81	98	127
	Turbidity	NTU	NG	5.9	5.3	7.2	24.4	41.6	33.6	20.6	181	83.4	17.6	7.6	6.4	7.4	34.7	26	35.3	46.4	20.5333333333333
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.018	0.011	0.03	0.009	0.015	0.057	0.011	0.048	0.063	0.113	0.022	0.005	0.005	0.007	0.019	0.007	0.005	0.0113333333333333
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	0.008	-	-	-	-
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.071	0.063	0.072	0.008	0.008	0.008	0.008	0.02	0.023	0.008	0.051	0.074	0.015	-	0.008	0.008	0.008	0.0173333333333333
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	0.002	0.002	0.002	0.002	0.01	0.005	0.002	0.012	0.006	0.006	0.004	0.002	0.002	0.006	0.002	0.007	0.008	0.003
	Phosphorus	µg/L	4	16	8	19	27	73	16	44	187	60	37	19	12	19	20	29	34	34	15
Biological	Phosphorus (Filtered) (Filtered)	mg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Coliforms	MPN/100mL	NG	1	1	-	-	2	6	-	-	1	-	1	-	11	-	23	1	1	1
Metals ⁵	E. Coli	MPN/100mL	NG	1	1	-	-	-	13	-	-	2	-	2	-	10	-	10	10	10	10
	Aluminum (Filtered)	µg/L	5 @ pH < 6.5100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5100 @ ≥ 6.5 ²	219	245	444	2030	1990	3470	3760	6963	5460	1300	704	511	653	1560	1450	611	2060	1088
	Antimony	µg/L	NG	0.7	-	1.2	0.5	0.5	0.5	0.9	0.9	-	-	0.7	-	1.9	0.5	0.5	0.5	1.3	0.5
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	0.2	0.2	0.2	2	2	1	0.6	1.9	1.2	1	1	1	1	1	1	1	1.3	-
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	28	27.4	24	23	33	57	57	98	65	38	27	27	13	32	19	22	41	31
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	0.4	4.4	0.4	10	10	10	10	10	10	5	5	0.4	5	5	5	2.2	5	0.4
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	NG	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	Cadmium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG	3	3	3	3	3	3	3	5.7	3	3	3	3	3	3	3	3	3	3
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³	2.4	2	2	2	2	3	3	5	4	2	2	2	2	2	2	2	2	2
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron	µg/L	300	190	170	300	600	1390	1980	2330	5440	2990	990	250	280	513	1060	957	818	1820	870.666666666667
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	µg/L	1-7 ³	1.1	1	1	1	1	1	1	2	1	1	1	1	1	2	1	1	1	1
	Lead (Filtered)	µg/L	1-7 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lithium	µg/L	NG	3	3	3	3	4	7	4	10	5	5	3	3	3	4	3	3	5	3.5
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Manganese	µg/L	NG	4.8	4.1	10	17	19	28	34	78	38	17	6	6	14	17	17	19	25	16.6666666666667
	Manganese (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mercury	µg/L	0.026	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	-
	Mercury (Filtered)	µg/L	0.026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Molybdenum	µg/L	73	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Molybdenum (Filtered)	µg/L	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nickel	µg/L	25-150 ³	1	1	3	1	2	3	3	7	4	1	1	1	1	3	30	30	30	30
	Nickel (Filtered)	µg/L	25-150 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rubidium	µg/L	NG	-	-	-	-	-	-	-	-	-	3.9	2.1	2.7	2.4	4.2	4.2	3.2	6.8	4
Rubidium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Selenium	µg/L	1	30	30	30	30	30	30	30	30	30	30	30	-	30	30	30	30	-	-	
Selenium (Filtered)	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silver	µg/L	0.25	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.8	1	1	1	1	
Silver (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Strontium	µg/L	NG	72.3	70.6	60	38	50	92	94	142	178	185	96	71	42	110	26	76	95	137	
Strontium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-</			

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.
NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.8a: CCME Water Quality Guidelines - Marian River, All Parameters

			Sampled Date Time	12/3/2001	1/14/2002	2/20/2002	3/13/2002	4/22/2002	5/21/2002	6/19/2002	7/24/2002	9/5/2002	9/24/2002	10/24/2002	11/21/2002	12/19/2002	1/31/2003	2/24/2003	3/31/2003	5/5/2003	
			SampleCode	Marian River_DL_03 Dec 01	Marian River_DL_14 Jan 02	Marian River_DL_20 Feb 02	Marian River_DL_13 Mar 02	Marian River_DL_22 Apr 02	Marian River_DL_21 May 02	Marian River_DL_19 Jun 02	Marian River_DL_24 Jul 02	Marian River_DL_05 Sep 02	Marian River_DL_24 Sep 02	Marian River_DL_24 Oct 02	Marian River_DL_21 Nov 02	Marian River_DL_19 Dec 02	Marian River_DL_31 Jan 03	Marian River_DL_24 Feb 03	Marian River_DL_31 Mar 03	Marian River_DL_05 May 03	
Chem_Group	ChemName	output unit	CCME FAL ¹																		
Cyanide	Cyanide Total	mg/L	NG	0.003	0.023	0.003	0.003	0.003	0.003	0.003	0.003	0.043	0.003	0.003	0.003	0.006	0.003	0.003	0.003	-	
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	-	3.17	2.79	2.44	2.57	2.27	1.11	1.75	1.54	2.51	2.56	-	-	-	-	-	-	
	pH	pH Units	6.5-9	7.67	7.86	7.56	-	7.43	7.85	7.77	7.91	7.73	7.93	8.06	7.64	7.65	7.29	7.51	7.77	7.97	
	Electrical Conductivity (EC)	µS/cm	NG	209	200	160	152	176	210	140	152	182	182	310	75.9	254	204	160	190	217	
	Total Suspended Solids (TSS)	mg/L	NG	8	7	76	3	6	3	25	18	18	222	20	3	4	12	3	4	6	
	Hardness as CaCO3	mg/L	NG	-	-	-	-	89.4	102	66.1	74.3	82.1	81.6	158	147	139	107	81.2	94.9	116	
	Alkalinity (total as CaCO3)	mg/L	NG	86.5	80.4	69.9	64.1	13	32	20	18	41	17	95	-	32	17	14	14	41	
	Calcium	mg/L	NG	25.3	19.1	18.3	16.4	19.7	25.6	16.1	16.5	22.7	16.8	44.3	8.3	35.3	24.9	18.9	22.6	30.8	
	Magnesium	mg/L	NG	9.63	9.58	8.88	7.67	9.76	9.23	6.29	6.04	6.18	9.66	11.5	2.51	12.5	10.9	8.27	9.34	9.54	
	Potassium	mg/L	NG	1.42	1.3	1.23	1.14	1.23	1.27	1	1.65	1.73	4.27	1.27	1.28	1.36	1.5	1.38	1.32	1.32	
	Sodium	mg/L	NG	2.25	2.17	2.01	2.02	2.38	2.17	1.66	2.26	2.38	2.29	2.77	2.2	2.74	2.55	2.31	2.26	2.1	
	Chloride	mg/L	120	1.5	1.5	1	2.1	1.9	1.6	1.1	1.8	1.4	2	1.7	-	1.9	1.8	1.8	2	1.7	
	Fluoride	mg/L	0.12	0.12	0.12	-	0.1	0.13	0.13	0.1	0.1	0.1	0.11	-	0.07	0.16	-	-	-	-	
	Sulphate	mg/L	NG	31	24	14	11	13	32	20	18	41	17	95	-	32	17	14	14	41	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	7.6	6.9	6.9	7	6.8	7.3	6.7	8.2	9.2	8.4	8.4	-	-	-	7.3	-	6.8	
	Total Organic Carbon (TOC)	mg/L	NG	7.7	7.1	6.9	6.8	6.7	7.1	6.4	7.7	8.9	8.1	-	-	-	-	7.5	-	6.9	
	Total Solids (Filtered)	mg/L	NG	140	127	76	134	126	154	118	125	133	248	88	170	150	90	128	144	144	
	Turbidity	NTU	NG	11.3	4.7	4.2	4.9	6.4	7.6	50.1	39.1	26.8	196	30.4	1.8	4.6	5.2	4.4	5.8	8.6	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.035	0.02	0.006	0.008	0.005	0.022	0.034	0.023	0.005	0.018	0.015	0.005	0.021	0.012	0.005	0.017	0.012	
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.08	0.073	0.011	
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.008	0.009	0.009	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.031	0.059	0.088	0.089	0.071	0.024	0.008	0.008	0.008	0.008	0.008	0.012	0.038	0.07	-	-	-	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	0.003	0.003	0.002	0.006	0.019	0.006	0.014	0.014	0.014	0.007	0.006	0.002	0.003	0.002	0.002	0.002	0.002	
	Phosphorus	µg/L	4	12	17	11	24	17	18	73	60	99	329	104	77	80	12	14	14	18	
	Phosphorus (Filtered) (Filtered)	mg/l	4	-	-	-	-	-	-	-	-	-	0.077	0.096	0.071	0.078	0.062	0.013	0.008	0.006	
	Total Coliforms	MPN/100mL	NG	2	1	1	1	1	1	2	2	54	4	2	2	1	2	2	2	2	
	E. Coli	MPN/100mL	NG	1	1	1	1	1	1	2	2	2	-	2	2	1	10	2	2	2	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	451	186	333	136	164	171	2870	2870	1150	7440	1640	814	165	148	166	245	285	
	Antimony	µg/L	NG	1.5	1.4	1.2	0.8	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.8	1.3	0.7	1	0.709	0.3	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5	1	1	2	1	1	1	2.2	1	1	-	1	2.3	1	1	1	1	1	
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Barium	µg/L	NG	25	26	23	21	27	20	45	49	28	92	40	37	20	28.2	24	23.9	21.9	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L	NG	2	2	2	2	2	2	2	2	2	2	2	2	2	0.1	0.1	0.02	0.1	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L	NG	0.4	1.3	0.4	0.5	0.4	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	NG	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.1	0.1	0.09	0.1	
	Cadmium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG	0.4	0.4	0.4	0.4	0.4	0.4	0.4	-	0.4	0.9	0.4	0.4	0.4	0.1	0.1	0.051	0.1	
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L	NG	3	3	3	3	3	3	4	3	3	-	5	5	3	0.5	1	1.23	2.3	
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cobalt	µg/L	NG	1	1	1	1	1	1	1	1	2	1	1	1	1	0.2	0	0.229	0.2	
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Copper	µg/L	2 - 4 ³	2	2	2	2	2	2	2	2	4	2	7	10	3	2	1.9	1	0.77	1.2
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Iron	µg/L	300	389	360	244	179	241	195	2160	1520	910	8780	1180	751	207	185	151	224	304	
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lead	µg/L	1-7 ³	1	1	2	1	1	1	1	3	-	1	4	1	1	0.3	0	1.07	0.1	
	Lead (Filtered)	µg/L	1-7 ³	-	-	-	-	-	-												

Table A.8a: CCME Water Quality Guidelines - Marian River, All Parameters

			Sampled Date	Time	6/5/2003	7/7/2003	7/31/2003	8/22/2003	10/1/2003	10/31/2003	12/5/2003	1/6/2004	2/11/2004	3/1/2004	4/15/2004	5/6/2004	6/10/2004	7/8/2004	8/16/2004	9/9/2004	10/18/2004	12/21/2004
			SampleCode		Marian River_DL_05 Jun 03	Marian River_DL_07 Jul 03	Marian River_DL_31 Jul 03	Marian River_DL_22 Aug 03	Marian River_DL_01 Oct 03	Marian River_DL_31 Oct 03	Marian River_DL_05 Dec 03	Marian River_DL_06 Jan 04	Marian River_DL_11 Feb 04	Marian River_DL_01 Mar 04	Marian River_DL_15 Apr 04	Marian River_DL_06 May 04	Marian River_DL_10 Jun 04	Marian River_DL_08 Jul 04	Marian River_DL_16 Aug 04	Marian River_DL_09 Sep 04	Marian River_DL_18 Oct 04	Marian River_DL_21 Dec 04
Chem_Group	ChemName	output unit	CCME FAL ¹																			
Cyanide	Cyanide Total	mg/L	NG		0.003	0.003	0.003	0.003	0.003	0.01	0.01	0.01	0.01	0.01	0.001	-	0.001	-	0.001	-	-	0.002
Field	Field Temperature	°C	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG		0.643333333333333	-	1.75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units	6.5-9	7.65666666666667	7.99	7.89	7.99	7.99	7.87	8.07	7.75	7.55	7.55	7.77	7.54	7.71	7.88	7.91	8.12666666666667	7.62	7.88	7.58333333333333
	Electrical Conductivity (EC)	µS/cm	NG	91.0666666666667	158	176	191	181	241	218	190	148	202	189	190	190	91.5	191	244	93.1	157	176.666666666667
	Total Suspended Solids (TSS)	mg/L	NG	40.6666666666667	18	36	32	50	30	112	4	6	4	4	4	4	10	56	24	28	40	3
	Hardness as CaCO3	mg/L	NG	31.3	73.1	70.2	72.8	81.8	112	92.9	90.9	79.9	109	103	106	106	44.8	111	125.7	51.8	70.2	85.7
	Alkalinity (total as CaCO3)	mg/L	NG	32.2333333333333	15	26	-	25	-	73.9	75	67.1	95.6	85.7	88.4	86	79.2	97.3333333333333	35.1	63.2	73.7666666666667	
	Calcium	mg/L	NG	6.67333333333333	18.6	16.3	13.9	19	25.4	21.8	21.1	17.8	24.1	22.8	23.6	10.2	20.8	27.9	9.9	15.7	19.2666666666667	
	Magnesium	mg/L	NG	3.54666666666667	6.47	7.16	9.26	8.36	11.8	9.37	9.26	8.6	11.8	11.2	11.6	4.7	10.1	13.6	4.5	7.5	9.1	
	Potassium	mg/L	NG	1.15333333333333	1.5	1.45	1.47	1.08	1.27	1.23	1.13	-	1.2	1.18	1.77	0.9	1.3	1.2	1	0.9	1.23333333333333	
	Sodium	mg/L	NG	1.23	2.03	2.11	2.26	2.39	2.81	2.48	2.23	-	2.4	2.4	2.2	1.6	2.5	2.6	1.7	1.5	2.36666666666667	
	Chloride	mg/L	120	1.1	1.2	1.3	1.4	1.5	1.7	1.6	-	1.2	1.7	-	-	1.1	1.5	1.5	1.2	1.5	1.56666666666667	
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sulphate	mg/L	NG	11.3333333333333	15	26	-	25	-	21	19	13	15	12	12	6	13	26	8	14	13.3333333333333	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	4.76666666666667	6.8	6.4	-	7.1	-	-	-	6.5	-	-	-	-	-	-	5.2	6.2	5.66666666666667	
	Total Organic Carbon (TOC)	mg/L	NG	4.5	6.7	6.4	-	7.6	-	-	-	-	-	-	-	-	-	-	5.3	-	-	-
	Total Solids (Filtered)	mg/L	NG	70	118	122	134	146	146	134	98	100	116	120	112	73	186	187.333333333333	88	114	115.333333333333	
	Turbidity	NTU	NG	60.1666666666667	35.1	55.2	61	108	67.6	19.4	8.15	5.96	6.46	6.78	8.26	20.9	144	106.333333333333	60.8	75.6	10.3666666666667	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.006	0.007	0.008	0.024	0.01	0.051	0.019	0.016	0.05	0.02	0.005	0.005	0.006	0.011	0.012	0.009	0.01	0.0136666666666667	
	Nitrate (as NO3-N)	mg/L	13	0.008	0.008	0.008	-	0.014	0.015	0.038	0.062	0.06	0.03	0.1	0.1	-	0.1	0.1	0.01	0.08	0.04	
	Nitrite (as NO2-N)	mg/L	0.06	0.009	0.009	0.009	-	0.009	0.009	0.009	0.009	0.01	0.03	0.05	0.05	-	0.05	0.05	-	0.01	0.01	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.008	-	0.008	0.008	-	0.015	0.038	0.062	0.06	0.03	0.2	0.2	0.2	0.2	0.01	0.08	-	-	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate (as P)	mg/L	NG	0.002	0.002	0.002	-	0.002	0.002	0.002	0.009	-	-	-	0.002	0.012	0.002	-	0.002	-	-	-	
Phosphorus	µg/L	4	80	66	101	92	175	100	30	20	10	10	20	10	40	220	176.666666666667	50	170	97		
Phosphorus (Filtered) (Filtered)	mg/L	4	0.0146666666666667	0.004	0.01	0.013	0.004	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	0.01	-	-	0.13	-	
Biological	Total Coliforms	MPN/100mL	NG	8.66666666666667	1	1	2	1	2	1	1	1	1	1	2	2	4	1	4	1	-	
	E. Coli	MPN/100mL	NG	14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	846	1200	2320	2140	4760	848	553	288	190	180	131	248	699	4480	3520	2050	2420	362.333333333333	
	Antimony	µg/L	NG	0.5	0.7	0.4	0.4	0.5	0.9	0.6	0.9	1.5	0.5	0.1	0.1	0.2	0.2	0.6	-	0.1	0.3	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	0.4	
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Barium	µg/L	NG	21.5333333333333	31	47.5	38	68.7	40.2	31	26.6	22.8	30.4	26.2	30.2	18.7	68.1	68.9666666666667	37.9	45.7	31.6666666666667	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Cadmium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG	0.1	0.1	0.2	0.2	0.5	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.4	0.2	0.3	0.1
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-										

Table A.8a: CCME Water Quality Guidelines - Marian River, All Parameters

			Sampled Date/Time	2/1/2005	3/3/2005	4/1/2005	5/2/2005	6/2/2005	7/1/2005	8/4/2005	9/6/2005	10/25/2005	12/8/2005	1/5/2006	2/8/2006	3/15/2006	4/5/2006	5/3/2006	7/2/2006	8/10/2006	9/5/2006	
Chem_Group	ChemName	output unit	SampleCode	Marian River_DL_01 Feb 05	Marian River_DL_03 Mar 05	Marian River_DL_07 Apr 05	Marian River_DL_02 May 05	Marian River_DL_02 Jun 05	Marian River_DL_07 Jul 05	Marian River_DL_04 Aug 05	Marian River_DL_06 Sep 05	Marian River_DL_25 Oct 05	Marian River_DL_08 Dec 05	Marian River_DL_05 Jan 06	Marian River_DL_08 Feb 06	Marian River_DL_15 Mar 06	Marian River_DL_05 Apr 06	Marian River_DL_03 May 06	Marian River_DL_27 Jul 06	Marian River_DL_10 Aug 06	Marian River_DL_05 Sep 06	
			CCME FAL ¹																			
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units	6.5-9	7.54	7.47	7.72	7.9	7.84	7.52	7.69	8	7.77	7.57666666666667	7.57	7.56	7.66	7.64	7.66	7.6	7.5	8.02	
	Electrical Conductivity (EC)	µS/cm	NG	178	169	171	195	158	64.5	111	145	333	211.333333333333	202	162	168.666666666667	169	165	79.3	62.5	161	
	Total Suspended Solids (TSS)	mg/L	NG	4	2	3	3	12	16	8	24	22	5.33333333333333	3	3	3	3	4	12	24	4	
	Hardness as CaCO3	mg/L	NG	88.5	80.7	84.8	96.4	70.4	28.6	49.1	73.2	156	107	98.2	79.9	84.8	79.2	68.2	37	29.5	80.6	
	Alkalinity (total as CaCO3)	mg/L	NG	76.5	70.9	73.9	86.2	42.9	24.4	38.5	48.2	69.5	74.1666666666667	76.1	64.8	68.8	69.6	69	22.5	23.4	51.8	
	Calcium	mg/L	NG	20.1	18.1	19	21.5	20	7.2	12.1	18.9	43.7	26.1	23.4	18.7	19.6	18.3	14.8	9.8	6.7	19.9	
	Magnesium	mg/L	NG	9.3	8.6	9.1	10.4	5.6	3	2.6	6.3	11.3	10.1666666666667	9.7	8.1	8.7	8.1	7.6	3.1	7.5	9	
	Potassium	mg/L	NG	1.21	1.17	1.04	1.04	1.09	0.8	0.9	1.3	0.8	1.19	1.17	0.9	1.16666666666667	1.17	0.9	0.8	0.9	0.8	
	Sodium	mg/L	NG	2.3	2	2	2	1.7	1.9	1.6	2.2	2.2	2.63333333333333	2.5	2.3	2.36666666666667	2.1	2.5	1.4	1.4	1.6	
	Chloride	mg/L	120	1.4	1.3	1.5	1.4	1.4	1.5	1.4	1.4	2.1	1.6	1.7	1.5	1.5	1	1	1	1	1.1	
	Fluoride	mg/L	-	0.12	-	-	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sulphate	mg/L	NG	12	10	10	19	32	4	12	20	94	27	23	14	12	13	11	12	4	25	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	7	6	5.8	6	6.1	6.9	8	6.9	8.7	7.56666666666667	6.6	7.1	7.1	7.1	6.5	5.9	5.3	5.8	
	Total Organic Carbon (TOC)	mg/L	NG	7.1	-	-	-	6.3	-	8.8	7.3	-	7.66666666666667	7.2	6.9	7.2	7.1	6.9	6	5.7	0	
	Total Solids (Filtered)	mg/L	NG	76	86	94	100	94	60	88	100	230	127.333333333333	118	86	70.6666666666667	86	88	76	54	122	
	Turbidity	NTU	NG	6.33	5.7	3.71	5.76	30.9	32.5	24.2	40.8	41.2	9.15	4.76	4.07	4.38666666666667	4.8	7.23	33	43.8	19	
	Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.005	-	0.009	0.011	0.007	0.023	0.009	0.005	0.01	0.0126666666666667	0.014	0.01	0.007	0.005	0.005	0.005	0.027	0.009
Nitrate (as NO3-N)		mg/L	13	-	-	0.03	-	-	-	-	-	0.01	-	0.11	-	0.06	0.1	-	0.01	0.01	0.01	
Nitrite (as NO2-N)		mg/L	0.06	-	-	0.01	-	-	-	-	-	-	0.02	-	-	0.01	0.01	-	0.01	0.01	0.01	
Nitrate and Nitrite (as N) (mg/L)		mg/L	NG	0.1	-	0.1	0.03	-	-	-	-	-	-	-	0.04	0.06	0.1	0.01	0.01	-	0.01	
Nitrogen (Total)		mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Orthophosphate (as P)		mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Biological	Phosphorus	µg/L	4	300	60	10	13	50	60	40	70	80	40	20	10	10	20	20	30	40	20	
	Phosphorus (Filtered) (Filtered)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Coliforms	1	NG	1	1	1	1	1	1	8	1	1	1	1	1	1	1	1	2	10	1	
Metals ⁵	E. Coli	MPN/100mL	NG	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	3.1	11	1	
	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	217	232	220	30	1130	1290	966	1360	1510	301.333333333333	186	179	185	212	297	1410	1900	566	
	Antimony	µg/L	NG	0.4	0.8	1.1	0.2	0.7	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.7	0.1	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5	0.2	0.3	0.4	0.4	0.4	0.7	0.9	1.5	0.6	0.433333333333333	0.3	0.3	0.3	0.3	0.3	0.5	0.8	0.8	
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Barium	µg/L	NG	24.8	25.9	27.9	26.1	24	22.6	24.2	30.5	38.8	26.0666666666667	24.9	24.2	23.5333333333333	23.2	23.3	22.7	38.3	22.7	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Cadmium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L	NG	0.4	1.1	0.7	1	2.3	2.4	1.6	2.5	2.8	0.9	0.6	0.6	0.6	0.6	0.4	0.7	2.3	-	1.3
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG	0.1	0.1	0.1	0.1	0.5	0.6	0.4	0.6	0.7	0.266666666666667	0.1	0.1	0.1	0.1	0.2	0.5	1	0.3	
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³	2.1	1.9	3.5	1.4	2	3.3	2.7	2.6	2.6	1.96666666666667	2.3	1.4	0.866666666666667	1.9	1.5	2.3	4.4	2.1	
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron	µg/L	300	220	297	282	50	1150	1290	867	1360	1550	349.333333333333	214	207	231	242	393	1210	1710	626	
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	µg/L	1-7 ³	0.1	0.2	0.3	0.1	0.5	0.6	0.5	1.4	0.6	0.433333333333333	0.4	0.1	0.1	0.2	0.1	1.1	-	0.3	
	Lead (Filtered)	µg/L	1-7 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lithium	µg/L	NG	2.7	2.8	2.7	2	3.2	3.3	3.2	3.7	5.1	3.26666666666667	3.2	3	2.63333333333333	2.2	2.1	3.2	4.3	2.9	
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Manganese	µg/L	NG	5.1	7.3	5.7	3.6	20.1	22.7	15.2	25.3	22.2	10.1333333333333	7.3	5.5	5.4	5.8	39.4	20.6	36	10.2	
	Manganese (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mercury	µg/L	0.02	0.02	0.02	0.02	-	0.03	-	0.02	0.02	0.01	0.0166666666666667	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	
	Mercury (Filtered)	µg/L	0.026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Molybdenum	µg/L	73	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.133333333333333	0.1	0.2	0.1	3	0.2	
	Molybdenum (Filtered)	µg/L	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nickel	µg/L	25-150 ³	0.8	1.1	1.2	0.5	1.9	2.1	1.7	3.2	2.4	0.933333333333333	0.8	0.8	0.4	1	0.7	2	2.6	1.2	
	Nickel (Filtered)	µg/L	25-150 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rubidium	µg/L	NG	1.8	2.1	2	1.2	3	4.1	3.3	3.8	4.2	2.13333333333333	1.9	2.1	1.9	1.9	1.9	4.1	5.4	2.2	
	Rubidium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Selenium	µg/L	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Selenium (Filtered)	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silver	µg/L	0.25	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.7	0.2	0.1	0.133333333333333	0.1	0.1	0.1	0.2	0.4	
	Silver (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Strontium	µg/L	NG	66.7	69.4	68.7	70.6															

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

* CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.
NG - No guideline

BOLD - Greater than Guideline
Blank - Not analyzed

Table A.8a: CCME Water Quality Guidelines - Marian River, All Parameters

			Sampled Date/Time	11/1/2006	12/20/2006	1/24/2007	3/21/2007	4/26/2007	5/15/2007	6/28/2007	7/25/2007	8/30/2007	9/17/2007	10/24/2007	11/29/2007	1/14/2008	2/19/2008	3/27/2008	4/29/2008	5/22/2008	6/11/2008
Chem_Group	ChemName	output unit	SampleCode	Marian River_DL_01 Nov 06	Marian River_DL_20 Dec 06	Marian River_DL_24 Jan 07	Marian River_DL_21 Mar 07	Marian River_DL_26 Apr 07	Marian River_DL_15 May 07	Marian River_DL_28 Jun 07	Marian River_DL_25 Jul 07	Marian River_DL_30 Aug 07	Marian River_DL_17 Sep 07	Marian River_DL_24 Oct 07	Marian River_DL_29 Nov 07	Marian River_DL_14 Jan 08	Marian River_DL_18 Feb 08	Marian River_DL_27 Mar 08	Marian River_DL_29 Apr 08	Marian River_DL_22 May 08	Marian River_DL_11 Jun 08
			CCME FAL ¹																		
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	6.5-9	7.82	7.79	7.72	7.63666666666667	7.93	7.85	7.46	7.63	8.09	8.07	7.99	7.7	7.65	7.61	7.54	7.82	8.14	7.945	
	Electrical Conductivity (EC)	µS/cm	NG	55.7	171	159	199.333333333333	186	95.3	57.5	60.1	200	174	178	192	194	176	202	185	96.6	131.5
	Total Suspended Solids (TSS)	mg/L	NG	8	4	4	3.6	3	6	14	24	20	16	24	8	4	3	6	3	16	
	Hardness as CaCO3	mg/L	NG	53.2	93.3	101	102.666666666667	92.7	49	30.1	32.9	108	93.5	92.4	101	75.4	90.4	102	108	53.3	72.85
	Alkalinity (total as CaCO3)	mg/L	NG	38.9	73.3	83.1	84.1	78.7	35.8	21.3	24.1	78.5	70.7	65.4	70	80.2	73.6	85.9	83	38.7	54.35
	Calcium	mg/L	NG	13.9	21.4	22.7	21.9	20.3	11.3	7.6	7.8	23.5	19.9	21	23.2	16.6	20	21.5	21.4	12.1	17
	Magnesium	mg/L	NG	4.5	9.7	10.7	11.6666666666667	10.2	5	2.7	3.5	11.9	9.7	10.5	8.2	13.3	9.8	13.3	9.8	5.6	7.4
	Potassium	mg/L	NG	0.8	1.2	1.3	1.3	1.1	0.9	1.1	1.3	0.9	1.1	1.3	0.3	1.3	0.9	1.2	0.9	1.2	0.8
	Sodium	mg/L	NG	1.4	2.3	2.4	2.2	2.1	1.5	1.8	1.5	2.3	2	2.1	2.5	2.3	2.3	2.2	1.5	2.3	1.7
	Chloride	mg/L	120	1.5	1.5	1.6	1.46666666666667	1.4	1.2	1.4	1.2	1.4	1.3	1.4	1.7	1.6	1.6	1.6	1	1.15	
	Fluoride	mg/L	- 0.12	-	-	-	-	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1
	Sulphate	mg/L	NG	22	15	15	11	11	9	4	4	19	14	21	23	13	11	13	15	9	13
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	6.1	-	6.9	6.7	6.2	5.3	6.2	5.4	6.9	6.3	5.9	6.5	6.4	6.7	6.2	6.1	4.7	4.75
	Total Organic Carbon (TOC)	mg/L	NG	6.1	-	7.3	6.8	6.3	5.2	6.3	5.7	6.1	6	5.4	6.3	6.7	6.6	6.4	6.3	4.3	4.35
	Total Solids (Filtered)	mg/L	NG	96	100	162	104	138	14	48	18	151	114	112	120	114	94	106	102	51	116
	Turbidity	NTU	NG	32.5	6.83	6.38	5.34	6.54	8.36	33.7	44.5	56	37.8	55.6	18.1	5.08	6.28	7.67	8.9	7.69	50.65
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.02	0.026	0.009	0.00633333333333	0.01	0.005	0.024	0.023	0.011	0.019	0.005	0.012	0.015	0.005	0.005	0.005	0.005	0.005
	Nitrate (as NO3-N)	mg/L	13	0.01	-	0.02	0.06	0.04	0.01	0.02	0.01	0.04	0.05	0.02	0.01	0.04	0.07	0.06	0.19	0.01	0.01
	Nitrite (as NO2-N)	mg/L	0.06	0.01	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.01	0.03	0.02	0.06	0.04	0.01	0.02	0.01	0.04	0.05	0.02	0.01	0.05	0.07	0.06	0.19	0.01	-
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biological	Phosphorus	µg/L	4	30	20	10	10	10	10	40	40	70	50	70	30	10	50	10	20	20	55
	Phosphorus (Filtered) (Filtered)	mg/L	1	NG	1	1	1	1	1	11	1	12	1	1	1	1	1	1	1	1	2.5
	Total Coliforms	MPN/100mL	NG	1	2	1	1	1	2	6.3	7.4	2	1	1	1	1	1	1	1	2	1.5
Metals ⁵	E. Coli	MPN/100mL	NG	1	2	1	1	1	2	6.3	7.4	2	1	1	1	1	1	1	1	2	1.5
	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	1140	391	241	196.666666666667	250	129	1090	1690	2020	1700	1540	517	280	219.5	211	260	465	2035
	Antimony	µg/L	NG	0.1	0.1	0.1	0.1	1.4	0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.6	0.1	0.2	0.3	0.1	1.9
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	1.6	2.8	-	0.86666666666667	-	0.7	0.6	0.8	0.6	0.5	1.3	0.5	0.5	0.5	0.4	0.6	0.3	0.65
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	25.4	25.2	27.3	22.1	28.8	5.5	18.1	25.6	43.8	43.3	39.1	29.7	26.2	21.55	25	26.4	16.6	43.35
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.05	0.1
	Cadmium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.25
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG	2.2	0.9	0.9	0.5	1	0.3	2.2	3.1	2.8	2.5	3.1	1	0.4	0.55	0.5	0.6	0.9	-
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG	0.6	0.1	0.1	0.1	0.2	0.1	0.4	0.6	0.7	0.5	1	0.4	0.2	0.15	0.1	0.2	0.2	0.65
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³	2.3	1.2	1	1.2	1.4	0.8	2.2	2.6	2.7	2.2	2.2	1.8	0.8	1.45	1.2	1.1	1.1	2.55
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron	µg/L	300	1070	417	242	224	274.4	136	1180	1780	1370	1360	1510	486	203	195	351	357	428	1665
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	µg/L	1-7 ³	0.5	0.3	0.2	0.2	0.2	0.1	0.5	0.8	0.7	0.9	0.8	0.4	0.1	0.1	0.1	0.2	0.2	-
	Lead (Filtered)	µg/L	1-7 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lithium	µg/L	NG	3.2	2.7	2.5	2.03333333333333	2.9	1.7	2	3.8	5.2	3.8	3	1.2	1.3	2.15	2.5	2.7	1.9	4.35
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Manganese	µg/L	NG	20.1	11.1	5	5.86666666666667	8.9	4.2	22.8	42.4	25.7	26	27.4	13.8	7.3	4.9	7.4	7.4	10	25.55
	Manganese (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mercury	µg/L	0.026	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.04	-	0.01	0.01	0.01	0.01	0.03	0.015	0.01	0.01	0.01
	Mercury (Filtered)	µg/L	0.026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Molybdenum	µg/L	73	0.2	0.2	0.2	0.2	0.16666666666667	0.2	0.1	0.1	0.1	0.2	0.1	0.8	0.1	0.2	0.2	0.2	0.1	0.1
	Molybdenum (Filtered)	µg/L	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nickel	µg/L	25-150 ³	2.9	1.4	1.1	0.76666666666667	1.2	0.6	2	2.7	2.3	2	2.5	1.1	0.6	0.8	0.9	0.8	0.9	2.55
	Nickel (Filtered)	µg/L	25-150 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rubidium	µg/L	NG	4.2	1.9	1.7	1.8	2	2.1	3.3	4.2	4.8	5	5.6	3.4	2.5	2.05	2	2.1	2	5.4
Rubidium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Selenium	µg/L	1	1	1	1	1	1	1	-	0.3	1	1	1	1	1	1	1	0.3	1	0.5	
Selenium (Filtered)	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silver	µg/L	0.25	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.1	0.1	
Silver (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Strontium	µg/L	NG	88.8	79	81.8	73.5	81.3	23.6	27.2	30	93.6	83.6	94.8	92.1	77.1	66.55	73.8	72.7			

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

* CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.
NG - No guideline

Table A.8a: CCME Water Quality Guidelines - Marian River, All Parameters

			Sampled Date Time	7/16/2008	8/20/2008	9/22/2008	10/15/2008	11/12/2008	12/17/2008	1/15/2009	2/26/2009	3/30/2009	4/22/2009	5/21/2009	7/8/2009	8/6/2009	9/3/2009	10/6/2009	11/26/2009	12/21/2009	1/18/2010	
Chem_Group	ChemName	output unit	SampleCode	Marian River_DL_16 Jul 08	Marian River_DL_20 Aug 08	Marian River_DL_22 Sep 08	Marian River_DL_15 Oct 08	Marian River_DL_12 Nov 08	Marian River_DL_17 Dec 08	Marian River_DL_15 Jan 09	Marian River_DL_26 Feb 09	Marian River_DL_30 Mar 09	Marian River_DL_22 Apr 09	Marian River_DL_27 May 09	Marian River_DL_08 Jul 09	Marian River_DL_06 Aug 09	Marian River_DL_03 Sep 09	Marian River_DL_06 Oct 09	Marian River_DL_26 Nov 09	Marian River_DL_21 Dec 09	Marian River_DL_18 Jan 10	
			CCME FAL ¹																			
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	1.22	16.74	17.91	14.8	4.34	-0.15	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units	6.5-9	8.09	8.08	7.95	7.92	7.64	7.41	7.42	7.4	7.51	7.58	7.49	7.48	7.79	7.91	7.9	7.555	7.5	7.49	
	Electrical Conductivity (EC)	µS/cm	NG	166	201	142	171	103	84	92.5	109	150.5	168	97.4	51.4	102	150	131	157	162	164	
	Total Suspended Solids (TSS)	mg/L	NG	24	36	50	54	14	3	3	4	3.5	3	4	44	10	14	30	13	4	3	
	Hardness as CaCO3	mg/L	NG	93.6	103.5	35.3	90	46.8	40	44.1	65.2	76.15	87.9	47.9	27.8	26.6	79.9	58.9	66.8	74.9	65.7	
	Alkalinity (total as CaCO3)	mg/L	NG	63.4	77.55	54.2	54.5	33.1	31	36.8	44.1	65.9	74.4	35.9	20.1	38.9	48.9	53.6	56.9	68	73.3	
	Calcium	mg/L	NG	21.5	27.7	10.2	25	13	11.4	11.2	17.3	18.55	20.8	12.5	7.2	6.3	16.8	13.5	16.8	18.6	15.4	
	Magnesium	mg/L	NG	9.7	8.3	2.4	6.7	3.5	2.8	3.9	5.3	7.25	8.8	4.1	2.4	2.7	6.9	6.6	6.9	8.6	6	
	Potassium	mg/L	NG	1.2	1.1	1	1.9	1.1	1.2	1.1	0.8	1.1	1.2	0.7	0.8	0.9	0.8	0.9	0.7	0.8	0.8	
	Sodium	mg/L	NG	2.1	2.4	2	2.5	2.3	1.8	2	2.25	2.3	2.3	2	2.1	1.7	1.8	1.6	1.7	1.7	1.8	
	Chloride	mg/L	120	1.4	1.5	1.3	1.9	1.7	1.4	1.4	1.35	1.4	1.35	1.4	1.4	1.7	1.5	1.4	1.4	1.4	1.4	
	Fluoride	mg/L	0.12	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Sulphate	mg/L	NG	19	24	13	28	14	8	8	12	11	12	11	3	13	21	12	20	16	14	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5.8	5.9	5.2	6.9	-	-	8.3	6.4	6.6	6.5	9.6	8	8.4	7.6	6.7	6.8	7.8	7.2	
	Total Organic Carbon (TOC)	mg/L	NG	5.2	5.45	5.6	7.3	-	-	8.4	6.8	6.6	9.2	9.5	8.4	8.4	7.7	6.5	7.15	7.6	7.4	
	Total Solids (Filtered)	mg/L	NG	120	159	90	106	82	54	64	83	74	90	16	58	194	84	97	112	102		
	Turbidity	NTU	NG	64.6	83.55	94.9	109	30.1	11.9	7.09	5.52	5.835	5.52	8.87	47.9	28.8	25.4	54	20.2	9.49	5.33	
	Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.021	0.04	0.033	0.011	0.019	0.012	0.006	0.005	0.0075	0.01	0.01	0.08	0.04	0.05	0.03	0.02	0.02	0.015
		Nitrate (as NO3-N)	mg/L	13	0.01	0.02	0.04	0.04	0.05	0.02	0.09	0.15	0.055	0.04	0.04	0.01	0.01	0.09	0.09	0.105	0.14	0.17
		Nitrite (as NO2-N)	mg/L	0.06	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Nitrate and Nitrite (as N) (mg/L)		mg/L	NG	-	0.02	0.04	0.04	0.05	0.02	0.09	0.15	0.055	0.04	0.04	0.01	0.01	0.09	0.09	0.105	0.14	0.17	
Nitrogen (Total)		mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Orthophosphate (as P)		mg/L	NG	-	-	-	-	-	0.005	0.002	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus		µg/L	4	20	85	80	70	50	20	10	10	10	20	20	20	50	40	30	40	15	10	
Biological	Phosphorus (Filtered) (Filtered)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Coliforms	MPN/100mL	NG	3	2	1	3	1	1	1	1	1	1	1	8	11	1	1	1	1	1	
	E. Coli	MPN/100mL	NG	1	1.5	2	1	1	1	1	1	1	1	1	8.5	2	1	1	1	1	1	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	2110	2265	393	1410	692.3	331	187	136	109	213.7	408	352	1110	974	2240	587.5	349	186	
	Antimony	µg/L	NG	0.4	0.6	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.2	0.1	1.5	0.1	0.1	0.1	0.1	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5	0.7	1.05	0.5	1.5	0.5	0.4	0.3	0.3	0.4	0.4	0.5	0.5	0.7	0.7	0.9	0.5	0.4	1.9	
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Barium	µg/L	NG	44.1	49.35	29.1	39.9	20.4	13.6	14.1	14.8	20.4	22.8	14.4	16.1	24	28.4	37.9	23.45	25.1	22.8	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.4	0.1	0.1	0.1	
	Cadmium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG	0.1	-	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L	NG	3.4	4.55	0.4	3.6	1.4	0.6	0.4	0.3	0.3	0.5	0.8	0.7	1.8	1.3	3.7	1.1	0.5	0.8	
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cobalt	µg/L	NG	0.8	0.65	0.3	0.3	0.4	0.2	0.1	0.1	0.1	0.1	0.2	0.3	0.5	0.4	0.9	0.3	0.1	0.1	
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Copper	µg/L	2 - 4 ³	2.9	3.45	0.7	3.5	1.9	2.3	3.3	0.8	0.95	1.4	2.1	2.4	2.1	2	2.6	1.4	1.1	13	
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Iron	µg/L	300	1690	2395	149	1570	762	282	183	131	140.5	273	561	494	1010	862	1740	519	262	201	
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lead	µg/L	1-7 ³	0.8	0.95	0.1	1.3	0.4	0.2	0.1	0.1	0.1	0.1	0.2	0.5	0.5	0.3	2.4	0.3	0.1	0.7	
	Lead (Filtered)	µg/L	1-7 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lithium	µg/L	NG	4.9	-	3.3	5.1	3	2.4	2.1	2	2.25	2.5	2.6	2.3	3.7	3.5	4.8	2.85	3.2	2.6	
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Manganese	µg/L	NG	26.7	37.05	15.4	35.9	16.8	10	7.1	5.4	4.9	5.7	19.4	24.8	20.4	15.3	34.3	16.6	8.2	5.6	
	Manganese (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Mercury	µg/L	0.026	0.01	0.015	0.01	0.01	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
	Mercury (Filtered)	µg/L	0.026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Molybdenum	µg/L	73	0.2	0.2	0.1	0.1	0.3	0.3	0.1	0.1	0.1	0.1	0.4	0.1	0.2	1.9	0.2	0.1	0.1	0.2	
	Molybdenum (Filtered)	µg/L	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nickel	µg/L	25-150 ³	2.7	3.4	0.9	3.2	1.5	1	0.7	0.6	0.55	0.7	1	1	1.8	1.7	2.9	1.25	0.8	0.9	
	Nickel (Filtered)	µg/L	25-150 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Rubidium	µg/L	NG	5.8	-	2.9	6	3.3	2.6	2.4	2	1.85	2	2.5	2.8	3.9	3.3	5.4	2.95	2.1	1.9	
	Rubidium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Selenium	µg/L	1	0.5	0.5	0.5	0.5	0.1	0.5	0.5	0.5	0.5	0.3	0.5	0.5	0.5	0.5	0.3	0.5	0.5	0.5	
	Selenium (Filtered)	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silver	µg/L	0.25	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Silver (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Strontium	µg/L	NG	92	118	69.7	110	60.4	44.6	42.8	45.3	58.05	66.1	51.8	23.6	55.3	88.3	66.5	86.4	79.3	70.9	
	Strontium (Filtered)	µg/L	NG	-	-	-	-	-	-													

Notes:

² Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given

^a CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.
NG - No guideline

BOLD - Greater than

Blank - Not analyzed

Table A.8a: CCME Water Quality Guidelines - Marian River, All Parameters

			Sampled Date/Time		2/11/2010	3/30/2010	4/29/2010	5/19/2010	6/29/2010	7/15/2010	8/12/2010	9/15/2010	10/21/2010	11/30/2010	12/21/2010	1/26/2011	2/24/2011	3/21/2011	4/26/2011	5/30/2011	6/15/2011	7/13/2011	
			SampleCode	Marian River_DL_11 Feb 10	Marian River_DL_30 Mar 10	Marian River_DL_29 Apr 10	Marian River_DL_19 May 10	Marian River_DL_29 Jun 10	Marian River_DL_15 Jul 10	Marian River_DL_11 Aug 10	Marian River_DL_15 Sep 10	Marian River_DL_21 Oct 10	Marian River_DL_30 Nov 10	Marian River_DL_21 Dec 10	Marian River_DL_26 Jan 11	Marian River_DL_24 Feb 11	Marian River_DL_21 Mar 11	Marian River_DL_26 Apr 11	Marian River_DL_30 May 11	Marian River_DL_15 Jun 11	Marian River_DL_13 Jul 11		
Chem_Group	ChemName	output unit	CCME FAL ¹																				
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Field	Field Temperature	°C	NG	-	-	-	5.69	18.54	21.73	19.81	5.88	-0.02	-	-	-	-	-	-	10.98	15.68	21.59		
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units	6.5-9	7.56	7.605	7.85	8.38	7.8	8.17	8.03	8.05	7.82	7.79	7.8	7.64	7.58	7.63	7.675	8.06	7.7	7.95		
	Electrical Conductivity (EC)	µS/cm	NG	162	157	172	133	126	211	170	188	172	184	171.5	164	167	149	166	109	85.3	158		
	Total Suspended Solids (TSS)	mg/L	NG	8	3	6	6	30	10	8	172	32	14	7.5	3	3	8	3	16	30	18		
	Hardness as CaCO3	mg/L	NG	42.8	57.7	106	30.9	60.2	109	66.2	89.9	91.1	91.1	89.9	79.7	87.3	76.7	87	52	41	86.5		
	Alkalinity (total as CaCO3)	mg/L	NG	73.3	75.35	68.3	57.3	50	98.6	72	89	63	76.5	78.45	70.2	80.4	71.9	75.4	43.5	34.1	69.1		
	Calcium	mg/L	NG	10.7	13.1	25.9	10	14.5	24.5	14.6	23.4	21.6	20.9	18.2	19.8	17.4	19.4	12	10.1	19.6			
	Magnesium	mg/L	NG	3.9	6.1	10.1	1.4	5.8	11.6	7.2	9.4	8.3	9.4	8.3	9.2	8.1	9.35	5.3	3.8	9.1			
	Potassium	mg/L	NG	0.8	0.75	0.4	1.1	0.4	1.2	0.8	1.1	1.2	1.2	1.1	1.2	1.1	1.2	0.9	1.1	1.2			
	Sodium	mg/L	NG	1.6	1.85	2.1	1.2	2.3	2.4	1.9	2.5	2.4	2.6	2.35	2.2	2.3	2.3	2.1	1.7	1.6	2.3		
	Chloride	mg/L	120	145	1.3	1.1	1.6	1.3	1.4	1.6	1.6	1.7	1.8	1.55	1.4	1.2	1.2	1.25	1.2	1.2	1.5		
	Fluoride	mg/L	0.12	0.1	0.1	0.1	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sulphate	mg/L	NG	12	10.5	24	16	12	19	12	14	25	18	13.5	11	11	10	10	8	9	15		
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	6.2	8.55	5.1	7.6	5.8	7	6.8	6.7	6.1	7.1	6.5	6.7	6.6	6.1	5.8	5.3	5.6	6.3		
	Total Organic Carbon (TOC)	mg/L	NG	6.5	9.9	5.5	9.8	6	7.5	6	6.9	7.9	7.4	6.75	6.6	7	6.6	6.05	5.8	5.5	6.5		
	Total Solids (Filtered)	mg/L	NG	100	87	116	96	94	138	114	88	130	114	97	86	108	94	96.5	70	94	114		
	Turbidity	NTU	NG	4.68	5.23	6.58	11.9	67.5	32.8	49.2	125	60.2	15.8	9.465	4.73	4.7	5.365	23.2	59.8	42.7			
	Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.01	0.01	0.01	0.01	0.03	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	
		Nitrate (as NO3-N)	mg/L	13	0.1	0.08	0.01	-	0.14	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Nitrite (as NO2-N)	mg/L	0.06	0.01	0.01	0.01	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.11	0.085	0.01	0.02	0.21	0.27	0.16	0.06	0.15	0.08	0.095	0.11	0.12	0.17	0.04	0.08	0.03	0.04	
		Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biological	Phosphorus	µg/L	4	10	10	20	20	60	40	40	120	40	20	15	20	10	10	30	40	50	40		
	Phosphorus (Filtered) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Total Coliforms	1 MPN/100mL	NG	1	1	1	1	2	8	9	1	1	1	1	1	1	1	1	2	3	5		
Metals ⁵	E. Coli	MPN/100mL	NG	1	1	1	2	4.1	5.2	4.1	1	1	3.1	1	1	1	1	4.1	3.1	5.2			
	Aluminum (Filtered)	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	170	190	200	535	3110	1310	1730	15.5	2200	631	386	177	214	134	132	933	2910	1280		
	Antimony	µg/L	NG	0.3	0.6	1.4	0.3	0.1	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.25	0.1	0.1	0.1		
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Arsenic	µg/L	5	0.5	0.4	0.4	0.5	1	0.8	1	0.4	0.8	0.5	0.5	0.4	0.4	0.4	0.4	0.6	0.9	0.6		
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Barium	µg/L	NG	26.1	26	28.3	20	47.9	39.3	42.4	4.1	40.9	28.3	26.6	23	25.2	24.4	27.1	23.2	41.9	38.9		
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Beryllium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Cadmium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.1	0.05	0.05	0.1	0.05	0.05	
	Cadmium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG	0.1	0.1	0.1	0.1	0.3	0.1	0.2	0.5	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1	
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L	NG	0.4	-	0.6	1	4.8	1.9	3.6	0.1	3.8	1.2	0.7	0.4	0.5	0.4	0.35	1.8	4.6	1.7		
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cobalt	µg/L	NG	0.1	0.1	0.1	0.3	1	0.5	0.7	0.1	1	0.3	0.2	0.1	0.1	0.1	0.1	0.4	1.2	0.5		
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Copper	µg/L	2 - 4 ³	1	0.95	1.1	1.4	3.3	2.4	3	0.6	2.7	1.5	1.1	1	3.2	1.4	0.9	1.7	3.5	2.7		
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Iron	µg/L	300	187	187.5	233	538	2440	981	1510	24	1780	563	348	172	213	172	147	965	2520	978		
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lead	µg/L	1-7 ³	0.1	-	0.1	0.3	1.8	0.5	3.9	0.1	0.9	0.3	0.1	0.1	0.1	0.1	0.1	0.5	1.1	0.6		
	Lead (Filtered)	µg/L	1-7 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lithium	µg/L	NG	3	2.65	3	2.8	5.7	4.6	5.3	10.2	5.2	3.4	3.25	2.6	2.9	3	2.95	3.4	5.7	4.6		
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Manganese	µg/L	NG	5.7	4.7	12.8	12.1	38.5	20.5	27.4	11.2	29	13	8.1	5.1	5.4	4.8	4	20.7	38.9	19.5		
	Manganese (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Mercury	µg/L	0.026	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
	Mercury (Filtered)	µg/L	0.026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Molybdenum	µg/L	73	0.2	1.2	0.2	0.2	0.1	0.1	0.3	0.2	0.2	0.2	0.1	0.2	0.1	0.15	0.3	0.1	0.2			
	Molybdenum (Filtered)	µg/L	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nickel	µg/L	25-150 ³	0.7	0.65	0.6	0.9	3.4	1.7	2.5	0.5	2.8	1.2	0.55	0.6	0.4	0.6	0.6	1.5	3.6	1.8		
	Nickel (Filtered)	µg/L	25-150 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Rubidium	µg/L	NG	1.9	1.95	1.9	2.1	7.3	4	5.2	2.6	5.9	2.9	2.35	2	2.1	2	1.9	3.2	6.8	4.4		
	Rubidium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Selenium	µg/L	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.3	
	Selenium (Filtered)	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silver	µg/L	0.25	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Silver (Filtered)	µg/L	NG	-</																			

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given

^b CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Notes:

- ¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)
- ² Guideline varies with pH
- ³ Guideline varies with hardness. Range given.
- ⁴ Guideline varies with pH and temperature. Most stringent given.
- ⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.8a: CCME Water Quality Guidelines - Marian River, All Parameters

			Sampled_Date_Time	SampleCode	2/21/2013	3/13/2013	4/17/2013	5/22/2013	6/24/2013	7/24/2013	8/12/2013	9/16/2013	10/23/2013	11/28/2013	12/17/2013	1/14/2014	2/18/2014	3/12/2014	4/15/2014	5/22/2014	6/18/2014	7/23/2014
					Marian River_DL_21 Feb 13	Marian River_DL_13 Mar 13	Marian River_DL_17 Apr 13	Marian River_DL_22 May 13	Marian River_DL_24 Jun 13	Marian River_DL_24 Jul 13	Marian River_DL_12 Aug 13	Marian River_DL_16 Sep 13	Marian River_DL_23 Oct 13	Marian River_DL_28 Nov 13	Marian River_DL_17 Dec 13	Marian River_DL_14 Jan 14	Marian River_DL_18 Feb 14	Marian River_DL_12 Mar 14	Marian River_DL_15 Apr 14	Marian River_DL_22 May 14	Marian River_DL_18 Jun 14	Marian River_DL_23 Jul 14
Chem_Group	ChemName	output unit	CCME FAL ¹																			
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	Field Temperature	°C	NG	-	-	0.94	2.13	22.95	18.34	19.68	11.81	2.28	-	-	-	-	-	-	6	18.82	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units	6.5-9	7.61	7.675	7.73	8.05	7.83	7.87	8.015	7.75	7.76	7.74	7.57	7.62	7.52	7.525	7.525	7.62	7.72	7.7	7.9
	Electrical Conductivity (EC)	µS/cm	NG	205	182	220.5	111	150	174	212	112	118	156	171	154	151	147.5	150	52	100	140	140
	Total Suspended Solids (TSS)	mg/L	NG	4	3	3	3	14	14	20	54	42	24	11	6	4	4	3	24	6	6	6
	Hardness as CaCO3	mg/L	NG	117	104	123	56.7	79.1	91.3	114.5	58.8	62.7	78	93.45	80.3	81.5	76.05	76.2	21.6	47.2	64.6	64.6
	Alkalinity (total as CaCO3)	mg/L	NG	94	84.8	93.45	43.9	62.6	67.8	88.75	45.1	45.8	63.7	71.15	62.3	63.7	63.55	65.5	20.6	35.2	52	52
	Calcium	mg/L	NG	26.7	23.7	27.45	13.1	18.2	21.3	25.2	13.4	14.6	17.7	21.45	18.6	18.8	17.65	16.7	5.2	11.3	15.8	15.8
	Magnesium	mg/L	NG	12.2	10.8	13.3	5.8	8.2	9.3	12.5	6.1	6.4	8.2	9.7	8.2	8.4	7.75	8.35	2.1	4.6	6.1	6.1
	Potassium	mg/L	NG	1.2	1.1	1.2	0.7	1.1	1.1	1.2	1	1	1.3	1.3	1.1	1.2	1.1	1.1	0.8	0.9	1.1	1.1
	Sodium	mg/L	NG	2.5	2.25	2.4	1.5	2.1	2.3	2.6	2	2	2.6	2.6	2.2	2.3	2.2	2.2	1.3	1.5	2.1	2.1
	Chloride	mg/L	120	1.4	1.5	1.35	1	1.3	1.4	1.4	1.4	1.5	1.9	1.8	1.5	1.5	1.45	1.4	0.9	1.1	1.4	1.4
	Fluoride	mg/L	0.12	0.1	0.15	0.2	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sulphate	mg/L	NG	14	14	14.5	9	11	16	18	7	11	12	14	12	11	10	10	4	11	15	15
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	7	8	-	8.6	7	7.5	7.9	7.1	6.5	8.3	7.7	7.4	7.1	7.25	7	4.9	4.8	6.4	6.4
	Total Organic Carbon (TOC)	mg/L	NG	6.8	9.2	-	8.1	7.9	8	8.35	6.7	6.4	7.95	7.3	7.95	7.3	7.55	6.95	5.1	4.5	5.9	5.9
	Total Solids (Filtered)	mg/L	NG	118	104	126	60	132	136	166	102	98	106	111	90	88	84	78	72	118	118	118
	Turbidity	NTU	NG	3.32	3.425	3.405	7.64	26	27.9	27.4	82	59	36.9	18.15	8.88	5.5	5.02	4.335	8.66	39.2	26.6	26.6
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.005	0.0085	0.005	0.005	0.005	0.009	-	0.005	0.005	0.008	0.022	0.0085	0.01	0.009	0.005	0.005	0.005	0.005	0.019
	Nitrate (as NO3-N)	mg/L	13	0.15	0.215	0.085	-	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrite (as NO2-N)	mg/L	0.06	0.01	0.01	0.01	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.16	0.215	0.085	0.07	0.08	0.14	0.08	0.06	0.14	0.21	0.215	0.17	0.19	0.19	0.11	0.05	0.01	0.07	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L	4	7	38.5	2.6	21	38	38	46	89	52	42	42	27	12	14	13.5	12.5	16	52	41
	Phosphorus (Filtered) (Filtered)	mg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.003	-	-	-
Biological	Total Coliforms	MPN/100mL	NG	1	1	1	-	1	2	4	1	4	1	1	1	1	1	1	4	2	2	2
	E. Coli	MPN/100mL	NG	1	1	1	-	1	1	1	3.1	3.1	1	1	1	1	1.5	1	3.1	2	2	2
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.3	40.5	6.4	6.6
	Aluminum Total	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	123	133.5	148.5	287	584	1220	1065	3490	2840	1430	633	341	237	226	212	257	1880	1760	1760
	Antimony	µg/L	NG	0.1	0.4	0.2	0.1	0.1	0.1	0.1	0.3	0.3	0.4	0.3	0.3	0.4	0.3	0.4	0.1	0.1	0.1	0.1
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.3	0.1	0.1
	Arsenic	µg/L	5	0.3	0.35	0.4	0.3	0.6	1	1.05	1.2	1.1	0.9	0.95	0.8	0.6	0.65	0.4	0.2	0.6	0.7	0.7
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.2	0.2	0.4
	Barium	µg/L	NG	29	26.65	31.25	54.5	30.2	36.8	-	52.9	41.9	38.2	29.05	23.4	21.8	35.4	22.95	8.5	32.1	36	36
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21	6.2	12.2	18.7
	Beryllium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	NG	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.1	0.05
	Cadmium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0.05	0.05	0.05
	Cesium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.15	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1
	Chromium	µg/L	NG	0.2	0.25	0.45	0.3	1.2	0.8	1.85	7.8	6.3	2.9	1.6	0.8	1	0.7					

Table A.8a: CCME Water Quality Guidelines - Marian River, All Parameters

			Sampled Date Time	8/26/2014	9/26/2014	10/22/2014	11/27/2014	12/15/2014	1/29/2015	2/18/2015	3/9/2015	4/9/2015	5/28/2015	6/25/2015	7/22/2015	8/28/2015	9/23/2015	10/21/2015	11/26/2015	12/15/2015	
			SampleCode	Marian River_DL_26 Aug 14	Marian River_DL_26 Sep 14	Marian River_DL_22 Oct 14	Marian River_DL_27 Nov 14	Marian River_DL_15 Dec 14	Marian River_DL_29 Jan 15	Marian River_DL_18 Feb 15	Marian River_DL_09 Mar 15	Marian River_DL_09 Apr 15	Marian River_DL_28 May 15	Marian River_DL_25 Jun 15	Marian River_DL_22 Jul 15	Marian River_DL_28 Aug 15	Marian River_DL_23 Sep 15	Marian River_DL_21 Oct 15	Marian River_DL_26 Nov 15	Marian River_DL_15 Dec 15	
Chem_Group	ChemName	output unit	CCME FAL ¹																		
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Field	Field Temperature	°C	NG	14.35	6.37	0.56	-	-	-	-	-	-	11.78	19.36	16.9	14.2	5.8	1.08	0.08	0.076	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	2.18	1.2	0.785	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	47	68.7	66.2	76.5	58.4	58	59.5	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	0.31	0.282	0.335	0.309	0.339	0.424	0.334	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	1.14	2.13	2.26	2.11	1.8	1.5	1.69	
	pH	pH Units	6.5-9	7.93	7.92	7.7	7.555	7.48	7.43	7.43	7.39	7.55	7.88	7.84	8.09	7.94	7.98	7.79	7.5	7.42	
	Electrical Conductivity (EC)	µS/cm	NG	153	160	120	152	156	152	158	159	191	148	133	165	174	201	220	174	165	
	Total Suspended Solids (TSS)	mg/L	NG	32	60	20	35	22	6	3	3	3	27	27	23	21	44	45	24	11	
	Hardness as CaCO3	mg/L	NG	74.6	78.1	56	71.6	72.6	73.8	78.9	76.7	100	74.5	71.9	81.5	85	100	98.3	83.9	83.8	
	Alkalinity (total as CaCO3)	mg/L	NG	60.8	66.7	44.7	60.75	63.2	62.1	63.9	66.5	84.9	44.2	47	68.7	66.2	76.5	58.4	58	59.5	
	Calcium	mg/L	NG	17.6	17	12.9	16.1	16.4	16.9	17.9	17.3	22.1	19.2	17.7	18.4	19.7	22.6	25.4	20.1	19.6	
	Magnesium	mg/L	NG	7.5	8.7	5.8	7.6	7.7	7.7	8.3	8.2	10.9	6.4	6.7	8.6	8.7	10.7	8.5	8.2	8.4	
	Potassium	mg/L	NG	1.2	1.1	1	1.3	1.3	1.2	1.2	1.2	1.3	1	1.3	1.2	1.3	1.2	1.1	1.2	1.2	
	Sodium	mg/L	NG	2.3	2.3	2	2.7	2.7	2.4	2.3	2.3	2.5	1.8	2.2	2.2	2.3	2.7	2.5	2.6	2.4	
	Chloride	mg/L	120	1.5	1.4	1.5	2	2	1.6	1.6	1.6	1.6	1.4	1.5	1.6	1.8	1.9	2.2	2	1.9	
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	0.1	-	0.1	-	0.1	0.1	0.1	
	Sulphate	mg/L	NG	14	12	12	12	11	11	11	11	10	13	29	19	16	19	23	48	24	20
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	6.3	6.7	5.9	8.15	8.16	6.5	6.4	6.6	6.5	4.7	5.2	5.3	5.3	6.5	6.2	6.6	7	
	Total Organic Carbon (TOC)	mg/L	NG	6.5	6.3	6	7.65	8.01	6.6	6.9	6.6	6.6	4.5	5	5.3	5.4	6	5.9	6.7	7.2	
	Total Solids (Filtered)	mg/L	NG	122	130	110	111	114	168	86	93	115	99	138	144	122	155	189	120	109	
	Turbidity	NTU	NG	61.7	94.1	60.9	62.85	38.7	8.38	7.35	5.82	6.26	46.9	93.5	66.2	58.9	98.3	96.2	39.7	19.1	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.028	0.005	0.016	0.032	0.0338	0.01	0.0055	0.005	0.005	0.01	0.007	0.005	0.01	0.009	0.016	0.029	0.022	
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	0.0054	0.005	0.0088	0.006	0.0248	0.0513	0.0485	
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	0.001	0.001	0.001	0.001	0.0016	0.001	0.001	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.1	0.08	0.11	0.125	0.16	0.12	0.13	0.13	0.12	0.01	0.0054	0.0051	0.0088	0.006	0.0248	0.0529	0.0485	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	0.329	0.341	0.327	0.357	0.39	0.411	0.369	
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	0.0018	0.001	0.0019	0.0011	0.0022	0.0027	0.0016	
	Phosphorus	µg/L	4	66	109	46	70	50	11	15	13	17	38	61.4	51	33.6	25.7	77	42.1	15.8	
	Phosphorus (Filtered) (Filtered)	mg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Coliforms	MPN/100mL	NG	3	1	1	1	1	1	1	1	1	1	1	2	-	1	1	1	1	
	E. Coli	MPN/100mL	NG	1	2	1	1	1	1	1	1	1	1	1	2	1	-	1	1	1	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	3.1	4.3	9	6.45	8.7	8.6	4.5	5.4	3.9	5.7	4.6	5.2	3.9	3.7	2.5	4.9	8.3	
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	2970	3270	1710	1615	1750	444	349	330	163	2130	4680	3210	2550	3920	3640	2590	938	
	Antimony	µg/L	NG	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Antimony (Filtered)	µg/L	NG	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Arsenic	µg/L	5	1.3	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.4	0.7	1.2	0.9	1.7	0.9	0.9	0.7	0.5	
	Arsenic (Filtered)	µg/L	5	0.4	0.4	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.4	0.3	0.3	0.3	0.3	0.3	
	Barium	µg/L	NG	54	59	39.4	35.75	33.8	27.9	25.6	25.1	28.1	36.5	68.1	60.3	55.6	69	63.1	49.2	31.4	
	Barium (Filtered)	µg/L	NG	20.6	20.1	16.3	20.5	21.1	22.6	20.8	21.2	24.9	15.2	18.7	21.8	23.9	24.2	24.5	21.8	23.4	
	Beryllium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Beryllium (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	NG	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
	Cadmium (Filtered)	µg/L	NG	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
	Cesium	µg/L	NG	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.4	0.3	0.5	0.5	0.3	0.1	
	Cesium (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Chromium	µg/L	NG	5.7	5	2.8	3.2	1.8	1.8	1.8	1.2	1.6	0.7	3.3	6.1	4.3	3.6	6.3	6.2	7	1.5
	Chromium (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Cobalt	µg/L	NG	1	1.2	0.7	0.85	0.4	0.1	0.1	0.1	0.1	0.6	1.2	1	0.8	1.5	1.6	0.9		

Table A.8a: CCME Water Quality Guidelines - Marian River, All Parameters

			Sampled Date Time	1/27/2016	2/24/2016	3/16/2016	4/21/2016	5/11/2016	6/28/2016	7/26/2016	8/23/2016	9/29/2016	10/26/2016	11/24/2016	12/13/2016	
			SampleCode	Marian River_DL_27 Jan 16	Marian River_DL_24 Feb 16	Marian River_DL_16 Mar 16	Marian River_DL_21 Apr 16	Marian River_DL_11 May 16	Marian River_DL_28 Jun 16	Marian River_DL_26 Jul 16	Marian River_DL_23 Aug 16	Marian River_DL_29 Sep 16	Marian River_DL_26 Oct 16	Marian River_DL_24 Nov 16	Marian River_DL_13 Dec 16	
Chem_Group	ChemName	output unit	CCME FAL ¹													
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	
Field	Field Temperature	°C	NG	-	-	-	-	0.89	19.66	15.9	18.43	4.87	6.95	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	0.319	0.306	0.539	1.55	-	0.001	1.7	1.1	1.3	2.7	1.7	1	
	Bicarbonate as CaCO3	mg/L	NG	65.4	72.9	68.7	72.6	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	0.394	0.379	0.35	0.296	-	0.344	0.273	0.257	0.323	0.334	0.322	0.356	
	Silica	mg/L	NG	2.04	2.45	2.17	1.91	0.806	0.888	1.18	1.13	2.19	1.72	1.61	2.08	
	pH	pH Units	6.5-9	7.49	7.49	7.56	7.73	7.83	7.88	7.96	7.97	7.94	7.85	7.58	7.51	
	Electrical Conductivity (EC)	µS/cm	NG	161	180	163	167	95	125	126	114.5	175	171	169	170	
	Total Suspended Solids (TSS)	mg/L	NG	4	3	4	3	10	15	13	7	172	9	14	3	
	Hardness as CaCO3	mg/L	NG	82	95.8	88.5	86.8	46.7	75	72.8	50.6	93.2	86.2	74.3	82	
	Alkalinity (total as CaCO3)	mg/L	NG	65.4	72.9	68.7	72.6	33.2	40.9	46.4	46.65	77.9	58.8	60.4	69.4	
	Calcium	mg/L	NG	18.3	20.6	20	19	11.2	17.7	15.3	10.25	19.7	20.8	17.7	19	
	Magnesium	mg/L	NG	8.8	10.8	9.4	9.5	4.5	7.5	8.4	6.1	10.7	8.3	7.3	8.4	
	Potassium	mg/L	NG	1.2	1.3	1.3	1.2	0.8	1.2	1.1	0.9	1.2	1.5	1.1	1.3	
	Sodium	mg/L	NG	2.3	2.7	2.4	2.3	1.5	2.4	2.1	1.7	2.4	2.3	2.2	2.5	
	Chloride	mg/L	120	1.8	1.8	1.7	1.6	1.3	1.8	1.7	1.3	1.3	1.5	1.6	1.8	
	Fluoride	mg/L	0.12	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Sulphate	mg/L	NG	16	16	15	14	13	19	13	9	14	25	22	17	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	6.5	6.6	6.6	5.3	4.6	5.5	6.8	5.4	6.2	5.4	6.2	6.6	
	Total Organic Carbon (TOC)	mg/L	NG	6.9	6.9	6.4	5.5	4.3	5.5	5.9	5.45	5.6	5.9	6.1	6.8	
	Total Solids (Filtered)	mg/L	NG	94	95	86	109	82	109	94.5	114	104	97	90	90	
	Turbidity	NTU	NG	6.17	3.43	3.62	4.69	20.6	48.8	38	28.25	219	26.2	21.1	6.7	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.012	0.005	0.012	0.005	0.005	0.005	0.005	0.005	0.005	0.007	0.009	0.015	
	Nitrate (as NO3-N)	mg/L	13	0.0731	0.0969	0.0856	0.0448	0.005	0.005	0.005	0.005	0.0127	0.0114	0.0153	0.0378	
	Nitrite (as NO2-N)	mg/L	0.06	0.001	0.001	0.0014	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.0742	0.099	0.087	0.0448	0.0051	0.0051	0.0051	0.0051	0.0127	0.0114	0.0153	0.0378	
	Nitrogen (Total)	mg/L	NG	0.36	0.378	0.344	0.314	-	0.299	0.321	0.287	0.477	0.317	0.373	0.353	
	Orthophosphate (as P)	mg/L	NG	0.0016	0.001	0.001	0.001	0.001	0.0018	0.001	0.0011	0.0011	0.001	0.0011	0.0018	
	Phosphorus	µg/L	4	6.4	5	16	10	21	52	36	26	137	25	25	9	
	Phosphorus (filtered) (Filtered)	mg/L	4	-	-	-	-	0.002	0.0062	0.0051	0.0021	0.0239	0.0179	0.0033	0.0029	
	Total Coliforms	MPN/100mL	NG	1	1	1	1	1	3	5	4	-	1	1	1	
	E. Coli	MPN/100mL	NG	1	1	1	1	1	1	1	3.55	-	1	1	1	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	5	3.8	5.3	3.6	18.8	18.6	10.5	17.85	2	3.1	4.4	26.2	
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	404	267	261	298	821	1870	1550	1110	3840	783	686	347	
	Antimony	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Antimony (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Arsenic	µg/L	5	0.5	0.3	0.3	0.3	0.4	0.7	0.6	1.4	0.5	0.5	0.4	0.4	
	Arsenic (Filtered)	µg/L	5	0.3	0.3	0.3	0.3	0.2	0.4	0.4	0.4	0.4	0.3	0.3	0.3	
	Barium	µg/L	NG	28.6	26.3	26.5	26.2	17.7	38.3	34.1	28.2	76.4	29.9	31	28.5	
	Barium (Filtered)	µg/L	NG	22	24.8	23.4	23.9	10.1	16.7	16.4	14.35	22.6	20.8	22.3	24.4	
	Beryllium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Beryllium (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Bismuth	µg/L	NG	-	-	-	-	0.2	0.2	0.4	0.2	0.2	0.2	0.2	0.2	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
	Boron - soluble	µg/L	NG	-	-	-	-	5.6	9.7	9.7	8.8	10.7	8.4	10.2	9.5	
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	4.3	7.6	8.5	7.7	10.4	8.1	10.4	7.9	
	Cadmium	µg/L	NG	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
	Cadmium (Filtered)	µg/L	NG	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
	Cesium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.6	0.1	0.1	0.1	
	Cesium (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Chromium	µg/L	NG	4.9	0.4	0.4	0.5	1.4	2.6	2.1	1.65	9.9	1.5	1.1	0.6	
	Chromium (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Cobalt	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.4	0.7	0.6	0.4	2.9	0.4	0.3	0.2
	Cobalt (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Copper	µg/L	2 - 4 ³	1.8	0.9	0.8	0.5	1.3	2.4	2.1	2.1	5.4	1.5	1.3	1	1
	Copper (Filtered)	µg/L	2 - 4 ³	0.6	0.8	0.8	0.5	0.8	1.2	1	1.1	1.1	0.9	0.8	0.8	0.8
	Iron	µg/L	300	250	186	162	203	697	1330	1140	798.5	4840	664	555	286	286
	Iron (Filtered)	µg/L	300	5	5	5	5	6	5	5	5	5.5	5	5	5	28
	Lead	µg/L	1-7 ²	0.6	0.1	0.1	0.1	0.1	0.3	0.7	0.6	0.4	2.2	0.3	0.3	0.2
	Lead (Filtered)	µg/L	1-7 ²	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Lithium	µg/L	NG	4.3	2.7	2.7	2.7	2.7	2.6	4.4	4.1	3.75	10.1	3.5	3.4	3.3
	Lithium (Filtered)	µg/L	NG	2.5	2.4	2.3	2.5	1.5	2.3	2.5	2.8	2.4	2.4	2.4	2.5	2.4
	Manganese	µg/L	NG	7.5	5.9	5.5	4.7	15.3	23.7	22.9	16.95	101	11.1	15.5	8	8
	Manganese (Filtered)	µg/L	NG	1.7	2.5	2.1	1.1	4.4	0.9	0.1	0.1	0.6	0.1	0.7	1.1	4
	Mercury	µg/L	0.026	0.03	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Mercury (Filtered)	µg/L	0.026	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Molybdenum	µg/L	73	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.2	0.1	0.2
	Molybdenum (Filtered)	µg/L	73	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1
	Nickel	µg/L	25-150 ³	0.8	0.6	0.6	0.6	1.1	2.3	1.9	1.5	7.8	1.4	1.2	0.9	0.9
	Nickel (Filtered)	µg/L	25-150 ³	0.3	3	0.4	0.1	0.1	0.4	0.3	0.3	0.4	0.4	0.4	0.5	0.5
	Rubidium	µg/L	NG	2.5	2.1	2.2	2.2	2.8	5.3	4.5	3.95	12.5	3.2	3.3	2.7	2.7
	Rubidium (Filtered)	µg/L	NG	1.6	1.7	1.7	1.7	1.7	1.1	1.8	1.7	1.6	1.3	1.6	1.7	1.9
	Selenium	µg/L	1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	Selenium (Filtered)	µg/L	1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	Silver	µg/L	0.25	0.1	0.1	0.1	0.1									

Sampled_Date_Time

Chem_Group			SampleCode	Marian River_22 Aug 97	Marian River_01 Oct 97	Marian River_03 Mar 98	Marian River_15 May 98	Marian River_04 Jun 98	Marian River_10 Jul 98	Marian River_07 Aug 98	Marian River_04 Nov 98	Marian River_19 Mar 99	Marian River_16 Apr 99	Marian River_04 May 99	Marian River_11 Jun 99	Marian River_09 Jul 99	Marian River_06 Aug 99	Marian River_10 Sep 99	Marian River_21 Oct 99	Marian River_27 Jan 00		
ChemName			output unit	CCME FAL ¹																		
Cyanide	Cyanide Total	mg/L	NG		0.001	-	-	-	0.004	0.001	0.001	0.004	0.005	0.001	-	0.001	-	0.003	0.003	0.003	0.001	0.003
Field	Field Temperature	°C	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chlorophyll A	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Physical/Major Ions	Bicarbonate as CaCO3	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG		-	-	3.18	-	-	-	-	-	2.72	-	-	-	-	0.991	-	1.89	-	
	pH	pH Units	6.5-9		7.6	7.48	7.69	7.72	7.72	7.96	7.87	7.77	7.73	7.86	8.03	7.44	7.31	7.34	7.6	7.91	7.7	
	Electrical Conductivity (EC)	µS/cm	NG		96.7	49.6	199	142	108	153	213	220	180	140	89.3	57.5	71.8	58.9	196	196	197	
	Total Suspended Solids (TSS)	mg/L	NG		19.3	18	3	22	12	18	28	17	5	5	4	37	21	8	39	3	4	
	Hardness as CaCO3	mg/L	NG		42.66823	21.55336	93.5163	70.02912	46.6157	65.96916	103.4519	103.13778	86.43784	88.52828	66.5614	39.75624	24.07361	30.77048	25.22927	93.94194	93.5163	
	Alkalinity (total as CaCO3)	mg/L	NG		34.7	17.5	84.7	53.8	39.2	59.4	88.9	58.7	80.5	77.3	59.9	28.8	21	25.1	19.5	61.6	80.8	
	Calcium	mg/L	NG		8.65	5.03	20.3	16.6	11	18.9	22.3	11	20.6	20.1	14.7	10.1	5.65	5.75	2.4	20.3	22.4	
	Magnesium	mg/L	NG		4.51	2.19	10.4	6.94	4.65	8.31	7.25	9.53	11.6	9.31	3.53	2.42	3.07	2.64	9.23	10.4	10.4	
	Potassium	mg/L	NG		1.07	0.891	1.27	1.05	1.16	1.39	1.26	1.44	1.28	1.3	1.1	1.4	1.09	1.2	1.49	1.3	1.29	
	Sodium	mg/L	NG		1.68	1.28	2.23	1.7	1.56	2.11	2.51	2.47	2.19	2.17	1.74	1.78	1.47	1.45	1.49	2.03	2.12	
	Chloride	mg/L	120		1.22	1.04	1.5	1.2	1.2	1.7	1.9	2.1	1.8	1.7	1.29	1.84	1.3	1.23	1.5	1.6	1.52	
	Fluoride	mg/L	0.12		-	-	0.17	-	-	-	-	-	0.12	-	-	0.07	0.06	0.07	-	-	0.14	
	Sulphate	mg/L	NG		9.3	7	12	12	12	16	16	42	4	10	6	21	9	8	13.4	33	13.1	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG		-	-	-	-	-	-	-	-	-	6.4	5.6	6.6	6.1	5.6	4.8	9.5	6.2	
	Total Organic Carbon (TOC)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Solids (Filtered)	mg/L	NG		-	46	97	103	83	113	146	148	109	117	83	80	50	63	55	9.5	6.2	
	Turbidity	NTU	NG		26.9	29.5	29	22	22	30.7	45.7	41.1	37.4	36.4	19.6	26.3	19.6	26.3	4.4	118	118	
Nutrients	Ammonia as N	mg/L	0.021 ⁴		0.01	0.008	0.018	0.034	0.019	0.036	0.031	0.036	0.03	0.024	0.033	0.037	0.034	0.04	0.061	0.024	0.014	
	Nitrate (as NO3-N)	mg/L	13		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrite (as NO2-N)	mg/L	0.06		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG		0.019	<0.008	0.083	<0.008	<0.008	<0.008	<0.008	0.011	0.074	0.051	0.014	<0.008	<0.008	<0.008	<0.008	0.025	0.063	
	Nitrogen (Total)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG		<0.002	<0.002	-	0.004	0.005	0.008	0.038	0.009	0.004	<0.002	0.006	0.006	-	<0.002	0.007	-	<0.002	
	Phosphorus	µg/L	4		41	32	9	42	39	51	65	27	21	181	23	16	20	30	33	35	12	
Biological	Phosphorus (Filtered) (Filtered)	mg/l	4		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Coliforms	MPN/100ml	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	E. Coli	MPN/100ml	NG		-	<1	<1	-	8	30	16	<1	<1	-	4	2	8	2	4	2	2	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²		2357	1680	243	1490	1740	573	3750	3350	237	338	399	2190	1570	2010	2700	1090	348	
	Antimony	µg/L	NG		0.27	0.4	0.5	0.3	0.1	<0.5	0.6	1.1	<0.5	<0.5	0.4	<0.5	0.7	<0.5	1	0.8	-	
	Antimony (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5		0.77	0.3	0.2	0.2	0.5	0.3	0.6	0.2	0.2	0.2	0.4	0.3	0.9	0.6	0.3	0.2	-	
	Arsenic (Filtered)	µg/L	5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Barium	µg/L	NG		-	27.8	23.2	27.2	26.9	37	53.1	46.1	24.4	25.1	19	32.7	24	26	34.2	41	29	
	Barium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L	NG		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.2	<0.1	<0.1	<0.1	<2	<2	<2	<2	<2	<2	
	Beryllium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L	NG		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.4	<0.4	<0.4	<0.4	<0.4	
	Bismuth (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	NG		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	
	Cadmium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG		<0.1	<0.2	<0.1	<0.1	<0.4	<0.1	<0.3	<0.2	<0.1	-	<0.1	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	
	Cesium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L	NG		<2	2.6	<1	2.3	2.1	<2	3.6	<2	<2	<2	4	<3	<3	<3	<3	<3	<3	
	Chromium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cobalt	µg/L	NG		<0.4	<0.4	<0.1	<0.1	<0.3	0.6	0.9	0.2	<0.1	<0.1	<1	<1	<1	<1	<1	<1	<1	
	Cobalt (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Copper	µg/L	2 - 4 ³		2.2	2.2	1.3	1.4	1.9	4.7	2.4	2.7	1.6	<0.1	<0.5	<2	<2	4	8.8	3	<2	
	Copper (Filtered)	µg/L	2 - 4 ³		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Iron	µg/L	300		1340	1170	188	1130	939	1020	1680	1490	260	220	300	740	1050	1240	1570	790	270	
	Iron (Filtered)	µg/L	300		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lead	µg/L	1-7 ¹		0.93	1.2	0.2	0.7	0.7	2	1.1	0.8	0.5	0.2	0.2	1	1	1	1	1	1	
	Lead (Filtered)	µg/L	1-7 ¹		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lithium	µg/L	NG		3.9	3.1	3.1	<3	2.9	4	6.2	5.3	2.2	3.2	2.6	4	<3	4	4.3	5	<3	
	Lithium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Manganese	µg/L	NG		21.8	20.2	7.6	26.1	15.1	22.3	42.3	22.7	5	6.2	14	27	21	20	26.1	18	5	
	Manganese (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Mercury	µg/L	0.026		-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
	Mercury (Filtered)	µg/L	0.026		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Molybdenum	µg/L	73		<0.1	0.2	0.3	0.2	<0.1	0.2	<0.1	<0.1	0.2	0.3	<0.1	<1	<1	<1	-	<1	<1	
	Molybdenum (Filtered)	µg/L	73		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nickel	µg/L	25-150 ³		2	2.6	0.5	1.8	1.8	0.1	2.5	2.6	0.9	1	0.7	3	2	2	3.3	2	1	
	Nickel (Filtered)	µg/L	25-150 ³		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Rubidium	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Rubidium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Selenium	µg/L	1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Selenium (Filtered)	µg/L	1		<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	
	Silver	µg/L	0.25		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silver (Filtered)	µg/L	NG		<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.3	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	
	Srionium	µg/L	NG		41.9	32.9	101	65.4	58.1	69	89.1	187	64.4	69.2	52.3	53	27	37	35.5	139	83	
	Srionium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

¹ Canada

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH.

³ Guideline varies with hardness. Range given

⁴ Guideline varies with pH and temperature. Most stringent given.

⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.8b: CCME Water Quality Guidelines - Marian River, All Parameters with <DL

Sampled Date, Time				5/5/2003	6/5/2003	7/7/2003	7/31/2003	8/22/2003	10/1/2003	10/31/2003	12/5/2003	1/6/2004	2/11/2004	3/1/2004	4/15/2004	5/6/2004	6/10/2004	7/8/2004	8/16/2004	9/9/2004
Chem_Group	ChemName	output unit	CCME FAL ¹	Marian River_05 May 03	Marian River_05 Jun 03	Marian River_07 Jul 03	Marian River_31 Jul 03	Marian River_22 Aug 03	Marian River_01 Oct 03	Marian River_31 Oct 03	Marian River_05 Dec 03	Marian River_06 Jan 04	Marian River_11 Feb 04	Marian River_01 Mar 04	Marian River_15 Apr 04	Marian River_06 May 04	Marian River_10 Jun 04	Marian River_08 Jul 04	Marian River_16 Aug 04	Marian River_09 Sep 04
Cyanide	Cyanide Total	mg/L	NG	-	<0.003	<0.003	0.003	<0.003	<0.003	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	-	0.001	-	0.001	-
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	0.6433333333333333	-	1.75	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units	6.5-9	7.97	7.656666666666667	7.99	7.89	7.99	7.87	8.07	7.75	7.55	7.55	7.77	7.54	7.71	7.88	7.91	8.126666666666667	7.62
	Electrical Conductivity (EC)	µS/cm	NG	217	91.06666666666667	158	176	191	181	241	218	190	148	202	189	190	91.5	191	244	93.1
	Total Suspended Solids (TSS)	mg/L	NG	6	40.66666666666667	18	36	32	50	30	10	4	6	4	4	4	10	56	-	28
	Hardness as CaCO3	mg/L	NG	116	31.3	73.1	70.2	72.8	81.8	112	92.9	90.9	79.9	109	103	106	44.8	111	125.7	51.8
	Alkalinity (total as CaCO3)	mg/L	NG	41	32.23333333333333	15	26	-	25	-	73.9	75	67.1	95.6	85.7	88.4	36	79.2	97.33333333333333	35.1
	Calcium	mg/L	NG	30.8	6.673333333333333	18.6	16.3	13.9	19	25.4	21.8	21.1	17.8	24.1	22.8	23.6	10.2	20.8	10.2	9.9
	Magnesium	mg/L	NG	9.54	3.546666666666667	6.47	7.16	9.26	8.36	11.8	9.37	9.26	8.6	11.8	11.2	11.6	4.7	10.1	13.6	4.5
	Potassium	mg/L	NG	1.32	1.153333333333333	1.5	1.45	1.47	1.08	1.27	1.08	1.23	1.13	-	1.2	1.18	1.77	0.9	1.3	1.2
	Sodium	mg/L	NG	2.1	1.23	2.03	2.11	2.26	2.39	2.81	2.48	2.23	-	2.4	2.4	2.2	1.6	2.5	2.6	1.7
	Chloride	mg/L	120	1.7	1.1	1.2	1.3	1.4	1.5	1.7	1.6	-	1.2	1.7	-	-	1	1.5	1.5	1.2
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sulphate	mg/L	NG	41	11.333333333333333	15	26	-	25	-	21	19	13	15	12	12	6	13	26	8
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	6.8	4.766666666666667	6.8	6.4	-	7.1	-	-	-	-	6.5	-	-	-	-	-	5.2
	Total Organic Carbon (TOC)	mg/L	NG	6.9	4.5	6.7	6.4	-	7.6	-	-	-	-	6.5	-	-	7.4	-	-	5.3
	Total Solids (Filtered)	mg/L	NG	144	70	118	122	134	146	146	134	98	100	116	120	112	73	186	187.33333333333333	88
	Turbidity	NTU	NG	8.6	60.16666666666667	35.1	55.2	61	108	67.6	19.4	8.15	5.96	6.46	6.78	8.26	20.9	144	106.33333333333333	60.8
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.012	0.006	0.007	0.008	0.024	0.01	0.051	0.019	0.016	0.05	0.02	<0.005	<0.005	0.006	0.011	0.012	0.009
	Nitrate (as NO3-N)	mg/L	13	0.011	<0.008	<0.008	<0.008	-	0.014	0.015	0.038	0.062	0.06	0.03	0.1	<0.1	-	<0.1	<0.1	<0.01
	Nitrite (as NO2-N)	mg/L	0.06	0.009	<0.009	0.009	0.009	<0.009	0.009	<0.009	<0.009	<0.009	<0.01	<0.03	<0.05	<0.05	-	<0.05	<0.05	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	-	<0.008	-	<0.008	-	0.015	0.038	0.062	0.06	0.03	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.01
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	<0.002	0.002	0.002	<0.002	<0.002	<0.002	<0.002	0.009	0.009	-	0.002	0.012	<0.002	-	0.002	-	-
	Phosphorus	µg/L	4	18	80	66	101	92	100	30	20	20	10	10	20	10	40	220	176.66666666666667	<50
	Phosphorus (filtered) (Filtered)	µg/L	4	0.006	0.014666666666667	<0.004	0.01	0.013	<0.004	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	-	<0.01	-	-
	Total Coliforms	MPN/100mL	NG	<2	8.666666666666667	1	<1	2	<10	2	<1	<1	<1	<1	<2	2	-	<0.01	-	<1
	E. Coli	MPN/100mL	NG	<2	14	1	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	1	<1
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	285	846	1200	2320	2140	4760	848	553	288	190	180	131	248	699	4480	3520	2050
	Antimony	µg/L	NG	0.3	0.5	0.7	0.4	0.4	0.5	0.9	0.6	0.9	1.5	0.5	<0.1	<0.1	0.2	0.2	0.6	-
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	2
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	21.9	21.533333333333333	31	47.5	38	68.7	40.2	31	26.6	22.8	30.4	26.2	30.2	18.7	68.1	68.96666666666667	37.9
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cadmium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG	<0.1	0.1	0.1	0.2	0.2	0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.5	0.4
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG	2.3	2.166666666666667	6.7	8.6	2	7.6	1.9	1.4	3.7	0.5	5.4	0.3	0.8	1.9	8.2	6.233333333333333	3.1
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG	0.2	0.9	0.5	0.8	1	-	0.8	0.4	0.2	0.3	0.1	0.1	0.2	0.4	2.1	1.6	1
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³	1.2	2.066666666666667	3.7	3.6	3	5.7	5	3.2	2.2	3.5	1.8	1.2	1.4	1.6	5.2	4.433333333333333	4.6
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron	µg/L	300	304	1951	1080	1522	1735	3943	2237	480	311	251	238	274	290	964	4850	3526.666666666667	

Table A.8b: CCME Water Quality Guidelines - Marian River, All Parameters with <DL

Sampled Date, Time				10/18/2004	12/21/2004	2/1/2005	3/3/2005	4/7/2005	5/2/2005	6/2/2005	7/7/2005	8/4/2005	9/6/2005	10/25/2005	12/8/2005	1/5/2006	2/8/2006	3/15/2006	4/5/2006	5/3/2006	
SampleCode				Marian River_18 Oct 04	Marian River_21 Dec 04	Marian River_01 Feb 05	Marian River_03 Mar 05	Marian River_07 Apr 05	Marian River_02 May 05	Marian River_02 Jun 05	Marian River_07 Jul 05	Marian River_04 Aug 05	Marian River_06 Sep 05	Marian River_25 Oct 05	Marian River_08 Dec 05	Marian River_05 Jan 06	Marian River_08 Feb 06	Marian River_15 Mar 06	Marian River_05 Apr 06	Marian River_03 May 06	
Chem_Group	ChemName	output unit	CCME FAL ¹																		
Cyanide	Cyanide Total	mg/L	NG	-	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units	6.5-9	7.88	7.583333333333333	7.54	7.47	7.72	7.9	7.84	7.52	7.69	8	7.77	7.576666666666667	7.57	7.56	7.66	7.64	7.66	
	Electrical Conductivity (EC)	µS/cm	NG	157	176.6666666666667	178	169	171	195	158	64.5	111	145	333	211.3333333333333	202	162	168.6666666666667	169	165	
	Total Suspended Solids (TSS)	mg/L	NG	40	<3	4	2	<3	3	12	16	8	24	22	5.333333333333333	<3	<3	<3	<3	4	
	Hardness as CaCO3	mg/L	NG	70.2	85.7	88.5	80.7	84.8	96.4	70.4	28.6	49.1	73.2	156	107	98.2	79.9	84.8	79.2	68.2	
	Alkalinity (total as CaCO3)	mg/L	NG	63.2	73.76666666666667	76.5	70.9	73.9	86.2	42.9	24.4	38.5	48.2	69.5	74.16666666666667	76.1	64.8	68.8	69.6	69	
	Calcium	mg/L	NG	15.7	19.266666666666667	20.1	18.1	19	21.5	20	7.2	12.1	18.9	43.7	26.1	23.4	18.7	19.6	18.3	14.8	
	Magnesium	mg/L	NG	7.5	9.1	9.3	8.6	9.1	10.4	5.6	2.6	4.6	6.3	11.3	10.166666666666667	9.7	8.1	8.7	8.1	7.6	
	Potassium	mg/L	NG	0.9	1.233333333333333	1.21	1.17	1.04	1.04	1	0.9	0.9	0.8	0.8	1.3	1.19	1.17	1.166666666666667	1.1	0.9	
	Sodium	mg/L	NG	1.5	2.366666666666667	2.3	2	2	2	1.7	1.5	1.9	1.6	2.2	2.633333333333333	2.5	2.3	2.366666666666667	2.1	2.5	
	Chloride	mg/L	120	1.5	1.566666666666667	1.4	1.3	1.5	1.4	1.4	1.5	1.5	1.4	2.1	1.6	1.7	1.5	1.5	-	-	
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sulphate	mg/L	NG	14	13.333333333333333	12	10	10	19	32	4	12	20	94	27	14	14	13	11	11	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	6.2	5.566666666666667	7	6	5.8	6	6.1	6.9	8	6.9	8.7	7.566666666666667	6.6	7.1	7.1	7.1	6.5	
	Total Organic Carbon (TOC)	mg/L	NG	-	-	7.1	-	-	-	-	6.3	8.8	7.3	-	7.666666666666667	7.2	6.9	7.2	7.1	6.9	
	Total Solids (Filtered)	mg/L	NG	114	115.33333333333333	76	86	94	100	94	60	88	100	230	127.33333333333333	118	86	70.66666666666667	86	88	
	Turbidity	NTU	NG	75.6	10.356666666666667	6.33	5.7	3.71	5.76	30.9	32.5	24.2	40.8	41.2	9.15	4.76	4.07	4.386666666666667	4.8	7.23	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.01	0.0136666666666667	<0.005	-	0.009	0.011	0.007	0.023	0.009	0.005	0.01	0.0126666666666667	0.014	0.01	0.007	<0.005	<0.005	
	Nitrate (as NO3-N)	mg/L	13	0.08	0.04	-	-	-	0.03	-	-	-	-	<0.01	-	0.11	-	0.06	0.1	-	
	Nitrite (as NO2-N)	mg/L	0.06	<0.01	<0.01	-	-	-	<0.01	-	-	-	-	-	0.02	-	-	<0.01	<0.01	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.08	-	0.1	-	0.1	0.03	-	-	-	-	-	-	-	0.04	0.06	0.1	<0.01	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Phosphorus	µg/L	4	170	97	300	60	<10	13	50	60	40	70	80	40	20	<10	10	20	20	
	Phosphorus (Filtered) (Filtered)	mg/L	4	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Biological	Total Coliforms	MPN/100L	NG	4	<1	<1	<1	<1	<1	4	8	2	<1	1	<1	<1	<1	<1	<1	<1
		E. Coli	MPN/100L	NG	<1	-	<1	<1	<1	<1	1	1	<1	<1	2	<1	<1	<1	<1	<1	<1
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	2420	362.3333333333333	217	232	220	<30	1130	1290	956	1360	1510	301.3333333333333	186	179	185	212	297	
	Antimony	µg/L	NG	<0.1	0.3	0.4	0.8	1.1	0.2	0.7	0.5	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5	1	0.4	0.2	0.3	0.4	0.4	0.4	0.7	0.9	1.5	0.6	0.4333333333333333	0.3	0.3	0.3	0.3	0.3	
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Barium	µg/L	NG	45.7	31.666666666666667	24.8	25.9	27.9	26.1	24	22.6	24.2	30.5	38.8	26.066666666666667	24.9	24.2	23.533333333333333	23.2	23.3	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Cadmium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	0.2	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L	NG	4.3	5.2	0.4	1.1	0.7	1	2.3	2.4	1.6	2.5	2.8	0.9	0.6	0.6	0.6	0.4	0.7	
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cobalt	µg/L	NG	0.9	0.15	0.1	<0.1	0.1	<0.1	0.5	0.6	0.4	0.6	0.7	0.2666666666666667	0.1	0.1	<0.1	<0.1	0.2	
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Copper	µg/L	2 - 4 ³	3.1	2.933333333333333	2.1	1.9	3.5	1.4	2	3.3	2.7	2.6	2.6	1.966666666666667	2.3	1.4	0.866666666666667	1.9	1.5	
	Copper (Filtered)	µg/L	2 - 4 ³	-																	

Table A.8b: CCME Water Quality Guidelines - Marian River, All Parameters with <DL

Sampled Date Time				7/27/2006	8/10/2006	9/5/2006	11/1/2006	12/20/2006	1/24/2007	3/21/2007	4/26/2007	5/15/2007	6/28/2007	7/25/2007	8/30/2007	9/17/2007	10/24/2007	11/29/2007	1/14/2008	2/18/2008
SampleCode				Marian River_ 27 Jul 06	Marian River_ 10 Aug 06	Marian River_ 05 Sep 06	Marian River_ 01 Nov 06	Marian River_ 20 Dec 06	Marian River_ 24 Jan 07	Marian River_ 21 Mar 07	Marian River_ 26 Apr 07	Marian River_ 15 May 07	Marian River_ 28 Jun 07	Marian River_ 25 Jul 07	Marian River_ 30 Aug 07	Marian River_ 17 Sep 07	Marian River_ 24 Oct 07	Marian River_ 29 Nov 07	Marian River_ 14 Jan 08	Marian River_ 18 Feb 08
Chem_Group	ChemName	output unit	CCME FAL ¹																	
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units	6.5-9	7.6	7.5	8.02	7.82	7.79	7.72	7.63666666666667	7.93	7.85	7.46	7.63	8.09	8.07	7.99	7.7	7.65	7.61
	Electrical Conductivity (EC)	µS/cm	NG	79.3	62.5	161	55.7	171	159	199.333333333333	186	95.3	57.5	60.1	200	174	178	192	194	176
	Total Suspended Solids (TSS)	mg/L	NG	12	24	4	8	4	4	3.6	<3	6	14	24	20	16	24	8	4	<3
	Hardness as CaCO3	mg/L	NG	37	29.5	80.6	53.2	93.3	101	102.666666666667	92.7	49	30.1	32.9	108	93.5	92.4	101	75.4	90.4
	Alkalinity (total as CaCO3)	mg/L	NG	22.5	23.4	51.8	38.9	73.3	83.1	84.1	78.7	35.8	21.3	24.1	78.5	70.7	65.4	70	80.2	73.6
	Calcium	mg/L	NG	9.8	6.7	19.9	13.9	21.4	22.7	21.9	20.3	11.3	7.6	7.8	23.5	19.9	21	23.2	16.6	20
	Magnesium	mg/L	NG	3	3.1	7.5	4.5	9.7	10.7	11.6666666666667	10.2	5	2.7	3.3	11.9	10.7	9.7	10.5	8.2	9.8
	Potassium	mg/L	NG	0.8	0.8	0.9	0.8	1.2	1.3	1.2	1.1	0.9	1	0.9	1.1	1	1	1.3	0.3	1.3
	Sodium	mg/L	NG	1.4	1.4	1.6	1.4	2.3	2.4	2.2	2.1	1.5	1.8	1.5	2.3	2	2.1	2.5	-	2.3
	Chloride	mg/L	120	1	1	1.1	1.5	1.5	1.6	1.46666666666667	1.4	1.2	1.4	1.2	1.4	1.3	1.4	1.7	-	1.6
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.1
	Sulphate	mg/L	NG	12	4	25	22	15	16	11	11	9	4	19	14	21	23	14	13	11
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5.9	5.3	5.8	6.1	6.9	6.7	6.2	5.3	6.2	5.4	6.9	6.3	5.9	6.5	6.4	6.7	6.7
	Total Organic Carbon (TOC)	mg/L	NG	6	5.7	0	6.1	-	7.3	6.8	6.3	5.2	6.3	5.7	6.1	6	5.4	6.3	6.7	6.6
	Total Solids (Filtered)	mg/L	NG	76	54	122	96	100	162	104	138	14	48	18	151	114	112	120	114	94
	Turbidity	NTU	NG	33	43.8	19	32.5	6.83	6.38	5.34	6.54	8.36	33.7	44.5	56	37.8	55.6	18.1	5.08	6.28
Nutrients	Ammonia as N	mg/L	0.021 ⁴	<0.005	0.027	0.009	0.02	0.026	0.009	0.0063333333333333	0.01	<0.005	0.024	0.023	0.011	0.019	<0.005	0.012	0.015	0.005
	Nitrate (as NO3-N)	mg/L	13	0.01	<0.01	<0.01	0.01	-	0.02	0.06	0.04	0.01	0.02	<0.01	0.04	0.05	0.02	<0.01	0.04	0.07
	Nitrite (as NO2-N)	mg/L	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.01	-	<0.01	0.01	0.03	0.02	0.06	0.04	0.01	0.02	<0.01	0.04	0.05	0.02	0.01	0.05	0.07
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L	4	30	40	20	30	20	10	<10	<10	10	40	40	70	50	70	30	10	<50
Phosphorus (Filtered) (Filtered)	mg/l	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Biological	Total Coliforms	MPN/100L	NG	<2	10	<1	<1	<1	<1	<1	<1	6	11	12	1	1	<1	<1	<1	1
	E. Coli	MPN/100L	NG	3.1	11	1	<1	2	<1	<1	1	2	6.3	7.4	2	1	<1	1	<1	1
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	1410	1900	566	1140	391	241	196.666666666667	250	129	1090	1690	2020	1700	1540	517	280	219.5
	Antimony	µg/L	NG	0.1	1.7	<0.1	<0.1	<0.1	<0.1	0.1	1.4	<0.1	0.2	0.2	<0.1	<0.1	0.2	0.2	0.6	<0.1
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	0.5	0.8	0.8	1.6	2.8	-	0.866666666666667	-	0.7	0.6	0.8	0.6	0.5	1.3	0.5	0.5	0.5
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	22.7	38.3	22.7	25.4	25.2	27.3	22.1	28.8	5.5	18.1	25.6	43.8	43.3	39.1	29.7	26.2	21.55
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1
	Cadmium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG	0.1	0.2	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2	0.2	0.2	0.3	<0.1	<0.1	0.1
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG	2.3	-	1.3	2.2	0.9	0.9	0.5	1	0.3	2.2	3.1	2.8	2.5	3.1	1	0.4	0.55
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG	0.5	1	0.3	0.6	<0.1	<0.1	0.1	0.2	<0.1	0.4	0.6	0.7	0.5	1	0.4	0.2	0.15
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³	2.3	4.4	2.1	2.3	1.2	1	1.2	1.4	0.8	2.2	2.6	2.7	2.2	2.2	1.8	0.8	1.45
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron	µg/L	300	1210	1710	626	1070	417	242	224	274.4	136	1180	1780	1370	1360	1510	486	203	195
	Iron (Filtered)</																			

Table A.8b: CCME Water Quality Guidelines - Marian River, All Parameters with <DL

Sampled Date, Time				3/27/2008	4/29/2008	5/22/2008	6/11/2008	7/16/2008	8/20/2008	9/22/2008	10/15/2008	11/12/2008	12/17/2008	1/15/2009	2/26/2009	3/30/2009	4/22/2009	5/27/2009	7/8/2009	8/6/2009
Chem_Group	ChemName	output unit	CCME FAL ¹	Marian River_27 Mar 08	Marian River_29 Apr 08	Marian River_22 May 08	Marian River_11 Jun 08	Marian River_16 Jul 08	Marian River_20 Aug 08	Marian River_22 Sep 08	Marian River_15 Oct 08	Marian River_12 Nov 08	Marian River_17 Dec 08	Marian River_15 Jan 09	Marian River_26 Feb 09	Marian River_30 Mar 09	Marian River_22 Apr 09	Marian River_27 May 09	Marian River_08 Jul 09	Marian River_06 Aug 09
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.22	16.74	17.91
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units	6.5-9	7.54	7.82	8.14	7.945	8.09	8.08	7.95	7.92	7.64	7.41	7.42	7.4	7.51	7.58	7.49	7.48	7.79
	Electrical Conductivity (EC)	µS/cm	NG	202	185	96.6	131.5	166	201	142	171	103	84	92.5	109	150.5	168	97.4	51.4	102
	Total Suspended Solids (TSS)	mg/L	NG	4	6	<3	16	24	36	50	54	14	<3	<3	4	3.5	<3	4	44	10
	Hardness as CaCO3	mg/L	NG	102	108	53.3	72.85	93.6	103.5	35.3	90	46.8	40	44.1	65.2	76.15	87.9	47.9	27.8	26.6
	Alkalinity (total as CaCO3)	mg/L	NG	85.9	83	38.7	54.35	63.4	77.55	54.2	54.5	33.1	31	36.8	44.1	65.9	74.4	35.9	20.1	38.9
	Calcium	mg/L	NG	21.5	21.4	12.1	17	21.5	27.7	10.2	25	13	11.4	11.2	18.55	20.8	12.5	7.2	6.3	
	Magnesium	mg/L	NG	11.8	13.3	5.6	7.4	9.7	8.3	2.4	6.7	3.5	2.8	3.9	5.3	7.25	8.8	4.1	2.4	2.7
	Potassium	mg/L	NG	1.2	1.2	0.8	0.9	1.2	1.1	1	1.1	1	1	0.8	1	1.1	1.2	1.1	1.1	0.8
	Sodium	mg/L	NG	2.3	2.2	1.5	1.7	2.1	2.4	2	2.5	2.3	1.8	1.8	2	2.25	2.3	2	2.1	1.7
	Chloride	mg/L	120	1.6	1.6	1	1.15	1.4	1.5	1.3	1.9	1.7	1.4	1.4	1.4	1.35	1.4	1.4	1.7	1.7
	Fluoride	mg/L	0.12	0.1	0.1	<0.1	0.1	0.2	0.2	0.1	0.2	<0.1	<0.1	<0.1	0.1	<0.1	0.1	<0.1	0.1	0.1
	Sulphate	mg/L	NG	13	15	9	13	19	24	13	28	14	8	8	12	11	12	11	3	13
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	6.2	6.1	4.7	4.75	5.8	5.9	5.2	6.9	-	-	8.3	6.4	6.6	6.5	9.6	8	8.4
	Total Organic Carbon (TOC)	mg/L	NG	6.4	6.3	4.3	4.35	5.2	5.45	5.6	7.3	-	-	8.4	6.8	6.6	9.2	9.5	8.4	8.4
	Total Solids (Filtered)	mg/L	NG	106	102	51	116	120	159	90	106	82	54	48	64	83	74	90	16	58
	Turbidity	NTU	NG	7.67	8.9	7.69	50.65	64.6	83.55	94.9	109	30.1	11.9	7.09	5.52	5.835	5.52	8.87	47.9	28.8
Nutrients	Ammonia as N	mg/L	0.021 ⁴	<0.005	<0.005	<0.005	0.005	0.021	0.04	0.033	0.011	0.019	0.012	0.006	0.005	0.0075	0.01	0.01	0.08	0.04
	Nitrate (as NO3-N)	mg/L	13	0.06	0.19	<0.01	0.01	<0.01	0.02	0.04	0.04	0.05	0.02	0.09	0.15	0.055	0.04	0.04	<0.01	<0.01
	Nitrite (as NO2-N)	mg/L	0.06	<0.01	<0.01	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.06	0.19	0.01	-	-	0.02	0.04	0.04	0.05	0.02	0.09	0.15	0.055	0.04	0.04	<0.01	<0.01
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	0.005	<0.002	-	-	-	-	-	-
	Phosphorus	µg/L	4	10	20	20	55	20	85	80	70	50	20	10	10	10	20	20	50	40
	Phosphorus (Filtered) (Filtered)	µg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Coliforms	MPN/100mL	NG	<1	<1	1	2.5	3	2	1	<1	1	<1	2	<1	<1	<1	1	8	11
	E. Coli	MPN/100mL	NG	1	1	2	1.5	<1	1.5	2	1	<1	<1	<1	<1	<1	<1	<1	8.5	2
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	211	260	465	2035	2110	2265	393	1410	692.3	331	187	136	109	213.7	408	352	1110
	Antimony	µg/L	NG	0.2	0.3	<0.1	1.9	0.4	0.6	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.2	<0.1
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	0.4	0.6	0.3	0.65	0.7	1.05	0.5	1.5	0.5	0.4	0.3	0.3	0.4	0.4	0.5	0.5	0.7
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	25	26.4	16.6	43.35	44.1	49.35	29.1	39.9	20.4	13.6	14.1	14.8	20.4	22.8	14.4	16.1	24
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	NG	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1
	Cadmium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG	<0.1	<0.1	<0.1	0.25	<0.1	<0.1	<0.1	<0.2	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG	0.5	0.6	0.9	-	3.4	4.55	0.4	3.6	1.4	0.6	0.4	0.3	0.3	0.5	0.8	0.7	1.8
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG	0.1	0.2	0.2	0.65	0.8	0.65	0.3	0.3	0.4	0.2	<0.1	<0.1	<0.1	0.1	0.2	0.3	0.5
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³	1.2	1.1	1.1	2.55	2.9	3.45	0.7	3.5	1.9	2.3	3.3	0.8	0.95	1.4	2.1	2.4	2.1
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron	µg/L	300	351	357	428	1665	1690	2395	149	1570	762	282	183	131	140.5	273	561	494	1010
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	µg/L	1-7 ³	<0.1	0.2	0.2	-	0.8	0.95	<0.1	1.3	0.4	0.2	<0.1	<0.1	<0.1	0.1	0.2	0.	

Sampled_Date_Time

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.8b: CCME Water Quality Guidelines - Marian River, All Parameters with <DL

Sampled_Date_Time				2/24/2011	3/21/2011	4/26/2011	5/30/2011	6/15/2011	7/13/2011	8/15/2011	9/22/2011	10/19/2011	11/23/2011	12/21/2011	1/26/2012	2/29/2012	3/28/2012	4/26/2012	5/23/2012	6/11/2012	
Chem_Group	ChemName	output unit	CCME FAL ¹	Marian River_ 24 Feb 11	Marian River_ 21 Mar 11	Marian River_ 26 Apr 11	Marian River_ 30 May 11	Marian River_ 15 Jun 11	Marian River_ 13 Jul 11	Marian River_ 15 Aug 11	Marian River_ 22 Sep 11	Marian River_ 19 Oct 11	Marian River_ 23 Nov 11	Marian River_ 21 Dec 11	Marian River_ 26 Jan 12	Marian River_ 29 Feb 12	Marian River_ 28 Mar 12	Marian River_ 26 Apr 12	Marian River_ 23 May 12	Marian River_ 11 Jun 12	
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Field	Field Temperature	°C	NG	-	-	-	10.98	15.68	21.59	17.57	10.91	2.61	-0.1	-0.25	-0.26	-	-0.06	1.2	4.63	14.61	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units	6.5-9	7.58	7.63	7.675	8.06	7.7	7.95	8.01	8.02	7.955	7.7	7.5	7.54	7.7	7.58	7.55	7.3	7.42	
	Electrical Conductivity (EC)	µS/cm	NG	167	149	166	109	85.3	158	151	195	160.5	199	187	192.5	216	214	186	55.9	55.3	
	Total Suspended Solids (TSS)	mg/L	NG	<3	8	<3	16	30	18	12	30	20	18	8	<3	<3	7	<3	<3	8	
	Hardness as CaCO3	mg/L	NG	87.3	76.7	87	52	41	86.5	77.7	97.6	85.05	106	95.9	98.55	111	111	98.4	24.9	24.6	
	Alkalinity (total as CaCO3)	mg/L	NG	80.4	71.9	75.4	43.5	34.1	69.1	65.3	82.3	68.35	75.8	74.4	82.3	92.3	91.2	82.3	21.7	21.5	
	Calcium	mg/L	NG	19.8	17.4	19.4	12	10.1	19.6	17.8	23.5	19.3	26.5	22.4	22.85	25.3	24.45	22.2	6.2	6.2	
	Magnesium	mg/L	NG	9.2	8.1	9.35	5.3	3.8	9.1	8.1	9.5	8.95	9.6	9.7	10.1	11.8	11.3	10.4	2.3	2.2	
	Potassium	mg/L	NG	1.1	1.1	1.1	0.8	0.9	1.2	1	1.2	1.05	1.2	1.2	1.2	1.2	1.2	1.1	0.8	0.9	
	Sodium	mg/L	NG	2.3	2.3	2.1	1.7	2.1	2.3	2.7	2.8	2.4	2.8	2.8	2.45	2.6	2.55	2.3	1.7	1.7	
	Chloride	mg/L	120	1.2	-	1.2	-	1.2	-	1.5	-	1.4	-	1.9	-	1.7	-	1.6	1.4	1.3	1.4
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sulphate	mg/L	NG	11	10	10	8	9	15	17	28	16	28	18	15	16	14	13	4	3	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	6.6	6.1	5.8	5.3	5.6	6.3	6.5	6.6	6.5	7.8	7.7	7.3	7.7	7.75	6.3	7	7.9	
	Total Organic Carbon (TOC)	mg/L	NG	7	6.6	6.05	5.8	5.5	6.5	6.2	6.9	6.3	8.2	7.7	8	8.2	7.8	6.3	7.2	9	
	Total Solids (Filtered)	mg/L	NG	108	94	96.5	70	94	114	122	158	125	116	108	105	122	109	122	<10	60	
	Turbidity	NTU	NG	4.61	4.7	5.365	23.2	59.8	42.7	32.1	59.7	41.85	27.6	10.3	4.59	3.94	3.81	4.06	8.79	17.8	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.01	<0.01	0.01	0.02	0.02	0.01	0.02	0.01	<0.01	<0.01	<0.01	
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrite (as NO2-N)	mg/L	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.12	0.17	0.04	0.08	0.03	0.04	<0.01	0.11	0.04	0.08	0.12	0.14	0.14	0.11	0.11	0.03	<0.01	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus	4	mg/L	4	10	10	30	40	50	40	40	60	50	60	20	20	<10	12.5	6	14	23	
	Phosphorus (filtered) (Filtered)	mg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Biological	Total Coliforms	MPN/100mL	NG	<1	<1	<1	2	3	5	2	1	3	<1	<1	<1	<1	<1	<1	<1	<1	
	E. Coli	MPN/100mL	NG	<1	<1	-	4.1	3.1	5.2	3.1	6.3	2.05	1	<1	<1	<1	<1	<1	<1	2	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	214	134	132	933	2910	1260	1450	1900	1835	1130	420	222.5	171	122	197	395	536	
	Antimony	µg/L	NG	<0.1	0.3	0.25	0.1	<0.1	<0.1	0.1	0.1	0.15	0.3	0.5	0.3	0.3	<0.1	0.8	0.3	0.2	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5	0.4	0.4	0.4	0.6	0.9	0.6	0.8	0.8	0.9	0.7	0.5	0.45	0.5	0.3	0.4	0.4	0.4	
	Arsenic (Filtered)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Barium	µg/L	NG	25.2	24.4	27.1	23.2	41.9	38.9	35.8	44.6	40.8	34.6	26.7	27.25	28.7	27.1	27.8	10.7	13.4	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	NG	<0.1	<0.05	<0.05	<0.1	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
	Cadmium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG	<0.1	<0.1	<0.1	0.1	0.3	0.1	0.2	0.3	0.3	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L	NG	0.5	0.4	0.35	1.8	4.6	1.7	2.1	3.7	3.25	2.1	1.1	0.4	0.4	0.25	0.5	0.7	0.9	
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cobalt	µg/L	NG	<0.1	<0.1	<0.1	0.4	1.2	0.5	0.7	1	0.7	0.5	0.2	<0.1	<0.1	<0.1	<0.1	0.2	0.3	
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Copper	µg/L	2 - 4 ³	3.2	1.4	0.9	1.7	3.5	2.7	3.1	3.6	2.05	2.3	1.8	1.05	1.2	0.7	1.2	1.6	1.9	
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Iron	µg/L	300	213	172	147	965	2520	978	1140	1900	1735	1100	405	189.5	178	157.5	206	405	553	
	Iron (Filtered)	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lead	µg/L	1-7 ²	<0.1	<0.1	0.1	0.5	1.1	0.6	0.8	1	0.95	0.6	0.3	<0.1	<0.1	<0.1	<0.1	0.2	0.3	
	Lead (Filtered)	µg/L	1-7 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lithium	µg/L	NG	2.9	3	2.95	3.4	5.7	4.6	4.6	5.4	5.15	5	3.4	3.55	3.6	3.05	3.4	2.2	2.4	
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Manganese	µg/L	NG	5.4	4.8	4	20.7	38.9	19.5	22.8	34.8	28.35	23.7	10.2	5.75	6.3	5	5.3	13.3	12	
	Manganese (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Mercury	µg/L	0.026	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.02	<0.01	
	Mercury (Filtered)	µg/L	0.026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Molybdenum	µg/L	73	0.2	0.1	0.15	0.3	<0.1	0.2	0.3	0.2	<0.1	<0.1	0.3	0.2	0.2	0.2	0.3	<0.1	0.1	
	Molybdenum (Filtered)	µg/L	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nickel	µg/L	25-150 ³	0.4	0.6	0.6	1.5	3.6	1.8	2	3.6	2.45	1.9	1	0.6	0.7	0.55	0.6	0.8	1.1	
	Nickel (Filtered)	µg/L	25-150 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Rubidium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Rubidium (Filtered)	µg/L	NG	2.1	2	1.9	3.2	6.8	4.4	4.4	5.7	5.1	3.9	2.4	2.1	2.1	1.85	2.1	2.5	3	
	Selenium	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Selenium (Filtered)	µg/L	1	<0.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	
	Silver	µg/L	0.26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silver (Filtered)	µg/L	NG	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	0.4	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	
	Strontium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Strontium (Filtered)	µg/L	NG	68.2	66.9	64.8	46	52.7	83.1	87.5	108	82.1	126	87.7	79.55	90.2	84.25	82.2	26.2	27.9	
	Thallium	µg/L	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Thallium (Filtered)	µg/L	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Tin	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Notes

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH.

³ Guideline varies with hardness. Range given

⁴ Guideline varies with pH and temperature. Most stringent given.

⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Sampled_Date_Time

Chem_Group		SampleCode	Marian River_ 12 Jun 12	Marian River_ 20 Aug 12	Marian River_ 19 Sep 12	Marian River_ 06 Nov 12	Marian River_ 13 Dec 12	Marian River_ 16 Jan 13	Marian River_ 21 Feb 13	Marian River_ 13 Mar 13	Marian River_ 17 Apr 13	Marian River_ 22 May 13	Marian River_ 24 Jun 13	Marian River_ 24 Jul 13	Marian River_ 12 Aug 13	Marian River_ 16 Sep 13	Marian River_ 23 Oct 13	Marian River_ 28 Nov 13	Marian River_ 17 Dec 13	
Chem_Name		output unit	CCME Falst 1																	
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Field	Field Temperature	°C	NG	19.33	17.03	9.5	-0.05	0.29	-	-	0.94	2.13	22.95	18.34	19.68	11.81	2.28	-	-	
Physical/Major ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units	6.5-9	7.4	8.065	8.19	7.84	7.75	7.77	7.61	7.675	7.73	8.05	7.83	7.87	8.015	7.75	7.76	7.74	7.57
	Electrical Conductivity (EC)	µS/cm	NG	57.1	161	204	225	215	215	205	182	220.5	111	150	174	212	112	118	156	171
	Total Suspended Solids (TSS)	mg/L	NG	28	17	24	20	6	<3	4	<3	<3	14	14	20	54	42	24	11	
	Hardness as CaCO3	mg/L	NG	31.3	80.25	113	117	116	117	117	104	123	56.7	79.1	91.3	114.5	58.8	62.7	78	93.45
	Alkalinity (total as CaCO3)	mg/L	NG	22.9	66.05	88.3	83.7	94.55	97.9	94	84.8	93.45	43.9	62.6	67.8	88.75	45.1	45.8	63.7	71.15
	Calcium	mg/L	NG	7.9	17.7	25.4	28.1	26.9	26.7	25.7	23.7	27.45	13.1	18.2	21.3	25.2	13.4	14.6	17.7	21.45
	Magnesium	mg/L	NG	2.8	8.8	12	11.3	11.75	12.2	12.2	10.8	13.3	5.8	8.2	9.3	12.5	6.1	6.4	8.2	9.7
	Potassium	mg/L	NG	1	1	1	1	1.1	1.2	1.2	0.7	1.1	1.2	1.1	1.2	1.1	1	1.3	1	1.3
	Sodium	mg/L	NG	1.7	2	2.4	2.7	2.65	2.4	2.5	2.4	2.25	1.5	2.1	2.3	2.6	2	2.6	2.6	2.6
	Chloride	mg/L	120	1.2	1.1	1.4	1.7	1.7	1.4	1.4	1.5	1.35	1	1.3	1.4	1.4	1.4	1.5	1.9	1.8
	Fluoride	mg/L	0.12	-	-	-	-	0.2	0.1	0.1	0.15	0.2	-	0.1	-	-	-	-	-	-
	Sulphate	mg/L	NG	3	11	18	28	17	16	14	14.5	9	11	16	18	7	11	12	14	
		Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	7.7	8.55	9.7	8	11.9	6.8	8	-	8.6	7	7.5	7.9	7.1	6.5	8.3	7.7
		Total Organic Carbon (TOC)	mg/L	NG	7.3	9.1	7.3	7.9	10.85	7.3	6.8	9.2	8.1	7.9	8	8.35	6.7	6.4	8	7.95
		Total Solids (Filtered)	mg/L	NG	42	109	108	68	142	122	118	104	126	60	132	116	136	102	98	111
		Turbidity	NTU	NG	39.4	33.65	30.2	29.6	9.115	4.38	3.32	3.425	3.405	26	27.9	27.4	8.02	5.9	36.9	18.15
	Nutrients	Ammonia as N	mg/L	0.021-4	-	-	-	-	0.024	0.02	0.005	0.0085	<0.005	<0.005	0.009	<0.005	0.008	0.008	0.022	0.0085
		Nitrate (as NO3-N)	mg/L	13	<0.01	<0.01	0.01	0.009	0.12	0.15	0.215	0.085	<0.005	0.085	<0.005	<0.005	<0.005	0.008	0.008	0.0085
		Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	0.07	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-	-	-
Nitrate and Nitrite (as N) (mg/L)		mg/L	NG	<0.01	<0.01	<0.01	0.09	0.07	0.12	0.16	0.215	0.085	0.07	0.08	0.14	0.08	0.06	0.14	0.21	0.215
Nitrogen (Total)		mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Orthophosphate (as P)		mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus		µg/L	4	58	37	20	37	20	12	7	38.5	2.6	21	38	38	46	89	52	42	27
Phosphorus (filtered) (Filtered)		mg/l	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Coliforms		MPN/100ml	NG	4	14	<1	<1	<1	<1	<1	<1	<1	-	1	2	4	1	<1	<1	
E. Coli		MPN/100ml	NG	1	2.05	1	<1	<1	1	<1	<1	<1	-	1	<1	1	3.1	3.1	<1	<1
Metals 2	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 2	776	763.5	1130	782	296.5	172	123	133.5	148.5	287	584	1220	1065	3490	2840	1430	633
	Antimony	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.2	0.1	<0.1	<0.1	<0.1	0.3	0.4	0.3	0.3
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	0.6	0.65	0.6	0.5	0.4	0.4	0.3	0.35	0.4	0.3	0.6	1	1.05	1.2	1.1	0.9	0.95
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	18.6	29.05	42.4	30.9	31.2	28.3	29	26.65	31.25	54.5	30.2	36.8	-	52.9	41.9	38.2	29.05
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	NG	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Cadmium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG	0.1	0.1	0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.15	0.4	0.3	0.2	0.1
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG	1.7	1.45	2.1	1.6	0.6	0.4	0.2	0.25	0.45	0.3	1.2	2	1.85	7.8	6.3	2.9	1.6
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG	0.5	0.5	0.5	0.4	0.15	<0.1	<0.1	0.1	<0.1	0.1	0.3	0.4	0.15	1.4	0.7	0.6	0.5
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 3	2	2	2.1	1.2	0.35	0.3	<0.2	0.25	0.5	0.6	2	1.7	2	3.9	3.3	2.3	2
	Copper (Filtered)	µg/L	2 - 4 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron	µg/L	300	1010	823.5	1030	841	315	182	153	141	183.5	284	544	824	846.5	3360	2540	1470	581.5
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	µg/L	1-7 4	0.2	0.4	0.4	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.3	0.7	0.2	1.4	0.9	0.6	0.2
	Lead (Filtered)	µg/L	1-7 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lithium	µg/L	NG	2.6	3.8	4.8	8.5	3.55	2.9	3.2	3.1	3.45	2.3	3.3	4.3	4.75	7.5	6.4	5	3.85
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Manganese	µg/L	NG	26.8	16.85	17.5	13.1	8.65	5.3	5	4.35	4.5	8.6	14	17.5	16.85	63.9	43.5	26.1	12.85
	Manganese (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mercury	µg/L	0.026	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	0.04	0.01
	Mercury (Filtered)	µg/L	0.026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Molybdenum	µg/L	73	<0.1	0.15	<0.1	0.4	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.3	0.3	0.2	<0.1	0.3	0.2
	Molybdenum (Filtered)	µg/L	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nickel	µg/L	25-150 3	1.8	1.5	1.8	1.4	0.75	0.7	0.5	0.5	0.6	0.6	1.1	1.8	1.6	5.4	4.2	2.3	1.5
	Nickel (Filtered)	µg/L	25-150 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rubidium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rubidium (Filtered)	µg/L	NG	4.2	3.55	3.7	3	2.25	1.8	1.6	1.75	1.75	1.6	3.1	3.9	4	9.1	7.5	5.5	3.4
	Selenium	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Selenium (Filtered)	µg/L	1	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
	Silver	µg/L	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silver (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.2	0.1	0.2	0.25
	Strontium	µg/L	NG	26.5	68.8	91.8	-	101	99.8	80	75.2	83.75	47.1	-	64.5	90.4	103.5	64.6	72.8	78.45
	Strontium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Thallium	µg/L	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Thallium (Filtered)	µg/L	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Tin	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tin (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Titanium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-					

¹ Canada

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH.

³ Guideline varies with hardness. Range given

⁴ Guideline varies with pH and temperature. Most stringent given

⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.8b: CCME Water Quality Guidelines - Marian River, All Parameters with <DL

Sampled Date, Time				1/14/2014	2/18/2014	3/12/2014	4/15/2014	5/22/2014	6/18/2014	7/23/2014	8/26/2014	9/26/2014	10/22/2014	11/27/2014	12/15/2014	1/29/2015	2/18/2015	3/9/2015	4/9/2015
SampleCode				Marian River_14 Jan 14	Marian River_18 Feb 14	Marian River_12 Mar 14	Marian River_15 Apr 14	Marian River_22 May 14	Marian River_18 Jun 14	Marian River_23 Jul 14	Marian River_26 Aug 14	Marian River_26 Sep 14	Marian River_22 Oct 14	Marian River_27 Nov 14	Marian River_15 Dec 14	Marian River_29 Jan 15	Marian River_18 Feb 15	Marian River_09 Mar 15	Marian River_09 Apr 15
Chem_Group	ChemName	output unit	CCME FAL ¹																
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	Field Temperature	°C	NG	-	-	-	-	6	18.82	-	14.35	6.37	0.56	-	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units	6.5-9	7.62	7.52	7.525	7.525	7.62	7.72	7.9	7.93	7.92	7.7	7.555	7.48	7.43	7.43	7.39	7.55
	Electrical Conductivity (EC)	µS/cm	NG	154	151	147.5	150	52	100	140	153	160	120	152	156	152	158	159	191
	Total Suspended Solids (TSS)	mg/L	NG	6	4	4	4	<3	24	6	32	60	20	35	22	6	<3	3	3
	Hardness as CaCO3	mg/L	NG	80.3	81.5	76.05	76.2	21.6	47.2	64.6	74.6	78.1	56	71.6	72.6	73.8	78.9	76.7	100
	Alkalinity (total as CaCO3)	mg/L	NG	62.3	63.7	63.55	65.5	20.6	35.2	52	60.8	66.7	44.7	60.75	63.2	62.1	63.9	66.5	84.9
	Calcium	mg/L	NG	18.6	18.8	17.65	16.7	5.2	11.3	15.8	17.6	17	12.9	16.1	16.4	16.9	17.9	17.3	22.1
	Magnesium	mg/L	NG	8.2	8.4	7.75	8.35	2.1	4.6	6.1	7.5	8.7	5.8	7.6	7.7	8.3	8.2	10.9	
	Potassium	mg/L	NG	1.1	1.2	1.1	1.1	0.8	0.9	1.1	1.2	1.1	1	1.3	1.3	1.2	1.2	1.2	1.3
	Sodium	mg/L	NG	2.2	2.3	2.2	2.2	1.3	1.5	2.1	2.3	2.3	2	2.7	2.7	2.4	2.3	2.3	2.5
	Chloride	mg/L	120	1.5	1.5	1.45	1.4	0.9	1.1	1.4	1.5	1.4	1.5	2	2	1.6	1.6	1.6	1.6
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sulphate	mg/L	NG	12	11	10	10	4	11	15	12	14	12	11	11	11	11	10	13
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	7.4	7.1	7.25	7	4.9	4.8	6.4	6.3	6.7	5.9	8.15	8.16	6.5	6.4	6.6	6.5
	Total Organic Carbon (TOC)	mg/L	NG	7.3	7.3	7.55	6.95	5.1	4.5	5.9	6.5	6.3	6	7.65	8.01	6.9	6.6	6.9	6.6
	Total Solids (Filtered)	mg/L	NG	90	88	84	78	28	72	118	122	130	110	111	114	168	86	93	115
	Turbidity	NTU	NG	8.88	5.5	5.02	4.335	8.66	39.2	35.6	61.7	94.1	60.9	62.85	38.7	8.38	7.35	5.82	6.26
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.01	0.009	0.006	<0.005	<0.005	<0.005	0.019	0.028	<0.005	0.016	0.032	0.0338	0.01	0.0055	<0.005	<0.005
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.17	0.19	0.19	0.11	0.05	<0.01	0.07	0.1	0.08	0.11	0.125	0.16	0.12	0.13	0.13	0.12
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L	4	12	14	13.5	12.5	16	52	41	66	109	46	70	50	11	15	13	17
	Phosphorus (Filtered) (Filtered)	mg/l	-	-	-	-	-	0.003	-	-	-	-	-	-	-	-	-	-	-
	Total Coliforms	MPN/100mL	NG	<1	<1	<1	<1	4	2	2	3	<1	<1	<1	<1	<1	-	<1	<1
Biological	E. Coli	MPN/100mL	NG	<1	<1	1.5	<1	<1	3.1	2	1	2	<1	<1	<1	<1	-	<1	<1
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	15.3	40.5	6.4	6.6	3.1	4.3	9	6.45	8.7	8.6	4.5	5.4	3.9
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	341	237	226	212	257	1880	1760	2970	3270	1710	1615	1750	444	349	330	163
	Antimony	µg/L	NG	0.4	0.3	0.3	0.4	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1
	Antimony (Filtered)	µg/L	NG	-	-	-	0.2	0.3	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Arsenic	µg/L	5	0.8	0.6	0.65	0.4	<0.2	0.6	0.7	1.3	0.8	0.7	0.7	0.6	0.6	0.5	0.4	
	Arsenic (Filtered)	µg/L	5	-	-	-	0.3	<0.2	<0.2	0.4	0.4	0.2	0.3	0.3	0.3	0.3	0.3	0.3	
	Barium	µg/L	NG	23.4	21.8	35.4	22.95	32.1	36	54	59	39.4	35.75	38.8	27.9	25.6	28.1	28.1	
	Barium (Filtered)	µg/L	NG	-	-	-	21	6.2	12.2	18.7	20.6	20.1	16.3	20.5	21.1	22.6	20.8	21.2	24.9
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	NG	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1	<0.1	<0.05	<0.05
	Cadmium (Filtered)	µg/L	NG	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Cesium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cesium (Filtered)	µg/L	NG	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chromium	µg/L	NG	0.8	1	0.7	0.7	0.6	3.2	2.3	5.7	5	2.8	3.2	1.8	1.8	1.2	1.6	0.7
	Chromium (Filtered)	µg/L	NG	-	-	-	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
	Cobalt	µg/L	NG	0.1	0.1	0.1	0.1	0.2	0.6	0.5	1	1.2	0.7	0.85	0.4	0.1	<0.1	<0.1	<0.1
	Cobalt (Filtered)	µg/L	NG	-	-	-	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Copper	µg/L	2 - 4 ³	1.1	1.1	1.35	1.15	0.7	1.1	2.4	3.8	3.9	3	2.9	2.5	1.7	1.4	1.2	0.9
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	0.7	0.7	<0.2	1.2	1.3	1.6	1.9	1.6	1.5	0.7	0.6	0.5	0.4
	Iron	µg/L	300	320	224	223	276.5	302	1590	1100	2300	2780	1480	1660	880	325	278	263	167
	Iron (Filtered)	µg/L	300	-	-	-	11	32	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Lead	µg/L	1-7 ³	0.2	0.2	0.2	0.1	0.6	0.6	1.6	0.8								

Table A.8b: CCME Water Quality Guidelines - Marian River, All Parameters with <DL

Sampled Date, Time				5/28/2015	6/25/2015	7/22/2015	8/28/2015	9/23/2015	10/21/2015	11/26/2015	12/15/2015	1/27/2016	2/24/2016	3/16/2016	4/21/2016	5/11/2016	6/28/2016	7/26/2016	8/23/2016	9/29/2016
SampleCode				Marian River_ 28 May 15	Marian River_ 25 Jun 15	Marian River_ 22 Jul 15	Marian River_ 28 Aug 15	Marian River_ 23 Sep 15	Marian River_ 21 Oct 15	Marian River_ 26 Nov 15	Marian River_ 15 Dec 15	Marian River_ 27 Jan 16	Marian River_ 24 Feb 16	Marian River_ 16 Mar 16	Marian River_ 21 Apr 16	Marian River_ 11 May 16	Marian River_ 28 Jun 16	Marian River_ 26 Jul 16	Marian River_ 23 Aug 16	Marian River_ 29 Sep 16
Chem_Group	ChemName	output unit	CCME FAL ¹																	
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	Field Temperature	°C	NG	11.78	19.36	16.9	14.2	5.8	1.08	0.08	0.076	-	-	-	-	0.89	19.66	15.9	18.43	4.87
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	2.1	2.18	1.2	0.785	0.319	0.306	0.539	1.55	-	0.001	1.7	1.1	1.3
	Bicarbonate as CaCO3	mg/L	NG	-	47	68.7	66.2	76.5	58.4	58	59.5	65.4	72.9	68.7	72.6	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	0.31	0.282	0.335	0.309	0.339	0.424	0.334	0.394	0.379	0.35	0.296	-	0.344	0.273	0.257	0.323
	Silica	mg/L	NG	-	1.14	2.13	2.26	2.11	1.8	1.5	1.69	2.04	2.45	2.17	1.91	0.806	0.888	1.18	1.13	2.19
	pH	pH Units	6.5-9	7.88	7.84	8.09	7.94	7.98	7.79	7.5	7.42	7.94	7.56	7.49	7.56	7.83	7.88	7.96	7.97	7.94
	Electrical Conductivity (EC)	µS/cm	NG	148	133	105	174	201	220	174	165	161	180	163	167	95	125	126	114.5	175
	Total Suspended Solids (TSS)	mg/L	NG	27	27	23	21	44	45	24	11	4	<3	4	<3	10	15	13	7	172
	Hardness as CaCO3	mg/L	NG	74.5	71.9	81.5	85	100	98.3	83.9	83.8	82	95.8	88.5	86.8	46.7	75	72.8	50.6	93.2
	Alkalinity (total as CaCO3)	mg/L	NG	44.2	47	68.7	66.2	76.5	58.4	58	59.5	65.4	72.9	68.7	72.6	33.2	40.9	46.4	46.65	77.9
	Calcium	mg/L	NG	19.2	17.7	18.4	19.7	22.6	25.4	20.1	19.6	18.3	20.6	20	19	11.2	17.7	15.3	10.25	19.7
	Magnesium	mg/L	NG	6.4	6.7	8.6	8.7	10.7	8.5	8.2	8.4	8.8	10.8	9.4	9.5	4.5	7.5	8.4	6.1	10.7
	Potassium	mg/L	NG	1	1.3	1.2	1.3	1.2	1.1	1.2	1.2	1.2	1.3	1.3	1.2	0.8	1.2	1.1	0.9	1.2
	Sodium	mg/L	NG	1.8	2.2	2.2	2.3	2.7	2.5	2.6	2.4	2.3	2.7	2.4	2.3	1.5	2.4	2.1	1.7	2.4
	Chloride	mg/L	120	1.4	1.5	1.6	1.8	1.9	2.2	2	1.9	1.8	1.8	1.7	1.6	1.3	1.8	1.7	1.3	1.3
	Fluoride	mg/L	0.12	-	<0.1	0.2	0.1	0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Sulphate	mg/L	NG	29	19	16	19	23	48	24	16	24	16	15	14	19	19	14	14	14
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	4.7	5.2	5.3	6.5	6.2	6.6	7	6.5	6.6	6.6	5.3	4.6	5.5	5.5	6.8	5.4	6.2
	Total Organic Carbon (TOC)	mg/L	NG	4.5	5	5.3	5.4	6	5.9	6.7	7.2	6.9	6.9	6.4	5.5	4.3	5.5	5.9	5.45	5.6
	Total Solids (Filtered)	mg/L	NG	99	138	144	122	155	189	120	109	94	95	86	109	62	82	109	94.5	114
	Turbidity	NTU	NG	46.9	93.5	66.2	58.9	98.3	96.2	39.7	19.1	6.17	3.43	3.62	4.69	20.6	48.8	38	28.25	219
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.01	0.007	<0.005	0.01	0.009	0.016	0.029	0.022	0.012	<0.005	0.012	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Nitrate (as NO3-N)	mg/L	13	-	0.0054	<0.005	0.0088	0.006	0.0248	0.0513	0.0485	0.0731	0.0969	0.0856	0.0448	<0.005	<0.005	<0.005	<0.005	0.0127
	Nitrite (as NO2-N)	mg/L	0.06	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.0016	<0.001	0.001	<0.001	0.0014	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	<0.01	0.0054	<0.0051	0.0088	0.006	0.0248	0.0529	0.0485	0.0742	0.099	0.087	0.0448	<0.0051	<0.0051	<0.0051	<0.0051	0.0127
	Nitrogen (Total)	mg/L	NG	-	0.329	0.341	0.327	0.357	0.39	0.411	0.369	0.36	0.378	0.344	0.314	-	0.299	0.321	0.287	0.477
	Orthophosphate (as P)	mg/L	NG	-	0.0018	<0.001	0.0019	0.0011	0.0022	0.0027	0.0016	0.0016	<0.001	<0.001	<0.001	<0.001	0.0018	<0.001	0.0011	0.0011
	Phosphorus	µg/L	4	-	38	61.4	51	33.6	77	42.1	15.6	6.4	5	19	10	36	58	49	39	187
	Phosphorus (Filtered) (Filtered)	mg/l	4	-	-	-	-	-	-	-	-	-	-	-	-	10	21	52	36	137
	Total Coliforms	MPN/100L	NG	1	1	2	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	3	5	4	-
	E. Coli	MPN/100L	NG	1	2	1	-	1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	3.55	-
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	5.7	4.6	5.2	3.9	3.7	2.5	4.9	8.3	5	3.8	5.3	3.6	18.8	18.6	10.5	17.85	2
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	2130	4680	3210	2550	3920	3640	2590	938	404	267	291	298	821	1870	1550	1110	3840
	Antimony	µg/L	NG	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Antimony (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Arsenic	µg/L	5	0.7	1.2	0.9	1.7	0.9	0.9	0.7	0.5	0.7	0.3	0.3	0.3	0.4	0.7	0.6	0.6	1.4
	Arsenic (Filtered)	µg/L	5	0.2	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
	Barium	µg/L	NG	36.5	68.1	60.3	55.6	69	63.1	49.2	31.4	28.6	26.3	26.3	26.3	34.1	34.1	28.2	28.2	76.4
	Barium (Filtered)	µg/L	NG	15.2	18.7	21.8	23.9	24.2	24.5	21.8	23.4	22	24.8	23.4	23.9	10.1	16.7	16.4	14.35	22.6
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
	Beryllium (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	0.2	<0.2	0.4	<0.2	<0.2
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	<0.2	<0.2
	Boron - soluble	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	5.6	9.7	9.7	8.8	10.7
	Boron - soluble (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	4.3	7.6	8.5	7.7	10.4
	Cadmium	µg/L	NG	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Cadmium (Filtered)	µg/L	NG	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Cesium	µg/L	NG	0.2	0.4	0.3	0.5	0.5	0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1				

Table A.8b: CCME Water Quality Guidelines - Marian River, All Parameters with <DL						
Chem_Group	ChemName	output unit	CCME FAL ¹	Sampled Date	10/26/2016	11/24/2016
				SampleCode	Marian River_26 Oct 16	Marian River_24 Nov 16
Chem_Group	ChemName	output unit	CCME FAL ¹		12/13/2016	
					Marian River_13 Dec 16	
Cyanide	Cyanide Total	mg/L	NG		-	-
Field	Field Temperature	°C	NG		6.95	-
Physical/Major Ions	Chlorophyll A	µg/L	NG		2.7	1.7
	Bicarbonate as CaCO3	mg/L	NG		-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG		0.334	0.322
	Silica	mg/L	NG		1.72	1.61
	pH	pH Units	6.5-9		7.85	7.58
	Electrical Conductivity (EC)	µS/cm	NG		171	169
	Total Suspended Solids (TSS)	mg/L	NG		9	14
	Hardness as CaCO3	mg/L	NG		86.2	74.3
	Alkalinity (total as CaCO3)	mg/L	NG		58.8	60.4
	Calcium	mg/L	NG		20.8	17.7
	Magnesium	mg/L	NG		8.3	7.3
	Potassium	mg/L	NG		1.5	1.1
	Sodium	mg/L	NG		2.3	2.2
	Chloride	mg/L	120		1.5	1.6
	Fluoride	mg/L	0.12		<0.1	0.1
	Sulphate	mg/L	NG		25	22
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG		5.4	6.2
	Total Organic Carbon (TOC)	mg/L	NG		5.9	6.1
	Total Solids (Filtered)	mg/L	NG		104	97
	Turbidity	NTU	NG		26.2	21.1
Nutrients	Ammonia as N	mg/L	0.021 ⁴		0.007	0.009
	Nitrate (as NO3-N)	mg/L	13		0.0114	0.0153
	Nitrite (as NO2-N)	mg/L	0.06		<0.001	<0.001
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG		0.0114	0.0153
	Nitrogen (Total)	mg/L	NG		0.317	0.373
	Orthophosphate (as P)	mg/L	NG		<0.001	0.0011
	Phosphorus	µg/L	4		25	9
	Phosphorus (filtered) (Filtered)	mg/l	4		0.0179	0.0033
Biological	Total Coliforms	MPN/100H	NG		<1	<1
	E. Coli	MPN/100H	NG		1	<1
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²		3.1	4.4
	Aluminum Total	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²		783	686
	Antimony	µg/L	NG		<0.1	<0.1
	Antimony (Filtered)	µg/L	NG		<0.1	<0.1
	Arsenic	µg/L	5		0.5	0.5
	Arsenic (Filtered)	µg/L	5		0.3	0.3
	Barium	µg/L	NG		29.9	31
	Barium (Filtered)	µg/L	NG		20.8	22.3
	Beryllium	µg/L	NG		<0.1	<0.1
	Beryllium (Filtered)	µg/L	NG		<0.1	<0.1
	Bismuth	µg/L	NG		<0.2	<0.2
	Bismuth (Filtered)	µg/L	NG		0.2	<0.2
	Boron - soluble	µg/L	NG		8.4	10.2
	Boron - soluble (Filtered)	µg/L	NG		8.1	10.4
	Cadmium	µg/L	NG		<0.05	<0.05
	Cadmium (Filtered)	µg/L	NG		<0.05	<0.05
	Cesium	µg/L	NG		<0.1	<0.1
	Cesium (Filtered)	µg/L	NG		0.1	<0.1
	Chromium	µg/L	NG		1.5	1.1
	Chromium (Filtered)	µg/L	NG		<0.1	<0.1
	Cobalt	µg/L	NG		0.4	0.3
	Cobalt (Filtered)	µg/L	NG		<0.1	<0.1
	Copper	µg/L	2 - 4 ³		1.5	1.3
	Copper (Filtered)	µg/L	2 - 4 ³		0.9	0.8
	Iron	µg/L	300		664	555
	Iron (Filtered)	µg/L	300		<5	<5
	Lead	µg/L	1.7 ³		0.3	0.3
	Lead (Filtered)	µg/L	1.7 ³		<0.1	<0.1
	Lithium	µg/L	NG		3.5	3.4
	Lithium (Filtered)	µg/L	NG		2.4	2.4
	Manganese	µg/L	NG		11.1	15.5
	Manganese (Filtered)	µg/L	NG		0.7	1.1
	Mercury	µg/L	0.026		<0.01	<0.01
	Mercury (Filtered)	µg/L	0.026		<0.01	<0.01
	Molybdenum	µg/L	73		0.2	0.1
	Molybdenum (Filtered)	µg/L	73		0.2	0.1
	Nickel	µg/L	25-150 ³		1.4	1.2
	Nickel (Filtered)	µg/L	25-150 ³		0.4	0.4
	Rubidium	µg/L	NG			
	Rubidium (Filtered)	µg/L	NG		3.2	3.3
	Selenium	µg/L	1		1.6	1.7
	Selenium (Filtered)	µg/L	1		<0.3	<0.3
	Silver	µg/L	0.25		<0.3	<0.3
	Silver (Filtered)	µg/L	NG		<0.1	<0.1
	Strontium	µg/L	NG		<0.1	<0.1
	Strontium (Filtered)	µg/L	NG		105	105
	Thallium	µg/L	0.8		101	102
	Thallium (Filtered)	µg/L	0.8		<0.1	<0.1
	Tin	µg/L	NG		<0.1	<0.1
	Tin (Filtered)	µg/L	NG		<0.1	<0.1
	Titanium	µg/L	NG		<0.1	<0.1
	Titanium (Filtered)	µg/L	NG		38.4	29.9
	Uranium	µg/L	15		0.2	<0.1
	Uranium (Filtered)	µg/L	15		0.3	0.3
	Vanadium	µg/L	NG		0.3	0.2
	Vanadium (Filtered)	µg/L	NG		1.4	1.3
	Zinc	µg/L	30		<0.1	<0.1
	Zinc (Filtered)	µg/L	30		2.6	2
	Zinc (Filtered)	µg/L	30		<0.4	<0.4

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Chem_Group	ChemName

Notes:

- 1 Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)
- 2 Guideline varies with pH
- 3 Guideline varies with hardness. Range given.
- 4 Guideline varies with pH and temperature. Most stringent given.
- 5 CCME F&L. Guideline developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Notes:

- ¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)
- ² Guideline varies with pH
- ³ Guideline varies with hardness. Range given.
- ⁴ Guideline varies with pH and temperature. Most stringent given.
- ⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Notes:
¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)
² Guideline varies with pH
³ Guideline varies with hardness. Range given.
⁴ Guideline varies with pH and temperature. Most stringent given.
⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.
 NG - No guideline
BOLD - Greater than Guideline
 Blank - Not analyzed

Notes:

- ¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015), Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)
- ² Guideline varies with pH
- ³ Guideline varies with hardness. Range given.
- ⁴ Guideline varies with pH and temperature. Most stringent given.
- ⁵ CCME FAI. Guideline developed for total metals only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

italic - Direction limit greater than guideline

Blank - Not analyzed

Notes:
¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)
² Guideline varies with pH
³ Guideline varies with hardness. Range given.
⁴ Guideline varies with pH and temperature. Most stringent given.
⁵ CCME FAI. Guidelines developed for total metals only. Guideline has been applied to dissolved metals for illustrative purposes only.
 NG - No guideline
BOLD - Greater than Guideline
italic - Detection limit greater than guideline
 Blank - Not analyzed

Chem_Group	ChemName	output

Notes:
¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2019). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)
² Guideline varies with pH
³ Guideline varies with hardness. Range given.
⁴ Guideline varies with pH and temperature. Most stringent given.
⁵ CCME FAI. Guidelines developed for total metals only. Guideline has been applied to dissolved metals for illustrative purposes only.
 NG - No guideline
BOLD - Greater than Guideline
italic - Detection limit greater than guideline
 Blank - Not analyzed

Table A.10: CCME Water Quality Guidelines - Slave River @ Fort Smith, All Parameters

				Sampled Date Time																		
				9/29/2010 SlaveRiver @FISmith 29 Sep 10	10/4/2010 SlaveRiver @FISmith 04 Oct 10	5/30/2012 SlaveRiver @FISmith 30 May 12	7/16/2012 SlaveRiver @FISmith 16 Jul 12	9/27/2012 SlaveRiver @FISmith 27 Sep 12	7/15/2013 SlaveRiver @FISmith 15 Jul 13	8/28/2013 SlaveRiver @FISmith 28 Aug 13	6/11/2014 SlaveRiver @FISmith 11 Jun 14	7/8/2014 SlaveRiver @FISmith 08 Jul 14	8/15/2014 SlaveRiver @FISmith 15 Aug 14	9/6/2015 SlaveRiver @FISmith 06 Sep 15	7/11/2015 SlaveRiver @FISmith 11 Jul 15	8/6/2015 SlaveRiver @FISmith 06 Aug 15	9/29/2015 SlaveRiver @FISmith 29 Sep 15	8/8/2016 SlaveRiver @FISmith 08 Aug 16	7/4/2016 SlaveRiver @FISmith 04 Jul 16	7/8/2016 SlaveRiver @FISmith 08 Jul 16	9/16/2016 SlaveRiver @FISmith 16 Sep 16	10/26/2016 SlaveRiver @FISmith 26 Oct 16
Chem_Group	ChemName	output unit	CCME FAL ¹																			
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	1	3	6	12	2	1.97	4.51	3.54	-	2	-	2	5.6	5000
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	0.42	-	-	-	-	-	-	-	-	0.309	0.419	0.393	0.483	0.312
	Silica	mg/L	NG	2.18	-	-	-	4.88	5.94	5.11	-	4.29	3.55	3.5	3.75	3.42	-	3.33	4.49	4.61	5.42	5.13
	Total Organic Carbon(TOC)	µg/L	NG	0.008	-	-	-	0.0138	0.0074	0.0123	0.01015	0.0118	0.0113	0.0066	0.0061	0.0062	-	0.0057	0.012	0.0115	0.0139	0.0073
	pH	pH Units	6.5-9	7.96	8	8.01	8.06	8.19	7.88	8.025	8.03	8.08	8.1	8.1	8.1	8.18	8.04	8.15	8.07	8.13	8.06	8.02
	Electrical Conductivity (EC)	µS/cm	NG	26	168	217	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-
	Total Suspended Solids (TSS)	mg/L	NG	32	16	90	442	38	468	82	184	76	38	221	64	22	33	118	581	268	572	52
	Hardness as CaCO3	mg/L	NG	95.1	108	101	111	104	114	102	104	105	86.7	105	101	97.3	85.3	113	122	126	118	113
	Alkalinity (total as CaCO3)	mg/L	NG	-	-	-	86	-	-	-	-	-	304	178	626	221	71	74	-	-	-	-
	Calcium	mg/L	NG	27.9	30.5	-	32.5	30	32.9	29.35	29.1	30.1	24.7	30	28.4	27.5	24.1	32.1	33.1	34	33.8	32.2
	Magnesium	mg/L	NG	6.2	7.4	6.9	7.4	7	7.7	7.05	7.7	7.2	6.1	7.4	7.2	7	6.1	8	9.4	9.9	8.2	8
	Potassium	mg/L	NG	0.8	1	1	0.7	0.8	1.2	1	1.2	1	1	0.9	0.9	0.8	0.7	0.9	1.3	1.1	1.2	1.1
	Sodium	mg/L	NG	6.9	8.4	6	3.7	6.7	5.8	7	6.8	7.3	6	4.6	6	6.7	5.3	8.1	5.5	6.6	6.6	7.5
	Chloride	mg/L	120	5.8	7.3	3.2	1.4	4.8	2.5	4.95	3.4	3.7	4.5	2.7	4.9	5.6	4.5	5	2.4	3.1	2.7	5.4
	Fluoride	mg/L	0.12	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1
	Sulphate	mg/L	NG	24	24	20	-	17	20	19	22	22	17	19	21	23	21	27	25	25	25	20
	Colour	TCU	NG	76.5	81.9	115	90.1	80.6	90.2	78.9	85.5	88.1	73.2	85	79.9	76	76.5	90.8	84	90.5	92.6	83.6
	Dissolved Organic Carbon (DOC)	mg/L	NG	7.6	-	-	10.9	7.4	12.4	10.05	12.4	11.7	7.1	5.9	-	-	6	12.3	11.9	14.1	7.6	-
	Total Solids (Filtered)	mg/L	NG	122	132	146	130	54	154	132	126	144	114	131	127	115	126	126	159	184	175	135
Nutrients	Turbidity	NTU	NG	34.4	24.5	68.8	282	21.67	40.8	66.15	129	68	29.9	166	53.3	147.9	20	87.9	169	245	42	62
	Ammonia as N	mg/L	0.021 ⁴	0.01	0.01	-	0.02	0.005	0.024	0.006	0.01	0.008	0.005	0.005	0.005	0.005	0.008	0.005	0.005	0.005	0.01	0.005
	Total Kjeldahl Nitrogen (TKN)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrate (as NO3-N)	mg/L	13	0.09	-	-	-	-	-	-	-	0.08	0.06	0.12	0.12	0.09	-	0.0565	0.0611	0.0436	0.0784	0.0378
	Nitrite (as NO2-N)	mg/L	0.06	0.06	-	-	-	-	-	-	-	0.01	0.01	0.04	0.01	-	-	0.0011	0.001	0.001	0.001	0.001
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	-	0.18	-	0.04	0.03	0.08	0.12	0.1	0.06	0.08	0.06	0.12	0.15	0.11	0.13	0.0576	0.0611	0.0436	0.0784
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	0.99	-	-	-	-	-	-	-	0.17	0.359	0.359	0.359	0.359	0.359
	Orthophosphate (as P)	mg/L	NG	0.003	-	-	-	-	-	-	-	-	0.002	0.002	0.002	0.006	0.003	-	0.0039	0.0052	0.0064	0.0065
	Phosphorus	µg/L	4	50	50	120	390	57	464	88	170	106	48	205	71	31	36	111	506	242	499	84
	Phosphorus (filtered) (Filtered)	µg/L	0.01	-	-	-	0.006	0.011	0.013	0.0125	0.004	0.005	0.002	0.002	0.003	0.002	-	0.0047	0.01	0.0143	0.0593	0.0077
	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	5.2	15.7	59.5	43.8	32.5	25.4	47.4	85.2	12.4	25.7	2.6	32.3	10.7	22.8	52.5	3.3
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	626	-	-	5375	800	4100	1150	2850	1590	540	5030	1530	444	548	1780	7480	6650	3810	724
	Antimony	µg/L	0.1	-	-	-	0.3	0.1	0.4	0.4	0.2	0.2	0.1	0.3	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.1
	Antimony (Filtered)	µg/L	NG	-	-	-	0.1	0.1	0.2	0.4	0.1	0.2	0.1	0.7	0.2	0.2	0.1	0.2	0.3	0.4	0.4	0.1
	Arsenic	µg/L	5	0.9	-	-	4.05	1	5.2	2.1	2.5	1.8	0.9	2.8	1.2	0.7	0.6	1.5	4.5	3.3	2.2	1
	Arsenic (Filtered)	µg/L	5	-	-	-	0.4	0.4	0.8	0.6	0.4	0.7	0.5	0.4	0.4	0.5	0.3	0.4	0.4	0.6	0.5	0.3
	Barium	µg/L	NG	50.4	-	-	166.5	61.3	254	84.9	114	84.8	54.5	134	82.9	49.5	51	95.9	303	207	285	66.2
	Barium (Filtered)	µg/L	NG	-	-	-	51	43.3	58	47.5	45.9	51.4	43.3	45.4	49	41.3	40.5	52.2	58.4	60.9	59.6	40.5
	Beryllium	µg/L	NG	0.1	-	-	0.3	0.1	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.4	0.3	0.4	0.1
Beryllium (Filtered)	µg/L	NG	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	0.3	2.7	0.2	0.3	0.2	1.8	0.4	0.2	0.3	0.2	0.2	
Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Boron - soluble	µg/L	1500	-	-	-	-	15.8	17.5	19.3	23.8	22.2	14.3	21.8	21.2	23.9	14.7	19	27.8	31.8	21.3	15	
Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	13.2	16	15.4	18.7	16.8	12.8	10.8	15.4	16.8	15.6	15.8	19.2	19.8	17.3	13.6	
Cadmium	µg/L	0.09	0.1	0.1	0.1	0.2	0.1	0.4	0.1	0.13	0.1	0.1	0.2	0.3	0.1	0.1	0.1	0.4	0.2	0.4	0.1	
Cadmium (Filtered)	µg/L	0.09	-	-	-	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.44	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
Cesium	µg/L	NG	0.2	-	-	1.05	0.2	1.2	0.4	0.6	0.4	0.1	0.9	0.3	0.1	0.2	0.4	1.5	1.2	0.6	0.2	
Cesium (Filtered)	µg/L	NG	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Chromium	µg/L	NG	1	0.4	3.5	8	1.6	7.2	2.3	4.7	3.8	1.3	8	2.9	1	0.9	2.6	11.2	9.5	6.1	1.2	
Chromium (Filtered)	µg/L	NG	-	-	-	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.4	0.1	
Cobalt	µg/L	NG	0.5	0.2	1.3	4.4	0.6	3.9	1.2	1.9	1	0.4	2.5	0.7	0.3	0.4	1.3	6.3	3.2	5.3	0.7	
Cobalt (Filtered)	µg/L	NG	-	-	-	0.1	0.1	0.1	0.1	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Copper	µg/L	2-4 ³	1.5	1.2	4.6	11.7	1.9	11.2	3.7	6.2	4	1.9	8.5	3	1.7	1.5	4	27	9	13.6	2.1	
Copper (Filtered)	µg/L	2-4 ³	-	-	-	1.3	0.9	3	1.6	2.1	3.3	1.9	1.5	1.9	1.2	0.8	1.4	3.1	2.7	4.4	0.7	
Iron	µg/L	300	1260	663	3220	10300	1430	9630	2510	5460	2870	1030	7200	2040	666	836	2900	14100	7200	7970	1500	
Iron (Filtered)	µg/L	300	-	-	-	17	62	218	109	100	103	88	152	17	31	6	73	85	86	170	35	
Lead	µg/L	1-7 ³	1	0.5	1.6	5.85	0.7	6.4	1.2	3	1.5	0.6	3.5	1.2	0.6	0.5	1.8	8.6	4.4	7.1	1	
Lead (Filtered)	µg/L	1-7 ³	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	1	0.6	0.1	0.1	0.1	0.1	0.2	0.1	
Lithium	µg/L	NG	5.5	-	-	10.2	5.6	8.7	7	10	8.6	5.2	8.7	5.8	5.4	5	7	15.6	12.6	12.1	5.4	
Lithium (Filtered)	µg/L	NG	-	-	-	3	4.2	4.7	5.2	5.7	5.8	4.2	3.7	4.3	4.4	4.3	4.7	5.1	5.3	5	4.4	
Manganese	µg/L	NG	33.1	23.2	63.5	210	37	183	57.8	98.7	67.8	33.4	122	44.8								

Table A.11: CCME Water Quality Guidelines - Slave River @ Mouth, All Parameters

			Sampled Date Time		6/18/1982	9/23/1982	6/19/1983	10/5/1983	6/19/1984	10/19/1984	7/11/1985	9/21/1985	6/26/1986	7/3/1987	6/22/1988	6/19/1988	6/14/1989	9/20/1989	6/30/1990	6/25/1991	9/20/1991	7/3/1992	9/23/1992	3/31/1993	6/8/1993	12/7/1994	3/30/1994	6/17/1994	9/29/1994	3/27/1995	6/22/1995	6/25/1996	10/2/1996	6/30/1997	10/5/1997	5/20/1998	9/30/1998	6/28/1999	9/30/1999	6/28/2000	6/13/2001	10/5/2001	7/3/2002	6/17/2003								
Chem_Group	ChemName	output unit	CCME FAL ¹	SampleCode	SlaveRiver@Mouth_18 Jun 82	SlaveRiver@Mouth_23 Sep 82	SlaveRiver@Mouth_14 Jun 83	SlaveRiver@Mouth_05 Oct 83	SlaveRiver@Mouth_19 Jun 84	SlaveRiver@Mouth_19 Oct 84	SlaveRiver@Mouth_11 Jul 85	SlaveRiver@Mouth_12 Sep 85	SlaveRiver@Mouth_26 Jun 86	SlaveRiver@Mouth_03 Jul 87	SlaveRiver@Mouth_22 Jun 88	SlaveRiver@Mouth_13 Sep 88	SlaveRiver@Mouth_14 Jun 89	SlaveRiver@Mouth_20 Sep 89	SlaveRiver@Mouth_30 Jun 90	SlaveRiver@Mouth_1 Oct 90	SlaveRiver@Mouth_25 Jun 91	SlaveRiver@Mouth_20 Sep 91	SlaveRiver@Mouth_03 Jul 92	SlaveRiver@Mouth_23 Sep 92	SlaveRiver@Mouth_31 Mar 93	SlaveRiver@Mouth_08 Jun 93	SlaveRiver@Mouth_27 Jan 94	SlaveRiver@Mouth_30 Mar 94	SlaveRiver@Mouth_17 Jun 94	SlaveRiver@Mouth_28 Sep 94	SlaveRiver@Mouth_29 Sep 94	SlaveRiver@Mouth_07 Dec 94	SlaveRiver@Mouth_27 Mar 95	SlaveRiver@Mouth_22 Jun 95	SlaveRiver@Mouth_1 Oct 95	SlaveRiver@Mouth_25 Jun 96	SlaveRiver@Mouth_02 Oct 96	SlaveRiver@Mouth_30 Jun 97	SlaveRiver@Mouth_09 Oct 97	SlaveRiver@Mouth_20 May 98	SlaveRiver@Mouth_30 Sep 98	SlaveRiver@Mouth_28 Jun 99	SlaveRiver@Mouth_30 Sep 99	SlaveRiver@Mouth_28 Jun 00	SlaveRiver@Mouth_2 Oct 00	SlaveRiver@Mouth_13 Jun 01	SlaveRiver@Mouth_05 Oct 01	SlaveRiver@Mouth_03 Jul 02	SlaveRiver@Mouth_17 Jun 03			
Physical/Major Ions	pH	pH Units	6.5-9		8	7.9	8	7.7	7.9	7.9	7.9	7.9	8	7.7	7.9	7.7	7.7	7.8	7.77	8.15	7.64	7.9	7.88	7.55	8.19	7.9	7.66	7.76	7.97	7.87	7.97	-	7.5	7.78	8.1	-	8.2	7.96	7.85	8.09	8	8.04	8.08	8.05	8	8.04	8.15	7.95	8.2			
	Electrical Conductivity (EC)	µS/cm	NG		100	15	100	60	80	100	100	55	45	100	60	340	70	-	60	350	25	100	25	20	40	20	7	40	30	15	10	8	30	30	50	30	50	55	40	35	30	20	-	200	120	50	50	80				
	Total Suspended Solids (TSS)	mg/L	NG		310	88	140	62	950	106	130	61	180	140	391	35	400	141	1960	146	-	-	188	48	26	110	20	26	71	284	43	3	14	67	31	357	117	230	165	203	41	492	47	970	94	341	57	445	142			
	Hardness as CaCO3	mg/L	NG		100	86.3	98	95	98.3	86.2	102	93	100	85	99	94	102	112	12.9	94	117	108.9	80	85	86	94	96	92	107	104	99.7	92.2	111	108	101	115	87.9	-	106	69.6	-	111	89.6	110	96.1	-	93.3	106	106			
	Calcium	mg/L	NG		29	24.6	27.9	27	28	24.7	29.3	28	29	25	29	27	30	32	39	27	34	30.6	20.9	24	25	27	27.9	26.7	30.3	29.7	30.1	27.2	34.7	31	29.7	33.1	25.1	27.1	30.6	18.4	23.2	32.8	25.1	31.7	28.3	29	26	30.4	31.7			
	Magnesium	mg/L	NG		6.76	6.05	6.98	6.7	6.9	5.96	6.93	5.8	6.9	5.6	6.7	6.4	7	8	7.9	6.5	8.1	7.8	6.8	6	5.72	6.4	6.5	6.2	7.7	7.3	6	5.88	5.97	7.38	6.46	7.89	6.13	7.08	7.15	5.77	5.91	7.06	6.54	7.39	6.21	6.66	6.88	7.42	6.48			
	Potassium	mg/L	NG		-	-	-	-	-	-	-	-	-	-	1.61	4.1	1.7	1	8.7	1.6	1.5	1	2.1	0.6	0.8	1.9	1.16	0.73	1.22	1.03	0.93	0.74	1.2	1.1	0.88	1.36	0.96	1.36	1.75	1.49	0.93	1.82	0.88	0.88	0.88	1.08	1.2	1.72	1.76			
	Sodium	mg/L	NG		-	-	-	-	-	-	-	-	-	-	8.3	7.8	8.7	6.8	7.3	6.9	8.5	10.5	8.7	11	6	9.4	7.02	5.7	8.96	9.6	7.55	7.59	8.1	8.16	8.8	6.38	7.78	6.69	9.26	6.73	7.94	14.1	7.06	7.13	11.5	7.5	10.1	6.08	10			
	Chloride	mg/L	120		5.6	6.4	6.5	7.9	6.4	12	5.8	7.3	12	6.3	9.6	11	6.8	5.8	5.7	8	6.1	10.8	8.5	9.5	7.06	8.39	2.42	5.44	5.8	8.59	9.07	8.7	9.53	7.67	9.83	6.03	8.99	4.99	9.8	8.9	8.9	18.2	8.5	8.8	15	6.1	10	4.7	8.4			
	Sulphate	mg/L	NG		16	16	16	15	18	18	14	14	15	14	23	17	25	14	21	15	32	19	21	17.1	18	24	16.4	17	20	24	19	18	20	21	21	-	16.6	24	12	18	16	33	20.6	66	21	20	20	24				
	Colour	TCU	NG		90	78	88	81	88	77	80	71	80	71	86	75	83.7	104	100	80	88.2	91	77	71	75.8	81.3	84.7	78	91.1	92.8	68.7	98	73	97.5	75.1	92.1	77.7	93.5	84.9	74.7	196	87.4	72.3	97.7	68.8	85.5	81.2	120	89.8			
	Total Solids (Filtered)	mg/L	NG		-	140	150	120	160	150	95	160	140	64	159	150	307	146	345	124	184	151	190	128	116	170	153	133	164	156	130	116	109	169	130	154	151	43	163	139	123	178	143	181	147	154	140	165	142			
	Turbidity	NTU	NG		180	53	48	35	300	65	94	39	100	69	100	34	225	97	1920	93	456	13	150	29	21	115	14.6	15.3	71.6	120	32	7.2	12.5	48.7	24.3	-	68.5	147	105	144	17.5	425	36	1260	72.7	220	48.7	423	147			
Nutrients	Ammonia as N	mg/L	0.021 ³		0.05	0.03	0.03	0.03	0.03	-	0.03	0.12	0.03	0.03	0.022	0.11	0.02	0.03	0.136	0.029	0.005	0.036	0.076	0.007	0.011	0.029	0.067	0.002	0.01	0.028	0.02	0.022	0.035	0.015	0.021	-	0.005	0.025	0.012	0.022	0.268	0.02	0.016	0.005	0.062	0.056	0.019	0.028	0.025	0.016		
	Total Kjeldahl Nitrogen (TKN)	mg/L	NG		-	0.48	0.56	0.52	0.97	-	0.37	0.42	0.039	0.29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG		0.04	0.04	0.04	0.07	0.08	-	0.069	0.04	0.056	0.02	0.04	0.02	0.02	0.03	0.18	0.01	0.07	0.02	0.03	0.04	0.074	0.035	0.083	0.01	0.023	0.01	0.019	0.044	0.094	0.029	0.008	0.071	0.034	0.048	0.075	0.05	0.008	0.119	0.009	0.124	0.03	0.1	0.023	0.064	0.048			
	Phosphorus	µg/L	4		80	50	50	50	160	-	83	50	65	130	270	47	320	130	1800	130	893	75	221	45	38	148	23	28	33	233	66	23	31	110	48	-	125	198	133	195	33	297	66	1150	130	332	48	781	334			
Metals	Arsenic	µg/L	5		1	1	1	3.2	2.1	1	1	0.5	1.3	2	1	1	4	0.5	25	1	7	1	1.8	0.6	1.3	1.6	0.5	0.5	1.3	2.7	0.9	0.3	0.4	1.5	0.6	-	1.2	-	-	-	-	-	-	-	-	-	-	-	-			
	Cadmium	µg/L	0.09		0.1	2.8	0.1	1.2	-	0.7	0.1	0.4	0.9	0.5	0.6	0.3	0.2	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.6	0.3	0.3	0.3	0.4	0.2					
	Chromium	µg/L	NG		-	-	1.1	1	3.8	-	1.61	2.4	4.7	1	7	2	15	5	66	1	23	1	2	1	1	2	1	1	2.1	2.3	7.9	19	3.3	0.2	1	3.9	2.7	14.1	3.2	15.3	14.3	10.7	2	38	3	63	6.8	19	3	30	7.5	
	Cobalt	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	0.4	0.4	1.3	3	0.3	0.3	0.1	1	0.4	3.4	1.4	2.6	2	1.1	0.1	6.7	1	10	2.3	4	1	5	3
	Copper	µg/L	2 - 4 ²		40	1	7.2	2.2	14.6	-	4.24	6.9	3.9	5	13	3	15	4	52	4	25	3	11	5	1	5	1.9	1.7	4.8	9	2.1	1.3	2.6	3.8	1.7	10.2	5.4	8.9	8.1	6.2	1.9	17.1	3	26	4.4	11	3	14	7.4			
	Iron	µg/L	300		6800	131	980	540	2350	2050	2730	1890	5170	3400	7100	360	12,700	3500	30,000	4480	8770	1190	-	1280	549	3800	944	950	3300	6120	1400	517	761	3280	1340	-	3250	7660	5050	5830	1030	20,200	810	43,400	4000	2320	2110	14,900	5890			
	Lead	µg/L	1-7 ²		-	1	1	0.4	5.5	-	2	1.4	5.8	2	8	1	3	1	20	1	9	1	2	1	1	2	1	1	0.6	2.4	5	1.1	1	1.4	1.9	1.3	5.6	2.3	4.7	4.1	3.7	2	10.2	1	13	2.1	6	1	10	3.4		
	Manganese	µg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Mercury	µg/L	0.026		0.01	0.03	0.16	0.09	0.06	0.013	0.09	0.03	0.18	0.07	0.02	0.02	0.02	0.04	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Nickel	µg/L	25-150 ²		-	5	5	2.1	19.2	-	10	10	8.8	5	13	6	18	6	76	4	25	1	10	3	2	4	2	2	5.6	12	2.5	1.6	2	4.6	2	13.3	5.9	11.3	11.1	7.3	0.1	23.1	3	36	4.8	15	4	18	10.1			
	Zinc	µg/L	30		30	22	23	13	36	-	15	15	36.4	20	43	1	48	16	184	12	91	5	32	8	7	11	3	3.1	13	34	5	5	28	12	5	-	12.5	34	29.9	18.3	10	77.4	10	131	14.2	49	10	83	24			

Notes:
¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)
² Guideline varies with hardness. Range given.
³ Guideline varies with pH and temperature. Most stringent given.
NG - No guideline
BOLD - Greater than Guideline
italic - Detection limit greater than guideline
Blank - Not analyzed

Table A.11: CCME Water Quality Guidelines - Slave River @ Mouth, All Parameters

			Sampled Date Time	9/30/2003	6/28/2004	10/5/2004	5/31/2005	9/20/2005	6/12/2006	10/4/2006	6/19/2007	10/2/2007	6/17/2008	9/28/2008	6/16/2009	10/1/2009	6/14/2010	10/4/2010
			SampleCode	SlaveRiver @Mouth_ 30 Sep 03	SlaveRiver @Mouth_ 28 Jun 04	SlaveRiver @Mouth_ 05 Oct 04	SlaveRiver @Mouth_ 31 May 05	SlaveRiver @Mouth_ 20 Sep 05	SlaveRiver @Mouth_ 12 Jun 06	SlaveRiver @Mouth_ 04 Oct 06	SlaveRiver @Mouth_ 19 Jun 07	SlaveRiver @Mouth_ 02 Oct 07	SlaveRiver @Mouth_ 17 Jun 08	SlaveRiver @Mouth_ 28 Sep 08	SlaveRiver @Mouth_ 16 Jun 09	SlaveRiver @Mouth_ 01 Oct 09	SlaveRiver @Mouth_ 14 Jun 10	SlaveRiver @Mouth_ 04 Oct 10
Chem_Group	ChemName	output unit	CCME FAL ¹															
Physical/Major Ions	pH	pH Units	8.03	7.97	7.97	7.44	8.13	8.13	7.98	8.08	8.09	8.09	8.1	7.9	8.1	8.08	7.94	
	Electrical Conductivity (EC)	µS/cm	NG	20	50	200	200	20	-	62	493	300	407	169	890	135	880	135
	Total Suspended Solids (TSS)	mg/L	NG	48	340	1070	639	44	296	12	634	55	161	42	140	42	228	14
	Hardness as CaCO3	mg/L	NG	90.4	130	122	103	90.5	109	107	151	104	105	66.8	115	75.2	110	104
	Calcium	mg/L	NG	25.8	27.6	35.2	30.6	23.7	30.9	29.8	43.1	29.2	29.2	22.2	34.4	21.8	31.5	29.5
	Magnesium	mg/L	NG	6.31	6.6	8.4	6.6	7.6	7.6	7.9	10.5	7.5	7.4	2.8	7.2	5	7.6	7.2
	Potassium	mg/L	NG	0.85	0.9	1.1	1.1	0.8	1.1	1.1	1.3	0.8	1	0.7	1.2	0.7	1.2	1
	Sodium	mg/L	NG	10.2	6.7	8.2	7.5	8	8.4	11.8	6	8.9	7.3	7.7	8.3	7.9	10.5	9.3
	Chloride	mg/L	120	10.9	5.7	5.1	5.3	8.4	6.4	13.1	2.4	8.9	5.7	7.3	5.2	8.7	7.8	9.8
	Sulphate	mg/L	NG	24	17	32	28	17	25	24	19	20	20	16	22	19	23	23
	Colour	TCU	NG	74.4	81.8	87.5	85.4	74.7	84.5	87.1	93.7	79.4	85.4	73	83.1	70.1	87	78.9
	Total Solids (Filtered)	mg/L	NG	128	158	194	184	110	192	138	130	147	180	98	164	116	182	134
	Turbidity	NTU	NG	31.9	296	1480	450	23.9	331	13.4	517	53.6	157	47.5	182	30.5	215	24.2
Nutrients	Ammonia as N	mg/L	0.021 ³	0.005	0.007	0.054	0.037	0.005	0.043	0.005	0.026	0.024	0.008	0.008	0.2	0.06	0.02	0.01
	Total Kjeldahl Nitrogen (TKN)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.008	0.2	0.19	0.04	0.01	0.06	0.01	0.06	0.01	0.06	0.09	0.03	0.09	0.23	0.1
	Phosphorus	µg/L	4	23	320	1030	390	70	410	30	420	140	290	80	310	40	330	10
Metals	Arsenic	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	0.09	0.1	0.1	0.6	0.4	0.1	0.3	0.1	0.3	0.1	0.15	0.1	0.1	0.1	0.2	0.1
	Chromium	µg/L	NG	0.8	6.2	19.2	10.4	1.2	9.3	0.6	9.5	1.1	4.6	0.2	4.5	0.9	6.1	7.2
	Cobalt	µg/L	NG	0.5	3	10.8	5.3	0.4	4.5	0.3	4.9	0.4	1.7	0.3	2	0.4	2.9	0.4
	Copper	µg/L	2-4 ²	3.2	8.7	31.9	16.9	2.6	13.5	2.4	13.9	2.6	6.2	19.8	7.9	2	9.2	1.5
	Iron	µg/L	300	1290	8580	33,000	14,300	1320	11,000	544	13,100	1480	4960	500	5070	851	7020	998
	Lead	µg/L	1-7 ²	1	5.2	17.3	8.6	0.7	6.6	0.3	7.8	1.1	3.1	0.5	2.8	0.8	4.3	29.5
	Manganese	µg/L	40.5	132	354	247	35.3	177	27.3	308	47.8	82.7	33.2	76.8	29.9	111	24.3	
	Mercury	µg/L	0.026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nickel	µg/L	25-150 ²	2.2	9.9	37.8	18.4	2.2	15.1	1.7	17.9	2.7	6.9	1.4	7.9	1.9	10.4	2.2
	Zinc	µg/L	30	10	36	153	99	10	46	10	58	10	20	5	23	5	31	5

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with hardness. Range given.

³ Guideline varies with pH and temperature. Most stringent given.

NG - No guideline

BOLD - Greater than Guideline

italic - Detection limit greater than guideline

Blank - Not analyzed

Table A.12: CCME Water Quality Guidelines - Snowdrift River @ Mouth Stark Lake, All Parameters

Chem. Group	ChemName	output unit	Sampled Date Time SampleCode	9/26/2006	7/12/2007	10/1/2007	7/7/2008	9/29/2008	7/14/2009	10/1/2009	7/12/2010	9/17/2010	7/4/2015
				Snowdrift @StarkLa ke_26 Sep 06	Snowdrift @StarkLa ke_12 Jul 07	Snowdrift @StarkLa ke_01 Oct 07	Snowdrift @StarkLa ke_07 Jul 08	Snowdrift @StarkLa ke_28 Sep 08	Snowdrift @StarkLa ke_14 Jul 09	Snowdrift @StarkLa ke_01 Oct 09	Snowdrift @StarkLa ke_12 Jul 10	Snowdrift @StarkLa ke_17 Sep 10	Snowdrift @StarkLa ke_04 Jul 15
			CCME FAL ¹										
Physical/Major ions	pH	pH Units	6.5-9	7.19	7.27	7.27	7.38	7.52	7.34	7.47	7.43	7.28	7.38
	Electrical Conductivity (EC)	µS/cm	NG	42.1	37	40.9	37.7	47.7	37.7	49	40	43.8	46.3
	Total Suspended Solids (TSS)	mg/L	NG	3	3	3	8	3	3	3	3	3	9
	Hardness as CaCO3	mg/L	NG	21.1	18.4	20.3	21.6	18.6	22.9	13.1	17.1	21.1	23.4
	Alkalinity (total as CaCO3)	mg/L	NG	14.8	14.6	14.3	12.4	15.7	12.9	21.1	13.2	14.1	14.3
	Calcium	mg/L	NG	5.8	5	5.5	6	6.2	6.8	3.7	4.8	5.9	6.2
	Magnesium	mg/L	NG	1.6	1.5	1.6	1.6	0.7	1.5	0.9	1.3	1.5	1.9
	Potassium	mg/L	NG	0.5	0.4	0.5	0.5	0.6	0.6	0.4	0.6	0.5	0.7
	Sodium	mg/L	NG	1.2	1.2	1.2	1.3	1.6	1.6	1.5	1.4	1.5	1.7
	Chloride	mg/L	120	2	1.8	2.1	2.1	2.6	2.3	3.2	2.1	2.6	2.8
	Sulphate	mg/L	NG	1	1	2	4	2	1	2	2	2	2
	Cobour	TCU	NG	24	20	26	28	22	25	21	24	19	47
	Total Solids (Filtered)	mg/L	NG	28	19	28	51	10	32	18	18	18	271
	Turbidity	NTU	NG	0.62	0.57	0.65	0.74	1.57	0.59	0.58	0.66	0.51	5.45
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.005	0.005	0.005	0.005	0.005	0.01	0.01	0.01	0.01	0.005
	Total Kjeldahl Nitrogen (TKN)	mg/L	NG	-	-	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.01	0.01	0.01	0.3	0.02	0.01	0.05	0.13	0.07	0.01
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	0.23
	Phosphorus	µg/L	4	10	10	10	10	10	10	10	10	10	15
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	4.1
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	332
	Antimony	µg/L	NG	-	-	-	-	-	-	-	-	-	0.1
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	0.1
	Arsenic	µg/L	5	-	-	-	-	-	-	-	-	-	0.2
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	0.2
	Barium	µg/L	NG	-	-	-	-	-	-	-	-	-	12.1
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	7.8
	Beryllium	µg/L	NG	-	-	-	-	-	-	-	-	-	0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	0.1
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	1.2
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	0.2
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	5.8
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	4.2
	Cadmium	µg/L	0.09	0.05	0.05	0.05	0.1	0.1	0.1	0.05	0.1	0.05	0.05
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	0.05
	Cesium	µg/L	NG	-	-	-	-	-	-	-	-	-	0.1
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	0.1
	Chromium	µg/L	NG	0.1	0.2	0.1	0.3	0.3	0.1	0.1	0.1	1.6	1.1
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	0.1
	Cobalt	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	0.1
	Copper	µg/L	2 - 4 ³	0.6	0.6	0.5	0.6	0.5	-	0.2	0.6	0.5	1.3
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	0.2
	Iron	µg/L	300	80	78	55	60	71	49	60	60	53	341
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	19
	Lead	µg/L	1-7 ³	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	4	0.9
	Lead (Filtered)	µg/L	1-7 ³	-	-	-	-	-	-	-	-	-	0.3
	Lithium	µg/L	NG	-	-	-	-	-	-	-	-	-	1
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	0.7
	Manganese	µg/L	NG	4.4	4.7	4	3.2	5.5	2.1	4.3	5.1	5.1	11.9
	Manganese (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	0.9
	Mercury	µg/L	0.026	-	-	-	-	-	-	-	-	-	0.06
	Mercury (Filtered)	µg/L	0.026	-	-	-	-	-	-	-	-	-	0.02
	Molybdenum	µg/L	73	-	-	-	-	-	-	-	-	-	0.3
	Molybdenum (Filtered)	µg/L	73	-	-	-	-	-	-	-	-	-	0.1
	Nickel	µg/L	25-150 ³	0.3	0.3	0.3	0.4	0.4	0.3	0.2	0.3	0.3	0.5
	Nickel (Filtered)	µg/L	25-150 ³	-	-	-	-	-	-	-	-	-	0.1
	Rubidium	µg/L	NG	-	-	-	-	-	-	-	-	-	2.1
	Rubidium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	1.6
	Selenium	µg/L	1	-	-	-	-	-	-	-	-	-	0.5
	Selenium (Filtered)	µg/L	1	-	-	-	-	-	-	-	-	-	0.3
	Silver	µg/L	0.25	-	-	-	-	-	-	-	-	-	0.1
	Silver (Filtered)	µg/L	0.25	-	-	-	-	-	-	-	-	-	0.1
	Strontium	µg/L	NG	-	-	-	-	-	-	-	-	-	30.8
	Strontium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	29.2
	Thallium	µg/L	0.8	-	-	-	-	-	-	-	-	-	0.1
	Thallium (Filtered)	µg/L	0.8	-	-	-	-	-	-	-	-	-	0.1
	Tin	µg/L	NG	-	-	-	-	-	-	-	-	-	1.6
	Tin (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	0.1
	Titanium	µg/L	NG	-	-	-	-	-	-	-	-	-	15.5
	Titanium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	0.1
	Uranium	µg/L	15	-	-	-	-	-	-	-	-	-	0.2
	Uranium (Filtered)	µg/L	15	-	-	-	-	-	-	-	-	-	0.1
	Vanadium	µg/L	NG	-	-	-	-	-	-	-	-	-	0.7
	Vanadium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	0.1
	Zinc	µg/L	30	0.4	0.4	0.4	10	1	5	0.4	5	0.4	5
	Zinc (Filtered)	µg/L	30	-	-	-	-	-	-	-	-	-	0.4

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.13: CCME Water Quality Guidelines - Taltson River @ Mouth, All Parameters

		Sampled Date Time		Sample Code		6/15/1982	9/23/1982	6/1/1983	6/1/1983	10/5/1983	6/19/1984	10/19/1984	7/11/1985	9/12/1985	6/26/1986	7/3/1987	6/22/1988	9/13/1988	6/14/1989	9/20/1989	6/30/1990	10/11/1990	6/25/1991	9/20/1991	7/3/1992	9/23/1992	3/31/1993	6/26/1993	TalsonRiv	12/7/1994	2/7/1994	2/7/1994	3/30/1994	6/17/1994	9/29/1994	9/29/1994	6/23/1995	#####	6/25/1995	10/21/1995	6/30/1997	10/9/1997	5/20/1998	9/30/1998	TalsonRiv	6/28/1999	9/30/1999	6/28/2000	#####	6/13/2001	10/5/2001	7/3/2002		
Chem_Group	ChemName	output unit	CCME FAL ¹	TalsonRiv @Month_1 5 Jun 82	TalsonRiv @Month_1 outh_23 Sep 82	TalsonRiv @Month_1 4 Jun 83	TalsonRiv @Month_1 5 Oct 83	TalsonRiv @Month_1 9 Jun 84	TalsonRiv @Month_1 9 Oct 84	TalsonRiv @Month_1 11 Jul 85	TalsonRiv @Month_1 2 Sep 85	TalsonRiv @Month_26 Jun 86	TalsonRiv @Month_03 Jul 87	TalsonRiv @Month_22 Jun 88	TalsonRiv @Month_13 Sep 88	TalsonRiv @Month_14 Jun 89	TalsonRiv @Month_20 Sep 89	TalsonRiv @Month_30 Jun 90	TalsonRiv @Month_10 Oct 90	TalsonRiv @Month_21 Jun 91	TalsonRiv @Month_20 Sep 91	TalsonRiv @Month_20 Jul 92	TalsonRiv @Month_23 Mar 93	TalsonRiv @Month_08 Jun 93	TalsonRiv @Month_28 Sep 93	TalsonRiv @Month_27 Jun 94	TalsonRiv @Month_30 Mar 94	TalsonRiv @Month_17 Jun 94	TalsonRiv @Month_29 Sep 94	TalsonRiv @Month_27 Mar 95	TalsonRiv @Month_22 Jun 95	TalsonRiv @Month_11 Oct 95	TalsonRiv @Month_25 Jun 96	TalsonRiv @Month_02 Oct 96	TalsonRiv @Month_30 Jun 97	TalsonRiv @Month_09 Oct 97	TalsonRiv @Month_20 May 98	TalsonRiv @Month_30 Sep 98	TalsonRiv @Month_28 Jun 99	TalsonRiv @Month_30 Sep 99	TalsonRiv @Month_29 Jun 00	TalsonRiv @Month_12 Oct 00	TalsonRiv @Month_13 Jun 01	TalsonRiv @Month_05 Oct 01	TalsonRiv @Month_03 Jul 02									
Physical/Major Ions	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	Total Organic Carbon(TOC)	ug/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	pH	gH Units	6.5-9	7.4	7.2	7.3	6.9	7.2	7	6.9	6.9	7	6.8	6.6	6.6	6.8	6.8	7.69	7.7	7.88	6.7	7.55	6.87	7.56	7.12	7.08	6.96	-	7.06	7.13	7.27	6.75	6.88	7.37	-	7.3	7.35	6.98	7.48	7.33	7.31	7.39	7.4	7.27	7.27	7.41	7.24							
	Electrical Conductivity (EC)	ug/L	54	54	54	54	57	54	57	52	54	49	48	49	49	46	42	45	43	47	44	45	40	51.2	46.3	46.3	53.7	52.2	54	54	46.6	56.6	53.1	42	46	44.1	48.1	45	49	53.8	42.4	52.5	47.1	55	45	46.5	48.5							
	Total Suspended Solids (TSS)	mg/L	NG	0.3	5	5	5	5	9	8.6	5	5	6	2	6.9	5	1	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
	Hardness as CaCO3	mg/L	NG	22.6	19	21.3	19.2	18.1	21.7	21	21	24	20	19	17	20	19	19	18	21	18.7	19	16	20	19	18	18	20	21	20.2	18.2	20.9	16.8	18.8	18.5	16.9	-	20.1	19.3	0.8	18.1	17.4	21	21.4	-	19.3	20.2							
	Alkalinity (total as CaCO3)	mg/L	NG	10	17	20	18	19	19	17	16	19	17	18	16	16.7	16	17	18	17	18	16	17	18	16	17.7	18	16	17.8	16	17.2	17.6	18.2	16.2	18.5	19.5	16.2	17.3	16.8	19.5	17.1	20.6	15	17.6	16	19.2	17.7	19.6	17.7	19.1				
	Calcium	mg/L	NG	6.43	5.19	5.87	5.2	4.6	5.84	6	5.9	6.4	5.6	5.3	4.7	5.5	5.3	5	5	6	5.17	5.3	4.6	5.66	5.3	5	5.3	5.69	5.8	5.6	5.2	6.16	4.6	5.53	5.28	4.67	5.47	5.75	4.91	4.9	5.02	4.77	6.03	6.11	5.96	5.32	5.98							
	Aluminum	mg/L	NG	1.58	1.47	1.62	1.5	1.6	1.72	1.5	1.6	2	1.5	1.5	1.4	1.5	1.3	1.4	1.4	1.5	1.4	1.4	1.4	1.3	1.2	1.54	1.2	1.54	1.2	1.41	1.5	1.3	1.24	1.39	1.1	1.24	1.39	1.1	1.24	1.39	1.1	1.24	1.39	1.1	1.24	1.39	1.1	1.24						
	Potassium	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
	Sodium	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
	Chloride	mg/L	120	2.2	1.7	1.3	1.8	2	2.2	1.6	1.5	1.9	1.9	1.9	1.3	1.8	1.4	1.7	1.4	2.1	1.5	1.8	1.3	1.6	1.52	1.38	7.72	1.86	1.54	1.5	1.44	1.67	1.48	1.56	1.76	1.64	2.07	1.55	2.1	1.4	1.3	1.5	2	1.8	2	1.6	1.4							
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Sulfate	mg/L	17	1.7	2.9	1.6	1.8	2.1	4.5	1.8	2.2	2.8	2.6	2.6	3.6	3	4	2	5	8	5	4	3.1	3	5	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3					
Colour	TCU	NG	10	10	20	25	15	25	25	10	15	10	10	20	12	10	10	20	12	10	10	6	25	28	20	25	20	10	10	15	10	10	16	12	8	10	5	10	5	10	5	10	15	10	10	10	10	10	10	10	10	10	10	10
Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Total Solids (Filtered)	mg/L	NG	-	52	38	31	37	41	57	55	38	47	40	47	40	47	49	20	47	20	55	27	43	48	54	54	34	34	49	34	23	41	37	34	39	13	39	45	32	43	35	40	49	34	37	50								
Turbidity	NTU	NG	18	14	1.3	4	3.2	7.1	9	2.2	4.4	2.3	2.3	17	4.9	1.3	2.1	2.2	11	16	7	4.4	3.4	3.3	3.4	3	0.9	0.6	5.6	4.4	12.5	5.8	5.1	3.2	3.2	3.9	3.9	5	4.2	3.9	3.7	6.4	6.1	9.4	3.9	2.3								
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.09	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.012	0.007	0.026	0.01	0.007	0.007	0.004	0.002	0.005	0.002	0.001	0.002	0.003	0.011	0.011	0.014	0.013	0.008	0.013	0.012	0.013	0.002	0.018	0.006	0.013	0.001	0.001	0.007	0.012	0.005							
	Total Kjeldahl Nitrogen (TKN)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Nitrate (as NO3-N)	mg/L	13	-	0.42	0.28	0.24	0.38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.04	0.04	0.04	0.05	0.04	-	0.04	0.04	0.04	0.02	0.04	0.02	0.02	0.02	0.04	0.02	0.035	0.02	0.03	0.04	0.074	0.009	0.008	0.047	0.075	0.035	0.008	0.011	0.07	0.008	0.014	0.008	0.01	0.01	0.01	0.025	0.008	0.013	0.008	0.016	0.019	0.008	0.018	0.008							
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	Phosphorus	ug/L	4	50	50	50	50	50	-	50	50	50	50	5	12	12	9	12	12	23	11	16	9	9	12	15	6	15	10	22	11	11	16	13	-	14	12	9	16	14	48	10	14	22	19	4	27							
	Phosphorus (Filtered) (Filtered)	mg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	Metals ⁵	Aluminum (Filtered)	ug/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		Aluminum Total	ug/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		Antimony	ug/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		Arsimony (Filtered)	ug/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		Arsenic	ug/L	5	1	1	1	1	1	1	1	0.5	0.5	1	1	1	1	1	0.5	1	1	0.5	0.5	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Arsenic (Filtered)		ug/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																						

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

^a Guideline varies with pH and temperature. Most stringent given.

CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.13: CCME Water Quality Guidelines - Taltson River @ Mouth, All Parameters

			Sampled Date Time	10/3/2002	6/17/2003	9/30/2003	6/28/2004	10/5/2004	5/31/2005	9/20/2005	6/12/2006	10/4/2006	6/19/2007	10/2/2007	6/17/2008	9/28/2008	6/16/2009	10/1/2009	6/14/2010	10/4/2010	7/22/2015	9/22/2015	7/27/2016	
			SampleCode	TaltsonRiv er@ Mouth 03 Oct 02	TaltsonRiv er@ Mouth 03 Jun 03	TaltsonRiv er@ Mouth 30 Sep 03	TaltsonRiv er@ Mouth 28 Jun 04	TaltsonRiv er@ Mouth 05 Oct 04	TaltsonRiv er@ Mouth 31 May 05	TaltsonRiv er@ Mouth 20 Sep 05	TaltsonRiv er@ Mouth 12 Jun 06	TaltsonRiv er@ Mouth 04 Oct 06	TaltsonRiv er@ Mouth 19 Jun 07	TaltsonRiv er@ Mouth 02 Oct 07	TaltsonRiv er@ Mouth 17 Jun 08	TaltsonRiv er@ Mouth 28 Sep 08	TaltsonRiv er@ Mouth 16 Jun 09	TaltsonRiv er@ Mouth 01 Oct 09	TaltsonRiv er@ Mouth 14 Jun 10	TaltsonRiv er@ Mouth 04 Oct 10	TaltsonRiv er@ Mouth 22 Jul 15	TaltsonRiv er@ Mouth 22 Sep 15	TaltsonRiv er@ Mouth 27 Jul 16	
Chem_Group	ChemName	output unit	CCME FAL ¹																					
Physical/Major Ions	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.272	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.13	
	Total Organic Carbon(TOC)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0068	
	pH	pH Units	6.5-9	7.18	7.25	7.37	7.49	7.38	6.94	7.54	7.55	7.3	7.54	7.48	7.59	7.58	7.37	7.57	7.6	7.39	7.53	7.44	7.53	
	Electrical Conductivity (EC)	µS/cm	NG	47.2	53.3	52	47.6	44.6	50.6	48.6	50.2	46.4	49	47.7	48	48.3	49.4	49.9	53.4	49.3	50.6	50.8	53.9	
	Total Suspended Solids (TSS)	mg/L	NG	4	14	12	3	4	6	3	16	3	3	3	3	3	3	3	10	3	3	4	4	
	Hardness as CaCO3	mg/L	NG	18.5	20.6	20.9	29.6	16	18.2	24.1	23.6	22.8	28.8	23.9	25	19.4	28.4	16.6	24.5	30.2	22.1	22.5	26.1	
	Alkalinity (total as CaCO3)	mg/L	NG	17.6	20.3	18.9	20	18	18.1	19.9	20.6	18.7	19.7	18.8	20.9	17.9	20.8	23.8	21.6	20.8	20.8	20.9	22.7	
	Calcium	mg/L	NG	5.12	5.78	5.9	6.2	4.2	5	6.2	6.5	6.3	8.2	6.7	7	6.6	8.4	4.8	6.9	8.8	6.2	6.4	5.9	
	Magnesium	mg/L	NG	1.38	1.51	1.51	1.7	1.3	1.4	2.1	1.8	1.7	2	1.7	1.8	0.7	1.8	1.1	1.8	2	1.6	1.7	2.8	
	Potassium	mg/L	NG	0.79	0.91	0.84	0.8	0.7	0.7	0.7	0.9	0.8	1	0.7	0.8	0.8	0.9	0.6	0.9	0.9	0.8	0.8	0.8	
	Sodium	mg/L	NG	1.34	1.69	1.54	1.5	1.2	1.3	1.5	1.7	1.2	1.9	1.3	1.6	19.4	1.8	1.4	2	1.6	1.6	1.6	1.6	
	Chloride	mg/L	120	1.7	1.8	1.2	1.5	1.3	1.5	1.9	1.7	1.3	1.6	1.4	1.8	1.6	1.8	1.8	2	2.1	1.7	1.6	1.7	
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	
	Sulphate	mg/L	NG	3	4	3	1.5	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	
	Colour	TCU	NG	20	20	15	10	10	15	10	49	29	22	28	30	28	32	31	37	23	28	29	-	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	
	Total Solids (Filtered)	mg/L	NG	42	14	36	48	34	50	24	54	20	16	31	31	14	14	26	54	26	39	37	34	
	Nutrients	Turbidity	NTU	NG	2.2	7.4	4.5	3.9	3.55	4.3	3.46	7.78	3.49	3.57	2.95	2.65	4.16	3.46	2.9	4.07	2.43	3.92	3.33	6.04
		Ammonia as N	mg/L	0.021 ⁴	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.009	0.005	0.005	0.005	0.01	0.01	0.01	0.01	0.005	0.005	0.005
Total Kjeldahl Nitrogen (TKN)		mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrate (as NO3-N)		mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0067	
Nitrite (as NO2-N)		mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	
Nitrate and Nitrite (as N) (mg/L)		mg/L	NG	0.012	0.017	0.01	0.2	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.45	0.01	0.01	0.04	0.07	0.16	0.07	0.08	
Nitrogen (Total)		mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.27	0.23	0.286	
Orthophosphate (as P)		mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	
Phosphorus		µg/L	4	65	26	13	10	90	20	20	20	10	10	10	20	10	20	10	10	10	10	11	6	34
Phosphorus (Filtered)		µg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0063	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.4	2.3	4.5	
	Aluminum Total	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	108	134	186	
	Antimony	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Arsenic	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.2	0.2	
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.2	
	Barium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.3	7.2	9.1	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.6	4.8	6.9	
	Beryllium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7	0.2	1	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.2	
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.1	5	5.2	
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.2	4.6	5.2	
	Cadmium	µg/L	0.09	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0.05	0.05	
	Cesium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.2	
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Chromium	µg/L	NG	3	3.4	0.3	1	0.3	0.4	0.3	0.7	0.3	0.3	0.3	0.3	0.1	0.1	0.2	0.2	0.3	0.6	0.5	0.2	0.2
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Cobalt	µg/L	NG	1	0.3	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Copper	µg/L	2 - 4 ³	2	0.8	1.5	0.3	1.1	0.6	0.5	0.8	0.6	0.7	0.4	0.6	-	1.1	0.5	0.5	0.2	0.4	0.4	0.3	0.3
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.2	
	Iron	µg/L	300	106	291	222	144	118	201	128	478	144	168	88	95	78	194	80	164	80	110	110	271	
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	5	28	
	Lead	µg/L	1-7 ³	1	0.2	0.2	1.3	0.1	0.1	0.1	0.3	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	1.5	0.3	0.1	0.1
	Lead (Filtered)	µg/L	1-7 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Lithium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	1	1	
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	0.9	0.8	
	Manganese	µg/L	NG	4	10.2	7.6	4.8	5.4	6.6	5.5	11.6	5.5	4.6	4.6	4.4	-	6.3	5	6	4.6	6.4	5.9	9.5	
	Manganese (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.4	0.3	
	Mercury	µg/L	0.026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	0.01	0.01	
	Mercury (Filtered)	µg/L	0.026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.01	0.01	
	Molybdenum	µg/L	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3	0.3	
	Molybdenum (Filtered)	µg/L	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.3	0.2	
	Nickel	µg/L	25-150 ³	1	1.9	0.4	0.2	0.4	0.5	0.3	0.6	0.3	0.5	0.3	0.3	0.6	0.4	0.3	0.4	0.3				

Chem_Group	ChemName

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.15: CCME Water Quality Guidelines - Tazin River @ Mouth, All Parameters

		Sampled Date/Time		SampleCode																																																
		7/21/1982 TazinRiver @ Mouth 29 Jul 82	9/23/1982 TazinRiver @ Mouth 23 Sep 82	6/14/1983 TazinRiver @ Mouth 14 Jun 83	10/5/1983 TazinRiver @ Mouth 05 Oct 83	6/19/1984 TazinRiver @ Mouth 19 Jun 84	10/19/1984 TazinRiver_1 @ Mouth_1 9 Oct 84	7/11/1985 TazinRiver @ Mouth_1 11 Jul 85	9/12/1985 TazinRiver @ Mouth_1 12 Sep 85	6/26/1986 TazinRiver @ Mouth_1 26 Jun 86	7/3/1987 TazinRiver @ Mouth_1 03 Jul 87	10/15/1987 TazinRiver @ Mouth_1 5 Oct 87	6/22/1988 TazinRiver @ Mouth_1 22 Jun 88	9/13/1988 TazinRiver @ Mouth_1 13 Sep 88	6/14/1989 TazinRiver @ Mouth_1 14 Jun 89	9/20/1989 TazinRiver @ Mouth_1 20 Sep 89	6/30/1990 TazinRiver @ Mouth_1 30 Jun 90	10/11/1990 TazinRiver @ Mouth_1 1 Oct 90	6/25/1991 TazinRiver @ Mouth_1 25 Jun 91	9/20/1991 TazinRiver @ Mouth_1 20 Sep 91	7/31/1992 TazinRiver @ Mouth_1 03 Jul 92	9/23/1992 TazinRiver @ Mouth_1 23 Sep 92	9/28/1993 TazinRiver @ Mouth_1 28 Sep 93	1/27/1994 TazinRiver @ Mouth_1 27 Jan 94	3/30/1994 TazinRiver @ Mouth_1 30 Mar 94	6/17/1994 TazinRiver @ Mouth_1 17 Jun 94	9/29/1994 TazinRiver @ Mouth_1 29 Sep 94	1/27/1994 TazinRiver @ Mouth_1 07 Dec 94	3/27/1995 TazinRiver @ Mouth_1 27 Mar 95	6/22/1995 TazinRiver @ Mouth_1 22 Jun 95	10/11/1995 TazinRiver @ Mouth_1 1 Oct 95	6/25/1996 TazinRiver @ Mouth_1 25 Jun 96	10/2/1996 TazinRiver @ Mouth_1 02 Oct 96	6/30/1997 TazinRiver @ Mouth_1 30 Jun 97	10/9/1997 TazinRiver @ Mouth_1 09 Oct 97	5/20/1998 TazinRiver @ Mouth_1 20 May 98	9/30/1998 TazinRiver @ Mouth_1 30 Sep 98	6/28/1999 TazinRiver @ Mouth_1 28 Jun 99	9/30/1999 TazinRiver @ Mouth_1 30 Sep 99	6/28/2000 TazinRiver @ Mouth_1 28 Jun 00	10/11/2000 TazinRiver @ Mouth_1 1 Oct 00	6/13/2001 TazinRiver @ Mouth_1 13 Jun 01	10/5/2001 TazinRiver @ Mouth_1 05 Oct 01	7/3/2002 TazinRiver @ Mouth_1 03 Jul 02	10/8/2002 TazinRiver @ Mouth_1 08 Oct 02	6/17/2003 TazinRiver @ Mouth_1 17 Jun 03	9/30/2003 TazinRiver @ Mouth_1 30 Sep 03					
Chem. Group	ChemName	output unit	CCME FAL ¹																																																	
Physical/Major Ions	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	Total Organic Carbon(TOC)	ug/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	pH	pH Units	6.5-9	7.3	7.1	7.1	6.9	7.1	7.1	6.8	6.9	6.8	6.7	6.6	6.5	6.6	6.7	6.7	7.63	7.88	7.51	6.7	7.32	6.55	7.14	6.8	6.9	7.03	7.25	4.21	6.77	6.81	7.3	-	7.24	7.32	7.27	7.34	7.24	7.21	7.36	7.34	7.26	7.24	7.31	7.17	7.15	7.24	7.3			
	Electrical Conductivity (EC)	uS/cm	NG	33	38	40	44	42	59	38	43	35	34	37	23	35	350	38	37	36	37	30	34	37.7	41.8	44.7	38.7	42.4	45.1	110	48.9	38.8	39.2	38.4	37.5	39.1	39.8	37.3	43.1	41.5	41.9	40.4	42.2	38.2	39.7	40.4	42.4					
	Total Suspended Solids (TSS)	NG	5	5	5	5	5	7	7	1.8	0.5	3	2	2	4	2	2	1	3	4	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			
	Hardness as CaCO3	mg/L	NG	16.2	16	15	16.7	13.9	15.6	15	16	16	15	14	14	15	16	15	17	17	15	15.5	13	13	14	16	17	14.1	20	16.5	19.5	17.8	17.1	15.2	14	-	17	13.2	-	15.8	16.3	14.9	15.2	16.2	16.8	16.8	16.8	16.8	16.8	16.8		
	Alkalinity (total as CaCO3)	mg/L	NG	18	13	13	14	14	14	12	13	13	12	14	14	12	13.2	14	14	14	13	14	12	13	11.8	14	14.6	12.7	14.4	21	20.4	16	14.4	14.5	14.3	15.5	14.4	15.3	15	15	15	16.1	15.2	15	16.3	14.5	14.5	15.6	15.6	15.6	15.6	
	Calcium	mg/L	NG	4.56	4.43	4.21	4.7	3.6	4.4	4.4	4.4	4.4	4.2	4.2	4	3.7	4.4	4.5	4	5	4	4.4	3.8	3.7	4	4.6	4.8	4.1	6.3	4.82	5.93	5.48	5.14	4.44	3.99	4.34	5.01	3.54	4.41	4.55	4.61	5.09	5.39	4.65	4.75	4.38	4.26	4.52	4.48	4.52	4.48	
	Magnesium	mg/L	NG	1.16	1.21	1.08	1.2	1.2	1.12	0.98	1.1	1.3	1	1.1	1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.9	1	1	0.9	1	1.04	1.09	1.13	0.99	1.02	0.99	0.99	1.07	1.08	1.07	1.05	1.09	1.16	1.16	1.15	1.15	1.19	1.09	1.1	0.94	1.14	1.14			
	Fluoride	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	Sodium	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	Chloride	mg/L	120	1.1	1.5	1	2.1	1.5	1.5	1.2	1	1.4	1.2	0.07	2.6	1	1.4	1.2	1.4	1.5	1.4	1.2	1.1	1	1.12	1.55	1.31	1.06	1.32	1.47	1.52	1.4	1.45	1.42	1.21	1.19	1.17	1.4	1	1.5	1.5	1.2	0.8	1.2	1.3	0.7	1.6	1.5	0.8			
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	Sulphate	mg/L	1.6	2.9	1	1.6	2.3	5.2	1	1.9	2.8	2	7	1.4	1.8	2	2	4	2	3	7	5	4	4.2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3		
	TCU	mg/L	30	15	30	15	20	25	30	40	10	20	7	10	20	13	10	10	10	10	15	12	30	10	15	20	17	18	15	20	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Total Solids (Filtered)	mg/L	NG	45	48	37	35	41	75	54	52	35	39	41	40	48	46	18	47	35	23	28	50	36	59	44	47	44	37	34	34	50	34	38	34	10	42	41	48	31	39	36	44	29	41	50	63	10	32	32		
	Turbidity	NTU	NG	2.1	0.65	0.76	1	0.65	0.4	7.5	0.8	3	0.48	0.4	0.6	1.4	2.7	0.75	0.6	1.3	0.9	0.4	1.6	1.2	0.6	0.7	0.6	1	1	2	0.6	1.9	1	1.1	1	1.3	1.5	2.2	1.2	3	1	1.8	1.7	0.6	2.7	1.1	0.9	0.9				
Nutrients	Ammonia as N	mg/L	0.021 ¹	0.082	0.03	0.03	0.03	0.03	-	0.03	0.05	0.04	0.03	0.07	0.007	0.028	0.03	0.03	0.009	0.012	0.014	0.011	0.009	0.007	0.002	0.017	0.003	0.005	0.02	0.045	0.015	0.01	0.014	0.003	0.016	0.005	0.008	0.012	0.019	0.007	0.005	0.018	0.074	0.005	0.011	0.005	0.005	0.005	0.005	0.005		
	Total Kjeldahl Nitrogen (TKN)	mg/L	13	0.018	0.48	0.28	0.32	0.37	-	0.45	0.28	0.47	0.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Nitrate (as NO3-N)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.04	0.04	0.04	0.06	0.04	-	0.04	0.04	0.04	0.02	0.01	0.04	0.02	0.02	0.02	0.04	0.01	0.04	0.02	0.01	0.04	0.008	0.024	0.062	0.008	0.015	0.038	0.074	0.008	0.012	0.008	0.009	0.008	0.012	0.026	0.008	0.024	0.008	0.009	0.008	0.008	0.013	0.008	0.009	0.008	0.008			
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Phosphorus	ug/L	4	100	50	50	50	50	-	50	50	50	50	50	7	8	6	6	6	9	5	6	10	5	14	4	6	14	12	12	11	10	8	-	12	9	6	8	17	9	10	16	4	12	4	8	74	12	7	7		
	Phosphorus (Filtered) (Filtered)	mg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Aluminum (Filtered)	ug/L	5 @ pH < 6.5100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Aluminum Total	ug/L	5 @ pH < 6.5100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Antimony	ng/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Antimony (Filtered)	ug/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	ug/L	5	5	1	1	1	1	1	1	0.5	0.5	1	1	1	1	1	0.5	1	1	0.5	0.5	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
	Arsenic (Filtered)	ug/L	5	-	-	-																																														

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given

^b CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.15: CCME Water Quality Guidelines - Tazin River @ Mouth, All Parameters

			Sampled Date Time	6/28/2004	10/5/2004	5/31/2005	9/20/2005	6/12/2006	10/4/2006	6/19/2007	10/2/2007	6/17/2008	9/28/2008	6/16/2009	10/1/2009	6/14/2010	10/4/2010	7/22/2015	9/22/2015	7/27/2016	
			SampleCode	TazinRiver @Mouth_28 Jun 04	TazinRiver @Mouth_05 Oct 04	TazinRiver @Mouth_31 May 05	TazinRiver @Mouth_20 Sep 05	TazinRiver @Mouth_12 Jun 06	TazinRiver @Mouth_04 Oct 06	TazinRiver @Mouth_19 Jun 07	TazinRiver @Mouth_02 Oct 07	TazinRiver @Mouth_17 Jun 08	TazinRiver @Mouth_28 Sep 08	TazinRiver @Mouth_16 Jun 09	TazinRiver @Mouth_01 Oct 09	TazinRiver @Mouth_14 Jun 10	TazinRiver @Mouth_04 Oct 10	TazinRiver @Mouth_22 Jul 15	TazinRiver @Mouth_22 Sep 15	TazinRiver @Mouth_27 Jul 16	
Chem_Group	ChemName	output unit	CCME FAL ¹																		
Physical/Major Ions	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.292	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	
	Total Organic Carbon(TOC)	ug/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0089	
	pH	pH Units	6.5-9	7.33	7.27	6.87	7.38	7.42	7.25	7.43	7.38	7.49	7.51	7.23	7.46	7.54	7.32	7.5	7.33	7.46	
	Electrical Conductivity (EC)	µS/cm	NG	36	36.8	39	39.6	37.7	41.5	39.4	43.1	39.5	41.9	38.5	41.4	42	44.1	42.8	43.2	42.7	
	Total Suspended Solids (TSS)	mg/L	NG	3	3	3	3	3	3	3	3	3	3	3	3	3	6	3	3	3	
	Hardness as CaCO3	mg/L	NG	22.4	12	14	19.8	18.2	18.5	22.1	21.1	20.6	11.1	22.4	11.8	19.5	25.6	18.1	17.3	19.5	
	Alkalinity (total as CaCO3)	mg/L	NG	15.1	14.5	13.8	16.2	15.8	16.8	15.9	16.4	15.4	15	14.3	15.7	15.6	16.5	15.7	16.1	15.9	
	Calcium	mg/L	NG	4.7	3.4	4.1	5.3	5.3	5.4	6.3	6.1	5.9	3.7	6.8	3.5	5.6	7.6	5.2	5	4.4	
	Magnesium	mg/L	NG	1.2	0.8	0.9	1.6	1.2	1.3	1.5	1.4	1.4	0.5	1.3	0.7	1.3	1.6	1.3	1.2	2	
	Potassium	mg/L	NG	0.8	0.7	0.6	0.7	0.8	0.8	1	0.7	0.8	0.8	0.9	0.6	0.9	1	0.8	0.8	0.7	
	Sodium	mg/L	NG	1.4	1.2	1.3	1.4	1.4	1.3	1.8	1.4	1.5	1.6	1.6	1.3	1.8	1.6	1.6	1.5	1.4	
	Chloride	mg/L	120	1.1	1.1	1.2	1.8	1.1	1.1	1.1	1.5	1.3	1.5	1.3	1.4	1.3	1.8	1.3	1.4	1.2	
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	
	Sulphate	mg/L	NG	0.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	Colour	TCU	NG	5	20	20	15	42	28	23	27	30	22	31	24	24	18	20	24	-	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.3	
	Total Solids (Filtered)	mg/L	NG	38	26	50	20	30	16	10	33	36	10	10	22	40	26	36	37	27	
	Turbidity	NTU	NG	1.08	1.08	1.14	1.06	1	0.97	0.68	0.79	0.95	1.25	2.89	1.07	1.09	0.98	0.82	1.09	0.96	
	Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.005	0.005	0.005	0.005	0.005	0.005	0.007	0.005	0.005	0.005	0.01	0.01	0.01	0.01	0.005	0.005	0.005
Total Kjeldahl Nitrogen (TKN)		mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrate (as NO3-N)		mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.005	
Nitrite (as NO2-N)		mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	
Nitrate and Nitrite (as N) (mg/L)		mg/L	NG	0.2	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.39	0.01	0.01	0.04	0.08	0.07	0.06	0.08	0.0051	
Nitrogen (Total)		mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.28	0.29	0.325	
Orthophosphate (as P)		mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	
Phosphorus		µg/L	4	10	80	10	10	10	10	10	20	10	10	10	10	10	10	9	5	0.0029	
Phosphorus (Filtered) (Filtered)		µg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Aluminum (Filtered)		µg/L	5 @ pH < 6.5[100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	1.7	5.5	
Metals ⁵	Aluminum Total	µg/L	5 @ pH < 6.5[100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.1	12	12.2	
	Antimony	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Arsenic	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.2	
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.2	
	Barium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4.3	4.9	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.9	3.5	4.8	
	Beryllium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.2	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.2	
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.2	3.5	3	
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.3	3.9	3.9	
	Cadmium	µg/L	0.09	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.05	0.05	0.05	
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0.05	0.05	
	Cesium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.1	0.1	
	Chromium	µg/L	NG	0.6	0.3	0.4	0.3	0.3	0.7	0.3	0.3	0.1	0.1	0.1	0.1	0.3	0.3	0.1	0.1	0.1	
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Cobalt	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Copper	µg/L	2 ∙ 4 ³	1	0.6	0.6	0.3	0.4	0.4	0.4	0.3	0.5	-	0.7	0.4	0.3	0.2	0.2	0.2	0.2	
	Copper (Filtered)	µg/L	2 ∙ 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.2	
	Iron	µg/L	300	54	59	0.4	82	159	77	66	50	72	37	105	47	57	38	26	36	78	
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	5	37	
	Lead	µg/L	1-7 ⁷	1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1	0.4	0.2	0.1	0.1	
	Lead (Filtered)	µg/L	1-7 ⁷	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Lithium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	0.7	0.6	
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	0.7	0.6	
	Manganese	µg/L	NG	7.5	5.9	8.6	9.6	8.1	11.4	6.1	8.2	10	11.1	11.4	10.6	11.3	12.6	12.9	16.3	12.2	
	Manganese (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.2	
	Mercury	µg/L	0.028	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.01	0.01	
	Mercury (Filtered)	µg/L	0.028	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.01	0.01	
	Molybdenum	µg/L	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.3	0.2	
	Molybdenum (Filtered)	µg/L	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.3	0.3	
	Nickel	µg/L	25-150 ³	0.1	0.1	0.3	0.1	0.1	0.3	0.1	0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.1	0.3	0.1	0.1
	Nickel (Filtered)	µg/L	25-150 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.1	0.1	
	Rubidium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.6	1.7	1.5	
	Rubidium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.6	1.6	1.5	
	Selenium	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3	0.3	
	Selenium (Filtered)	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3	0.3	
	Silver	µg/L	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Silver (Filtered)	µg/L	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Strontium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28.7	30.5	29.1	
	Strontium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28.9	27.8	27	
	Thallium	µg/L	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Thallium (Filtered)	µg/L	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Tin	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Tin (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	
	Titanium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	0.4	0.2	

Table A.16: CCME Water Quality Guidelines - Thelon River @ Catling Lake, All Parameters

Chem_Group	ChemName	output unit	Sampled Date Time	9/11/1983	9/11/1984	9/14/1985	9/4/1986	9/9/1987	8/31/1988	9/13/1989	9/6/1990	9/9/1991	9/9/1992	8/25/1993	8/17/1994	9/7/1995	8/26/1996	9/17/1997	9/1/1998	9/13/1999	8/21/2000	9/18/2001	9/11/2002	8/30/2003	9/21/2004	9/2/2005	9/1/2006	9/13/2007	9/9/2008	9/1/2009	9/3/2010	7/20/2015	3/24/2016			
			SampleCode	ThelonR @CatlingL _11 Sep 83	ThelonR @CatlingL _11 Sep 84	ThelonR @CatlingL _14 Sep 85	ThelonR @CatlingL _04 Sep 86	ThelonR @CatlingL _09 Sep 87	ThelonR @CatlingL _31 Aug 88	ThelonR @CatlingL _13 Sep 89	ThelonR @CatlingL _06 Sep 90	ThelonR @CatlingL _09 Sep 91	ThelonR @CatlingL _09 Sep 92	ThelonR @CatlingL _25 Aug 93	ThelonR @CatlingL _17 Aug 94	ThelonR @CatlingL _07 Sep 95	ThelonR @CatlingL _26 Aug 96	ThelonR @CatlingL _17 Sep 97	ThelonR @CatlingL _01 Sep 98	ThelonR @CatlingL _13 Sep 99	ThelonR @CatlingL _21 Aug 00	ThelonR @CatlingL _18 Sep 01	ThelonR @CatlingL _11 Sep 02	ThelonR @CatlingL _30 Aug 03	ThelonR @CatlingL _21 Sep 04	ThelonR @CatlingL _02 Sep 05	ThelonR @CatlingL _01 Sep 06	ThelonR @CatlingL _13 Sep 07	ThelonR @CatlingL _09 Sep 08	ThelonR @CatlingL _01 Sep 09	ThelonR @CatlingL _03 Sep 10	ThelonR @CatlingL _20 Jul 15	ThelonR @CatlingL _24 Mar 16			
Physical/Major Ions	Bicarbonate as CaCO3	mg/L	CCME FAL ¹	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.6	6.4			
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.171	0.333		
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.225	0.988		
	Total Organic Carbon(TOC)	ug/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0031	0.0044		
	pH	pH Units	6.5-9	6.5	6.3	6.4	6.4	6.3	7.5	6.3	7.45	7.94	6.89	6.45	6.74	6.53	6.8	6.69	6.24	6.8	6.77	6.67	6.6	6.64	6.61	6.6	6.77	6.8	6.94	6.79	6.77	6.78	6.47			
	Electrical Conductivity (EC)	µS/cm	NG	12	13	13	13	12	12	11	11.2	11.5	15.6	11.1	12.2	11	11.3	11.4	12.4	11.3	11.9	12.9	11.8	13.3	12.6	11.8	11.9	12.3	11.9	10.8	12.9	10.7	21.7			
	Total Suspended Solids (TSS)	mg/L	NG	5	5	5	3	2	0.2	4	3	3				3	3					3	3	3	3	4	3	3	3	3	3	3	3	3		
	Hardness as CaCO3	mg/L	NG	4.6	1.6	3.7	4.5	4.1	4.4	4	4	4	3	4.1	4.2	4.2	3.7	4.07	-	4.07	4.43	4.52	4.74	4.44	5.5	7.7	8.1	7.9	11.9	4.6	8.1	5.5	9.3			
	Alkalinity (total as CaCO3)	mg/L	NG	3.3	-	3.5	3.4	3.4	3.6	2.9	2.8	3	4	1.3	3.3	3	3.7	3.6	3.2	3.2	3.1	3.9	3.5	5.6	4.8	5.2	5.2	3.6	4.2	3.9	3.6	6.4				
	Calcium	mg/L	NG	1.1	1	1	1	1	1	1	1	1	1	1	1.02	1.07	0.88	1	1.01	0.97	1.05	1.1	1.04	1.12	1.4	2	2	1.9	3.3	0.9	2.1	1.5	2.4			
	Magnesium	mg/L	NG	0.5	0.4	0.46	0.47	0.39	0.5	0.4	0.4	0.4	0.4	0.4	0.38	0.37	0.383	0.42	0.4	0.44	0.43	0.52	0.4	0.5	0.6	0.8	0.7	0.9	0.6	0.7	0.4	0.8				
	Potassium	mg/L	NG	-	0.5	-	-	0.3	0.4	0.2	0.3	0.3	0.7	0.2	0.3	0.26	0.24	0.297	0.32	0.3	0.28	0.43	0.28	0.24	-	0.3	0.3	0.3	0.2	0.3	0.3	0.6				
	Sodium	mg/L	NG	-	0.1	-	-	0.6	0.6	0.4	0.4	0.4	0.8	0.4	0.23	0.75	0.39	0.41	0.42	0.41	0.39	0.44	0.43	0.37	0.4	0.4	0.4	0.4	0.6	0.3	0.4	0.4	1			
	Chloride	mg/L	120	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.4	0.29	0.58	0.42	0.18	0.28	0.42	0.4	0.2	0.2	0.3	0.2	0.3	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7			
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.2		
	Sulphate	mg/L	NG	1	2.3	1.5	3	2.5	1.8	2	4	2	2	3	-	5	3	3	3	3	3	0.5	3	3	1	1	1	1	1	1	1	1	1	1		
	Colour	TCU	NG	5	20	5	5	5	5	7	5	5	5	5	7	5	5	5	5	-	5	5	5	10	10	5	17	15	12	12	12	12	12	12		
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.3	4.2		
	Total Solids (Filtered)	mg/L	NG	5	22	24	21	20	10	10	35	13	19	10	27	19	10	21	10	14	27	20	30	12	12	10	24	14	10	45	10	10	27			
	Turbidity	NTU	NG	1	2.3	0.42	0.84	0.4	-	-	1	0.6	1.1	0.06	0.5	0.7	0.6	0.6	0.6	0.7	0.3	0.9	0.5	0.6	0.72	1.39	0.83	0.58	0.68	0.61	0.7	0.6	0.3			
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.09	0.01	0.09	0.014	0.03	0.007	0.04	0.11	0.005	0.007	0.01	0.007	0.009	0.01	0.004	0.011	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005		
	Total Kjeldahl Nitrogen (TKN)	mg/L	NG	0.44	0.27	0.11	0.24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.005	0.0759	
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	0.001	
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.02	0.04	0.02	0.04	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.718	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.0051	0.0759			
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.189	0.327	
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	0.001	
	Phosphorus	µg/L	4	50	50	50	50	50	5	5	14	8000	5	8	2	8	8	11	12	7	9	4	51	4	90	10	10	10	10	10	10	10	2	2		
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ¹	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	5.8		
	Aluminum Total	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.9	10.6	
	Antimony	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1		
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1		
	Arsenic	µg/L	5	2.8	1	0.5	0.7	1	1	0.5	1	0.5	0.5	0.3	0.3	0.3	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	
	Barium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	6.9	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.5	7	
	Beryllium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	
	Cadmium	µg/L	0.09	0.05	0.5	0.4	0.1	0.5	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.1	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			

Notes:

- ¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)
- ² Guideline varies with pH
- ³ Guideline varies with hardness. Range given.
- ⁴ Guideline varies with pH and temperature. Most stringent given.
- ⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.17a: CCME Water Quality Guidelines - Yellowknife River, All Parameters

			Sampled Date Time	6/30/1988	8/17/1988	9/28/1988	11/30/1988	8/10/1989	9/12/1989	10/10/1989	11/16/1989	12/14/1989	1/31/1990	2/15/1990	4/4/1990	5/4/1990	7/25/1990	8/27/1990	
			SampleCode	YKRiver@Bridge_DL_30 Jun 88	YKRiver@Bridge_DL_17 Aug 88	YKRiver@Bridge_DL_28 Sep 88	YKRiver@Bridge_DL_30 Nov 88	YKRiver@Bridge_DL_10 Aug 89	YKRiver@Bridge_DL_12 Sep 89	YKRiver@Bridge_DL_10 Oct 89	YKRiver@Bridge_DL_16 Nov 89	YKRiver@Bridge_DL_14 Dec 89	YKRiver@Bridge_DL_31 Jan 90	YKRiver@Bridge_DL_15 Feb 90	YKRiver@Bridge_DL_04 Apr 90	YKRiver@Bridge_DL_04 May 90	YKRiver@Bridge_DL_25 Jul 90	YKRiver@Bridge_DL_27 Aug 90	
Chem. Group	ChemName	output unit	CCME FAL ¹																
Cyanide	Cyanide Total	mg/L	NG	0.00100000004749745	0.001	-	0.0020000000949949	0.001	-	0.001	0.0020000000949949	0.00100000004749745	0.0020000000949949	0.00300000002607703	0.0020000000949949	0.00100000004749745	0.00100000004749745	0.001	
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	0.40999996423721	0.37999996231628	0.370000004768372	0.44999998079071	0.360000014305115	0.310000002384186	0.330000013113022	0.44999998079071	0.46000000834465	0.479999989271164	0.519999980926513	0.490000009536743	0.430000007152557	0.28999999165535	0.28999999165535	
	pH	pH Units	6.5-9	8	7.51999998092651	7.63099986648559	7.17000007629394	7.46000003814697	7.3699998555908	7.51999998092651	7.17000007629394	7.7399997711816	7.5	7.1100001335144	7.44999980926513	8.09000015258789	8.10000038146972	7.8699998555908	
	Electrical Conductivity (EC)	µS/cm	NG	50.099998474121	50.7999992370605	48.599998474121	48.7999992370605	50.4000015258789	49	52	48.7000007629394	49	51.2000007629394	50	45.7999992370605	45.2000007629394	47.7000007629394	45.7999992370605	
	Total Suspended Solids (TSS)	mg/L	NG	3	1.39999997615814	1	1	1	1	1.3999997615814	1	1.3999997615814	1	1	1	1	1	1	
	Hardness as CaCO3	mg/L	NG	19.1000003814697	19.6000003814697	16.8999996185302	18.7000007629394	19.1000003814697	18.7000007629394	18.5	19	18	17.9999992370605	17.1000003814697	-	16.7999992370605	18.8999996185302	17.5	
	Alkalinity (total as CaCO3)	mg/L	NG	-	17.8999996185302	16.1000003814697	16.2999992370605	17	16.1000003814697	16.3999996185302	16.3999996185302	15.6999998092651	17.3999996185302	15.8000001907348	14.8000001907348	20	15.6999998092651	14.8999996185302	
	Calcium	mg/L	NG	4.69000005722045	4.90000009536743	4.30000019073486	4.69999980926513	4.69999980926513	4.59999990463256	4.80000019073486	4.40000009536743	4.40000009536743	4.23000001907348	4.09999990463256	4.71999979019165	4.289999976185302	4.289999976185302	4.289999976185302	
Magnesium	mg/L	NG	1.79999995231628	1.79999995231628	1.5	1.70000004768371	1.79999995231628	1.70000004768371	1.70000004768371	1.70000004768371	1.6599999662139	1.6599999662139	1.58000004291534	1.60000002384185	1.60000002384185	1.74000000953674	1.64999997615814		
Potassium	mg/L	NG	0.8999998079071	0.949999988079071	0.910000026226043	0.9200000166893	0.949999988079071	0.910000026226043	0.860000014305114	0.95999978542327	0.930000007152557	0.930000007152557	1.46000003814697	1.32000005245208	0.930000007152557	0.9200000166893	0.87000004768371		
Sodium	mg/L	NG	1.6599999662139	1.65999999046325	1.6299999523162	1.6599999662139	1.67999994754791	1.61000001430511	1.72000002861022	1.69000005722045	1.72000002861022	1.79999995231628	1.97000002861022	1.5	1.39999997615814	1.70000004768371	1.5		
Chloride	mg/L	120	1.5	1.60000002384185	1.3999997615814	1.60000002384185	1.70000004768371	1.70000004768371	1.5	1.60000002384185	1.8999997615814	1.79999995231628	1.97000002861022	1.5	1.39999997615814	1.70000004768371	1.5		
Fluoride	mg/L	0.12	0.059999986588955	0.0500000007450581	0.059999986588955	0.0500000007450581	0.079999982118607	0.0700000002980232	0.0700000002980232	0.0700000002980232	0.0700000002980232	0.0700000002980232	0.0700000002980232	0.059999986588955	0.0900000035762787	0.0700000002980232	0.0700000002980232		
Sulphate	mg/L	NG	3.20000004768371	2.79999995231628	2.79999995231628	3.20000004768371	2.90000009536743	2.5	2.79999995231628	3.70000004768371	2.20000004768371	2.5	2.90000009536743	3.59999990463256	2.79999995231628	2.29999995231628	2.59999990463256		
Colour	TCU	NG	5	10	7.5	7.5	10	7.5	5	7.5	5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5.07999992370605	5.30999994277954	4.92000007629394	4.65000009536743	4.71000003814697	4.7399997711816	4.76999998092651	4.57999992370605	4.7899996185302	4.80000019073486	4.55999994277954	5.01999998092651	4.53000020980834	4.6100001335144	4.53000020980834	4.53000020980834	
Total Organic Carbon (TOC)	mg/L	NG	5.30000019073486	5.40000009536743	5.01000022888183	4.80000019073486	4.8699998555908	4.94000005722045	4.92000007629394	4.8600001335144	5.01999998092651	5.21999979019165	5.13000011444091	5.25	4.61999998555908	4.78000020980834	4.75		
Total Solids (Filtered)	mg/L	NG	14	25	23	24	25	23	23	25	23	25	24	25	23	22	22	22	
Turbidity	NTU	NG	3.20000004768371	0.789999980926513	1.23000001907348	1.11000001430511	2.09999990463256	2	1.83000004291534	1.08000004291534	1.12999999523162	1.340000033786	0.759999990463256	0.680000007152557	0.800000011920928	1.5299997138977	1.6599999662139	1.6599999662139	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.01	0.01	0.0160000007599592	0.052999993741512	0.01	0.01	0.01	0.013000002682209	0.0500000007450581	0.054999997019768	0.0560000017285347	0.0579999983310699	0.063000001013279	0.0370000004768372	0.01	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Phosphorus	µg/L	4	6	6	6	6	6	6	6	6	6	6	6	4	4	4	4	
	Phosphorus (filtered) (Filtered)	mg/l	4	0.003	0.00300000002607703	0.003	0.00300000002607703	0.00300000002607703	0.003	0.00300000002607703	0.00499999988824129	0.00499999988824129	0.003	0.00300000002607703	0.002	0.002	0.00300000002607703	0.002	
	Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Biological	Total Coliforms	MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E. Coli	MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Antimony	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic (Filtered)																		

Table A.17a: CCME Water Quality Guidelines - Yellowknife River, All Parameters

			Sampled Date Time		9/24/1990	10/17/1990	12/10/1990	1/28/1991	3/12/1991	5/28/1991	6/20/1991	7/17/1991	8/8/1991	4/2/1992	5/11/1992	6/2/1992	6/29/1992	7/28/1992	10/5/1992
			Sample Code	YKRiver@Bridge_DL_24 Sep 90	YKRiver@Bridge_DL_17 Oct 90	YKRiver@Bridge_DL_10 Dec 90	YKRiver@Bridge_DL_28 Jan 91	YKRiver@Bridge_DL_12 Mar 91	YKRiver@Bridge_DL_28 May 91	YKRiver@Bridge_DL_20 Jun 91	YKRiver@Bridge_DL_17 Jul 91	YKRiver@Bridge_DL_08 Aug 91	YKRiver@Bridge_DL_02 Apr 92	YKRiver@Bridge_DL_11 May 92	YKRiver@Bridge_DL_02 Jun 92	YKRiver@Bridge_DL_29 Jun 92	YKRiver@Bridge_DL_28 Jul 92	YKRiver@Bridge_DL_05 Oct 92	
Chem_Group	ChemName	output unit	CCME FAL ¹																
Cyanide	Cyanide Total	mg/L	NG	-	0.001	0.001	0.00100000004749745	-	0.00100000004749745	0.0020000000949949	0.0020000000949949	0.0020000000949949	0.0020000000949949	0.0020000000949949	0.00133333339666327	0.00100000004749745	0.0020000000949949	0.0020000000949949	
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	0.310000002384186	0.370000004768372	0.5	0.52999997138977	0.550000011920928	0.550000011920928	0.519999980926513	0.483333329235699	0.419999986886978	0.730000019073486	0.56999992847442	0.550000011920929	0.479999989271164	0.31999992847443	0.389999985694885	
	pH	pH Units	6.5-9	7.80000019073486	7.92000007629394	7.55999994277954	7.17000007629394	7.48000001907348	8.11999988555908	6.78999996185302	8.40999984741211	7.53000020980834	8.189999803833	7.75	7.32666673020449	7.48999977111816	7.42000007629394	7.30000019073486	
	Electrical Conductivity (EC)	µS/cm	NG	46.2000007629394	46.4000015258789	46.599998474121	47	50	58	50.2000007629394	70.066666209798	48.599998474121	51.599998474121	52.2000007629394	54.7333335876454	54.5	50.7000007629394	49	
	Total Suspended Solids (TSS)	mg/L	NG	1	1	1	1	1	1.39999997615814	1.6000002384185	3.733333492279	1	1	1	1.10000002384186	1.60000002384185	2.20000004768371	1.79999995231628	
	Hardness as CaCO3	mg/L	NG	17.7000007629394	17.8999996185302	17.6000003814697	17.1000003814697	17.8999996185302	19.2000007629394	18.5	20.1000003814697	19	19.1000003814697	19.7999992370605	20.9666663951	20	19.5	19	
	Alkalinity (total as CaCO3)	mg/L	NG	14.1999998092651	14.8999996185302	15.1000003814697	14.8999998092651	15.6999998092651	18.1000003814697	17.2000007629394	16.4333333969116	15.1999998092651	16.8999996185302	15.6000003814697	18.1333332061767	17.7000007629394	17.8999996185302	16.3999996185302	
	Calcium	mg/L	NG	4.38000011444091	4.40000009536743	4.3600001335144	4.19999980926513	4.46999979019165	4.69999980926513	4.5	5	4.69999980926513	4.69999980926513	4.80000019073486	5.13333320617675	4.88999986648559	4.80000019073486	4.67000007629394	
	Magnesium	mg/L	NG	1.64999997615814	1.69000005722045	1.63999998569488	1.60000002384185	1.62999999523162	1.80999994277954	1.76999998092651	1.85000002384185	1.76999998092651	1.78999996185302	1.88999998569488	1.98000001907348	1.8799999523162	1.83000004291534	1.77999997138977	
	Potassium	mg/L	NG	0.870000004768371	0.839999973773956	0.849999985694885	0.9200000166893	0.949999988079071	0.93000007152557	0.889999985694885	0.916666686534881	0.87999995231628	0.9200000166893	0.959999978542327	0.94999998807907	0.87999995231628	0.889999985694885	0.89999976158142	
	Sodium	mg/L	NG	1.75	1.64999997615814	1.64999997615814	1.63999998569488	1.77999997138977	1.77999997138977	1.74000000953674	1.75666666030883	1.63999998569488	1.72000002861022	1.72000002861022	1.8766666650772	1.72000002861022	1.67999994754791	1.73000001907348	
	Chloride	mg/L	120	1.79999995231628	1.5	1.60000002384185	1.60000002384185	1.70000004768371	1.5	1.5	1.60000002384185	1.60000002384185	1.70000004768371	1.78999996185302	2.0266664123535	1.90999996662139	1.63999998569488	1.41999995708465	
	Fluoride	mg/L	0.12	0.0700000002980232	0.0599999986588955	0.079999982118607	0.0900000035762787	0.059999986588955	0.0700000002980232	0.059999986588955	0.063333325386047	0.059999986588955	0.0500000007450581	0.0500000007450581	0.0500000007450581	0.059999986588955	0.059999986588955	0.0500000007450581	
	Sulphate	mg/L	NG	2.79999995231628	2.5	2.20000004768371	2.40000009536743	2.59999990463256	2	2.40000009536743	2.83333341280619	3.09999990463256	3.70000004768371	2.79999995231628	2.83333333333333	2.90000009536743	3.59999990463256	2.90000009536743	
	Colour	TCU	NG	5	5	5	5	5	7.5	5	10	7.5	5	15	5	10	10	5	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	4.32999992370605	4.21999979019165	4.57999992370605	4.5	4.9099998474121	5.01000022888183	4.90000009536743	5.29666678110758	5.34999990463256	5.09999990463256	5.44000005722045	5.2400000890096	5.1599998474121	5.30000019073486	4.96999979019165	
	Total Organic Carbon (TOC)	mg/L	NG	4.55999994277954	4.32999992370605	4.76999998092651	4.69000005722045	5.13000011444091	5.09000015258789	5.03999996185302	5.53333314259847	5.40000009536743	5.21000003814697	5.550000019073486	5.36333338419596	5.38000011444091	5.530000020980834	5.13999998648559	
	Total Solids (Filtered)	mg/L	NG	22	22	22	22	23	24	24	24.3333333333333	23	25	23	25	25	25	23	
	Turbidity	NTU	NG	1.83000004291534	1.32000005245208	0.82999998310699	0.720000028610229	0.699999988079071	1.40999996662139	2.29999995231628	2.83333333333333	1.60000002384185	0.680000007152557	1.30999994277954	1.6600000635782	1.63999998569488	2.5	2.09999990463256	
	Nutrients	Ammonia as N	mg/L	0.021 ⁴	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.01	0.020999997168779	0.048999987185001	0.0500000007450581	0.063000001013279	0.034000001847744	0.0230000000447035	0.01	0.01	0.0670000016689301	0.039999991059303	0.034000001847744	0.01	0.01	0.0130000002682209
		Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Phosphorus	µg/L	4	4	4	4	4	4	4	4	6.50000013411045	4	4	4	4.50000003911555	4.9999998824129	7.00000021606684	4
		Phosphorus (Filtered) (Filtered)	mg/l	4	0.002	0.00300000002607703	0.002	0.002	0.002	0.00300000002607703	0.002	0.0083333345750968	0.00899999961256981	0.00300000002607703	0.006000000005215406	0.0063333344012499	0.00800000037997961	0.00800000037997961	0.0049999998824129
Demand Parameters		Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Biological		Total Coliforms	MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		E. Coli	MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Antimony	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Antimony (Filtered)	µg/L	NG	-	-	-													

Table A.17a: CCME Water Quality Guidelines - Yellowknife River, All Parameters

			Sampled Date Time		4/11/1994	5/3/1994	6/8/1994	7/5/1994	8/24/1994	9/7/1994	10/5/1994	11/4/1994	12/9/1994	1/9/1995	2/6/1995	3/14/1995	4/6/1995	5/8/1995	6/6/1995
			SampleCode	YKRiver@Bridge_DL_11 Apr 94	YKRiver@Bridge_DL_03 May 94	YKRiver@Bridge_DL_08 Jun 94	YKRiver@Bridge_DL_05 Jul 94	YKRiver@Bridge_DL_24 Aug 94	YKRiver@Bridge_DL_07 Sep 94	YKRiver@Bridge_DL_05 Oct 94	YKRiver@Bridge_DL_04 Nov 94	YKRiver@Bridge_DL_09 Dec 94	YKRiver@Bridge_DL_09 Jan 95	YKRiver@Bridge_DL_06 Feb 95	YKRiver@Bridge_DL_14 Mar 95	YKRiver@Bridge_DL_06 Apr 95	YKRiver@Bridge_DL_08 May 95	YKRiver@Bridge_DL_06 Jun 95	
Chem. Group	ChemName	output unit	CCME FAL ¹																
Cyanide	Cyanide Total	mg/L	NG	0.001	0.001	0.001	-	0.002	0.001	0.001	-	0.002	0.004	0.003	0.003	0.005	0.002	0.002	
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	0.46	0.42	0.34	0.32	0.31	0.22	0.28	0.35	0.416666666666667	0.45	0.44	0.41	0.41	0.436666666666667	0.39	
	pH	pH Units	6.5-9	6.94	7.01	7.34	7.44	7.42	7.34	7.12	7.2	6.473333333333333	7.1	6.96	6.56	6.76	6.75	7.06	
	Electrical Conductivity (EC)	µS/cm	NG	49.5	48.7	50.4	54.1	50.1	48.2	49.1	48.2	70.36666666666667	53	48.5	49.7	55.4	54.36666666666667	55.7	
	Total Suspended Solids (TSS)	mg/L	NG	3	3	3	11	6	3	3	-	4.333333333333333	6	3	3	3	8	3	
	Hardness as CaCO3	mg/L	NG	16.16082	16.65754	18.27523	17.98838	18.4851	18.11055	17.77717	17.61249	18.1814	18.69095	17.73868	15.37591	17.65025	16.812963333333333	18.06804	
	Alkalinity (total as CaCO3)	mg/L	NG	15.7	14.6	15.5	16	15.8	16	16.2	16.7	16.333333333333333	16.2	16	13.4	15.1	14.833333333333333	14.8	
	Calcium	mg/L	NG	4.03	3.86	4.29	4.32	4.56	4.64	4.31	4.35	4.48	4.52	4.18	3.92	3.93	4.16	4.17	
	Magnesium	mg/L	NG	1.44	1.39	1.49	1.53	1.61	1.68	1.6	1.59	1.62	1.69	1.58	1.46	1.52	1.723333333333333	1.65	
	Potassium	mg/L	NG	0.95	0.78	0.79	0.7	0.85	0.79	0.81	0.67	0.89	0.95	0.96	0.66	0.71	0.803333333333333	0.72	
	Sodium	mg/L	NG	0.6	0.74	0.68	0.48	0.52	0.47	0.59	0.44	0.46	0.46	1.15	1.01	1.04	1.11	1.06	
	Chloride	mg/L	120	1.69	1.8	1.58	1.45	1.6	1.64	1.6	1.65	1.896666666666667	1.95	1.68	1.42	1.6	1.6	1.58	
	Fluoride	mg/L	0.12	0.08	0.07	0.06	0.06	0.07	0.06	0.05	0.05	0.06	0.08	0.08	0.06	0.06	0.06	0.06	
	Sulphate	mg/L	NG	3.9	4.3	3.5	3.2	3.2	3.1	3.2	3.2	3.766666666666667	3.5	2.3	2.9	3.3	3.966666666666667	3.3	
	Colour	TCU	NG	7	7	8	8	8	7	8	7	10	5	8	5	5	5	5	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5.9	4.8	4.2	5.3	4.7	5.5	3.9	4.1	4.7	4	4	4.3	4.3	4.5	4.3	
	Total Organic Carbon (TOC)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Solids (Filtered)	mg/L	NG	30	40	50	37	40	31	31	33	37	24	31	10	25	38.333333333333333	50	
	Turbidity	NTU	NG	0.7	2.1	4.8	10.1	5	4.8	3	3.5	2.966666666666667	2	1.2	1.3	1.1	3.033333333333333	2.6	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.034	0.0025	0.004	0.019	0.024	0.012	0.026	0.02	0.0853333333333333	0.017	0.0025	0.006	0.01	0.0193333333333333	0.016	
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.07	0.077	0.029	0.005	0.01	0.016	0.025	0.0586666666666667	0.0653	0.06	0.072	0.075	0.045	0.015		
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Phosphorus	µg/L	4	16	7	7	30	13	6	13	8	15.666666666666667	7	12	15	8	17	10	
	Phosphorus (filtered) (Filtered)	mg/l	4	0.009	0.005	0.007	0.007	0.01	0.003	0.002	0.003	0.012	0.004	0.011	0.013	0.006	0.008	0.005	
	Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Coliforms	MPN/100mL	NG	-	2	1	106	1	-	1	1	2.5	5	1	1	5	1	1
E. Coli		MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	60	49	80	142	144	113	109	81	58.333333333333333	42	34	30	28	268.333333333333333	150	
	Antimony	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic (Filtered)	µg/L	5	0.2	0.3	0.4	3.7	1	0.3	0.3	0.2	0.13333333333333333	0.1	0.1	0.1	0.1	0.2666666666666667	0.3	
	Barium	µg/L	NG	4.4	4.5	4.5	5.3	5.4	5.2	4.5	4.5	4.666666666666667	4.2	3.9	4.5	6.533333333333333	5.6		
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L	NG	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	0.09	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L	NG	0.5	0.2	0.3	0.4	0.4	0.2	0.3	0.2	1.0666666666666667	0.2	0.2	0.4	0.5666666666666667	0.8		
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cobalt	µg/L	NG	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1666666666666667	0.1	
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Copper	µg/L	2 - 4 ³	2.8	0.9	1.4	0.9	0.8	0.8	1.1	0.9	0.8	1.43333333333333333	1.1	1	0.8	1.1	0.9	
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Iron	µg/L	300	52.2	52	92.8	178	157	266	144	75.4	72.5	39.4	36.2	27.6	303.333333333333333	159	303.3333333333333	

Table A.17a: CCME Water Quality Guidelines - Yellowknife River, All Parameters

			Sampled Date Time		7/4/1995	8/15/1995	9/7/1995	10/11/1995	11/14/1995	12/11/1995	1/11/1996	2/8/1996	3/18/1996	5/27/1996	6/20/1996	8/6/1996	9/16/1996	1/14/1997	2/9/1997
			SampleCode	YKRiver@Bridge_DL_04 Jul 95	YKRiver@Bridge_DL_15 Aug 95	YKRiver@Bridge_DL_07 Sep 95	YKRiver@Bridge_DL_11 Oct 95	YKRiver@Bridge_DL_14 Nov 95	YKRiver@Bridge_DL_11 Dec 95	YKRiver@Bridge_DL_11 Jan 96	YKRiver@Bridge_DL_08 Feb 96	YKRiver@Bridge_DL_18 Mar 96	YKRiver@Bridge_DL_27 May 96	YKRiver@Bridge_DL_20 Jun 96	YKRiver@Bridge_DL_06 Aug 96	YKRiver@Bridge_DL_16 Sep 96	YKRiver@Bridge_DL_14 Jan 97	YKRiver@Bridge_DL_09 Feb 97	
Chem. Group	ChemName	output unit	CCME FAL ¹																
Cyanide	Cyanide Total	mg/L	NG	0.001	0.002	0.002	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.0036666666666667	
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	0.31	0.26	0.24	0.21	0.32	0.41	0.4	0.42	0.49	0.39	0.3933333333333333	0.36	0.33	0.5	-	
	pH	pH Units	6.5-9	7.38	7.42	7.24	7.24	7.3	7.23	7.12	7.04	7.09	7.36	7.496666666666667	7.42	7.25	7.18	7.476666666666667	
	Electrical Conductivity (EC)	µS/cm	NG	45.6	45.2	45.7	43.8	47.5	41.7	48.5	41.7	42.9	50.2	43.2	42.76666666666667	40.4	41.2	41.9	41.56666666666667
	Total Suspended Solids (TSS)	mg/L	NG	4	3	3	3	3	3	5	3	6	19	14.666666666666667	3	9	3	7	
	Hardness as CaCO3	mg/L	NG	17.23928	17.82102	17.48764	17.27302	17.53015	18.72335	16.63525	15.74778	15.94754	16.24584	16.90655	15.12621	14.96153	14.95276	-	
	Alkalinity (total as CaCO3)	mg/L	NG	15.5	15.1	14.4	16.4	15.8	15	14.7	15.2	14.9	13.5	13.733333333333333	14	12.6	-	-	
	Calcium	mg/L	NG	4.37	4.26	4.22	4.14	3.87	4.05	4.1	4.03	4.05	4.75	4.123333333333333	3.89	3.66	3.75	-	
	Magnesium	mg/L	NG	1.64	1.58	1.58	1.56	1.42	1.48	1.52	1.5	1.52	1.84	1.5333333333333333	1.43	1.37	1.37	-	
	Potassium	mg/L	NG	0.7	0.65	0.68	0.76	0.74	0.87	0.75	0.81	0.96	0.74	0.7366666666666667	0.72	0.72	0.84	-	
	Sodium	mg/L	NG	1.05	1.16	1.17	1.13	0.71	0.84	1.17	1.25	1.44	1.94	1.8933333333333333	0.81	0.64	1.01	-	
	Chloride	mg/L	120	1.51	1.63	1.57	1.62	1.85	1.91	1.42	1.36	1.95	1.54	1.696666666666667	1.41	1.49	1.56	-	
	Fluoride	mg/L	0.12	0.06	0.08	0.07	0.06	0.06	0.08	0.07	0.1	0.07	0.07	0.07	0.07	0.07	0.06	0.06	-
	Sulphate	mg/L	NG	2.6	2	2.6	3.4	3.5	3.6	3	2.8	3.3	3.1	2.3	2.7	3.9	2.5	-	-
	Colour	TCU	NG	10	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	4.4	4.2	4.3	4.6	4.1	4.8	4.5	-	5.8	4.7	3.666666666666667	4.5	4.6	-	-	-
	Total Organic Carbon (TOC)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Solids (Filtered)	mg/L	NG	29	41	21	49	32	49	74	23	27	38	-	28	37	14	22	-
	Turbidity	NTU	NG	2.9	2.9	4.2	2.4	2.5	1.4	2.1	2.8	0.9	15	3.466666666666667	1.8	1.4	0.8	1.766666666666667	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.016	0.033	0.015	0.006	0.018	0.031	0.023	-	0.099	0.015	0.0056666666666667	0.005	0.008	0.035	0.0076666666666667	
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.189	0.016	0.019	0.011	0.045	0.068	0.051	-	0.061	0.017	0.008	0.008	0.008	0.146	0.02433333333333333	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L	4	11	9	12	10	7	8	8	9	10	24	8.666666666666667	10	3	11	10	
	Phosphorus (filtered) (Filtered)	mg/l	4	0.003	0.004	0.007	0.006	0.004	0.005	0.008	0.008	0.006	0.006	0.003	0.007	0.002	0.01	0.009333333333333333	
Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Biological	Total Coliforms	MPN/100mL	NG	1	1	4	1	1	1	1	1	1	1	1	1	1	1	3	
	E. Coli	MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	124	119	90	77	75	38	24	26	27	499	137	61	52	23	-	-
	Antimony	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic (Filtered)	µg/L	5	0.2	0.3	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.3	0.9666666666666667	0.2	0.1	0.2	-	-
	Barium	µg/L	NG	5	4.9	4.7	4.6	4.6	4.1	4.6	4.1	4.1	8.7	4.9	3.9	3.8	4	-	-
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	-
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	0.09	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-	0.4	0.1	0.1	0.1	0.1	0.1	-
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG	0.3	0.2	0.4	0.2	0.2	1	0.2	0.5	0.6	0.9	0.3	0.2	0.2	0.3	-	-
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.1	-
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³	1.7	0.8	0.9	0.6	0.8	2.2	0.9	6.5	3.4	1.2	1.266666666666667	0.9	0.8	-	-	-
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron	µg/L	300	121	94.1	213	65.8	66	39.2	20.9	30.3	30.4	537	134.33333333333333	77.5	51.8	1.4	-	-
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-						

Table A.17a: CCME Water Quality Guidelines - Yellowknife River, All Parameters

			Sampled Date Time		3/17/1997	5/21/1997	6/30/1997	9/21/1997	1/13/1998	3/11/1998	5/7/1998	6/30/1998	7/30/1998	9/9/1998	1/14/1999	3/17/1999	5/18/1999	6/30/1999	7/30/1999
			SampleCode	YKRiver@Bridge_DL_17 Mar 97	YKRiver@Bridge_DL_21 May 97	YKRiver@Bridge_DL_30 Jun 97	YKRiver@Bridge_DL_02 Sep 97	YKRiver@Bridge_DL_13 Jan 98	YKRiver@Bridge_DL_11 Mar 98	YKRiver@Bridge_DL_07 May 98	YKRiver@Bridge_DL_30 Jun 98	YKRiver@Bridge_DL_30 Jul 98	YKRiver@Bridge_DL_09 Sep 98	YKRiver@Bridge_DL_14 Jan 99	YKRiver@Bridge_DL_17 Mar 99	YKRiver@Bridge_DL_18 May 99	YKRiver@Bridge_DL_30 Jun 99	YKRiver@Bridge_DL_30 Jul 99	
Chem. Group	ChemName	output unit	CCME FAL ¹																
Cyanide	Cyanide Total	mg/L	NG	0.001	0.001	0.001	0.00366666666666667	0.001	0.006	0.001	0.001	0.001	0.01	0.001	0.001	-	0.003	-	
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	0.5	0.38	0.35	0.383333333333333	-	0.42	0.4	0.31	0.36	0.32	0.48	0.46	0.5	0.4	0.36	
	pH	pH Units	6.5-9	7.06	7.36	7.41	7.47666666666667	7.23	7.39	7.39	7.43	7.14	7.10666666666667	7.11	6.99	7.25	7.27	7.12	
	Electrical Conductivity (EC)	µS/cm	NG	43.6	42.9	44	41.5666666666667	43.5	43.2	48.2	47.3	47.6	48.0666666666667	45	46.6	47.2	49	46	
	Total Suspended Solids (TSS)	mg/L	NG	3	6	3	7	3	3	3	3	3	6.66666666666667	3	3	7	7	4	
	Hardness as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Alkalinity (total as CaCO3)	mg/L	NG	-	-	-	13.4	13.9	-	-	-	-	-	-	-	-	-	-	
	Calcium	mg/L	NG	3.9	-	-	3.78666666666667	-	3.94	3.95	4.2	-	4.24333333333333	4.03	3.87	-	4.45	4.22	
	Magnesium	mg/L	NG	1.46	-	-	1.40666666666667	-	1.46	1.47	1.52	-	1.51666666666667	1.44	1.39	-	1.57	1.47	
	Potassium	mg/L	NG	0.93	-	-	0.756666666666667	-	0.85	0.69	0.87	-	0.88	0.91	0.96	-	0.79	0.72	
	Sodium	mg/L	NG	1.14	-	-	0.98	-	1.26	0.96	1.38	-	1.31	1.31	1.45	-	1.31	1.23	
	Chloride	mg/L	120	1.76	1.54	1.67	1.57666666666667	-	1.56	1.59	1.7	1.67	1.6	1.73	1.64	1.69	1.84	1.71	
	Fluoride	mg/L	0.12	0.07	0.06	0.06	0.066666666666667	-	0.03	0.05	0.05	0.07	0.07	0.06	0.05	0.4	0.07	0.07	
	Sulphate	mg/L	NG	2.9	2.4	3	2.73333333333333	-	2.4	2.9	2.7	2.8	5.6	3.1	3	3.1	3	2.8	
	Colour	TCU	NG	5	5	5	5	5	5	5	5	5	15	5	5	5.6	5	5	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5.2	4.3	4.8	10.3333333333333	4.4	4.6	5	4.7	4.8	4.73333333333333	4.4	4.3	5.1	4.9	5.8	
	Total Organic Carbon (TOC)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Solids (Filtered)	mg/L	NG	10	32	10	22	37	41	34	43	34	37	54	24	5	41	62	
	Turbidity	NTU	NG	0.9	3.1	2.5	1.76666666666667	1.3	0.6	2.9	3.4	2.4	4.26666666666667	1.2	1.1	5	3.3	3.5	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.018	0.02	0.012	0.00766666666666667	0.029	0.033	0.026	0.016	0.013	0.00733333333333333	0.035	0.03	0.019	0.011	0.06	
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.07	0.008	0.008	0.0243333333333333	0.048	0.054	0.017	0.008	0.008	0.013	0.05	0.067	0.033	0.008	0.008	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Phosphorus	µg/L	4	5	11	15	10	9	21	23	16	15	14.6666666666667	9	17	18	9	19	
	Phosphorus (filtered) (Filtered)	mg/l	4	0.005	0.011	0.007	0.00933333333333333	0.007	0.006	0.017	0.007	0.009	0.00866666666666667	0.007	0.014	0.013	0.006	0.008	
	Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Biological	Total Coliforms	MPN/100mL	NG	1	1	2	1	1	1	1	3	1	3	1	1	1	1	2	
	E. Coli	MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	23	-	-	69	-	23	114	122	-	166.666666666667	25	32	-	138	124	
	Antimony	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic (Filtered)	µg/L	5	0.2	-	-	0.2	-	0.1	0.7	0.3	-	0.7	0.2	0.2	-	0.1	0.2	
	Barium	µg/L	NG	3.9	-	-	4.03333333333333	-	3.8	4.5	4.7	-	5.4	4.1	4.8	-	4.9	5.1	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L	NG	50	-	-	50	-	50	50	50	-	50	50	-	-	50	50	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	0.09	0.1	-	-	0.1	-	0.1	0.1	0.1	-	0.1	0.2	0.2	-	0.1	0.1	
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L	NG	0.3	-	-	0.2	-	1.1	0.2	0.2	-	0.233333333333333	0.3	2.7	-	2.2	0.6	
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cobalt	µg/L	NG	0.1	-	-	0.1	-	0.1	0.2	0.1	-	0.1	0.1	0.2	-	0.2	0.1	
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Copper	µg/L	2 - 4 ³	1.8	-	-	-	-	2.3	0.9	0.7	-	0.966666666666667	1.3	2.6	-	1	4.7	
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Iron	µg/L	300	32.4	-	-	0.633333333333333	-	31.3	155	115	-	185.333333333333	28.5	91.7	-	154	132	
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lead	µg/L	1-7 ²	0.2	-	-	0.3	-	0.5	0.2	0.4	-	0.4	0.25	0.2	0.6	-	0.2	0.9
	Lead (Filtered)	µg/L	1-7 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lithium	µg/L	NG	0.7	-	-	1.36666666666667	-	1.8	1.3	1.6	-	1.46666666666667	1.7	1.5	-	1.6	1.5	
	Lithium (Filtered)	µg/L	NG																

Table A.17a: CCME Water Quality Guidelines - Yellowknife River, All Parameters

			Sampled Date Time		9/13/1999	2/8/2000	3/29/2000	4/28/2000	5/17/2000	5/26/2000	6/22/2000	6/28/2000	7/19/2000	7/31/2000	8/19/2000	9/1/2000	9/21/2000	10/18/2000	11/27/2000
			SampleCode	YKRiver@Bridge_DL_13 Sep 99	YKRiver@Bridge_DL_08 Feb 00	YKRiver@Bridge_DL_29 Mar 00	YKRiver@Bridge_DL_28 Apr 00	YKRiver@Bridge_DL_17 May 00	YKRiver@Bridge_DL_26 May 00	YKRiver@Bridge_DL_22 Jun 00	YKRiver@Bridge_DL_28 Jun 00	YKRiver@Bridge_DL_19 Jul 00	YKRiver@Bridge_DL_31 Jul 00	YKRiver@Bridge_DL_18 Aug 00	YKRiver@Bridge_DL_01 Sep 00	YKRiver@Bridge_DL_21 Sep 00	YKRiver@Bridge_DL_18 Oct 00	YKRiver@Bridge_DL_27 Nov 00	
Chem. Group	ChemName	output unit	CCME FAL ¹																
Cyanide	Cyanide Total	mg/L	NG	0.001	0.002	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	0.33	0.45	0.48	0.506	-	0.54	-	0.41	-	0.38	0.34	-	0.48	0.42	0.48	
	pH	pH Units	6.5-9	7.64	7.22333333333333	7.15	7.2	7.36	7.13	7.4	7.46	7.55	7.44	7.48	7.5	7.13	7.29	7.16	
	Electrical Conductivity (EC)	µS/cm	NG	46.5	52.6666666666667	46.6	47.2	46.7	45.5	49.3	51	46.3	45.9	46.3	45	29.8	44.2	44	
	Total Suspended Solids (TSS)	mg/L	NG	3	3	5	3	64	6	21	7	8	3	3	3	3	3	3	
	Hardness as CaCO3	mg/L	NG	-	-	-	18.92357	-	18.75009	-	19.47553	-	19.29329	18.67649	-	24.23825	18.69794	16.02001	
	Alkalinity (total as CaCO3)	mg/L	NG	-	-	-	15	16.1	15.9	17.3	17.2	17.6	16.8	14.6	14.5	13.2	15	14	
	Calcium	mg/L	NG	4.09	4.04666666666667	4.19	4.61	4.7	4.59	4.47	4.93	4.51	4.89	4.61	4.33	6.59	4.8	3.81	
	Magnesium	mg/L	NG	1.46	1.49	1.51	1.8	2.01	1.77	1.63	1.74	1.63	1.72	1.74	1.58	1.89	1.63	1.58	
	Potassium	mg/L	NG	0.78	0.953333333333333	0.97	0.99	1.12	0.97	0.84	0.9	0.85	0.92	0.92	0.82	1.33	0.82	0.88	
	Sodium	mg/L	NG	1.19	1.43	1.38	1.66	1.51	1.68	1.32	1.65	1.37	1.67	1.63	1.32	-	1.6	1.62	
	Chloride	mg/L	120	1.89	1.85333333333333	1.69	1.5	1.81	1.6	1.64	1.4	1.65	1.4	1.5	1.58	1.2	1.2	1.3	
	Fluoride	mg/L	0.12	0.07	0.07	0.09	0.12	0.06	0.11	0.05	0.08	0.07	0.09	0.09	0.07	0.07	0.07	0.06	
	Sulphate	mg/L	NG	4.4	2.23333333333333	3.3	8	-	6	-	3	-	8	3	-	5	5	4	
	Colour	TCU	NG	5	5	5	10	20	5	5	5	5	5	5	5	15	10	5	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5.2	4.3	4.7	4.2	4.6	5.2	4.7	5.3	5.6	6.3	5.3	6.2	-	4.8	4.6	
	Total Organic Carbon (TOC)	mg/L	NG	-	-	-	4.2	-	4.9	-	5	-	5.8	5.3	-	-	4.8	4.7	
	Total Solids (Filtered)	mg/L	NG	35	33	26	38.2	64	30	32	33	54	31	57	35	36	18	10	
	Turbidity	NTU	NG	3.8	1.73333333333333	2.2	0.4	29	5.8	6.1	3.1	2.6	0.6	1.4	1.4	2.2	2.2	0.9	
	Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.011	0.012	0.026	0.011	0.005	0.005	0.025	0.052	0.026	0.039	0.005	0.01	-	0.075	0.079
		Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite (as NO2-N)		mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrate and Nitrite (as N) (mg/L)		mg/L	NG	0.008	0.051	0.05	0.041	0.013	0.025	0.013	0.008	0.008	0.008	0.008	0.01	-	0.035	0.008	
Nitrogen (Total)		mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Orthophosphate (as P)		mg/L	NG	-	-	-	0.002	-	-	-	0.002	-	0.002	0.002	-	-	0.002	0.002	
Phosphorus		µg/L	4	11	7.5	2	-	36	8	4	4	28	5	10	9	273	4	10	
Phosphorus (filtered) (Filtered)	mg/l	4	0.006	-	0.002	-	0.052	-	0.002	-	0.007	-	-	0.002	-	-	-		
Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	2	-	5	-	-	-	-	2	-	
Biological	Total Coliforms	MPN/100mL	NG	1	1.5	1	-	1	-	1	1	3	1	-	1	-	1	-	
	E. Coli	MPN/100mL	NG	-	-	-	-	-	-	-	1	-	1	-	-	-	1	-	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	98	24.5	32	34	1230	248	197	89	100	99	103	68	46	59	72	
	Antimony	µg/L	NG	-	-	-	0.7	-	0.5	-	0.6	-	-	1	-	0.8	1.3	-	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5	-	-	-	0.2	-	2	-	2	-	1	0.5	-	1	1	1	
	Arsenic (Filtered)	µg/L	5	0.5	0.2	0.2	-	0.2	-	0.2	-	0.2	-	-	0.2	-	-	-	
	Barium	µg/L	NG	5	4.23333333333333	-	4	14.2	6	5.5	4.7	5	5	4.3	-	4	4	5	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L	NG	50	50	50	2	50	2	50	2	50	2	2	50	2	2	2	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L	NG	-	-	-	0.4	-	10	-	10	-	10	5	-	10	10	5	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	0.09	0.1	0.1	0.1	0.3	0.2	0.3	0.1	0.3	0.1	0.3	0.3	0.1	0.3	0.3	0.3	
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG	-	-	-	0.4	-	0.4	-	0.4	-	0.4	0.4	-	0.4	0.4	0.4	
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L	NG	0.3	0.25	4	3	2.3	3	0.4	3	0.2	3	3	0.2	3	3	3	
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cobalt	µg/L	NG	0.3	0.1	0.1	1	0.7	1	0.1	1	0.1	1	1	0.1	1	1	1	
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Copper	µg/L	2 - 4 ³	-	2.56666666666667	4.2	2	2.5	2	1	2	0.9	2	2	1.6	2	2	2	
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Iron	µg/L	300	235	29.95	55.5	40	1280	100	217	30	95.4	90	204	69.7	90	-	40	
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lead	µg/L	1-7 ³	4.6	0.25	2.3	1	1	1	0.4	1	0.2	1	1	0.2	1	1	1	
	Lead (Filtered)	µg/L	1-7 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lithium	µg/L	NG	1.4	1.3	1.3	3	3	3	1.6	3	1.4	3	3	1.3				

Notes:

- ¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)
- ² Guideline varies with pH
- ³ Guideline varies with hardness. Range given.
- ⁴ Guideline varies with pH and temperature. Most stringent given.
- ⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.17a: CCME Water Quality Guidelines - Yellowknife River, All Parameters

			Sampled Date Time	2/20/2002	3/13/2002	4/22/2002	5/21/2002	6/19/2002	7/24/2002	9/5/2002	9/17/2002	10/24/2002	11/21/2002	12/19/2002	1/31/2003	2/24/2003	3/27/2003	5/5/2003	
			SampleCode	YKRiver@Bridge_DL_20 Feb 02	YKRiver@Bridge_DL_13 Mar 02	YKRiver@Bridge_DL_22 Apr 02	YKRiver@Bridge_DL_21 May 02	YKRiver@Bridge_DL_19 Jun 02	YKRiver@Bridge_DL_24 Jul 02	YKRiver@Bridge_DL_05 Sep 02	YKRiver@Bridge_DL_17 Sep 02	YKRiver@Bridge_DL_24 Oct 02	YKRiver@Bridge_DL_21 Nov 02	YKRiver@Bridge_DL_19 Dec 02	YKRiver@Bridge_DL_31 Jan 03	YKRiver@Bridge_DL_24 Feb 03	YKRiver@Bridge_DL_27 Mar 03	YKRiver@Bridge_DL_05 May 03	
Chem. Group	ChemName	output unit	CCME FAL ¹																
Cyanide	Cyanide Total	mg/L	NG	0.003	0.003	0.003	0.003	0.003	0.003	-	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	0.72	0.7333333333333333	0.68	0.61	0.63	0.47	0.41	-	0.59	-	-	-	-	-	-	
	pH	pH Units	6.5-9	7.1	6.406666666666667	6.92	7.13	7.24	7.32	7.3	7.38	7.38	8.16	7.07	6.87	7.14	7.16	7.16	
	Electrical Conductivity (EC)	µS/cm	NG	51	53.1	52.2	52.8	55.3	52.2	55	54.4	53.7	-	51.6	54	53.5	54.4	52.2	
	Total Suspended Solids (TSS)	mg/L	NG	3	3	4	8	5	5	8	4	6	12	3	10	3	11.3	4	
	Hardness as CaCO3	mg/L	NG	-	-	20.2	20.2	22.9	21.7	21.7	22.1	20.7	31.1	19.1	22.5	20.9	28.6	21.8	
	Alkalinity (total as CaCO3)	mg/L	NG	18.9	18.666666666666667	19.1	19	18.7	18.4	18.9	18.7	18.8	-	17.6	22.4	49.2	20	-	
	Calcium	mg/L	NG	4.99	5.02	4.88	4.94	5.61	5.2	5.26	5.48	5.06	-	4.79	5.41	5.12	5.52	5.38	
	Magnesium	mg/L	NG	1.98	1.846666666666667	1.95	1.91	2.15	2.12	2.09	2.03	1.96	-	1.74	2.19	1.97	3.6	2.03	
	Potassium	mg/L	NG	1.1	1.02	1.03	1.14	1.11	1.05	1.04	1.04	0.79	1.44	1.02	1.04	1.08	0.99	1.07	
	Sodium	mg/L	NG	1.82	1.9	1.83	1.8	1.85	1.84	1.86	2.16	1.75	3.03	1.83	1.86	1.82	1.88	1.86	
	Chloride	mg/L	120	1.2	1.866666666666667	1.9	2	1.3	1.9	1.5	1.53	1.6	2.1	1.5	1.8	1.9	1.9	1.7	
	Fluoride	mg/L	0.12	0.05	0.0533333333333333	0.06	0.07	0.07	0.06	0.06	-	-	0.15	0.06	-	-	-	-	
	Sulphate	mg/L	NG	8	4.666666666666667	4	4	6	4	4	3	4	-	4	4	4	3	5	
	Colour	TCU	NG	10	8.333333333333333	5	20	10	20	10	10	15	20	-	10	10	10	10	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5.6	5.266666666666667	5.6	5.8	5.5	5.9	6.5	5.2	5.1	-	-	-	5.1	-	5.6	
	Total Organic Carbon (TOC)	mg/L	NG	5.6	5.3	5.3	6	5.2	5.9	6.6	-	5.2	-	-	-	5.2	-	5.6	
	Total Solids (Filtered)	mg/L	NG	24	24	46	48	48	38	31	41.3	46	-	42	58	24	57.3	37	
	Turbidity	NTU	NG	1.5	1.9	1	4.4	2.9	3.4	1.7	1.07	1.7	-	1.8	0.67	0.67	1.8	-	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.005	0.005	0.005	0.007	0.005	0.005	0.005	0.005	0.005	0.02	0.012	0.005	0.005	0.005	0.005	
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	0.058	0.076	0.068	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.058	0.0693333333333333	0.063	0.035	0.008	0.008	0.008	0.008	0.026	0.011	0.039	0.041	-	-	0.009	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	0.002	0.0023333333333333	0.007	0.002	0.004	0.002	0.002	-	0.002	0.003	0.003	0.002	0.002	0.003	0.002	
	Phosphorus	µg/L	4	4	11.333333333333333	15	8	8	16	70	74	71	53	4	7	6	10	10	
	Phosphorus (filtered) (Filtered)	mg/l	4	-	-	-	-	-	-	0.055	0.057	0.06	0.087	0.053	0.01	0.006	0.004	0.007	
	Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG	2	2	2	3	-	-	-	4.3	2	-	-	-	-	-	-
		Total Coliforms	MPN/100mL	NG	1	1	1	1	197	2	1	2	2	2	1	2	2	2	2
Biological	E. Coli	MPN/100mL	NG	1	1	10	2	-	2	2	2	2	2	1	2	2	2	2	
	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	30	-	-	-	-	-	-	-	
Metals ⁵	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	30	30	117	190	94	52	52	47	30	30	15.6	30	30	130	
	Antimony	µg/L	NG	0.5	0.75	0.5	0.8	0.7	0.5	0.6	0.5	1.3	0.8	1.8	0.834	1.9	0.77	0.4	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	0.47	-	-	-	-	-	0.89	-	
	Arsenic	µg/L	5	2	1.1	1	1	1	1	1	1	1	1	1.1	1	1	1	1	
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	
	Barium	µg/L	NG	4	4	4	5	8	5	5	5	4	4	4	4.3	5	4.43	5	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	4.4	-	-	-	-	-	4.1	-	
	Beryllium	µg/L	NG	2	2	2	2	2	2	2	2	2	2	2	0.02	-	0.1	0.1	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	0.2	-	-	-	-	-	0.2	-	
	Bismuth	µg/L	NG	0.4	0.5	0.4	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	0.09	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.02	0.1	0.1	0.1	
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	0.02	-
	Cesium	µg/L	NG	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.03	0.1	0.1	
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	0.008	-
	Chromium	µg/L	NG	3	3	3	3	3	3	3	3	3	3	3	4	0.1	1	0.34	2.5
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	0.3	-	-	-	-	-	-	0.27	-
	Cobalt	µg/L	NG	1	1	1	1	1	1	1	1	1	1	1	1	0.145	1	0.23	0.1
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	0.17	-
	Copper	µg/L	2 - 4 ³	2	2	2	2	2	2	2	2	2	2	2	3	0.32	1	1.1	1
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	0.7	-	-	-	-	-	-	1.13	-
	Iron	µg/L	300	39	44.5	51	91	157	71	68	49	53	30	30	30	30	39	125	125
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	30	-	-	-	-	-	-	22	-
	Lead	µg/L	1-7 ²	1	1	1	1	1	1	1	1	1	1	1	1	0.08	0	0.43	0.1
	Lead (Filtered)	µg/L	1-7 ²	-	-	-	-	-	-	-	0.23	-	-	-	-	-	-	0.12	-

Table A.17a: CCME Water Quality Guidelines - Yellowknife River, All Parameters

			Sampled Date Time	6/5/2003	7/7/2003	7/31/2003	8/22/2003	10/1/2003	10/31/2003	12/5/2003	1/6/2004	2/11/2004	3/1/2004	4/15/2004	5/6/2004	6/10/2004	7/8/2004	8/16/2004	
			SampleCode	YKRiver@Bridge_DL_05 Jun 03	YKRiver@Bridge_DL_07 Jul 03	YKRiver@Bridge_DL_31 Jul 03	YKRiver@Bridge_DL_22 Aug 03	YKRiver@Bridge_DL_01 Oct 03	YKRiver@Bridge_DL_31 Oct 03	YKRiver@Bridge_DL_05 Dec 03	YKRiver@Bridge_DL_06 Jan 04	YKRiver@Bridge_DL_11 Feb 04	YKRiver@Bridge_DL_01 Mar 04	YKRiver@Bridge_DL_15 Apr 04	YKRiver@Bridge_DL_06 May 04	YKRiver@Bridge_DL_10 Jun 04	YKRiver@Bridge_DL_08 Jul 04	YKRiver@Bridge_DL_16 Aug 04	
Chem_Group	ChemName	output unit	CCME FAL ¹																
Cyanide	Cyanide Total	mg/L	NG	0.003	0.003	0.003	0.003	0.003	0.01	0.01	0.01	0.01	0.01	0.016	-	0.001	-	0.001	
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	0.66	-	0.44	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units	6.5-9	7.4	7.4	7.34	7.34	7.4	7.43	7.37	7.17	7.1	7.26	7.3	7.32	7.53	7.41	7.59	
	Electrical Conductivity (EC)	µS/cm	NG	58.8	59.9	62	60.6	62.8	60.6	64.4	56.3	50.8	55.4	60.8	55.6	56.8	57.5	56.4	
	Total Suspended Solids (TSS)	mg/L	NG	3	4	3	3	6	3	3	3	4	3.3	3	3	8	6	3	
	Hardness as CaCO3	mg/L	NG	18.8	20.2	21	21.8	23.9	23.3	23.2	22.3	23.1	21.9	26	25.1	24.1	29	20.8	
	Alkalinity (total as CaCO3)	mg/L	NG	20.6	20.5	21.4	21.3	20.4	20.5	21.3	19.9	19.5	19.3	21.3	20.5	19.9	20.4	20.3	
	Calcium	mg/L	NG	4.34	5.17	5.23	5.38	5.96	5.77	5.8	5.49	5.7	6.5	5.49	6.3	6	5.7	5.3	
	Magnesium	mg/L	NG	1.94	1.78	1.94	2.03	2.18	2.16	2.12	2.08	2.2	2.13	2.4	2.3	2.2	2.2	1.8	
	Potassium	mg/L	NG	1.01	1.14	0.96	0.97	1.06	1.07	1.05	1.04	-	1.07	1.12	1.08	1.09	1	0.99	
	Sodium	mg/L	NG	1.75	1.81	1.74	1.83	2.01	2.03	1.95	1.91	-	1.9	2.1	2	2	1.9	1.89	
	Chloride	mg/L	120	1.8	1.5	1.4	1.6	1.6	1.4	1.4	-	1.6	2	-	-	1.9	1.8	2.8	
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sulphate	mg/L	NG	4	3	6	-	7	-	3	4	10	3.53	3.9	3.7	-	3	3.5	
	Colour	TCU	NG	10	10	10	5	10	-	-	-	5	-	-	-	-	-	-	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5.7	5.9	5.8	-	-	4.9	-	-	-	4.47	4.7	4.9	-	5.3	5.1	
	Total Organic Carbon (TOC)	mg/L	NG	5.6	6.1	5.9	-	-	4.7	-	-	-	4.67	4.7	4.7	5.2	5.3	4.3	
	Total Solids (Filtered)	mg/L	NG	40	54	42	36	42	36	42	22	44	25.3	32	28	40	38	44	
	Turbidity	NTU	NG	2.6	2.9	2.6	2	2.3	1.5	1.02	1.47	1.65	2.12	1.65	2.12	8	4.45	2.79	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.005	-	0.005	0.005	0.005	0.005	0.005	0.006	0.013	0.005	0.005	0.005	0.005	0.005	0.005	
	Nitrate (as NO3-N)	mg/L	13	0.018	0.008	0.008	-	0.008	0.022	0.049	0.048	0.03	0.04	0.1	0.1	0.1	0.1	0.1	
	Nitrite (as NO2-N)	mg/L	0.06	0.009	0.009	0.009	-	0.009	0.009	0.009	0.009	0.01	0.03	0.05	0.05	-	0.05	0.05	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.018	-	0.008	0.008	-	0.022	0.049	0.048	0.03	0.033	0.2	0.2	0.2	0.2	0.2	
	Nitrogen (Total)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	0.002	0.002	0.002	-	0.002	0.002	0.002	-	-	0.0023	0.002	0.002	-	0.002	-	
	Phosphorus	µg/L	4	14	8	15	10	4	10	10	10	10	10	10	10	20	10	20	
	Phosphorus (filtered) (Filtered)	mg/l	4	0.01	0.085	0.062	0.006	0.004	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	0.01	-	
	Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Coliforms	MPN/100mL	NG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6
Biological	E. Coli	MPN/100mL	NG	1	1	1	4.1	2	2	1	1	1	1	1	1	1	1	1	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	64	57	80	79	78	63	32	30	30	32	30	30	165	74	94	
	Antimony	µg/L	NG	0.9	0.3	0.5	0.7	1.1	0.6	1	0.2	5.1	0.57	0.1	0.1	0.1	0.3	0.6	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Barium	µg/L	NG	4.6	4.5	5.7	5	5.3	4.9	4.8	4.6	4.6	4.4	4.5	4.9	6.4	5.1	5.7	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L	NG	0.1	0.1	0.1	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	0.09	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L	NG	0.3	-	-	-	-	0.3	0.7	0.5	0.3	0.3	-	0.3	0.5	1.5	0.3	0.3
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cobalt	µg/L	NG	0.1	0.1	0.1	-	-	0.1	0.2	0.1	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³	0.8	1.7	1.9	1	1.6	1.6	1.2	0.7	2	0.9	1.4	1.5	1.3	0.9	1.3	1.3
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron	µg/L	300	190	75	87	50	67	88	50	50	50	59.3	50	50	217	77	78	78
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	µg/L	1-7 ³	0.1	0.9	1	1	1.2	0.7	1.2	0.5	0.6	0.73	0.1	0.1	0.1	0.1	0.1	0.1
	Lead (Filtered)	µg/L	1-7 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lithium	µg/L	NG	1.6	1.2	1.5	2	2	1	1.7	1.5	1.5	1.47	1.8	1.4	1.7	1.6	1.6	1.6
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-</									

Table A.17a: CCME Water Quality Guidelines - Yellowknife River, All Parameters

			Sampled Date Time		9/9/2004	10/18/2004	12/21/2004	2/1/2005	3/3/2005	4/7/2005	5/2/2005	6/2/2005	7/7/2005	8/4/2005	9/6/2005	10/25/2005	12/8/2005	1/5/2006	2/8/2006
			SampleCode	YKRiver@Bridge_DL_09 Sep 04	YKRiver@Bridge_DL_18 Oct 04	YKRiver@Bridge_DL_21 Dec 04	YKRiver@Bridge_DL_01 Feb 05	YKRiver@Bridge_DL_03 Mar 05	YKRiver@Bridge_DL_07 Apr 05	YKRiver@Bridge_DL_02 May 05	YKRiver@Bridge_DL_02 Jun 05	YKRiver@Bridge_DL_07 Jul 05	YKRiver@Bridge_DL_04 Aug 05	YKRiver@Bridge_DL_06 Sep 05	YKRiver@Bridge_DL_25 Oct 05	YKRiver@Bridge_DL_08 Dec 05	YKRiver@Bridge_DL_05 Jan 06	YKRiver@Bridge_DL_08 Feb 06	
Chem_Group	ChemName	output unit	CCME FAL ¹																
Cyanide	Cyanide Total	mg/L	NG	-	-	0.002	-	-	-	-	0.002	-	-	-	-	-	-	-	
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units	6.5-9	7.35	7.5	7.29	7.22	7.25	7.37	7.48	7.53	7.5	7.52	7.63666666666667	7.2	7.32	7.33	7.35	
	Electrical Conductivity (EC)	µS/cm	NG	61.6	57.5	56.2	56.6	57.5	59.5	58.3	56.5	57.2	58.5	58.1666666666667	57.9	60.4	62.3	60.4	
	Total Suspended Solids (TSS)	mg/L	NG	3	3	3	3	-	3	3	3	3	3	3	3	3	3	3	
	Hardness as CaCO3	mg/L	NG	30.9	17.8	24.9	22.1	22.2	23	22.9	23	24	22.9	25.2333333333333	25.1	25.7	25.1	24.4	
	Alkalinity (total as CaCO3)	mg/L	NG	20.2	21.2	20	20	20.2	20.7	20.7	20.7	20.9	20.9	21.3	20.2	21.8	21.9	21.7	
	Calcium	mg/L	NG	6.2	4.4	6.3	5.4	5.3	5.6	5.7	5.7	6.2	5.8	6.6	6	6.4	6.2	6	
	Magnesium	mg/L	NG	2.2	1.6	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.13333333333333	2.5	2.3	2.3	2.3	
	Potassium	mg/L	NG	1.1	0.7	1.1	1.07	1.08	1.05	1.01	1.04	0.9	0.9	0.8	0.8	1.16	1.15	1.06	
	Sodium	mg/L	NG	2.1	1.3	2	2.1	2.1	2.2	1.9	1.9	1.6	1.8	1.7	1.7	2.2	2.2	2	
	Chloride	mg/L	120	1.9	2.2	2	1.8	1.8	2.4	1.7	1.9	1.8	1.8	1.86666666666667	1.9	1.8	2	2	
	Fluoride	mg/L	0.12	-	-	-	-	-	-	0.1	-	-	-	-	-	-	-	-	
	Sulphate	mg/L	NG	3	3	3	3	3	3	6	4	3	3	3	3	3	3	4	
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	4.6	5.1	4.9	5.8	4.9	5	4.7	5.2	4.5	5.6	5.7	5.4	5.3	5.2	5.2	
	Total Organic Carbon (TOC)	mg/L	NG	4.7	-	-	5.5	-	-	-	4.9	4.3	5.66666666666667	-	5.5	5.5	5.2	5.2	
	Total Solids (Filtered)	mg/L	NG	40	34	44	10	20	28	30	32	30	30	36.6666666666667	36	34	32	33	
	Turbidity	NTU	NG	2.59	-	1.98	0.83	0.68	0.39	2.16	2.18	1.75	1.94	2.64	1.27	0.73	1.18	0.73	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
	Nitrate (as NO3-N)	mg/L	13	-	0.02	0.04	-	-	0.04	-	-	-	-	-	0.02	-	-	-	
	Nitrite (as NO2-N)	mg/L	0.06	0.01	0.01	0.01	-	-	0.01	-	-	-	-	-	-	-	-	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	-	0.02	-	0.07	-	0.05	0.04	-	-	-	-	-	0.03	0.04	0.03	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Phosphorus	µg/L	4	50	160	150	260	100	10	10	10	10	10	10	10	60	10	10	
	Phosphorus (filtered) (Filtered)	mg/l	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Biological	Total Coliforms	MPN/100mL	NG	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	
	E. Coll	MPN/100mL	NG	1	1	-	1	1	1	1	1	1	2	2.7	1	1	1	1	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	7.6	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	77	77	84	38	30	30	24.7	30	58	42.8	55	55.6666666666667	48	30	26.7	30	
	Antimony	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	2.9	0.4	0.1	0.2	0.1	1	0.3	0.6	0.3	0.1	0.1	0.1	0.1	0.1	0.2	
	Antimony (Filtered)	µg/L	NG	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5	1	1	0.3	0.2	0.4	0.3	0.6	0.2	0.5	0.6	1.63333333333333	0.3	0.4	0.5	0.2	
	Arsenic (Filtered)	µg/L	5	-	-	0.3	-	-	-	-	-	-	-	-	-	-	-	-	
	Barium	µg/L	NG	6	5.1	5	4.9	4	4.8	5.1	4.6	4.6	5.2	4.86666666666667	5	4.7	4.7	5.1	
	Barium (Filtered)	µg/L	NG	-	-	4.5	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Beryllium (Filtered)	µg/L	NG	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	0.09	0.1	0.1	0.1	0.1	0.1	0.08	0.3	0.1	0.05	0.1	0.1	0.1	0.1	0.05	0.1	
	Cadmium (Filtered)	µg/L	0.09	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Cesium (Filtered)	µg/L	NG	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L	NG	0.3	0.3	2	0.3	0.3	0.2	0.4	0.4	0.2	0.3	0.3	0.3	0.4	0.2	0.3	
	Chromium (Filtered)	µg/L	NG	-	-	0.2	-	-	-	-	-	-	-	-	-	-	-	-	
	Cobalt	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Cobalt (Filtered)	µg/L	NG	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	
	Copper	µg/L	2 - 4 ³	3	1.4	1.4	1.4	1	1.5	-	1	0.9	1.2	0.96666666666667	0.8	1.2	0.9	1.2	
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	1.7	-	-	-	-	-	-	-	-	-	-	-	-	
	Iron	µg/L	300	87	129	54	65	50	50	50	58	57	70	72.3333333333333	80	77	50	50	
	Iron (Filtered)	µg/L	300	-	-	50	-	-	-	-	-	-	-	-	-	-	-	-	
	Lead	µg/L	1-7 ²	0.2	0.1	0.1	0.1	0.1	0.1	0.2	-	0.1	0.1	0.1	0.3	0.1	0.3	0.1	
	Lead (Filtered)	µg/L	1-7 ²	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	
	Lithium	µg/L	NG	1.2	1.4	1.5	1.7	1.3	1.5	1.2	1.4	1.6	1.6	1.76666666666667	1.7	1.9	1.8	2	
	Lithium (Filtered)	µg/L	NG	-	-	1.5	-	-	-	-	-	-	-	-	-	-	-	-	
	Manganese	µg/L	NG	2.6	3	1													

Table A.17a: CCME Water Quality Guidelines - Yellowknife River, All Parameters

			Sampled Date Time	3/15/2006	4/5/2006	5/3/2006	7/27/2006	8/10/2006	9/5/2006	11/1/2006	12/20/2006	1/24/2007	3/21/2007	4/26/2007	5/15/2007	6/28/2007	7/25/2007	8/30/2007
			SampleCode	YKRiver@Bridge_DL_15 Mar 06	YKRiver@Bridge_DL_05 Apr 06	YKRiver@Bridge_DL_03 May 06	YKRiver@Bridge_DL_27 Jul 06	YKRiver@Bridge_DL_10 Aug 06	YKRiver@Bridge_DL_05 Sep 06	YKRiver@Bridge_DL_01 Nov 06	YKRiver@Bridge_DL_20 Dec 06	YKRiver@Bridge_DL_24 Jan 07	YKRiver@Bridge_DL_21 Mar 07	YKRiver@Bridge_DL_26 Apr 07	YKRiver@Bridge_DL_15 May 07	YKRiver@Bridge_DL_28 Jun 07	YKRiver@Bridge_DL_25 Jul 07	YKRiver@Bridge_DL_30 Aug 07
Chem. Group	ChemName	output unit	CCME FAL ¹															
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units	6.5-9	7.36	7.35	7.41	7.62	7.6	7.6	7.53	7.35	7.33	7.3	7.4	7.55	7.58	7.66	7.61
	Electrical Conductivity (EC)	µS/cm	NG	61.6	60.8	62.6	58	57.4	53.7	79.43	55.8	44.7	58.1	57.2	56.4	59	58.9	59.3
	Total Suspended Solids (TSS)	mg/L	NG	3	3	3	4	3	3	3	6	3	3	3	3	3	3	3
	Hardness as CaCO3	mg/L	NG	26.1	23.1	21.1	26.4	27.4	24.9	23.93	25.1	23.1	24.7	21.5	26	29.5	29.8	29.3
	Alkalinity (total as CaCO3)	mg/L	NG	21.7	21.2	22.1	21.2	20.4	20.2	20.73	20.5	20.1	20.4	20.3	20.7	21.3	22.5	21.5
	Calcium	mg/L	NG	6.5	5.7	5.3	6.6	6.8	6	6.1	6.3	5.7	5.8	5.1	6.2	7.8	7.4	7.3
	Magnesium	mg/L	NG	2.4	2.2	1.9	2.4	2.5	2.4	2.1	2.3	2.2	2.5	2.1	2.5	2.4	2.7	2.7
	Potassium	mg/L	NG	1.2	1.1	0.9	1	1.1	0.8	1	1.1	1.1	1.9	1	1.1	1.1	1	1
	Sodium	mg/L	NG	2.3	2.1	1.9	1.9	1.9	1.7	1.66	2.2	2	1.9	2	2	2.1	1	2.1
	Chloride	mg/L	120	1.9	-	2.1	1.8	1.7	1.6	1.9	2	1.9	1.7	1.8	1.9	2	1.9	1.9
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1
	Sulphate	mg/L	NG	4	4	4	3	3	3	3	4	4	3	3	4	4	3	3
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5.3	5.8	5.5	5.3	4.9	4.7	4.03	5.2	4.8	5	4.8	5	5	5	5.6
	Total Organic Carbon (TOC)	mg/L	NG	5.1	5.6	5.7	5.4	5.5	-	4.5	4.6	5	4.8	4.6	5.1	5.2	5.6	5.4
	Total Solids (Filtered)	mg/L	NG	10	30	32	30	36	46	36	24	26	22	48	50	38	48	48
	Turbidity	NTU	NG	0.83	0.53	1.86	1.97	1.96	2.15	2.49	0.87	0.8	0.7	0.85	4.05	1.11	1.55	1.33
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.005	0.005	0.005	0.005	0.005	0.005	0.007	0.007	0.007	0.005	0.005	0.005	0.014	0.005	0.005
	Nitrate (as NO3-N)	mg/L	13	0.04	0.05	-	0.01	0.01	0.01	0.03	-	0.04	0.04	0.03	0.02	0.01	0.01	0.01
	Nitrite (as NO2-N)	mg/L	0.06	0.01	0.01	-	0.01	0.01	0.01	0.01	-	0.04	0.04	0.03	0.02	0.01	0.01	0.01
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.04	0.05	0.03	0.01	-	0.01	0.03	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L	4	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Phosphorus (filtered) (Filtered)	mg/l	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Coliforms	MPN/100mL	NG	1	1	1	1	1	1	1	1	1	1	1	1	1	4	1
Biological	E. Coll	MPN/100mL	NG	1	1	1	2	1	2	1	1	1	1	1	1	1	3.1	1
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	15.3	15.9	56	91	96	65	69.3	20.2	-	17.5	8.9	-	33	46	48	48
	Antimony	µg/L	NG	0.1	0.1	0.1	0.3	1.5	0.1	0.1	0.1	0.1	0.1	0.9	-	0.1	0.1	0.1
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	0.4	0.4	0.5	0.6	0.4	0.5	0.86	0.4	0.6	0.3	0.4	-	0.5	0.5	0.4
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	4.5	4.6	5.2	7	13.8	4.5	4.76	4.3	4.2	3.7	5.5	-	4.1	4.8	4.5
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	0.09	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.05	0.09	0.05	0.05	0.1	0.1	0.05	0.1
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-	0.1	0.1	0.1
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG	0.1	0.1	0.4	2.5	-	0.4	0.3	0.1	0.2	0.1	0.1	-	0.3	0.1	0.3
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-	0.1	0.1	0.1
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³	0.3	0.5	0.8	0.9	2.7	1.1	0.83	0.5	0.5	0.6	0.5	-	0.8	0.7	1.3
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron	µg/L	300	50	50	100	105	95	84	65	50	50	50	50	-	50	50	50
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	µg/L	1-7 ²	0.1	0.1	0.1	-	-	0.1	0.1	0.1	0.1	0.1	0.1	3.2	0.1	0.1	0.1
	Lead (Filtered)	µg/L	1-7 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lithium	µg/L	NG	1.2	1.5	1.4	1.7	1.9	1.6	1.63	1.3	1.3	1.4	1.7	-	1	1.8	1.8
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Manganese	µg/L	NG	1.1	1.1	8.5	3.6	3.2	2.5	2.2	1	1.1	1.2	4.2	-	2	2.3	2.1
	Manganese (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-						

Table A.17a: CCME Water Quality Guidelines - Yellowknife River, All Parameters

			Sampled Date Time	9/17/2007	10/24/2007	11/29/2007	1/14/2008	2/18/2008	3/27/2008	4/29/2008	5/22/2008	6/11/2008	7/16/2008	8/20/2008	9/22/2008	10/15/2008	11/12/2008	12/17/2008	
			SampleCode	YKRiver@Bridge_DL_17 Sep 07	YKRiver@Bridge_DL_24 Oct 07	YKRiver@Bridge_DL_29 Nov 07	YKRiver@Bridge_DL_14 Jan 08	YKRiver@Bridge_DL_18 Feb 08	YKRiver@Bridge_DL_27 Mar 08	YKRiver@Bridge_DL_29 Apr 08	YKRiver@Bridge_DL_22 May 08	YKRiver@Bridge_DL_11 Jun 08	YKRiver@Bridge_DL_16 Jul 08	YKRiver@Bridge_DL_20 Aug 08	YKRiver@Bridge_DL_22 Sep 08	YKRiver@Bridge_DL_15 Oct 08	YKRiver@Bridge_DL_12 Nov 08	YKRiver@Bridge_DL_17 Dec 08	
Chem_Group	ChemName	output unit	CCME FAL ¹																
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units	6.5-9	7.62	7.52	7.355	7.29	7.31	7.21	7.41	7.535	7.67	7.68	7.6	7.61	7.47	7.53	7.365	
	Electrical Conductivity (EC)	µS/cm	NG	60.9	59.1	60.05	56.7	60.5	59.7	56.9	55.55	53.9	57.4	60.7	61.5	56.4	56.4	53.5	
	Total Suspended Solids (TSS)	mg/L	NG	3	3	3	3	3	3	3	3	8	3	3	3	3	4.5	9	
	Hardness as CaCO3	mg/L	NG	29.4	25	27.45	11.8	25.5	22.8	25.2	28.8	27.4	31.6	29	34.5	14.2	25.9	24.85	
	Alkalinity (total as CaCO3)	mg/L	NG	22.3	21.7	21.7	20.5	20.8	20.9	20.9	21.2	21.1	21.8	22.8	22.6	22	21.4	19.15	
	Calcium	mg/L	NG	7.3	6.4	6.95	3.1	6.3	5.5	5.6	7	6.8	7.8	8.5	10.1	4.3	7.3	7.2	
	Magnesium	mg/L	NG	2.7	2.2	2.45	1	2.4	2.2	2.2	2.7	2.75	2.5	2.9	1.9	2.2	0.8	1.85	1.7
	Potassium	mg/L	NG	1	1	1.1	1.1	1.1	1.1	1.1	1.1	1	1.1	1	1.1	1	1	1	1
	Sodium	mg/L	NG	1.9	2.3	2.05	7.6	2.5	2	2.1	2.1	2	2.1	2.2	2.1	2.1	2.1	2.05	
	Chloride	mg/L	120	1.9	2	2.05	6.5	2.5	2	2.2	2	1.9	2.1	2.2	2.1	2.1	1.95	1.8	
	Fluoride	mg/L	0.12	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-	
	Sulphate	mg/L	NG	3	3	3	3	4	4	4	3	3	4	3	5	3	3	-	
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5.4	5	5	5	5	4.5	4.7	5.3	4.5	5.3	5.3	4.8	4.9	5.1	5.45	
	Total Organic Carbon (TOC)	mg/L	NG	5.7	4.7	5	5	4.7	4.7	5.1	4.8	4.7	5.1	5.2	5.5	5.3	4.45	6.3	
	Total Solids (Filtered)	mg/L	NG	29	26	33	32	28	38	26	13	50	32	36	28	10	31.5	37	
Turbidity	NTU	NG	1.91	2.41	1.63	0.95	1.15	1	1.5	2.835	1.91	2.45	2.68	2.76	2.3	7.395	2.3		
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.005	0.005	0.005	0.005	0.005	0.007	0.005	0.005	0.005	0.008	0.005	0.005	0.005	0.005	0.005	
	Nitrate (as NO3-N)	mg/L	13	0.01	0.01	0.04	0.05	0.04	0.04	0.06	0.01	-	-	0.01	0.05	0.04	0.01	0.025	
	Nitrite (as NO2-N)	mg/L	0.06	0.01	0.01	0.04	0.01	0.01	0.01	0.01	0.01	-	-	0.01	0.01	0.01	0.01	0.01	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.01	0.01	0.01	0.05	0.05	0.04	0.06	0.01	-	-	0.01	0.05	0.04	0.01	0.025	
	Nitrogen (Total)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	0.004	0.002	
	Phosphorus	µg/L	4	10	20	10	10	50	10	10	15	10	10	20	20	10	15	15	
	Phosphorus (filtered) (Filtered)	mg/l	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Biological	Total Coliforms	MPN/100mL	NG	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1
		E. Coli	MPN/100mL	NG	1	4.1	1	1	1	1	1	1	2	1	3	1	3.1	1	1
	Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum Total		µg/L	55	59	47.5	38	30	30	38	101.5	97	68	76	26	28	51.1	89.5	89.5	
Antimony		µg/L	0.1	0.3	0.15	0.8	0.1	0.2	0.4	0.1	1.2	0.5	0.1	0.6	0.1	0.1	0.1	0.1	
Antimony (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Arsenic		µg/L	5	1.2	1.4	0.4	1.2	0.4	0.4	0.7	0.4	1.1	0.5	0.4	0.8	0.5	0.45	0.4	
Arsenic (Filtered)		µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Barium		µg/L	NG	4.9	5.4	5.35	3.8	3.7	4	4.8	6.3	6.2	6	4.9	4.9	4.9	5.35	4.9	
Barium (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Beryllium		µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Beryllium (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bismuth		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bismuth (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron - soluble		µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron - soluble (Filtered)		µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cadmium		µg/L	0.09	0.05	0.05	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.15	0.1	0.1	
Cadmium (Filtered)		µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cesium		µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-	0.1	0.1	0.1	
Cesium (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chromium		µg/L	NG	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.4	0.3	0.3	0.2	0.1	0.2	0.1	0.2	
Chromium (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cobalt		µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Cobalt (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Copper		µg/L	2 - 4 ³	0.8	0.8	1	0.7	0.9	0.8	0.9	0.8	1	0.7	0.8	0.2	0.9	0.7	1.3	
Copper (Filtered)		µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Iron		µg/L	300	52	62	50.5	50	50	50	56	109.5	101	66	198	18	70.1	59.05	84.5	
Iron (Filtered)		µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lead		µg/L	1-7 ²	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.5	0.2	0.1	0.1	0.4	0.1	0.1	
Lead (Filtered)		µg/L	1-7 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lithium		µg/L	NG	1.3	0.3	0.3	0.3	1.2	1.5	1.5	1.65	1.9	1.8	2.8	1.9	2.1	1.8	2.05	
Lithium (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Manganese		µg/L	NG	2.3	2.														

Notes:

- ¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)
- ² Guideline varies with pH
- ³ Guideline varies with hardness. Range given.
- ⁴ Guideline varies with pH and temperature. Most stringent given.
- ⁵ CCME FAL Guidelines developed for *total metals* only; Guideline has been applied to dissolved metals for illustrative purposes only.
NG - Not a guideline

BOLD - Greater than Guideline
Blank - Not analyzed

Table A.17a: CCME Water Quality Guidelines - Yellowknife River, All Parameters

			Sampled Date Time	5/19/2010	6/29/2010	7/15/2010	8/11/2010	9/15/2010	10/21/2010	11/30/2010	12/21/2010	1/26/2011	2/24/2011	3/21/2011	4/26/2011	5/30/2011	6/15/2011	7/13/2011	
			SampleCode	YKRiver@Bridge_DL_19 May 10	YKRiver@Bridge_DL_29 Jun 10	YKRiver@Bridge_DL_15 Jul 10	YKRiver@Bridge_DL_11 Aug 10	YKRiver@Bridge_DL_15 Sep 10	YKRiver@Bridge_DL_21 Oct 10	YKRiver@Bridge_DL_30 Nov 10	YKRiver@Bridge_DL_21 Dec 10	YKRiver@Bridge_DL_26 Jan 11	YKRiver@Bridge_DL_24 Feb 11	YKRiver@Bridge_DL_21 Mar 11	YKRiver@Bridge_DL_26 Apr 11	YKRiver@Bridge_DL_30 May 11	YKRiver@Bridge_DL_15 Jun 11	YKRiver@Bridge_DL_13 Jul 11	
Chem_Group	ChemName	output unit	CCME FAL ¹																
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Field	Field Temperature	°C	NG	6.04	17.24	19.63	21.15	12.09	2.55	-	-	-	-	-	-	9.91	13.04	20.4	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units	6.5-9	7.44	7.6	7.72	7.66	7.46	7.44	7.46	7.42	7.33	7.26	7.24	7.35	7.39	7.64	7.63	
	Electrical Conductivity (EC)	µS/cm	NG	55.4	58.8	56.9	63.4	60.6	58.7	61	58	58.8	54.3	55.6	57.8	58.4	52.9	55.1	
	Total Suspended Solids (TSS)	mg/L	NG	3	4	4	3	3	3	3	3	3	3	3	3	12	3	3	
	Hardness as CaCO3	mg/L	NG	5.9	24.8	24.3	20.2	28.6	26.4	24.4	23.7	23.3	23	22.35	23.8	24.2	24.5	26.6	
	Alkalinity (total as CaCO3)	mg/L	NG	22.6	22.4	23.1	22.6	22.4	22.2	22.8	22.4	21.4	22.1	22	21.4	18.5	21.5	21.1	
	Calcium	mg/L	NG	2.2	6.2	6.1	5.1	7.4	6.7	6.1	6	5.8	5.7	5.6	5.8	6.1	6.1	6.7	
	Magnesium	mg/L	NG	0.1	2.3	2.2	1.8	2.4	2.4	2.2	2.1	2.1	2.1	2.05	2.2	2.2	2.2	2.4	
	Potassium	mg/L	NG	0.5	1.1	1	0.7	1	1.2	1.1	1	1.1	1	1.05	1	1	1.1	1.1	
	Sodium	mg/L	NG	1.4	2.3	2.2	1.8	2	2.2	2.3	2.1	2.2	2.2	2.35	2.3	2.1	2.2	2.3	
	Chloride	mg/L	120	1.8	1.9	1.8	2.1	2.1	1.9	2.3	2	1.9	1.7	1.8	2	2.2	2	2.1	
	Fluoride	mg/L	0.12	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sulphate	mg/L	NG	3	4	4	4	3	4	3	4	3	3	3.5	4	4	3	4	
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5.9	4.7	5	5.9	5.2	4.8	4.9	4.7	5.1	5.2	4.85	5	4.1	5.1	4.6	
	Total Organic Carbon (TOC)	mg/L	NG	6.2	5.5	6.5	6	6	5.7	5.1	4.9	5.3	5.5	5.05	5	4.9	5.1	4.9	
	Total Solids (Filtered)	mg/L	NG	36	34	32	28	30	36	32	30	30	38	32	40	32	32	36	
	Turbidity	NTU	NG	1.9	2.85	3.52	2.27	3.37	2.28	1.69	0.94	0.58	0.55	0.71	0.54	5.02	1.96	2.84	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
	Nitrate (as NO3-N)	mg/L	13	-	0.14	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrite (as NO2-N)	mg/L	0.06	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.06	0.18	0.18	0.18	0.07	0.13	0.1	0.09	0.08	0.08	0.135	0.04	0.02	0.04	0.04	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Phosphorus	µg/L	4	10	10	10	10	10	10	10	10	10	10	10	10	20	20	20	
	Phosphorus (filtered) (Filtered)	mg/l	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Coliforms	MPN/100mL	NG	1	1	12	1	2	1	1	1	1	1	1	1	1	1	1	
Biological	E. Coli	MPN/100mL	NG	1	1	-	1	5.2	1	1	1	2	1	1	1	1	1	1	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	86	85	104	90	95	100	66	33	23.3	22.1	28.3	23	207	85	90	
	Antimony	µg/L	NG	0.3	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5	0.7	0.6	0.7	0.7	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.5	
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	5.7	5.6	5.4	6.2	5	5	5.1	4.4	4.1	4.4	4.3	4.5	6.7	5.1	5.5	
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	0.09	0.1	0.1	0.1	0.05	0.1	0.05	0.05	0.05	0.05	0.1	0.05	0.05	0.1	0.05	0.05	
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L	NG	0.2	0.4	0.2	0.7	0.2	0.3	0.2	0.1	0.1	0.2	0.1	0.1	0.5	0.1	0.2	
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cobalt	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Copper	µg/L	2 - 4 ³	0.9	1.3	1	1	1.6	0.9	0.8	0.8	0.8	3	0.85	0.7	1.1	2.1	0.9	
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Iron	µg/L	300	99	87	100	75	92	83	76	26	18	22	23.5	19	235	73	81	
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lead	µg/L	1-7 ³	0.1	0.2	0.1	2.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Lead (Filtered)	µg/L	1-7 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Lithium	µg/L	NG	2	2	1.8	2	1.6	1.8	2	1.6	1.7	1.6	1.7	1.7	2.2	1.9	1.8	
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Manganese	µg/L	NG	3.6	3.1	3.1	3.1	3.9	2.3	1.6	1.3	1.2	1.2	1.05	1	6	3.4	3.1	
	Manganese (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-</						

Notes:

- ¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)
- ² Guideline varies with pH
- ³ Guideline varies with hardness. Range given.
- ⁴ Guideline varies with pH and temperature. Most stringent given.
- ⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.17a: CCME Water Quality Guidelines - Yellowknife River, All Parameters

			Sampled Date Time	12/13/2012	1/16/2013	2/21/2013	3/13/2013	4/17/2013	5/22/2013	6/24/2013	7/24/2013	8/12/2013	9/16/2013	10/23/2013	11/28/2013	12/17/2013	1/14/2014	2/18/2014
			SampleCode	YKRiver@Bridge_DL_13 Dec 12	YKRiver@Bridge_DL_16 Jan 13	YKRiver@Bridge_DL_21 Feb 13	YKRiver@Bridge_DL_13 Mar 13	YKRiver@Bridge_DL_17 Apr 13	YKRiver@Bridge_DL_22 May 13	YKRiver@Bridge_DL_24 Jun 13	YKRiver@Bridge_DL_24 Jul 13	YKRiver@Bridge_DL_12 Aug 13	YKRiver@Bridge_DL_16 Sep 13	YKRiver@Bridge_DL_23 Oct 13	YKRiver@Bridge_DL_28 Nov 13	YKRiver@Bridge_DL_17 Dec 13	YKRiver@Bridge_DL_14 Jan 14	YKRiver@Bridge_DL_18 Feb 14
Chem_Group	ChemName	output unit	CCME FAL ¹															
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	Field Temperature	°C	NG	0.36	-	-	-	1.15	7.25	18.85	18.62	20.37	13	5.44	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units	6.5-9	7.37	7.32	7.2	7.26	7.23	7.455	7.49	7.52	7.6	7.475	7.42	7.335	7.21	7.29	7.24
	Electrical Conductivity (EC)	µS/cm	NG	56.7	56.7	56.2	55.7	57.6	58	56.6	58.4	59.1	58.75	57.8	60	58	57.3	57.15
	Total Suspended Solids (TSS)	mg/L	NG	3	3	3	3	3	3.5	3	3	4	3	3	3	3	3	3
	Hardness as CaCO3	mg/L	NG	29.1	28.4	30.1	29.7	27.1	26.3	27.4	29.4	30	29.5	29.7	28.8	27.7	27.4	27.4
	Alkalinity (total as CaCO3)	mg/L	NG	21.6	21.15	21	21.9	20.2	20.45	20.6	20.4	21.6	20.9	20.9	22	23.7	20.3	23.9
	Calcium	mg/L	NG	7.5	7.25	7.7	7.6	6.5	6.6	7	7.4	7.6	7.5	7.5	7.15	7.3	7.1	6.9
	Magnesium	mg/L	NG	2.5	2.5	2.6	2.6	2.6	2.4	2.4	2.6	2.7	2.6	2.6	2.45	2.5	2.4	2.45
	Potassium	mg/L	NG	1	1	1.1	1	1.1	1	1	1	1	1	1	1.05	1.1	1.1	1.1
	Sodium	mg/L	NG	2.1	2.15	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.25	2.2	2.3	2.3
	Chloride	mg/L	120	1.7	1.8	1.8	1.9	1.9	1.8	2	1.8	1.8	1.9	1.9	2.05	2	2	2
	Fluoride	mg/L	0.12	0.1	0.1	0.1	0.1	0.1	-	0.1	-	-	-	-	-	-	-	-
	Sulphate	mg/L	NG	3	3	4	4	4	4	4	4	4	3.5	4	4	4	4	4
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	6.5	5.05	5.2	5	5.4	6.75	5.1	5.5	5.4	5.55	5.2	5.25	5.1	5.3	5.05
	Total Organic Carbon (TOC)	mg/L	NG	6.2	5.5	5	5.3	5.5	6.7	5.6	5.6	5.5	5.9	5.6	5.5	5.3	5.7	5.35
	Total Solids (Filtered)	mg/L	NG	52	32	42	32	36	36	36	34	44	40	36	39	42	34	33
	Turbidity	NTU	NG	1.31	0.855	0.45	0.49	0.61	5.125	3.03	2.9	3.06	2.65	1.21	1.64	1.16	0.98	0.595
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.005	0.005	0.005	0.0095	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
	Nitrate (as NO3-N)	mg/L	13	0.06	0.065	0.08	0.08	0.04	-	0.04	-	-	-	-	-	-	-	-
	Nitrite (as NO2-N)	mg/L	0.06	0.01	0.01	0.01	0.01	0.01	-	0.01	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.06	0.075	0.08	0.08	0.04	0.045	0.04	0.04	0.03	0.06	0.08	0.105	0.1	0.12	0.135
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L	4	6	10	2	14	4	10.5	22	6	11	8	5	8.5	8	6	9
	Phosphorus (filtered) (Filtered)	mg/l	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biological	Total Coliforms	MPN/100mL	NG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	E. Coli	MPN/100mL	NG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	32	18.1	18	17	24	149	83	100	62	86.5	71	62.4	33.2	25	20.3	20.3
	Antimony	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	0.1	0.1	0.1	0.4	0.2	0.15	0.1	0.1	0.1	0.25	0.4	0.3	0.3	0.3	0.2
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	0.4	0.3	0.3	0.4	0.4	0.55	1.9	0.7	0.7	0.6	0.6	0.6	0.7	0.7	0.3
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	4.3	4.25	4.4	4.1	4.2	15.95	5.5	5.2	6.5	8.3	4.6	5.45	4.2	4	4.2
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	0.09	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.4	0.9	0.9	0.35	1.3	0.3	0.2	0.4
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³	0.2	0.2	0.2	0.2	0.5	0.5	1.2	0.4	0.7	0.8	0.8	0.5	0.8	0.6	0.55
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron	µg/L	300	34	22.5	20	17	31	139	99	87	67	82.5	67	54	27	24	53
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	µg/L	1-7 ³	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Lead (Filtered)	µg/L	1-7 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lithium	µg/L	NG	1.7	1.55	1.7	1.8	1.9	2.2	1.9	1.9	1.9	2.05	2	2	1.9	1.8	1.75
	Lithium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Manganese	µg/L	NG	1.6	1.35	1.2	1	1.4	4.55									

Table A.17a: CCME Water Quality Guidelines - Yellowknife River, All Parameters

			Sampled Date Time	3/12/2014	4/15/2014	5/22/2014	6/18/2014	7/23/2014	8/26/2014	9/26/2014	10/22/2014	11/27/2014	12/15/2014
			SampleCode	YKRiver@Bridge_DL_12 Mar 14	YKRiver@Bridge_DL_15 Apr 14	YKRiver@Bridge_DL_22 May 14	YKRiver@Bridge_DL_18 Jun 14	YKRiver@Bridge_DL_23 Jul 14	YKRiver@Bridge_DL_26 Aug 14	YKRiver@Bridge_DL_26 Sep 14	YKRiver@Bridge_DL_22 Oct 14	YKRiver@Bridge_DL_27 Nov 14	YKRiver@Bridge_DL_15 Dec 14
Chem_Group	ChemName	output unit	CCME FAL ¹										
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-
Field	Field Temperature	°C	NG	-	-	5.31	15.24	-	15.22	8.95	3.99	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-
	pH	pH Units	6.5-9	7.44	7.24	7.57	7.59	7.71	7.59	7.47	7.47	7.28	7.265
	Electrical Conductivity (EC)	µS/cm	NG	95.2	56.7	54.1	56.3	56.4	56.5	55.55	56	61.1	57.35
	Total Suspended Solids (TSS)	mg/L	3	3	3	3	3	3	3	3	3	3	3
	Hardness as CaCO3	mg/L	NG	38.4	22.9	21.3	23	22.6	23.3	23	23.25	23.3	22.75
	Alkalinity (total as CaCO3)	mg/L	NG	36.8	21.1	20.4	20.7	21	21.3	21.25	20.95	21	20.8
	Calcium	mg/L	NG	12.3	5.4	5.2	5.5	5.6	5.8	5.75	5.85	5.9	5.7
	Magnesium	mg/L	NG	3.5	2.3	2	2.2	2.1	2.1	2.1	2.1	2.1	2.05
	Potassium	mg/L	NG	1.4	1.1	1	1	1	1	1	1	1	1
	Sodium	mg/L	NG	3	2.3	2	2.1	2.1	2.1	2.1	2.1	2.9	2.1
	Chloride	mg/L	120	3.3	1.9	1.7	1.8	1.8	1.8	1.7	1.9	2.8	1.9
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-
	Sulphate	mg/L	NG	5	4	3	3	3	3	3	3	3	4
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	7.8	5.3	5	5.3	5.1	5.3	5	4.6	5.2	4.81
	Total Organic Carbon (TOC)	mg/L	NG	8.3	5.5	5.2	5.4	5.4	5.7	5.05	4.7	5.1	4.845
	Total Solids (Filtered)	mg/L	NG	54	26	18	44	44	36	41	36	34	43
	Turbidity	NTU	NG	0.65	0.5	4.21	2.7	3.04	2.49	2.39	2.015	1.92	0.915
Nutrients	Ammonia as N	mg/L	0.021 ²	0.005	0.008	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.0068
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.14	0.11	0.05	0.01	0.05	0.05	0.05	0.065	0.09	0.095
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L	4	7	4	12	2	4	7	2	2	3	2
	Phosphorus (filtered) (Filtered)	mg/l	4	-	-	0.004	-	-	-	-	-	-	-
Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-
Biological	Total Coliforms	MPN/100mL	NG	1	1	1	1	1	1	1	1	1	1
	E. Coli	MPN/100mL	NG	1	1	1	2	1	1	1.5	1	1	1
Metals ³	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ > 6.5 ⁴	-	5	10.2	2.2	6.1	4.9	3.9	4.75	4.3	3.45
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ > 6.5 ⁴	23.2	18.1	128	82.1	106	90.7	81.95	64.9	442	37.5
	Antimony	µg/L	NG	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Antimony (Filtered)	µg/L	NG	0.3	0.3	0.3	0.1	0.1	0.3	0.1	0.1	0.1	0.1
	Arsenic	µg/L	5	0.7	0.2	0.2	0.3	0.5	0.4	0.35	0.4	0.4	0.4
	Arsenic (Filtered)	µg/L	5	-	0.3	0.2	-	0.4	0.4	0.3	0.3	0.2	0.3
	Barium	µg/L	NG	13.2	4.4	5.4	4.7	5.2	6.1	5.25	5.2	5.9	4.95
	Barium (Filtered)	µg/L	NG	-	4.3	4.2	4	4	4.8	4.25	4.35	4.3	4.1
	Beryllium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Beryllium (Filtered)	µg/L	NG	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	0.09	0.05	0.05	0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.1
	Cadmium (Filtered)	µg/L	0.09	-	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	Cesium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Cesium (Filtered)	µg/L	NG	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Chromium	µg/L	NG	0.4	0.1	1.3	0.2	0.4	1.2	0.2	0.1	0.9	0.45
	Chromium (Filtered)	µg/L	NG	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Cobalt	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Cobalt (Filtered)	µg/L	NG	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Copper	µg/L	2 - 4 ³	1.1	0.5	0.5	0.2	0.8	0.3	0.9	0.6	0.9	0.75
	Copper (Filtered)	µg/L	2 - 4 ³	-	0.5	0.2	0.2	0.3	0.2	0.3	1.35	1.3	0.6
	Iron	µg/L	300	31	18	148	79	95	80	68	47	170	23.5
	Iron (Filtered)	µg/L	300	-	5	7	5	5	5	5	5	5	5
	Lead	µg/L	1-7 ³	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Lead (Filtered)	µg/L	1-7 ³	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
	Lithium	µg/L	NG	2.3	1.7	2	1.7	1.8	1.9	1.6	1.95	2	1.75
	Lithium (Filtered)	µg/L	NG	-	1.9	1.6	1.6	1.6	1.5	1.6	1.8	1.7	1.65
	Manganese	µg/L	NG	4.4	0.9	5	3.1	3	4.3	2.3	1.8	5.7	1.2
	Manganese (Filtered)	µg/L	NG	-	0.5	1	0.8	0.1	0.1	0.1	0.1	0.1	0.25
	Mercury	µg/L	0.026	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.08	0.01
	Mercury (Filtered)	µg/L	0.026	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Molybdenum	µg/L	73	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1
	Molybdenum (Filtered)	µg/L	73	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Nickel	µg/L	25-150 ³	0.5	0.4	0.5	0.1	0.5	0.4	0.3	0.45	0.5	0.4
	Nickel (Filtered)	µg/L	25-150 ³	-	0.4	0.4	0.1	0.3	0.3	0.3	0.4	0.3	0.3
	Rubidium	µg/L	NG	3.1	2.2	2.1	2.2	2.1	2.3	2.1	2	2.1	2.2
	Rubidium (Filtered)	µg/L	NG	-	2.2	1.9	2	1.9	2	1.9	1.85	2	2.05
	Selenium	µg/L	1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5
	Selenium (Filtered)	µg/L	1	-	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	Silver	µg/L	0.25	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Silver (Filtered)	µg/L	0.25	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Strontium	µg/L	NG	41.5	25.9	23.4	25.4	23.6	26.7	24.7	23.4	32.2	25.75
	Strontium (Filtered)	µg/L	NG	-	25.5	23.2	24.9	22.4	25	23.9	22.65	25.1	24.85
	Thallium	µg/L	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Thallium (Filtered)	µg/L	0.8	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Tin	µg/L	NG	-	-	-	-	-	-	-	-	-	-
	Tin (Filtered)	µg/L	NG	-	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Titanium	µg/L	NG	0.5	0.6	5.6	2.6	3.3	2.8	2.4	2.6	3.6	1.85
	Titanium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-
	Uranium	µg/L	15	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Uranium (Filtered)	µg/L	15	-	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Vanadium	µg/L	NG	0.1	0.1	0.3	0.2	0.2	0.1	0.15	0.2	0.4	0.1
	Vanadium (Filtered)	µg/L	NG	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Zinc	µg/L	30	7.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.7	0.4
	Zinc (Filtered)	µg/L	30	-	0.4	0.4	0.4	0.6	0.4	0.4	1.25	0.9	0.4

Notes:

¹ Canadian Council of Ministers of the Environment (CCME). (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

⁵ CCME FAL Guidelines developed for total metals only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.17a: CCME Water Quality Guidelines - Yellowknife River, All Parameters

			Sampled Date Time	1/29/2015	2/18/2015	3/9/2015	4/9/2015	5/28/2015	6/25/2015	7/22/2015	8/28/2015	9/23/2015	10/21/2015	11/26/2015	12/15/2015	
			SampleCode	YKRiver@Bridge_DL_29 Jan 15	YKRiver@Bridge_DL_18 Feb 15	YKRiver@Bridge_DL_09 Mar 15	YKRiver@Bridge_DL_09 Apr 15	YKRiver@Bridge_DL_28 May 15	YKRiver@Bridge_DL_25 Jun 15	YKRiver@Bridge_DL_22 Jul 15	YKRiver@Bridge_DL_28 Aug 15	YKRiver@Bridge_DL_23 Sep 15	YKRiver@Bridge_DL_21 Oct 15	YKRiver@Bridge_DL_26 Nov 15	YKRiver@Bridge_DL_15 Dec 15	
Chem_Group	ChemName	output unit	CCME FAL ¹													
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	
Field	Field Temperature	°C	NG	-	-	-	-	12.46	18.14	18.61	15.1	9.04	2.56	0.6	-0.009	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	1.69	2.54	1.12	0.638	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	21.3	21	21.25	21.1	20.7	21	20.7	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	0.266	0.226	0.225	0.225	0.207	0.247	0.225	
	Silica	mg/L	NG	-	-	-	-	-	0.336	0.315	0.32	0.305	0.309	0.37	0.447	
	pH	pH Units	6.5-9	7.19	7.14	7.15	7.22	7.6	7.58	7.7	7.495	7.44	7.4	7.18	7.17	
	Electrical Conductivity (EC)	µS/cm	NG	56.7	57.1	57.7	58.4	56.6	54.6	55.7	58.1	57.8	56.4	57.2	58	
	Total Suspended Solids (TSS)	mg/L	NG	3	3	3	3	4	4	3	3	5	3	3	3	
	Hardness as CaCO3	mg/L	NG	22.3	24.1	22.4	24.7	25.3	27.9	23.2	23.3	23.1	22.4	23.3	24.3	
	Alkalinity (total as CaCO3)	mg/L	NG	21.3	20.6	22.4	21.9	21.2	21.3	21	21.25	21.1	20.7	21	20.7	
	Calcium	mg/L	NG	5.5	6	5.5	6.1	6.3	6.8	5.7	5.8	5.8	5.7	5.8	6.1	
	Magnesium	mg/L	NG	2.1	2.2	2.1	2.3	2.3	2.6	2.2	2.15	2.1	2	2.1	2.2	
	Potassium	mg/L	NG	1.1	1.1	1	1.1	1.1	1.1	1	1	1	1	1	1.1	
	Sodium	mg/L	NG	2.2	2.2	2.2	2.3	2.2	2.4	2.1	2.15	2.1	2.1	2	2.1	
	Chloride	mg/L	120	1.9	1.95	1.9	2	2.1	2	2	2	1.9	2.1	1.8	2.1	
	Fluoride	mg/L	0.12	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Sulphate	mg/L	NG	4	3.5	4	4	4	3	4	4	4	4	3	4	
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	4.8	4.95	4.8	4.9	5.9	5.2	4.4	4.9	5.2	4.9	4.7	4.7	
	Total Organic Carbon (TOC)	mg/L	NG	5.2	4.85	4.9	5.1	6.4	5.4	4.8	4.9	5.4	5.2	4.6	4.8	
	Total Solids (Filtered)	mg/L	NG	36	38	36	33	38	29	48	28.5	34	44	36	35	
	Turbidity	NTU	NG	0.56	0.58	0.47	0.69	5.19	3.72	2.51	1.855	2.42	1.83	1.32	1.03	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.009	0.005	0.005	
	Nitrate (as NO3-N)	mg/L	-	-	-	-	-	-	0.005	0.005	0.005	0.005	0.0515	0.0536	0.0536	
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.11	0.085	0.11	0.1	0.001	0.0051	0.0051	0.0051	0.0051	0.0515	0.0536	0.0536	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	0.226	0.23	0.232	0.22	0.232	0.245	0.22	
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
	Phosphorus	µg/L	4	2	5	3	8	7	9	2	11.3	5.3	5.8	4.1	3.8	
	Phosphorus (filtered) (Filtered)	mg/l	4	-	-	-	-	-	-	-	-	-	-	-	-	
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Coliforms	MPN/100mL	NG	1	1	1	1	1	1	1	-	1	1	1	1	1
Biological	E. Coli	MPN/100mL	NG	1	1	1	4.1	1	1	1	-	1	1	1	1	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	2.6	1.9	1.8	2.2	4	4.2	6.4	5.45	3.7	3.6	4.1	4	
	Aluminum Total	µg/L	5 @ pH < 6.5 100 @ ≥ 6.5 ²	17.9	14	13.2	15.5	220	146	109	51.1	88.6	39.9	26.9	53.5	
	Antimony	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Antimony (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Arsenic	µg/L	5	0.3	0.3	0.3	0.3	0.5	0.7	0.6	0.45	0.6	0.4	0.3	0.3	
	Arsenic (Filtered)	µg/L	5	0.3	0.3	0.2	0.3	0.4	0.4	0.4	0.5	0.5	0.4	0.3	0.4	
	Barium	µg/L	NG	4.7	4.5	4.6	4.2	6.6	6	5.3	5.25	5.5	5	5	5.2	
	Barium (Filtered)	µg/L	NG	4.3	4.2	4.3	4.1	4.4	4.6	4.4	4.85	4.6	4.6	4.6	5.3	
	Beryllium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Beryllium (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	0.09	0.05	0.05	0.05	0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
	Cadmium (Filtered)	µg/L	0.09	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
	Cesium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Cesium (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Chromium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.7	0.8	0.4	0.1	0.1	0.1	0.1	
	Chromium (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Cobalt	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Cobalt (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Copper	µg/L	2 - 4 ³	0.2	0.65	0.2	0.2	0.8	1.7	0.9	0.65	0.9	0.6	0.5	0.2	
	Copper (Filtered)	µg/L	2 - 4 ³	0.2	0.7	0.2	0.2	0.4	0.4	0.5	0.65	0.6	0.5	0.4	0.2	
	Iron	µg/L	300	15	14	13	15	182	116	77	50.5	85	42	27	23	
	Iron (Filtered)	µg/L	300	5	5	5	5	5	5	5	5	5	5	5	5	
	Lead	µg/L	1-7 ³	0.1	0.1	0.1	0.1	0.1	0.2	0.4	0.2	0.1	0.1	0.1	0.1	
	Lead (Filtered)	µg/L	1-7 ³	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Lithium	µg/L	1.6	1.65	1.6	1.5	1.6	2.1	2.2	1.9	1.7	1.75	1.7	1.8	1.7	
	Lithium (Filtered)	µg/L	NG	1.5	1.6	1.5	1.6	1.6	1.6	1.75	1.6	1.75	1.7	1.6	1.8	
	Manganese	µg/L	NG	1	0.85	0.8	0.8	4.2	3.2	2.6	2.65	10.1	2.1	1.2	0.9	
	Manganese (Filtered)	µg/L	NG	0.2	0.3	0.3	0.3	0.4	0.7	0.1	0.1	0.4	0.5	0.2	0.3	
	Mercury	µg/L	0.026	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
	Mercury (Filtered)	µg/L	0.026	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
	Molybdenum	µg/L	73	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	
	Molybdenum (Filtered)	µg/L	73	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Nickel	µg/L	25-150 ³	0.3	0.4	0.3	0.4	0.6	0.5	0.4	0.4	0.4	0.4	0.3	0.4	
	Nickel (Filtered)	µg/L	25-150 ³	0.3	0.4	0.3	0.3	0.5	0.1	0.3	0.3	0.3	0.3	0.3	0.3	
	Rubidium	µg/L	NG	2	2.15	2.1	2.2	2.4	2.3	2.1	2.1	2.1	2	2.1	2	
	Rubidium (Filtered)	µg/L	NG	1.9	2.1	2.1	2.1	2.3	2.1	2.1	2.1	1.9	1.9	1.9	2.1	
	Selenium	µg/L	1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
	Selenium (Filtered)	µg/L	1	0.3	0.3	0.3	0.3	0.3	0.3	0.3						

Table A.17a: CCME Water Quality Guidelines - Yellowknife River, All Parameters

			Sampled Date Time		1/2/2016	2/24/2016	3/16/2016	4/21/2016	5/12/2016	6/28/2016	7/26/2016	8/23/2016	9/29/2016	10/26/2016	11/29/2016	12/13/2016	
			SampleCode	YKRiver@Bridge_DL_27 Jan 16	YKRiver@Bridge_DL_24 Feb 16	YKRiver@Bridge_DL_16 Mar 16	YKRiver@Bridge_DL_21 Apr 16	YKRiver@Bridge_DL_11 May 16	YKRiver@Bridge_DL_28 Jun 16	YKRiver@Bridge_DL_26 Jul 16	YKRiver@Bridge_DL_23 Aug 16	YKRiver@Bridge_DL_29 Sep 16	YKRiver@Bridge_DL_26 Oct 16	YKRiver@Bridge_DL_26 Oct 16	YKRiver@Bridge_DL_25 Nov 16	YKRiver@Bridge_DL_13 Dec 16	
Chem_Group	ChemName	output unit	CCME FAL ¹														
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	
Field	Field Temperature	°C	NG	-	-	-	-	7.43	18.41	17.97	18.68	8.72	2.79	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	0.488	0.535	0.909	1.47	-	0.001	1.1	2	1	2.2	2	1	-	
	Bicarbonate as CaCO3	mg/L	NG	20.1	17.9	20.2	17.9	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	0.273	0.245	0.241	0.236	0.206	0.252	0.2	0.213	0.206	0.254	0.235	0.251	0.251	
	Silica	mg/L	NG	0.436	0.471	0.41	0.406	0.32	0.337	0.356	0.272	0.301	0.338	0.367	0.469	0.469	
	pH	pH Units	6.5-9	7.21	7.2	7.19	7.28	7.5	7.66	6.97	7.69	7.37	7.44	7.23	7.25	7.25	
	Electrical Conductivity (EC)	µS/cm	NG	55	54.7	53.5	51.9	51.2	55.4	62.6	56.5	53.7	54.7	56.3	58	58	
	Total Suspended Solids (TSS)	mg/L	NG	3	3	3	4	3	3	3	3	3	3	3	3	3	
	Hardness as CaCO3	mg/L	NG	22.7	23.3	23.3	20.4	28.3	20.4	28.3	20.4	22.1	23.2	20.2	20.2	20.2	
	Alkalinity (total as CaCO3)	mg/L	NG	20.1	17.9	20.2	17.9	17.9	21.3	14.1	21.4	20.6	21.1	21.1	22.7	22.7	
	Calcium	mg/L	NG	5.7	5.7	5.8	4.9	4.6	6.4	5.9	4.7	5.4	5.8	5	4.9	4.9	
	Magnesium	mg/L	NG	2	2.2	2.1	2	1.9	3	2.9	2.1	2.1	2.1	1.9	1.9	1.9	
	Potassium	mg/L	NG	1.1	1.1	1.1	1	1	0.9	0.8	1	1.1	1	1	1	1	
	Sodium	mg/L	NG	2.1	2.3	2.4	2.1	2	2.3	2	1.8	2.2	2.1	2.1	2.3	2.3	
	Chloride	mg/L	120	2	2	2.2	1.8	1.9	2	6.3	1.8	1.8	1.8	1.8	2	2	
	Fluoride	mg/L	0.12	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Sulphate	mg/L	NG	3	3	3	3	4	4	4	3	3	3	3	4	4	
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	4.9	4.7	5	4.3	4.3	4.5	5	4.4	4.5	3.9	4.5	4.7	4.7	
	Total Organic Carbon (TOC)	mg/L	NG	5.2	5	4.8	4.4	4.4	4.5	4.6	4.9	4.8	4.7	4.7	4.8	4.8	
	Total Solids (Filtered)	mg/L	NG	30	37	24	42	30	24	69	38	29	33	36	22	22	
	Turbidity	NTU	NG	0.69	0.35	0.38	0.68	6.12	2.46	2.71	2.11	1.84	1.47	2.23	1.09	1.09	
	Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
		Nitrate (as NO3-N)	mg/L	13	0.0504	0.0535	0.0499	0.037	0.0086	0.005	0.005	0.005	0.005	0.0113	0.0385	0.052	0.052
		Nitrite (as NO2-N)	mg/L	0.06	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
		Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.0504	0.0535	0.0499	0.037	0.0086	0.0051	0.0051	0.0051	0.0051	0.0113	0.0385	0.052	0.052
		Nitrogen (Total)	mg/L	NG	0.226	0.226	0.226	0.226	0.226	0.233	0.225	0.223	0.223	0.243	0.243	0.24	0.24
Orthophosphate (as P)		mg/L	NG	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
Phosphorus		µg/L	4	3.4	3.6	18	6	10	8	12	3	7	2	4	2	2	
Phosphorus (Filtered) (Filtered)		mg/L	4	-	-	-	-	0.002	0.0032	0.0023	0.002	-	0.0025	0.0024	0.0068	0.0017	
Demand Parameters		Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-
Biological		Total Coliforms	MPN/100mL	NG	1	1	1	1	1	1	1	14	1	1	1	1	1
	E. Coli	MPN/100mL	NG	1	1	1	1	1	4.1	1	13.5	1	1	1	1	1	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	3.2	4.1	7.2	2.3	13.7	14.9	6.3	18.8	3.3	3.1	4	4	4	
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	17.9	14.2	19.1	24.1	272	36.5	73.2	88.6	59.3	34.9	82.7	47.9	47.9	
	Antimony	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Antimony (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Arsenic	µg/L	5	0.3	0.3	0.3	0.3	0.4	0.4	2.9	1.1	0.4	0.4	0.3	0.4	0.4	
	Arsenic (Filtered)	µg/L	5	0.3	0.3	0.3	0.3	0.3	0.3	1	0.8	0.4	0.3	0.3	0.3	0.3	
	Barium	µg/L	NG	4.6	4.5	4.2	4.5	6.9	4.3	5.5	5	4.8	4.7	5.5	5.3	5.3	
	Barium (Filtered)	µg/L	NG	4.1	4.3	4.1	4.3	4.1	4.2	5.3	4.2	4.2	4.2	4.6	4.7	4.7	
	Beryllium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Beryllium (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	Bismuth	µg/L	NG	-	-	-	-	-	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	0.2	0.2	0.6	0.2	0.2	0.2	0.2	0.2	0.2
	Boron - soluble	µg/L	1500	-	-	-	-	-	5	5.1	5.9	4.7	4.9	5.4	5.9	5.9	5.9
	Boron - soluble (Filtered)	µg/L	-	-	-	-	-	-	5	5.3	5.9	4.7	4.9	5.4	5.9	5.9	5.9
	Cadmium	µg/L	0.09	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	Cadmium (Filtered)	µg/L	0.09	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	Cesium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Cesium (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Chromium	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.4	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.2
	Chromium (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Cobalt	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1
	Cobalt (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Copper	µg/L	2 - 4 ³	0.3	0.5	0.5	0.2	0.8	0.5	0.5	1.1	0.8	0.6	0.3	0.4	0.5	0.5
	Copper (Filtered)	µg/L	2 - 4 ³	0.3	0.6	0.6	0.4	0.6	0.7	0.5	0.7	0.6	0.4	0.2	0.3	0.3	0.3
	Iron	µg/L	300	14	11	13	15	194	37	150	63	47	31	44	38	38	38
	Iron (Filtered)	µg/L	300	5	5	5	5	5	5	5	8	5	5	5	5	5	5
	Lead	µg/L	1-7 ³	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
	Lead (Filtered)	µg/L	1-7 ³	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Lithium	µg/L	NG	1.4	1.5	1.4	1.5	1.4	1.5	1.6	1.6	1.7	1.6	1.6	1.8	1.7	1.7
	Lithium (Filtered)	µg/L	NG	1.5	1.5	1.4	1.5	1.4	1.5	1.6	1.6	1.7	1.5	1.5	1.7	1.7	1.7
	Manganese	µg/L	NG	1.4	1.2	1.1	1.3	1.1	7.6	2.7	6.1	3.1	2.3	1.3	1.7	1.1	1.1
	Manganese (Filtered)	µg/L	NG	0.3	0.3	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
	Mercury	µg/L	0.026	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Mercury (Filtered)	µg/L	0.026	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Molybdenum	µg/L	73	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Molybdenum (Filtered)	µg/L	73	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1
	Nickel	µg/L	25-150 ³	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.4	0.3	0.3	0.3	0.4	0.4
	Nickel (Filtered)	µg/L	25-150 ³	0.3	0.3	0.3	0.3	0.1	0.1	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
	Rubidium	µg/L	NG	2.1	2.1	2.1	2.1	2.4	2	2	2.1	2.1	2	2.1	2.2	2.2	2.2
	Rubidium (Filtered)	µg/L	NG	1.8	2.1	2	2.2	1.9	1.9	2.1	1.8	2.1	1.9	2	2	2	2
	Selenium	µg/L	1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	Selenium (Filtered)	µg/L	1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	Silver	µg/L	0.25	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Silver (Filtered)	µg/L	0.25	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Strontium	µg/L	NG	24	23.7	22.7	23.1	21.9	23.3	24.3	25	23.3	23.7	26.7	26.7	26.8	26.8
	Strontium (Filtered)	µg/L	NG	21.8	23.3	22.4	24	21.3	23.2	24.9	22.6	23.2	23.4	26	25.5	25.5	25.5
	Thallium	µg/L	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Thallium (Filtered)	µg/L	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Tin	µg/L	NG	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1
	Tin (Filtered)	µg/L	NG	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Titanium	µg/L	NG	0.4	0.4	0.7	0.7	11.1	1.5	2.9	2.7	2	1.2	2.3	1.3	1.3	1.3
	Titanium (Filtered)	µg/L	NG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1
	Uranium	µg/L	15	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
	Uranium (Filtered)	µg/L	15	0.1	0.1												

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given

^a CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

Blank - Not analyzed

Abstract

Chem_Group	ChemName	output unit	CCME Fal ¹																	
Cyanide	Cyanide Total	mg/L	NG	-	-	<0.001	<0.001	0.00100000004749745	0.00100000004749745	<0.001	0.00100000004749745	0.00100000004749745	<0.001	0.0020000000949949	0.0020000000949949	<0.001	<0.001	<0.001	0.00100000004749745	
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	-	0.300000011920929	-	0.569999992847442	0.550000011920928	0.419999986886978	0.400000005960464	0.28999999165535	0.313333332538605	0.209999993443489	0.370000004768372	0.579999983310699	0.389999985694885	0.56000002384185	0.360000014305115	0.409999996423721	0.409999996423721
	pH	pH Units	6.5-9	-	-	-	7.59999990463256	7.30000019073486	7.19999980926513	7.1000003814697	7.1	7.52	7.639999986648559	7.59999990463256	7.28000020980834	7.69999980926513	7.5	7.69999980926513	8	8
	Electrical Conductivity (EC)	µS/cm	NG	40.7000007629394	44.4000015258789	50	48	48.099998474121	53	48.96667175293	48.266676839193	84	49.2999992370605	75.8000030517578	43.7999992370605	75	43.2000007629394	50.099998474121	50.099998474121	
	Total Suspended Solids (TSS)	mg/L	NG	-	-	<1	<1	2	2	2.33333333333333	2	2.33333333333333	2	2.33333333333333	2	2.33333333333333	2	2	3	
	Hardness as CaCO3	mg/L	NG	-	16	18.8999996185302	19	18	18.5	18.0666662851969	19.2000001271565	18	17.5	42.9000015258789	17.2999992370605	34.099998474121	16.2000007629394	19.1000003814697	19.1000003814697	
	Alkalinity (total as CaCO3)	mg/L	NG	13	13.19999980992651	-	13.3000001907348	15.1000003814697	15	16.2999992370605	16.8333333333333	16.3333333333333	16.466668574015	15.3999996185302	25.5	14.3000001907348	15.3000001907348	13.8999996185302	-	
	Calcium	mg/L	NG	4.59999990463256	5	-	4.59999990463256	4.80000019073486	4.40000009536743	4.59999990463256	4.59999990463256	4.73333326975504	4.39999993642171	4.19999980926513	12.8999996185302	4.30000019073486	9.99999980926513	4	4.69000005722045	4.69000005722045
	Magnesium	mg/L	NG	-	-	-	1.7999999231628	1.7000004768371	1.7000004768371	1.7000004768371	1.6000002384185	1.7999999231628	1.7000004768371	2.5999999463256	1.6000002384185	2.40000009536743	-	-	1.7999999231628	1.7999999231628
	Potassium	mg/L	NG	0.69999998079071	0.800000011920928	-	0.930000007152557	0.980000019073486	0.930000007152557	0.9200000166893	0.883333345254282	0.870000008742014	0.939999997615814	1.10000002384185	0.939999997615814	1.17999994754791	0.910000026226043	0.89999976158142	0.89999976158142	0.89999976158142
	Sodium	mg/L	NG	-	1.39999997615814	-	1.79999995231628	1.70000004768371	1.60000002384185	1.60000002384185	1.60000002384185	1.60000002384185	1.6666670640309	1.70000004768371	2.09999990463256	1.62999999523162	2.26999998092651	1.5	1.6599999662139	1.6599999662139
	Chloride	mg/L	120	-	1.20000004768371	-	1.60000002384185	1.5	1.60000002384185	1.60000002384185	1.5	1.63333336512247	1.4666665871938	1.60000002384185	2.29999995231628	1.5	2.40000009536743	1.39999997615814	1.5	1.5
	Fluoride	mg/L	0																	

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

³ Guideline varies with hardness. Range given.

⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for illustrative purposes only.

BOLD - Greater than Guideline
Blank - Not analyzed

			Sampled Date Time	8/17/1988	9/28/1988	11/30/1988	8/10/1989	9/12/1989	10/10/1989	11/16/1989	12/14/1989	1/31/1990	2/15/1990	4/4/1990	5/4/1990	7/25/1990	8/27/1990	9/24/1990	10/17/1990	
Chem_Group	ChemName	output unit	Site ID	CCME FAL ¹	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	
Cyanide	Cyanide Total	mg/L	NG		<0.001	-	0.0020000000949949	<0.001	-	<0.001	0.0020000000949949	0.00100000004749745	0.0020000000949949	0.00300000002607703	0.0020000000949949	0.00100000004749745	0.00100000004749745	<0.001	-	<0.001
	Field Temperature	°C	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrogen (Organic) (Filtered)		mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG		0.37999995231628	0.370000004768372	0.449999988079071	0.360000014305115	0.310000002384186	0.330000013113022	0.449999988079071	0.46000000834465	0.479999989271164	0.519999980926513	0.490000009536743	0.430000007152557	0.2899999165535	0.2899999165535	0.310000002384186	0.370000004768372
pH		pH Units	6.5-9		7.51999998092651	7.63999998648559	7.17000007629394	7.46000003814697	7.36999998555908	7.51999998092651	7.17000007629394	7.7399997111816	7.5	7.11000001335144	7.4499999826513	8.09000015258789	8.10000038146972	7.86999998555908	7.80000019073486	7.92000007629394
	Rheological Conductivity (EC)	µS/cm	NG		50.7999992370605	48.599998474121	48.7999992370605	50.4000015258789	49	52	48.7000007629394	49	51.2000007629394	50	45.7999992370605	45.2000007629394	47.7000007629394	45.7999992370605	46.2000007629394	46.4000015258789
Total Suspended Solids (TSS)		mg/L	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Hardness as CaCO3	mg/L	NG		19.6000003814697	16.8999996185302	18.7000007629394	19.1000003814697	18.7000007629394	18.5	19	18	17.7999992370605	17.1000003814697	16.7999992370605	16.7999992370605	18.8999996185302	17.5	17.7000007629394	17.8999996185302
Alkalinity (total as CaCO3)		mg/L	NG		17.8999996185302	16.1000003814697	16.2999992370605	16.3999996185302	16.3999996185302	16.3999996185302	15.6999998092651	17.3999996185302	15.8000001907348	14.8000001907348	20	15.6999998092651	14.8999996185302	14.8999996185302	14.8999996185302	14.8999996185302
	Calcium	mg/L	NG		4.90000009536743	4.30000019073486	4.69999980926513	4.69999980926513	4.69999980926513	4.59999990463256	4.80000019073486	4.40000009536743	4.40000009536743	4.23000001907348	4.19999980926513	4.09999990463256	4.71999979019165	4.28999996185302	4.38000011444091	4.40000009536743
Magnesium		mg/L	NG		1.79999995231628	1.5	1.70000004768371	1.79999995231628	1.70000004768371	1.70000004768371	1.70000004768371	1.65999996662139	1.58000004291534	1.58000004291534	1.60000002384185	1.60000002384185	1.74000000953674	1.64999997615814	1.64999997615814	1.69000005722045
	Potassium	mg/L	NG		0.949999988079071	0.910000026226043	0.9200000166893	0.949999988079071	0.910000026226043	0.860000014305114	0.959999978542327	0.930000007152557	1.46000003814697	1.32000005245208	0.9					

Blank - Not analyzed

Table A.17b: CCME Water Quality Guidelines - Yellowknife River, All Parameters with <DL

			Sampled Date Time	12/10/1990	1/28/1991	3/12/1991	5/28/1991	6/20/1991	7/17/1991	8/8/1991	4/2/1992	5/11/1992	6/2/1992	6/29/1992	7/28/1992	10/5/1992	11/2/1992	12/7/1992	1/5/1993
Chem_Group	ChemName	output unit	Site_ID	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ
			CCME FAL ¹																
Cyanide	Cyanide Total	mg/L	NG	<0.001	0.00100000004749745	-	0.00100000004749745	0.0020000000949949	0.0020000000949949	0.0020000000949949	0.0020000000949949	0.0020000000949949	0.00133333339666327	0.00100000004749745	0.0020000000949949	0.0020000000949949	0.00100000004749745	-	-
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	0.5	0.52999997138977	0.550000011920928	0.550000011920928	0.519999980926513	0.48333332935969	0.419999986868978	0.730000019073486	0.569999992847442	0.550000011920929	0.479999989271164	0.319999992847443	0.389999985694885	0.449999988079071	0.5	0.550000011920928
	pH	pH Units	6.5-9	7.55999994277954	7.17000007629394	7.48000001907348	8.11999988555908	6.78999996185302	8.40999984741211	7.53000020980834	8.1899995803833	7.75	7.32666667302449	7.48999977111816	7.42000007629394	7.30000019073486	7.44999980926513	7.30999994277954	7.07999992370605
	Electrical Conductivity (EC)	µS/cm	NG	46.599998474121	47	50	58	50.2000007629394	70.0666669209798	48.599998474121	51.599998474121	52.2000007629394	54.7333335876464	54.5	50.7000007629394	49	50.7999992370605	53.599998474121	49.2000007629394
	Total Suspended Solids (TSS)	mg/L	NG	<1	<1	<1	1.39999997615814	1.60000002384185	3.7333333492279	<1	<1	1	1.10000002384186	1.60000002384185	2.20000004768371	1.79999995231628	1.20000004768371	2	-
	Hardness as CaCO3	mg/L	NG	17.6000003814697	17.1000003814697	17.8999996185302	19.2000007629394	18.5	20.1000003814697	19	19.1000003814697	19.7999992370605	20.96666653951	20	19.5	19	19.6000003814697	20.1000003814697	18.8999996185302
	Alkalinity (total as CaCO3)	mg/L	NG	15.1000003814697	14.8999996185302	15.6999998092651	18.1000003814697	17.2000007629394	16.433333969116	15.1999998092651	16.8999996185302	15.6000003814697	18.1333332061767	17.7000007629394	17.8999996185302	16.3999996185302	21.1000003814697	18.2999992370605	18.2999992370605
	Calcium	mg/L	NG	4.3600001335144	4.19999980926513	4.46999979019165	4.69999980926513	4.5	4.69999980926513	4.89999980926513	4.80000019073486	5.13333320617675	4.8899998648559	4.80000019073486	4.67000007629394	4.90000009536743	5	4.69999980926513	4.69999980926513
	Magnesium	mg/L	NG	1.6399998569488	1.60000002384185	1.6299999523162	1.80999994277954	1.76999998092651	1.85000002384185	1.78999998092651	1.8899998569488	1.98000001907348	1.8799999523162	1.83000004291534	1.77999997138977	1.79999995231628	1.85000002384185	1.73000001907348	1.73000001907348
	Potassium	mg/L	NG	0.88999985694885	0.9200000166893	0.94999988079071	0.930000007152557	0.88999985694885	0.91666666534881	0.87999995231628	0.9200000166893	0.959999978542327	0.94999998807907	0.87999995231628	0.88999985694885	0.899999976158142	0.9200000166893	0.930000007152557	0.970000028610229
	Sodium	mg/L	NG	1.64999997615814	1.63999998569488	1.77999997138977	1.77999997138977	1.74000000953674	1.75666666030883	1.6399998569488	1.72000002861022	1.72000002861022	1.8766666650772	1.72000002861022	1.67999994754791	1.73000001907348	1.87000000476837	1.74000000953674	1.76999998092651
	Chloride	mg/L	120	1.60000002384185	1.60000002384185	1.70000004768371	1.5	1.5	1.60000002384185	1.60000002384185	1.70000004768371	1.78999996185302	2.02666664123535	1.90999996662139	1.63999998569488	1.41999995708465	1.63999998569488	1.6599996662139	1.6599996662139
	Fluoride	mg/L	0.12	0.079999982118607	0.0900000035762787	0.059999986588955	0.0700000002980232	0.059999986588955	0.0633333325386047	0.059999986588955	0.0500000007450581	0.0500000007450581	0.0500000007450581	0.059999986588955	0.059999986588955	0.0500000007450581	0.059999986588955	0.079999982118607	0.0900000035762787
	Sulphate	mg/L	NG	2.20000004768371	2.40000009536743	2.59999990463256	2	2.40000009536743	2.833333341280619	3.09999990463256	3.70000004768371	2.79999995231628	2.83333333333333	2.90000009536743	3.59999990463256	2.90000009536743	4	3.09999990463256	3.2999995231628
	Colour	TCU	NG	<5	5	7.5	7.5	<5	10	7.5	5	15	5	10	10	5	7.5	7.5	7.5
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	4.57999992370605	4.5	4.9099998474121	5.01000022888183	4.90000009536743	5.29666678110758	5.34999990463256	5.09999990463256	5.44000005722045	5.2400000890096	5.1599998474121	5.30000019073486	4.96999979019165	4.78999996185302	5.15000009536743	5.4099998474121
	Total Organic Carbon (TOC)	mg/L	NG	4.76999998092651	4.69000005722045	5.13000011444091	5.09000015258789	5.0399996185302	5.53333314259847	5.40000009536743	5.21000003814697	5.55000019073486	5.36333338419596	5.38000011444091	5.53000020980834	5.13999986648559	4.92999982833862	5.30000019073486	6.19999980926513
	Total Solids (Filtered)	mg/L	NG	22	22	23	24	24	24	24	23	25	25	25	25	25	25	27	25
	Turbidity	NTU	NG	0.829999983310699	0.720000028610229	0.699999988079071	1.40999996662139	2.29999995231628	2.83333333333333	1.60000002384185	0.680000007152557	1.30999994277954	1.66000000635782	1.63999998569488	2.5	2.09999990463256	2.20000004768371	1.62000000476837	2.20000004768371
Nutrients	Ammonia as N	mg/L	0.021 ⁴	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.048999987185001	0.0500000007450581	0.0630000011031279	0.034000001847744	0.0230000000447035	<0.01	<0.01	0.0670000016689301	0.0399999991059303	0.034000001847744	<0.01	<0.01	0.0130000002682209	0.0399999991059303	0.0590000003576279	0.0529999993741512
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L	4	<4	<4	<4	<4	<4	6.50000013411045	<4	<4	<4	4.50000003911555	4.99999988824129	7.000000021606684	<4	<4	<4	32.0000015199184
	Phosphorus (Filtered) (Filtered)	mg/L	4	<0.002	<0.002	<0.002	0.00300000002607703	<0.002	0.00833333345750968	0.00899999961256981	0.00300000002607703	0.00600000005215406	0.00633333344012499	0.00800000037997961	0.00800000037997961	0.00499999988824129	0.0020000000949949	0.00700000021606684	0.0370000004768372
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Demand Parameters	Total Coliforms	MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. Coli		MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biological																			

Appendix A Standards_Annual All Parameters1.xlsx

Table A.17b: CCME Water Quality Guidelines - Yellowknife River, All Parameters with <DL

			Sampled Date Time	Site ID	8/24/1994	9/7/1994	10/5/1994	11/4/1994	12/9/1994	1/9/1995	2/6/1995	3/14/1995	4/6/1995	5/8/1995	6/6/1995	7/4/1995	8/15/1995	9/7/1995	10/11/1995	11/14/1995
Chem_Group	ChemName	output unit	CCME FAL ¹		GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ
Cyanide	Cyanide Total	mg/L	NG		0.002	<0.001	<0.001	-	0.002	0.004	0.003	0.003	0.005	0.002	0.002	<0.001	0.002	0.002	<0.001	<0.001
Field	Field Temperature	°C	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG		0.31	0.22	0.28	0.35	0.41666666666667	0.45	0.44	0.41	0.41	0.43666666666667	0.39	0.31	0.26	0.24	0.21	0.32
	pH	pH Units	6.5-9		7.42	7.34	7.12	7.2	6.47333333333333	7.1	6.96	6.56	6.76	6.75	7.06	7.38	7.42	7.24	7.24	7.3
	Electrical Conductivity (EC)	µS/cm	NG		50.1	50.5	49.1	48.2	70.3666666666667	53	48.5	49.7	55.4	54.3666666666667	55.7	45.6	45.2	45.7	43.8	47.5
	Total Suspended Solids (TSS)	mg/L	NG		<3	6	<3	-	4.33333333333333	6	<3	<3	<3	8	<3	4	<3	<3	3	<3
	Hardness as CaCO3	mg/L	NG		18.4851	18.11055	17.77717	17.61249	18.1814	18.69095	17.73868	15.37591	17.65025	16.8129633333333	18.06804	17.23928	17.82102	17.48764	17.27302	17.53015
	Alkalinity (total as CaCO3)	mg/L	NG		15.8	16	16.2	16.7	16.3333333333333	16.2	13.4	16	15.1	14.8333333333333	14.8	15.5	15.1	14.4	16.4	15.8
	Calcium	mg/L	NG		4.56	4.64	4.31	4.35	4.48	4.52	4.18	3.92	3.93	4.16	4.17	4.37	4.26	4.22	4.14	3.87
	Magnesium	mg/L	NG		1.61	1.68	1.6	1.59	1.62	1.69	1.58	1.46	1.52	1.72333333333333	1.65	1.64	1.58	1.58	1.56	1.42
	Potassium	mg/L	NG		0.85	0.79	0.81	0.67	0.89	0.95	0.96	0.66	0.71	0.80333333333333	0.72	0.7	0.65	0.68	0.76	0.74
	Sodium	mg/L	NG		0.52	0.47	0.59	0.44	0.46	1.15	1.13	1.01	1.04	1.11	1.06	1.05	1.16	1.17	1.13	0.71
	Chloride	mg/L	120		1.6	1.64	1.6	1.65	1.89666666666667	1.95	1.68	1.42	1.6	1.6	1.58	1.51	1.63	1.57	1.62	1.85
	Fluoride	mg/L	0.12		0.07	0.06	0.05	0.05	0.06	0.08	0.08	0.06	0.06	0.06	0.06	0.06	0.08	0.07	0.06	0.06
	Sulphate	mg/L	NG		3.2	3.1	3.2	3.2	3.76666666666667	3.5	2.3	2.9	3.3	3.96666666666667	3.3	2.6	2	2.6	3.4	3.5
	Colour	TCU	NG		8	7	8	7	10	5	8	<5	5	5	5	10	5	5	5	<5
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG		4.7	5.5	3.9	4.1	4.7	4	4	4.3	4.3	4	4.3	4.4	4.2	4.3	4.6	4.1
	Total Organic Carbon (TOC)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Solids (Filtered)	mg/L	NG		40	31	31	33	37	24	31	<10	25	38.3333333333333	50	29	41	21	32	49
	Turbidity	NTU	NG		5	3.5	3	3.5	2.96666666666667	2	1.2	1.3	1.1	3.03333333333333	2.6	2.9	4.2	2.4	2.5	
Nutrients	Ammonia as N	mg/L	0.021 ⁴		0.024	0.012	0.026	0.02	0.085333333333333	0.017	0.0025	0.006	0.01	0.019333333333333	0.016	0.016	0.033	0.015	0.006	0.018
	Nitrate (as NO3-N)	mg/L	13		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrite (as NO2-N)	mg/L	0.06		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG		<0.01	<0.01	0.016	0.025	0.058666666666667	0.0653	0.06	0.072	0.075	0.045	0.015	0.189	0.016	0.019	0.011	0.045
	Nitrogen (Total)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L	4		13	6	13	8	15.6666666666667	7	12	15	8	17	10	11	9	12	10	7
	Phosphorus (Filtered) (Filtered)	mg/L	4		0.01	0.003	0.002	0.003	0.012	0.004	0.011	0.013	0.006	0.008	0.005	0.003	0.004	0.007	0.006	0.004
	Biochemical Oxygen Demand (BOD)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Biological	Total Coliforms	MPN/100mL	NG		1	-	<1	1	2.5	5	1	1	5	1	1	1	4	<1	<1
	E. Coli	MPN/100mL	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²		144	113	109	81	58.3333333333333	42	34	30	28	268.333333333333	150	124	119	90	77	75
	Antimony	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Antimony (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic (Filtered)	µg/L	5		1	0.3	0.3	0.2	0.133333333333333	0.1	<0.1	0.1	0.1	0.266666666666667	0.3	0.2	0.3	0.2	0.2	0.1
	Barium	µg/L	NG		5.3	5.4	5.2	4.5	4.66666666666667	4.2	4.2	3.9	4.5	6.53333333333333	5.6	5	4.9	4.7	4.6	4.6
	Barium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	Beryllium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	0.09		<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
	Cadmium (Filtered)	µg/L	0.09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG		0.4	0.2	0.3	<0.2	1.06666666666667	<0.2	0.2	<0.2	0.4	0.56666666666667	0.8	0.3	0.2	0.4	<0.2	<0.2
	Chromium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG		0.1	0.1	0.1	0.1	<0.1	0.1	<0.1	0.1	<0.1	0.166666666666667	<0.1	0.1	<0.1	0.1	0.1	0.1
	Cobalt (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³		0.8	1.1	0.9	0.8	1.43333333333333	1.1	1	1	0.8	1.1	0.9	1.7	0.8	0.9	0.6	

Table A.17b: CCME Water Quality Guidelines - Yellowknife River, All Parameters with <DL

			Sampled Date Time	Site ID	12/11/1995	1/11/1996	2/8/1996	3/18/1996	5/27/1996	6/20/1996	8/6/1996	9/16/1996	1/14/1997	2/9/1997	3/17/1997	5/21/1997	6/30/1997	9/2/1997	1/13/1998	3/11/1998
Chem_Group	ChemName	output unit	CCME FAL ¹		GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ
Cyanide	Cyanide Total	mg/L	NG		<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0036666666666667	<0.001	<0.001	<0.001	0.0036666666666667	<0.001	0.006
Field	Field Temperature	°C	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG		0.41	0.4	0.42	0.49	0.39	0.393333333333333	0.36	0.33	0.5	-	0.5	0.38	0.35	0.383333333333333	-	0.42
	pH	pH Units	6.5-9		7.23	7.12	7.04	7.09	7.36	7.49666666666667	7.42	7.25	7.18	7.47666666666667	7.06	7.36	7.41	7.47666666666667	7.23	7.39
	Electrical Conductivity (EC)	µS/cm	NG		48.5	41.7	42.9	50.2	43.2	42.7666666666667	40.4	41.2	41.9	41.5666666666667	43.6	42.9	44	41.5666666666667	43.5	43.2
	Total Suspended Solids (TSS)	mg/L	NG		<3	5	<3	6	19	14.6666666666667	<3	9	-	7	<3	6	<3	7	3	<3
	Hardness as CaCO3	mg/L	NG		18.72335	16.63525	15.74778	15.94754	16.24584	16.90655	15.12621	14.96153	14.95276	-	-	-	-	-	-	-
	Alkalinity (total as CaCO3)	mg/L	NG		15	14.7	15.2	14.9	13.5	13.7333333333333	14	12.6	-	-	-	-	-	13.4	13.9	-
	Calcium	mg/L	NG		4.05	4.1	4.03	4.05	4.75	4.12333333333333	3.89	3.66	3.75	-	3.9	-	-	3.78666666666667	-	3.94
	Magnesium	mg/L	NG		1.48	1.52	1.5	1.52	1.84	1.53333333333333	1.43	1.37	1.37	-	1.46	-	-	1.40666666666667	-	1.46
	Potassium	mg/L	NG		0.87	0.75	0.81	0.96	0.74	0.736666666666667	0.72	0.72	0.84	-	0.93	-	-	0.756666666666667	-	0.85
	Sodium	mg/L	NG		0.84	1.17	1.25	1.44	1.94	1.89333333333333	0.81	0.64	1.01	-	1.14	-	-	0.98	-	1.26
	Chloride	mg/L	120		1.91	1.42	1.36	1.95	1.54	1.69666666666667	1.41	1.49	1.56	-	1.76	1.54	1.67	1.57666666666667	-	1.56
	Fluoride	mg/L	0.12		0.08	0.07	0.1	0.07	0.07	0.07	0.07	0.06	0.06	-	0.07	0.06	0.06	0.066666666666667	-	0.03
	Sulphate	mg/L	NG		3.6	3	2.8	3.3	3.1	2.3	2.7	3.9	2.5	-	2.9	2.4	3	2.73333333333333	-	2.4
	Colour	TCU	NG		<5	5	<5	5	5	<5	<5	<5	<5	<5	<5	5	5	5	5	<5
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG		4.8	4.5	-	5.8	4.7	3.66666666666667	4.5	4.6	-	-	5.2	4.3	4.8	10.3333333333333	4.4	4.6
	Total Organic Carbon (TOC)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Solids (Filtered)	mg/L	NG		36	74	23	74	38	-	28	37	14	22	<10	32	<10	22	37	41
	Turbidity	NTU	NG		1.4	2.1	2.8	0.9	15	3.46666666666667	1.8	1.4	0.8	1.76666666666667	0.9	3.1	2.5	1.76666666666667	1.3	0.6
Nutrients	Ammonia as N	mg/L	0.021 ⁴		0.031	0.023	-	0.09	0.015	0.005666666666667	0.005	0.008	0.035	0.007666666666667	0.018	0.02	0.012	0.007666666666667	0.029	0.033
	Nitrate (as NO3-N)	mg/L	13		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrite (as NO2-N)	mg/L	0.06		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG		0.068	0.051	-	0.061	0.017	<0.008	<0.008	<0.008	0.146	0.0243333333333333	0.07	<0.008	0.008	0.0243333333333333	0.048	0.054
	Nitrogen (Total)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L	4		8	8	9	10	24	8.66666666666667	10	3	11	10	5	11	15	10	9	21
	Phosphorus (Filtered)	mg/L	4		0.005	0.008	0.008	0.006	0.006	0.003	0.007	<0.002	0.01	0.0093333333333333	0.005	0.011	0.007	0.0093333333333333	0.007	0.006
Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biological	Total Coliforms	MPN/100mL	NG		1	1	1	<1	<1	1	1	<1	<1	3	<1	<1	2	1	1	<1
	E. Coli	MPN/100mL	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²		38	24	26	27	499	137	61	52	23	-	23	-	-	69	-	23
	Antimony	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Antimony (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic (Filtered)	µg/L	5		0.2	0.1	0.1	0.1	0.3	0.966666666666667	0.2	0.1	0.2	-	0.2	-	-	0.2	-	0.1
	Barium	µg/L	NG		4.6	4.1	4.1	4.1	8.7	4.9	3.9	3.8	4	-	3.9	-	-	4.03333333333333	-	3.8
	Barium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG		<50	<50	<50	<50	<50	<50	<50	<50	<50	-	<50	-	-	<50	-	<50
	Beryllium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	0.09		0.1	<0.1	-	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	-	0.1
	Cadmium (Filtered)	µg/L	0.09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG		1	<0.2	0.5	0.6	0.9	0.3	<0.2	<0.2	0.3	-	0.3	-	-	<0.2	-	1.1
	Chromium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG		<0.1	<0.1	0.1	0.1	0.3	0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	0.1	-	0.1
	Cobalt (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³		2.2	0.9	6.5	3.4	1.2	1.26666666666667	0.9	0.8	-	-	1.8	-	-	-	-	2.3
	Copper (Filtered)	µg/L	2 - 4 ³		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron																			

Table A.17b: CCME Water Quality Guidelines - Yellowknife River, All Parameters with <DL

			Sampled Date Time	5/7/1998	6/30/1998	7/30/1998	9/9/1998	1/14/1999	3/17/1999	5/18/1999	6/30/1999	7/30/1999	9/13/1999	2/8/2000	3/29/2000	4/28/2000	5/17/2000	5/26/2000	6/22/2000	
Chem_Group	ChemName	output unit	Site_ID	CCME FAL ¹	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	
Cyanide	Cyanide Total	mg/L		NG	<0.001	<0.001	<0.001	0.01	<0.001	<0.001	-	0.003	-	<0.001	0.002	<0.001	<0.001	<0.002	<0.002	
Field	Field Temperature	°C		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L		NG	0.4	0.31	0.36	0.32	0.48	0.46	0.5	0.4	0.36	0.33	0.45	0.48	0.506	-	0.54	
	pH	pH Units		6.5-9	7.39	7.43	7.14	7.10666666666667	7.11	6.99	7.25	7.27	7.12	7.64	7.22333333333333	7.15	7.2	7.36	7.13	
	Electrical Conductivity (EC)	µS/cm		NG	48.2	47.3	47.6	48.0666666666667	45	46.6	47.2	49	46	46.5	52.6666666666667	46.6	47.2	46.7	45.5	
	Total Suspended Solids (TSS)	mg/L		NG	<3	<3	<3	6.66666666666667	<3	<3	7	7	4	<3	3	5	64	6	21	
	Hardness as CaCO3	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	18.92357	-	18.75009	
	Alkalinity (total as CaCO3)	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	15	16.1	15.9	
	Calcium	mg/L		NG	3.95	4.2	-	4.24333333333333	4.03	3.87	-	4.45	4.22	4.09	4.04666666666667	4.19	4.61	4.7	4.59	
	Magnesium	mg/L		NG	1.47	1.52	-	1.51666666666667	1.44	1.39	-	1.57	1.47	1.46	1.49	1.51	1.8	2.01	1.77	
	Potassium	mg/L		NG	0.69	0.87	-	0.88	0.91	0.96	-	0.79	0.72	0.78	0.95333333333333	0.97	0.99	1.12	0.97	
	Sodium	mg/L		NG	0.96	1.38	-	1.31	1.31	1.45	-	1.31	1.23	1.19	1.43	1.38	1.66	1.51	1.68	
	Chloride	mg/L		120	1.59	1.7	1.67	1.6	1.73	1.64	1.69	1.84	1.71	1.89	1.85333333333333	1.69	1.5	1.81	1.6	
	Fluoride	mg/L		0.12	0.05	0.05	0.07	0.07	0.06	0.05	0.4	0.07	0.07	0.07	0.07	0.09	0.12	0.06	0.11	
	Sulphate	mg/L		NG	2.9	2.7	2.8	5.6	3.1	3	3.1	3	2.8	4.4	2.23333333333333	3.3	8	-	6	
	Colour	TCU		NG	5	<5	<5	15	5	<5	5.6	5	5	5	5	10	20	5	5	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L		NG	5	4.7	4.8	4.73333333333333	4.4	4.3	5.1	4.9	5.8	5.2	4.3	4.7	4.2	4.6	5.2	
	Total Organic Carbon (TOC)	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Solids (Filtered)	mg/L		NG	34	43	34	37	54	24	-	41	62	35	33	26	38.2	64	30	
	Turbidity	NTU		NG	2.9	3.4	2.4	4.26666666666667	1.2	1.1	5	3.3	3.5	3.8	1.73333333333333	2.2	0.4	29	5.8	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.026	0.016	0.013	0.00733333333333	0.035	0.03	0.019	0.011	0.06	0.011	0.012	0.026	0.011	<0.005	<0.005	0.025	
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.017	<0.008	<0.008	0.013	0.05	0.067	0.033	<0.008	<0.008	0.008	0.051	0.05	0.041	0.013	0.025	0.013	
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG	4	23	16	15	14.6666666666667	9	17	18	9	19	11	7.5	<2	<0.002	36	8	
	Phosphorus	µg/L	4	0.017	0.007	0.009	0.00866666666667	0.007	0.014	0.013	0.006	0.008	0.006	-	<0.002	-	0.052	-	<0.002	
	Biological	Total Coliforms	MPN/100mL	NG	<1	3	<1	3	1	<1	<1	<1	2	<1	1.5	<1	-	<1	-	<1
	E. Coli	MPN/100mL	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum Total		µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	114	122	-	166.666666666667	25	32	-	138	124	98	24.5	32	34	1230	248	197	
Antimony		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	0.7	-	<0.5	-	
Antimony (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Arsenic		µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	-	<2	-	
Arsenic (Filtered)		µg/L	5	0.7	0.3	-	0.7	0.2	0.2	-	0.1	0.2	0.5	0.2	0.2	-	0.2	-	0.2	
Barium		µg/L	NG	4.5	4.7	-	5.4	4.1	4.8	-	4.9	5.1	5	4.23333333333333	-	4	14.2	6	5.5	
Barium (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Beryllium		µg/L	NG	<50	<50	-	<50	<50	-	-	<50	<50	<50	<50	<50	<50	<2	<50	<2	<50
Beryllium (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bismuth		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	<10	-
Bismuth (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron - soluble		µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron - soluble (Filtered)		µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium		µg/L	0.09	<0.1	<0.1	-	<0.1	0.2	0.2	-	<0.1	<0.1	<0.1	0.1	0.1	0.1	<0.3	0.2	<0.3	<0.1
Cadmium (Filtered)		µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.4	-	<0.4	-
Cesium (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium		µg/L	NG	0.2	<0.2	-	0.23333333333333	0.3	2.7	-	2.2	0.6	0.3	0.25	4	<3	2.3	<3	0.4	-
Chromium (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt		µg/L	NG	0.2	<0.1	-	-	0.1	0.1	0.2	-	0.2	0.1	0.3	0.1	0.1	<1	0.7	<1	0.1
Cobalt (Filtered)		µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper		µg/L	2 - 4 ³	0.9	0.7	-	0.96666666666667	1.3	2.6	-	1	4.7	-	2.56666666666667	4.2	<2	2.5	<2	1	-
Copper (Filtered)		µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron		µg/L	300	155	115	-	185.333333333333	28.5	91.7	-	154	132	235	29.95	55.5	40	1280	100	217	-
Iron (Filtered)		µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead		µg/L	1-7 ³	<0.2	0.4	-	0.25	<0.2	0.6	-	<0.2	0.9	4.6	0.25	2.3	<1	1	<1	<1	0.4
Lead (Filtered)		µg/L	1-7 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium		µg/L	NG	1.3	1.6	-	1.46666666666667	1.7	1.5	-	1.6	1.5	1.4	1.3						

Table A.17b: CCME Water Quality Guidelines - Yellowknife River, All Parameters with <DL

			Sampled Date Time	Site ID	6/28/2000	7/19/2000	7/31/2000	8/18/2000	9/1/2000	9/21/2000	10/18/2000	11/27/2000	1/10/2001	1/23/2001	3/13/2001	4/18/2001	5/17/2001	5/23/2001	6/18/2001	6/28/2001
Chem_Group	ChemName	output unit	CCME FAL ¹		GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ
Cyanide	Cyanide Total	mg/L	NG		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.006333333333333333	0.008	<0.003	<0.003	<0.003	<0.003
Field	Field Temperature	°C	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG		0.41	-	0.38	0.34	-	0.48	0.42	0.48	0.62	-	-	0.58	-	0.55	-	0.48
	pH	pH Units	6.5-9		7.46	7.55	7.44	7.48	7.5	7.13	7.29	7.16	7.23	6.98	7.206666666666667	-	7.27	7.26	7.32	7.26
	Electrical Conductivity (EC)	µS/cm	NG		51	55.2	45.9	46.3	45	28.8	44.2	44	54.3	52.4	48.83333333333333	54.8	49.8	52.4	49.8	50.7
	Total Suspended Solids (TSS)	mg/L	NG		7	8	3	<3	<3	<3	<3	<3	<3	<3	<3	5	<3	<3	<3	<3
	Hardness as CaCO3	mg/L	NG		19.47553	-	19.29329	18.67649	-	24.23825	18.69794	16.02001	20.04722	-	-	19.20176	-	19.84353	-	20.9847
	Alkalinity (total as CaCO3)	mg/L	NG		17.2	17.6	16.8	14.6	14.5	13.2	15	14	17.8	17	16.366666666666667	17.9	16.8	17.2	16.6	17.6
	Calcium	mg/L	NG		4.93	4.51	4.89	4.61	4.33	6.59	4.8	3.81	5.06	4.31	4.676666666666667	4.54	4.7	4.83	4.73	5.32
	Magnesium	mg/L	NG		1.74	1.63	1.72	1.74	1.58	1.89	1.63	1.58	1.8	1.53	1.6833333333333333	1.91	1.72	1.89	1.73	1.87
	Potassium	mg/L	NG		0.9	0.85	0.92	0.92	0.82	1.33	0.82	0.88	0.99	0.87	0.9566666666666667	1.08	0.93	1.12	0.81	0.97
	Sodium	mg/L	NG		1.65	1.37	1.67	1.63	1.32	-	1.6	1.62	1.82	1.36	1.45	1.88	1.47	1.79	1.27	1.76
	Chloride	mg/L	120		1.4	1.65	1.4	1.5	1.58	1.2	1.2	1.3	1.7	1.72	1.696666666666667	1.9	1.82	1.8	1.91	1.9
	Fluoride	mg/L	0.12		0.08	0.07	0.09	0.09	0.07	0.07	0.07	0.06	0.07	0.09	0.1233333333333333	0.06	0.11	0.05	0.09	0.07
	Sulphate	mg/L	NG		3	-	8	3	-	5	5	4	3	-	-	3	-	3	-	3
	Colour	TCU	NG		5	5	<5	5	<5	15	10	5	<5	<5	<5	10	5	10	5	5
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG		5.3	5.6	6.3	5.3	6.2	-	4.8	4.6	5.6	6.1	5.633333333333333	5.6	7.4	6.1	5.2	6.1
	Total Organic Carbon (TOC)	mg/L	NG		5	-	5.8	5.3	-	-	4.8	4.7	5.7	-	-	5.6	-	6.3	-	6.1
	Total Solids (Filtered)	mg/L	NG		33	54	31	57	35	36	18	<10	46	35	38.33333333333333	47	39	<10	45	39
	Turbidity	NTU	NG		3.1	2.6	0.6	1	1.4	2.5	2.2	0.9	0.7	1.6	0.9666666666666667	0.9	3.1	2.3	1.4	2.5
Nutrients	Ammonia as N	mg/L	0.021 ⁴		0.052	0.026	0.039	0.005	0.01	-	0.075	0.079	0.02	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Nitrate (as NO3-N)	mg/L	13		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrite (as NO2-N)	mg/L	0.06		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG		<0.008	<0.008	<0.008	<0.008	0.01	-	0.035	<0.008	0.047	0.05	0.066	0.065	0.033	0.038	<0.008	<0.008
	Nitrogen (Total)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG		<0.002	-	<0.002	<0.002	-	-	<0.002	<0.002	<0.002	-	-	0.003	-	<0.002	-	0.003
	Phosphorus	µg/L	4		4	28	5	10	9	273	4	10	8	5	12	15	7	4	6	4
	Phosphorus (Filtered) (Filtered)	mg/L	4		-	0.007	-	-	<0.002	-	-	-	-	0.004	0.009	-	<0.002	-	<0.002	-
	Biochemical Oxygen Demand (BOD)	mg/L	NG		<2	-	5	-	-	-	<2	-	<2	-	-	-	2	-	<2	-
Demand Parameters	Total Coliforms	MPN/100mL	NG		<1	3	<1	-	<1	-	<1	-	<2	1	1	-	1	<1	<1	<1
	E. Coli	MPN/100mL	NG		<1	-	<1	-	-	-	<1	-	<2	-	-	-	<1	-	<1	-
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²		89	100	99	103	68	46	59	72	131	15	16.333333333333333	30	70	48	59	134
	Antimony	µg/L	NG		0.6	-	-	1	-	0.8	1.3	-	1.5	-	-	0.9	-	1.3	-	1.6
	Antimony (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5		<2	-	<1	0.5	-	<1	<1	<1	-	-	-	2	-	<1	-	-
	Arsenic (Filtered)	µg/L	5		-	0.2	-	-	0.2	-	-	-	0.1	-	0.1	-	0.2	-	0.3	-
	Barium	µg/L	NG		5	4.7	5	5	4.3	4	4	5	4	-	4.066666666666667	5	4.6	4	4.3	5
	Barium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG		<2	<50	<2	<2	<50	<2	<2	<2	<2	<50	<50	<2	<50	<2	<50	<2
	Beryllium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG		<10	-	<10	<5	-	<10	<10	<5	<5	-	-	<0.4	-	<5	-	<5
	Bismuth (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	0.09	0.09		<0.3	<0.1	<0.3	<0.3	<0.1	<0.3	<0.3	<0.3	<0.3	<0.1	<0.1	<0.3	0.1	<0.3	<0.1	<0.3
	Cadmium (Filtered)	µg/L	0.09		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG		<0.4	-	<0.4	<0.4	-	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	-	<0.4	-	<0.4
	Cesium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG		<3	0.2	<3	<3	<0.2	<3	<3	<3	<3	<0.2	<0.2	<3	0.2	<3	<0.2	<3
	Chromium (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG		<1	0.1	<1	<1	0.1	<1	<1	<1	<1	0.1	0.1	<1	0.1	<1	<0.1	<1
	Cobalt (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³		<2	0.9	<2	<2	1.6	<2	<2	<2	<2	2.4	1.5333333333333333	<2	0.8	<2	0.6	<2
	Copper (Filtered)	µg/L	2 - 4 ³		-	-	-	-	-	-	-	-	-	-	-	-				

			Sampled Date Time	8/1/2001	8/21/2001	8/30/2001	10/2/2001	11/7/2001	12/3/2001	1/14/2002	2/20/2002	3/13/2002	4/22/2002	5/21/2002	6/19/2002	7/24/2002	9/5/2002	9/17/2002	10/24/2002
Chem_Group	ChemName	output unit	Site ID	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ
			CCME FAL 1																
Cyanide	Cyanide Total	mg/L	NG	<0.003	<0.003	0.012	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	<0.003	<0.003
Field	Field Temperature	°C	-	-	-	-	NG	-	-	-	-	-	-	-	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	0.45	-	0.47	0.48	0.63	-	0.72	0.72	0.7333333333333333	0.68	0.61	0.63	0.47	0.41	-	0.59
	pH	pH Units	6.5-9	7.4	7.5	7.35	7.36	7.16	7.08	7.41	7.1	6.406666666666667	6.92	7.13	7.24	7.32	7.3	7.38	7.38
	Electrical Conductivity (EC)	µS/cm	NG	58.2	47.3	47.1	47.4	47.4	49.3	51.6	51	53.1	52.2	52.8	55.3	52.2	55	54.4	53.7
	Total Suspended Solids (TSS)	mg/L	4	<3	<3	4	<3	4	<3	4	<3	<3	4	5	8	4	8	4	6
	Hardness as CaCO3	mg/L	NG	26.78748	-	-	17.83627	-	19.7	-	<3	-	20.2	20.2	22.9	21.7	21.7	22.1	20.7
	Alkalinity (total as CaCO3)	mg/L	NG	20.6	16.2	15.7	16.5	19.8	20	18.7	18.9	18.666666666666667	19.1	19	18.7	18.4	18.9	18.73	18.8
	Calcium	mg/L	NG	6.44	-	4.29	4.5	4.99	4.6	4.79	4.99	5.02	4.88	4.94	5.61	5.2	5.26	5.48	5.06
	Magnesium	mg/L	NG	2.6	-	1.73	1.77	1.75	1.76	1.8	1.98	1.8466666666666667	1.95	1.91	2.15	2.12	2.09	2.03	1.96
	Potassium	mg/L	NG	1.04	-	0.96	0.93	0.97	1.45	1.12	1.1	1.02	1.03	1.14	1.11	1.05	1.04	1.04	0.79
	Sodium	mg/L	NG	1.4	-	1.67	1.7	1.65	1.72	1.8	1.82	1.9	1.83	1.8	1.85	1.84	1.86	2.16	1.75
	Chloride	mg/L	120	1	-	1.5	1.5	1.6	1.6	1.6	1.2	1.8666666666666667	1.9	2	1.3	1.9	1.5	1.53	1.6
	Fluoride	mg/L	0.12	0.06	-	0.05	0.06	0.05	0.06	0.05	0.05	0.05333333333333333	0.06	0.07	0.07	0.06	0.06	-	-
	Sulfate	mg/L	NG	3	-	2.4	3	3	3	4	8	4.666666666666667	4	4	4	<3	4	4	4
	Colour	TCU	NG	30	20	5	20	10	<5	10	10	8.333333333333333	5	10	10	10	10	10	15
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5.8	-	5.5	5.6	5.7	5.4	5.6	5.5	5.666666666666667	5.6	5.8	5.5	5.9	6.5	5.2	5.1
	Total Organic Carbon (TOC)	mg/L	NG	-	-	5.7	5.7	5.3	5.5	5.5	5.6	5.3	5.3	5.3	5.2	5.9	6.6	6.1	5.2
	Total Solids (Filtered)	mg/L	NG	43	25	36	29	39	48	33	24	56.666666666666667	46	48	48	38	31	41.3	46
	Turbidity	NTU	NG	2.3	2.2	3.3	1.8	1.9	1.7	1.2	1.5	1.9	1	4.4	2.9	3.4			

Table A.17b: CCME Water Quality Guidelines - Yellowknife River, All Parameters with <DL

			Sampled Date Time	Site ID	11/21/2002	12/19/2002	1/31/2003	2/24/2003	3/27/2003	5/5/2003	6/5/2003	7/7/2003	7/31/2003	8/22/2003	10/1/2003	10/31/2003	12/5/2003	1/6/2004	2/11/2004	3/2/2004	
Chem_Group	ChemName	output unit	CCME FAL ¹		GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	
Cyanide	Cyanide Total	mg/L	NG		<0.003	<0.003	<0.003	<0.003	<0.003	0.002	<0.003	<0.003	<0.003	<0.003	<0.003	<0.01	<0.01	<0.01	<0.01	<0.01	
Field	Field Temperature	°C	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG		-	-	-	-	-	-	0.66	-	-	0.44	-	-	-	-	-	-	
	pH	pH Units	6.5-9		8.16	7.07	6.87	7.14	7.16	7.16	7.4	7.4	7.34	7.34	7.4	7.43	7.37	7.17	7.1	7.26	
	Electrical Conductivity (EC)	µS/cm	NG		54.6	54	53.5	54.4	52.2	58.8	59.9	62	60.6	62.8	60.6	64.4	56.3	50.8	55.4	55.4	
	Total Suspended Solids (TSS)	mg/L	NG		12	<3	10	<3	11.3	4	<3	4	<3	<3	6	<3	<3	<3	4	3.3	
	Hardness as CaCO3	mg/L	NG		31.1	19.1	22.5	20.9	28.6	21.8	18.8	20.2	21	21.8	23.9	23.3	23.2	22.3	23.1	21.9	
	Alkalinity (total as CaCO3)	mg/L	NG		-	17.6	22.4	49.2	20	20.6	20.5	21.4	21.3	20.4	20.4	20.4	20.5	19.9	19.5	19.3	
	Calcium	mg/L	NG		-	4.79	5.41	5.12	5.52	5.38	4.34	5.17	5.23	5.38	5.96	5.77	5.8	5.49	5.7	5.27	
	Magnesium	mg/L	NG		-	1.74	2.19	1.97	3.6	2.03	1.94	1.78	1.94	2.03	2.18	2.16	2.12	2.08	2.2	2.13	
	Potassium	mg/L	NG		1.44	1.02	1.04	1.08	0.99	1.07	1.01	1.14	0.96	0.97	1.06	1.07	1.05	1.04	-	1.07	
	Sodium	mg/L	NG		3.03	1.83	1.86	1.82	1.88	1.86	1.75	1.81	1.74	1.83	2.01	2.03	1.95	1.91	-	1.9	
	Chloride	mg/L	120		2.1	1.5	1.8	1.9	1.9	1.7	1.8	1.5	1.4	1.6	1.6	1.4	1.4	-	1.6	2	
	Fluoride	mg/L	0.12		0.15	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sulphate	mg/L	NG		-	4	4	4	4	3	5	4	6	-	7	-	3	4	<10	3.53	
	TCU	NG	NG		20	-	10	10	10	10	10	10	10	<5	10	-	-	3	-	5	
	Colour	NG	NG		-	-	-	5.1	-	5.8	5.7	5.9	5.8	-	-	-	4.9	-	-	-	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG		-	-	-	5.2	-	5.6	5.6	6.1	5.9	-	-	4.7	-	-	-	4.47	
	Total Organic Carbon (TOC)	mg/L	NG		-	-	-	-	-	5.6	5.6	6.1	5.9	-	-	4.7	-	-	-	4.67	
	Total Solids (Filtered)	mg/L	NG		-	42	58	24	57.3	37	40	54	42	36	42	36	24	42	22	44	25.3
Turbidity	NTU	NG		-	0.7	0.7	0.7	0.67	1.8	2.6	2.9	2.6	2.2	2.2	2	2.3	1.5	1.02	1.47	2.52	
Nutrients	Ammonia as N	mg/L	0.021 ⁴		0.02	0.012	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.06	0.013
	Nitrate (as NO3-N)	mg/L	13		-	-	-	0.058	0.076	0.035	0.018	<0.008	<0.008	-	<0.008	0.022	0.049	0.048	0.03	0.04	
	Nitrite (as NO2-N)	mg/L	0.06		-	-	-	<0.008	<0.009	<0.009	<0.009	<0.009	<0.009	-	<0.009	<0.009	<0.009	<0.009	<0.01	<0.03	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG		0.011	0.039	0.041	-	-	-	0.018	-	<0.008	<0.008	-	0.022	0.049	0.048	0.03	0.033	
	Nitrogen (Total)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Orthophosphate (as P)	mg/L	NG		0.003	0.003	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	0.002	-	0.0023	
Demand Parameters	Phosphorus	µg/L	4		75	53	4	7	6	10	14	8	15	10	4	<10	<10	<10	<10	<10	
	Phosphorus (Filtered) (Filtered)	mg/L	4		0.087	0.053	0.01	0.006	0.004	0.007	0.01	0.085	0.062	0.006	<0.004	<0.01	<0.01	<0.01	<0.01	<0.01	
Biological	Biochemical Oxygen Demand (BOD)	mg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Total Coliforms	MPN/100mL	NG		<2	<1	<2	<2	<2	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	E. Coli	MPN/100mL	NG		<2	<1	<2	<2	<2	<1	<1	<1	1	4.1	2	<1	<1	<1	<1	<1	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²		<30	<30	15.6	<30	<30	130	64	57	80	79	78	63	32	<30	<30	32	
	Antimony	µg/L	NG		0.8	1.8	0.834	1.9	0.77	0.4	0.9	0.3	0.5	0.7	1.1	0.6	1	0.2	5.1	0.57	
	Antimony (Filtered)	µg/L	NG		-	-	-	-	0.89	-	-	-	-	-	-	-	-	-	-	-	
	Arsenic	µg/L	5		<1	1.1	<1	<1	<1	<1	<1	<1	<1	<1	1	2	<1	<1	<1	<1	
	Arsenic (Filtered)	µg/L	5		-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	
	Barium	µg/L	NG		4	4	4.3	5	4.43	5	4.6	4.5	5.7	5	5.3	4.9	4.8	4.6	4.6	4.4	
	Barium (Filtered)	µg/L	NG		-	-	-	-	4.1	-	-	-	-	-	-	-	-	-	-	-	
	Beryllium	µg/L	NG		<2	<2	<0.02	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	
	Beryllium (Filtered)	µg/L	NG		-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bismuth (Filtered)	µg/L	NG		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble	µg/L	1500		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Boron - soluble (Filtered)	µg/L	1500		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cadmium	µg/L	0.09		<0.3	<0.3	<0.02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Cadmium (Filtered)	µg/L	0.09		-	-	-	-	<0.02	-	-	-	-	-	-	-	-	-	-	-	
	Cesium	µg/L	NG		<0.4	<0.4	0.03	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Cesium (Filtered)	µg/L	NG		-	-	-	-	<0.008	-	-	-	-	-	-	-	-	-	-	-	
	Chromium	µg/L	NG		<3	4	<0.1	1	0.34	2.5	<0.3	-	-	-	<0.3	0.7	0.5	<0.3	<0.3	-	
	Chromium (Filtered)	µg/L	NG		-	-	-	-	0.27	-	-	-	-	-	-	-	-	-	-	-	
	Cobalt	µg/L	NG		<1	<1	0.145	1	0.23	0.1	0.1	<0.1	<0.1	<0.1	-	<0.1	0.2	<0.1	0.5	0.1	
	Cobalt (Filtered)	µg/L	NG		-	-	-	-	0.17	-	-	-	-	-	-	-	-	-	-	-	
	Copper	µg/L	2 - 4 ³		2	3	0.32	1	1.1	1	0.8	1.7	1.9	1.							

Table A.17b: CCME Water Quality Guidelines - Yellowknife River, All Parameters with <DL

			Sampled Date Time	4/15/2004	5/6/2004	6/10/2004	7/8/2004	8/16/2004	9/9/2004	10/18/2004	12/21/2004	2/1/2005	3/3/2005	4/7/2005	5/2/2005	6/2/2005	7/7/2005	8/4/2005	9/6/2005
Chem_Group	ChemName	output unit	Site_ID	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ
			CCME FAL ¹																
Cyanide	Cyanide Total	mg/L	NG	0.016	-	<0.001	-	<0.001	-	-	0.002	-	-	-	-	<0.002	-	-	-
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units	6.5-9	7.3	7.32	7.53	7.41	7.59	7.35	7.5	7.29	7.22	7.25	7.37	7.48	7.53	7.5	7.52	7.63666666666667
	Electrical Conductivity (EC)	µS/cm	NG	60.8	55.6	56.8	57.5	56.4	61.6	57.5	56.2	56.6	57.5	59.5	58.3	56.5	57.2	58.5	58.1666666666667
	Total Suspended Solids (TSS)	mg/L	NG	<3	<3	8	6	<3	<3	<3	<3	<3	-	<3	<3	<3	<3	<3	<3
	Hardness as CaCO3	mg/L	NG	26	25.1	24.1	29	20.8	30.9	17.8	24.9	22.1	22.2	23	22.9	23	24	22.9	25.2333333333333
	Alkalinity (total as CaCO3)	mg/L	NG	21.3	20.5	19.9	20.4	20.3	20.2	21.2	20	20	20.2	20.7	20.7	20.7	20.9	20.9	21.3
	Calcium	mg/L	NG	6.5	6.3	6	5.7	5.3	6.2	4.4	6.3	5.4	5.3	5.6	5.7	5.7	6.2	5.8	6.6
	Magnesium	mg/L	NG	2.4	2.3	2.2	2.2	1.8	2.2	1.6	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.13333333333333
	Potassium	mg/L	NG	1.12	1.08	1.09	1	0.99	1.1	0.7	1.1	1.07	1.08	1.05	1.01	1.04	0.9	0.9	0.8
	Sodium	mg/L	NG	2.1	2	2	1.9	1.89	2.1	1.3	2	2.1	2.1	2.2	1.9	1.9	1.6	1.8	1.7
	Chloride	mg/L	120	-	-	1.9	1.8	2.8	1.9	2.2	2	1.8	1.8	2.4	1.7	1.9	1.8	1.8	1.86666666666667
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-
	Sulphate	mg/L	NG	3.9	3.7	-	3	3.5	3	3	3	3	3	3	6	4	3	3	3
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	4.7	4.9	-	5.3	5.1	4.6	5.1	4.9	5.8	4.9	5	5	4.7	5.2	4.5	5.6
	Total Organic Carbon (TOC)	mg/L	NG	4.7	4.7	5.2	5.3	4.3	4.7	-	5.5	-	-	-	-	-	4.9	4.3	5.66666666666667
	Total Solids (Filtered)	mg/L	NG	32	28	40	38	44	40	34	44	<10	20	28	30	32	30	30	36.6666666666667
	Turbidity	NTU	NG	1.65	2.12	8	4.45	2.79	2.59	-	1.98	0.83	0.68	0.39	2.16	2.18	1.75	1.94	2.64
Nutrients	Ammonia as N	mg/L	0.021 ⁴	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Nitrate (as NO3-N)	mg/L	13	0.1	<0.1	<0.1	<0.1	<0.1	-	0.02	0.04	-	-	-	0.04	-	-	-	-
	Nitrite (as NO2-N)	mg/L	0.06	<0.05	<0.05	-	<0.05	<0.05	<0.01	<0.01	<0.01	-	-	-	<0.01	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.02	-	0.07	-	0.05	0.04	-	-	-	-
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate (as P)	mg/L	NG	<0.002	<0.002	-	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus	µg/L	4	<10	<10	20	10	20	<50	160	150	260	100	<10	10	<10	<10	<10	10	
Phosphorus (Filtered)	mg/L	4	<0.01	<0.01	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	
Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Coliforms	MPN/100mL	NG	<1	<1	<1	<1	6	1	<1	<1	2	<1	<1	<1	<1	<1	<1	1
Biological	E. Coli	MPN/100mL	NG	1	<1	1	1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	2	2.7
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	7.6	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	<30	<30	165	74	94	77	84	38	<30	<30	24.7	<30	58	42.8	55	55.6666666666667
	Antimony	µg/L	NG	<0.1	<0.1	0.1	0.3	0.6	2.9	0.4	0.1	0.2	<0.1	1	0.3	0.6	0.3	<0.1	<0.1
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	<1	<1	<1	<1	<1	<1	<1	0.3	<0.2	0.4	0.3	0.6	0.2	0.5	0.6	1.63333333333333
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	0.3	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	4.5	4.9	6.4	5.1	5.7	6	5.1	5	4.9	4	4.8	5.1	4.6	4.6	5.2	4.86666666666667
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	4.5	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	0.09	0.09	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.08	0.3	<0.1	0.05	<0.1	<0.1
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	-	-	-
	Cesium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG	0.3	0.5	1.5	<0.3	<0.3	<0.3	<0.3	2	<0.3	<0.3	0.2	0.4	0.4	0.2	<0.3	<0.3
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³	1.4	1.5	1.3	0.9	1.3	3	1.4	1.4	1.4	1	1.5	-	1	0.9	1.2	0.96666666666667
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	1.7	-	-	-	-	-	-	-	-
	Iron	µg/L	300	<50	<50	217	77	78	87	129	54	65	<50	<50	<50	58	57	70	72.3333333333333
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	<50	-	-	-	-	-	-	-	-
	Lead	µg/L	1.7 ³	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	&lt						

Table A.17b: CCME Water Quality Guidelines - Yellowknife River, All Parameters with <DL

			Sampled_Date_Time	10/25/2005	12/8/2005	1/5/2006	2/8/2006	3/15/2006	4/5/2006	5/3/2006	7/27/2006	8/10/2006	9/5/2006	11/1/2006	12/20/2006	1/24/2007	3/21/2007	4/26/2007	5/15/2007
			Site_ID	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ
Chem_Group	ChemName	output_unit	CCME_FAL ¹																
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units	6.5-9	7.2	7.32	7.33	7.35	7.36	7.35	7.41	7.62	7.6	7.6	7.53	7.35	7.33	7.3	7.4	7.55
	Electrical Conductivity (EC)	µS/cm	NG	57.9	60.4	62.3	60.4	61.6	60.8	62.6	58	57.4	53.7	79.43	55.8	44.7	58.1	57.2	56.4
	Total Suspended Solids (TSS)	mg/L	NG	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	6	<3	<3	<3	<3
	Hardness as CaCO3	mg/L	NG	25.1	25.7	25.1	24.4	26.1	23.1	21.1	26.4	27.4	24.9	23.93	25.1	23.1	24.7	21.5	26
	Alkalinity (total as CaCO3)	mg/L	NG	20.2	21.8	21.9	21.7	21.7	21.2	22.1	21.2	20.4	20.2	20.73	20.5	20.1	20.4	20.3	20.7
	Calcium	mg/L	NG	6	6.4	6.2	6	6.5	5.7	5.3	6.6	6.8	6	6.1	6.3	5.7	5.8	5.1	6.2
	Magnesium	mg/L	NG	2.5	2.3	2.3	2.3	2.4	2.2	1.9	2.4	2.5	2.4	2.1	2.3	2.2	2.5	2.1	2.5
	Potassium	mg/L	NG	0.8	1.16	1.15	1.06	1.2	1.1	0.9	1	1.1	0.8	1	1.1	1.1	1.9	1	1.1
	Sodium	mg/L	NG	1.7	2.2	2.2	2	2.3	2.1	1.9	1.9	1.9	1.7	1.66	2.2	2	1.9	2	2
	Chloride	mg/L	120	1.9	1.8	2	2	1.9	-	2.1	1.8	1.7	1.6	1.9	2	1.9	1.7	1.8	1.9
	Fluoride	mg/L	0.12	-	-	2	2	-	-	-	-	-	-	-	-	-	-	<0.1	0.1
	Sulphate	mg/L	NG	3	3	3	4	4	4	4	3	3	3	3	4	4	3	3	4
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5.7	5.4	5.3	5.2	5.3	5.8	5.5	5.3	4.9	4.7	4.03	5.2	4.8	5	4.8	5
	Total Organic Carbon (TOC)	mg/L	NG	-	5.5	5.5	5.2	5.1	5.6	5.7	5.4	5.5	-	4.5	4.6	5	4.8	4.6	5.1
	Total Solids (Filtered)	mg/L	NG	36	34	32	33	<10	30	32	50	36	46	36	24	76	22	48	50
	Turbidity	NTU	NG	1.27	0.73	1.18	0.73	0.83	0.53	1.86	1.97	1.86	2.15	0.87	0.8	0.7	0.85	0.7	4.05
Nutrients	Ammonia as N	mg/L	0.021 ⁴	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	0.007	<0.005	<0.005	<0.005
	Nitrate (as NO3-N)	mg/L	13	0.02	-	-	-	0.04	0.05	-	<0.01	<0.01	<0.01	0.03	-	0.04	0.04	0.03	0.02
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	0.04	0.04	0.03	0.02
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	-	0.03	0.04	0.03	0.04	0.05	0.03	<0.01	-	<0.01	0.03	0.03	<0.01	<0.01	<0.01	<0.01
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L	4	10	60	10	<10	<10	<10	10	10	<10	<10	<10	<10	<10	<10	<10	10
	Phosphorus (Filtered) (Filtered)	mg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Biological	Total Coliforms	MPN/100mL	NG	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	E. Coli	MPN/100mL	NG	1	<1	<1	<1	<1	<1	<1	2	<1	2	1	<1	1	<1	<1	<1
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L	48	<30	<30	26.7	<30	15.3	15.9	56	91	96	65	69.3	20.2	24.9	17.5	8.9	-
	Antimony	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.3	1.5	<0.1	<0.1	<0.1	<0.1	<0.1	0.9	-
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	0.3	0.4	0.5	<0.2	0.4	0.4	0.5	0.6	0.4	0.5	0.86	0.4	0.6	0.3	0.4	-
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	5	4.7	4.7	5.1	4.5	4.6	5.2	7	13.8	4.5	4.76	4.3	4.2	3.7	5.5	-
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	0.09	<0.1	<0.1	<0.05	<0.1	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	0.09	<0.05	<0.05	0.1
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG	<0.3	0.4	0.2	0.3	0.1	<0.1	0.4	2.5	-	0.4	<0.3	0.1	0.2	0.1	<0.1	-
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³	0.8	1.2	0.9	1.2	<0.3	0.5	0.8	0.9	2.7	1.1	0.83	0.5	0.5	0.6	0.5	-
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron	µg/L	300	80	77	<50	<50	<50	<50	100	105	95	84	65	<50	<50	<50	<50	-
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	µg/L	1.7 ³	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	3.2
	Lead (Filtered)	µg/L	1.7 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lithium	µg/L	NG	1.7	1.9	1.8	2	1.2	1.5	1.4	1.7	1.9	1.						

Table A.17b: CCME Water Quality Guidelines - Yellowknife River, All Parameters with <DL

			Sampled Date Time	6/28/2007	7/25/2007	8/30/2007	9/17/2007	10/24/2007	11/29/2007	1/14/2008	2/18/2008	3/27/2008	4/29/2008	5/22/2008	6/11/2008	7/16/2008	8/20/2008	9/22/2008	10/15/2008
			Site_ID	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ
Chem_Group	ChemName	output unit	CCME FAL ¹																
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	Field Temperature	°C	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units	6.5-9	7.58	7.66	7.61	7.62	7.52	7.355	7.29	7.31	7.21	7.41	7.535	7.67	7.68	7.6	7.61	7.47
	Electrical Conductivity (EC)	µS/cm	NG	59	59.9	59.3	60.9	59.1	60.05	56.7	60.5	59.7	56.9	55.55	53.9	57.4	60.7	61.5	56.4
	Total Suspended Solids (TSS)	mg/L	NG	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	8	<3	<3	<3	<3
	Hardness as CaCO3	mg/L	NG	29.5	29.8	29.3	29.4	25	27.45	11.8	25.5	22.8	25.2	28.8	27.4	31.6	29	34.5	14.2
	Alkalinity (total as CaCO3)	mg/L	NG	21.3	22.5	21.5	22.3	21.7	21.7	20.5	20.8	20.9	20.9	21.2	21.1	21.8	22.8	22.6	22
	Calcium	mg/L	NG	7.8	7.4	7.3	7.3	6.4	6.95	3.1	6.3	5.5	5.6	7	6.8	7.8	8.5	10.1	4.3
	Magnesium	mg/L	NG	2.4	2.7	2.7	2.7	2.2	2.45	1	2.4	2.2	2.7	2.75	2.5	2.9	1.9	2.2	0.8
	Potassium	mg/L	NG	1.1	1	1	1	1	1.1	-	1.1	1.1	1.1	1.1	1	1.1	1	1.1	1.1
	Sodium	mg/L	NG	2.1	1	2.1	1.9	2.3	2.05	7.6	2.5	2	2.1	2.1	2	2.1	2.2	2.1	2.1
	Chloride	mg/L	120	2	1.9	1.9	1.9	2	2.05	6.5	2.5	2	2.2	2	1.9	2.1	2.2	2.1	2.1
	Fluoride	mg/L	0.12	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	<0.1	0.1
	Sulphate	mg/L	NG	4	3	3	3	3	3	4	4	4	4	3	3	4	3	5	3
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5	5	5.6	5.4	5	5	5	5	4.5	4.7	5.3	4.5	5.3	5.3	4.8	4.9
	Total Organic Carbon (TOC)	mg/L	NG	5.2	5.6	5.4	5.7	4.7	5	5	4.7	4.7	5.1	4.8	4.7	5.1	5.2	5.5	5.3
	Total Solids (Filtered)	mg/L	NG	38	10	48	29	26	33	32	28	38	26	13	50	32	36	28	10
	Turbidity	NTU	NG	1.11	1.55	1.33	1.91	2.41	1.63	0.95	1.15	1	1.5	2.835	1.91	2.45	2.68	2.76	2.54
Nutrients	Ammonia as N	mg/L	0.021 ⁴	0.014	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	0.008	0.018	<0.005
	Nitrate (as NO3-N)	mg/L	13	<0.01	<0.01	<0.01	<0.01	0.01	0.04	0.05	0.05	0.04	0.06	<0.01	-	-	<0.01	0.05	0.04
	Nitrite (as NO2-N)	mg/L	0.06	0.01	<0.01	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.01	<0.01	<0.01
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.05	0.05	0.04	0.06	0.01	-	-	<0.01	0.05	0.04
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Demand Parameters	Phosphorus	µg/L	4	<10	<10	10	10	20	<10	<10	<50	<10	<10	15	10	10	20	20	<10
	Phosphorus (Filtered) (Filtered)	mg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biological	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Coliforms	MPN/100mL	NG	<1	4	1	2	1	<1	<1	<1	<1	<1	1	<1	<1	2	<1	<1
	E. Coli	MPN/100mL	NG	<1	3.1	1	<1	4.1	1	1	<1	<1	<1	<1	<1	<1	3	1	3.1
	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals ³	Aluminum Total	µg/L	33	46	48	55	59	47.5	38	<30	<30	38	101.5	97	68	76	26	28	28
	Antimony	µg/L	NG	0.1	<0.1	<0.1	0.1	0.3	0.15	0.8	<0.1	0.2	0.4	<0.1	1.2	0.5	<0.1	0.6	<0.1
	Antimony (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L	5	0.5	0.5	0.4	1.2	1.4	0.4	1.2	0.4	0.4	0.7	0.4	1.1	0.5	0.4	0.8	0.5
	Arsenic (Filtered)	µg/L	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L	NG	4.1	4.8	4.5	4.9	5.4	5.35	3.8	3.7	4	4.8	6.3	6.2	6	-	4.9	4.9
	Barium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Beryllium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	0.09	<0.1	<0.05	<0.1	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	0.15	<0.1
	Cadmium (Filtered)	µg/L	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1
	Cesium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L	NG	<0.3	<0.1	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.2	0.4	0.3	0.3	0.2	0.1	0.2
	Chromium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cobalt (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	2 - 4 ³	0.8	0.7	1.3	0.8	0.8	1	0.7	0.9	0.8	0.9	0.8	1	0.7	0.8	<0.2	0.9
	Copper (Filtered)	µg/L	2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron	µg/L	300	<50	<50	<50	52	62	50.5	<50	<50	<50	56	109.5	101	66	198	18	70.1
	Iron (Filtered)	µg/L	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	µg/L	1-7 ³	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	0.5	0.2	<0.1	<0.1
	Lead (Filtered)	µg/L	1-7 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

			Sampled Date Time	11/12/2008	12/17/2008	1/15/2009	2/26/2009	3/30/2009	4/22/2009	5/27/2009	7/8/2009	8/6/2009	9/3/2009	10/6/2009	11/26/2009	12/21/2009	1/18/2010	2/11/2010	3/30/2010	
Chem_Group	ChemName	output unit	Site_ID	GNWT	GSL_WQ	GNWT	GSL_WQ	GNWT	GSL_WQ	GNWT	GSL_WQ	GNWT	GSL_WQ	GNWT	GSL_WQ	GNWT	GSL_WQ	GNWT	GSL_WQ	
			CCME FAL ¹																	
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Field	Field Temperature	°C	NG	-	-	-	-	-	-	4.81	13.99	17.56	15.21	8.35	0.08	-	-	-	-	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH	pH Units	6.5-9	7.53	7.365	7.25	7.23	7.24	7.27	7.495	7.615	7.54	7.51	7.5	7.34	7.24	7.2	7.26	7.26	
	Electrical Conductivity (EC)	µS/cm	NG	54.4	54.5	51.8	52.85	54.4	53.7	56.95	56	57.5	57.5	52.8	53.2	52.7	53.3	53.8	58	
	Total Suspended Solids (TSS)	mg/L	4	4.5	4.3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	8	<3	
	Hardness as CaCO3	mg/L	NG	25.9	24.85	21.2	29.7	24	25.2	26.45	29.9	12.4	23.4	17	16.6	14.7	12.35	7.6	8.9	
	Alkalinity (total as CaCO3)	mg/L	NG	21.4	19.15	20.3	19.15	20.7	20.9	22.15	22.75	21.9	21.2	20.9	20.9	20.4	20.9	20.7	21.4	
	Calcium	mg/L	NG	7.3	7.2	5.9	8.3	6.4	6.6	7.05	7.9	3.1	5.2	4.2	4.3	4.2	3.45	2.4	2.3	
	Magnesium	mg/L	NG	1.85	1.7	1.6	2.2	2	2.1	2.2	2.5	1.2	2.5	1.5	1.4	1	0.9	0.4	0.8	
	Potassium	mg/L	NG	1	1	0.9	1.05	1.1	1.1	1.2	1.2	0.8	0.9	0.7	0.7	0.7	0.8	0.7	0.8	
	Sodium	mg/L	NG	2.1	2.05	2.1	2.2	2.3	2.3	2.5	2.5	1.8	1.8	1.6	1.6	1.5	1.65	1.5	2.4	
	Chloride	mg/L	120	1.95	1.8	1.9	1.85	1.8	1.9	2	2.1	2.4	1.9	1.7	1.7	1.7	1.7	1.8	2.9	
	Fluoride	mg/L	0.12	<0.1	-	0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Sulphate	mg/L	NG	3	3	3	3	3	3	4	3	4	4	3	3	3	3	4	4	
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5.1	5.45	4.9	5.9	5.2	5.3	5.4	5.95	5.2	5.8	5.2	4.9	5.7	5.35	4.5	5.7	
	Total Organic Carbon (TOC)	mg/L	NG	4.45	6.3	5	6	5.5	5.3	5.95	6.65	-	6.2	5.4	5.1	5.5	5.6	5	6.8	
	Total Solids (Filtered)	mg/L	NG	31.5	37	18	NG	22	36	58.5	10	26	98	40	40	24	36	16	24	
	Turbidity	NTU	NG	2.3	7.395	1	1.045	0.75	0.95	1.44	2.77	2.83	2.05	3.8	1.47	1.27	0.825	0.64	0.65	
	Nutrients	Ammonia as N	mg/L	0.001 ⁴	<0.005	0.005	<0.005	<0.005	<0.005	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01
		Nitrate (as NO3-N)	mg/L	13	<0.01	0.025	0.03													

Blank - Not analyzed

Table A.17b: CCME Water Quality Guidelines - Yellowknife River, All Parameters with <DL

			Sampled Date Time	4/29/2010	5/19/2010	6/29/2010	7/15/2010	8/11/2010	9/15/2010	10/21/2010	11/30/2010	12/21/2010	1/26/2011	2/24/2011	3/21/2011	4/26/2011	5/30/2011	6/15/2011	7/13/2011
Chem_Group	ChemName	output unit	Site_ID	CCME FAL ¹	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ
Cyanide	Cyanide Total	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	Field Temperature	°C		NG	-	6.04	17.24	19.63	21.15	12.09	2.55	-	-	-	-	-	9.91	13.04	20.4
Physical/Major Ions	Chlorophyll A	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units		6.5-9	7.27	7.44	7.6	7.72	7.66	7.46	7.46	7.42	7.33	7.26	7.24	7.35	7.39	7.64	7.63
	Electrical Conductivity (EC)	µS/cm		NG	56.25	55.4	58.8	56.9	63.4	60.6	58.7	58	58.8	54.3	55.6	57.8	58.4	52.9	55.1
	Total Suspended Solids (TSS)	mg/L		NG	3.5	<3	4	4	<3	<3	<3	<3	<3	<3	<3	<3	12	<3	<3
	Hardness as CaCO3	mg/L		NG	31.05	5.9	24.8	24.3	20.2	28.6	26.4	24.4	23.7	23.3	23	22.35	23.8	24.2	24.5
	Alkalinity (total as CaCO3)	mg/L		NG	22.35	22.6	22.4	23.1	22.6	22.4	22.2	22.8	22.4	22.1	22	21.4	18.5	21.5	21.1
	Calcium	mg/L		NG	7.35	2.2	6.2	6.1	5.1	7.4	6.7	6.1	6	5.8	5.7	5.6	5.8	6.1	6.1
	Magnesium	mg/L		NG	3.05	0.1	2.3	2.2	1.8	2.4	2.2	2.1	2.1	2.1	2.05	2.2	2.2	2.2	2.4
	Potassium	mg/L		NG	1.2	0.5	1.1	1	0.7	1	1.2	1.1	1	1.1	1	1.05	1	1.1	1.1
	Sodium	mg/L		NG	2.35	1.4	2.3	2.2	1.8	2	2.2	2.3	2.2	2.2	2.2	2.35	2.3	2.1	2.2
	Chloride	mg/L		120	2	1.8	1.9	1.8	2.1	2.1	1.9	2.3	2	1.9	1.7	1.8	2	2.2	2
	Fluoride	mg/L		0.12	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-
	Sulphate	mg/L		NG	4	3	4	4	4	3	4	3	4	3	3	3.5	4	4	3
	Colour	TCU		NG	4	3	4	4	4	3	4	3	4	3	3	3.5	4	4	3
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L		NG	4.65	5.9	4.7	5	5.9	5.2	4.8	4.9	4.7	5.1	5.2	4.85	5	4.1	5.1
	Total Organic Carbon (TOC)	mg/L		NG	4.9	6.2	5.5	6.5	6	6	5.7	5.1	4.9	5.3	5.5	5.05	5	4.9	5.1
	Total Solids (Filtered)	mg/L		NG	36	36	36	34	32	28	36	32	30	30	38	32	40	40	32
	Turbidity	NTU		NG	1.865	1.9	2.85	3.52	2.27	3.37	2.28	1.69	0.94	0.58	0.55	0.71	0.54	5.02	1.96
Nutrients	Ammonia as N	mg/L		0.021 ⁴	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Nitrate (as NO3-N)	mg/L		13	0.02	-	0.14	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrite (as NO2-N)	mg/L		0.06	<0.01	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L		NG	0.025	0.06	0.18	0.18	0.18	0.07	0.13	0.1	0.09	0.08	0.08	0.135	0.04	0.02	0.04
	Nitrogen (Total)	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	µg/L		NG	4	<10	<10	<10	10	<10	10	<10	<10	10	<10	<10	10	20	20
Demand Parameters	Phosphorus (Filtered) (Filtered)	mg/L		4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Biochemical Oxygen Demand (BOD)	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Biological	Total Coliforms	MPN/100mL		NG	<1	1	<1	12	1	2	<1	<1	<1	<1	<1	<1	<1	<1	1
	E. Coli	MPN/100mL		NG	<1	<1	<1	<1	<1	5.2	<1	<1	<1	2	<1	1	<1	<1	<1
Metals ⁵	Aluminum (Filtered)	µg/L		5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L		5 @ pH < 6.5/100 @ ≥ 6.5 ²	60.3	86	85	104	90	95	100	66	33	23.3	22.1	28.3	23	207	85
	Antimony	µg/L		NG	1.35	0.3	<0.1	0.2	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
	Antimony (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L		5	0.6	0.7	0.6	0.7	0.7	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.5
	Arsenic (Filtered)	µg/L		5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L		NG	5.85	5.7	5.6	5.4	6.2	5	5	5.1	4.4	4.1	4.4	4.3	4.5	6.7	5.1
	Barium (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L		NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Beryllium (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L		1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L		1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L		0.09	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.1	<0.05
	Cadmium (Filtered)	µg/L		0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L		NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cesium (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L		NG	0.25	0.2	0.4	0.2	0.7	0.2	0.3	0.2	0.1	<0.1	0.2	0.1	<0.1	0.5	<0.1
	Chromium (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L		NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
	Cobalt (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L		2 - 4 ³	1.25	0.9	1.3	1	1	1.6	0.9	0.8	0.8	0.8	3	0.85	0.7	1.1	2.1
	Copper (Filtered)	µg/L		2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron	µg/L		300	81	99	87	100	75	92	83	76	26	18	22	23.5	19	235	73
	Iron (Filtered)	µg/L		300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	µg/L		1-7 ³	<0.1	<0.1	0.2	<0.1	2.3	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
	Lead (Filtered)	µg/L		1-7 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lithium	µg/L		NG	2.15	2	2	1.8	2	1.6	1.8	2	1.6	1.7	1.6	1.7	1.7	2.2	1.9
	Lithium (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Manganese	µg/L		NG	4.6	3.6	3.1	3.1	3.1	3.9	2.3	1.6	1.3	1.2	1.2	1.05	1	6	3.4
	Manganese (Filtered)	µg/L																	

Table A.17b: CCME Water Quality Guidelines - Yellowknife River, All Parameters with <DL

			Sampled Date Time	8/15/2011	9/22/2011	10/19/2011	11/23/2011	12/21/2011	1/26/2012	2/29/2012	3/28/2012	4/26/2012	5/23/2012	6/11/2012	6/12/2012	8/20/2012	9/19/2012	11/6/2012	12/13/2012
Chem_Group	ChemName	output unit	Site_ID	CCME FAL ¹	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ
Cyanide	Cyanide Total	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field	Field Temperature	°C		NG	18.15	11.4	5.43	-0.25	-0.28	-0.28	-	-0.21	0.4	5.16	10.28	19.26	17.88	12.37	0.98
Physical/Major Ions	Chlorophyll A	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units		6.5-9	7.64	7.57	7.47	7.36	7.24	7.22	7.32	7.25	7.3	7.3	7.505	7.5	7.63	7.64	7.35
	Electrical Conductivity (EC)	µS/cm		NG	54	59.3	53.8	54.6	57.7	57.4	61.4	60.6	76.2	59.2	57.85	59.6	58.7	55.1	57.6
	Total Suspended Solids (TSS)	mg/L		NG	<3	8	<3	<3	<3	<3	<3	6	4	<3	<3	<3	4	4	<3
	Hardness as CaCO3	mg/L		NG	23	23.9	24.2	23.4	24.5	22.7	25.3	23.7	25.6	24.6	23.1	29.3	27.6	32.2	29.7
	Alkalinity (total as CaCO3)	mg/L		NG	22.4	21.4	20.8	21.1	20.8	21.1	21.8	21.5	21.7	21.9	21.6	22.6	21.6	20.9	21
	Calcium	mg/L		NG	5.8	6.2	6.2	6.1	6.2	5.6	6.3	5.8	6.3	6.1	5.8	7.5	6.9	8.1	7.8
	Magnesium	mg/L		NG	2.1	2.1	2.1	2	2.2	2.1	2.3	2.2	2.4	2.3	2.1	2.5	2.5	2.9	2.5
	Potassium	mg/L		NG	0.9	1	1	0.9	1	1	1	1	1.3	1	1	1.1	1	1	1
	Sodium	mg/L		NG	1.9	2.1	2.1	2	2.2	2.1	2.3	2.2	5.2	2.2	2	2.1	2	2.1	2
	Chloride	mg/L		120	1.8	1.9	1.9	1.7	2.5	1.9	2.1	1.9	6.7	2	1.9	1.9	1.8	1.9	1.8
	Fluoride	mg/L		0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
	Sulphate	mg/L		NG	3	3	3	3	3	4	4	4	4	4	3	3	3	3	3
	Colour	TCU		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L		NG	5.2	4.8	4.5	4.5	4.9	5	5.1	5.2	5	5.6	5.7	6.4	6.8	6.5	5.3
	Total Organic Carbon (TOC)	mg/L		NG	5.3	4.9	4.6	4.9	5.1	5	5.3	5.4	5	6.1	6.7	6.7	6.8	5	5.6
	Total Solids (Filtered)	mg/L		NG	36	30	34	16	35	30	40	42	42	16	46	34	42	16	<10
	Turbidity	NTU		NG	1.76	2.16	1.61	1.39	0.76	0.53	0.49	0.78	2.08	1.59	1.495	2.55	2.71	2.55	1.56
Nutrients	Ammonia as N	mg/L		0.021 ⁴	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.005	0.006
	Nitrate (as NO3-N)	mg/L		13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.06
	Nitrite (as NO2-N)	mg/L		0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
	Nitrate and Nitrite (as N) (mg/L)	mg/L		NG	<0.01	<0.01	0.01	0.04	0.06	0.05	0.04	0.05	0.04	0.05	<0.01	<0.01	<0.01	0.06	0.06
	Nitrogen (Total)	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L		4	10	10	10	<10	10	20	<10	8	7	4	8	49	7	<10	6
	Phosphorus (Filtered) (Filtered)	mg/L		4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Biochemical Oxygen Demand (BOD)	mg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Biological	Total Coliforms	MPN/100mL		NG	1	3	1	<1	<1	<1	<1	<1	<1	<1	1	3	<1	<1
E. Coli		MPN/100mL		NG	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1
Metals ⁵	Aluminum (Filtered)	µg/L		5 @ pH < 6.5/100 @ ≥ 6.5 ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aluminum Total	µg/L		5 @ pH < 6.5/100 @ ≥ 6.5 ²	61	103	88	49	31.7	24	26	19	160	52.5	48.5	62	81.3	50.2	44
	Antimony	µg/L		NG	<0.1	0.2	<0.1	0.3	0.4	0.3	-	0.1	0.6	0.3	0.2	<0.1	<0.1	<0.1	<0.1
	Antimony (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arsenic	µg/L		5	0.4	2.4	0.5	0.4	0.4	0.4	0.4	0.4	0.6	0.4	0.45	0.5	0.5	0.5	0.4
	Arsenic (Filtered)	µg/L		5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	µg/L		NG	4.9	5.9	4.6	4.7	4.7	4.5	10.9	4.2	9.3	5	4.55	5	7.4	5.2	4.3
	Barium (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	µg/L		NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Beryllium (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L		1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L		1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L		0.09	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	0.57	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Cadmium (Filtered)	µg/L		0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cesium	µg/L		NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cesium (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium	µg/L		NG	0.1	0.3	<0.1	0.2	0.3	0.1	-	0.2	0.9	0.1	0.1	0.1	0.1	0.2	0.2
	Chromium (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	µg/L		NG	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cobalt (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L		2 - 4 ³	1.1	1.3	<0.2	1.1	1.2	<0.2	1.1	0.8	5.9	1.2	1.1	0.6	0.7	1	0.4
	Copper (Filtered)	µg/L		2 - 4 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron	µg/L		300	64	333	75	46	35	23	24	19	250	53	44	70	69	69	46
	Iron (Filtered)	µg/L		300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	µg/L		1.7 ³	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Lead (Filtered)	µg/L		1.7 ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lithium	µg/L		NG	1.9	2.4	1.7	1.9	1.8	1.8	2	1.6	2.3	1.9	1.8	1.9	1.6	2	-
	Lithium (Filtered)	µg/L		NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.7
	Manganese	µg/L		NG	3.1	7.6	2	1.6	1.5	1.3	1.3	1.3	4.5	2.4	2.45	3.3			

Notes:

- ¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)
- ² Guideline varies with pH
- ³ Guideline varies with hardness. Range given.
- ⁴ Guideline varies with pH and temperature. Most stringent given.
- ⁵ CCME FAL Guidelines developed for *total metals* only. Guideline has been applied to dissolved metals for *ecological* purposes only.

NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Notes:

- ¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)
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NG - No guideline

BOLD - Greater than Guideline

Blank - Not analyzed

Table A.17b: CCME Water Quality Guidelines - Yellowknife River, All Parameters with <DL

Chem_Group	ChemName	output unit	Sampled_Date Time	5/22/2014	6/18/2014	7/23/2014	8/26/2014	9/26/2014	10/22/2014	11/27/2014	12/15/2014	1/29/2015	2/18/2015	3/9/2015
			Site_ID	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ
			CCME FAL ¹											
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-
Field	Field Temperature	°C	NG	5.31	15.24	-	15.22	8.95	3.99	-	-	-	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-
	Silica	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-
	pH	pH Units	6.5-9	7.57	7.59	7.71	7.59	7.47	7.47	7.28	7.265	7.18	7.14	7.15
	Electrical Conductivity (EC)	µS/cm	NG	54.1	56.3	56.4	56.5	55.55	56	61.1	57.35	56.7	57.1	57.7
	Total Suspended Solids (TSS)	mg/L	NG	<3	<3	<3	<3	<3	3	<3	<3	<3	<3	<3
	Hardness as CaCO3	mg/L	NG	21.3	23	22.6	23.3	23	23.25	23.3	22.75	22.3	24.1	22.4
	Alkalinity (total as CaCO3)	mg/L	NG	20.4	20.7	21	21.3	21.25	20.95	21	20.8	21.3	20.6	22.4
	Calcium	mg/L	NG	5.2	5.5	5.6	5.8	5.75	5.85	5.9	5.7	5.5	6	5.5
	Magnesium	mg/L	NG	2	2.2	2.1	2.1	2.1	2.1	2.1	2.05	2.1	2.2	2.1
	Potassium	mg/L	NG	1	1	1	1	1	1	1	1	1.1	1.1	1
	Sodium	mg/L	NG	2	2.1	2.1	2.1	2.1	2.1	2.9	2.1	2.2	2.2	2.2
	Chloride	mg/L	120	1.7	1.8	1.8	1.8	1.7	1.9	2.8	1.9	1.9	1.95	1.9
	Fluoride	mg/L	0.12	-	-	-	-	-	-	-	-	-	-	-
	Sulphate	mg/L	NG	3	3	3	3	3	3	3	4	4	3.5	4
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	5	5.3	5.1	5.3	5	4.6	5.2	4.81	4.8	4.95	4.8
	Total Organic Carbon (TOC)	mg/L	NG	5.2	5.4	5.4	5.7	5.05	4.7	5.1	4.845	5.2	4.85	4.9
	Total Solids (Filtered)	mg/L	NG	18	30	36	36	41	36	43	36	36	36	36
	Turbidity	NTU	NG	4.21	2.7	3.04	2.49	2.39	2.015	1.92	0.915	0.56	0.58	0.47
Nutrients	Ammonia as N	mg/L	0.021 ⁴	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0068	<0.005	<0.005	<0.005
	Nitrate (as NO3-N)	mg/L	13	-	-	-	-	-	-	-	-	-	-	-
	Nitrite (as NO2-N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	-	-
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	0.05	<0.01	0.05	0.05	0.05	0.065	0.09	0.095	0.11	0.085	0.11
	Nitrogen (Total)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-
	Orthophosphate (as P)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-
	Phosphorus	µg/L	4	12	2	4	7	<2	2	3	<2	<2	5	3
	Phosphorus (filtered) (Filtered)	mg/L	4	0.004	-	-	-	-	-	-	-	-	-	-
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-
Demand Parameters	Total Coliforms	MPN/100mL	NG	<1	<1	<1	1	<1	<1	<1	<1	1	<1	<1
	E. Coli	MPN/100mL	NG	<1	<1	<1	<1	1.5	<1	<1	<1	<1	<1	<1
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	10.2	2.2	6.1	4.9	3.9	4.75	4.3	3.45	2.6	1.9	1.8
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	128	82.1	106	90.7	81.95	64.9	442	37.5	17.9	14	13.2
	Antimony	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Antimony (Filtered)	µg/L	NG	0.3	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Arsenic	µg/L	5	0.2	0.3	0.5	0.5	0.4	0.35	0.4	0.4	0.3	0.3	0.3
	Arsenic (Filtered)	µg/L	5	<0.2	0.2	0.4	0.4	0.4	0.3	<0.2	0.3	0.3	0.3	0.2
	Barium	µg/L	NG	5.4	4.7	5.2	6.1	5.25	5.2	5.9	4.55	4.7	4.5	4.6
	Barium (Filtered)	µg/L	NG	4.2	4	4	4.8	4.25	4.35	4.3	4.1	4.3	4.2	4.3
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Beryllium (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	µg/L	0.09	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05
	Cadmium (Filtered)	µg/L	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Cesium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cesium (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chromium	µg/L	NG	1.3	0.4	0.2	0.9	0.2	0.45	0.1	0.45	<0.1	<0.1	<0.1
	Chromium (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cobalt	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1
	Cobalt (Filtered)	µg/L	NG	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Copper	µg/L	2 - 4 ³	0.5	<0.2	0.8	0.3	0.9	0.6	0.9	0.75	<0.2	0.65	<0.2
	Copper (Filtered)	µg/L	2 - 4 ³	0.2	<0.2	0.3	<0.2	0.3	1.35	1.3	0.6	<0.2	0.7	<0.2
	Iron	µg/L	300	148	79	95	80	68	47	170	23.5	15	14	13
	Iron (Filtered)	µg/L	300	7	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Lead	µg/L	1-7 ³	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1
	Lead (Filtered)	µg/L	1-7 ³	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	0.2	0.2	<0.1	0.3	<0.1
	Lithium	µg/L	NG	2	1.7	1.8	1.9	2	1.95	2	1.75	1.6	1.65	1.5
	Lithium (Filtered)	µg/L	NG	1.6	1.6	1.6	1.5	1.6	1.8	1.7	1.65	1.5	1.6	1.5
	Manganese	µg/L	NG	5	3.1	3	4.3	2.3	1.8	5.7	1.2	1	0.85	0.8
	Manganese (Filtered)	µg/L	NG	1	0.8	<0.1	0.1	0.1	0.1	0.1	0.25	0.2	0.3	0.3
	Mercury	0.026	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Mercury (Filtered)	µg/L	0.026	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Molybdenum	µg/L	73	0.1	0.1	<0.1	0.1	<0.1	<0.1	0.3	0.1	<0.1	0.1	<0.1
	Molybdenum (Filtered)	µg/L	73	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	<0.1
	Nickel	25-150 ³	0.5	<0.1	0.5	0.5	0.4	0.3	0.45	0.5	0.4	0.3	0.4	0.3
	Nickel (Filtered)	µg/L	25-150 ³	0.4	<0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3
	Rubidium	µg/L	NG	2.1	2.2	2.1	2.3	2.1	2	2.1	2	2.15	2.1	2.1
	Rubidium (Filtered)	µg/L	NG	1.9	2	1.9	2	1.9	1.85	2	2.05	1.9	2.1	2.1
	Selenium	µg/L	1	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5	<0.3	<0.3	<0.3
	Selenium (Filtered)	µg/L	1	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
	Silver	µg/L	0.25	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Silver (Filtered)	µg/L	0.25	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Strontium	µg/L	NG	23.4	25.4	23.6	26.7	24.7	23.4	32.2	25.75	24.4	25.3	25.1
	Strontium (Filtered)	µg/L	NG	23.2	24.9	22.4	25	23.9	22.65	25.1	24.85	24.2	24.85	24.6
	Thallium	µg/L	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.15	<0.1
	Thallium (Filtered)	µg/L	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
	Tin	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-
	Tin (Filtered)	µg/L	NG	0.3	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Titanium	µg/L	NG	5.6	2.6	3.3	2.8	2.4	2.6	3.6	1.85	0.5	0.65	0.5
	Titanium (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-
	Uranium	15	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Uranium (Filtered)	µg/L	15	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1
	Vanadium	µg/L	NG	0.3	0.2	0.2	0.1	0.15	0.2	0.4	0.1	0.1	0.15	0.1
	Vanadium (Filtered)	µg/L	NG	<0.1	0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	0.1	0.1
	Zinc	30	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.7	<0.4	<0.4	<0.4	<0.4
	Zinc (Filtered)	µg/L	30	<0.4	<0.4	0.6	<0.4	<0.4	1.25	0.9	<0.4	<0.4	<0.4	<0.4

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

Table A.17b: CCME Water Quality Guidelines - Yellowknife River, All Parameters with <DL

			Sampled Date Time	4/9/2015	5/28/2015	6/25/2015	7/22/2015	8/28/2015	9/23/2015	10/21/2015	11/26/2015	12/15/2015	1/27/2016	2/24/2016	3/16/2016	4/21/2016	5/11/2016	6/28/2016	7/26/2016	
			Site ID	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	
Chem_Group	ChemName	output unit	CCME FAL ¹																	
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Field	Field Temperature	°C	NG	-	12.46	18.14	18.61	15.1	9.04	2.56	0.6	-0.009	-	-	-	-	7.43	18.41	17.97	
Physical/Major Ions	Chlorophyll A	µg/L	NG	-	-	-	-	-	1.69	2.54	1.12	0.638	0.488	0.535	0.909	1.47	-	0.001	1.1	
	Bicarbonate as CaCO3	mg/L	NG	-	-	21.3	21	21.25	21.1	20.7	21	20.7	20.1	17.9	20.2	17.9	-	-	-	
	Nitrogen (Organic) (Filtered)	mg/L	NG	-	-	0.266	0.226	0.225	0.221	0.207	0.247	0.225	0.273	0.245	0.241	0.236	0.206	0.252	0.2	
	Silica	mg/L	NG	-	-	0.336	0.315	0.32	0.365	0.309	0.37	0.447	0.436	0.471	0.41	0.406	0.32	0.337	0.356	
	pH	pH Units	6.5-9	7.22	7.6	7.58	7.7	7.495	7.44	7.4	7.17	7.21	7.2	7.19	7.28	7.5	7.66	6.97		
	Electrical Conductivity (EC)	µS/cm	NG	58.4	56.6	54.6	55.7	58.1	57.8	56.4	57.2	58	55	54.7	53.5	51.9	51.2	55.4	62.6	
	Total Suspended Solids (TSS)	mg/L	NG	<3	4	4	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	4	<3	19	
	Hardness as CaCO3	mg/L	NG	24.7	25.3	27.9	23.2	23.3	23.1	22.4	23.3	24.3	22.7	23.3	20.4	19.5	28.3	26.8		
	Alkalinity (total as CaCO3)	mg/L	NG	21.9	21.2	21.3	21	21.25	21.1	20.7	21	20.7	20.1	17.9	20.2	17.9	17.9	21.3	14.1	
	Calcium	mg/L	NG	6.1	6.3	6.8	5.7	5.8	5.8	5.7	5.7	5.8	6.1	5.7	5.7	5.8	4.9	4.6	5.9	
	Magnesium	mg/L	NG	2.3	2.3	2.6	2.2	2.15	2.1	2	2.1	2.2	2	2.2	2.1	2	1.9	3	2.9	
	Potassium	mg/L	NG	1.1	1.1	1.1	1	1	1	1	1	1.1	1.1	1.1	1	1	1	0.9		
	Sodium	mg/L	NG	2.3	2.2	2.4	2.1	2.15	2.1	2.1	2	2.1	2.1	2.3	2.4	2.1	2	2.3	2	
	Chloride	mg/L	120	2	2.1	2	2	2	1.9	2.1	1.8	2.1	2	2	2.2	1.8	1.9	2	6.3	
	Fluoride	mg/L	0.12	-	-	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Sulphate	mg/L	NG	4	4	3	4	4	4	4	3	4	3	3	3	3	4	4	4	
	Colour	TCU	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	4.9	5.9	5.2	4.4	4.9	5.2	4.9	4.7	4.7	4.9	4.7	5	4.3	4.3	4.5	5	
	Total Organic Carbon (TOC)	mg/L	NG	5.1	6.4	5.4	4.8	4.9	5.4	5.2	4.6	4.8	5.2	5	4.8	4.4	4.5	4.6		
	Total Solids (Filtered)	mg/L	NG	33	33	33	29	48	28.5	34	44	36	35	30	37	24	42	30	24	
	Turbidity	NTU	NG	0.69	5.19	3.72	2.51	1.855	2.42	1.83	1.32	1.03	0.69	0.35	0.38	0.68	6.12	2.46	2.71	
Nutrients	Ammonia as N	mg/L	0.021 ⁴	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
	Nitrate (as NO3-N)	mg/L	13	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	0.0515	0.0536	0.0504	0.0535	0.0499	0.037	0.0086	<0.005	<0.005	
	Nitrite (as NO2-N)	mg/L	0.06	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
	Nitrate and Nitrite (as N) (mg/L)	mg/L	0.1	<0.01	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	0.0515	0.0536	0.0504	0.0535	0.0499	0.037	0.0086	<0.0051	<0.0051	
	Nitrogen (Total)	mg/L	NG	-	-	0.226	0.23	0.232	0.22	0.232	0.245	0.22	0.236	0.247	0.234	0.236	0.248	0.233	0.225	
	Orthophosphate (as P)	mg/L	NG	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Phosphorus	µg/L	4	8	7	9	<2	11.3	5.3	5.8	4.1	3.8	3.4	3.6	18	6	10	8	12		
Phosphorus (Filtered) (Filtered)	mg/L	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	0.0032	0.0023	
Demand Parameters	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Biological	Total Coliforms	MPN/100mL	NG	<1	<1	<1	1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
	E. Coli	MPN/100mL	NG	4.1	<1	<1	1	-	1	<1	<1	<1	<1	<1	<1	<1	<1	4.1	1	
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	2.2	4	4.2	6.4	5.45	3.7	3.6	4.1	4	3.2	4.1	7.2	2.3	13.7	14.9	6.3	
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	15.5	220	146	109	51.1	88.6	39.9	26.9	53.5	17.9	14.2	19.1	24.1	272	36.5	73.2	
	Antimony	µg/L	NG	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	
	Antimony (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Arsenic	µg/L	5	0.3	0.5	0.7	0.6	0.45	0.6	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	2.9	
	Arsenic (Filtered)	µg/L	5	0.3	0.4	0.4	0.4	0.5	0.5	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	1	
	Barium	µg/L	NG	4.2	6.6	6	5.3	5.25	5.5	5	5.2	4.6	4.5	4.2	4.5	6.9	4.3	5.5		
	Barium (Filtered)	µg/L	NG	4.1	4.4	4.6	4.4	4.85	4.6	4.6	4.6	5.3	4.1	4.3	4.1	4.3	4.2	5.3		
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Beryllium (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Bismuth	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	
	Bismuth (Filtered)	µg/L	NG	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	<0.2	0.6	
	Boron - soluble	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	5.1	5.2
	Boron - soluble (Filtered)	µg/L	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	5	5.3
	Cadmium	µg/L	0.09	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Cadmium (Filtered)	µg/L	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Cesium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Cesium (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chromium																			

Table A.17b: CCME Water Quality Guidelines - Yellowknife River, All Parameters with <DL

			Sampled Date Time	8/23/2016	9/29/2016	10/26/2016	11/25/2016	12/13/2016
			Site ID	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ	GNWT_GSL_WQ
Chem_Group	ChemName	output unit	CCME FAL ¹					
Cyanide	Cyanide Total	mg/L	NG	-	-	-	-	-
Field	Field Temperature	°C	NG	18.68	8.72	2.79	-	-
Physical/Major Ions	Chlorophyll A	µg/L	NG	2	<1	-	2	<1
	Bicarbonate as CaCO3	mg/L	NG	-	-	-	-	-
	Nitrogen (Organic) (Filtered)	mg/L	NG	0.213	0.206	0.254	0.235	0.251
	Silica	mg/L	NG	0.272	0.301	0.338	0.367	0.469
	pH	pH Units	6.5-9	7.69	7.37	7.44	7.23	7.25
	Electrical Conductivity (EC)	µS/cm	NG	56.5	53.7	54.7	56.3	58
	Total Suspended Solids (TSS)	mg/L	NG	<3	<3	<3	<3	<3
	Hardness as CaCO3	mg/L	NG	20.4	22.1	23.2	20.2	20.2
	Alkalinity (total as CaCO3)	mg/L	NG	21.4	20.6	21.1	21.1	22.7
	Calcium	mg/L	NG	4.7	5.4	5.8	5	4.9
	Magnesium	mg/L	NG	2.1	2.1	2.1	1.9	1.9
	Potassium	mg/L	NG	0.8	1.1	1.1	1	1.1
	Sodium	mg/L	NG	1.8	2.2	2.1	2.1	2.3
	Chloride	mg/L	120	1.8	1.8	1.8	1.8	2
	Fluoride	mg/L	0.12	-	<0.1	<0.1	<0.1	<0.1
	Sulphate	mg/L	NG	3	3	3	3	4
	Colour	TCU	NG	-	-	-	-	-
	Dissolved Organic Carbon (DOC) (Filtered)	mg/L	NG	4.4	4.5	3.9	4.5	4.7
	Total Organic Carbon (TOC)	mg/L	NG	4.9	4.8	4.7	4.7	4.8
	Total Solids (Filtered)	mg/L	NG	38	29	33	36	22
	Turbidity	NTU	NG	2.11	1.84	1.47	2.23	1.09
Nutrients	Ammonia as N	mg/L	0.021 ⁴	<0.005	<0.005	<0.005	<0.005	<0.005
	Nitrate (as NO3-N)	mg/L	13	<0.005	<0.005	0.0113	0.0385	0.052
	Nitrite (as NO2-N)	mg/L	0.06	<0.001	<0.001	<0.001	<0.001	<0.001
	Nitrate and Nitrite (as N) (mg/L)	mg/L	NG	<0.0051	<0.0051	0.0113	0.0385	0.052
	Nitrogen (Total)	mg/L	NG	0.223	0.213	0.256	0.243	0.24
	Orthophosphate (as P)	mg/L	NG	<0.001	<0.001	<0.001	<0.001	<0.001
	Phosphorus	µg/L	4	3	7	2	4	<2
	Phosphorus (filtered) (Filtered)	mg/L	NG	<0.002	0.0025	0.0024	0.0068	0.0017
	Biochemical Oxygen Demand (BOD)	mg/L	NG	-	-	-	-	-
Demand Parameters	Total Coliforms	MPN/100mL	NG	14	<1	<1	<1	<1
	E. Coli	MPN/100mL	NG	13.5	1	<1	<1	<1
Metals ⁵	Aluminum (Filtered)	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	18.8	3.3	3.1	4	4
	Aluminum Total	µg/L	5 @ pH < 6.5/100 @ ≥ 6.5 ²	88.6	59.3	34.9	82.7	47.9
	Antimony	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1
	Antimony (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1
	Arsenic	µg/L	5	1.1	0.4	0.4	0.3	0.4
	Arsenic (Filtered)	µg/L	5	0.8	0.4	0.3	0.3	0.3
	Barium	µg/L	NG	5	4.8	4.7	5.5	5.3
	Barium (Filtered)	µg/L	NG	4.2	4.2	4.2	4.6	4.7
	Beryllium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1
	Beryllium (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1
	Bismuth	µg/L	NG	<0.2	<0.2	<0.2	<0.2	<0.2
	Bismuth (Filtered)	µg/L	NG	<0.2	<0.2	<0.2	<0.2	<0.2
	Boron - soluble	µg/L	1500	5.9	4.7	4.9	5.4	5.9
	Boron - soluble (Filtered)	µg/L	1500	5.9	4.5	5	5.6	5.2
	Cadmium	µg/L	0.09	<0.05	<0.05	<0.05	<0.05	<0.05
	Cadmium (Filtered)	µg/L	0.09	<0.05	<0.05	<0.05	<0.05	<0.05
	Cesium	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1
	Cesium (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1
	Chromium	µg/L	NG	0.2	<0.1	<0.1	0.1	0.2
	Chromium (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1
	Cobalt	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1
	Cobalt (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1
	Copper	µg/L	2 - 4 ³	0.8	0.6	0.3	0.4	0.5
	Copper (Filtered)	µg/L	2 - 4 ³	0.6	0.4	0.2	0.3	0.3
	Iron	µg/L	300	63	47	31	44	38
	Iron (Filtered)	µg/L	300	8	<5	<5	<5	<5
	Lead	µg/L	1.7 ³	<0.1	<0.1	<0.1	<0.1	<0.1
	Lead (Filtered)	µg/L	1.7 ³	<0.1	<0.1	<0.1	<0.1	<0.1
	Lithium	µg/L	NG	1.7	1.6	1.6	1.8	1.7
	Lithium (Filtered)	µg/L	NG	1.4	1.5	1.5	1.5	1.7
	Manganese	µg/L	NG	3.1	2.3	1.3	1.3	1.1
	Manganese (Filtered)	µg/L	NG	0.3	0.2	0.1	0.3	0.2
	Mercury	µg/L	0.026	<0.01	<0.01	<0.01	<0.01	<0.01
	Mercury (Filtered)	µg/L	0.026	<0.01	<0.01	<0.01	<0.01	<0.01
	Molybdenum	µg/L	73	0.1	<0.1	<0.1	<0.1	0.1
	Molybdenum (Filtered)	µg/L	73	0.1	0.2	0.1	<0.1	<0.1
	Nickel	µg/L	25-150 ³	0.4	0.3	0.3	0.3	0.4
	Nickel (Filtered)	µg/L	25-150 ³	0.3	0.3	0.3	0.3	0.3
	Rubidium	µg/L	NG	2.1	2.1	2	2.1	2.2
	Rubidium (Filtered)	µg/L	NG	1.8	2.1	1.9	2	2
	Selenium	µg/L	1	<0.3	<0.3	<0.3	<0.3	<0.3
	Selenium (Filtered)	µg/L	1	<0.3	<0.3	<0.3	<0.3	<0.3
	Silver	µg/L	0.25	<0.1	<0.1	<0.1	<0.1	<0.1
	Silver (Filtered)	µg/L	0.25	<0.1	<0.1	<0.1	<0.1	<0.1
	Strontium	µg/L	NG	25	23.3	23.7	26.7	26.8
	Strontium (Filtered)	µg/L	NG	22.6	23.2	23.4	26	25.5
	Thallium	µg/L	0.8	<0.1	<0.1	<0.1	<0.1	<0.1
	Thallium (Filtered)	µg/L	0.8	<0.1	<0.1	<0.1	<0.1	<0.1
	Tin	µg/L	NG	<0.1	<0.1	<0.1	<0.1	0.2
	Tin (Filtered)	µg/L	NG	<0.1	<0.1	<0.1	<0.1	<0.1
	Titanium	µg/L	NG	2.7	2	1.2	2.3	1.3
	Titanium (Filtered)	µg/L	NG	0.1	0.2	<0.1	0.1	<0.1
	Uranium	µg/L	15	0.2	0.1	0.1	0.1	0.1
	Uranium (Filtered)	µg/L	15	0.1	0.1	0.1	0.1	0.1
	Vanadium	µg/L	NG	0.2	0.1	0.1	0.1	0.1
	Vanadium (Filtered)	µg/L	NG	0.1	<0.1	<0.1	<0.1	<0.1
	Zinc	µg/L	30	<0.4	<0.4	0.5	<0.4	<0.4
	Zinc (Filtered)	µg/L	30	<0.4	<0.4	<0.4	<0.4	<0.4

Notes:

¹ Canadian Council of Ministers of the Environment (CCME) (Updated 2015). Canadian Water Quality Guidelines for the Protection of Aquatic Life (Freshwater)

² Guideline varies with pH

³ Guideline varies with hardness. Range given.

⁴ Guideline varies with pH and temperature. Most stringent given.

⁵ CCME FAL Guidelines developed for total metals only. Guideline has been applied to dissolved metals for illustrative purposes only.

NG - No guideline

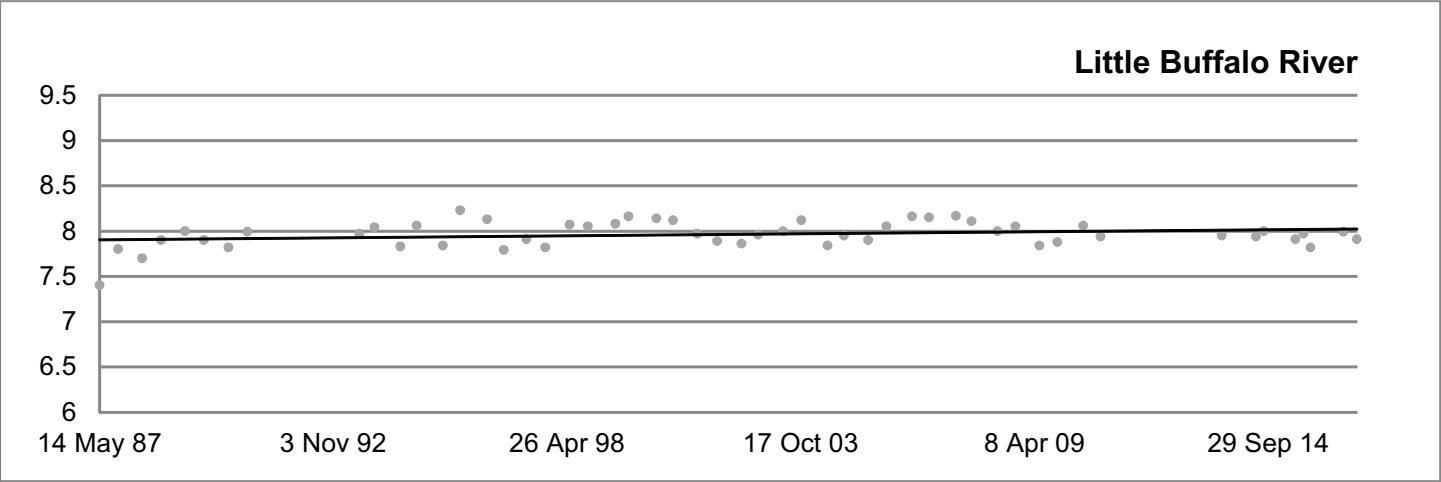
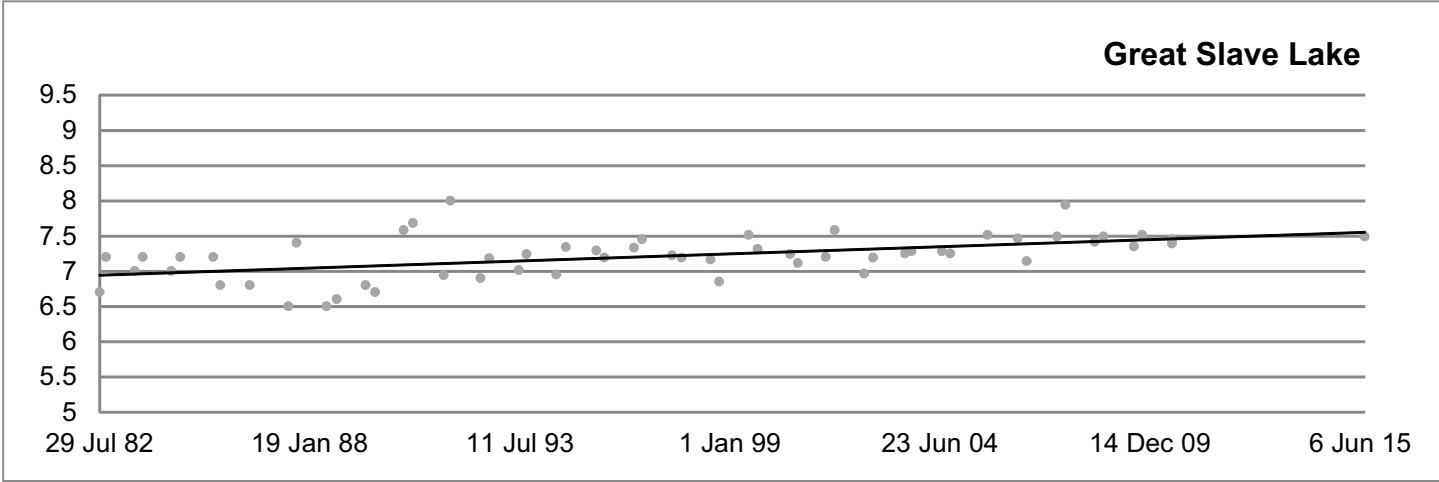
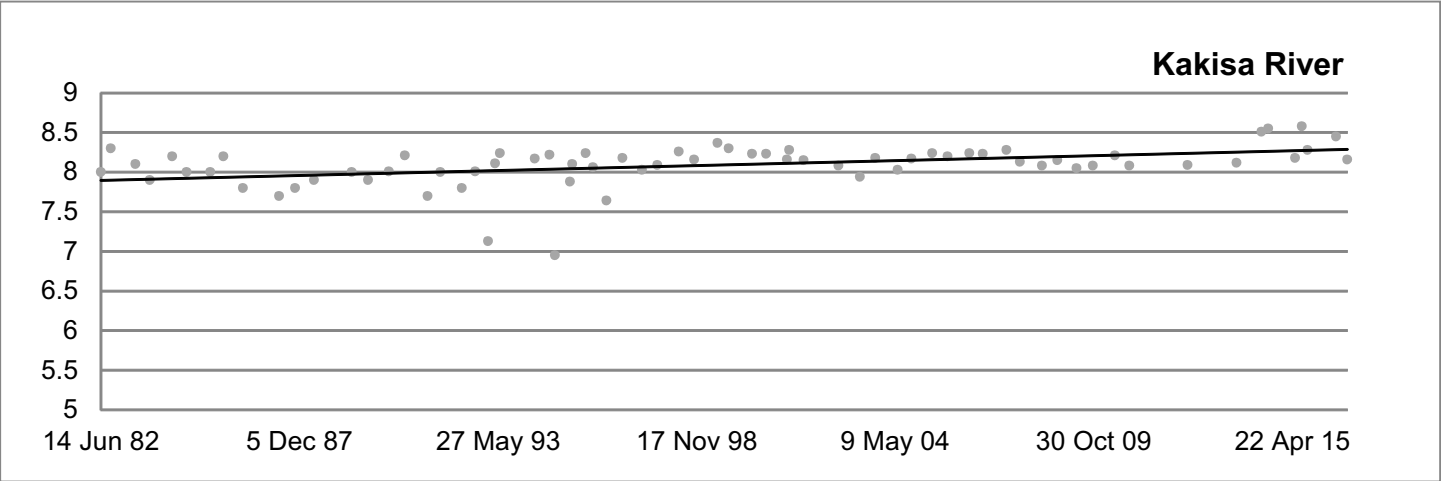
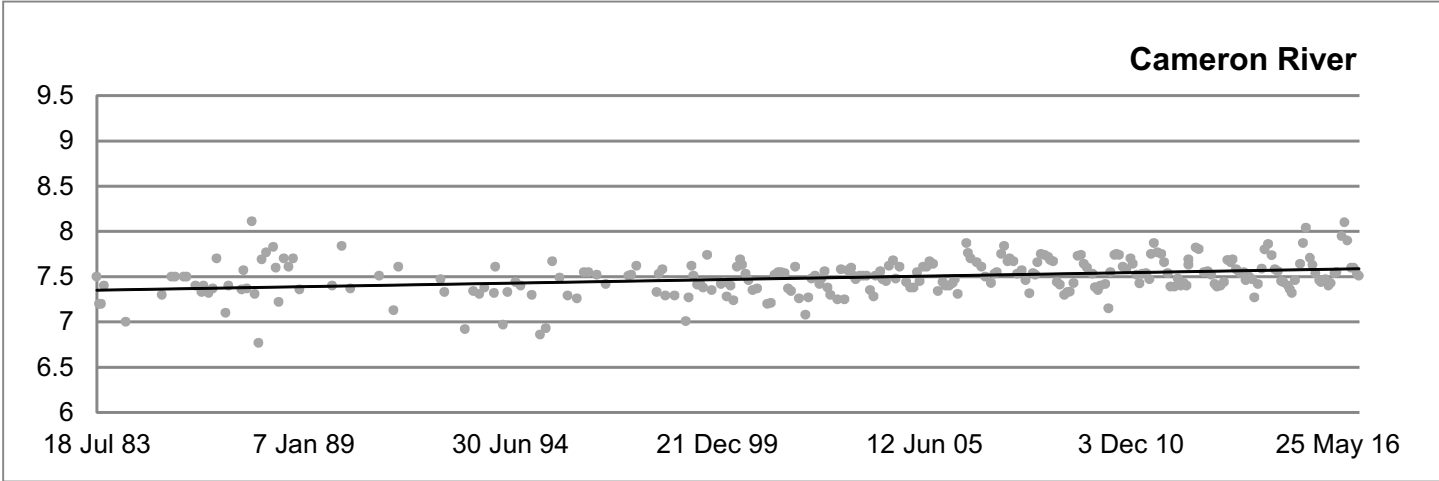
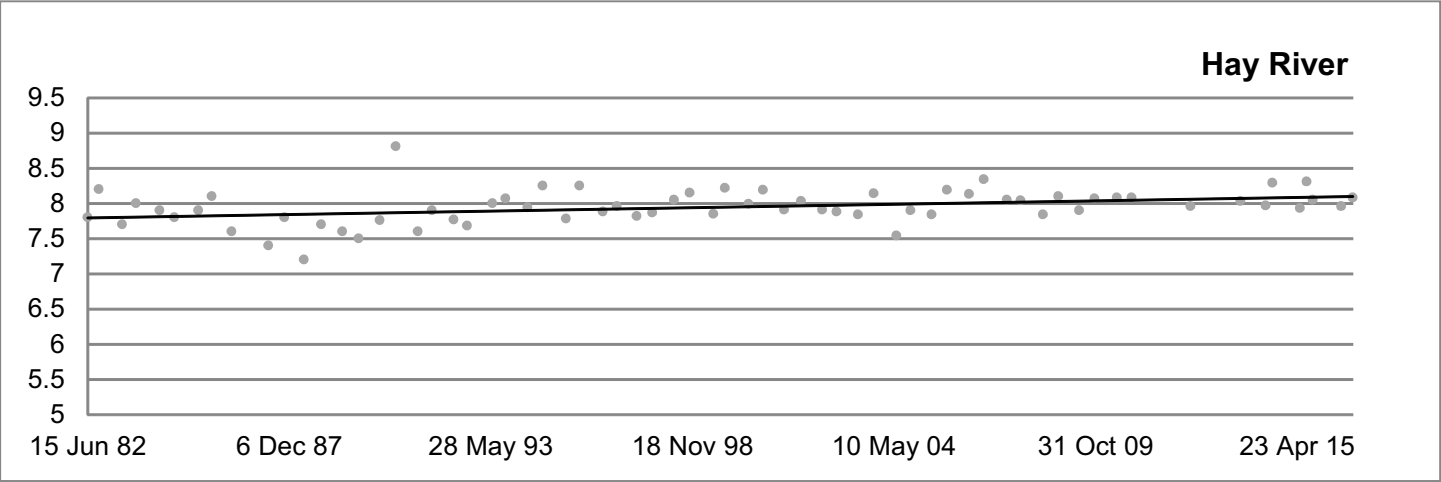
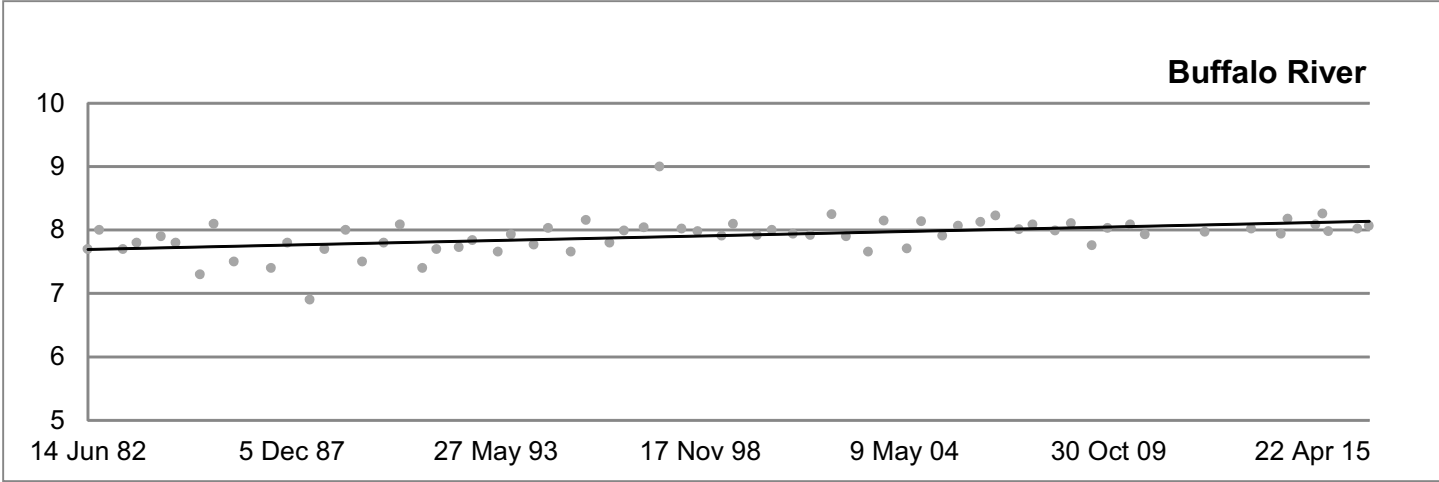
BOLD - Greater than Guideline

Blank - Not analyzed

APPENDIX B

SCATTER PLOTS – ANALYTES OF INTEREST AT ALL WATER QUALITY SITES

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

CLIENT



TETRA TECH

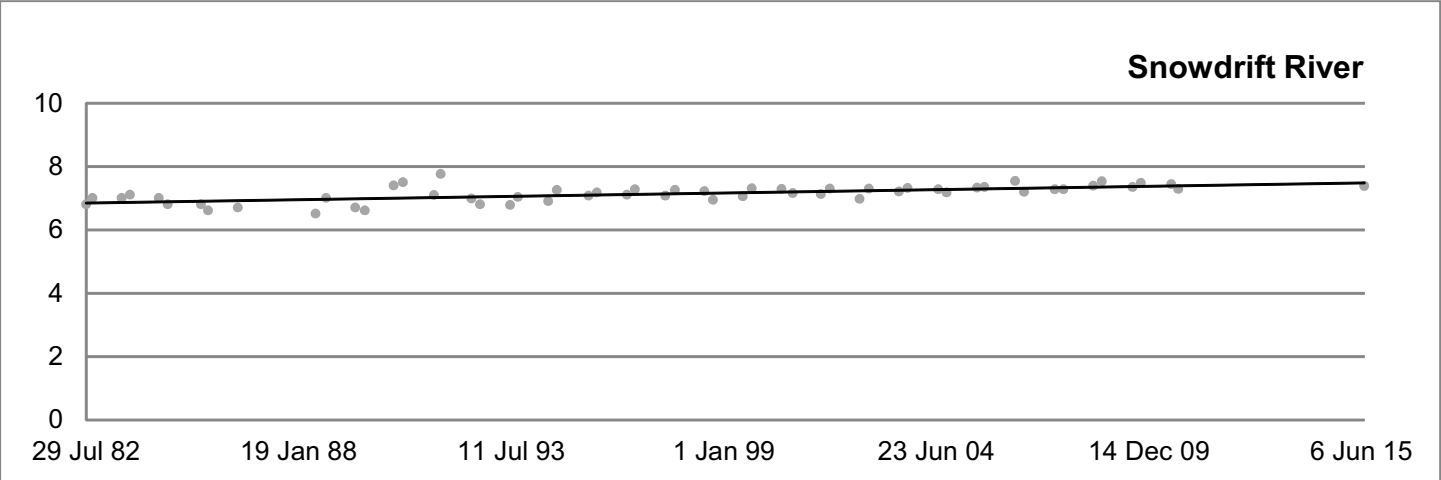
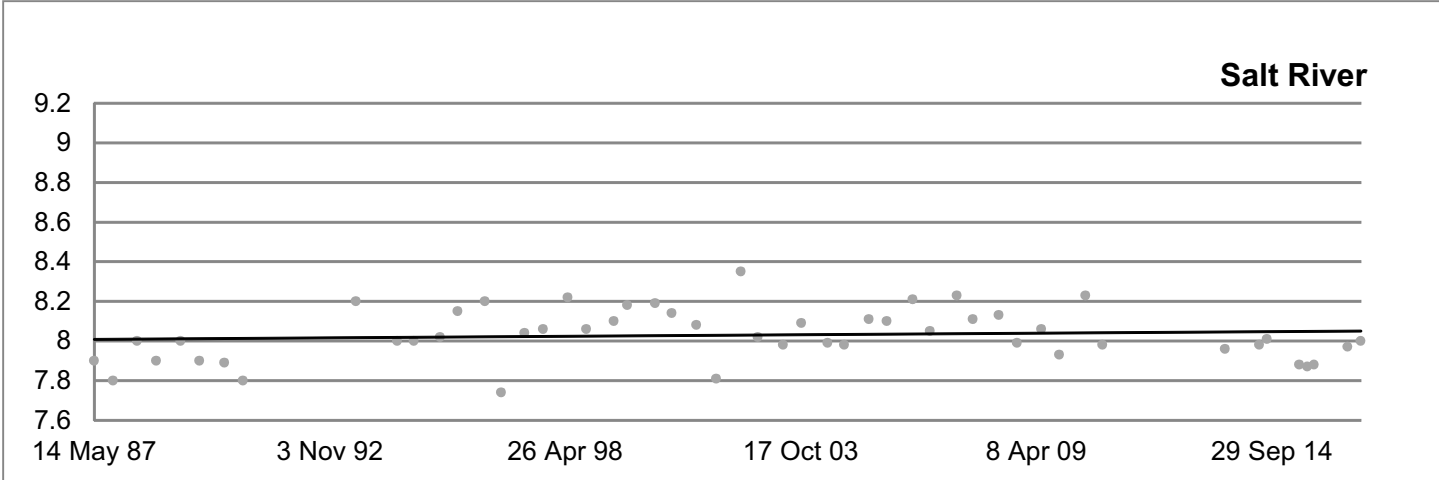
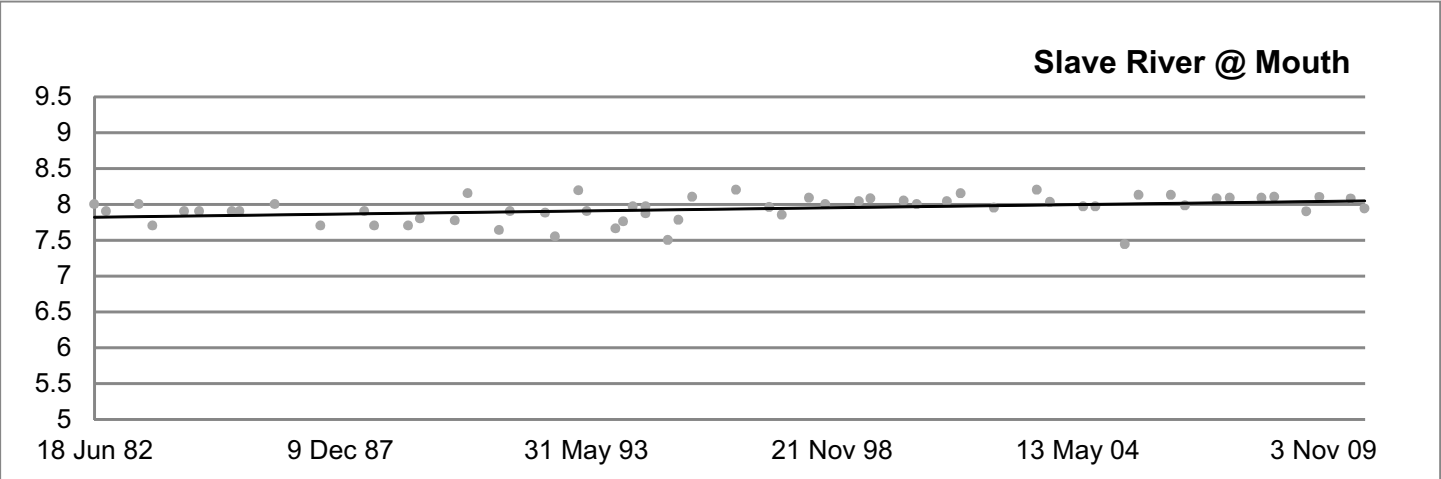
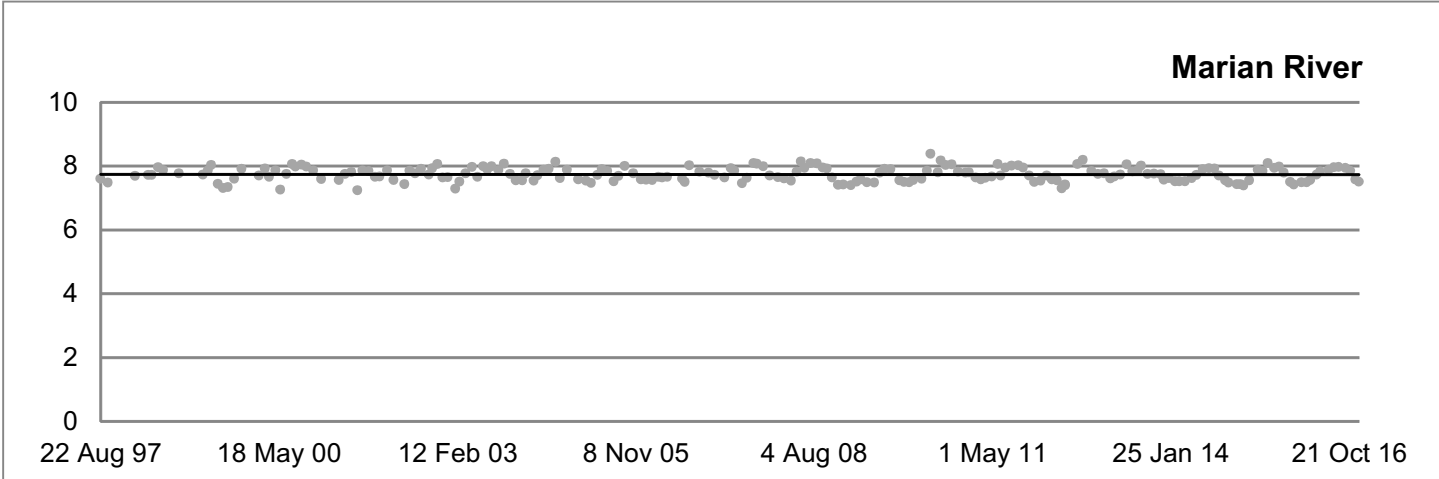
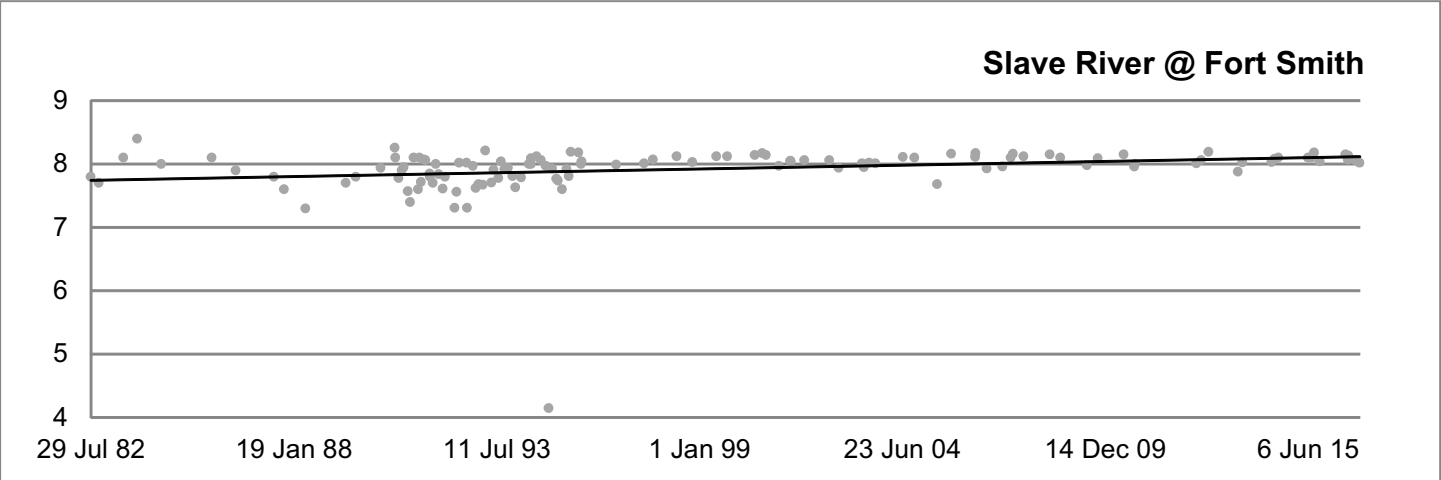
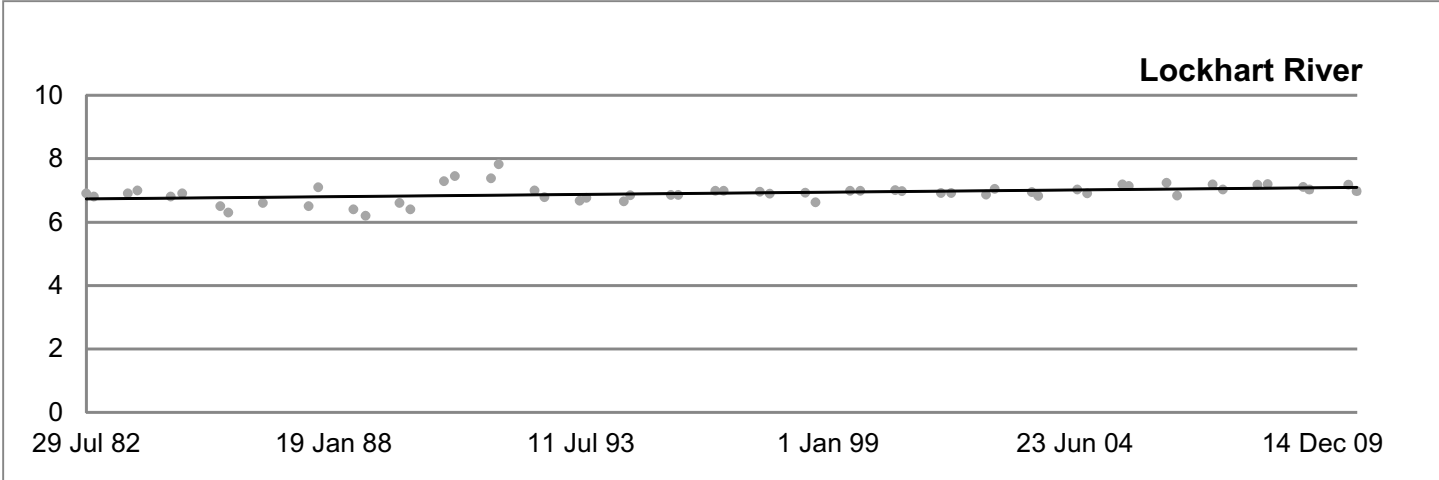
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

pH (pH Units)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0	Figure B.1a
OFFICE Tt-VANC	DATE March 30, 2017				

STATUS
ISSUED FOR USE

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**pH (pH Units)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

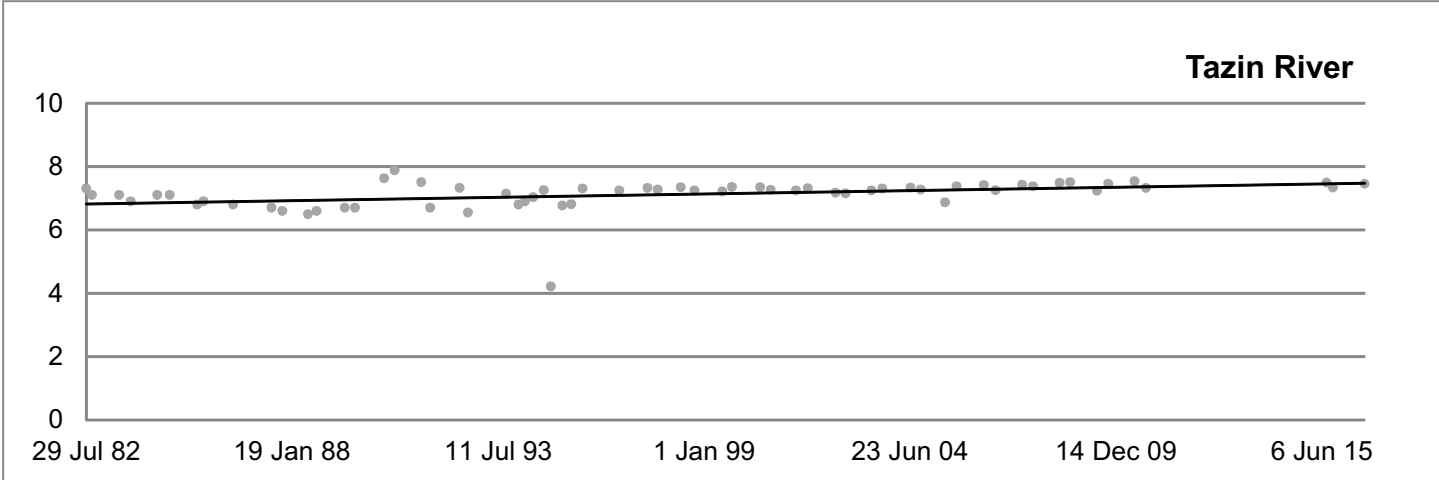
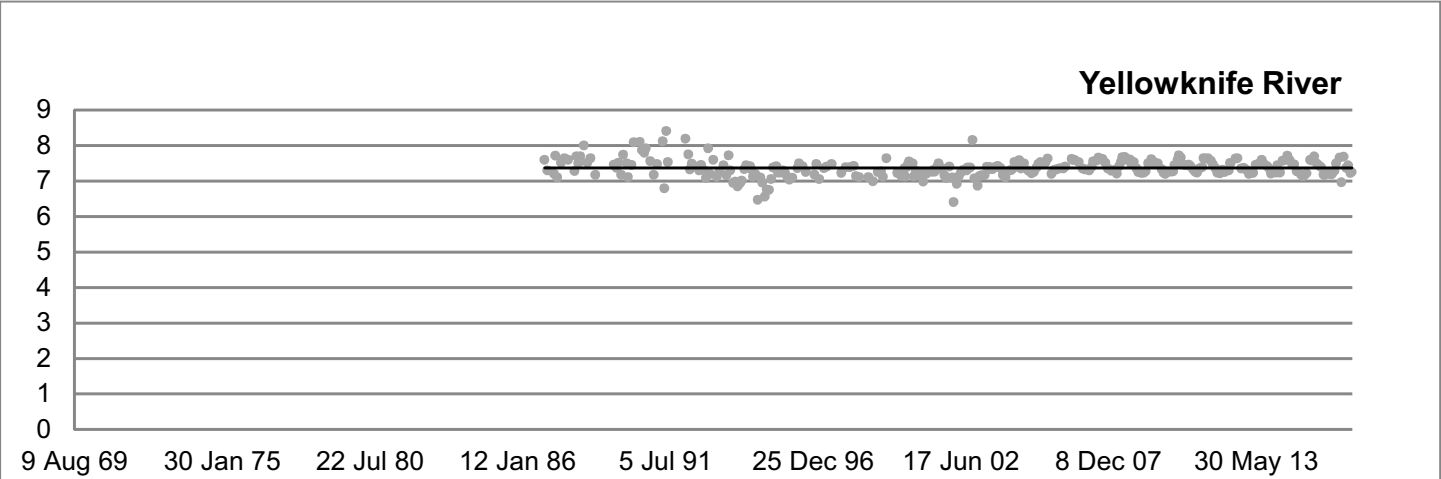
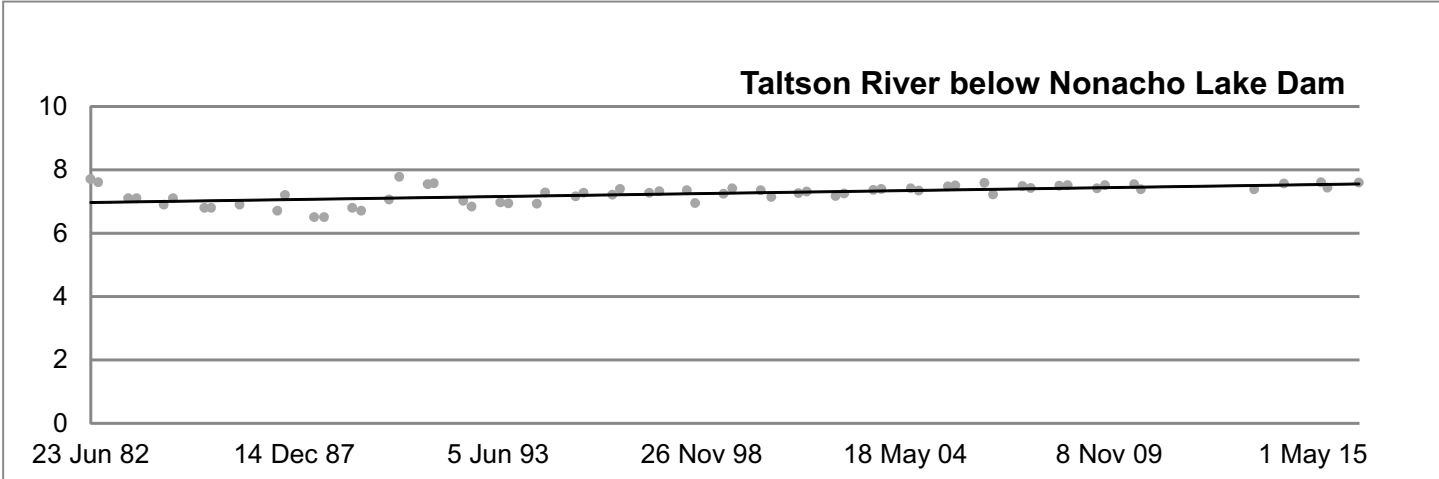
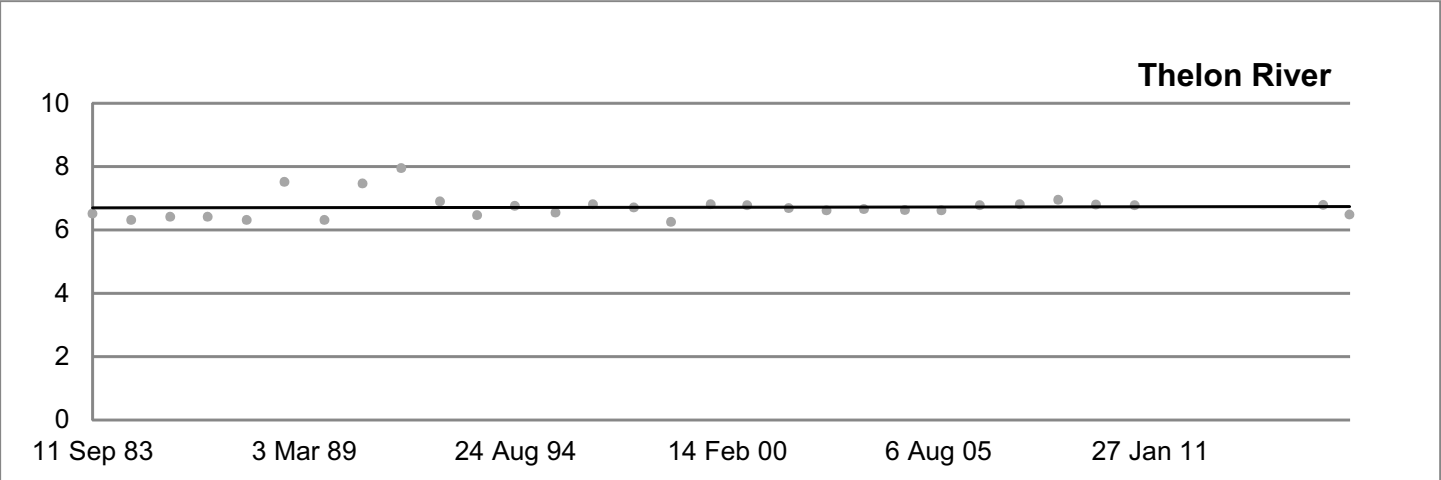
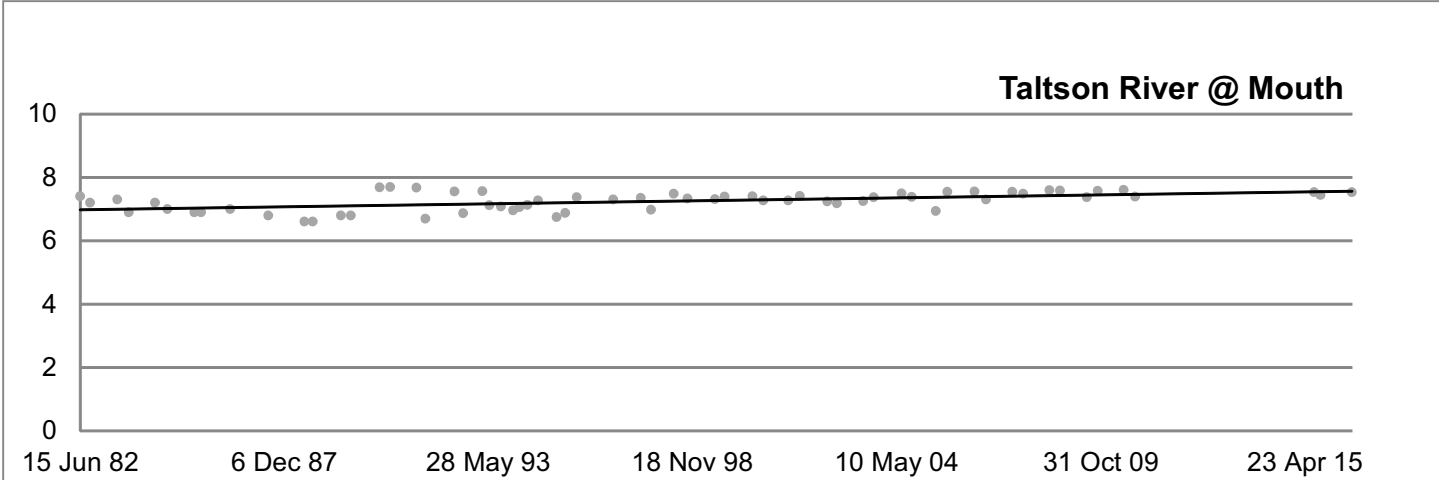
REV
0

OFFICE
Tt-VANC

DATE
March 30, 2017

Figure B.1b

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**pH (pH Units)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.
ENW.VENW03044-01

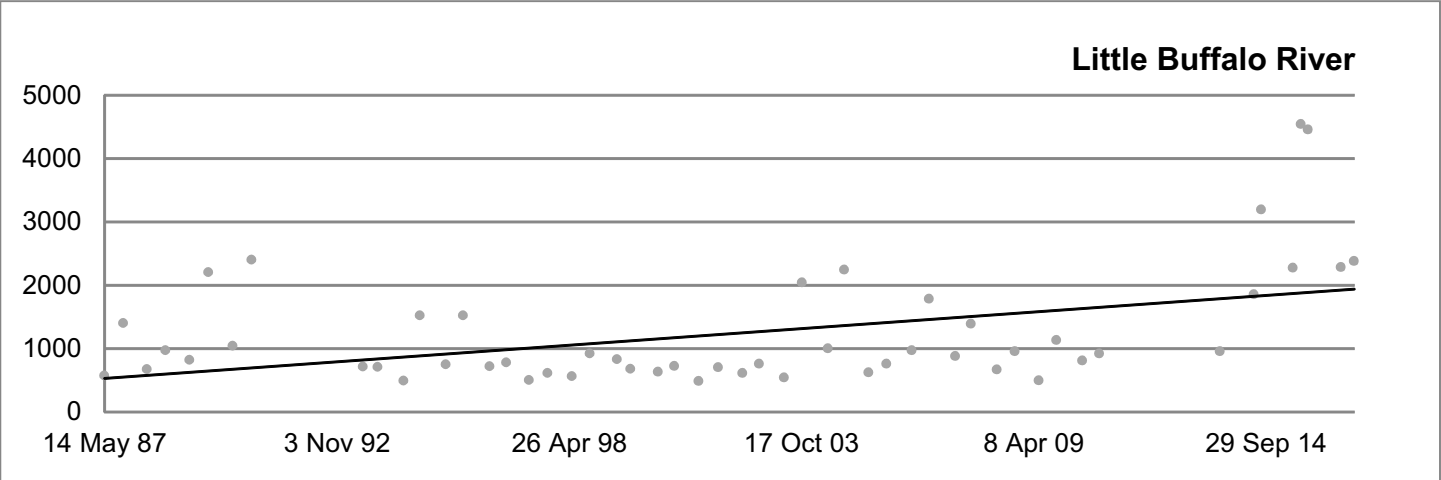
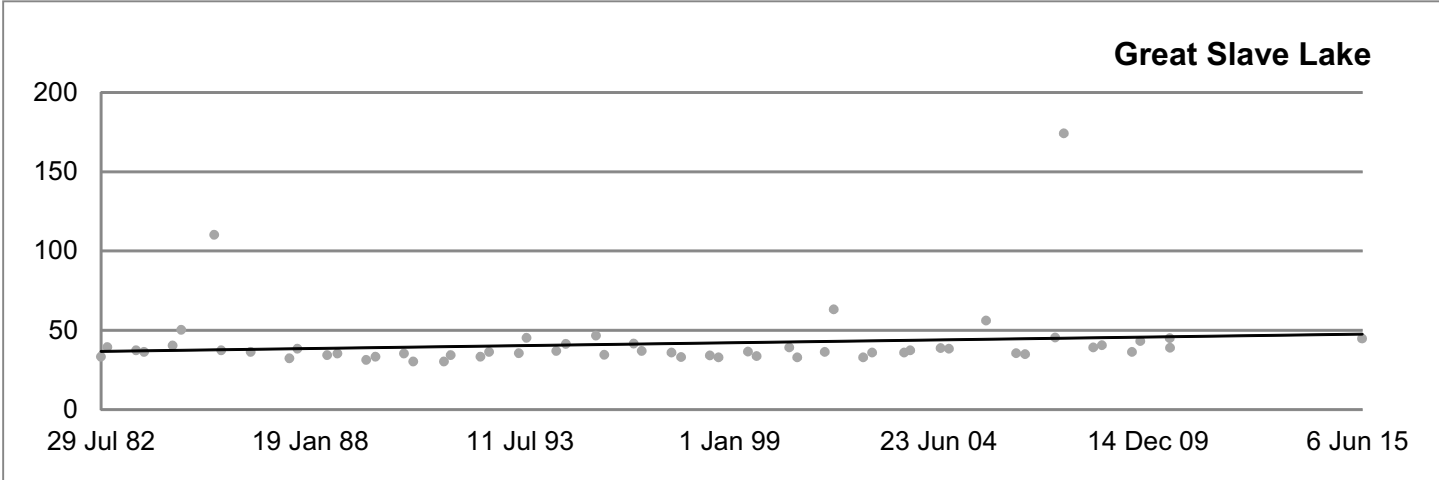
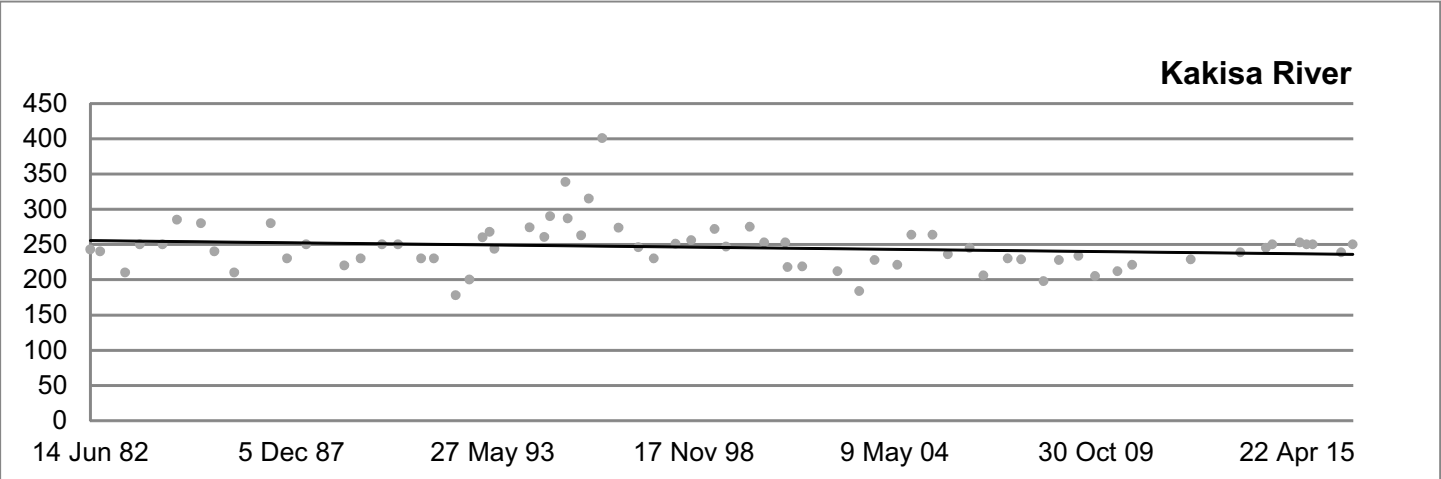
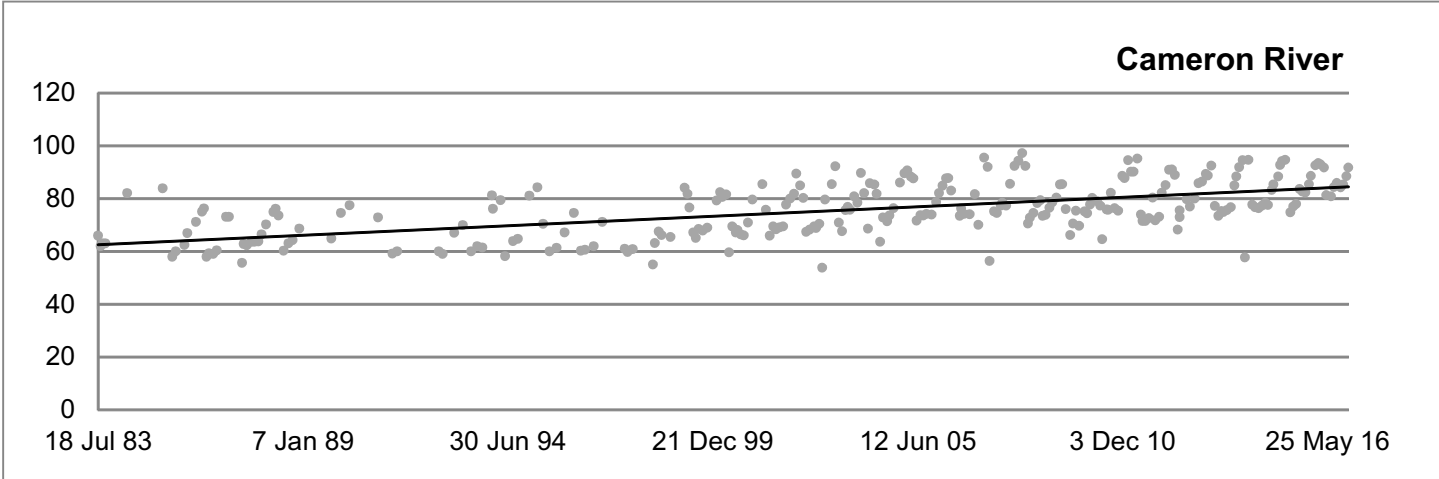
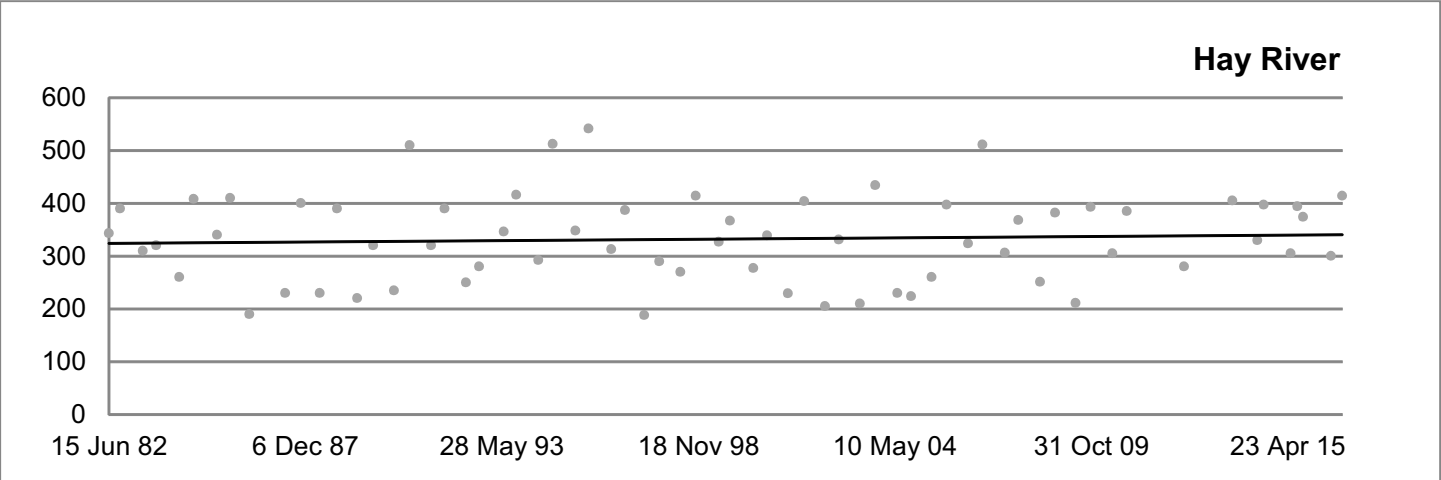
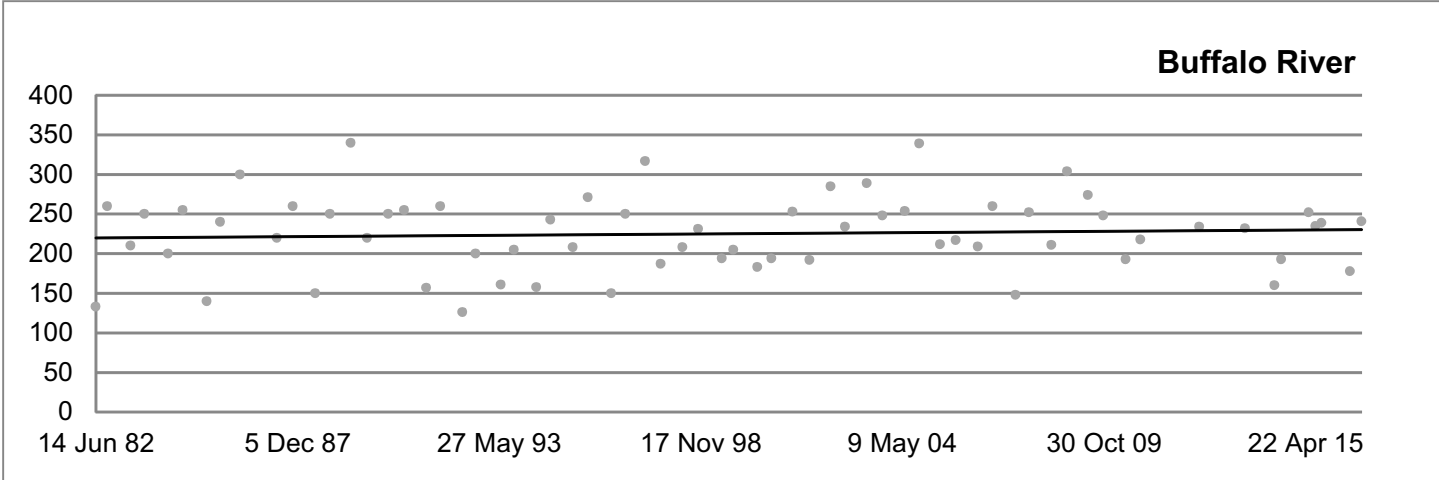
DWN **CKD** **APVD** **REV**
SL MEZ SW 0

OFFICE
Tt-VANC

DATE
March 30, 2017

Figure B.1c

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

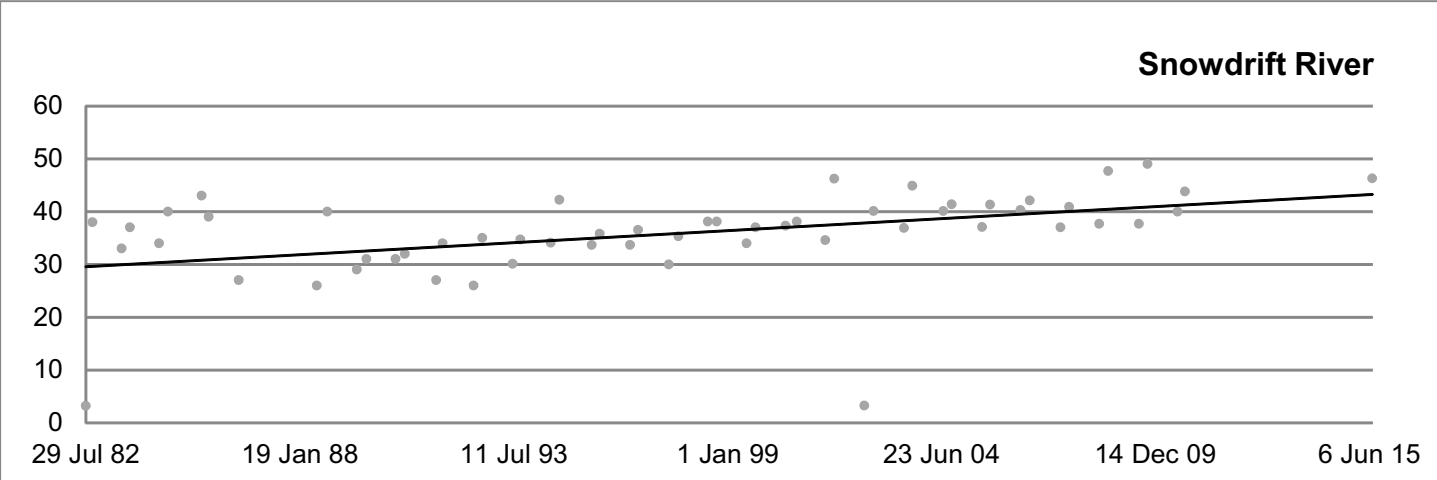
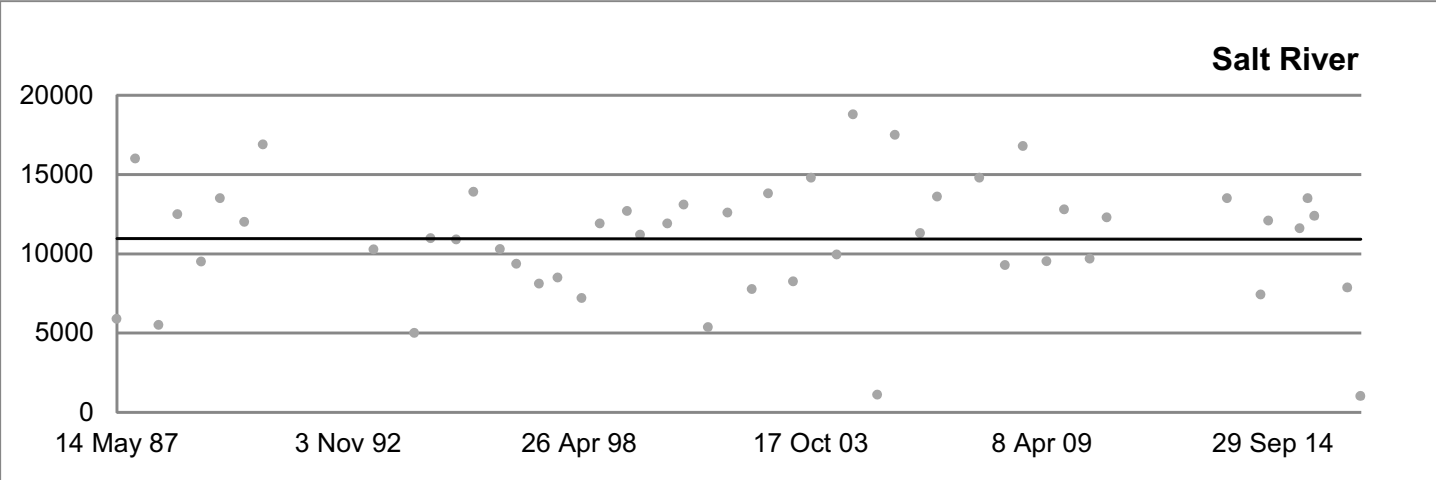
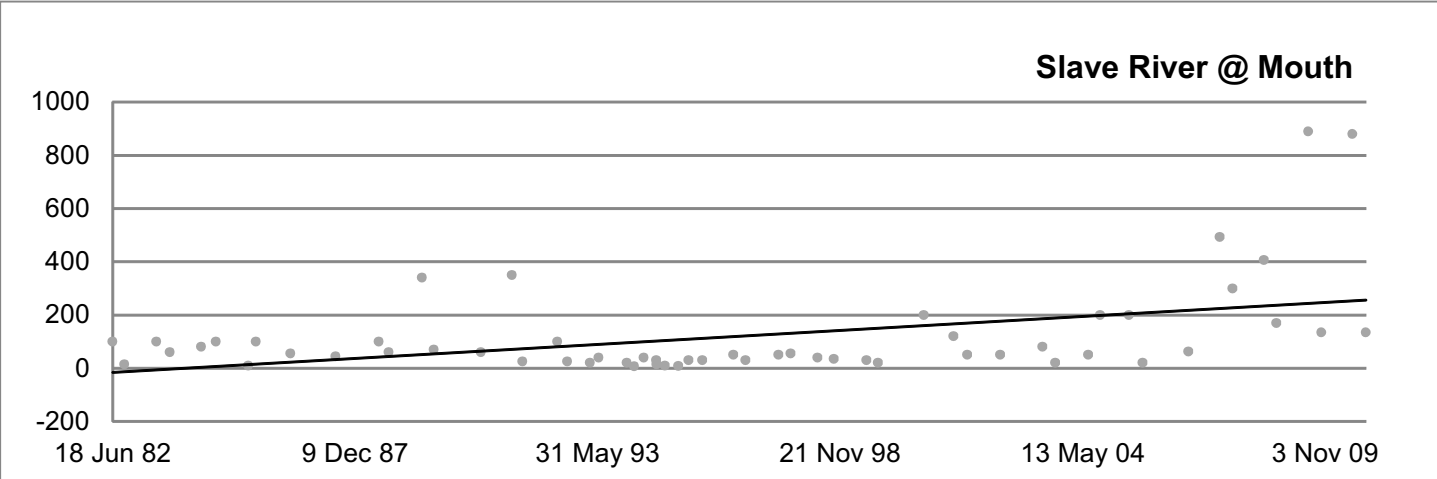
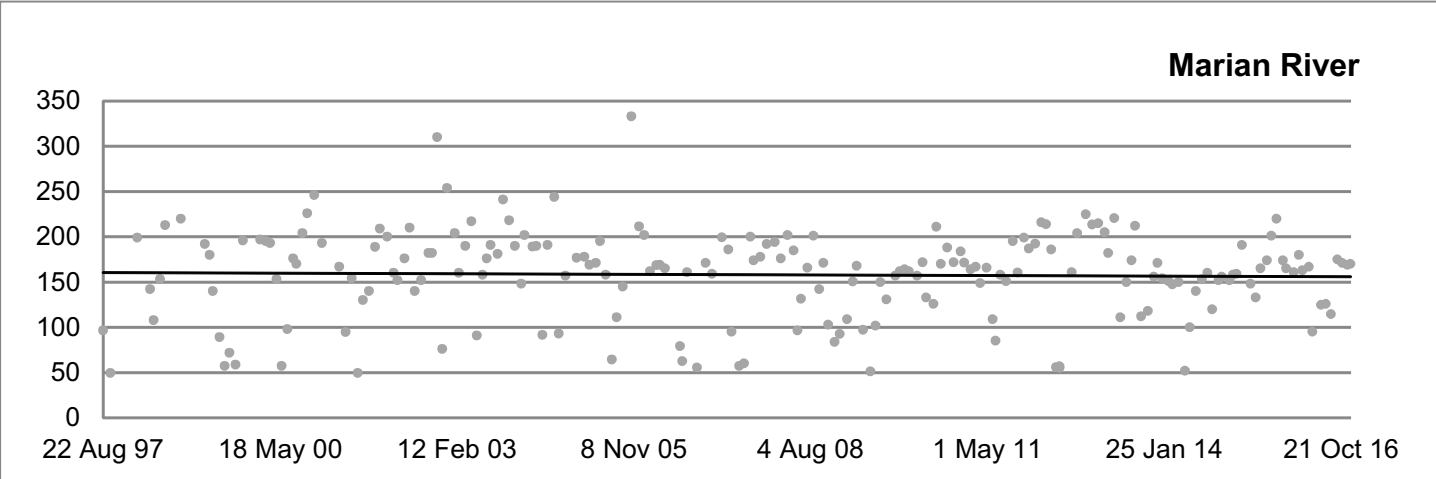
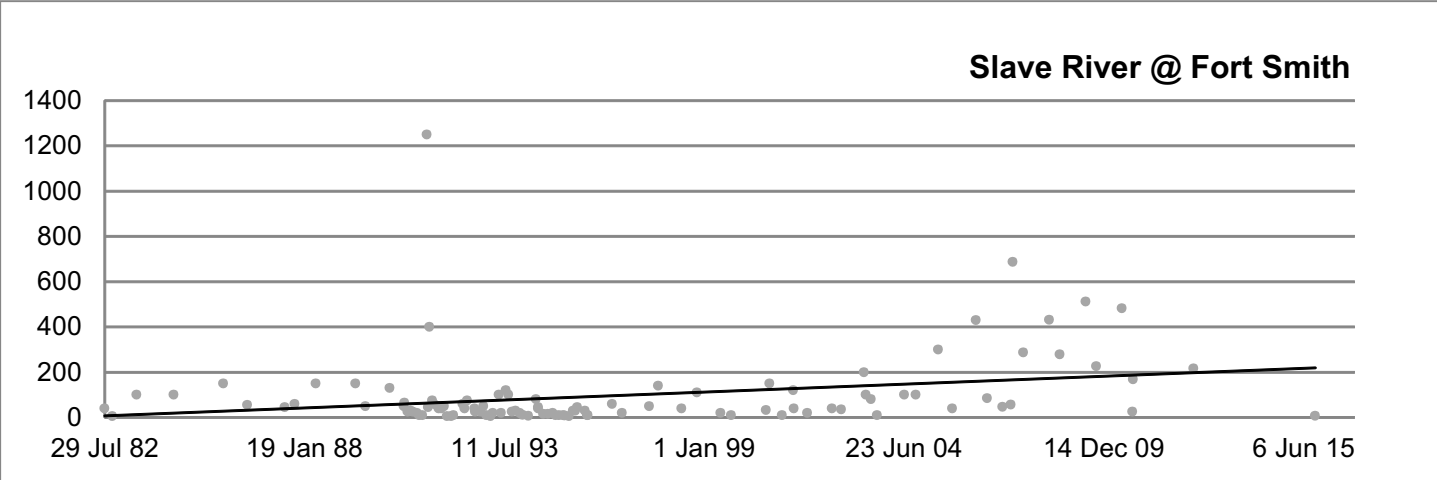
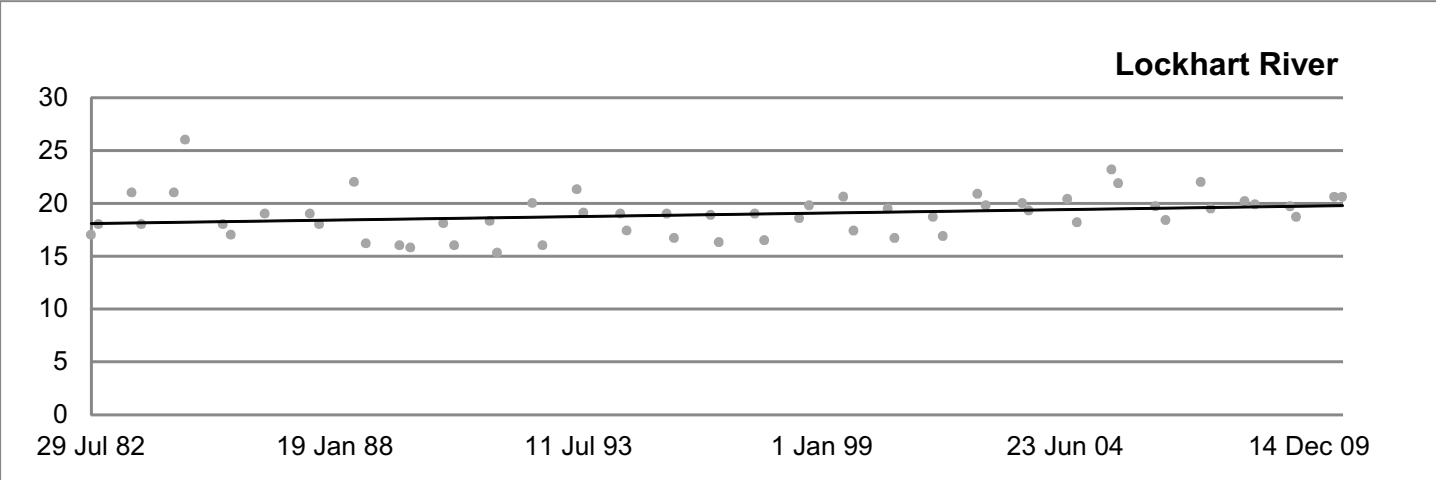
STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Conductivity (µs/cm)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.2a

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

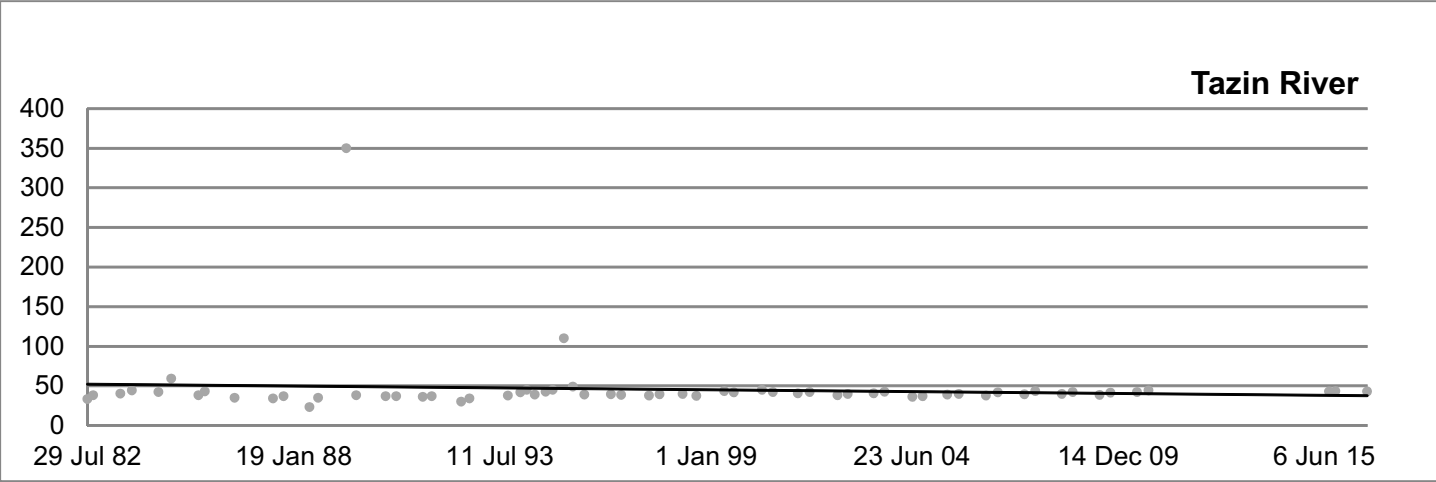
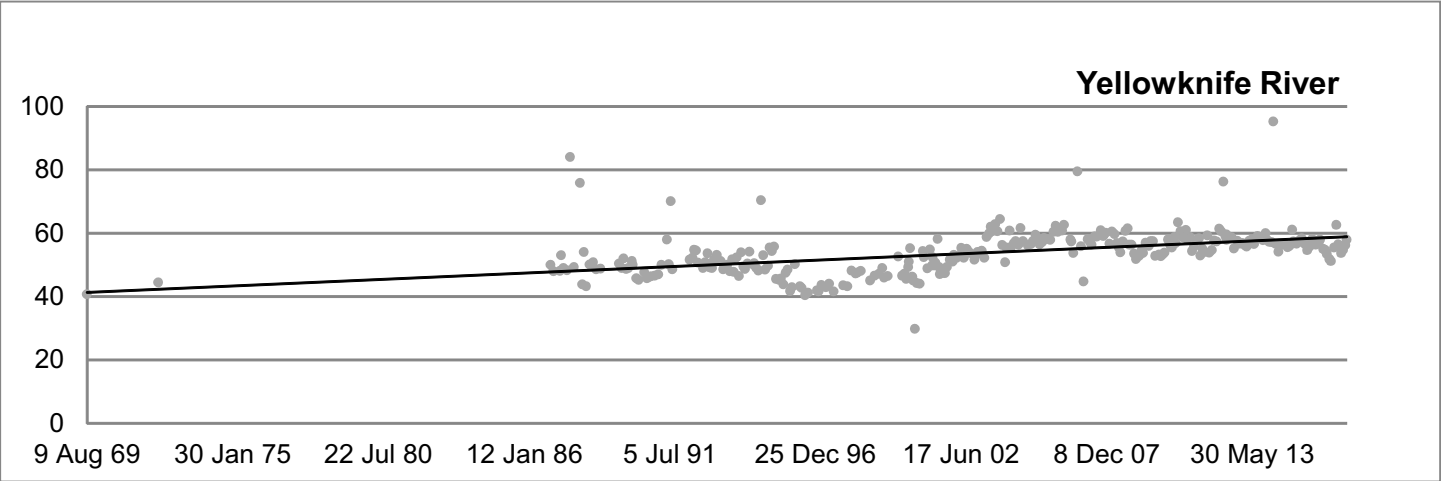
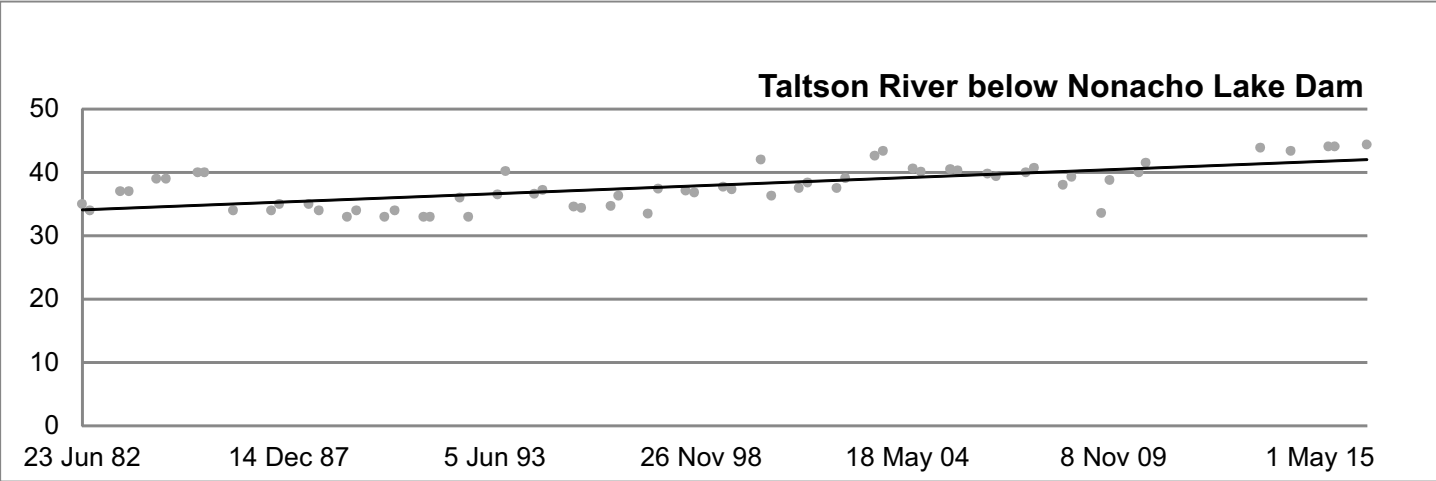
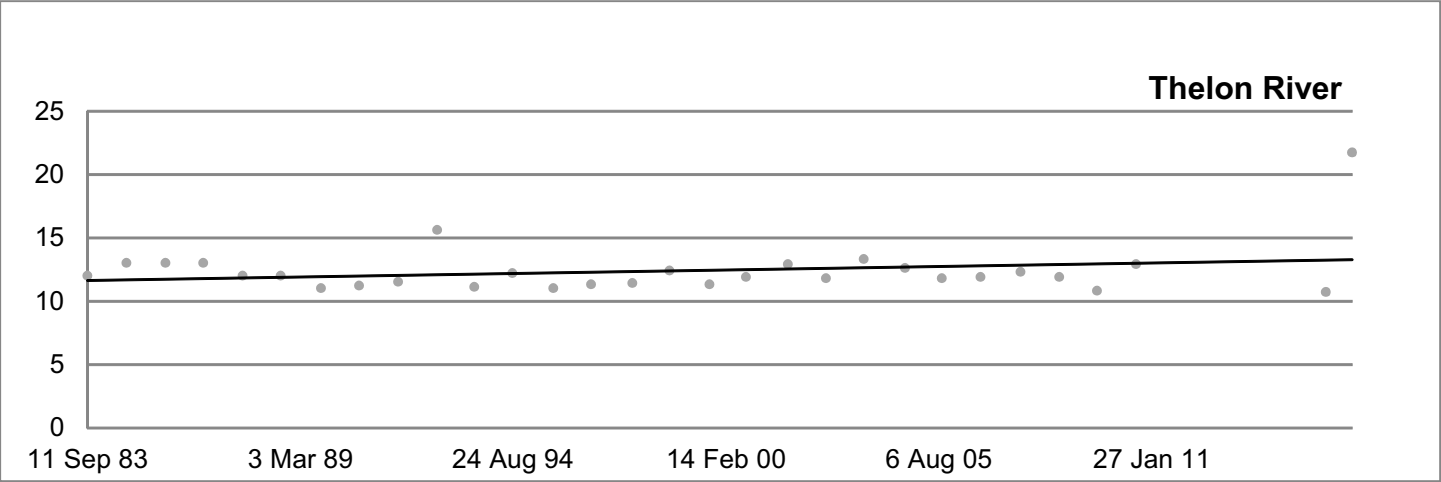
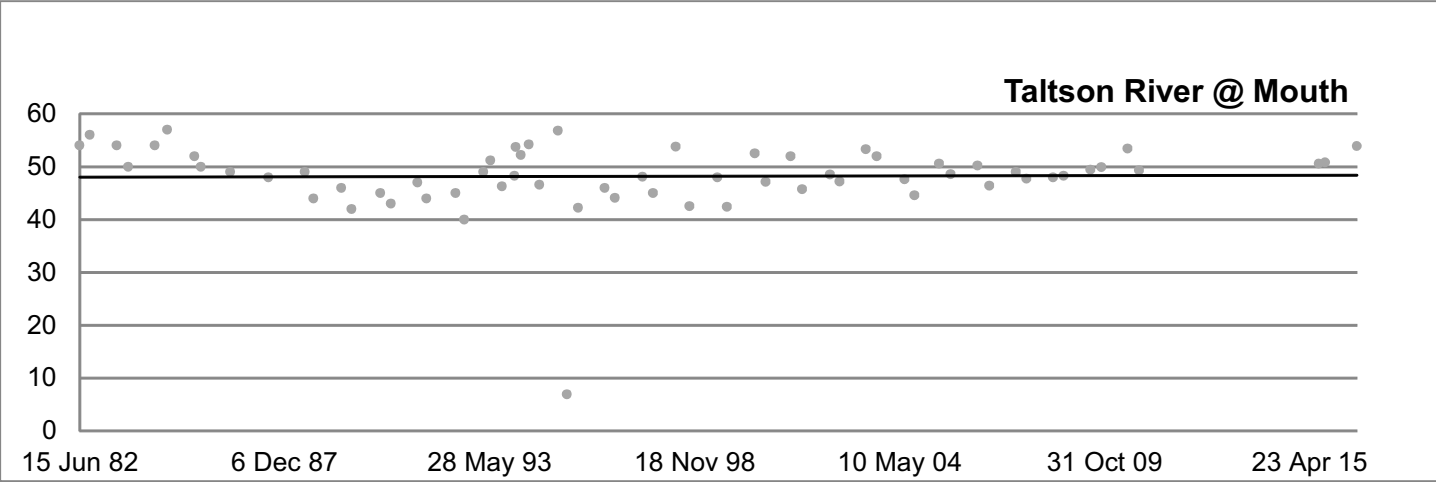
STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Conductivity ($\mu\text{S}/\text{cm}$)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.2b

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Conductivity ($\mu\text{S}/\text{cm}$)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

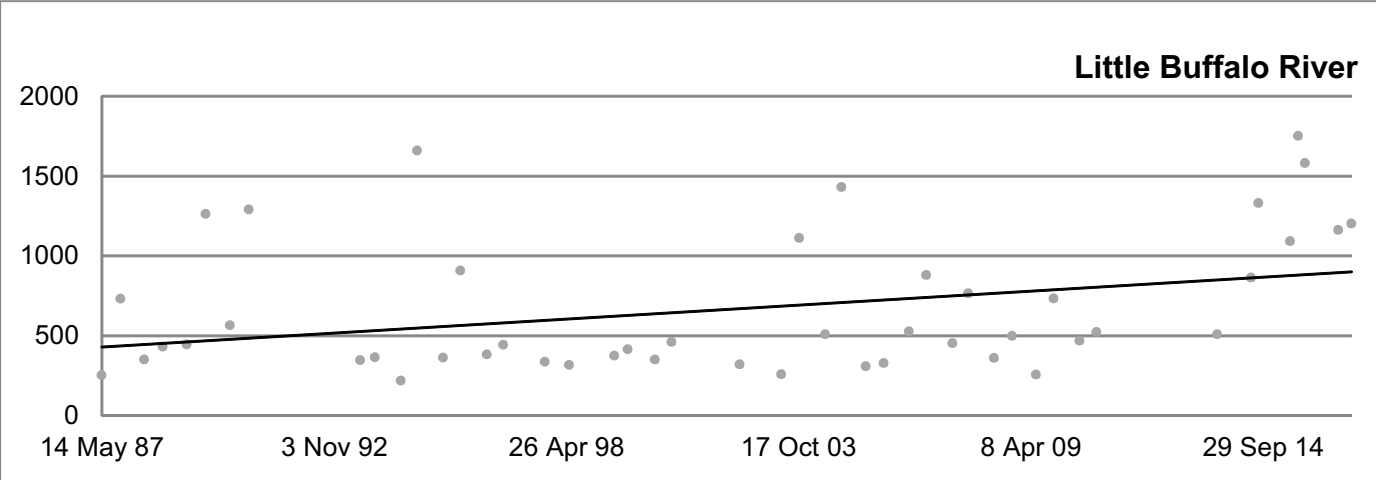
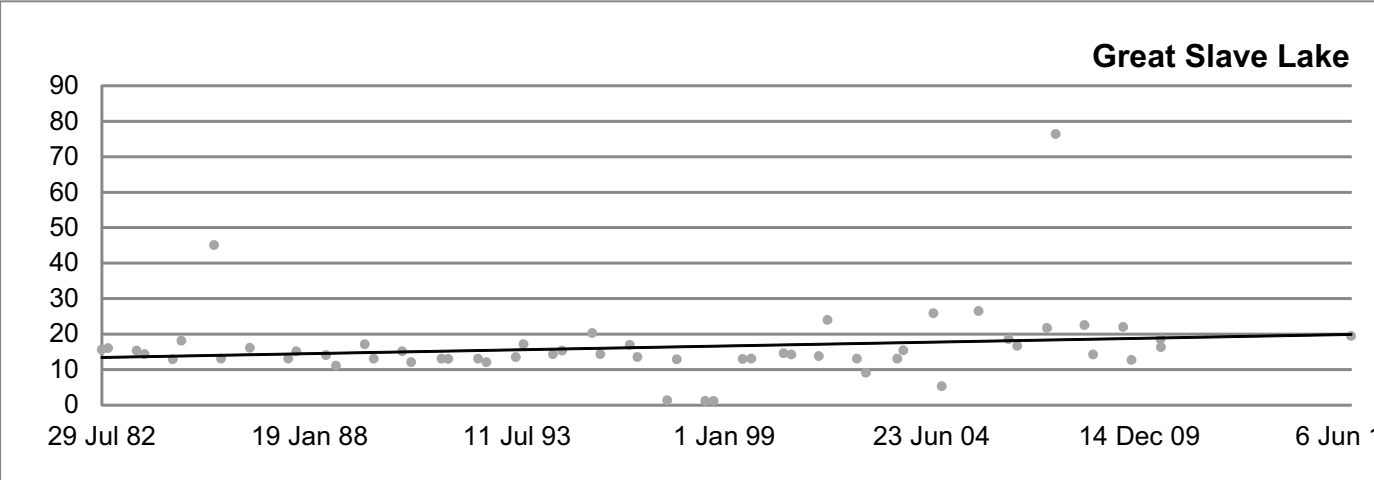
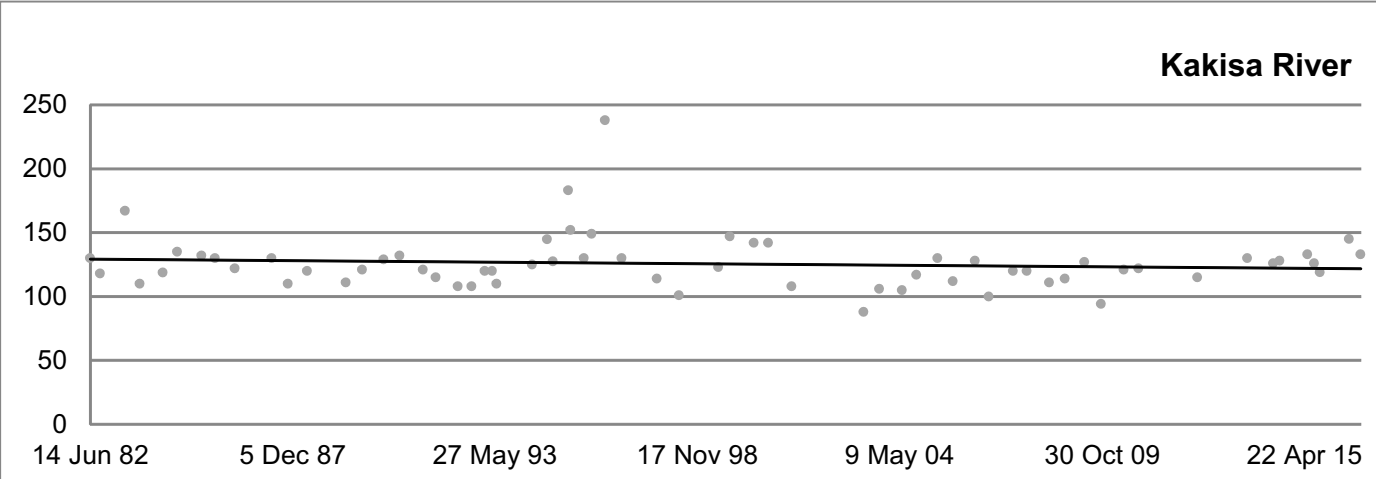
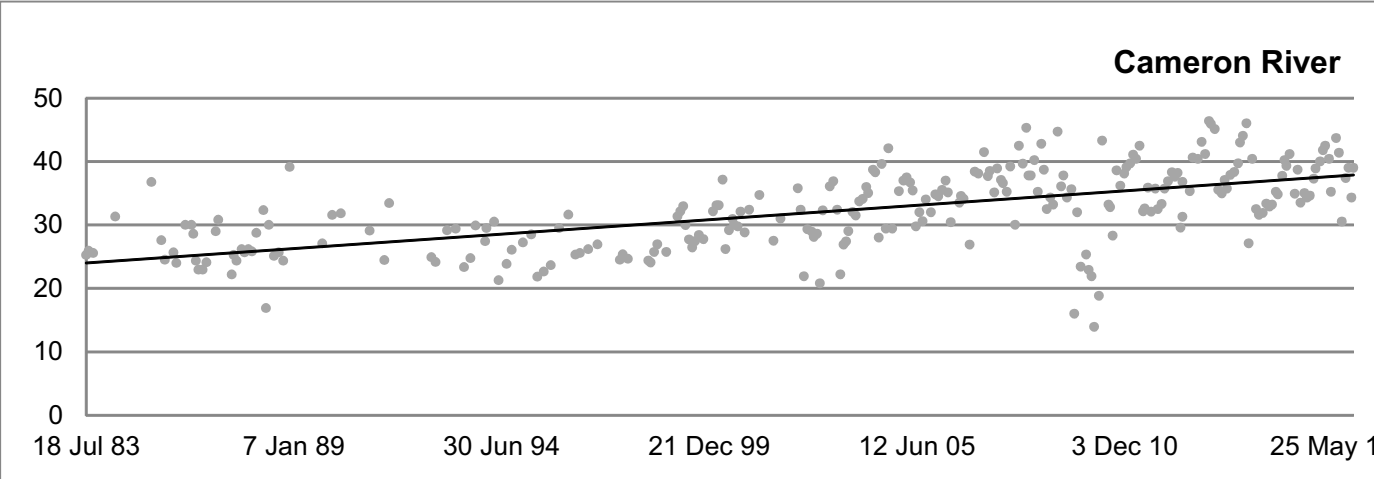
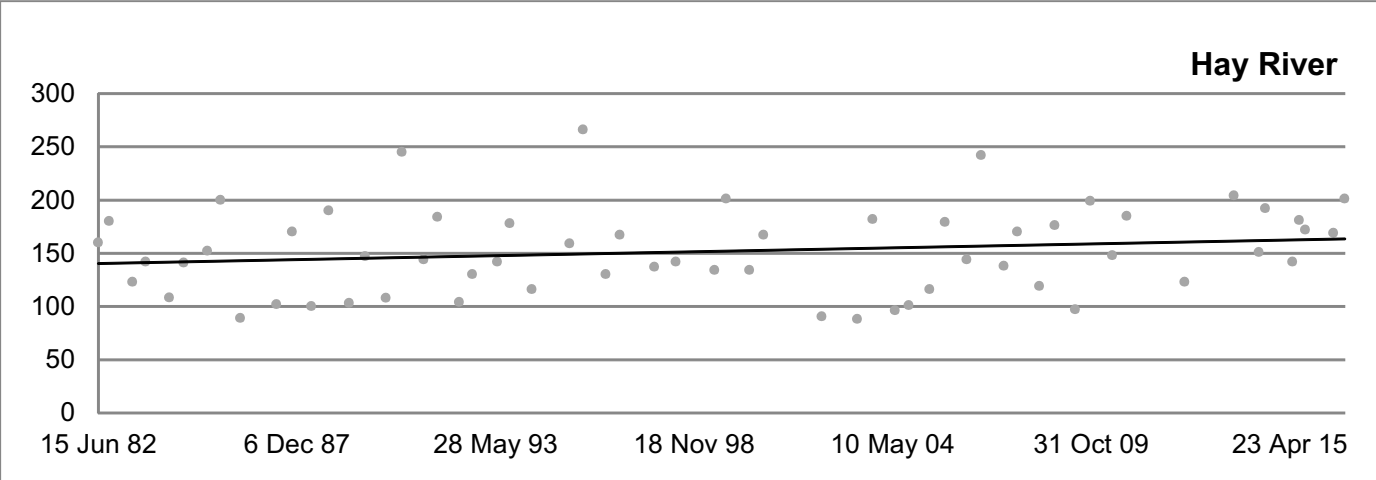
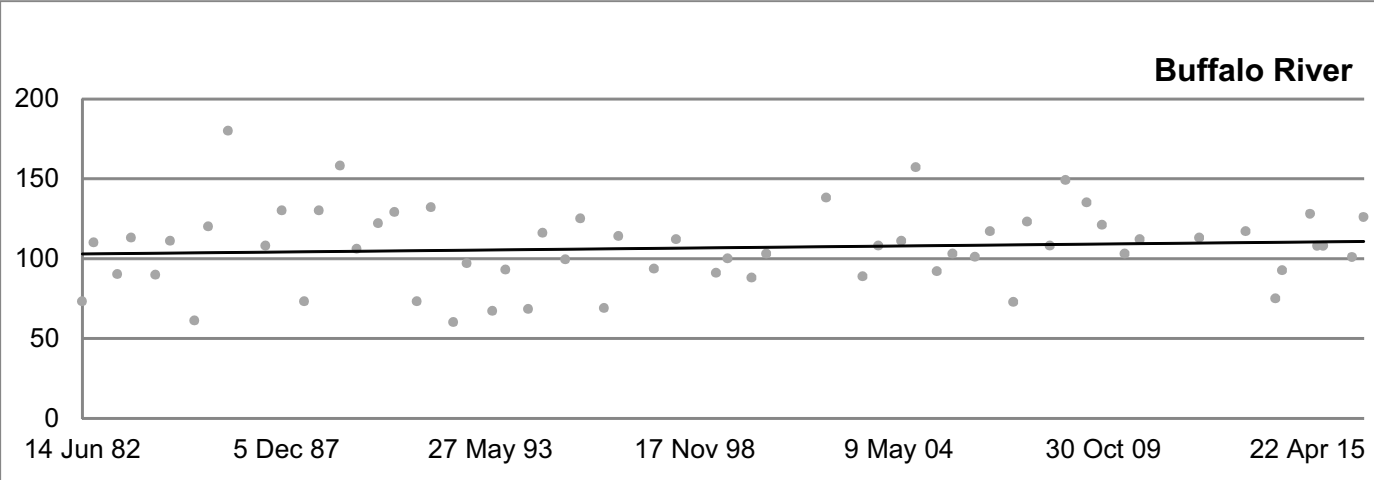
REV
0

OFFICE
Tt-VANC

DATE
March 30, 2017

Figure B.2c

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Hardness (as CaCO_3) (mg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

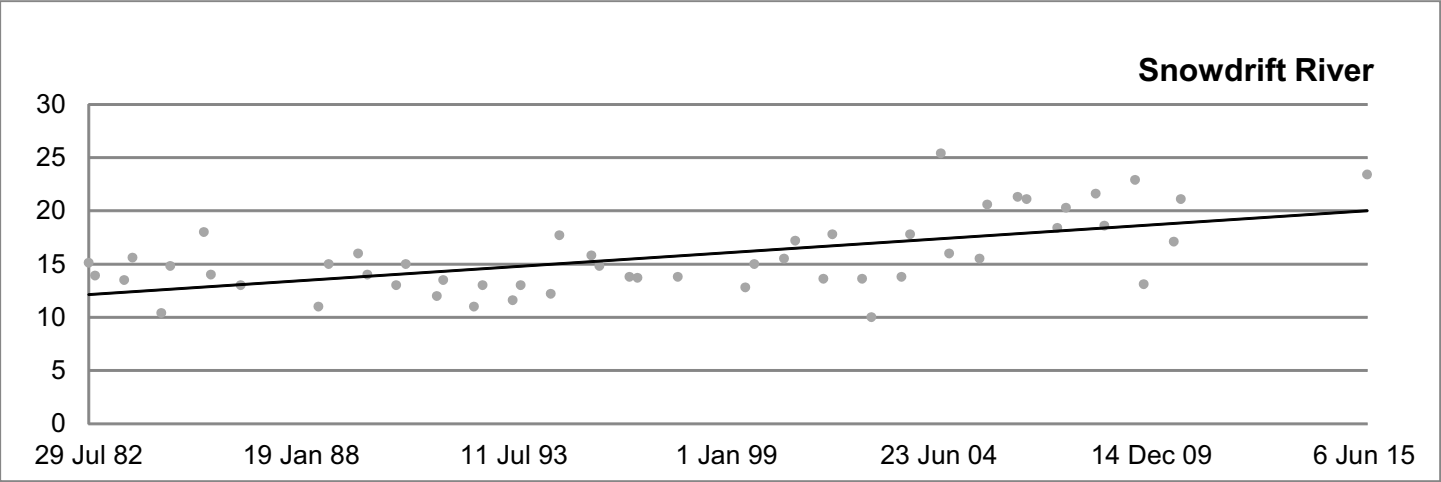
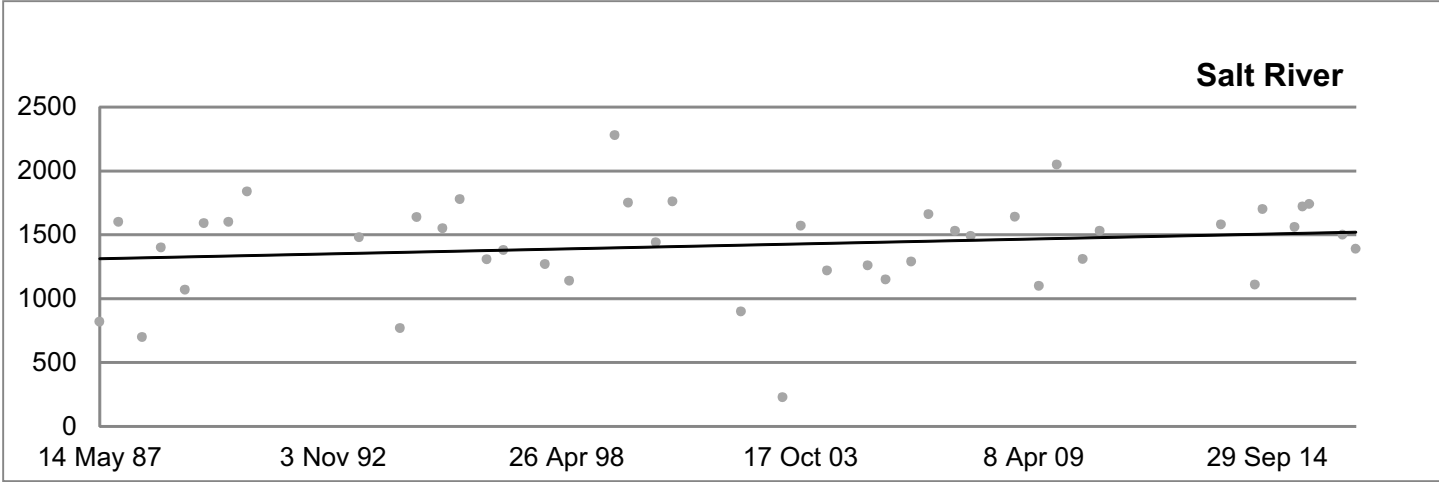
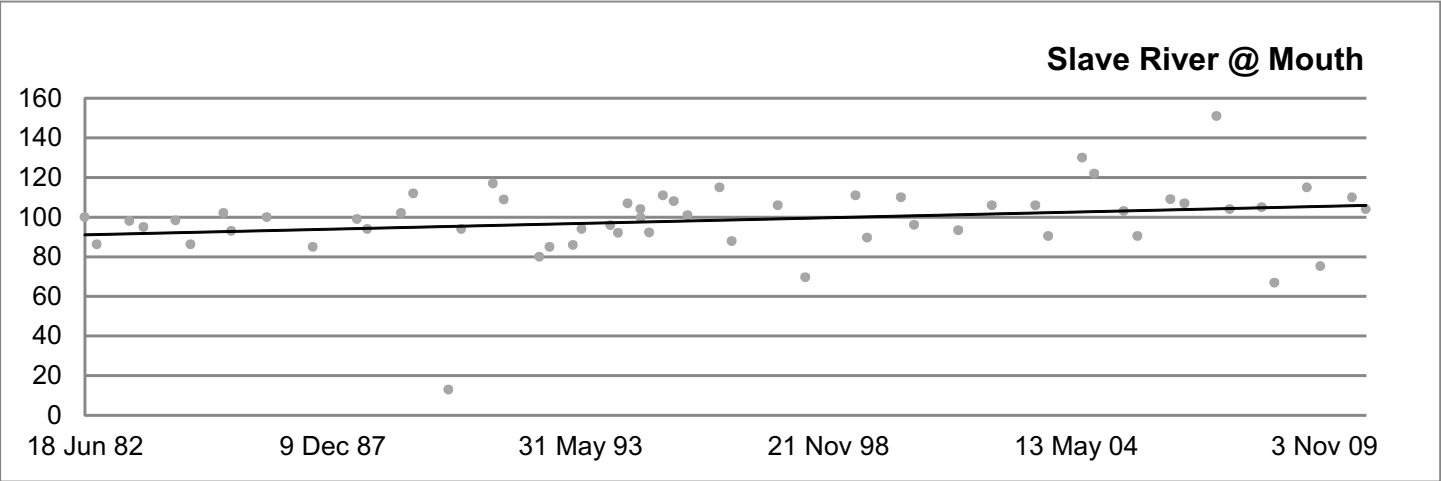
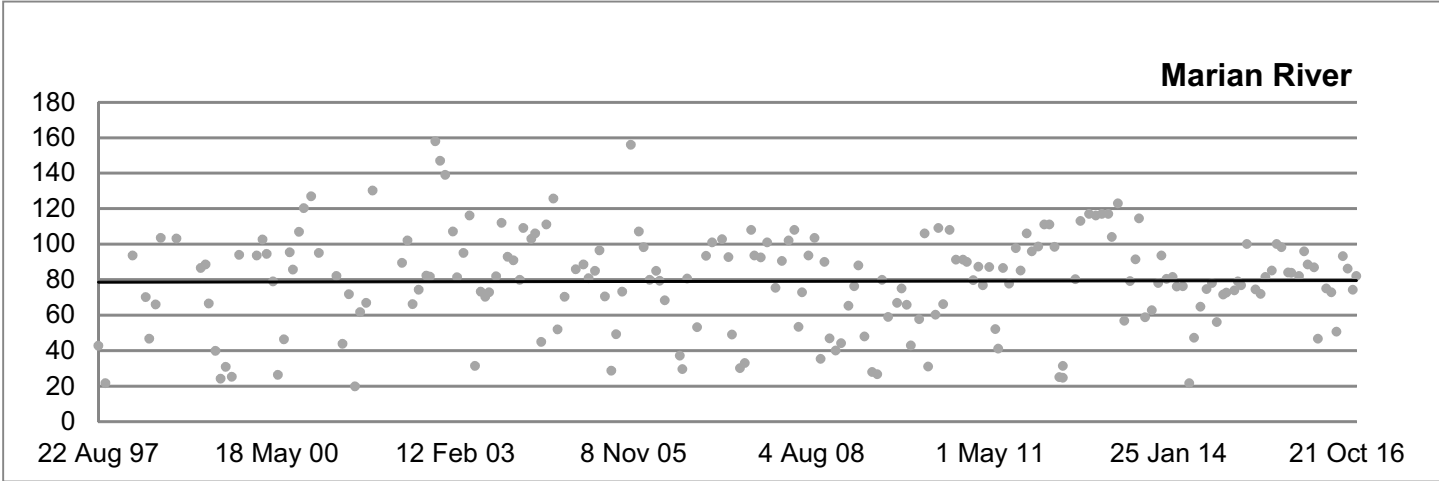
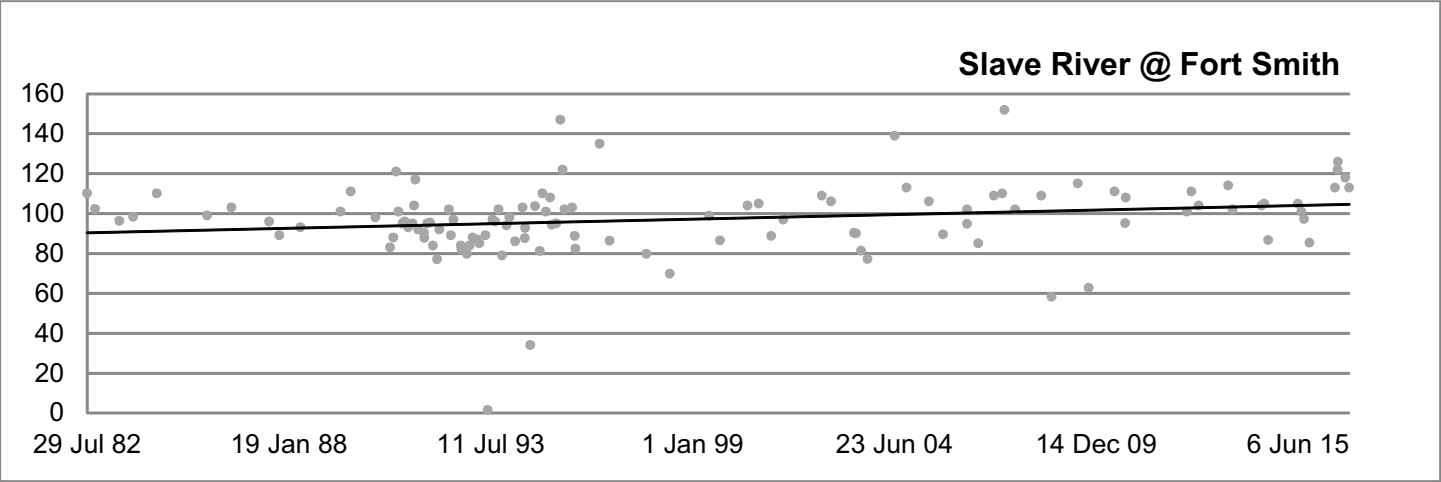
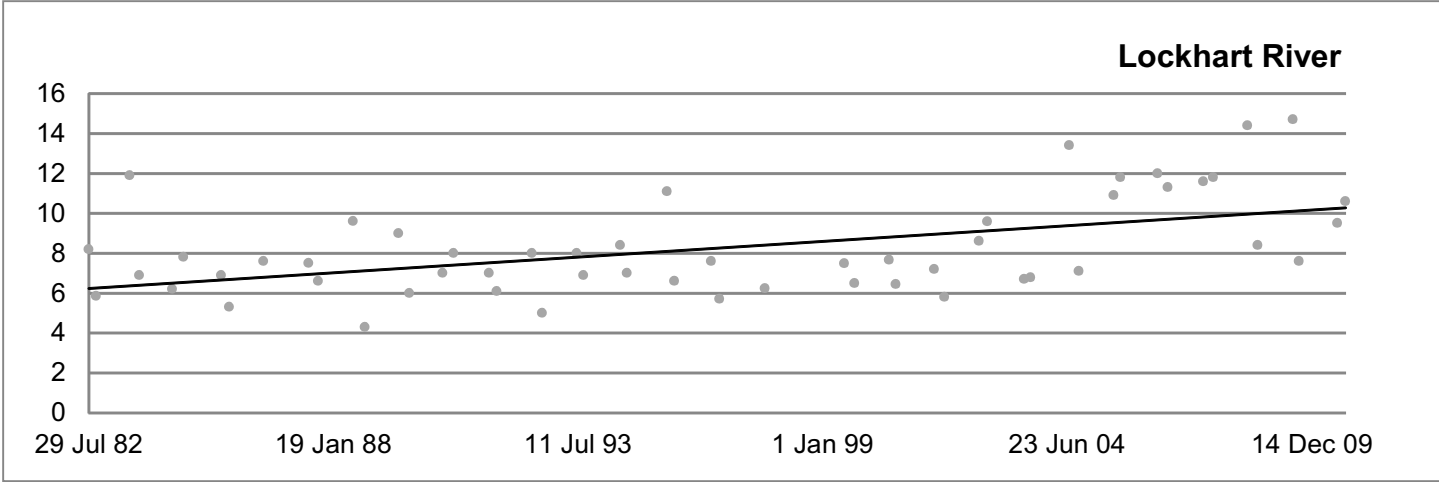
REV
0

OFFICE
Tt-VANC

DATE
March 30, 2017

Figure B.3a

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



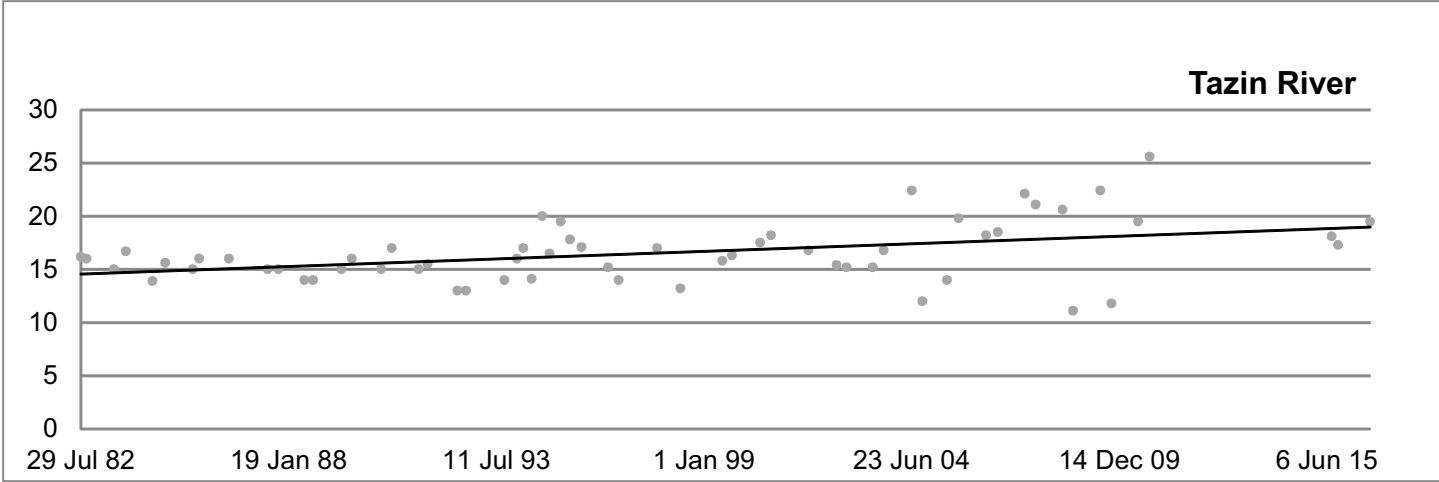
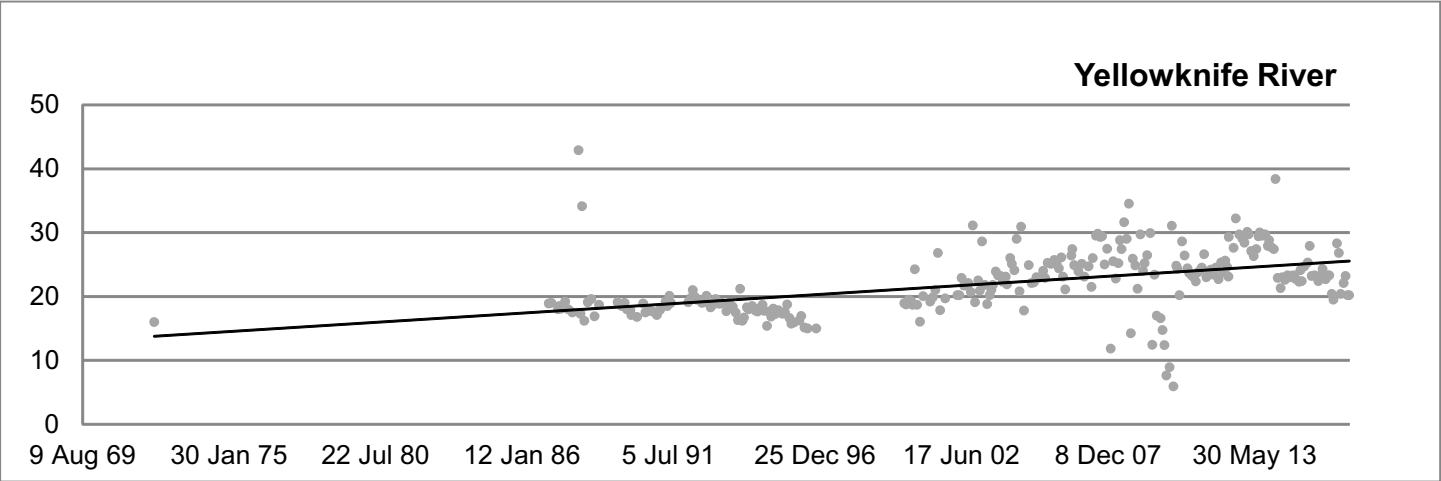
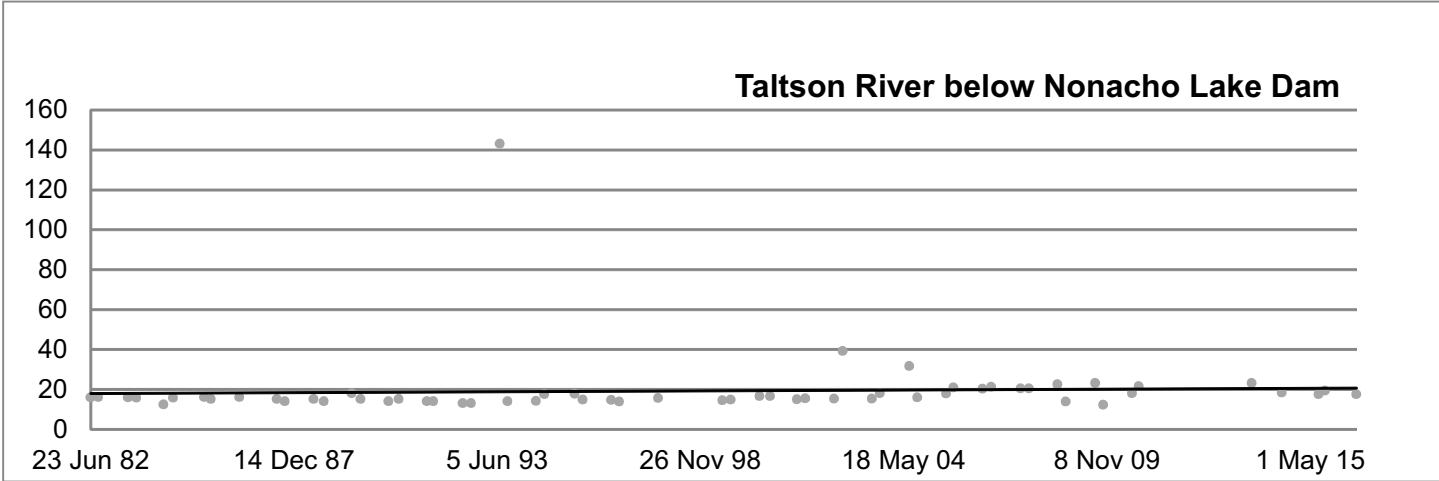
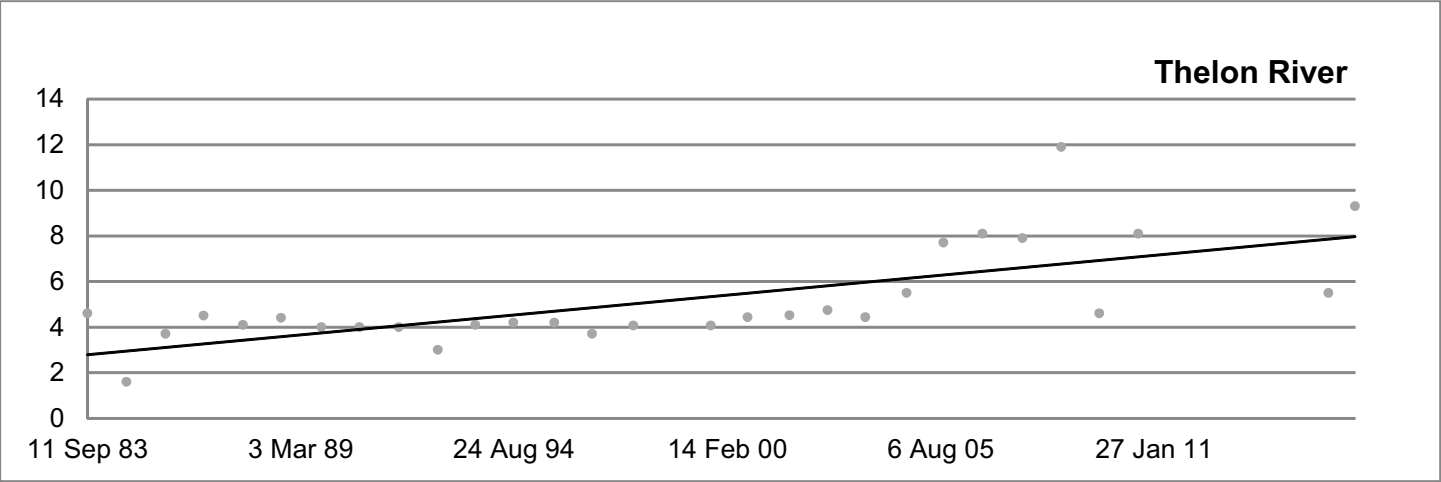
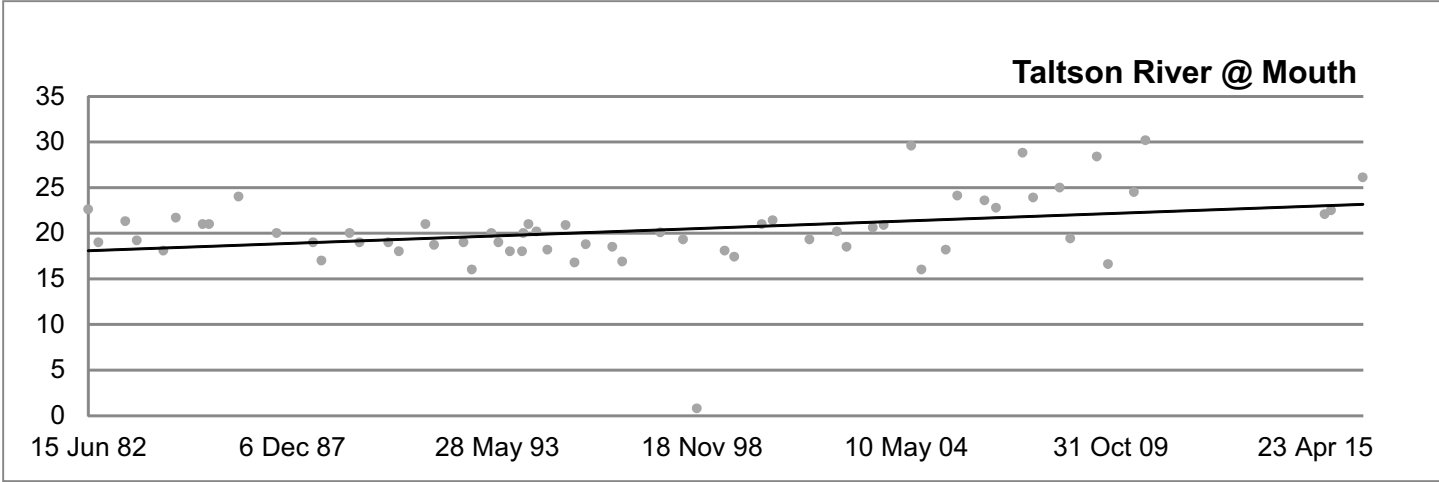
TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Hardness (as CaCO_3) (mg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0	Figure B.3b
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



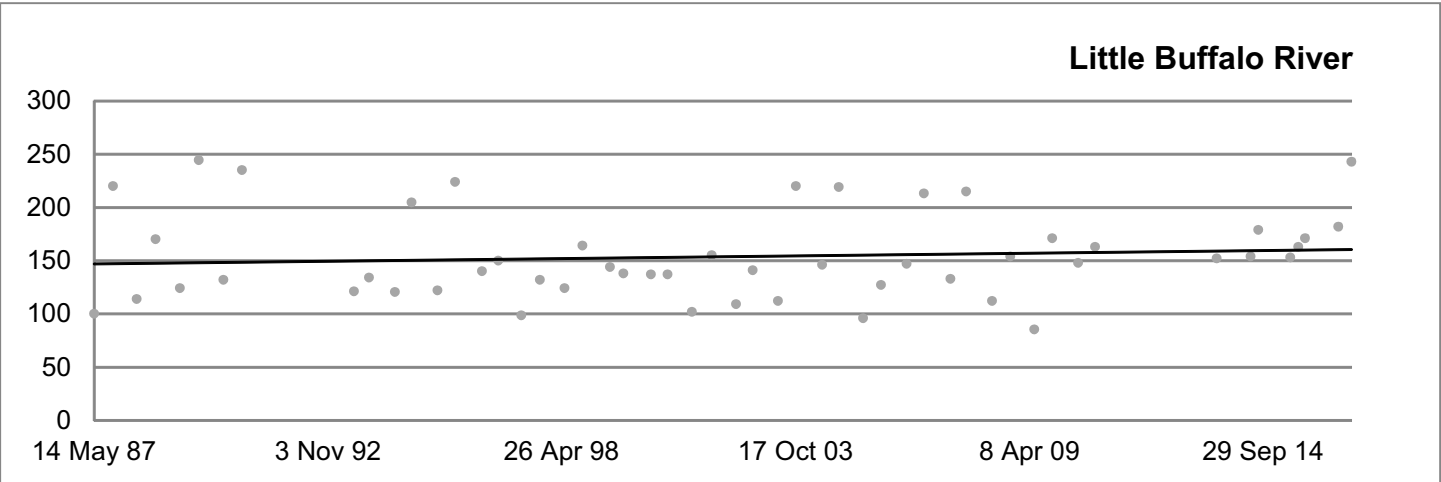
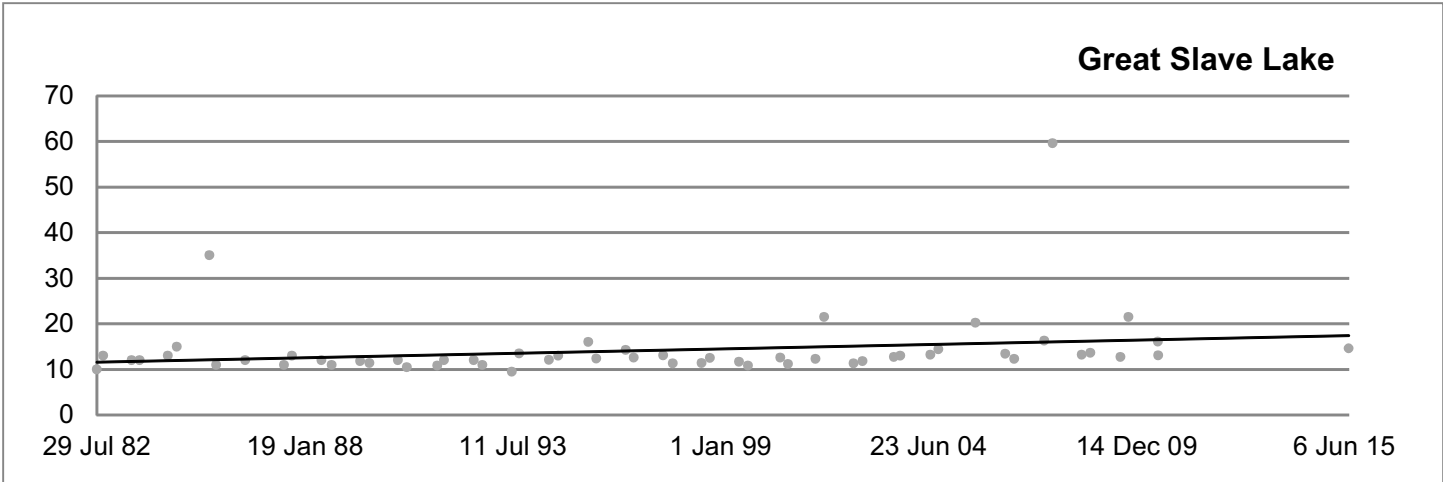
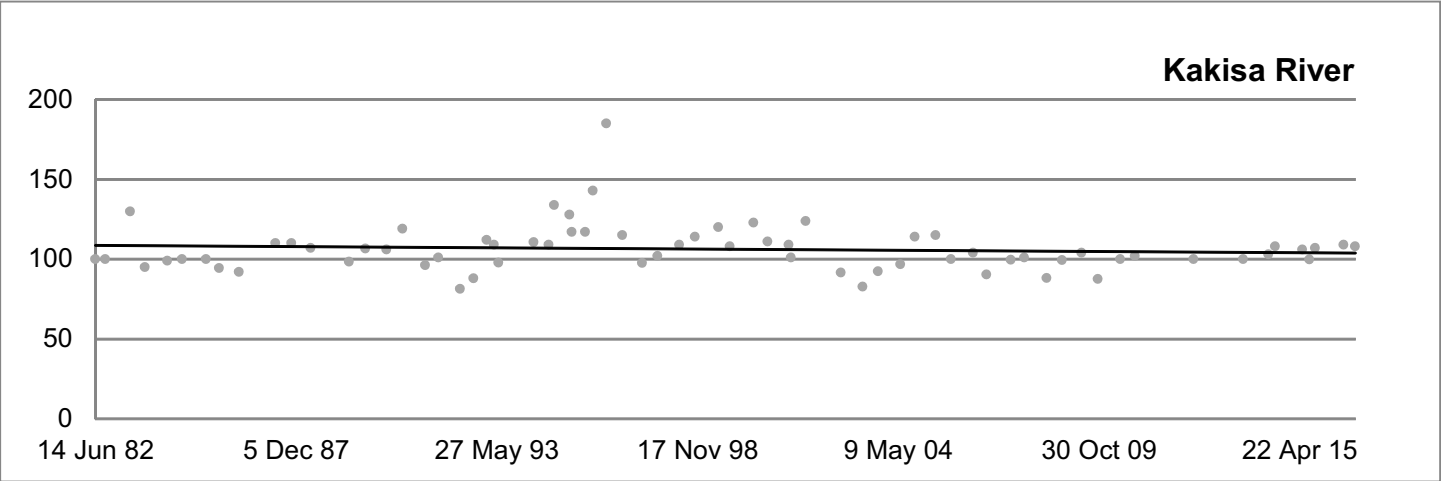
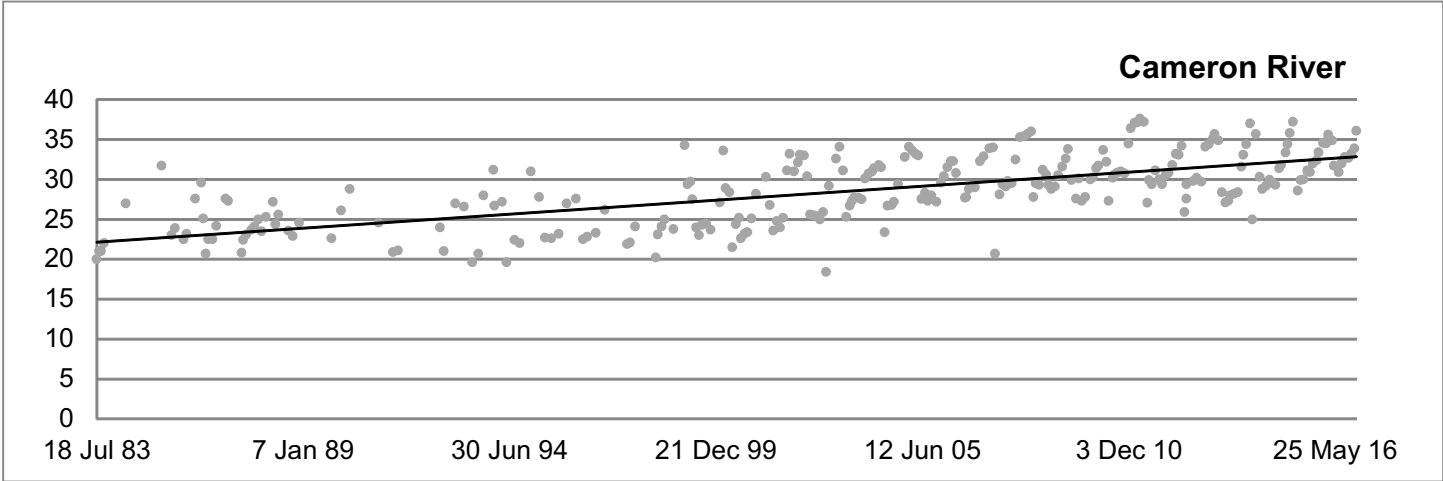
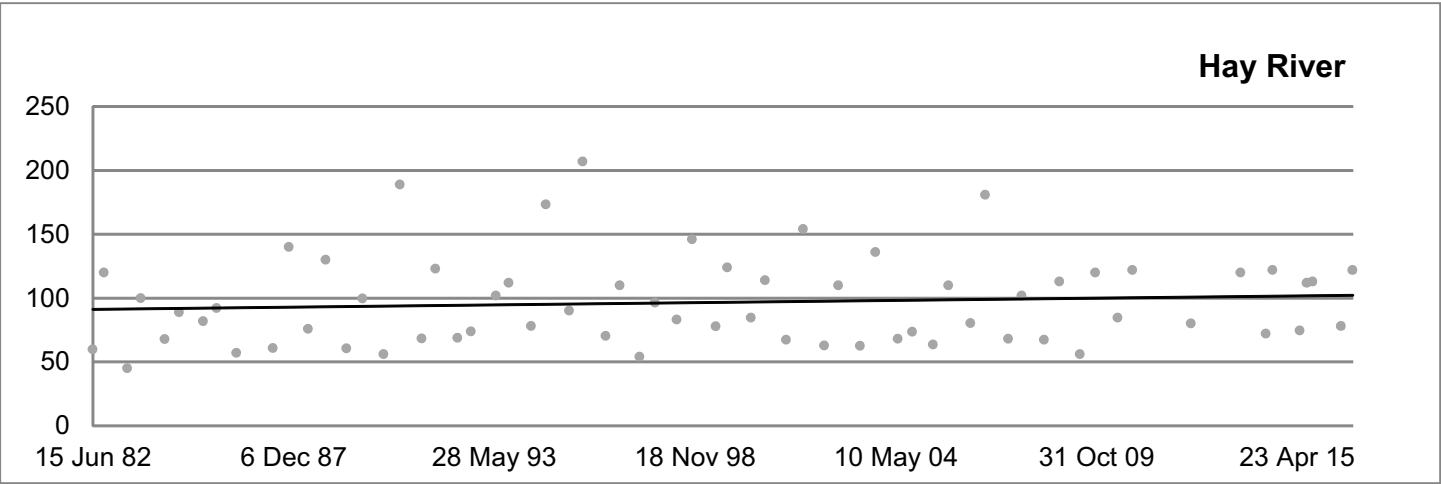
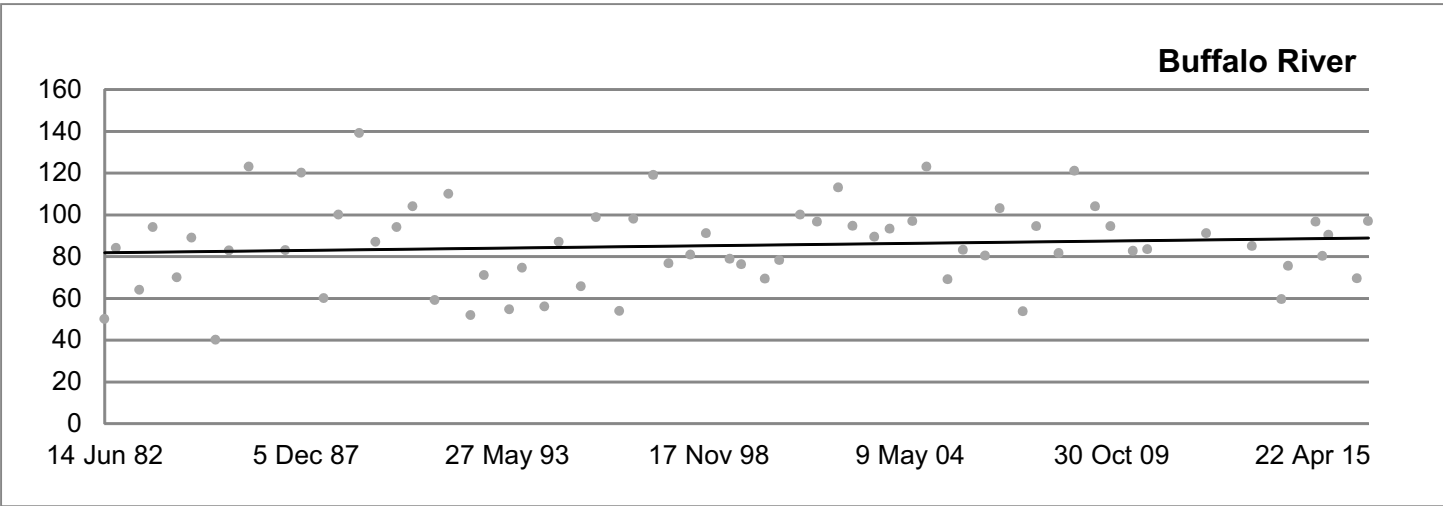
TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Hardness (as CaCO₃) (mg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0	Figure B.3c
OFFICE Tt-VANC	DATE March 30, 2017				

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

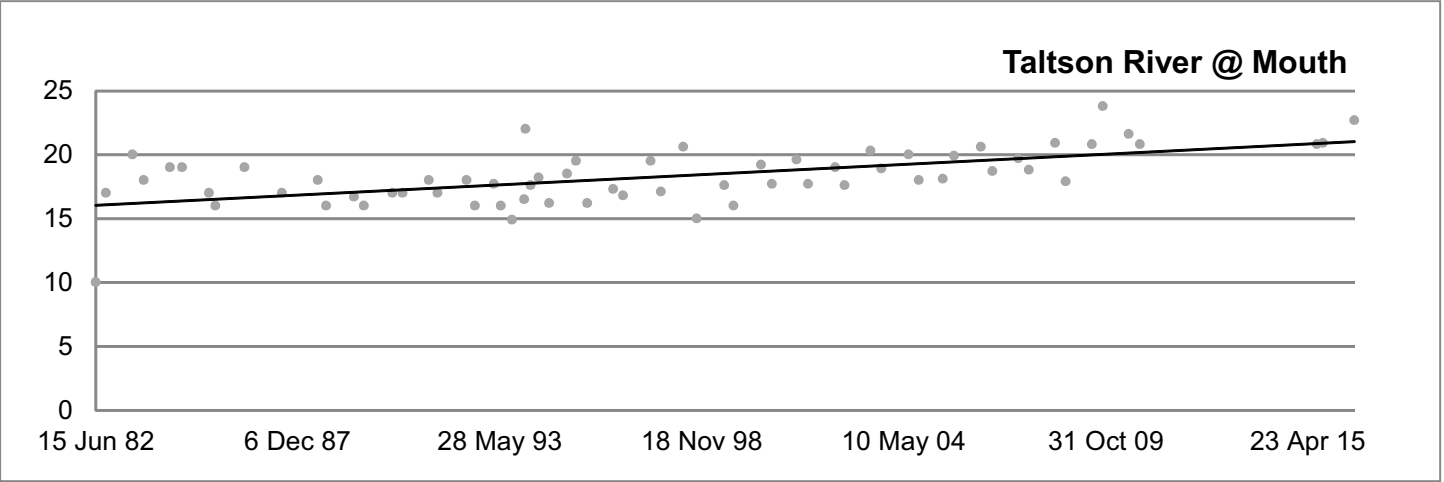
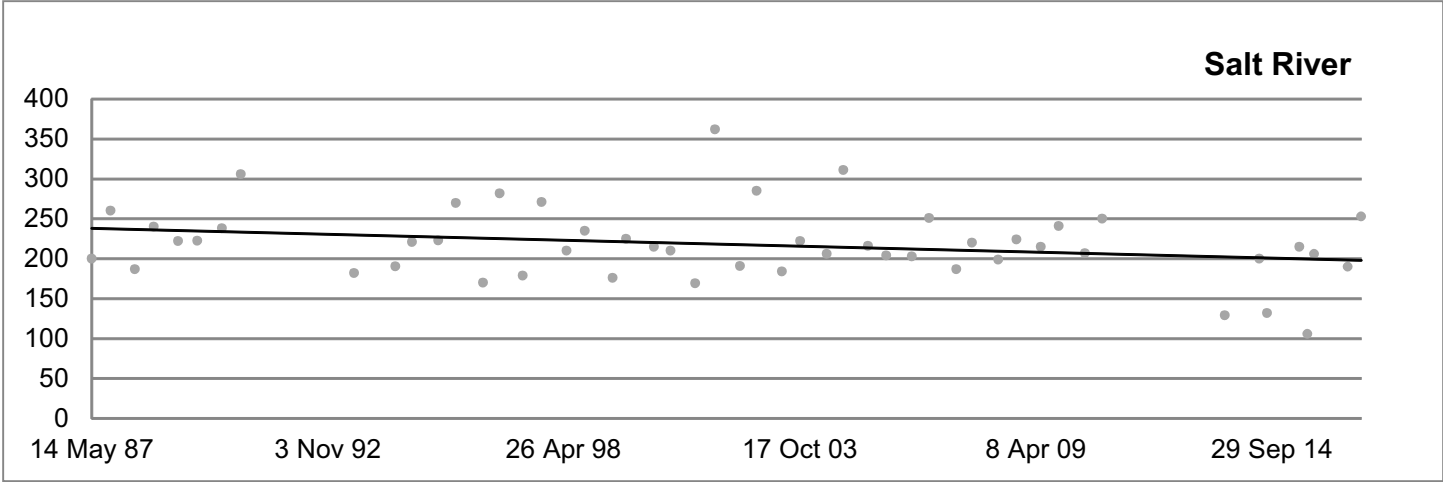
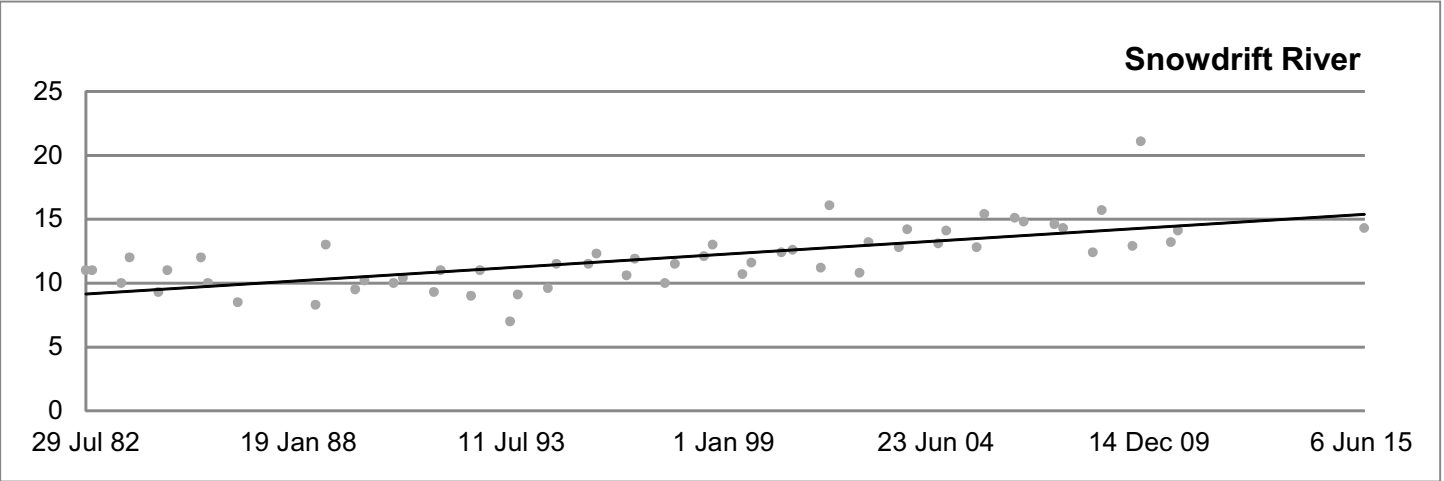
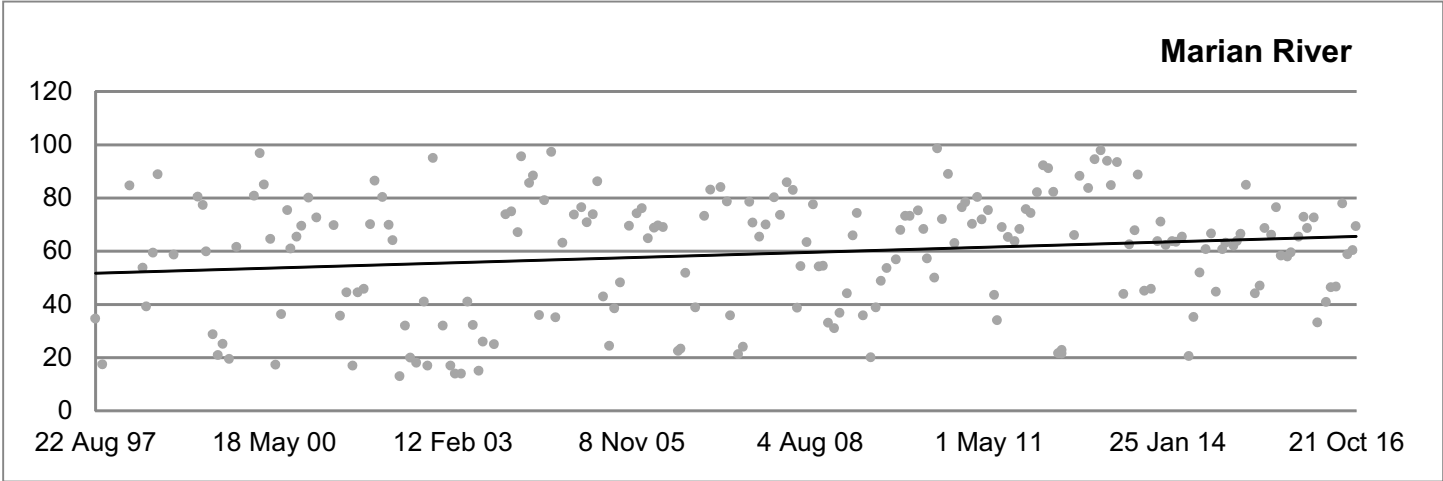
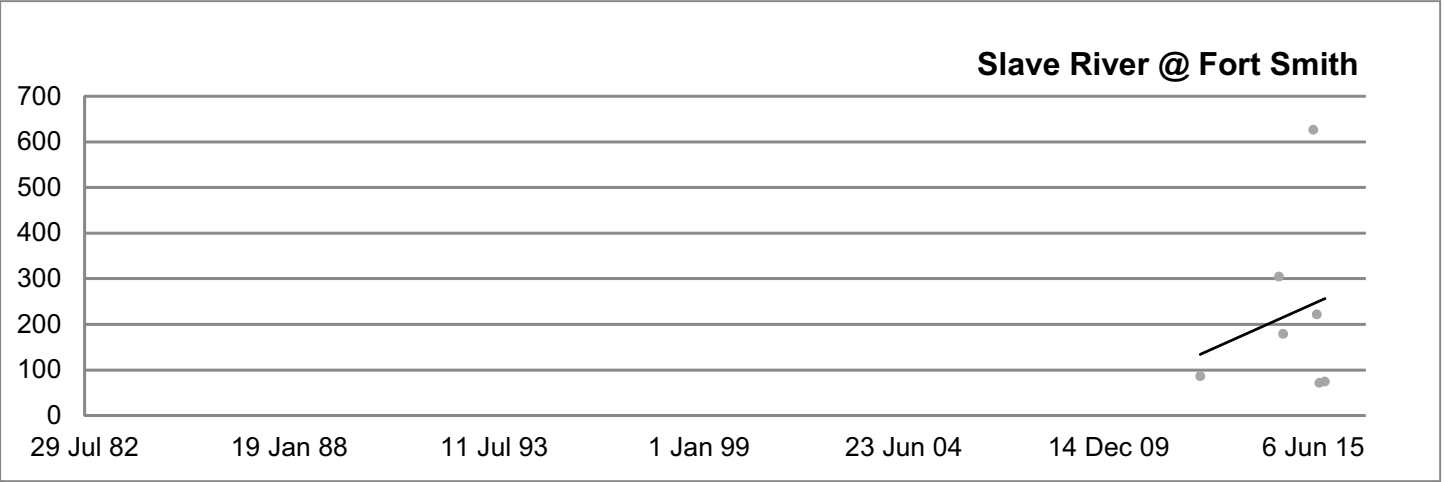
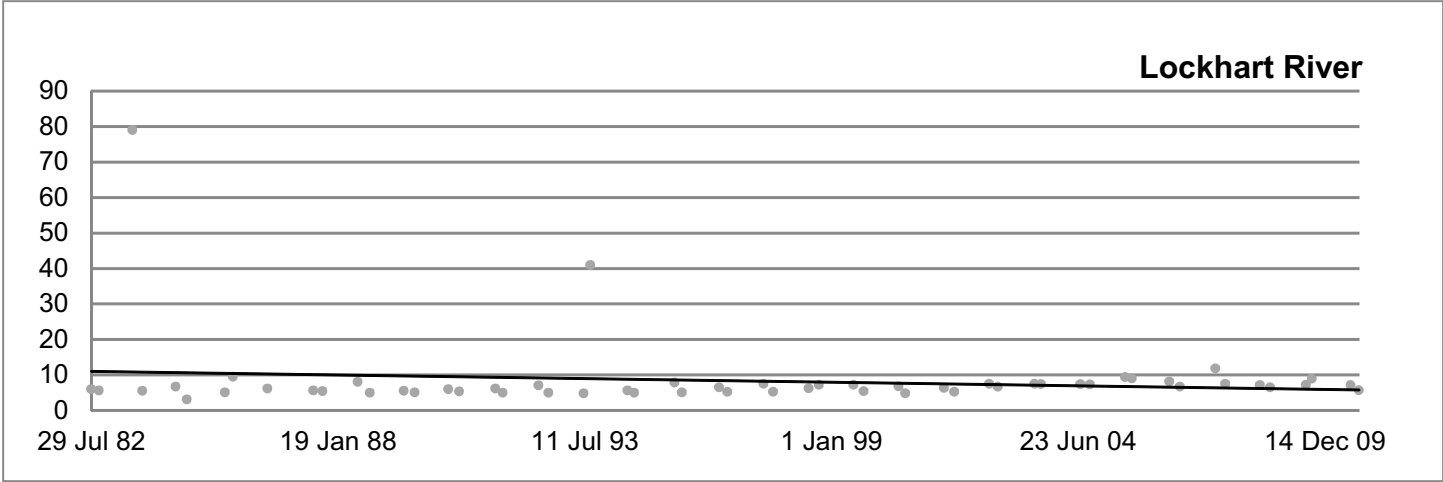
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Alkalinity (mg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.4a

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

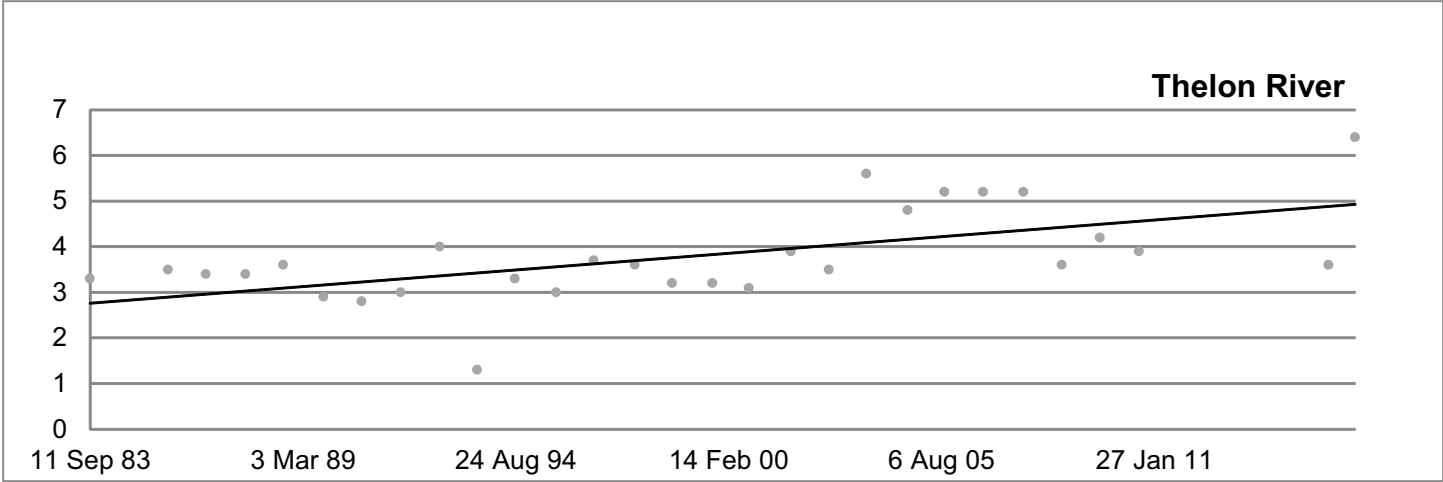
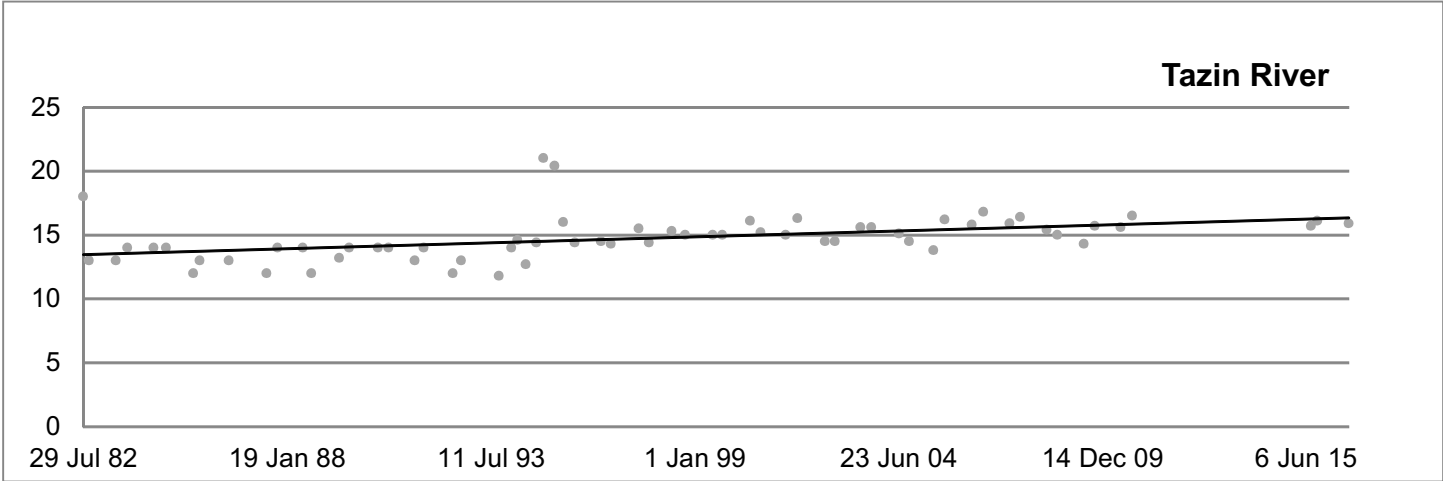
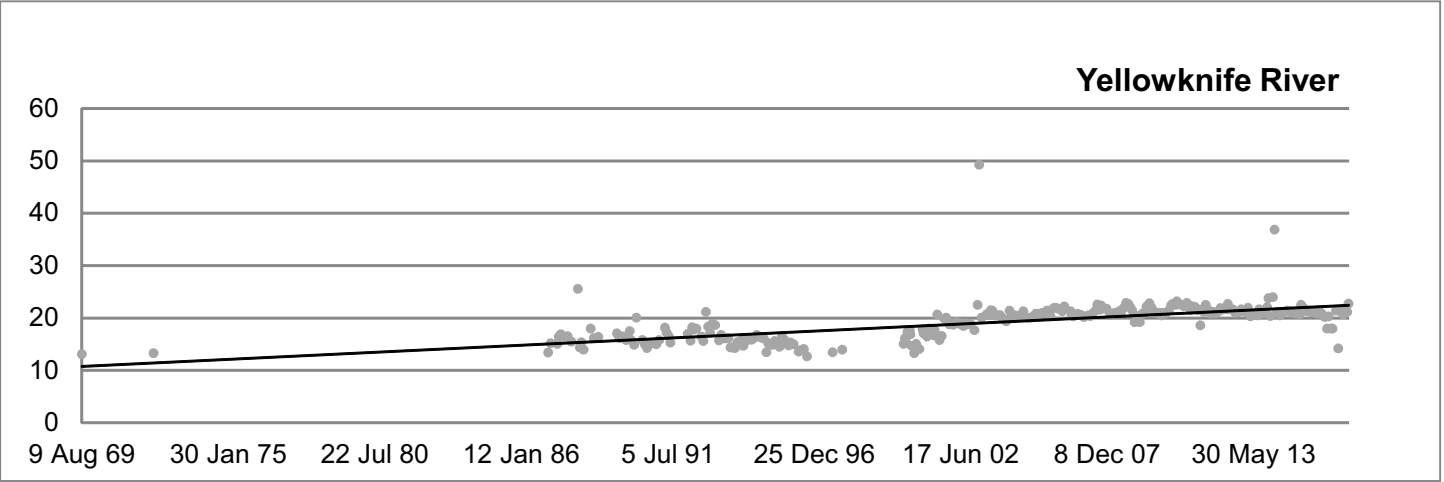
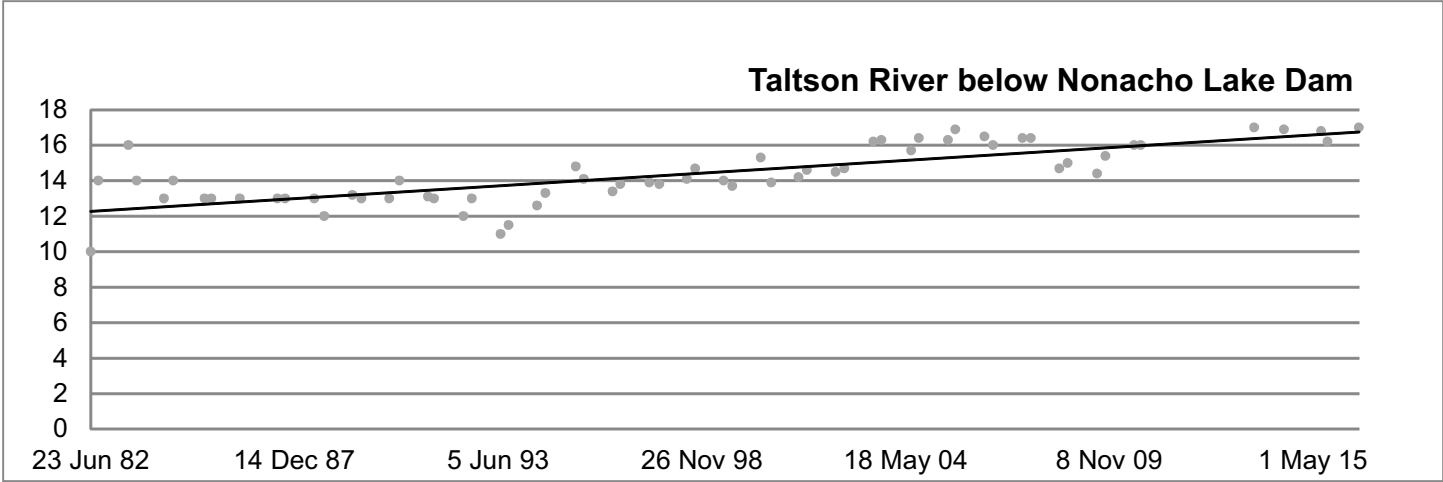
STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Alkalinity (mg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.4b

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



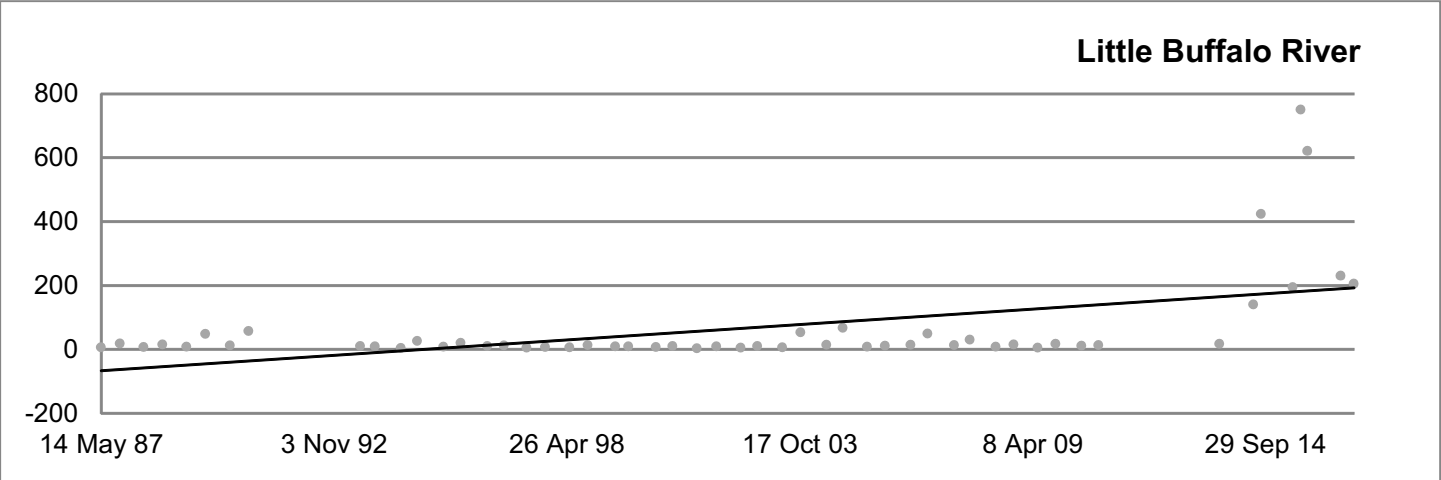
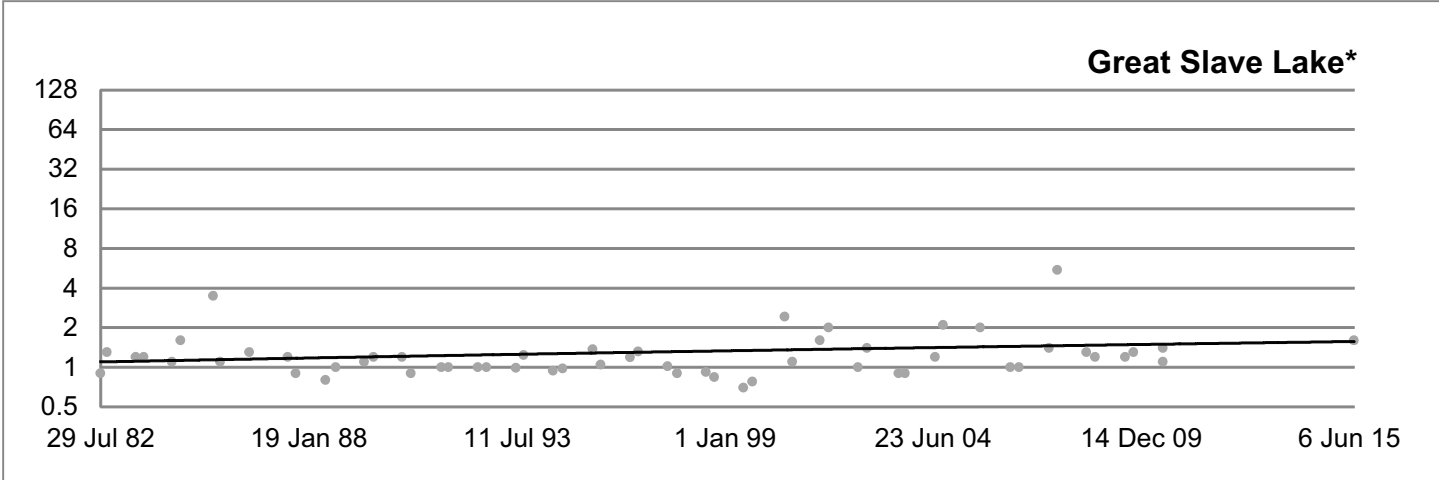
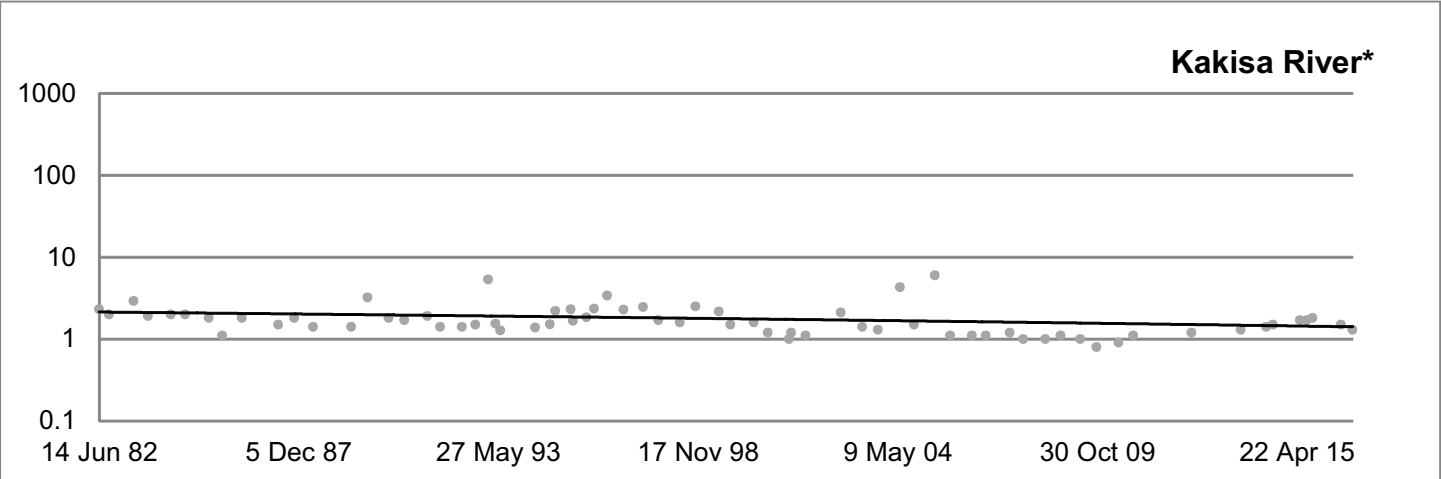
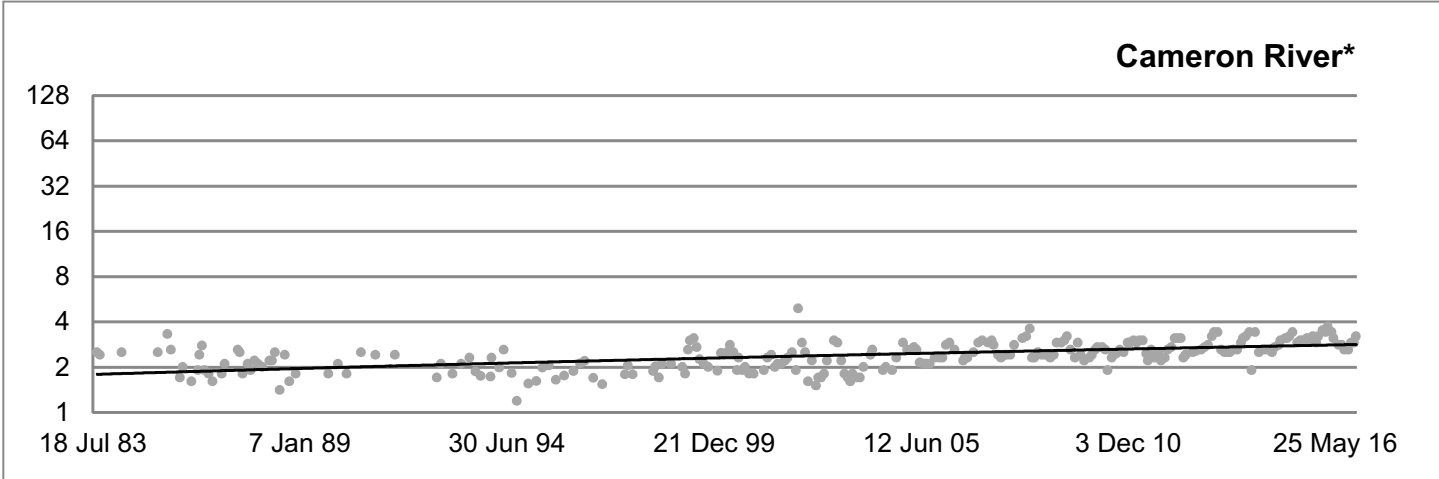
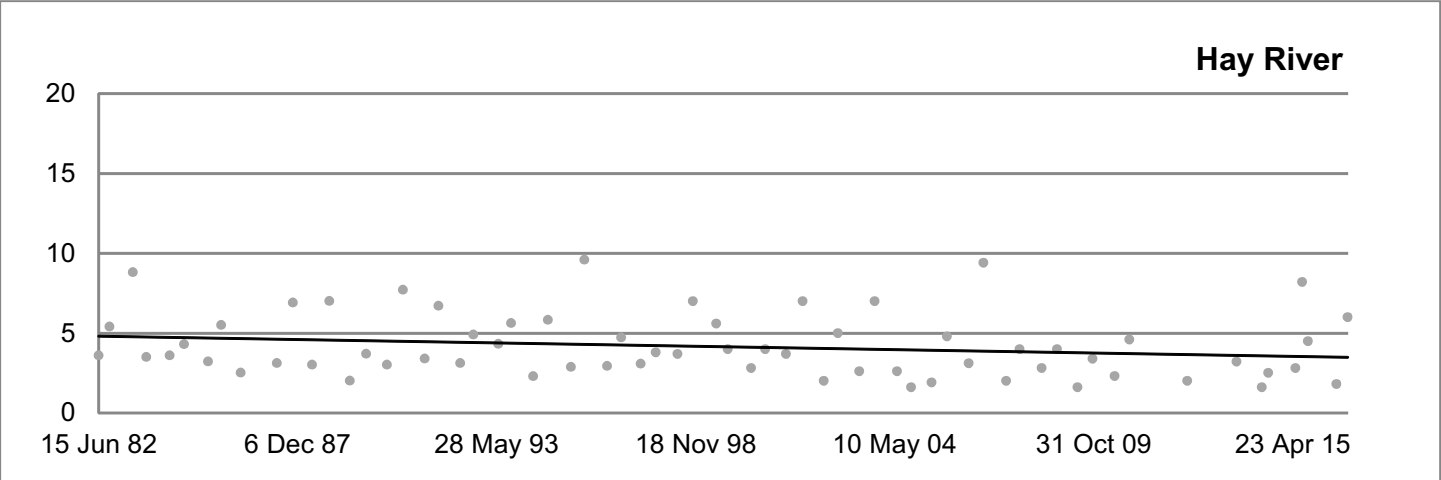
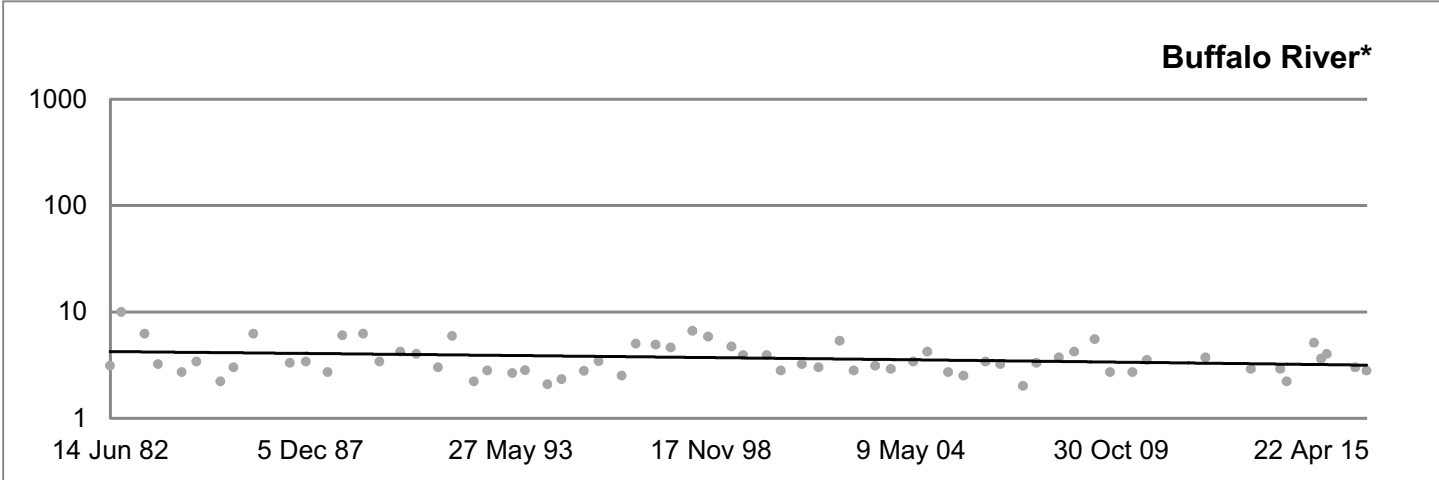
TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Alkalinity (mg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0	Figure B.4c
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



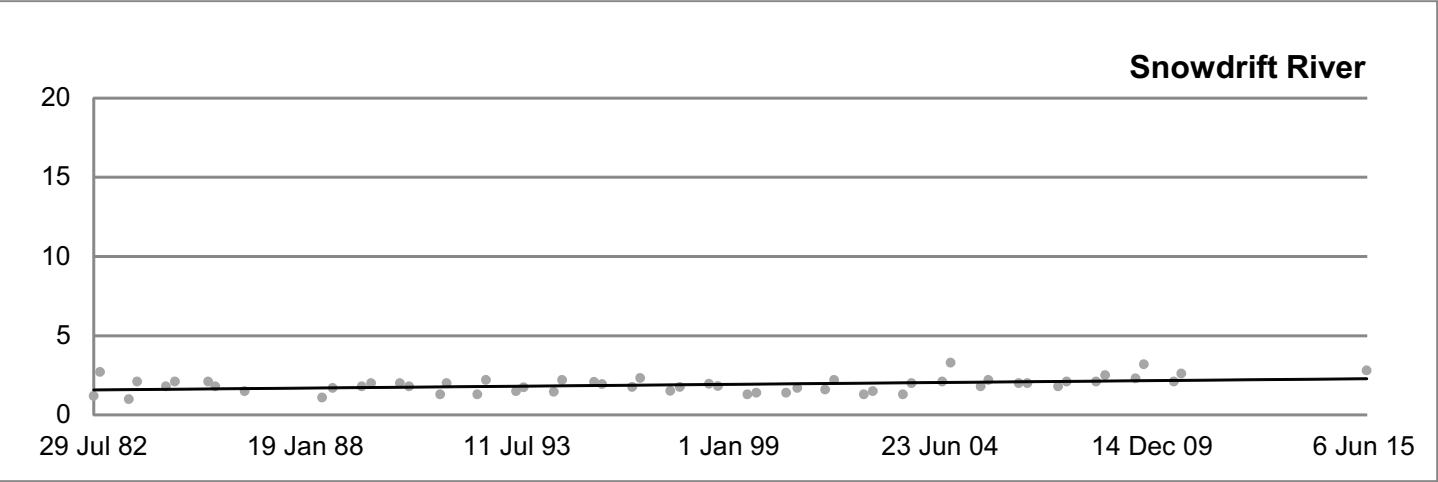
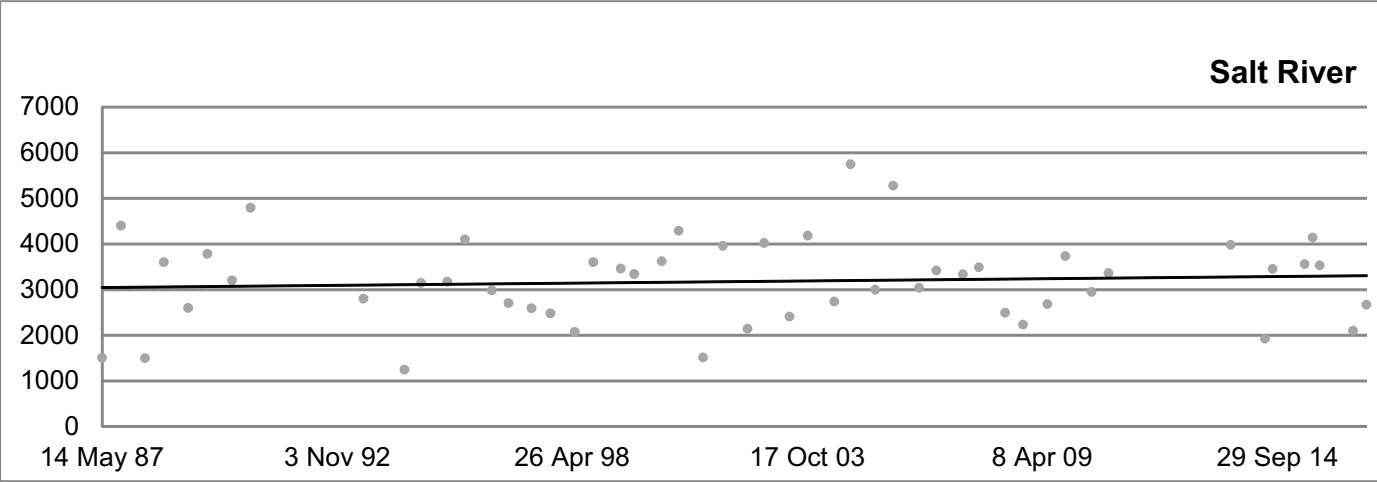
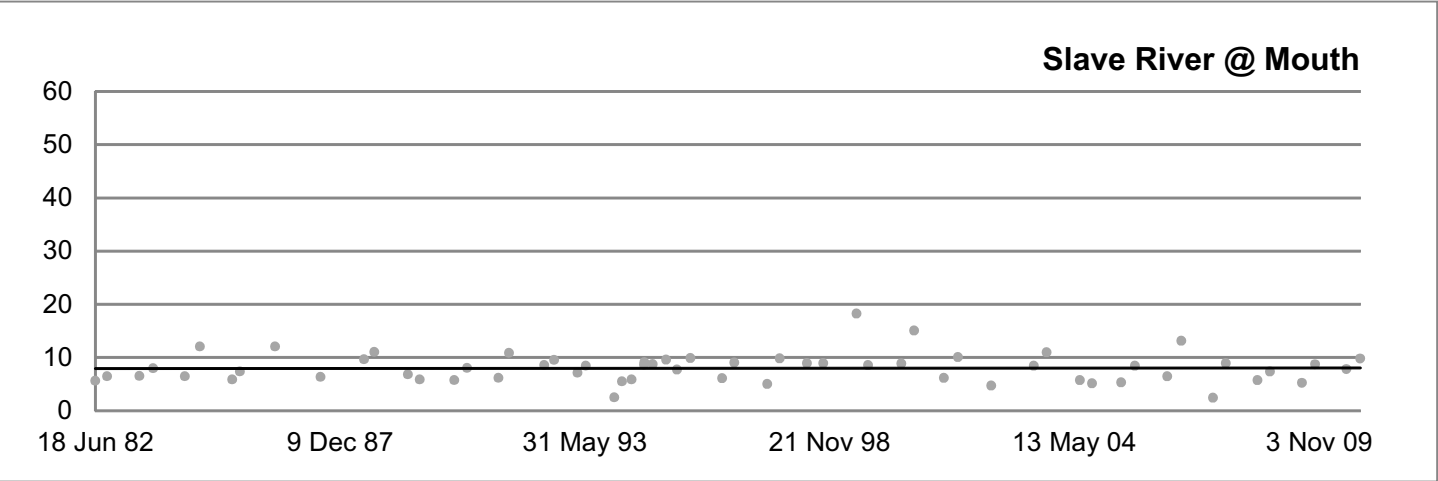
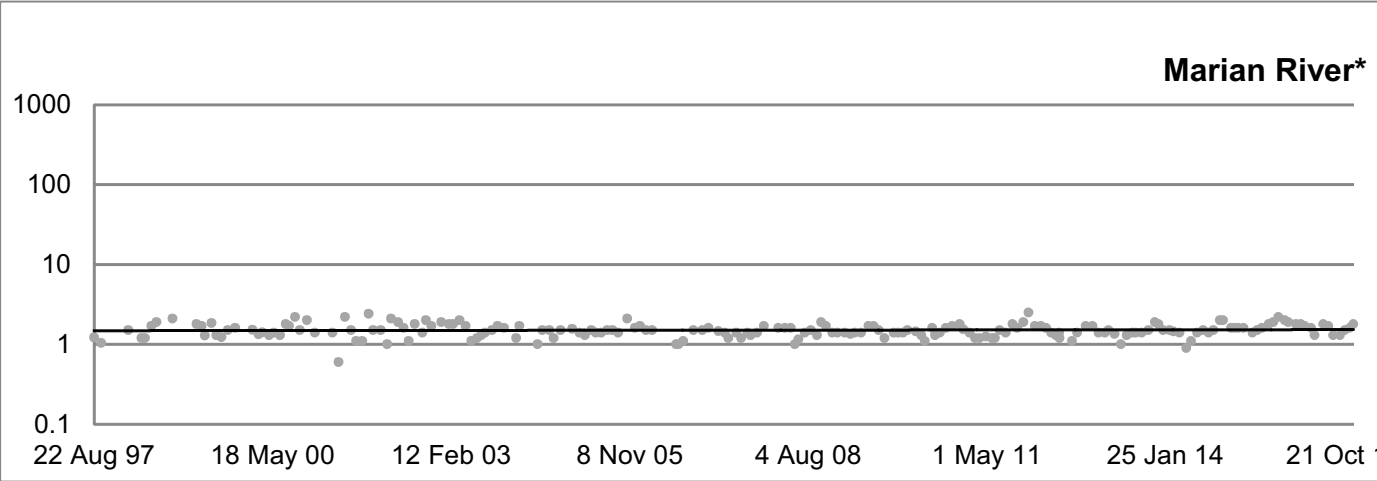
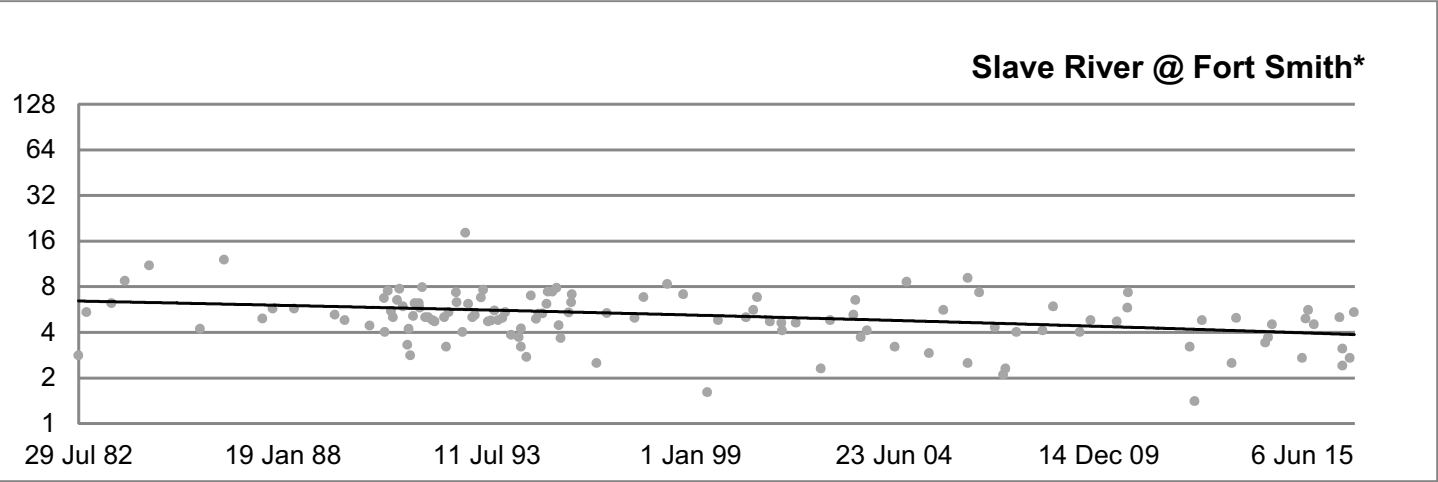
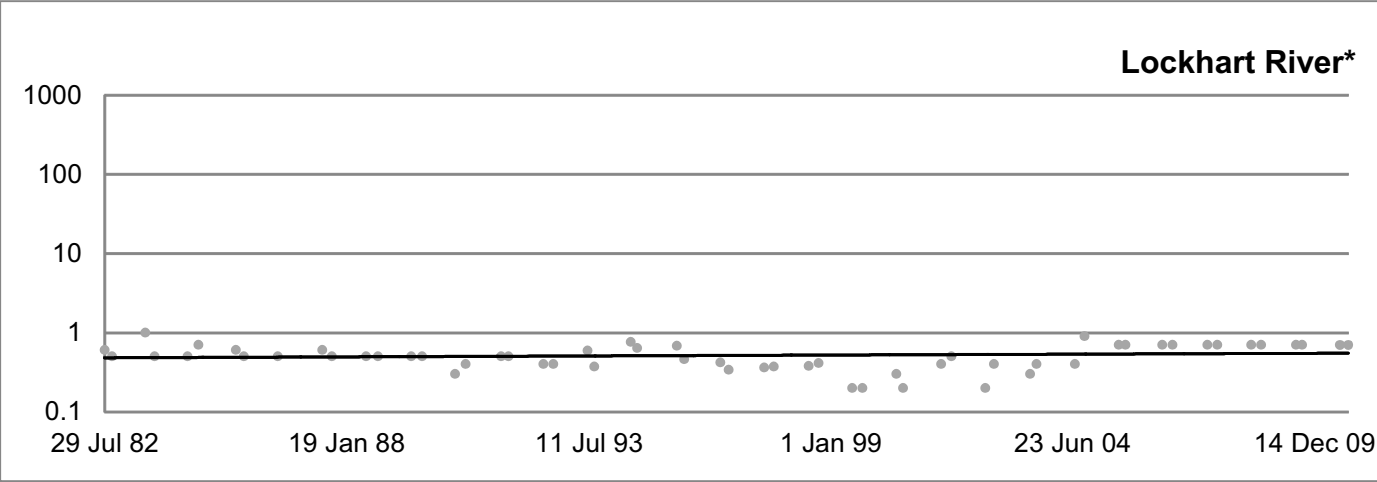
TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Chloride (mg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0	Figure B.5a
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT

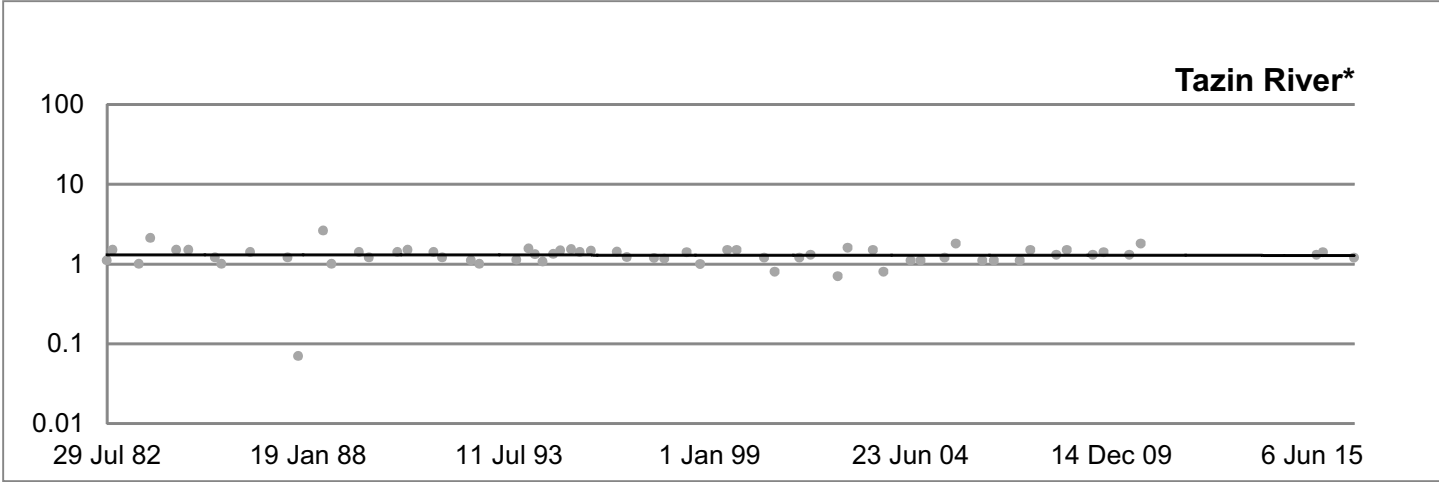
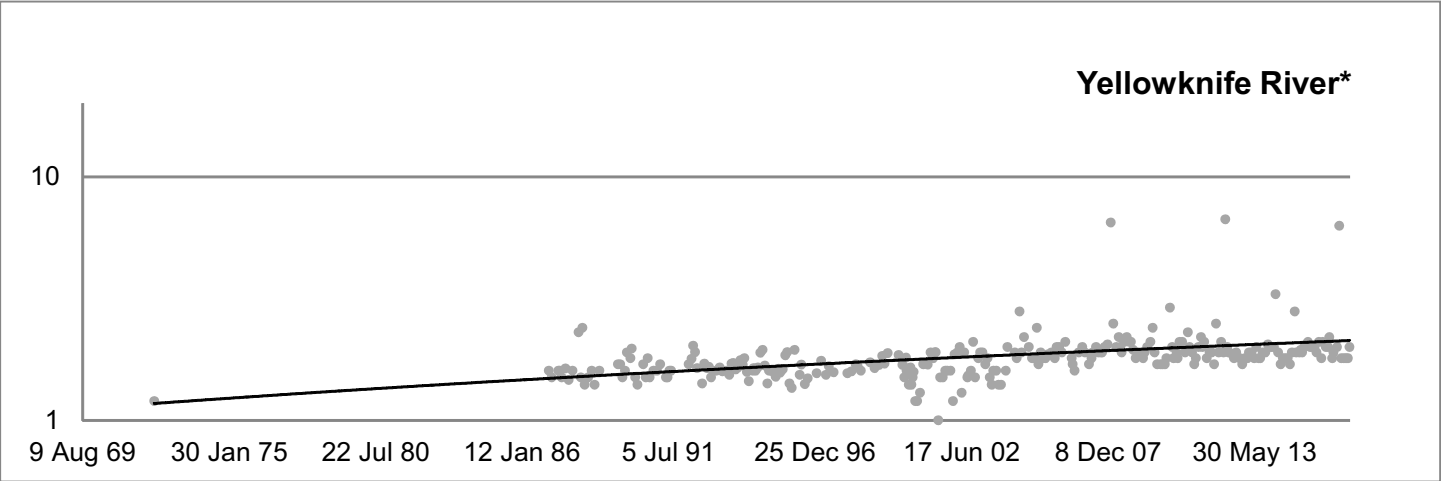
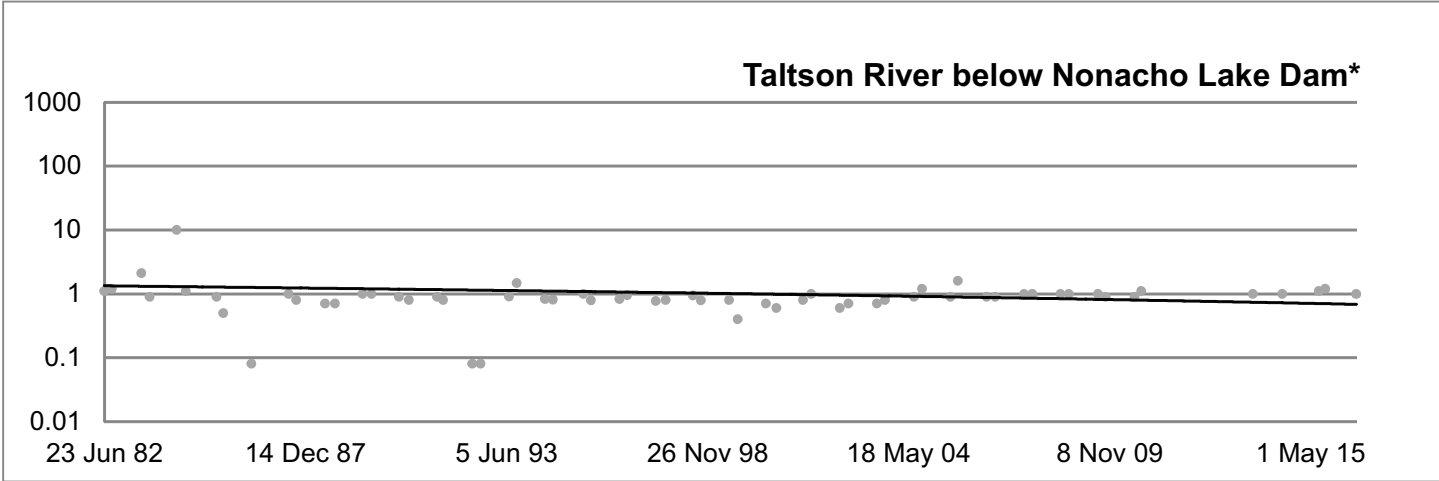
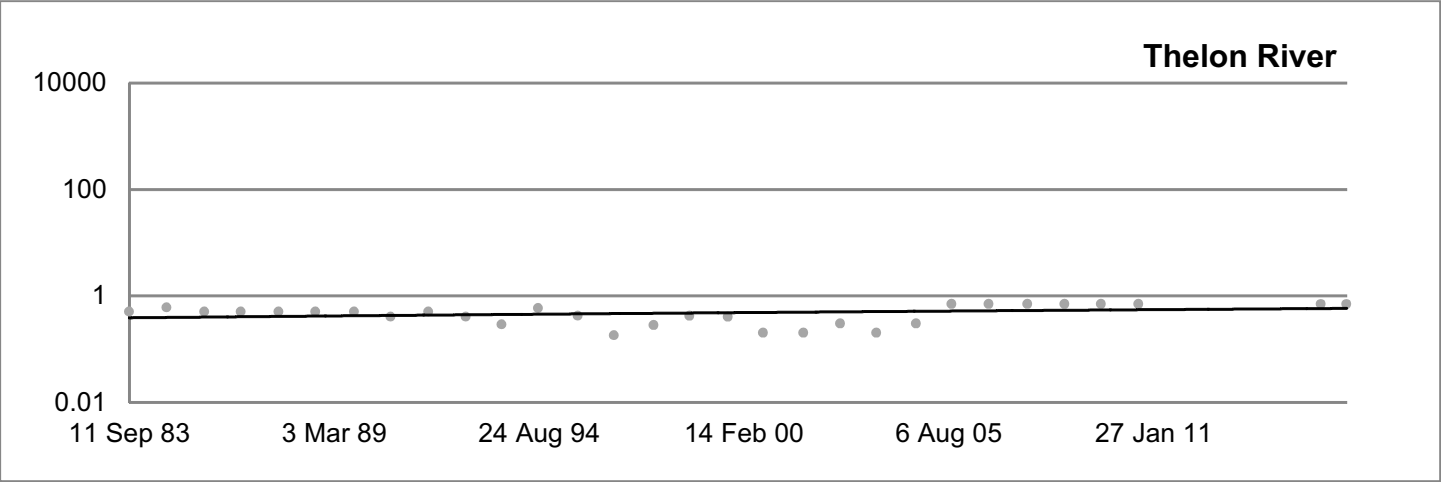
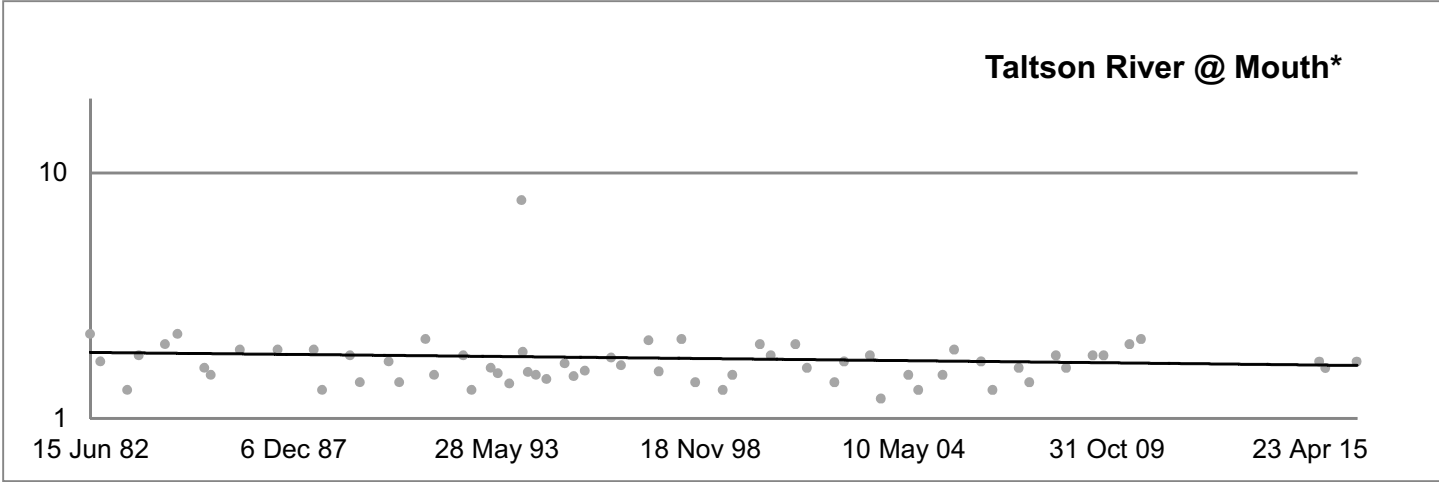


STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

**Chloride (mg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0	Figure B.5b
OFFICE Tt-VANC	DATE March 30, 2017				

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Chloride (mg/L)
Scatter Plot of all Water Quality Site Data**

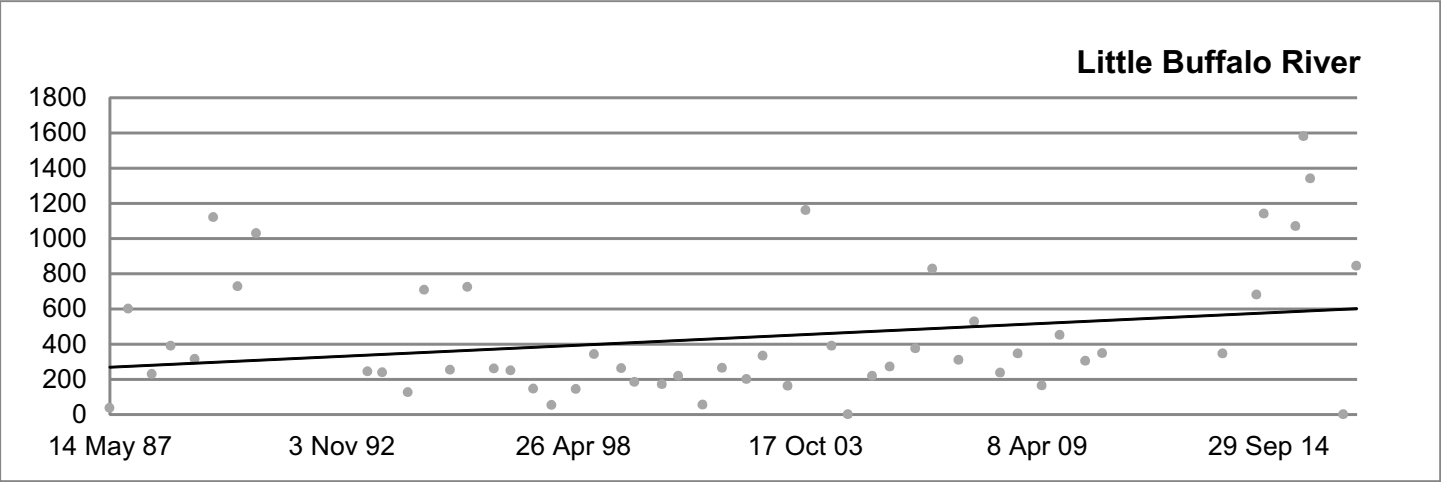
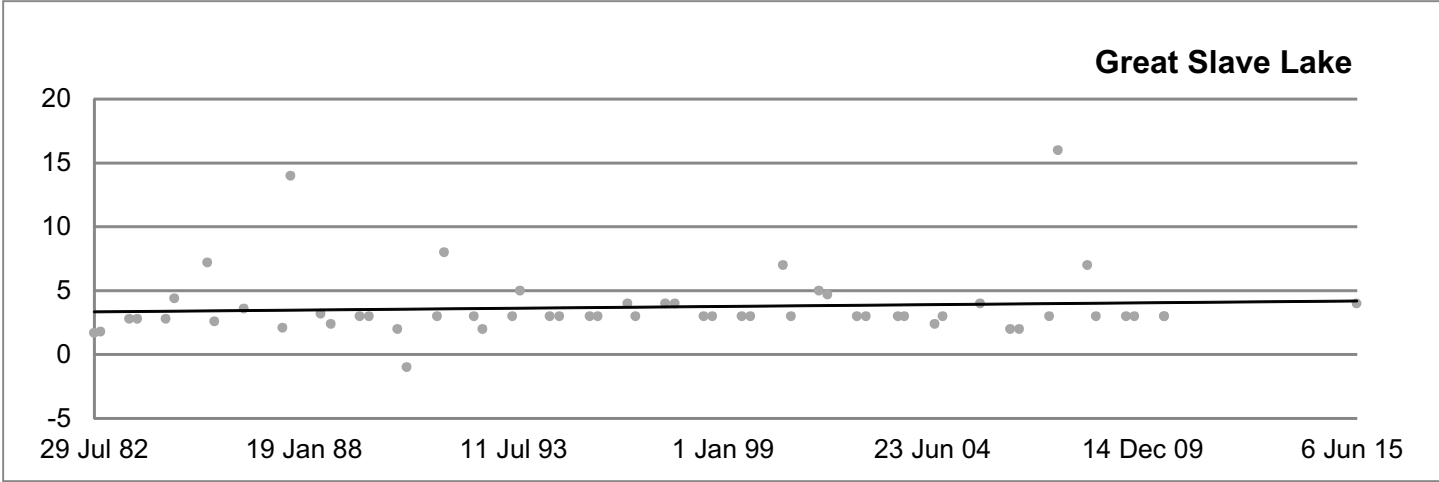
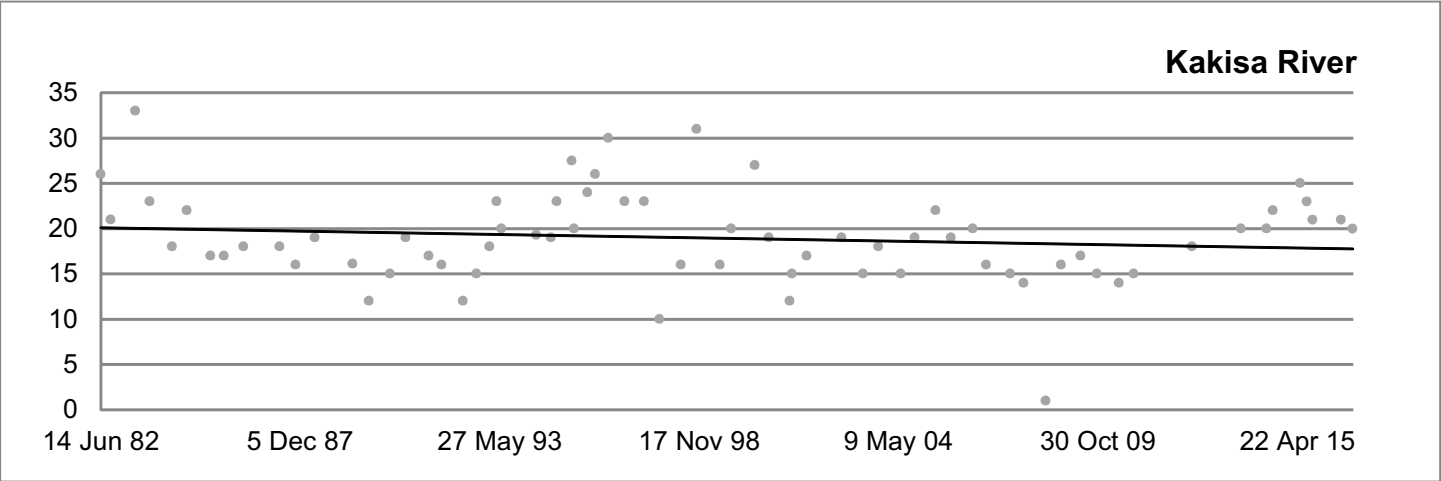
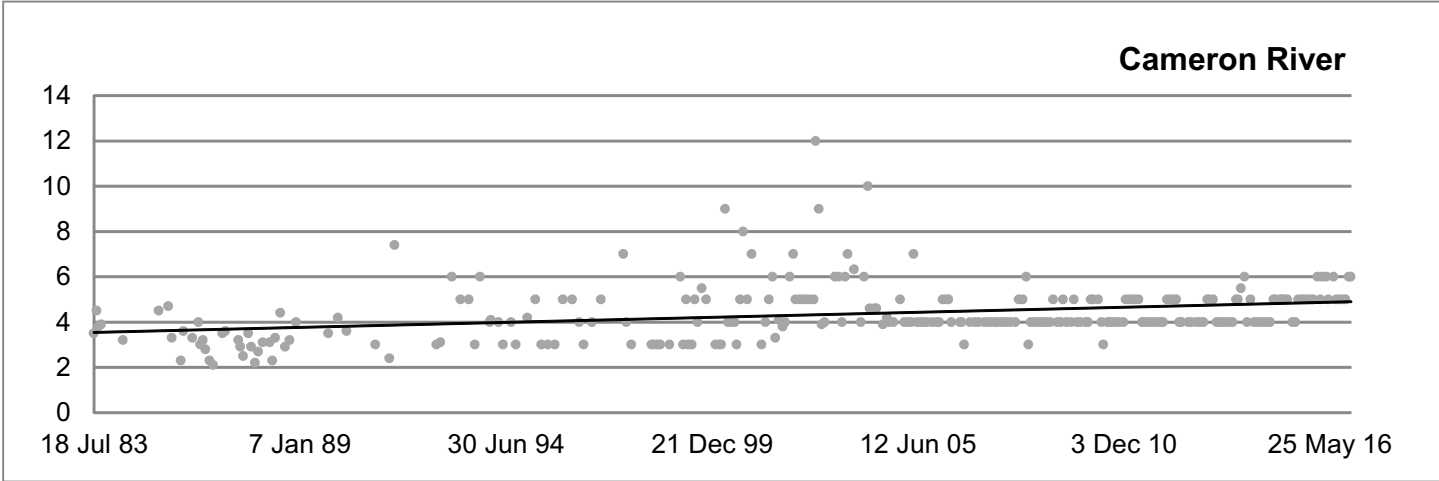
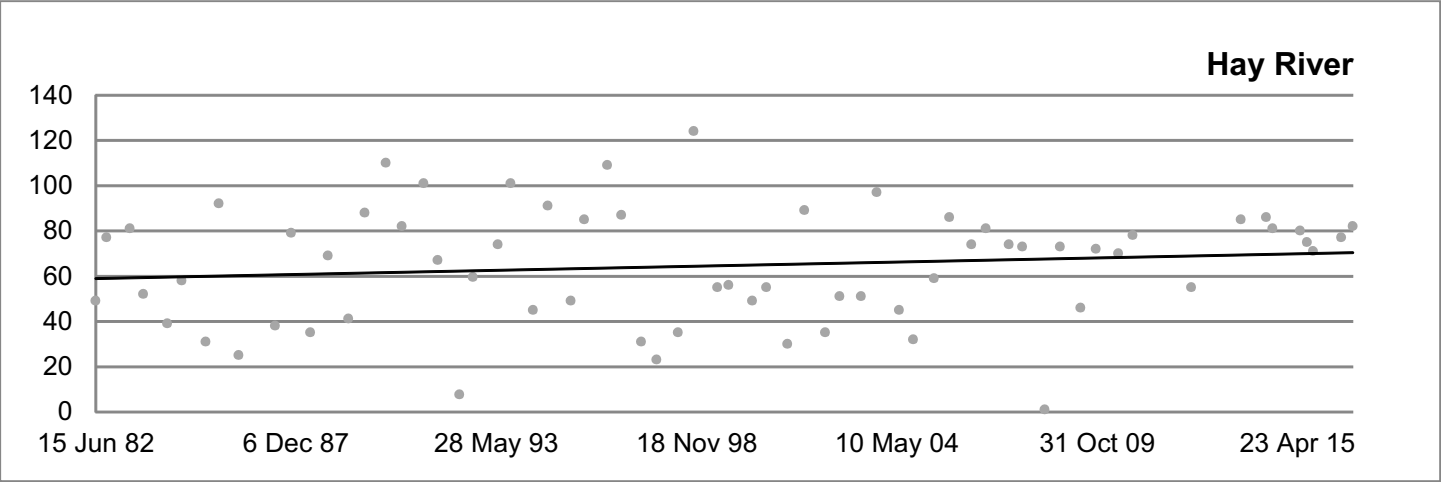
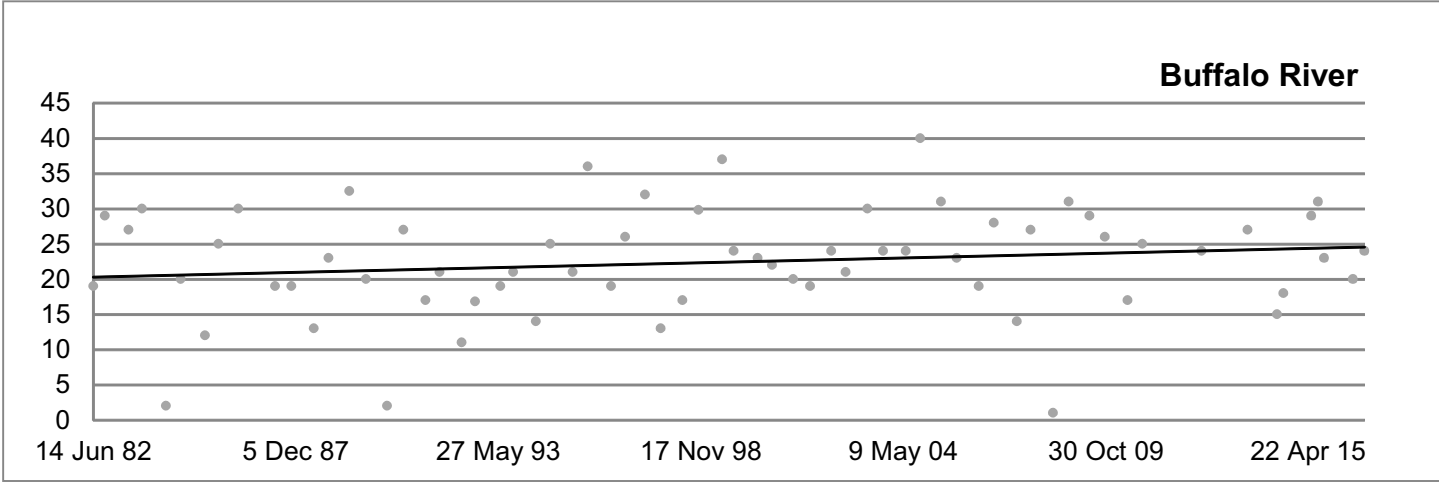
PROJECT NO.
ENW.VENW03044-01

OFFICE
Tt-VANC

DWN SL	CKD MEZ	APVD SW	REV 0
DATE March 30, 2017			

Figure B.5c

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

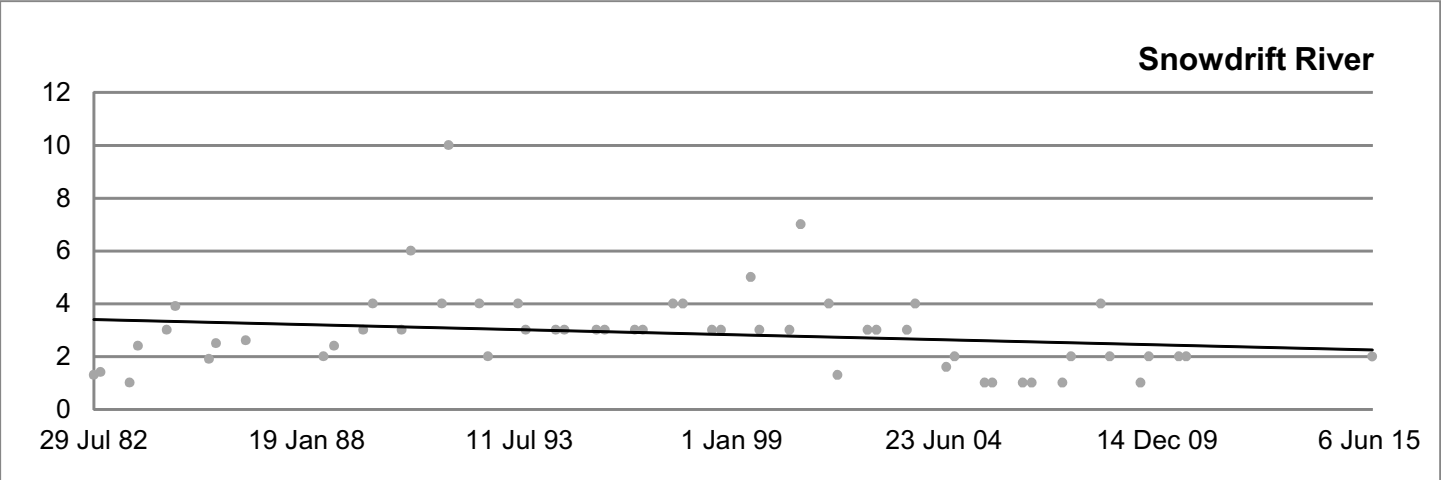
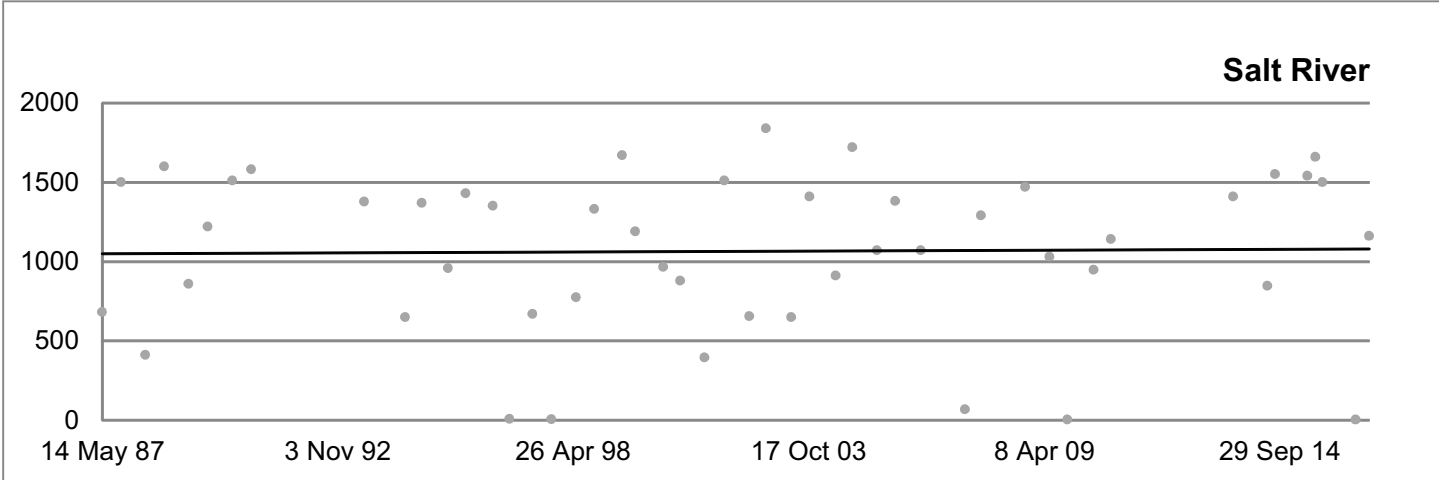
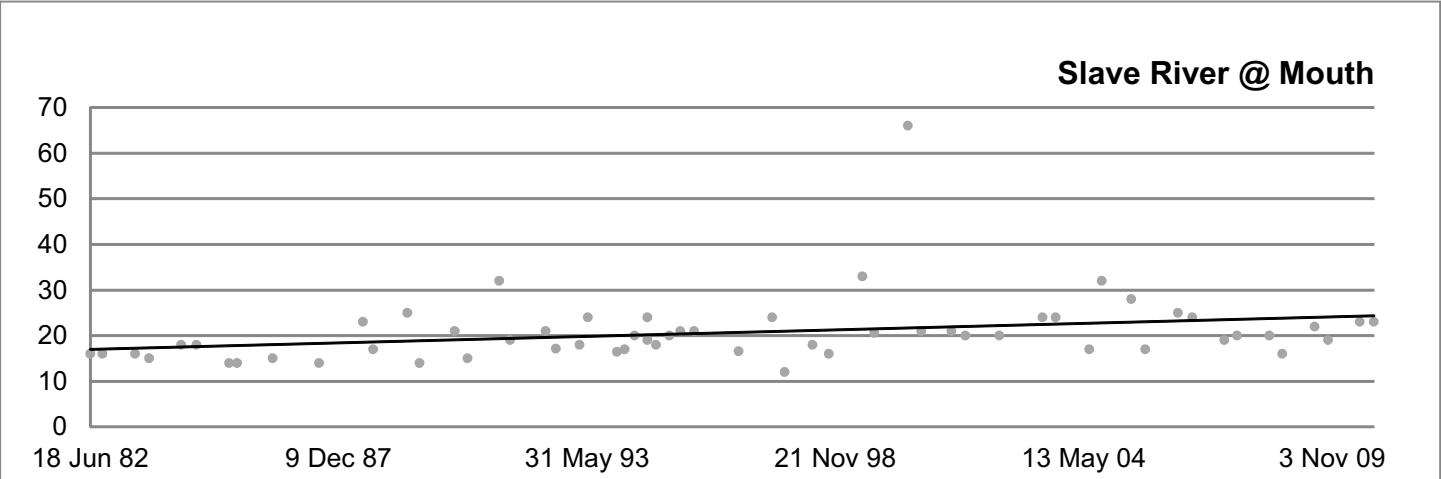
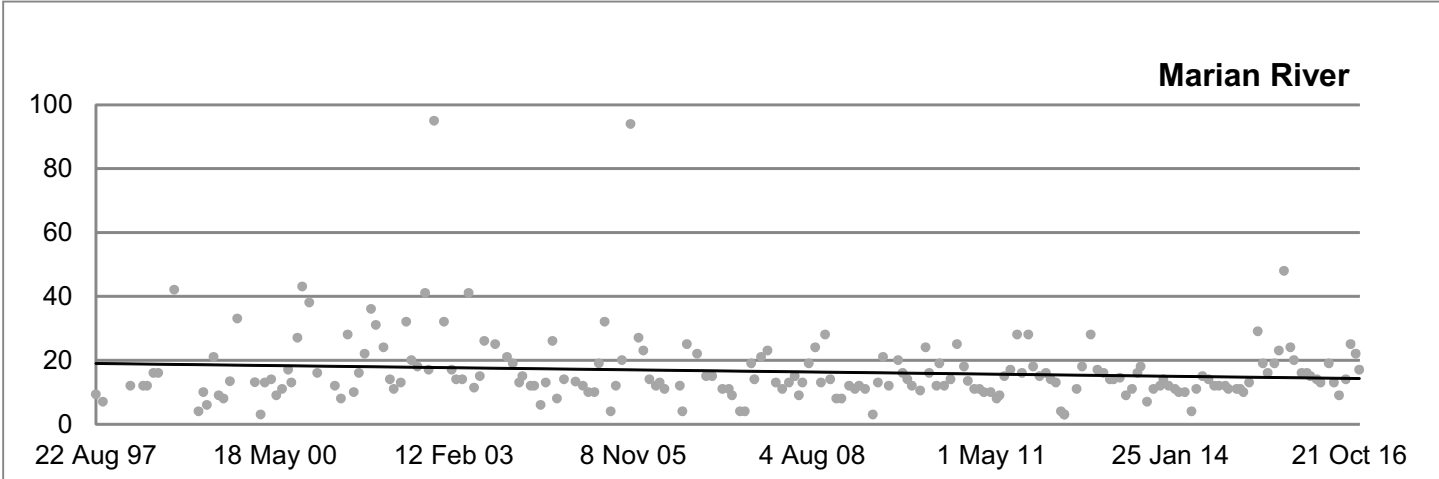
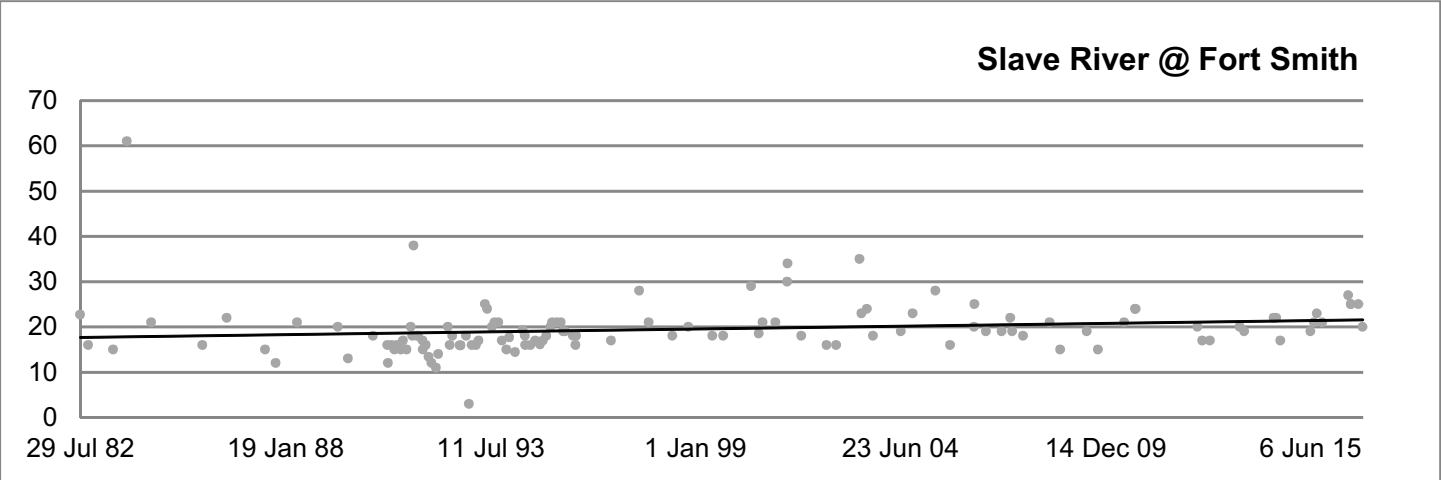
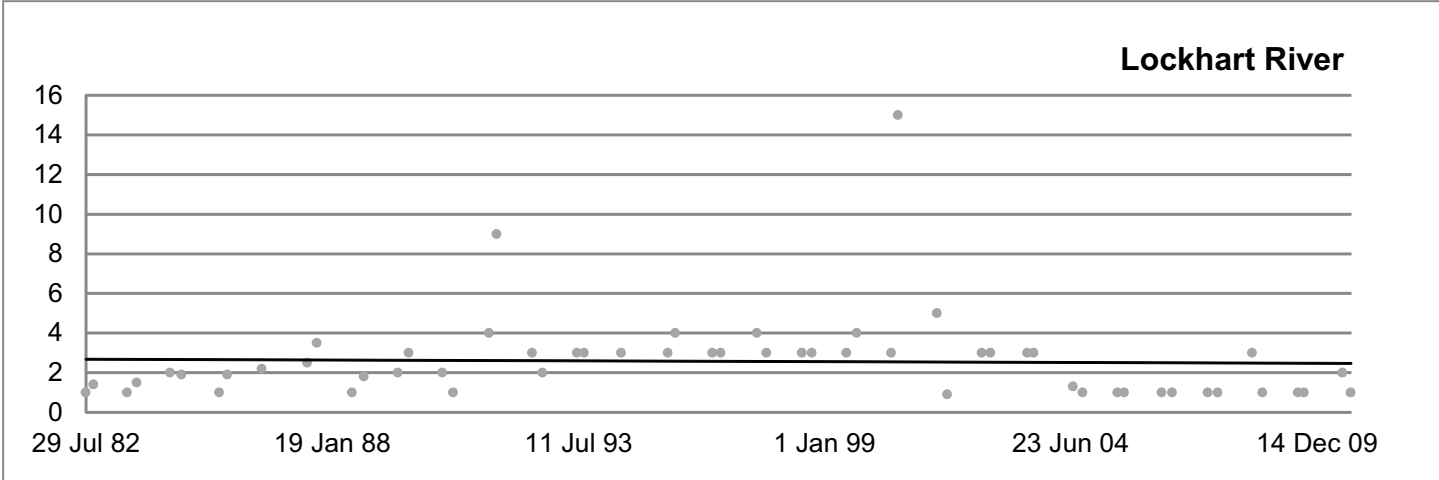
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Sulphate (mg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.6a

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Sulphate (mg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

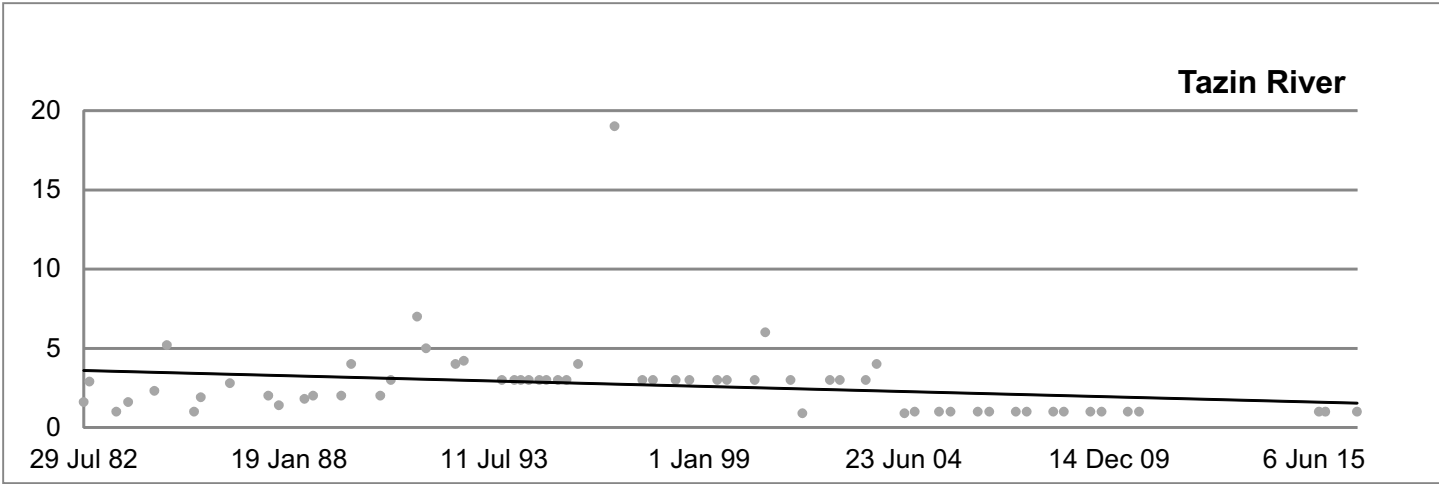
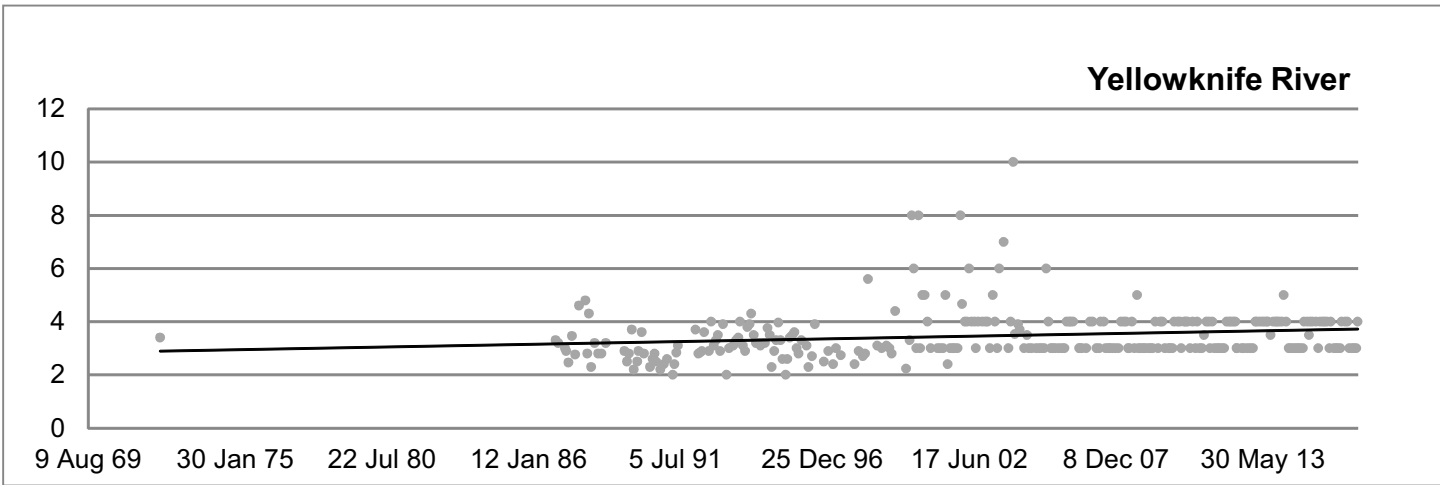
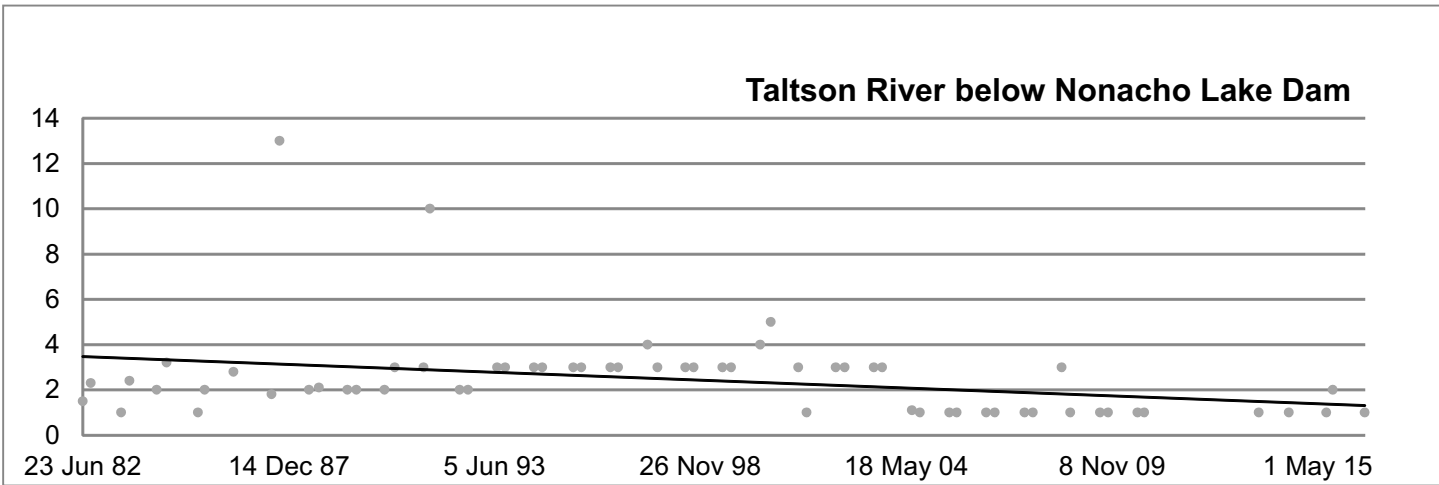
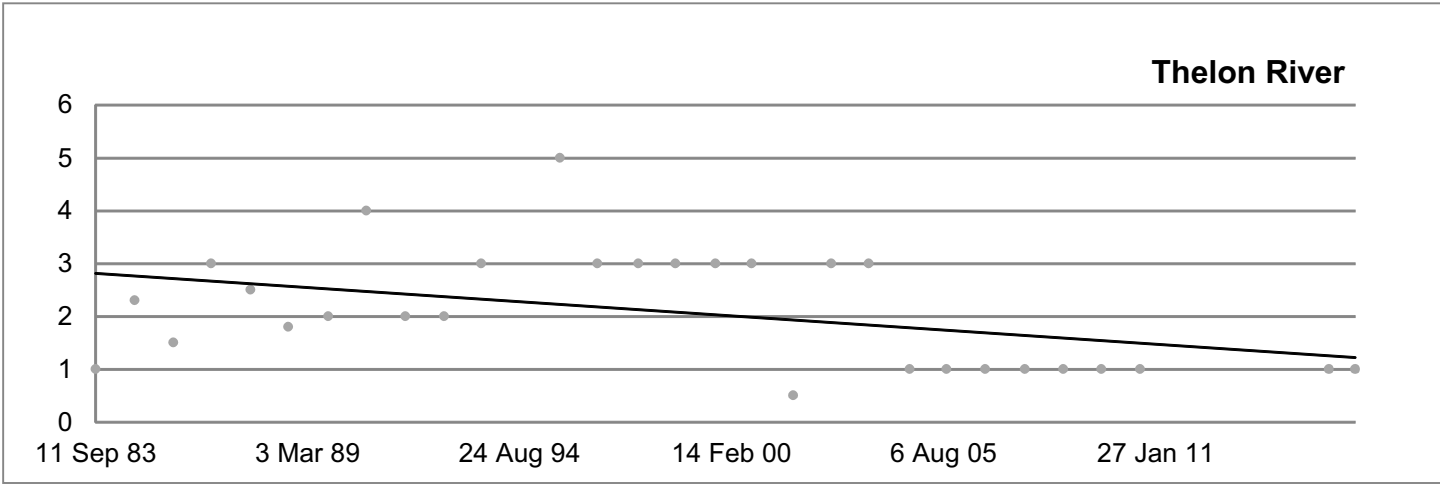
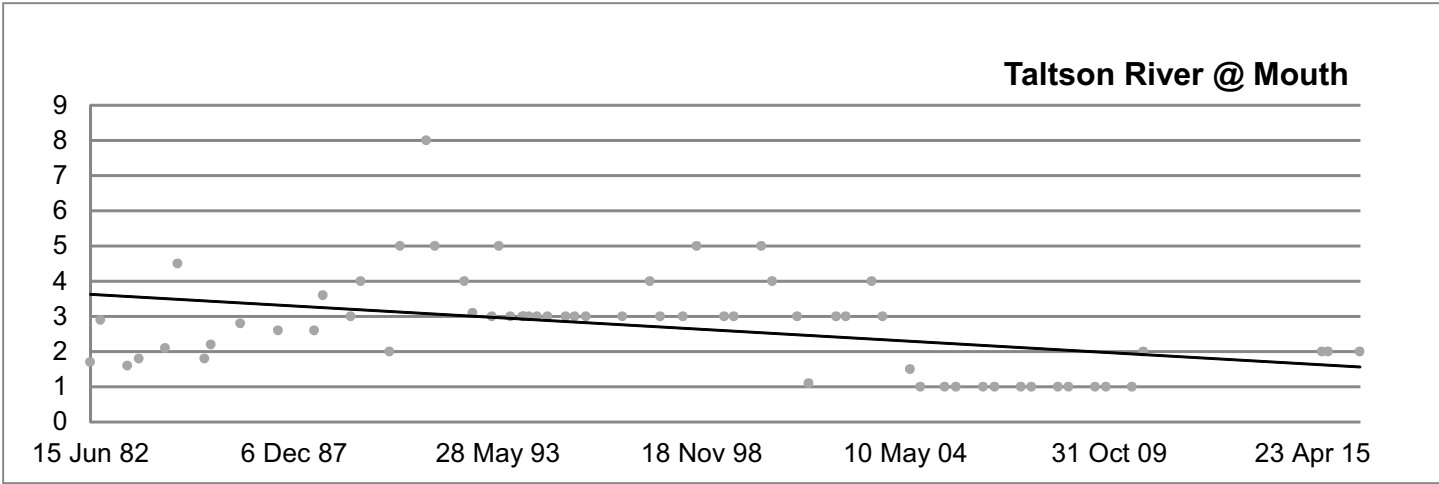
REV
0

OFFICE
Tt-VANC

DATE
March 30, 2017

Figure B.6b

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Sulphate (mg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

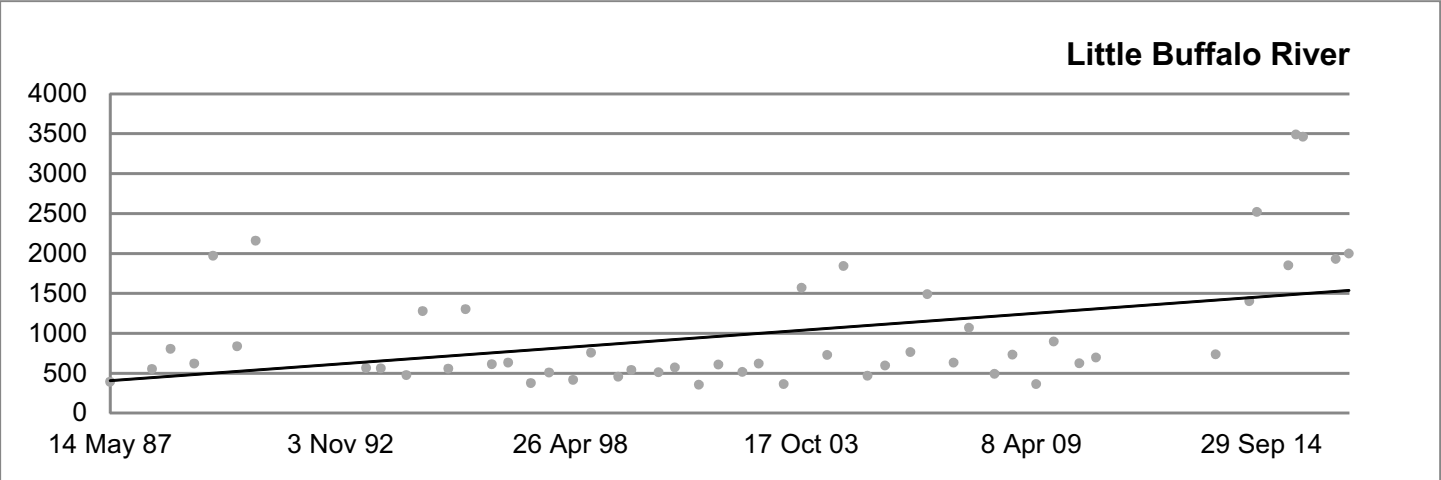
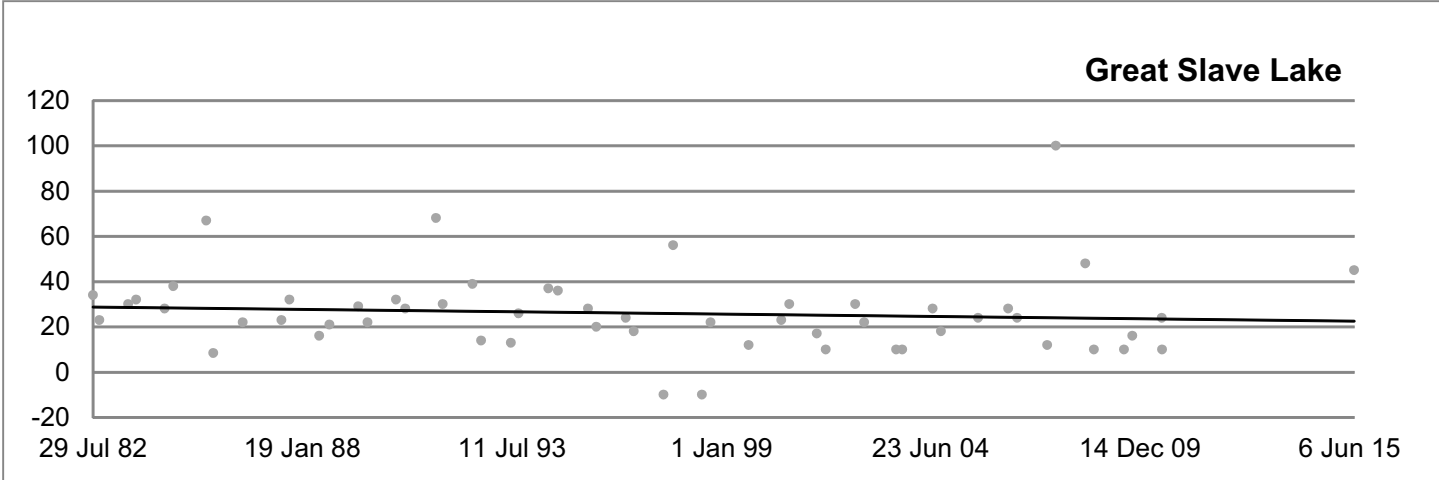
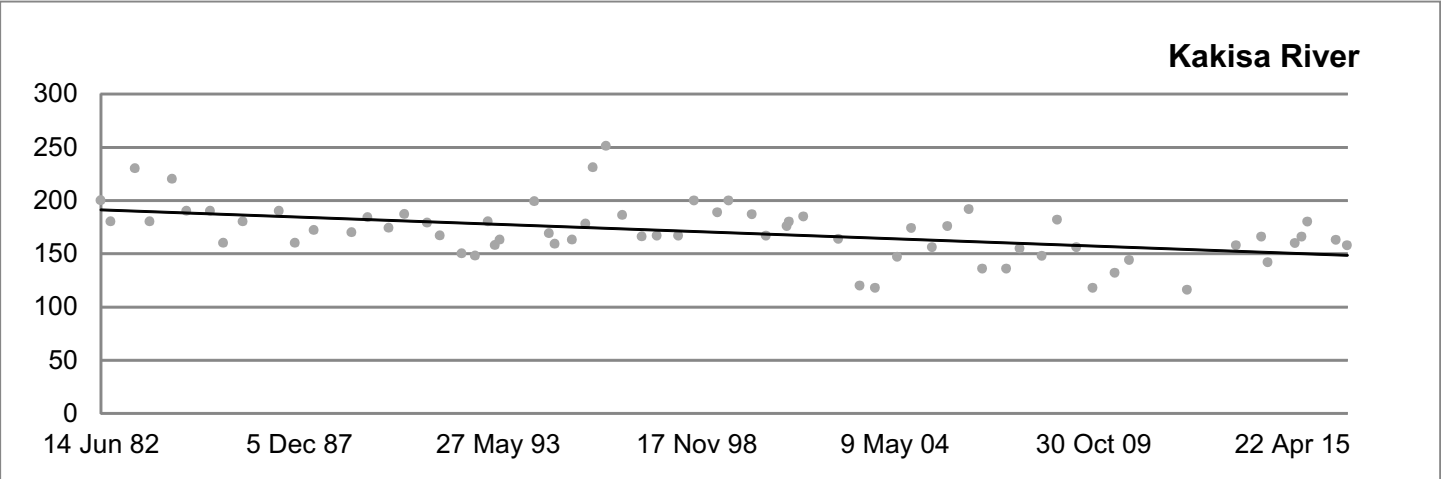
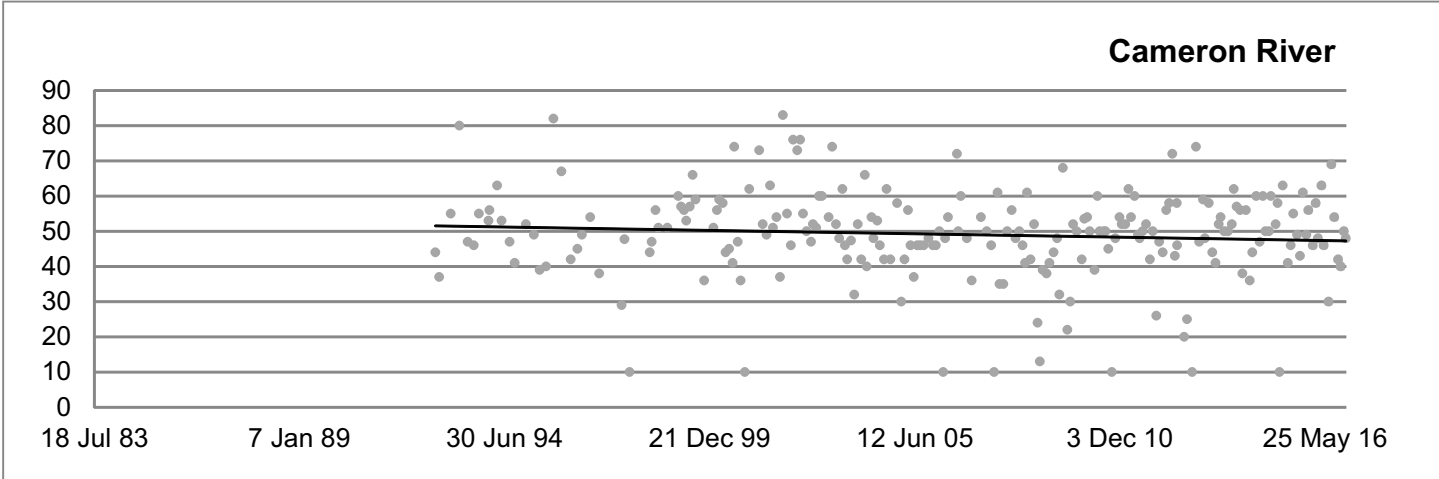
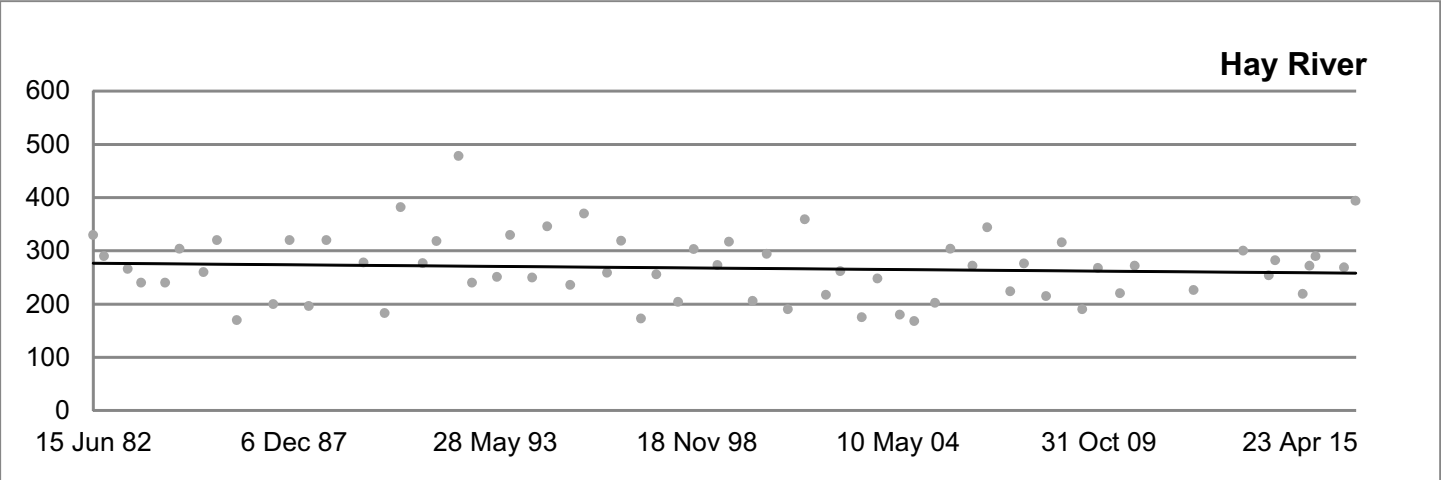
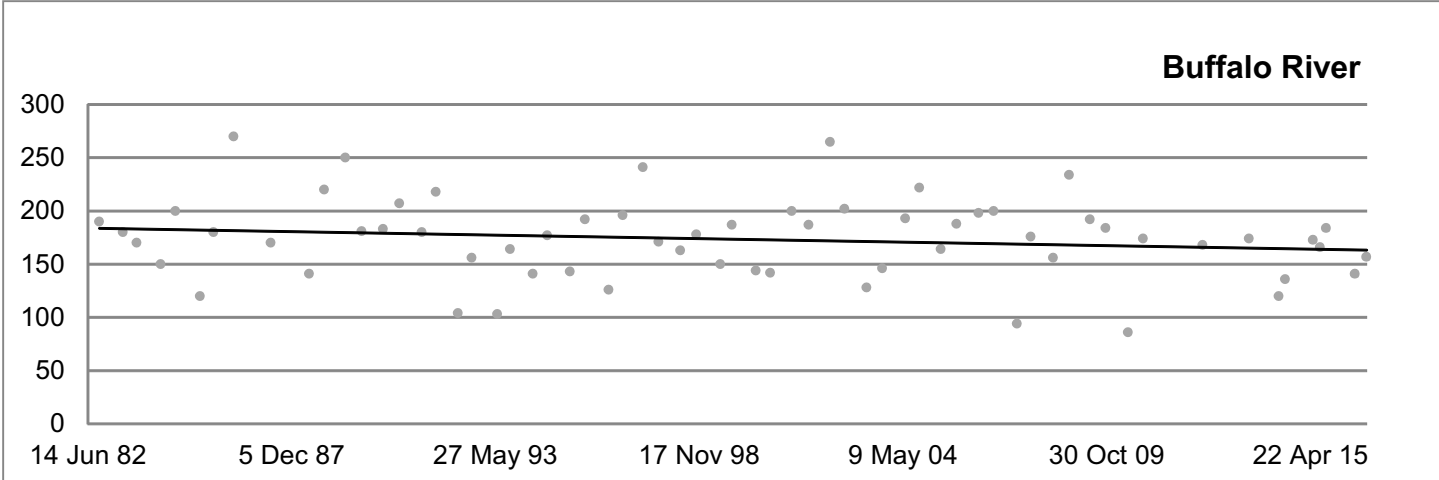
REV
0

OFFICE
Tt-VANC

DATE
March 30, 2017

Figure B.6c

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



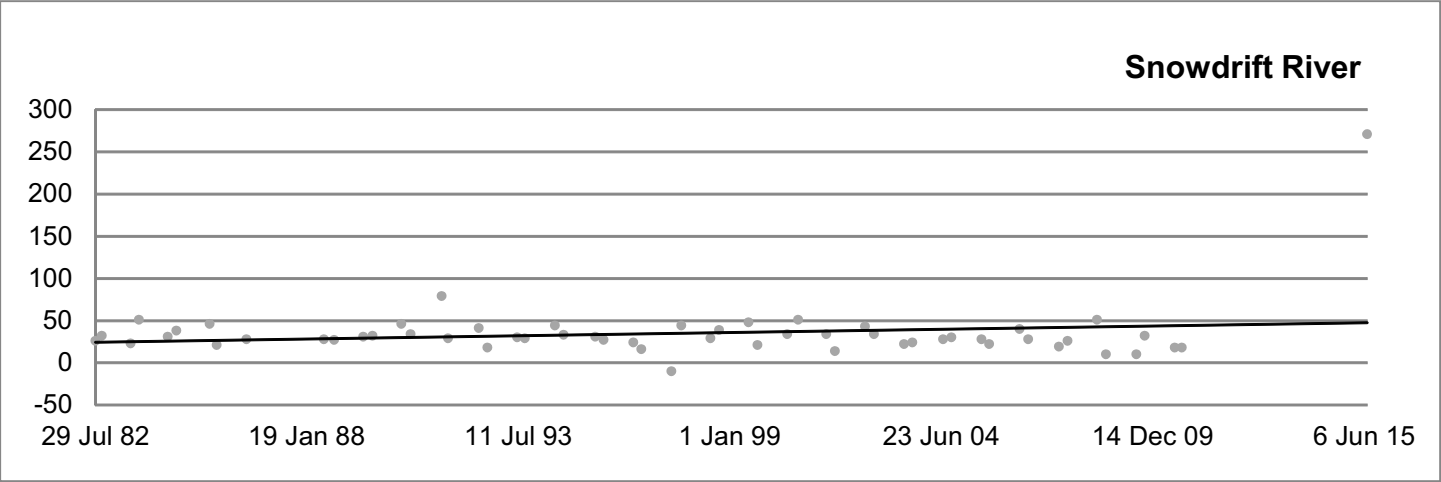
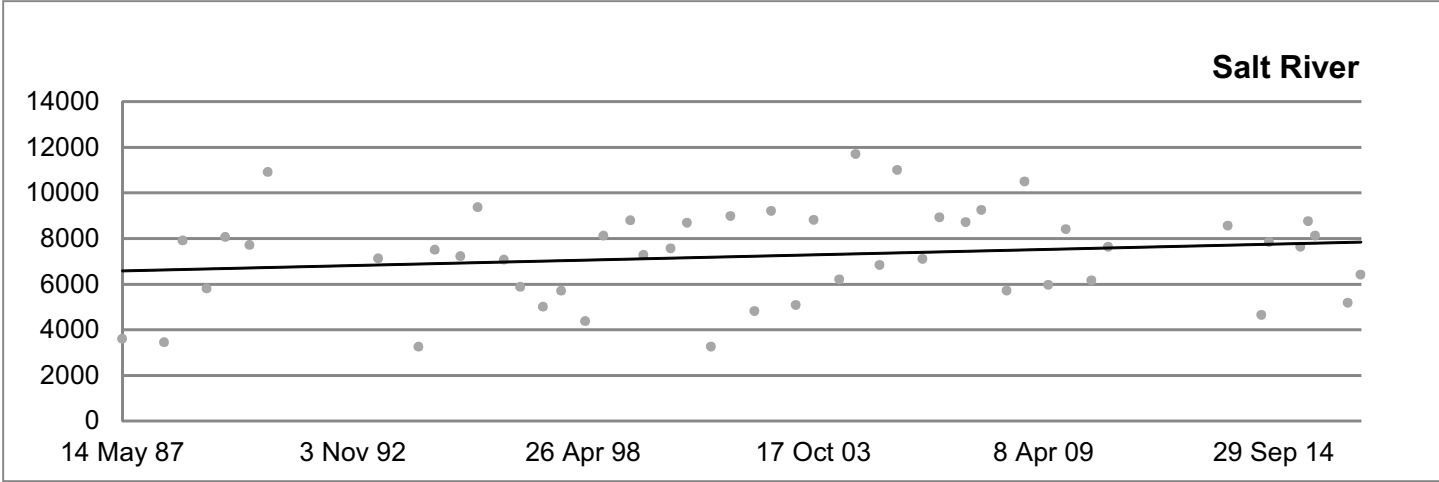
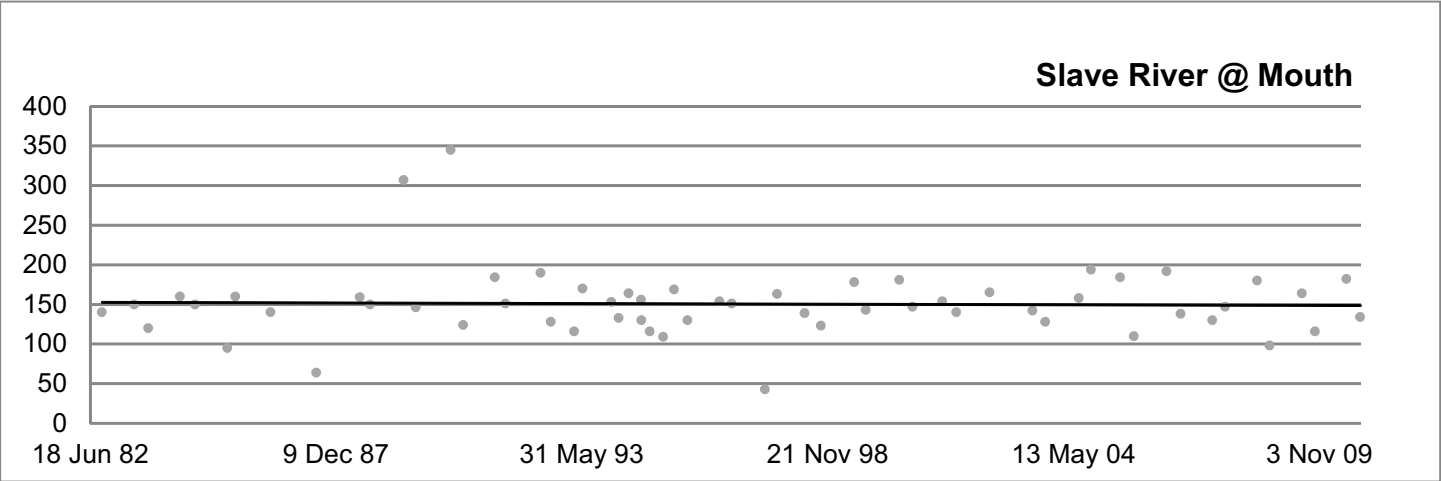
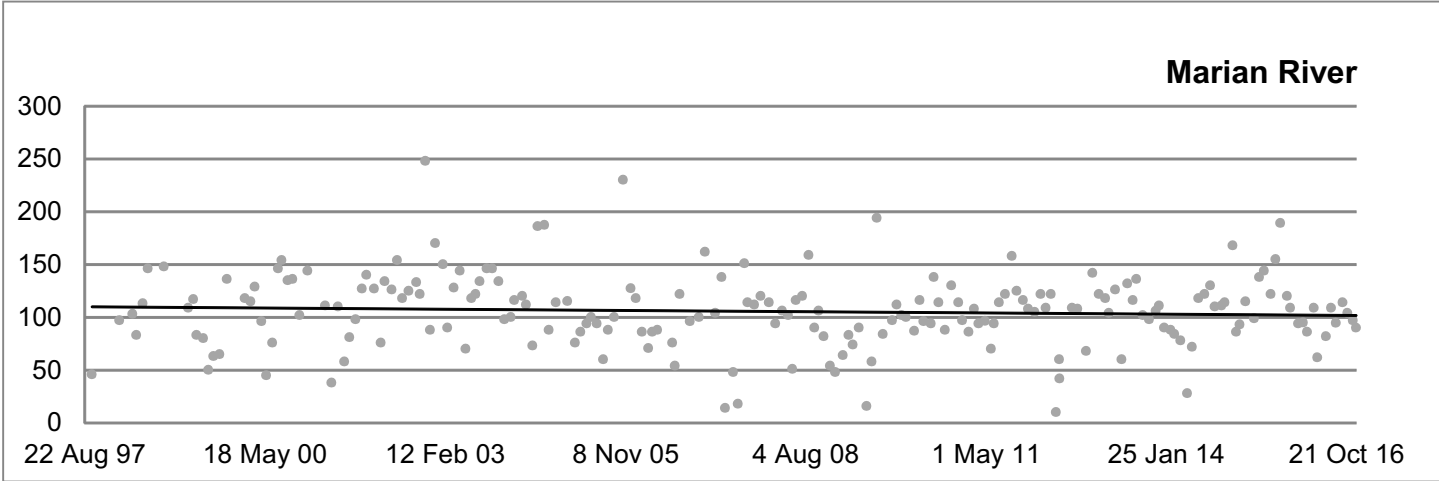
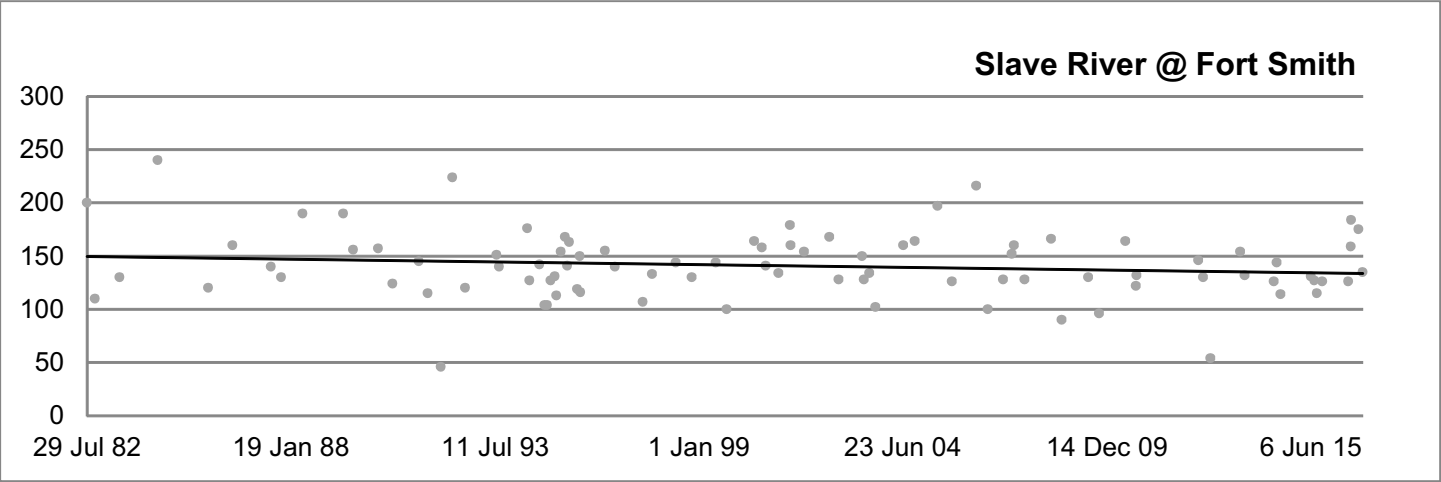
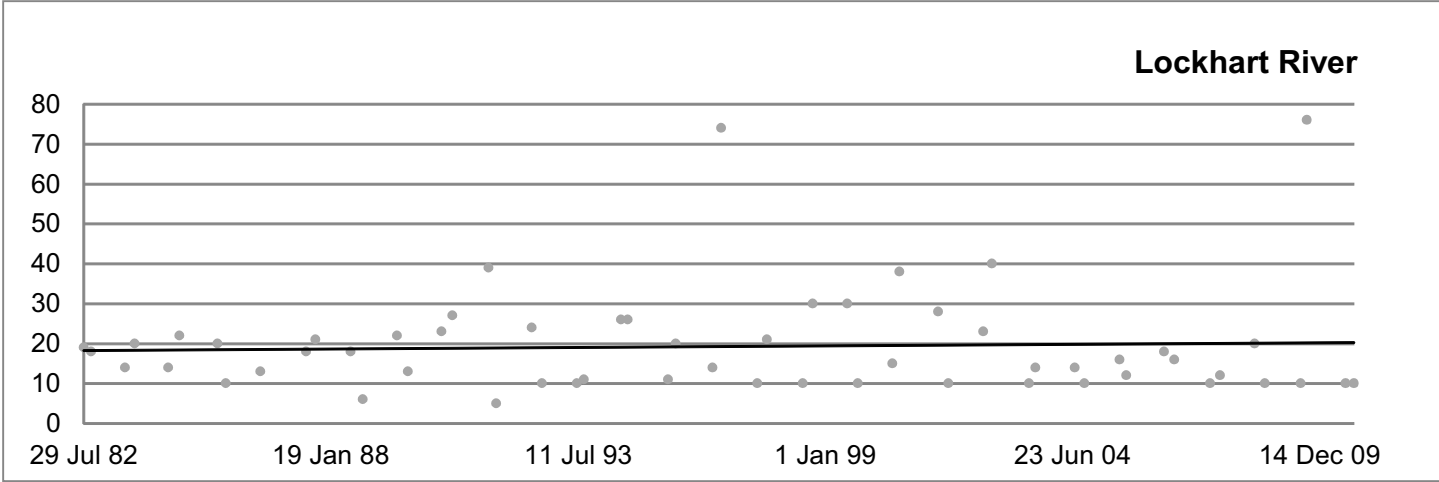
TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Total Dissolved Solids (mg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0	Figure B.7a
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



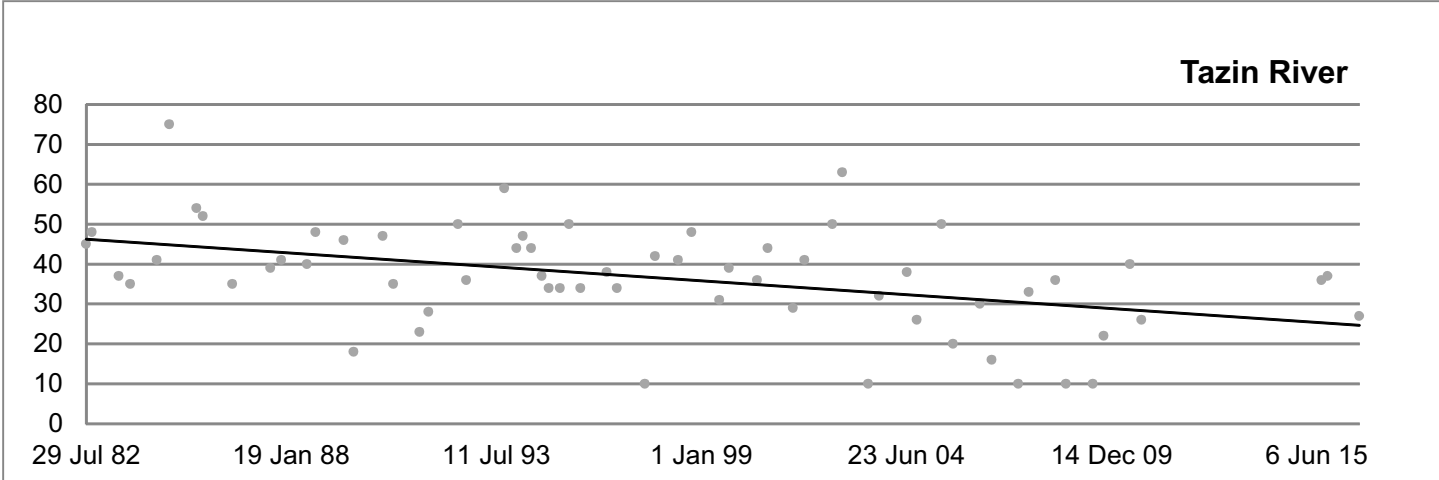
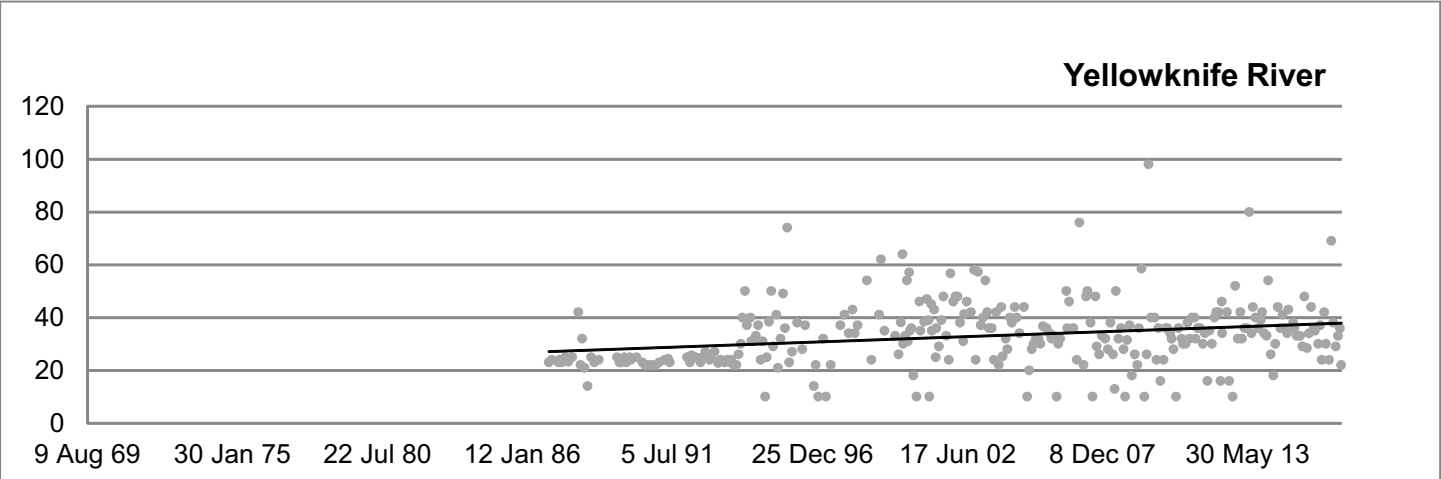
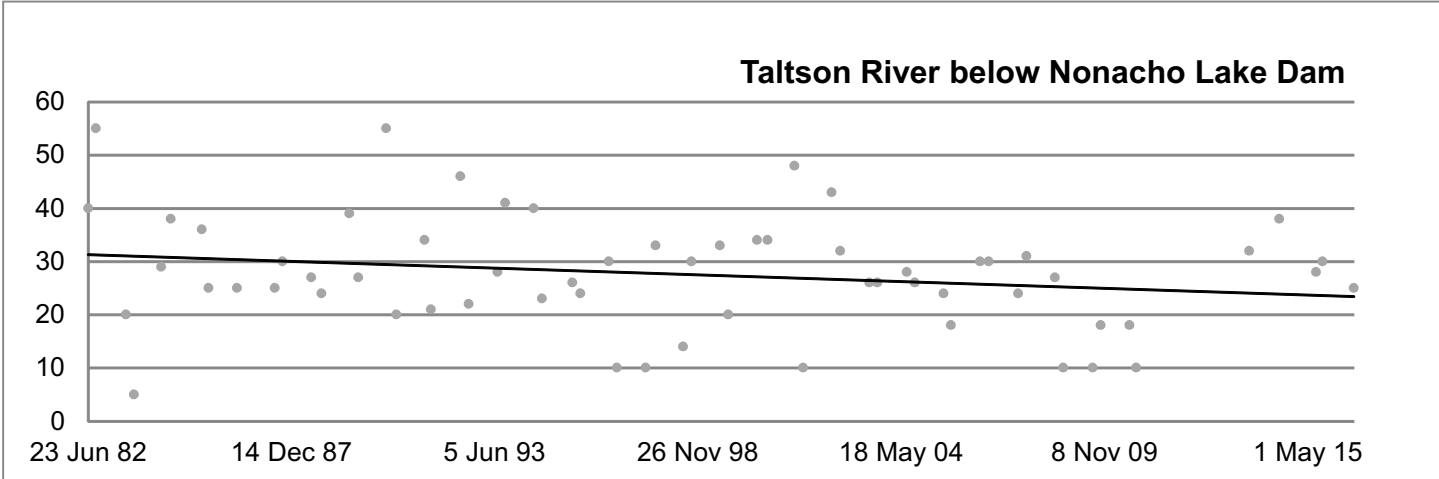
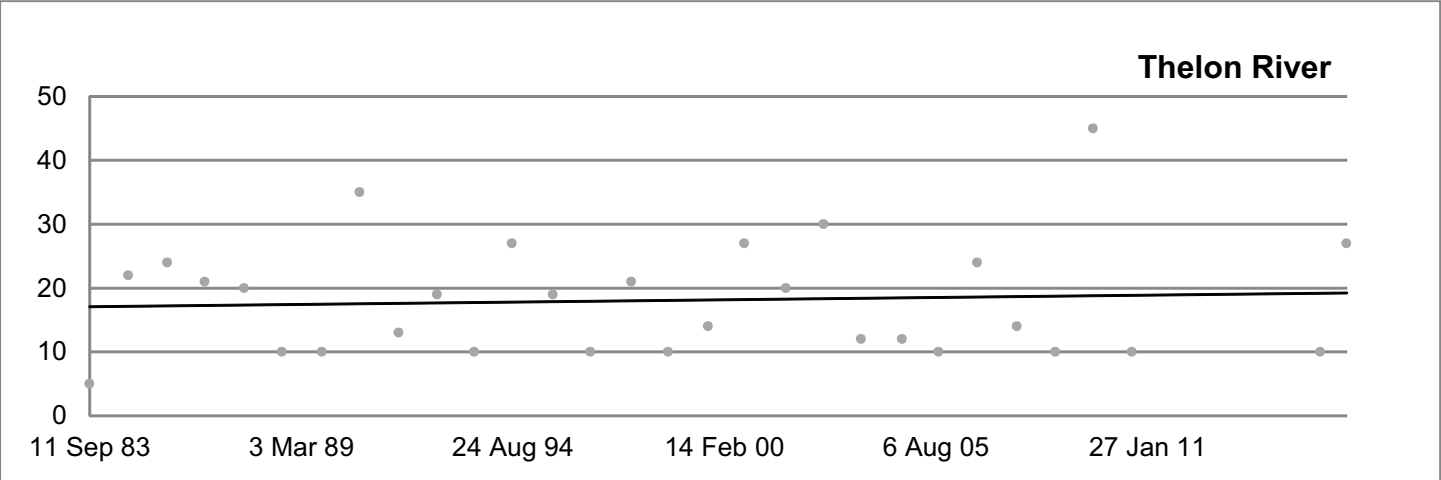
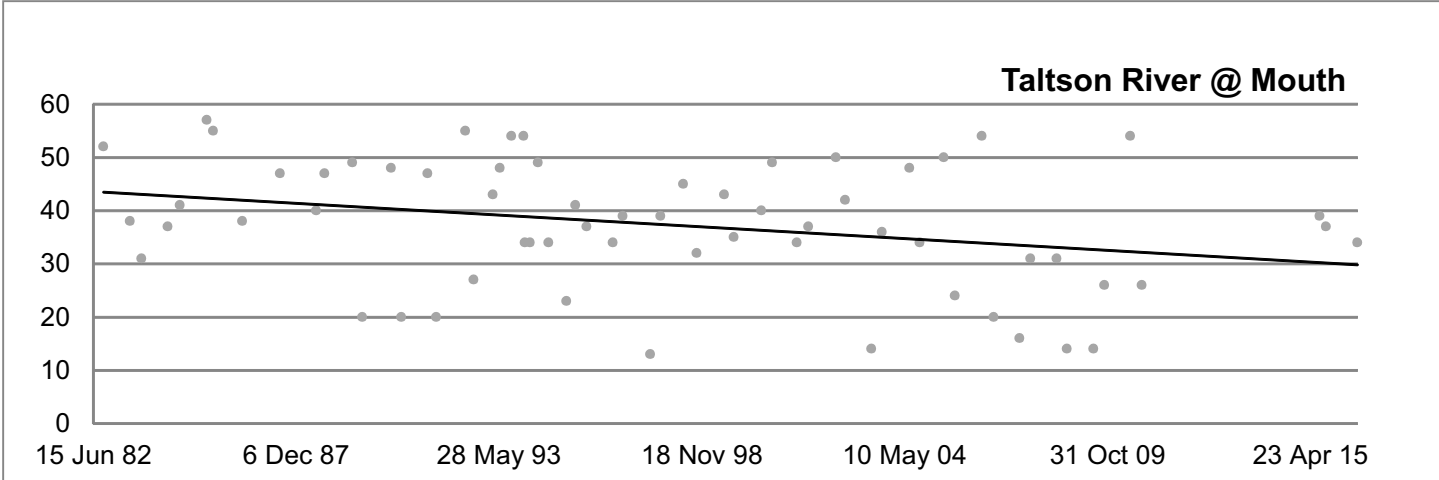
TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Total Dissolved Solids (mg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0	Figure B.7b
OFFICE Tt-VANC	DATE March 30, 2017				

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



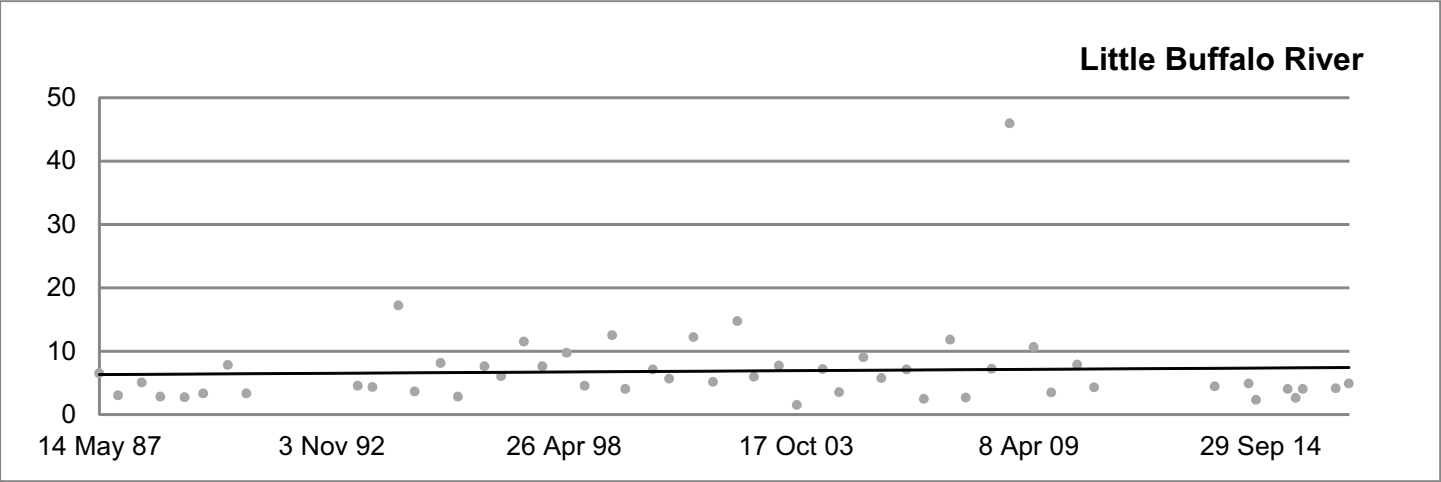
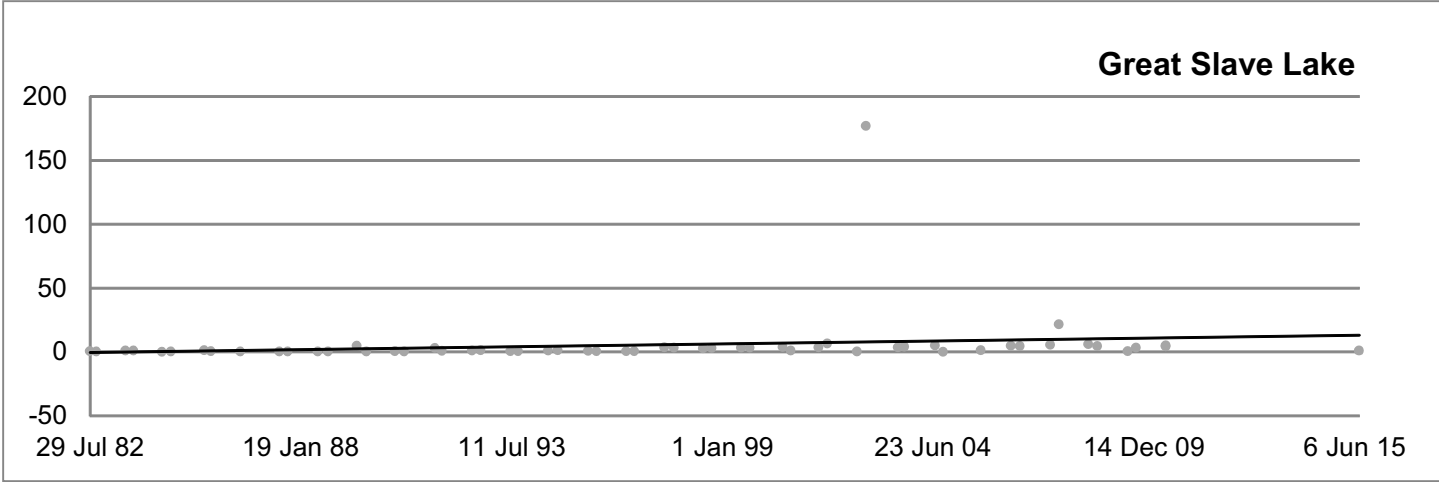
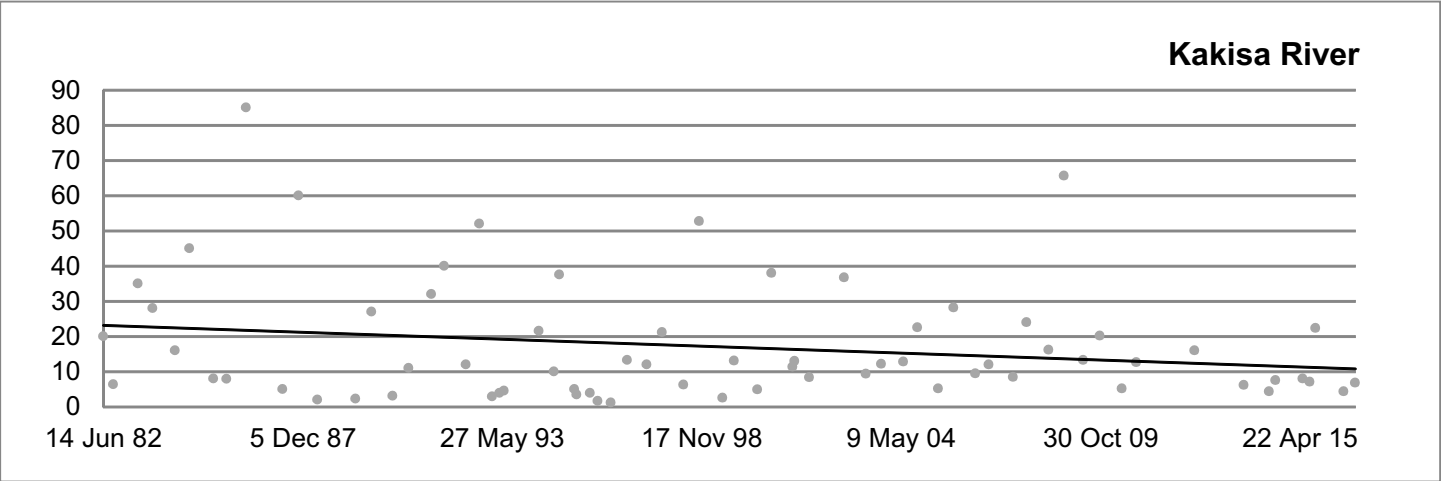
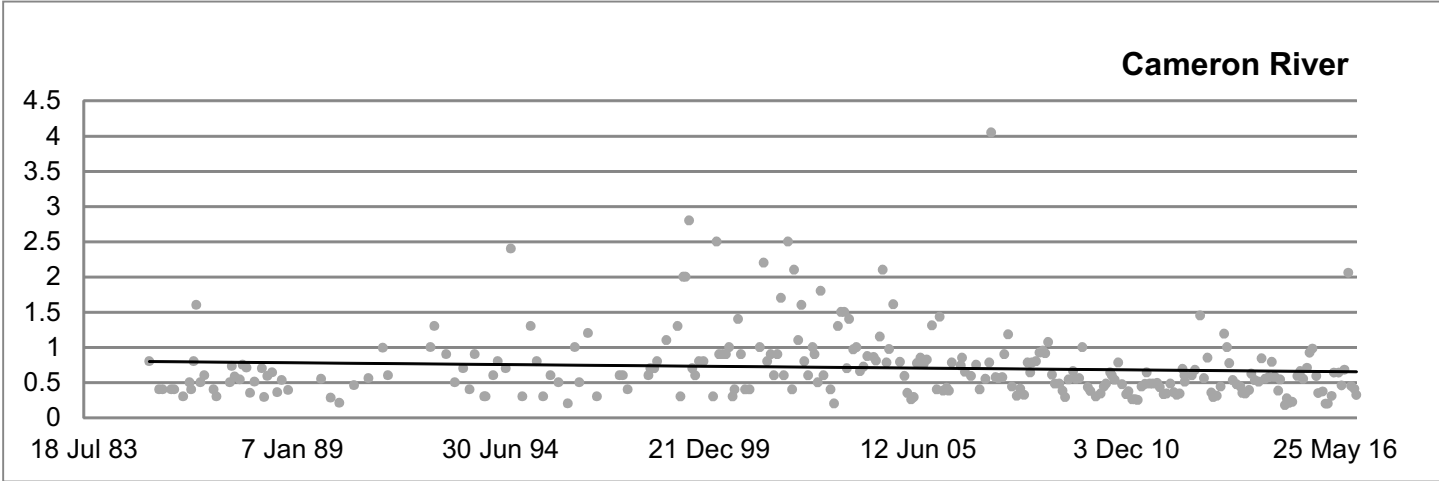
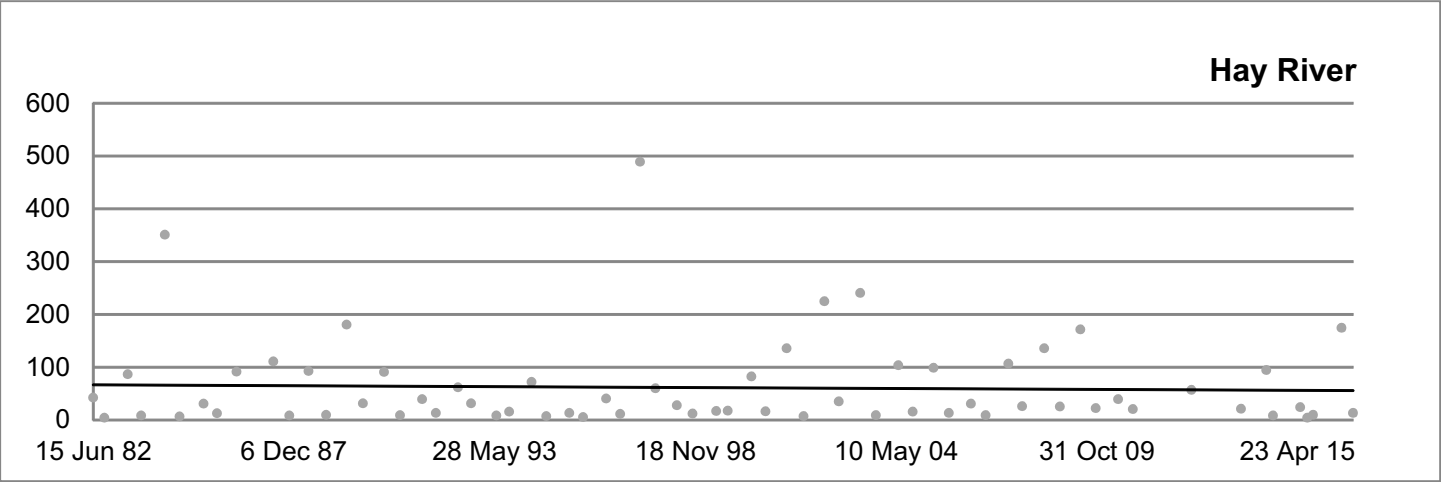
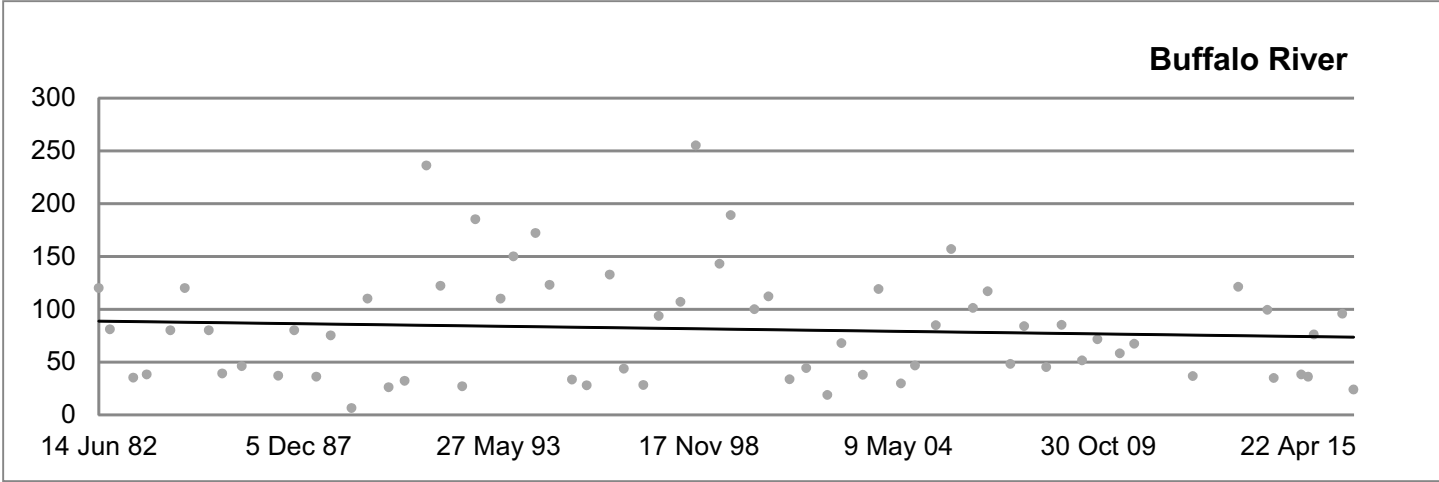
TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

**Total Dissolved Solids (mg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0	Figure B.7c
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



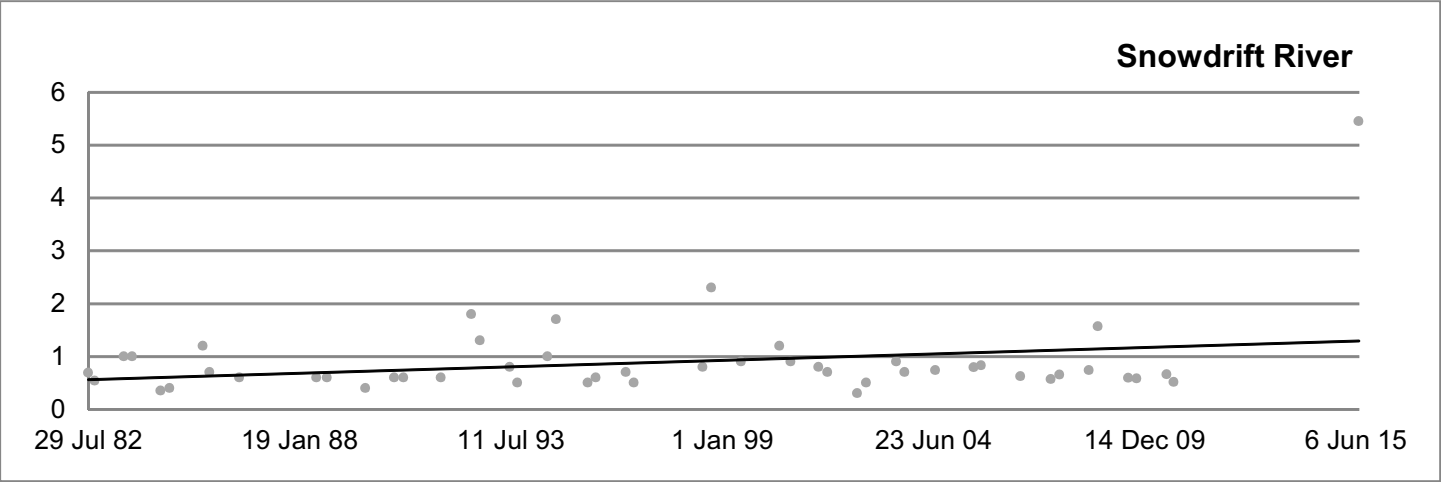
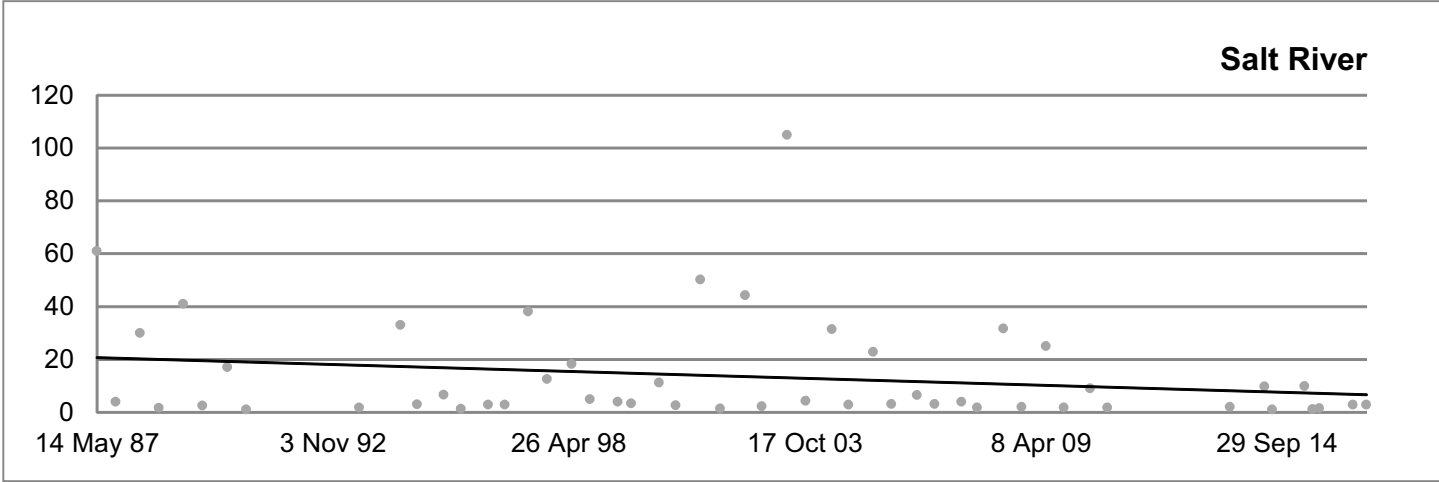
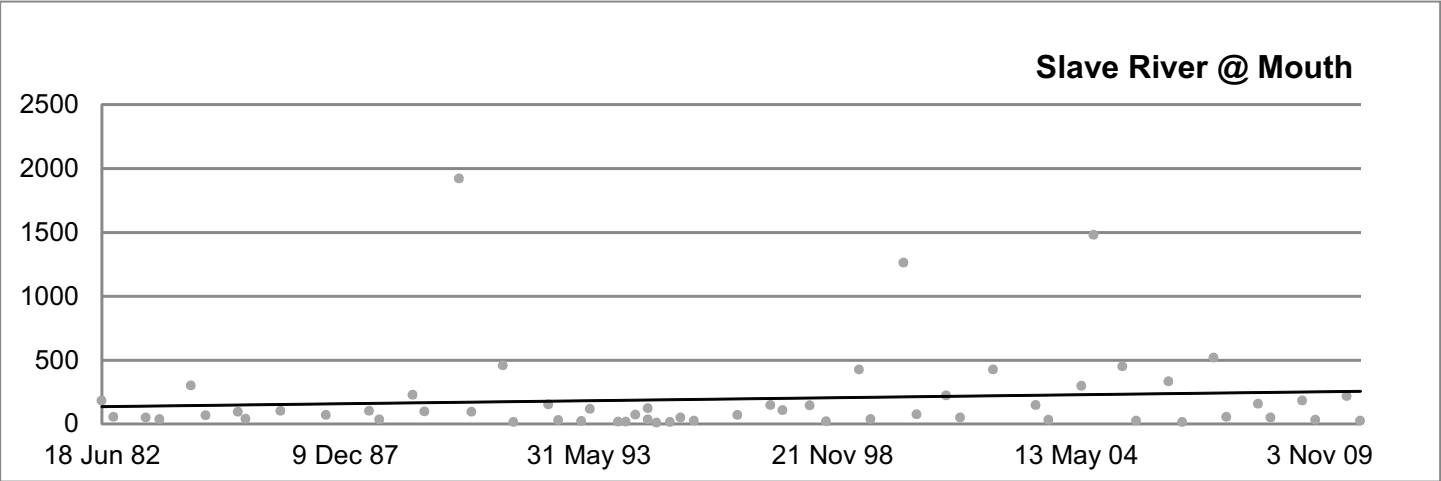
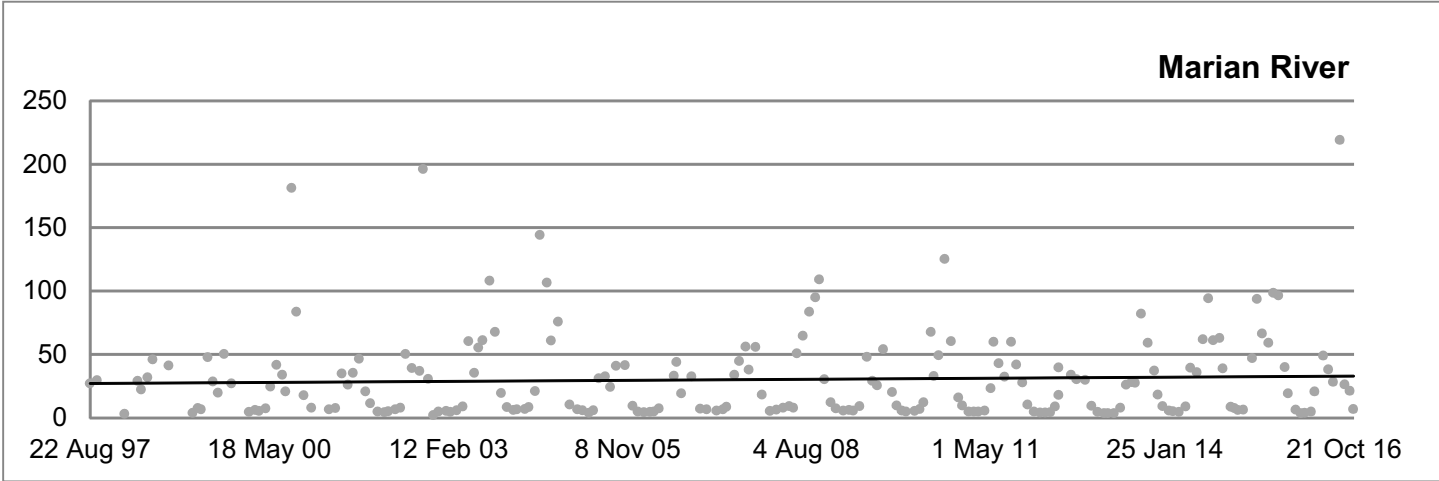
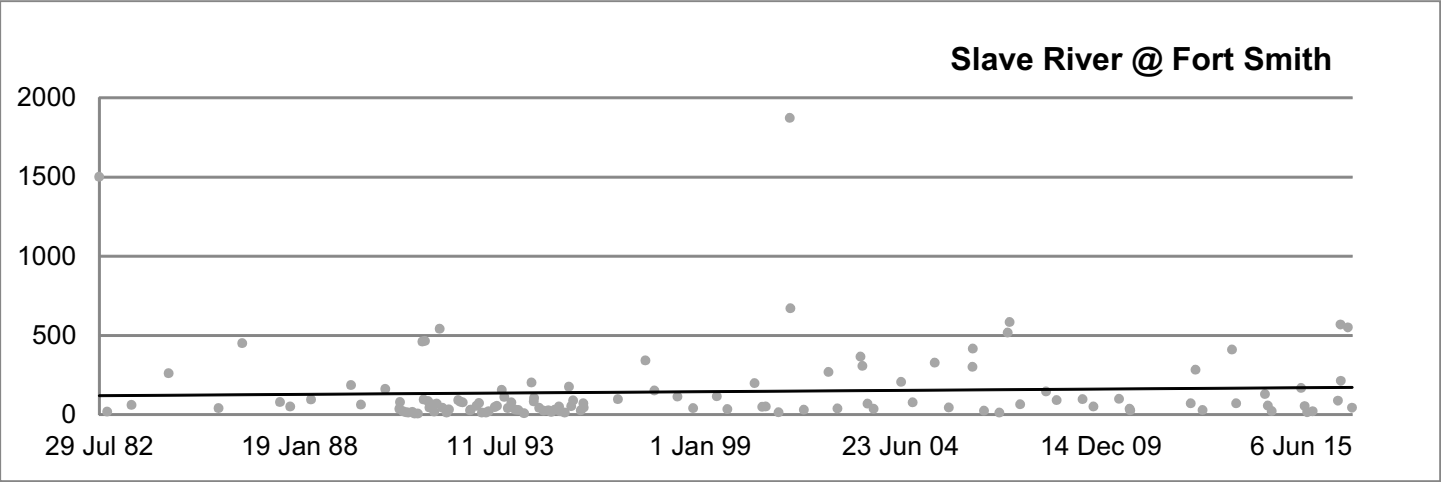
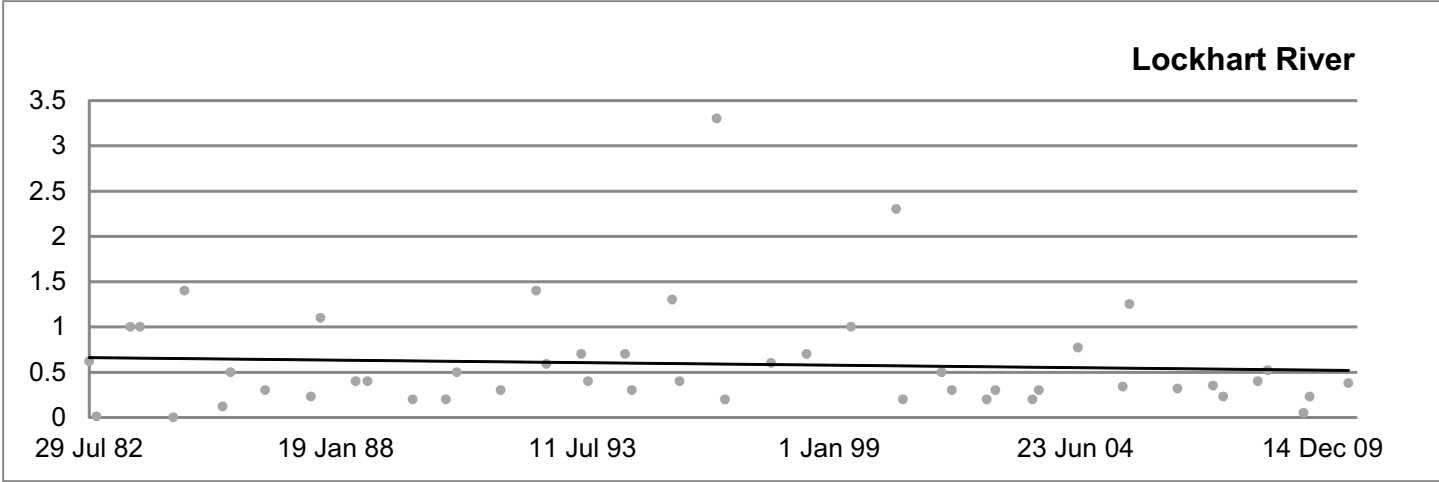
TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

**Turbidity (NTU)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0	Figure B.8a
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

CLIENT



TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Turbidity (NTU)
Scatter Plot of all Water Quality Site Data

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

REV
0

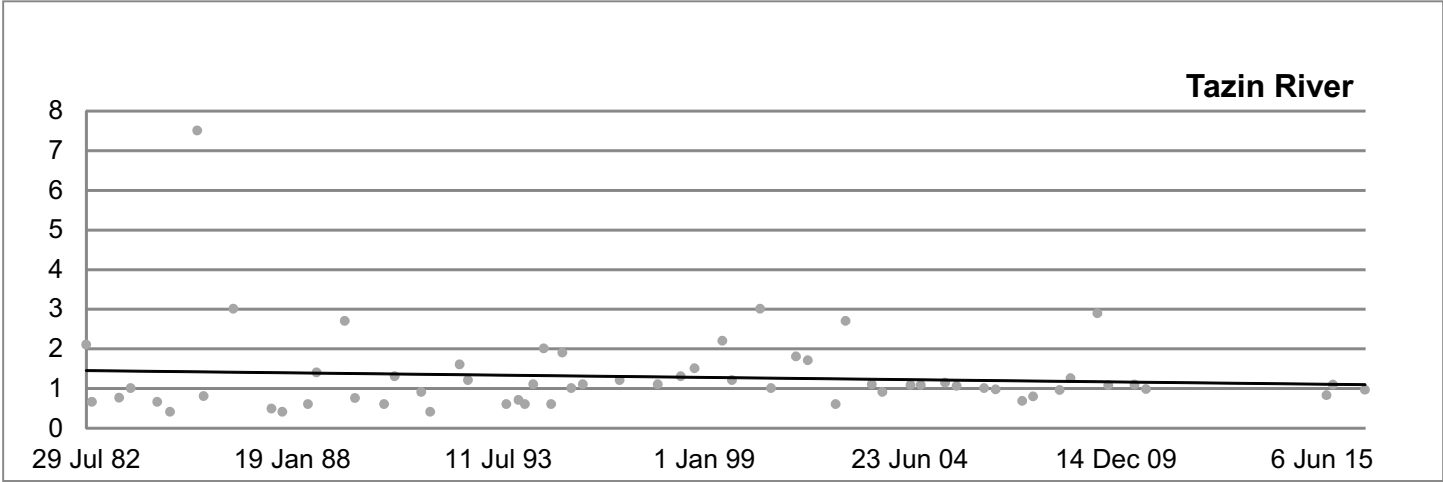
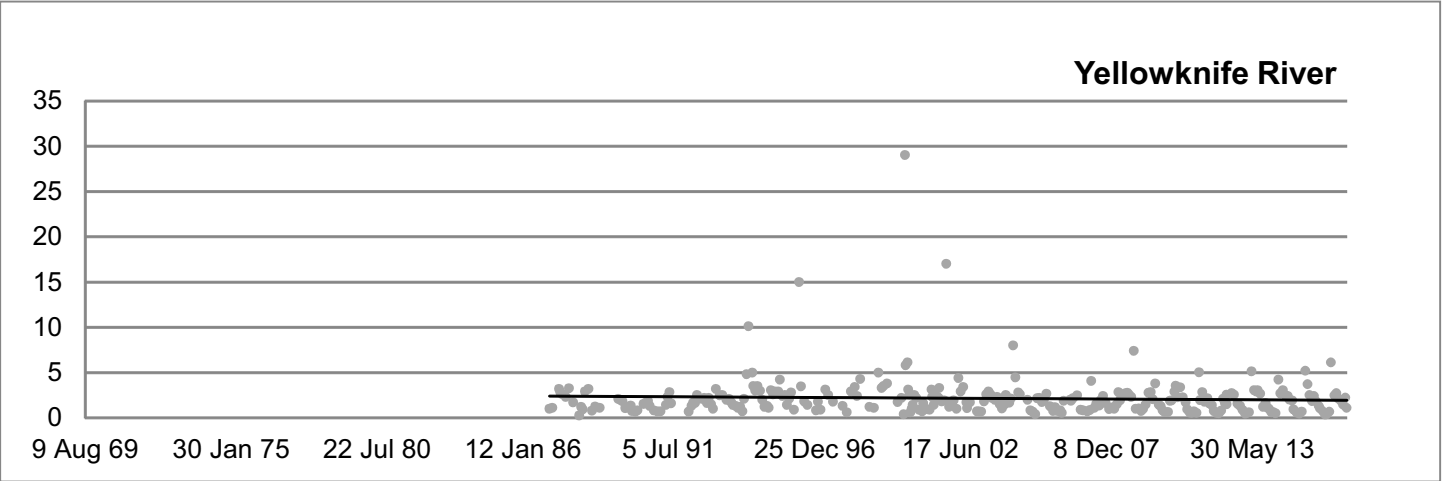
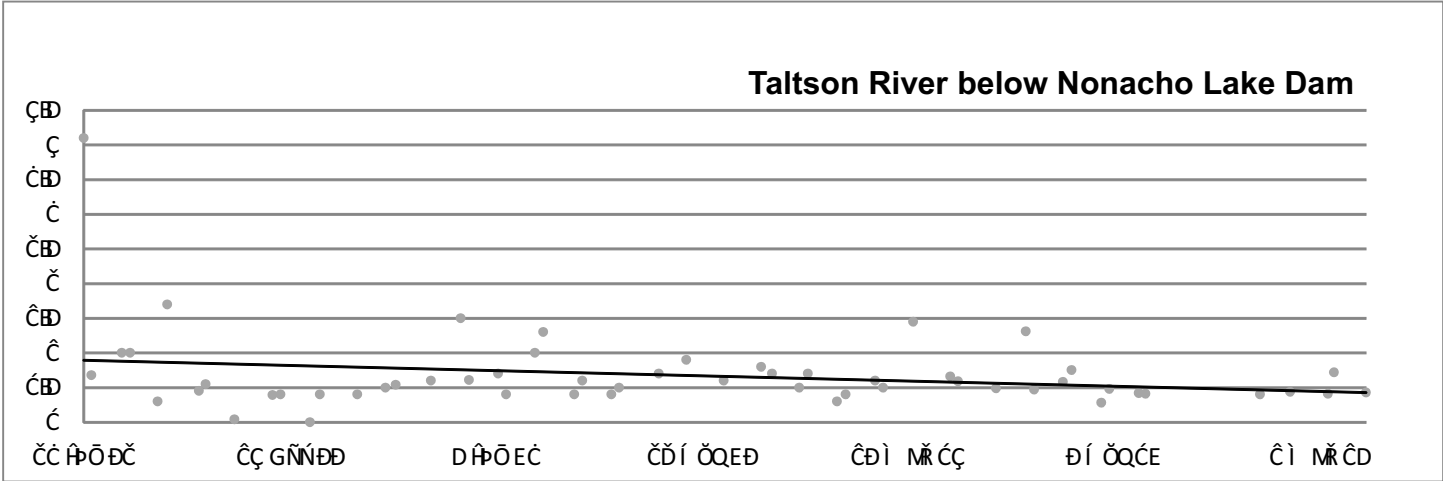
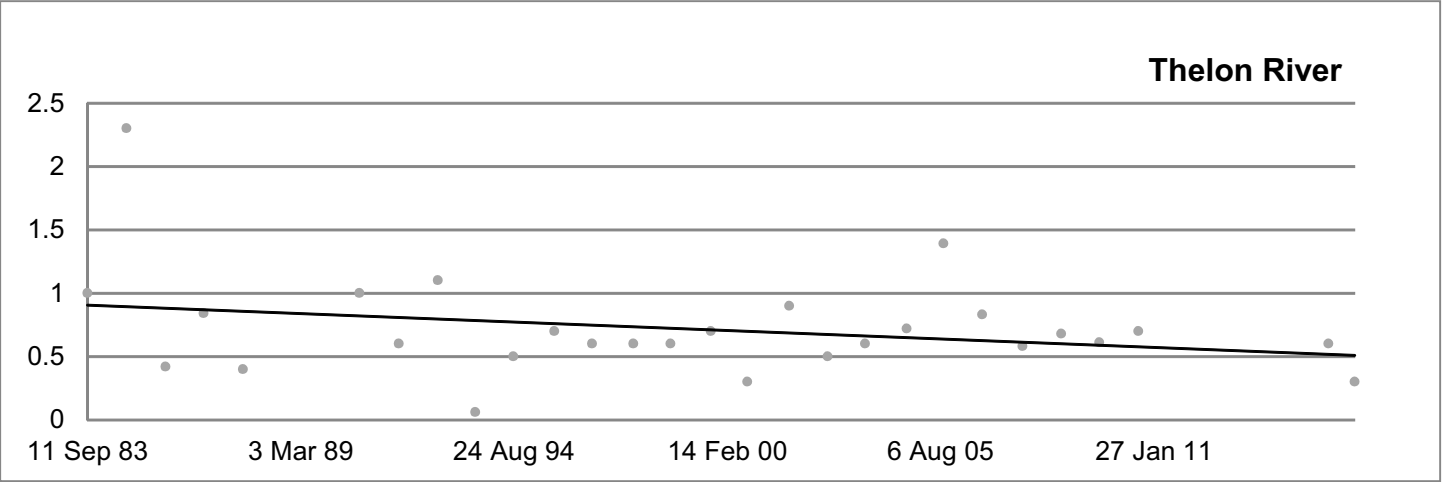
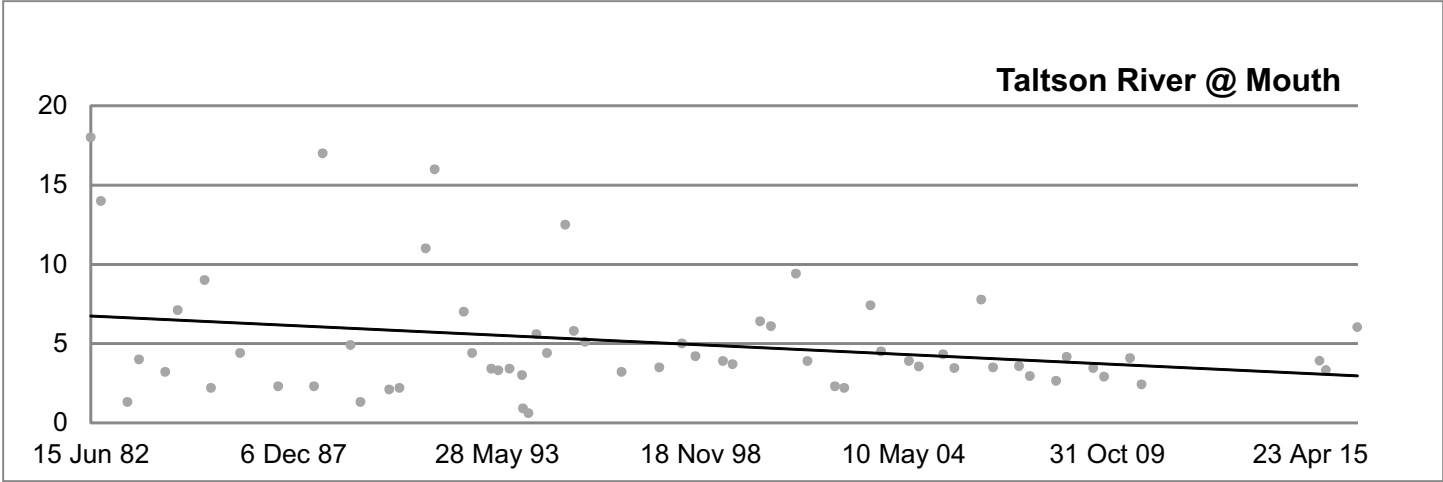
OFFICE
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DATE
March 30, 2017

Figure B.8b

STATUS
ISSUED FOR USE

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



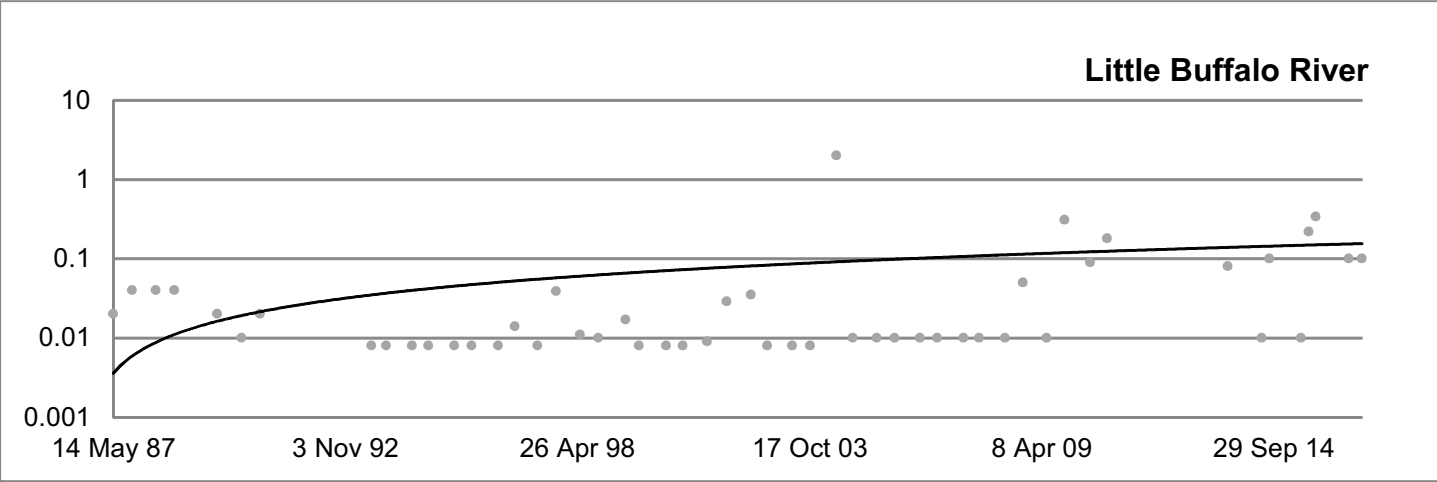
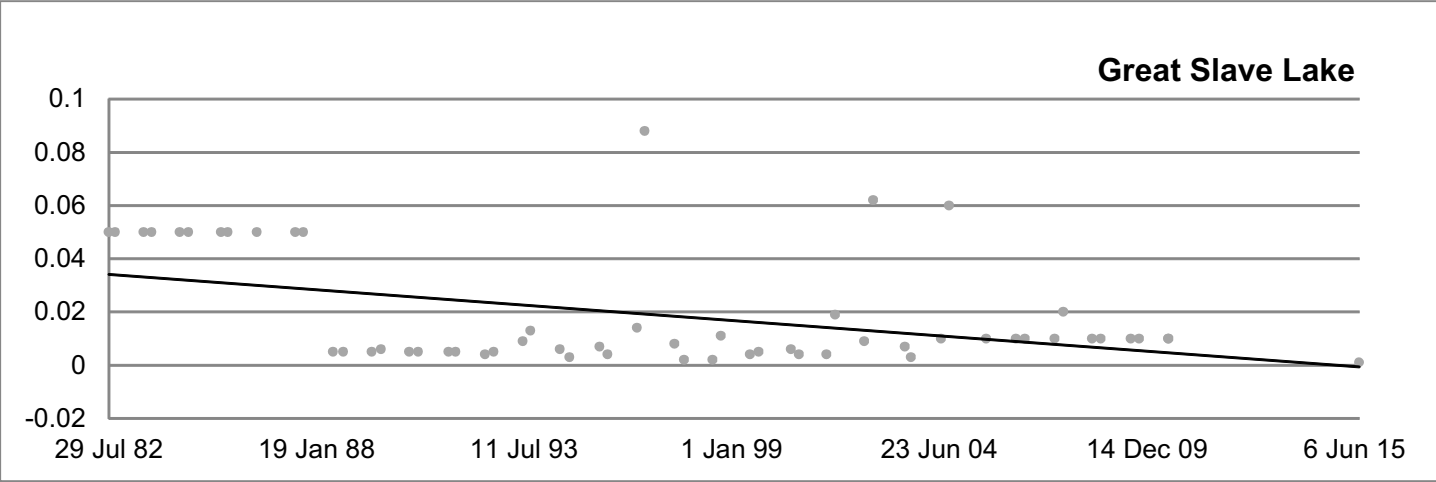
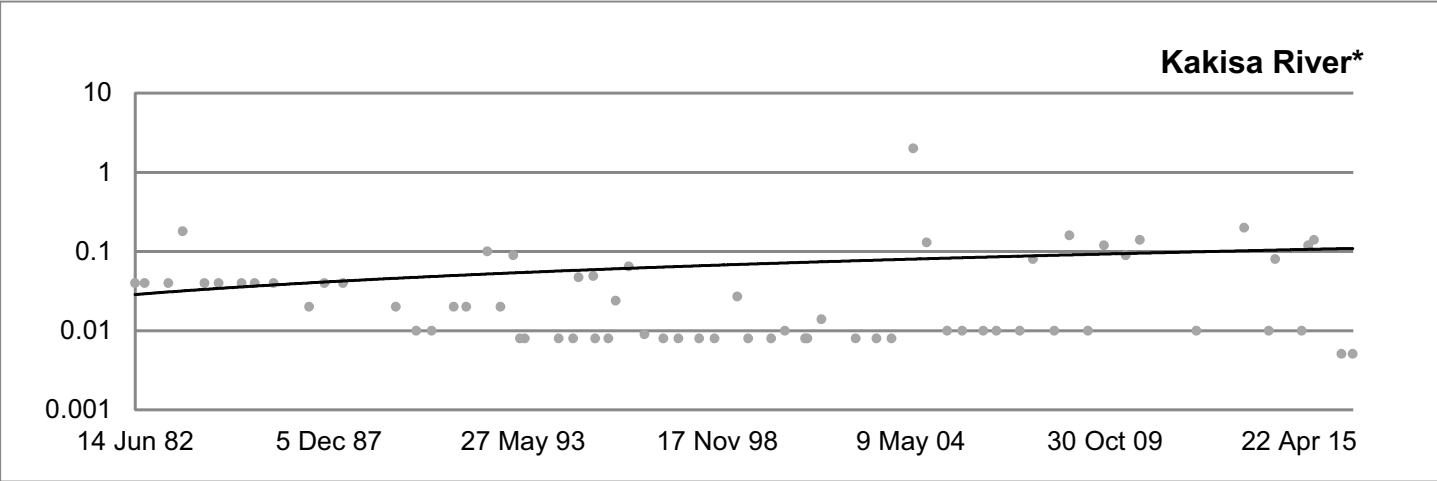
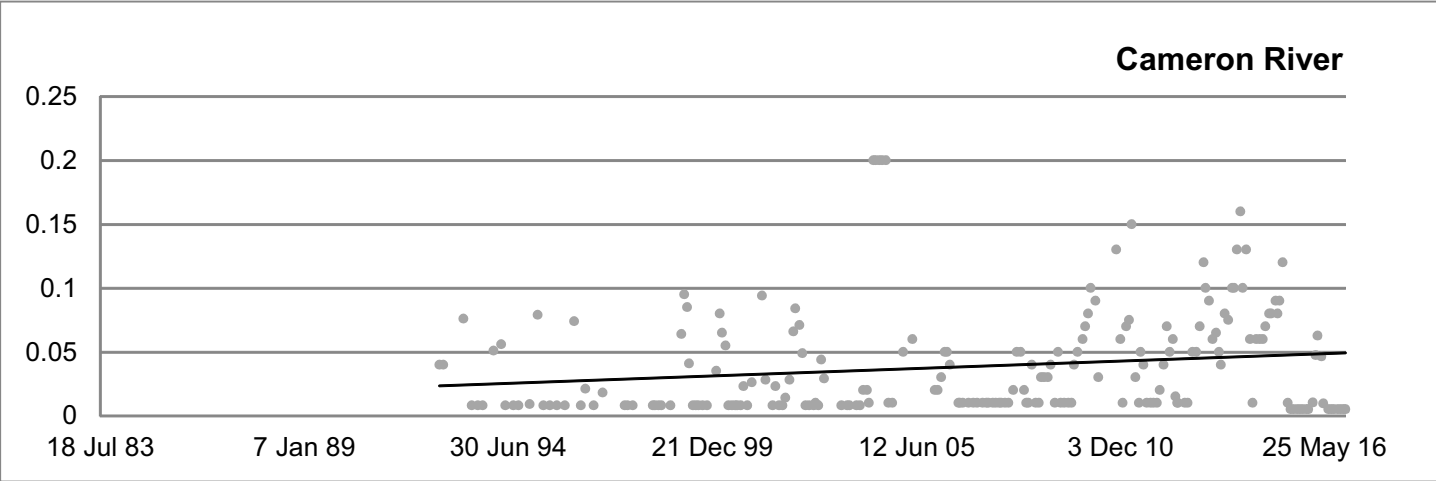
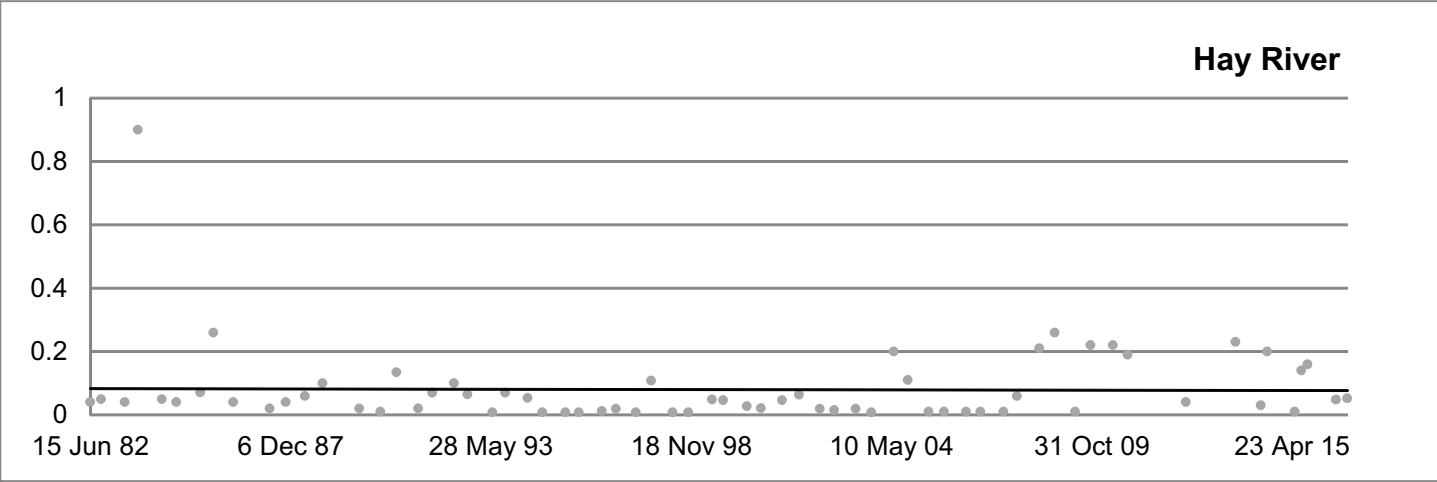
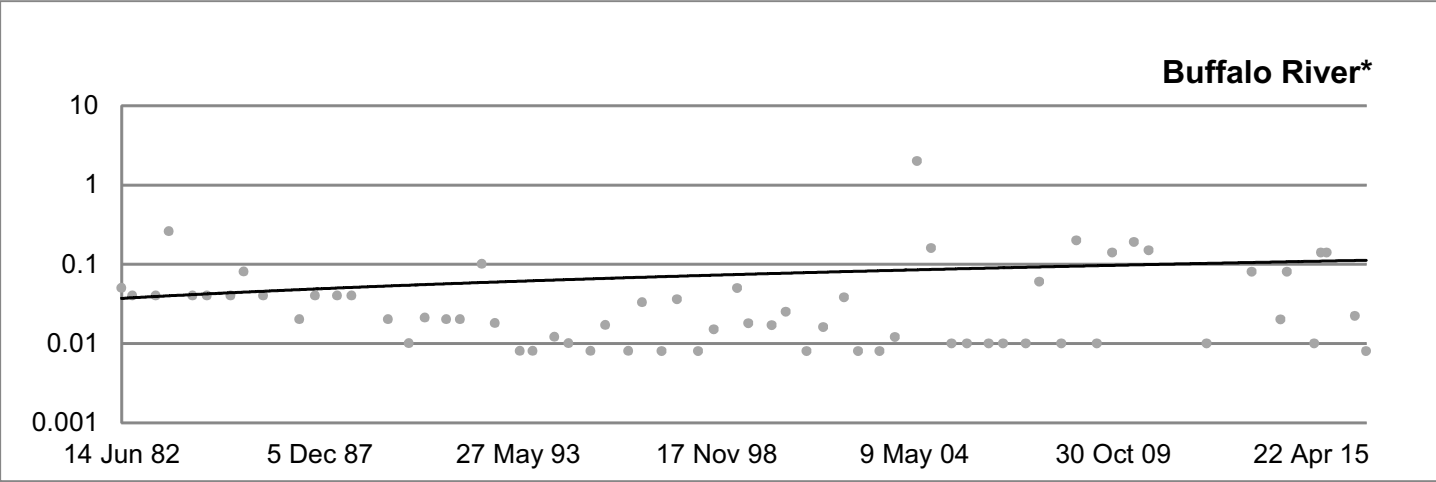
TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Turbidity (NTU)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0	Figure B.8c
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Nitrate-Nitrite (mg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

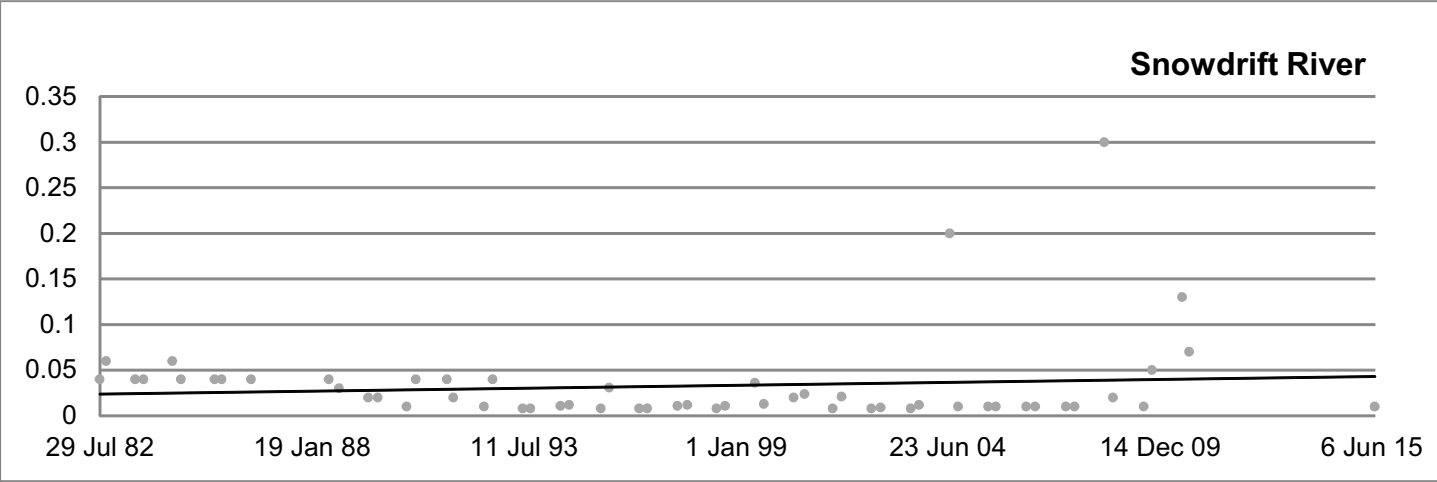
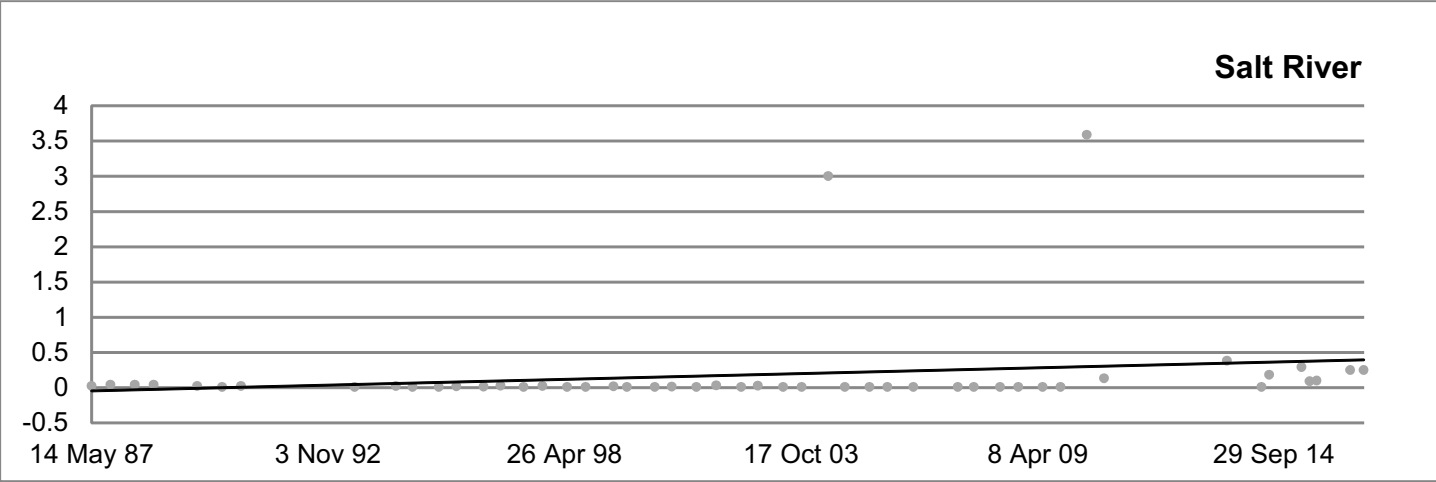
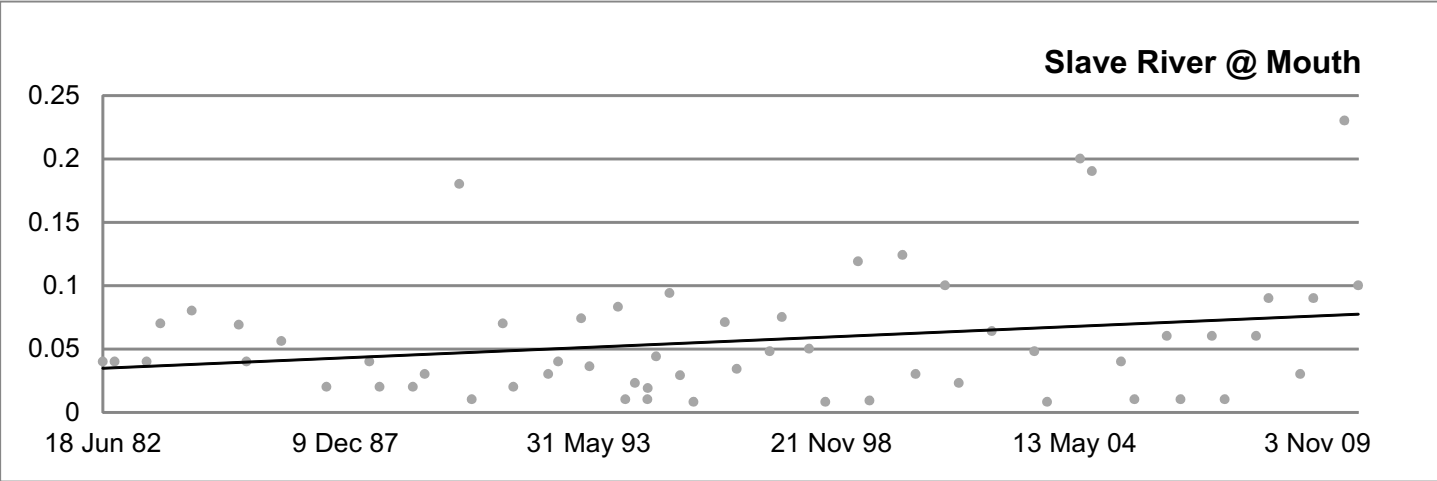
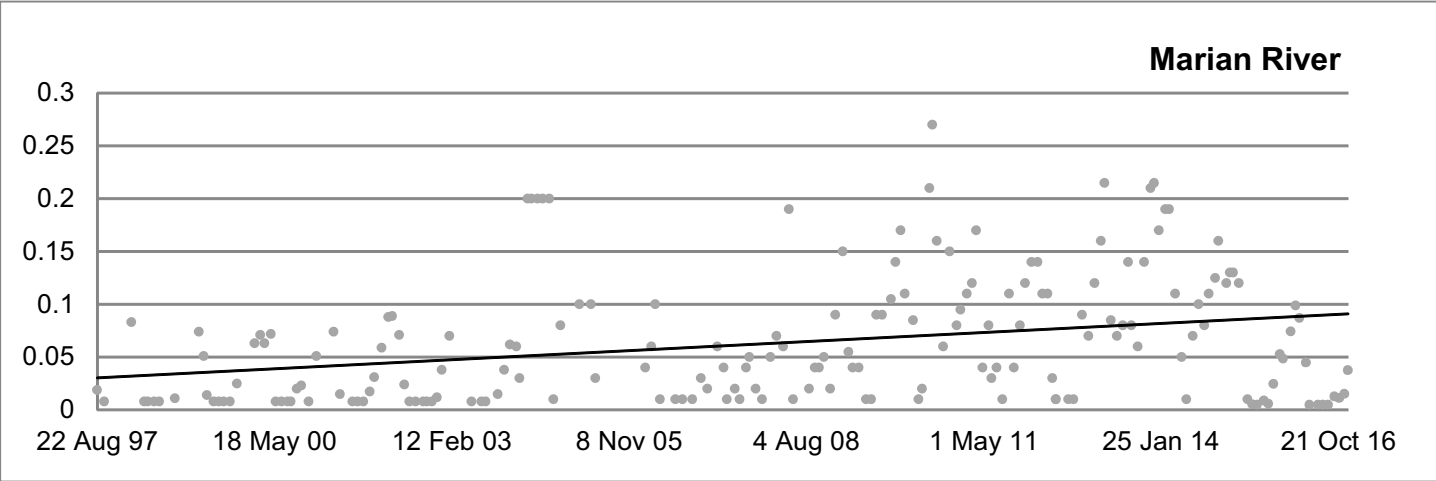
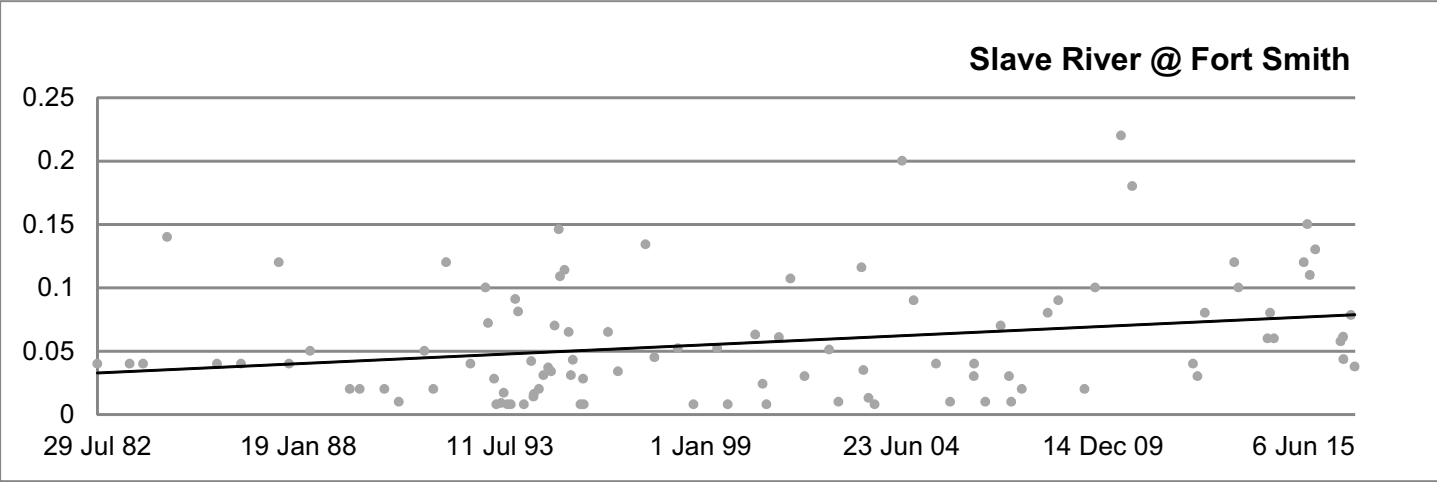
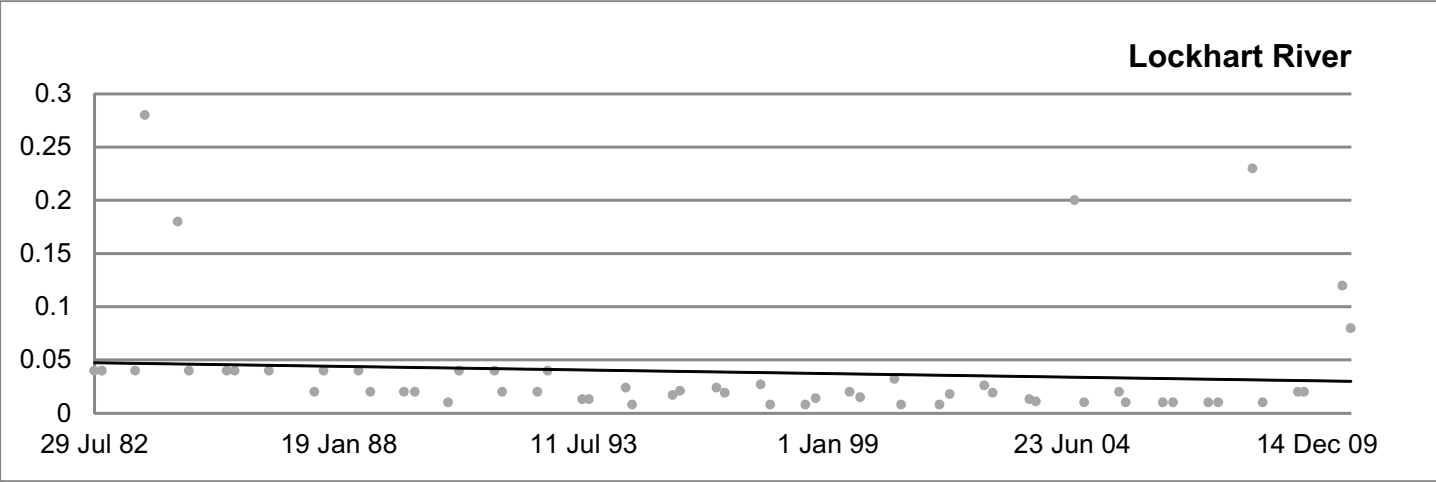
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DATE
March 30, 2017

Figure B.9a

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



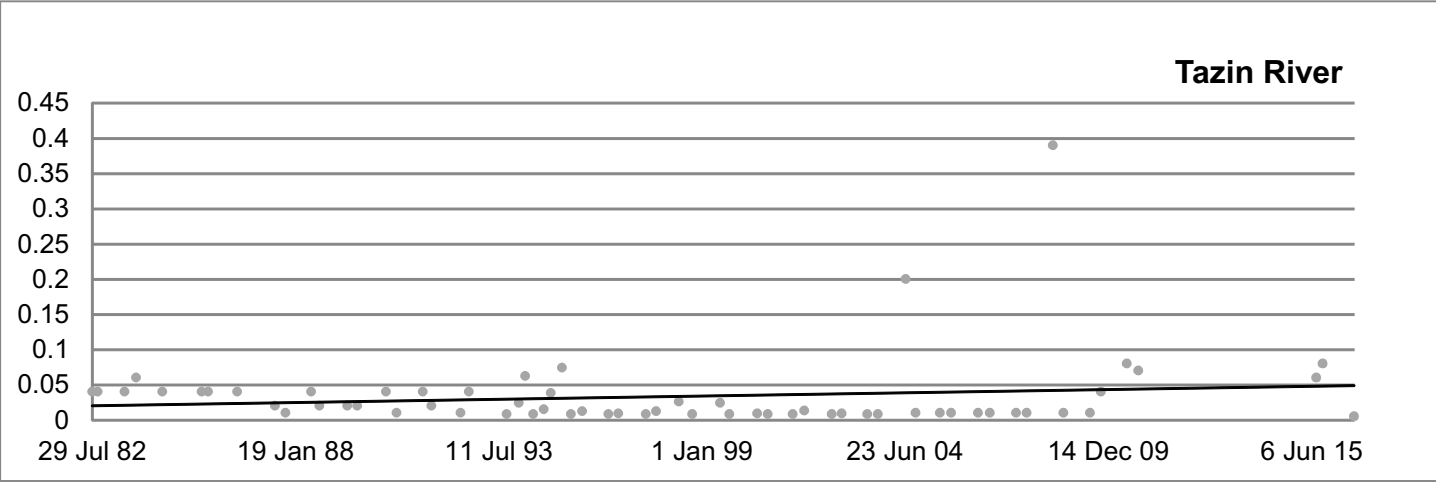
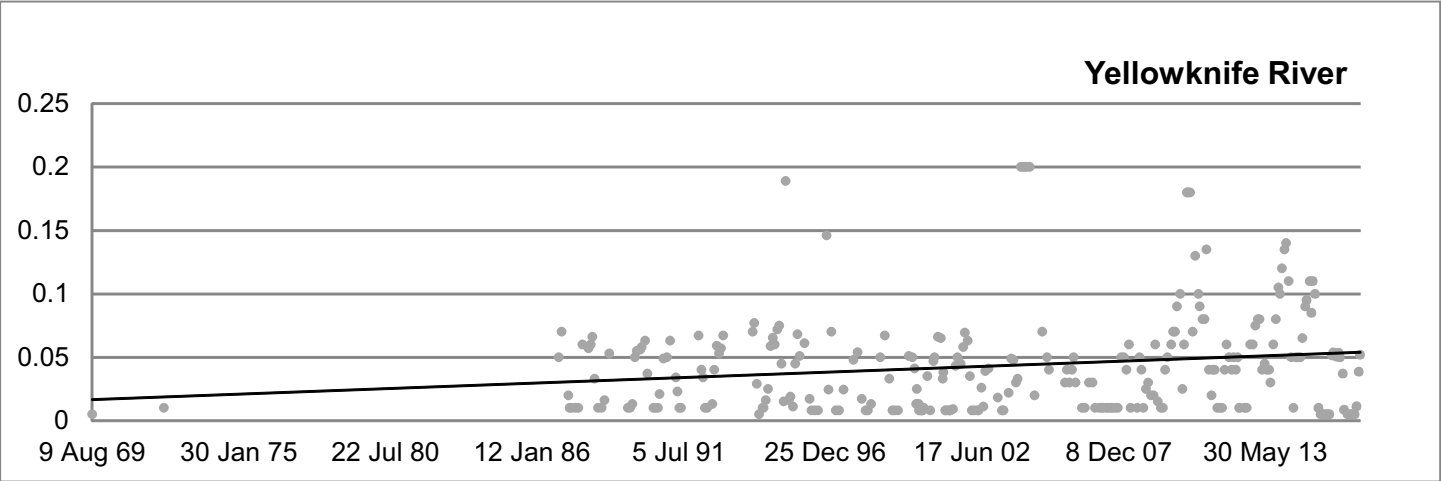
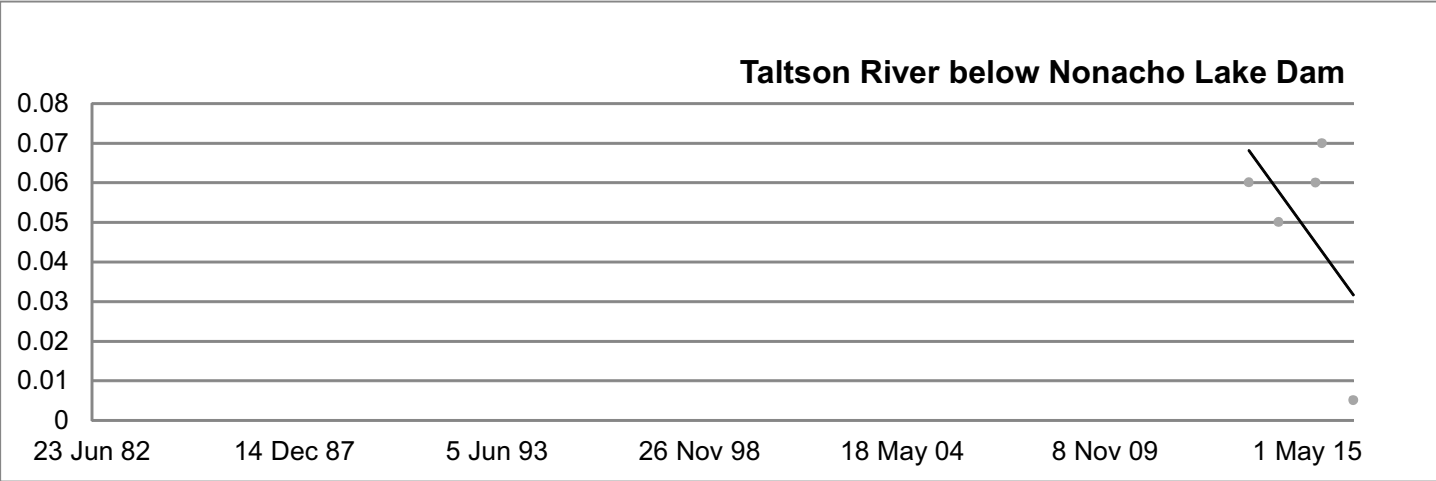
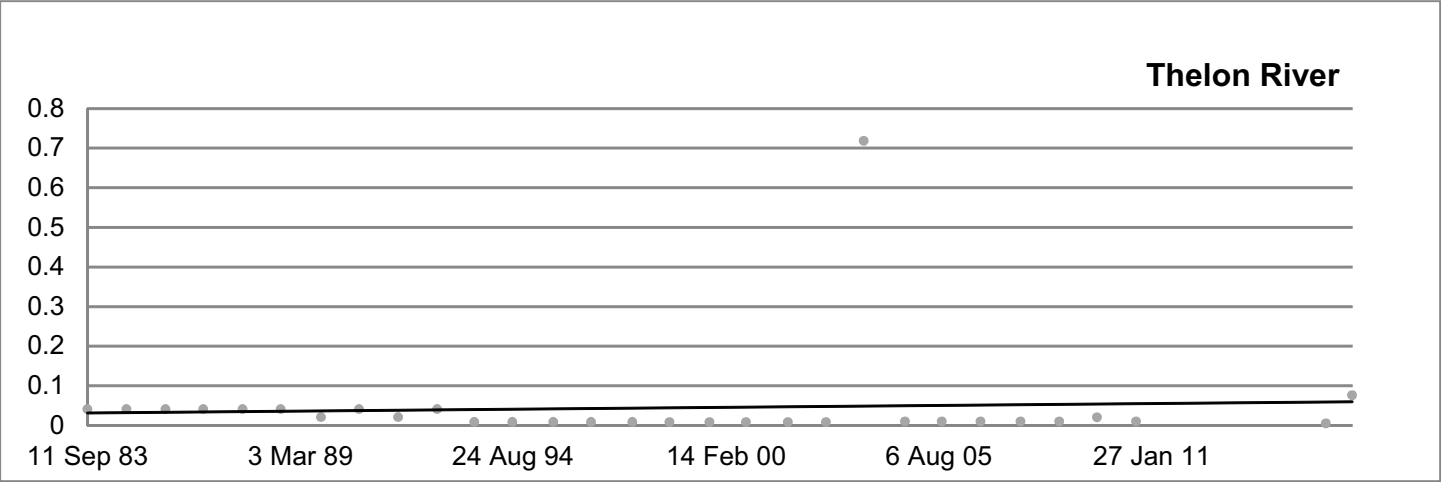
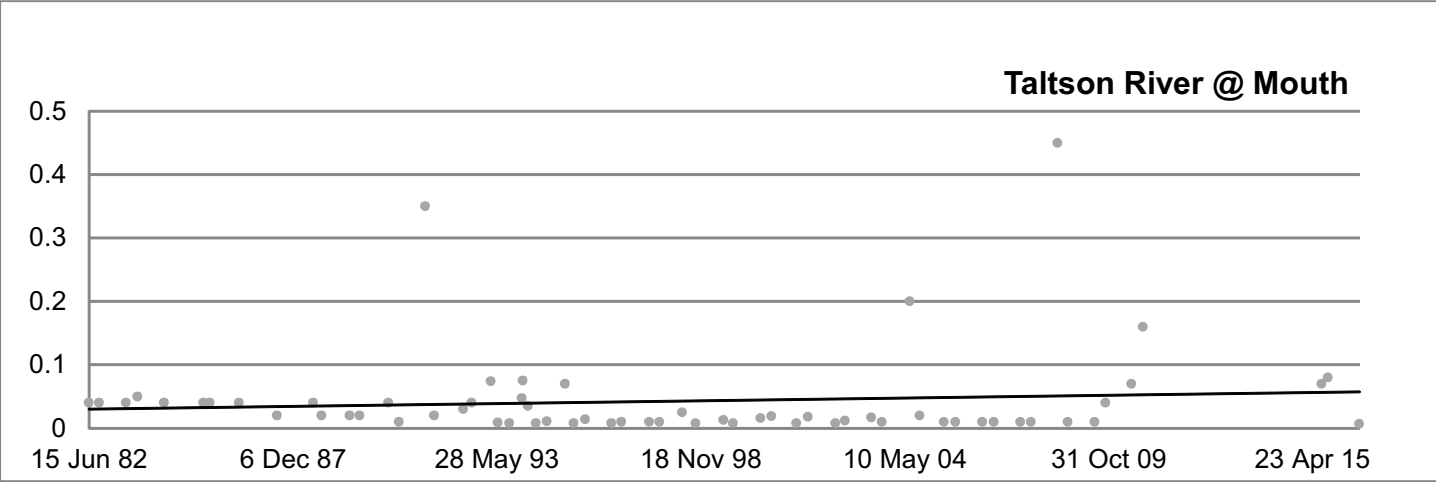
**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Nitrate-Nitrite (mg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.9b

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Nitrate-Nitrite (mg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

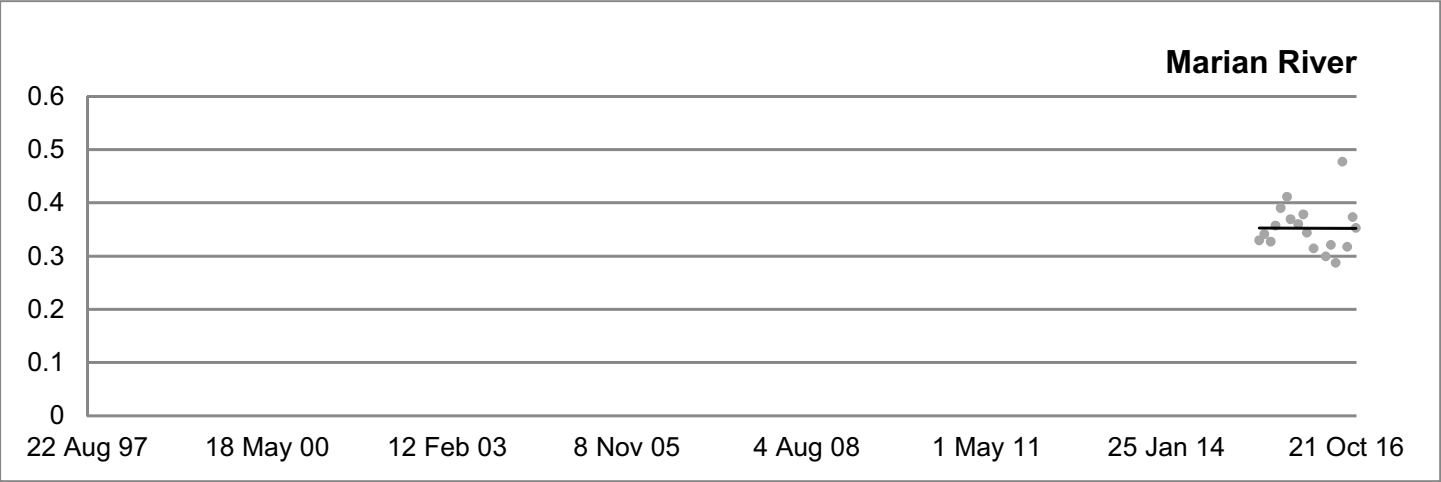
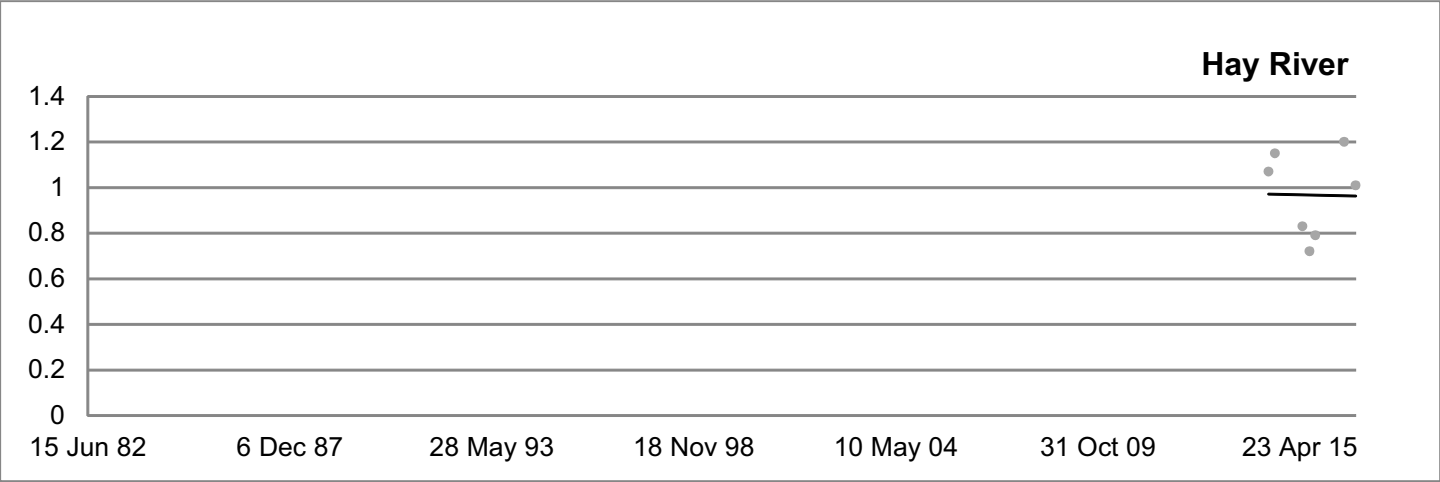
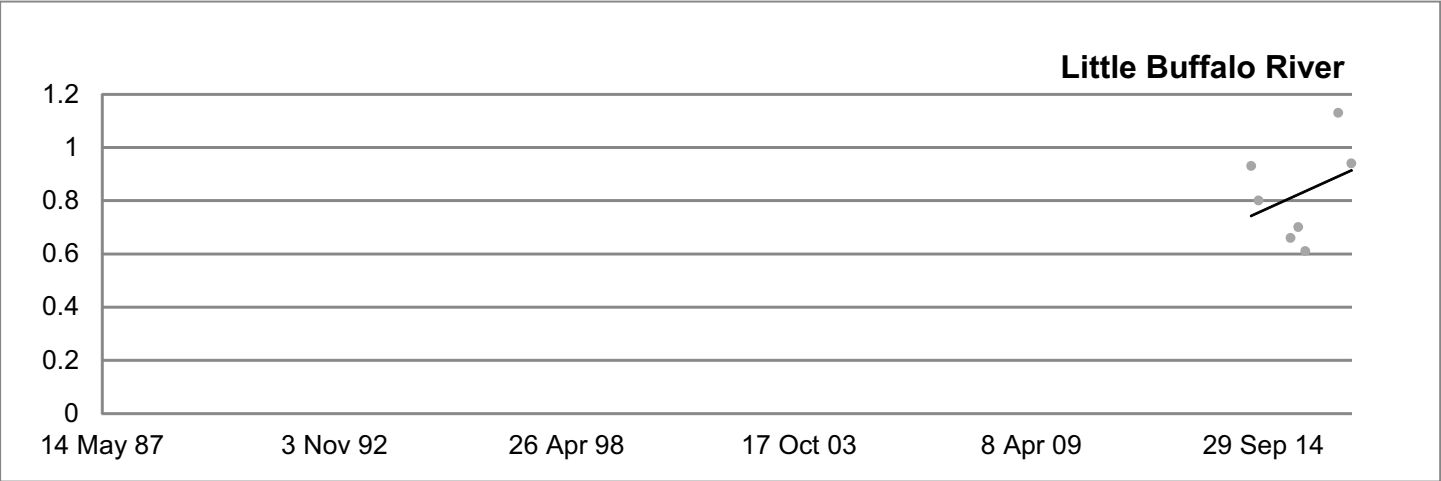
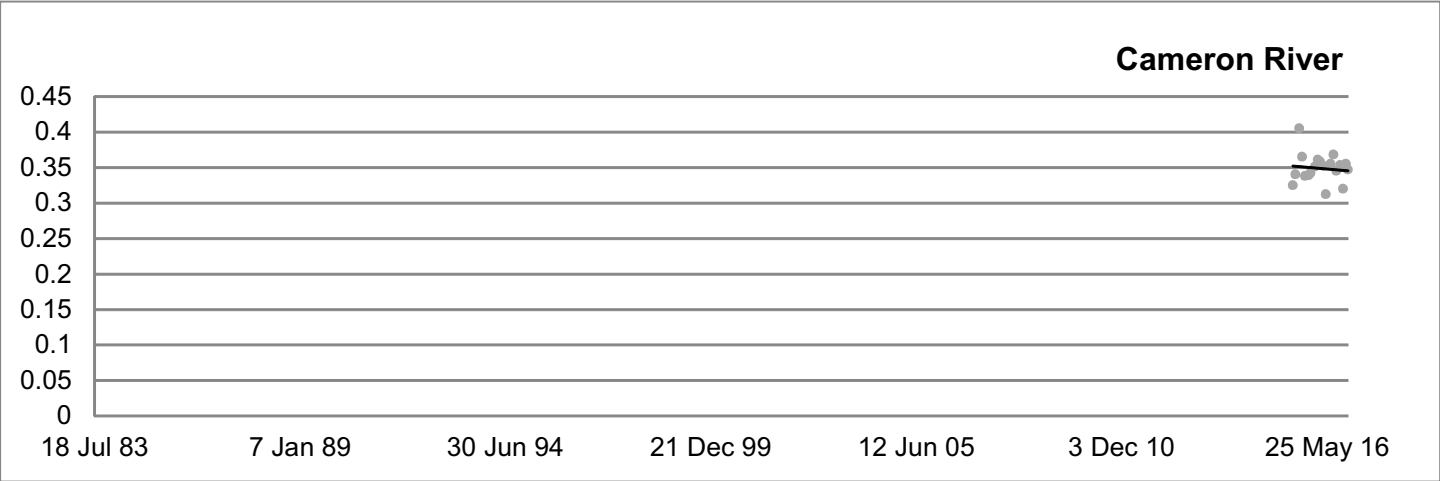
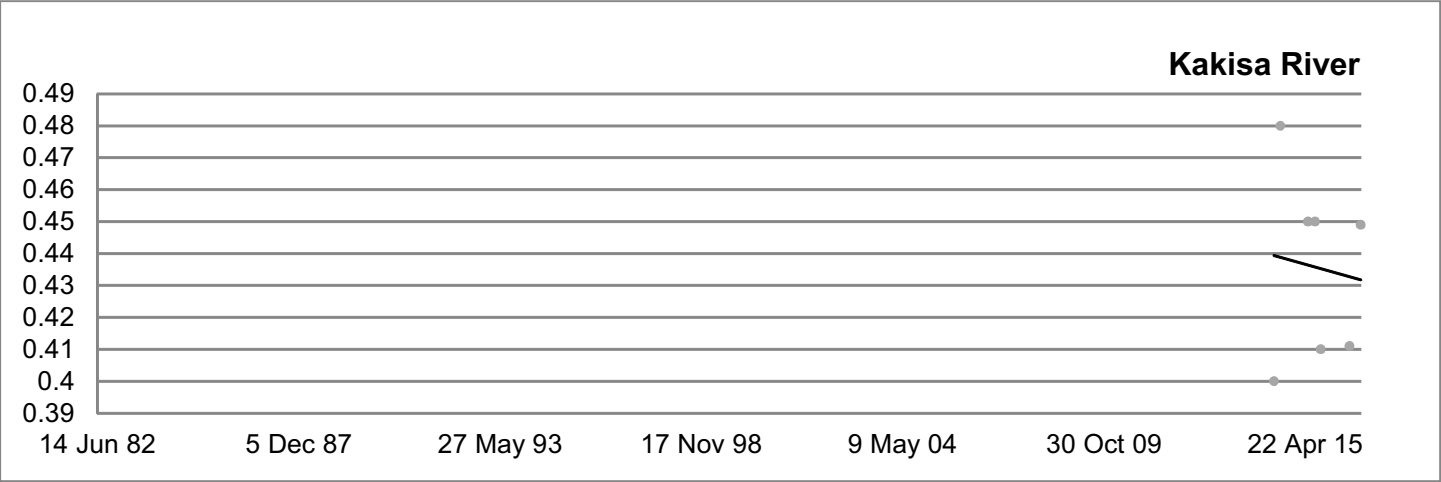
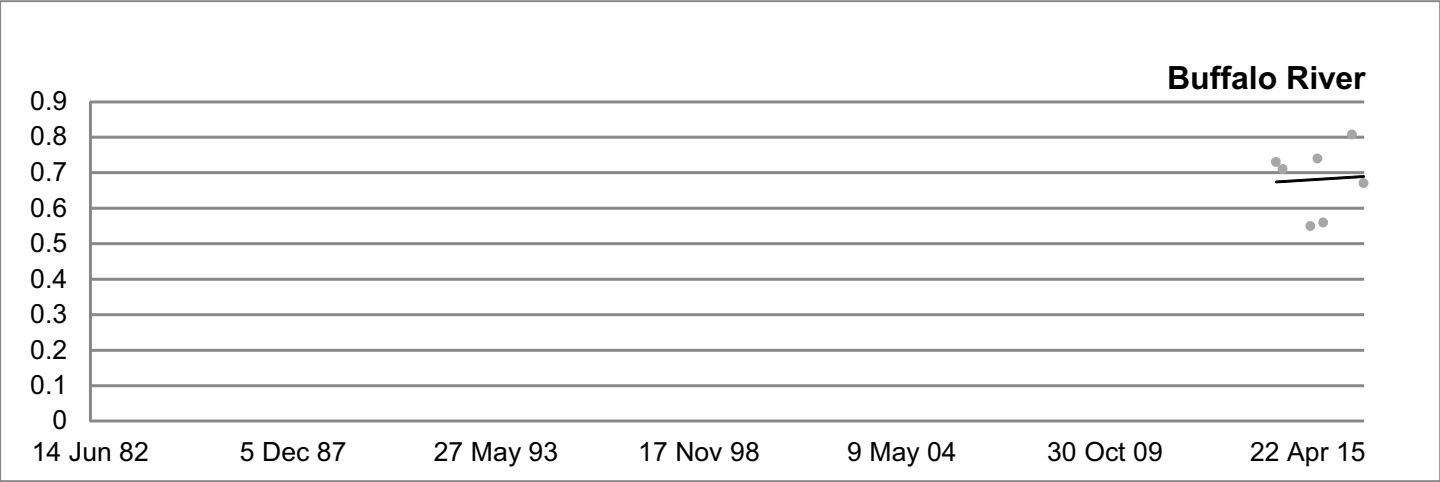
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DATE
March 30, 2017

Figure B.9c

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Total Nitrogen (mg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

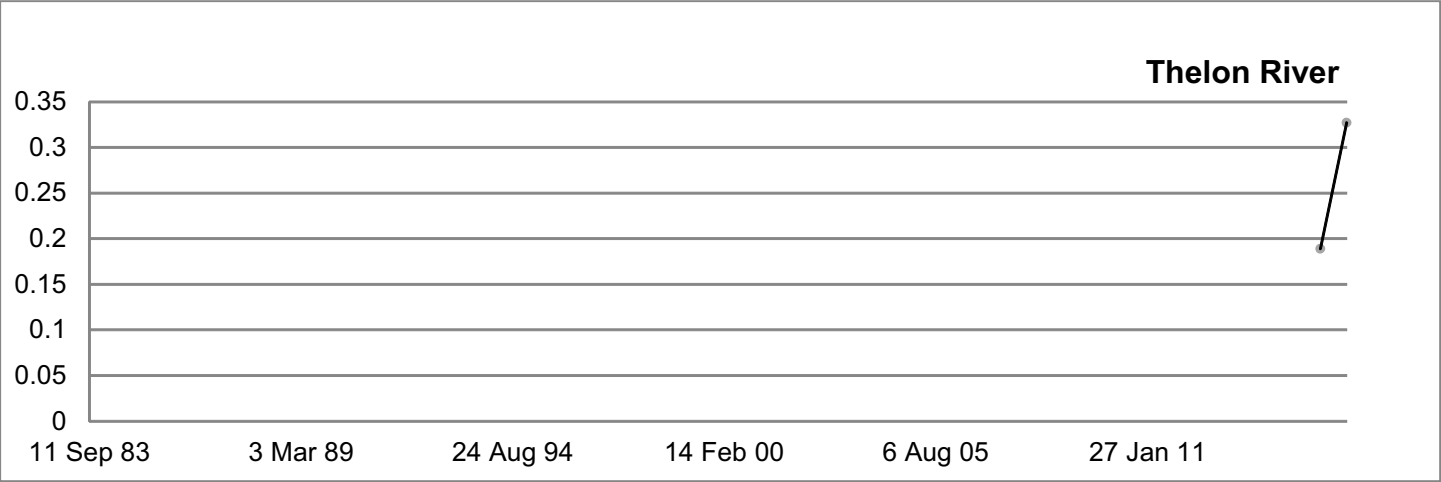
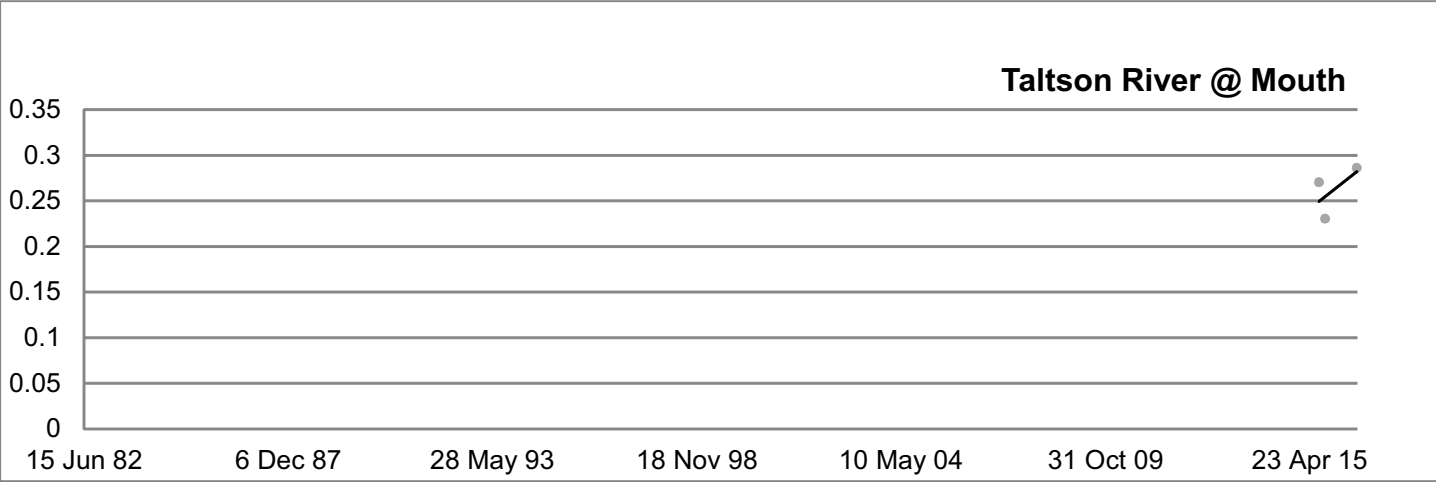
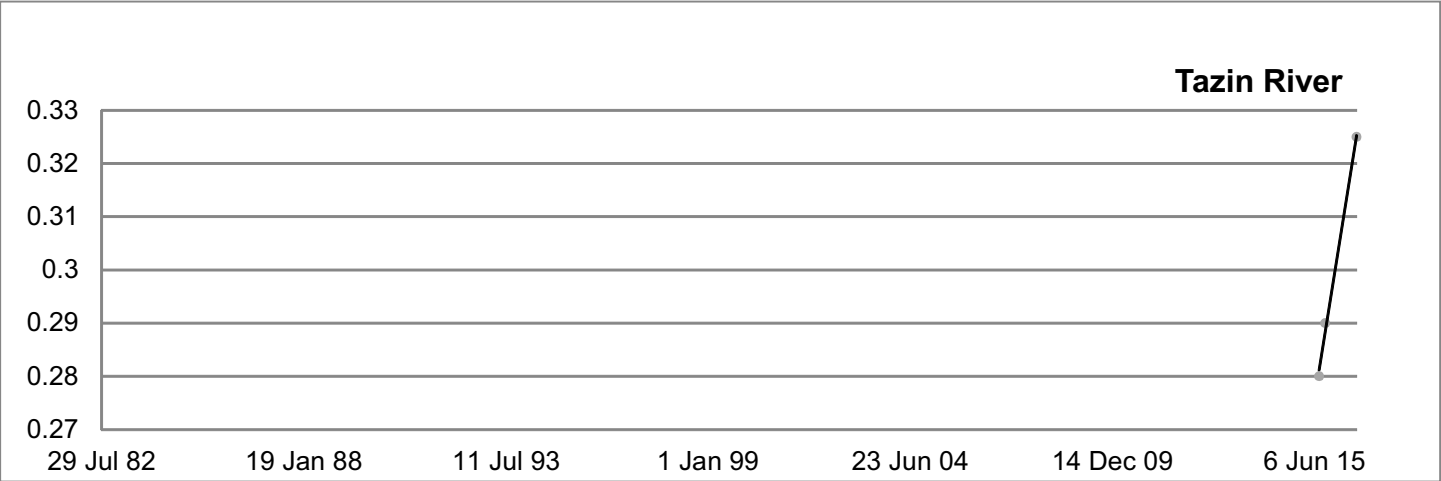
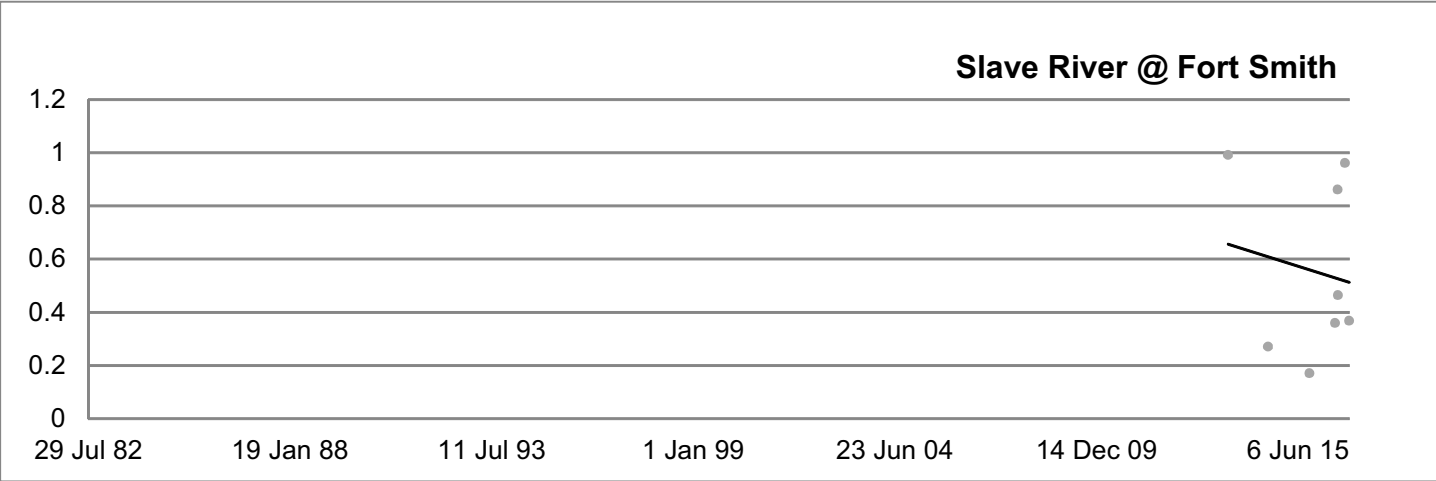
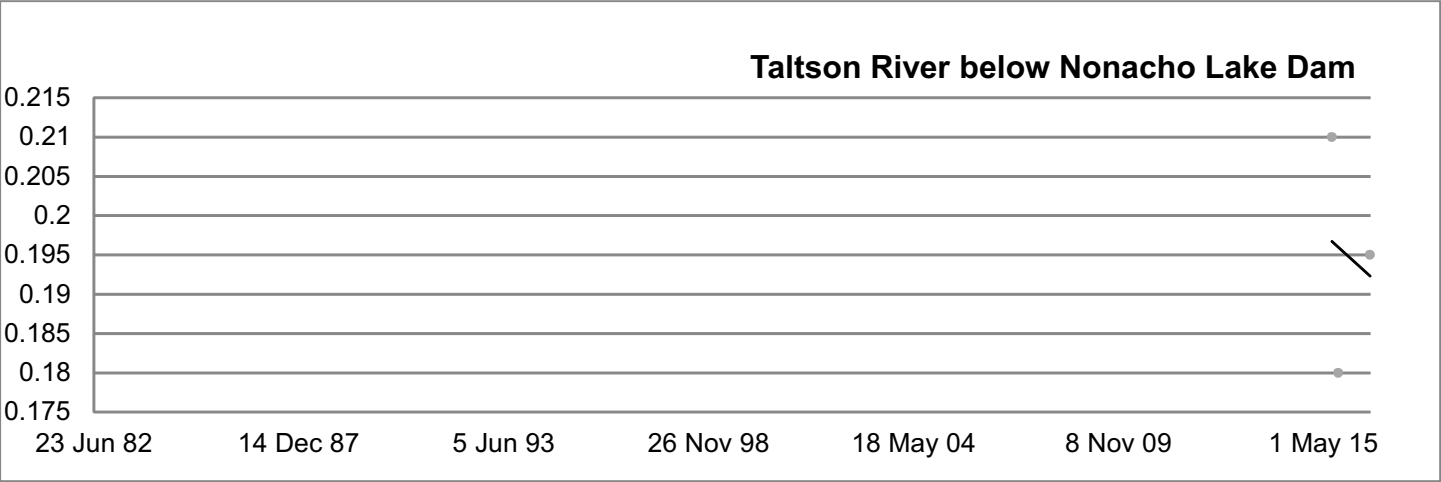
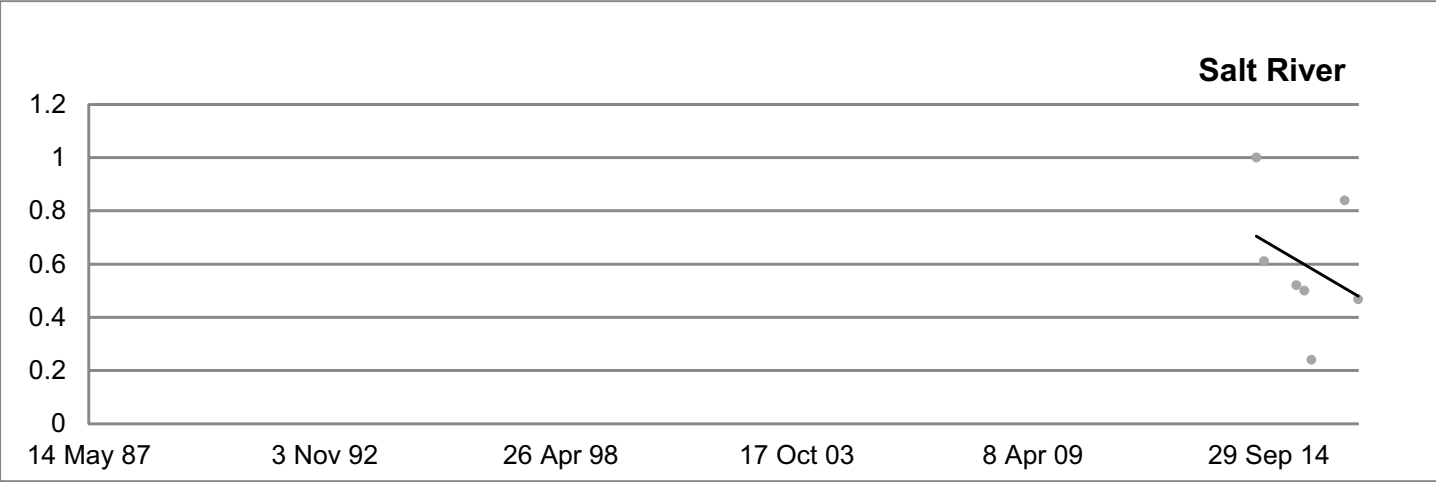
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DATE
March 30, 2017

Figure B.10a

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Total Nitrogen (mg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

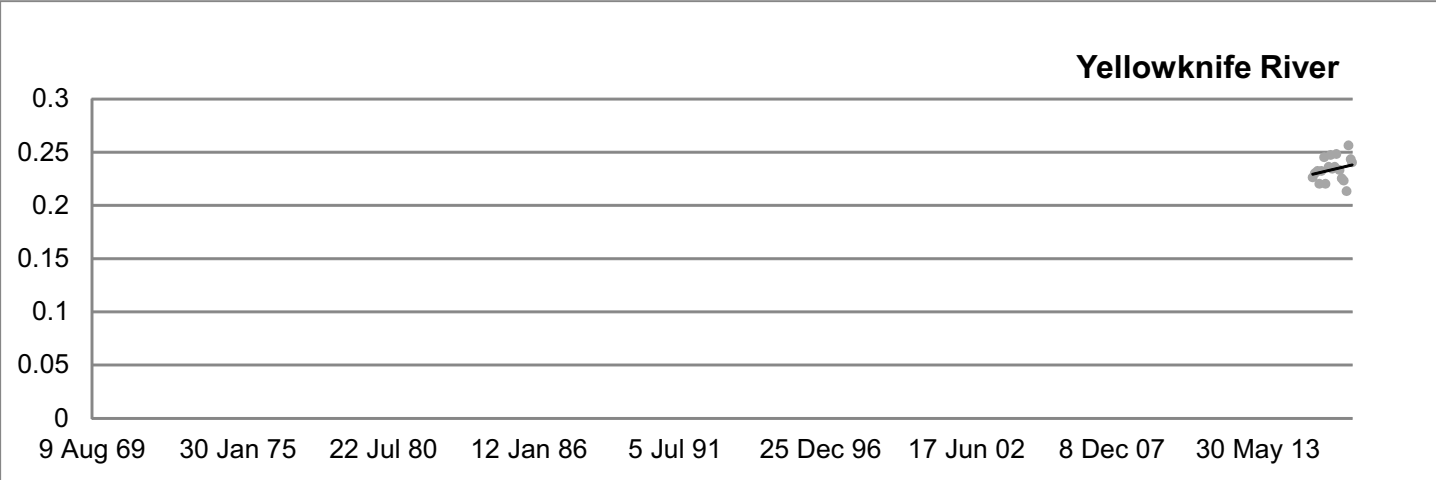
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OFFICE
Tt-VANC

DATE
March 30, 2017

Figure B.10b

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW\VENW03044-01\Scatterplots



LEGEND

Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT

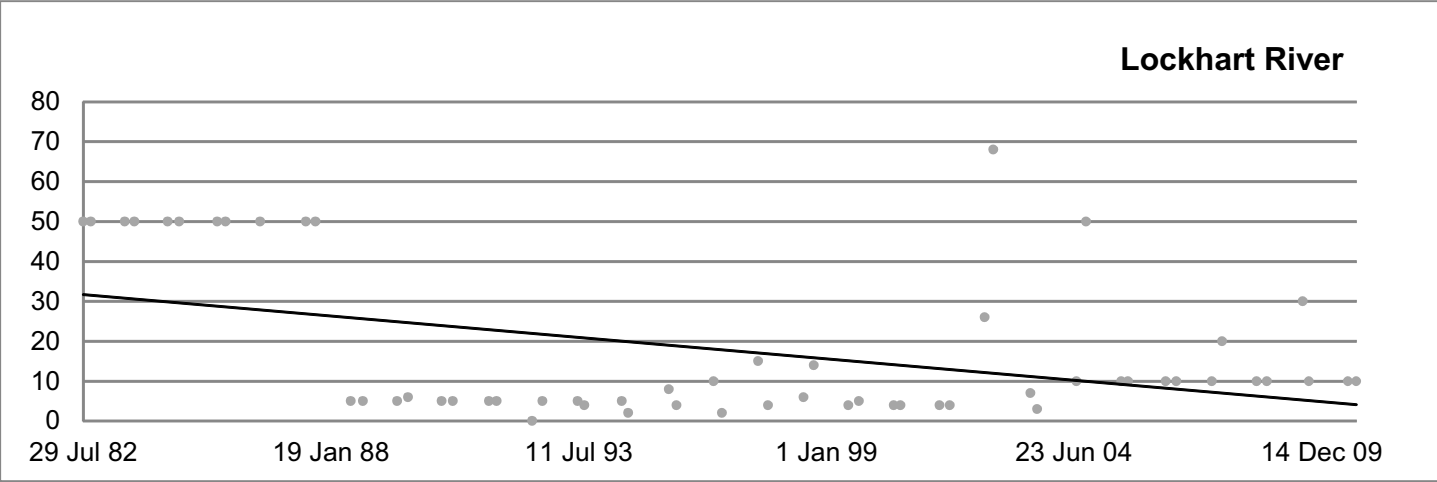
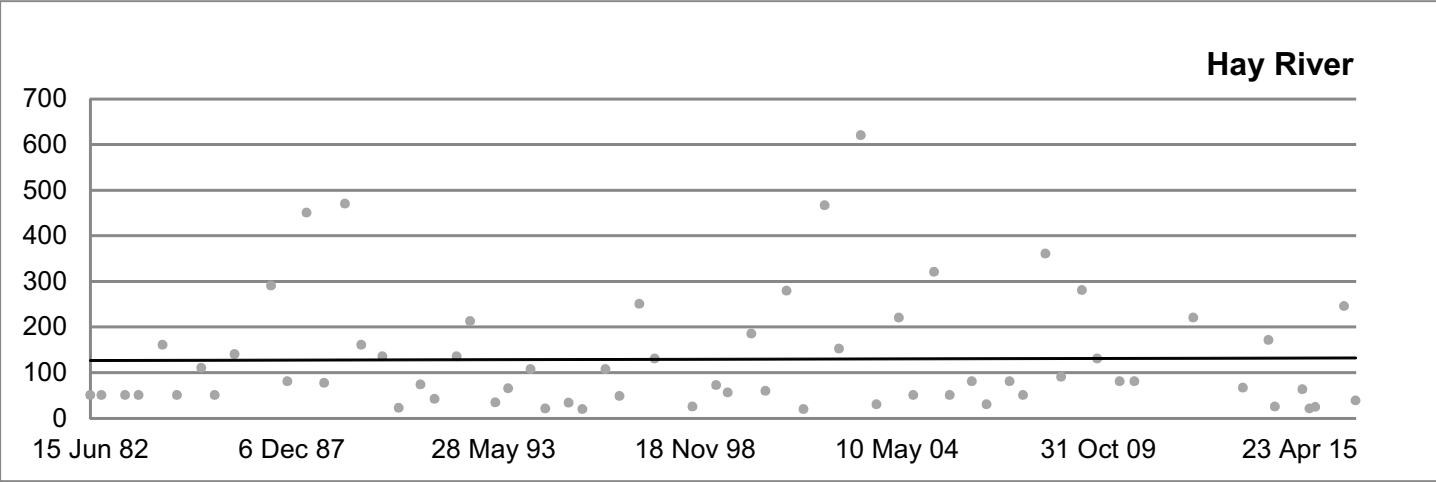
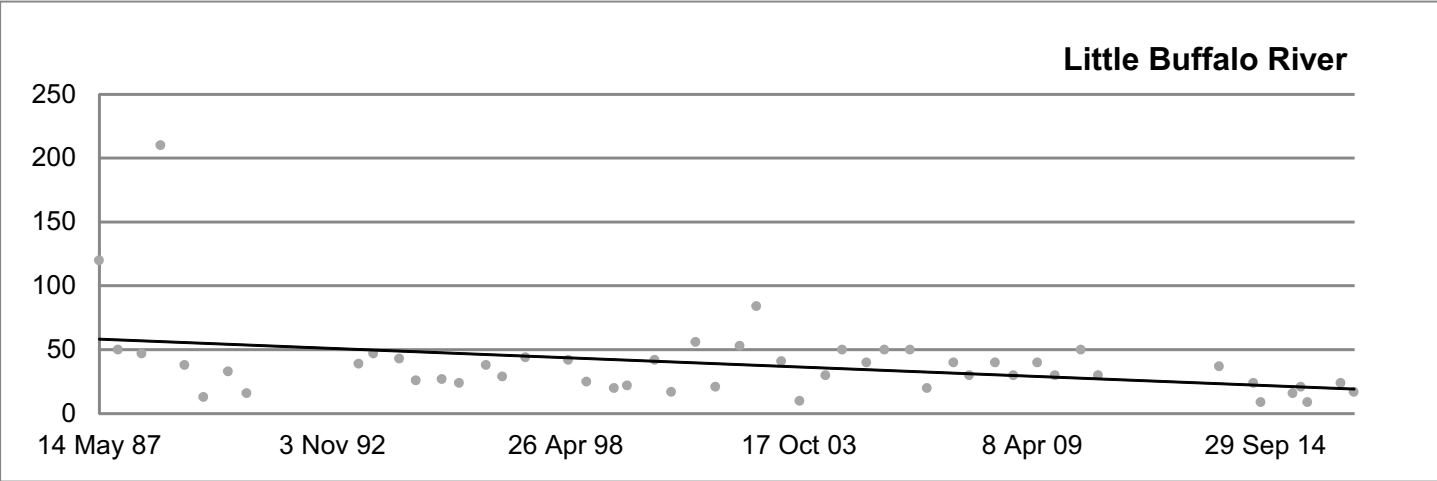
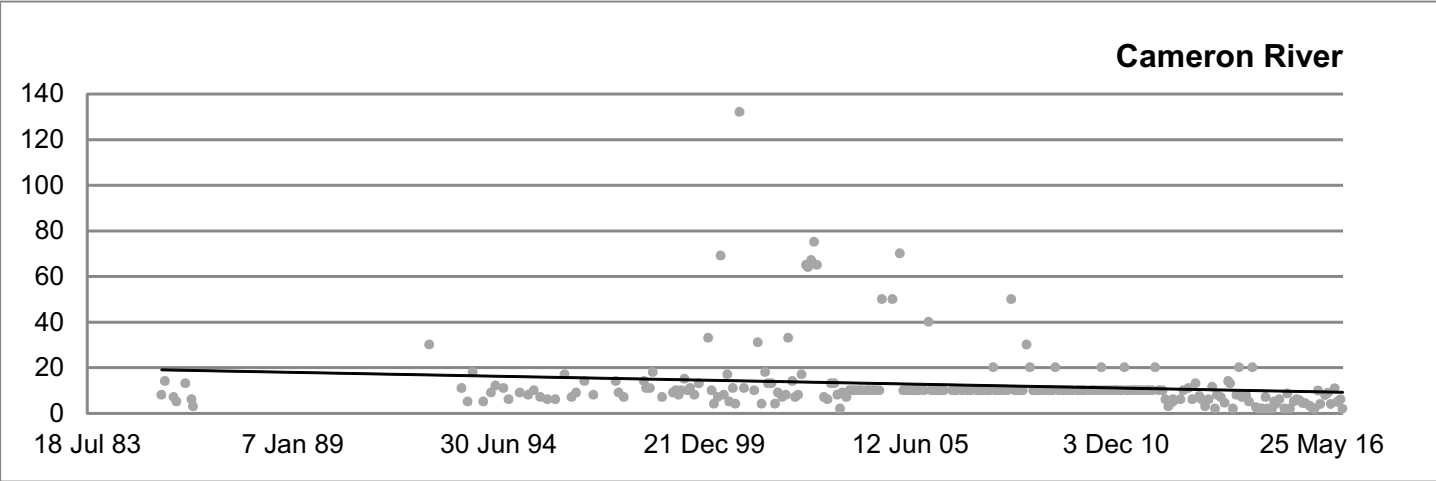
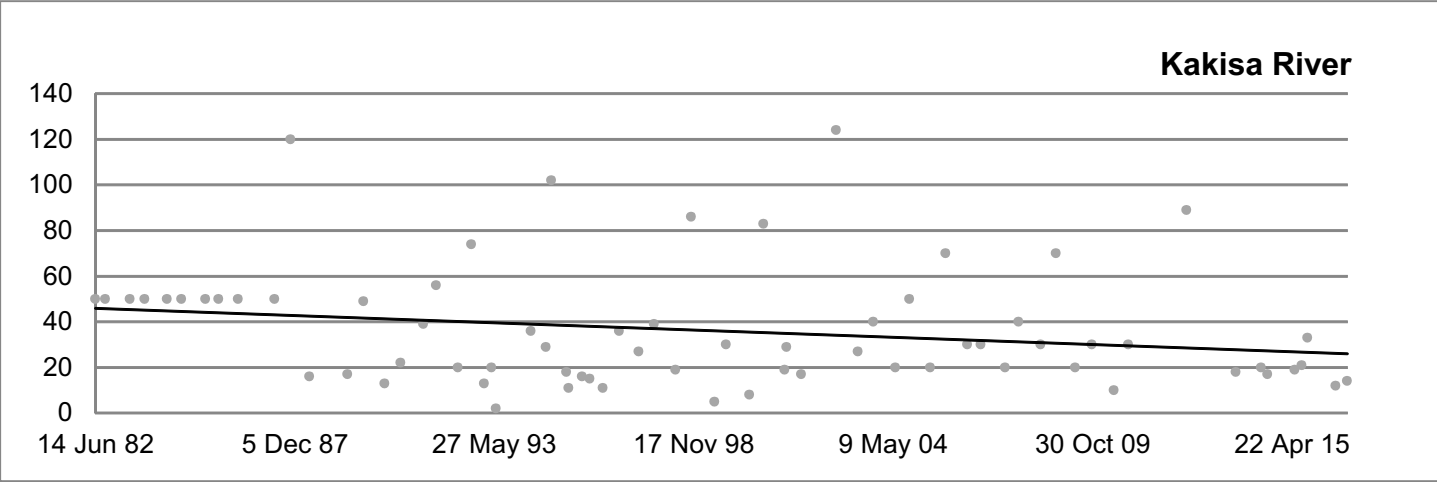
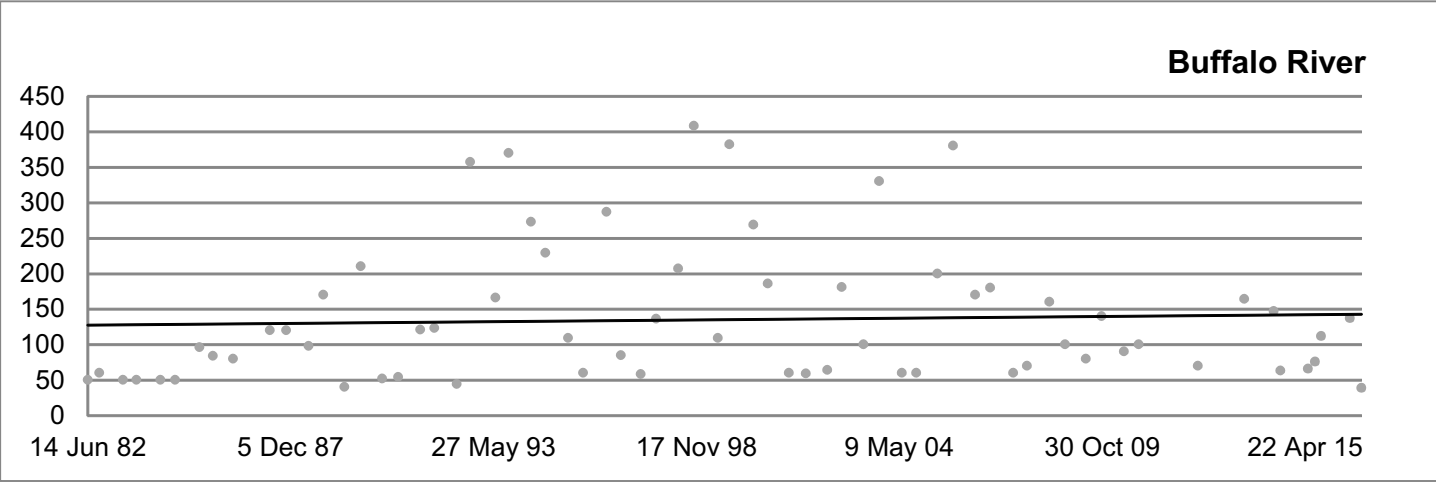


STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Total Nitrogen (mg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0	Figure B.10c
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

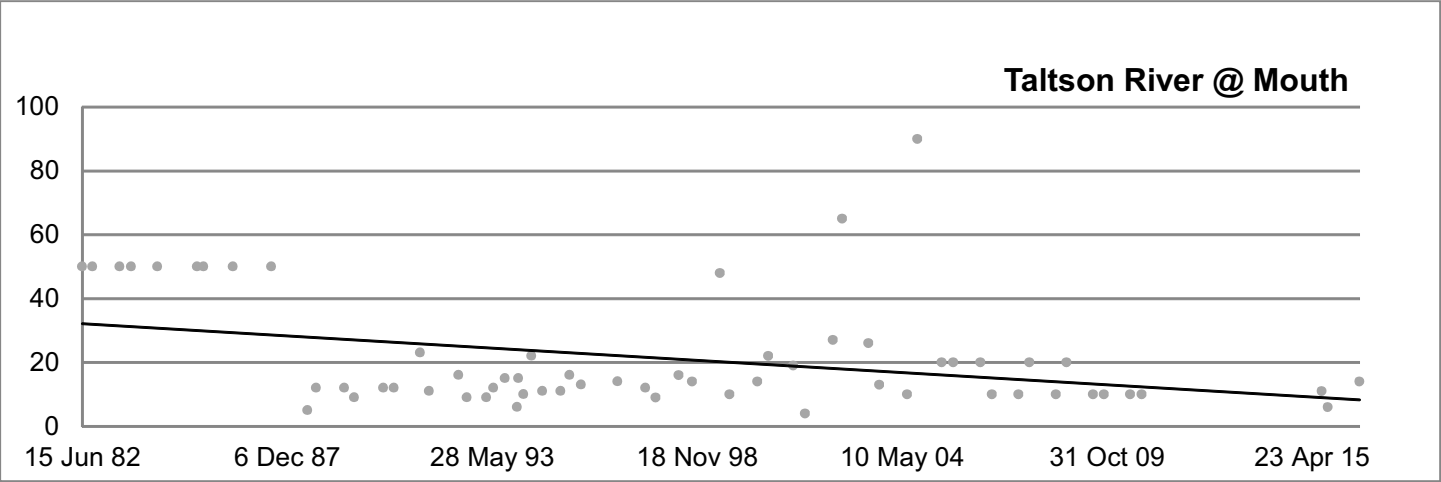
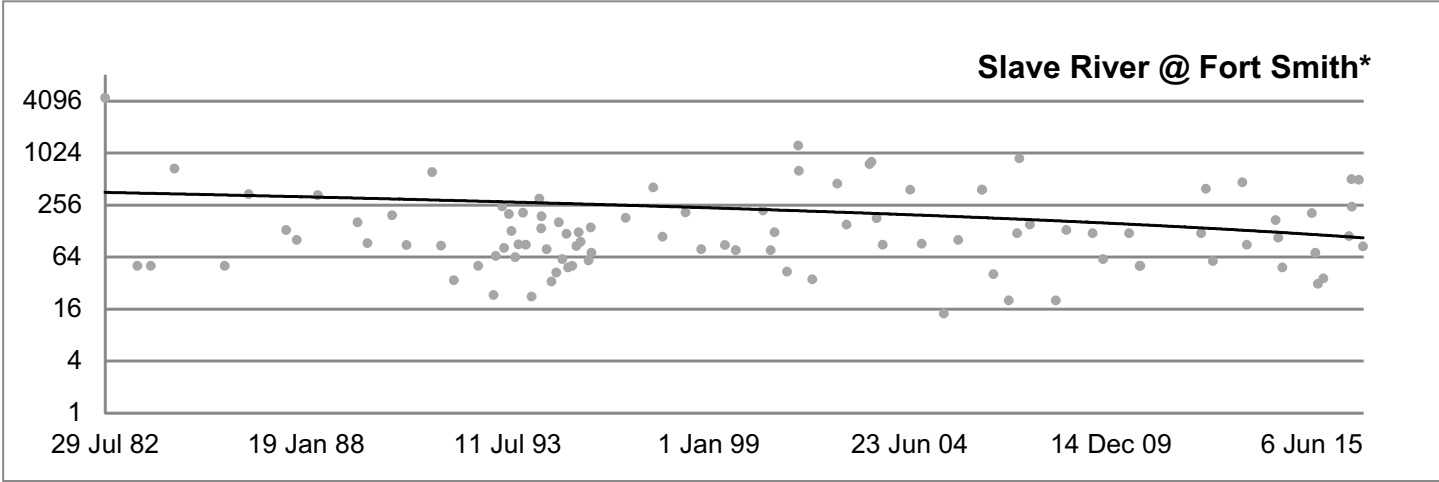
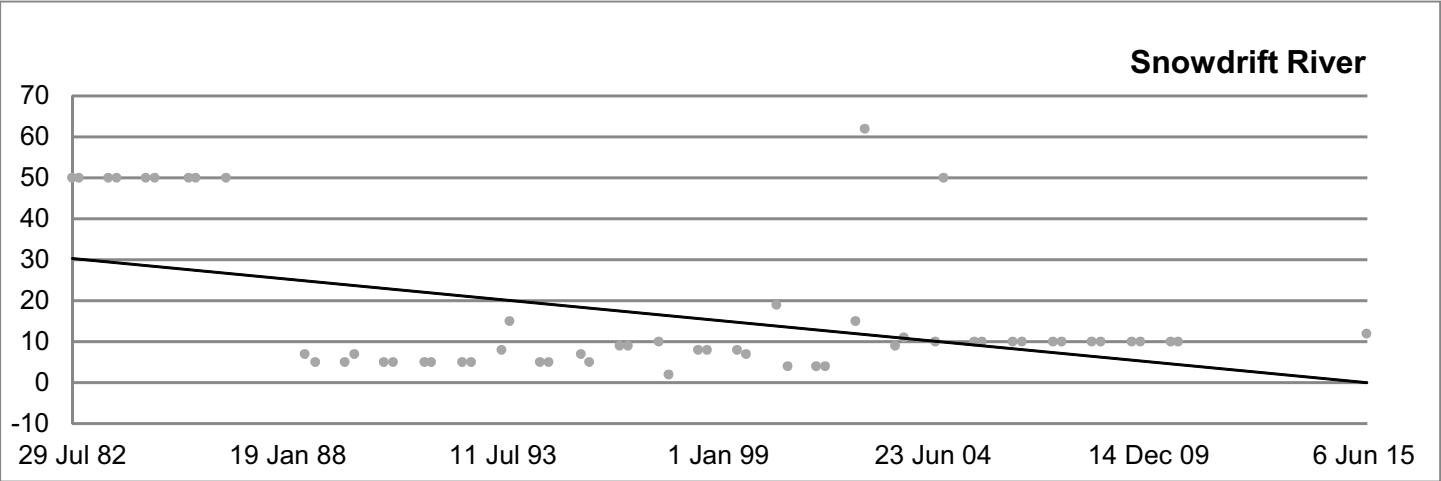
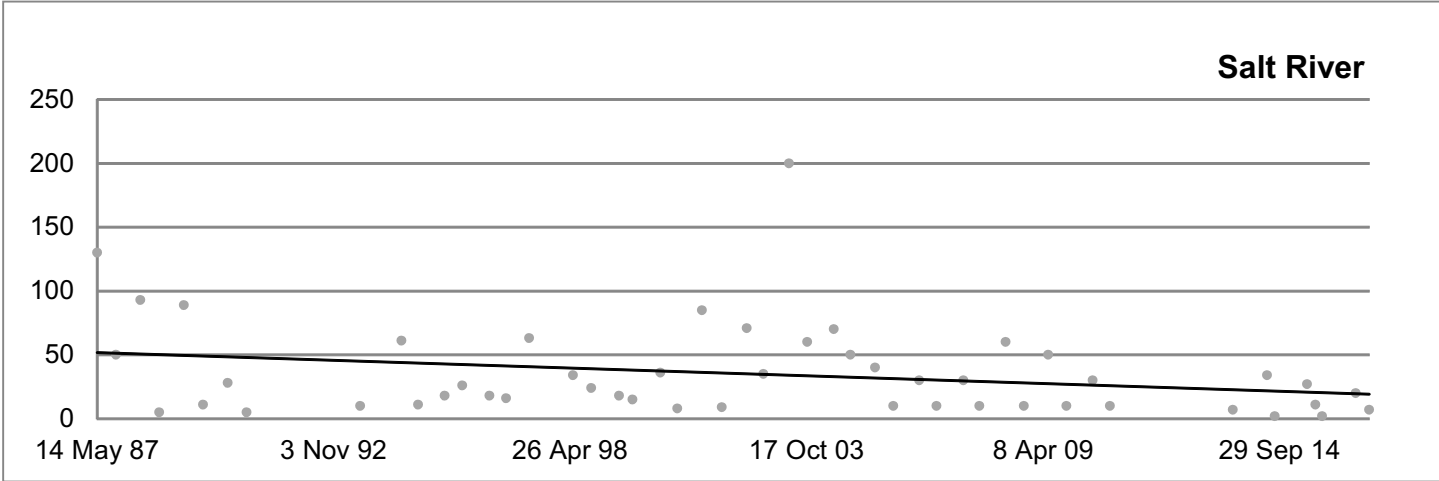
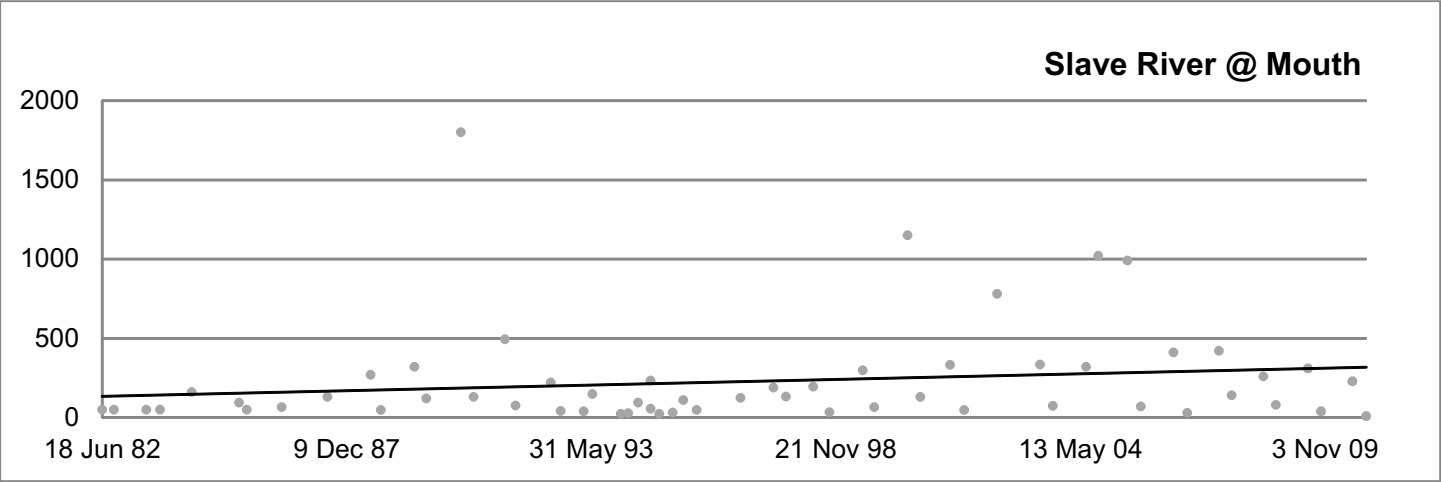
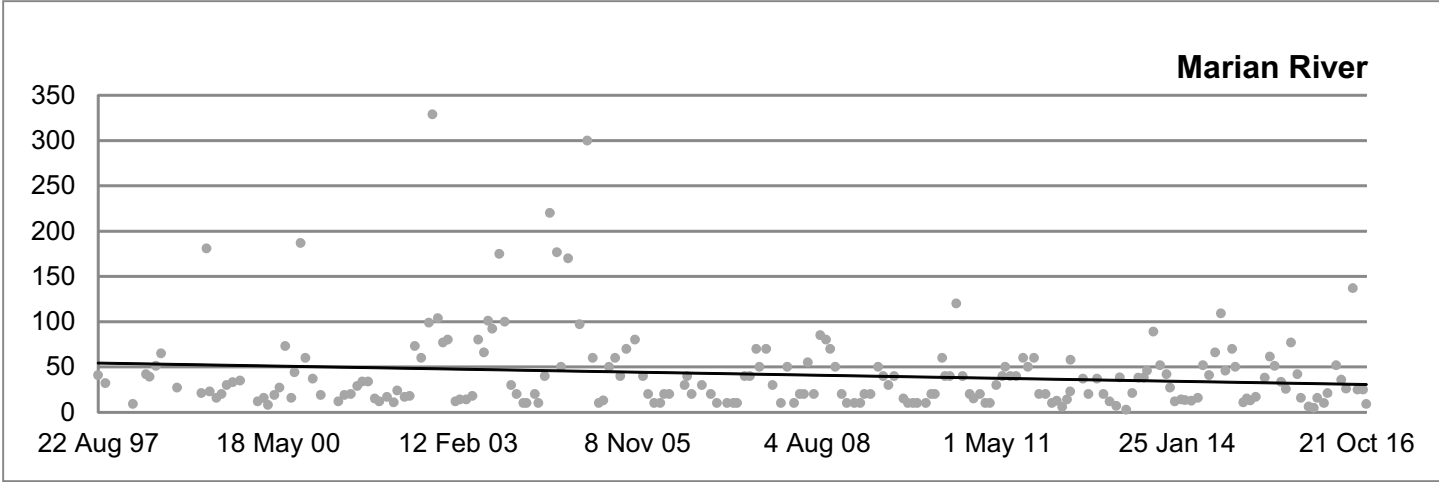
Total Phosphorus (mg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO.
ENW.VENW03044-01
OFFICE
Tt-VANC

DWN
SL
CKD
MEZ
APVD
SW
REV
0
DATE
March 30, 2017

Figure B.11a

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT

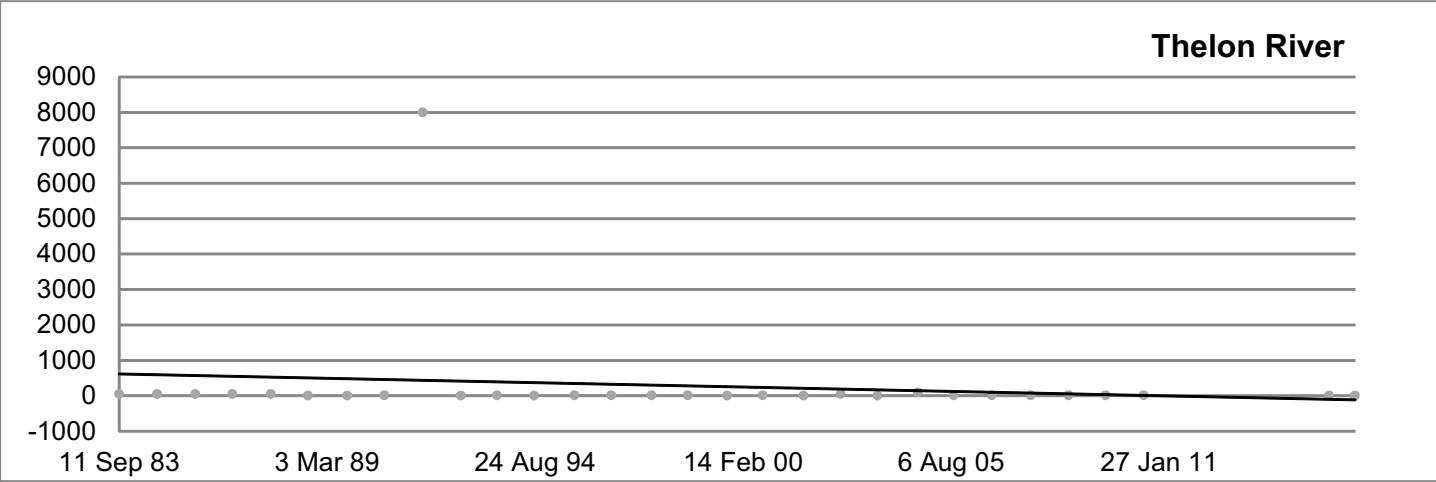
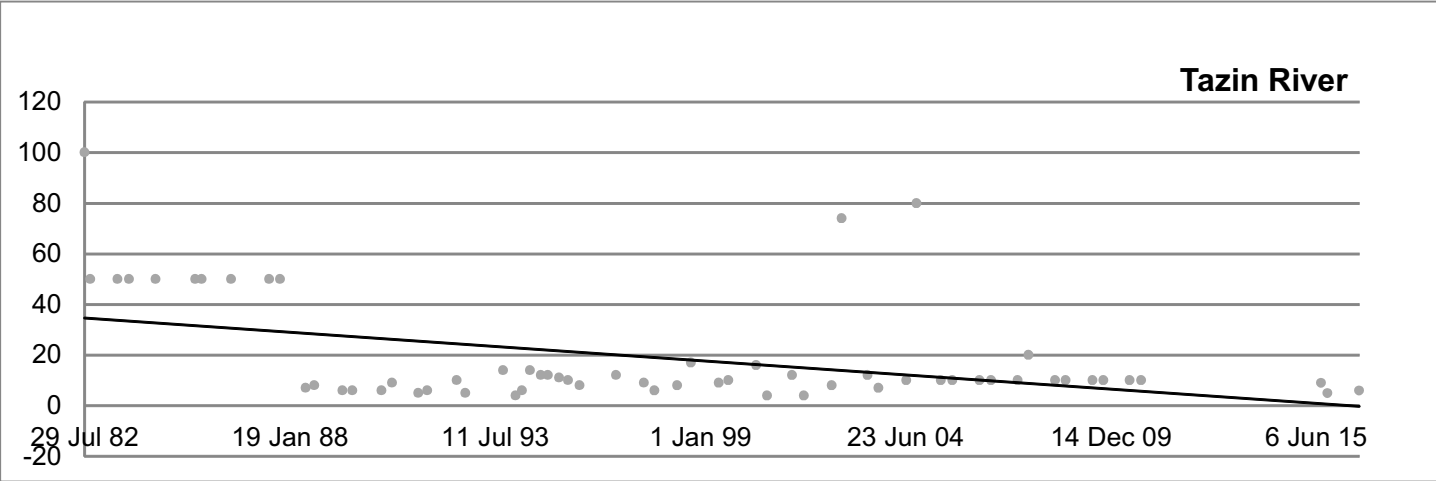
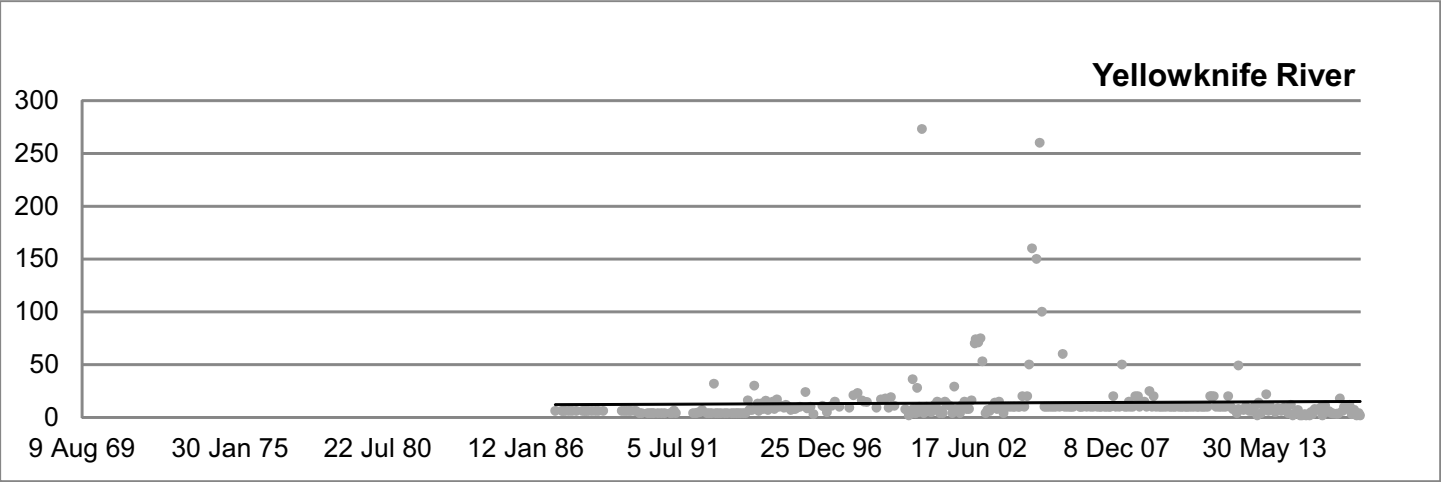
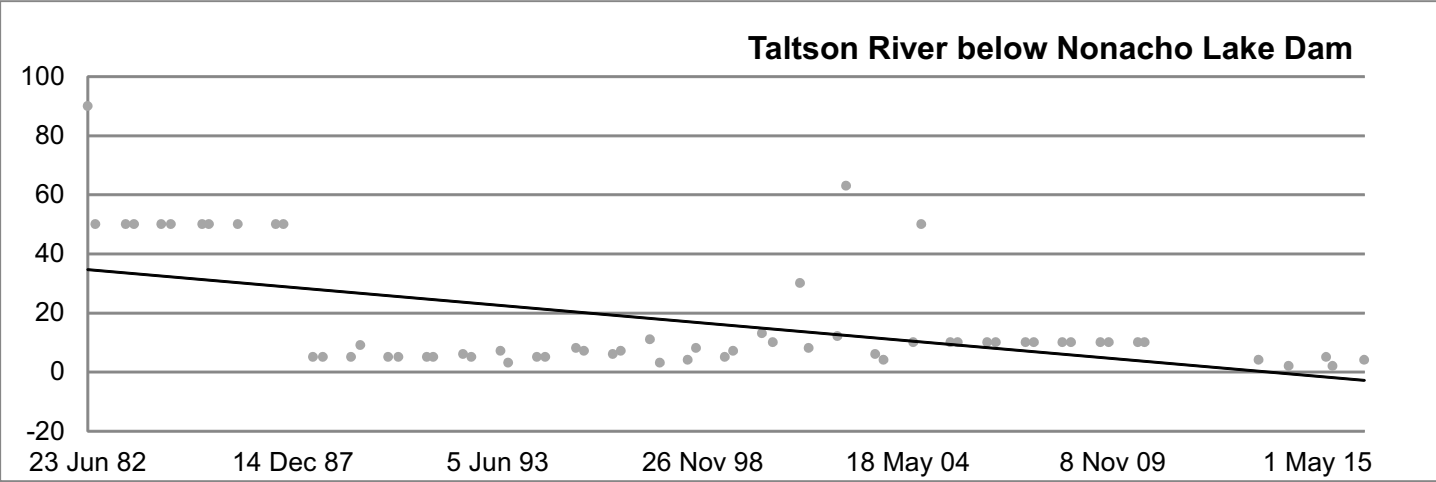


STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Total Phosphorus (mg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0	Figure B.11b
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Total Phosphorus (mg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO.

ENW.VENW03044-01

DWN

SL

CKD

MEZ

APVD

SW

REV

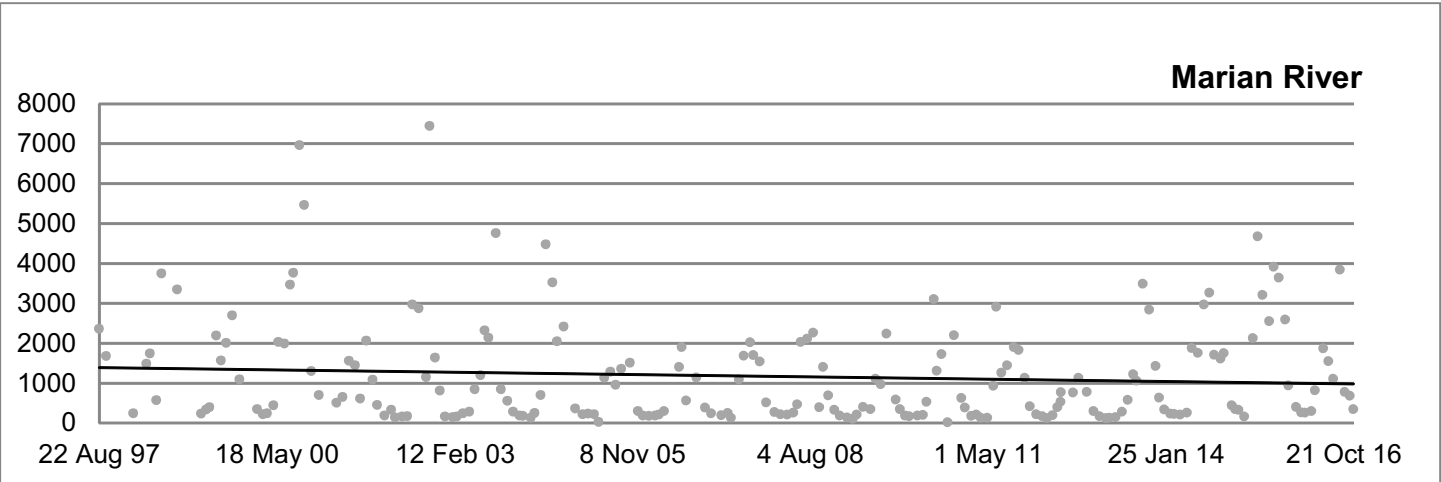
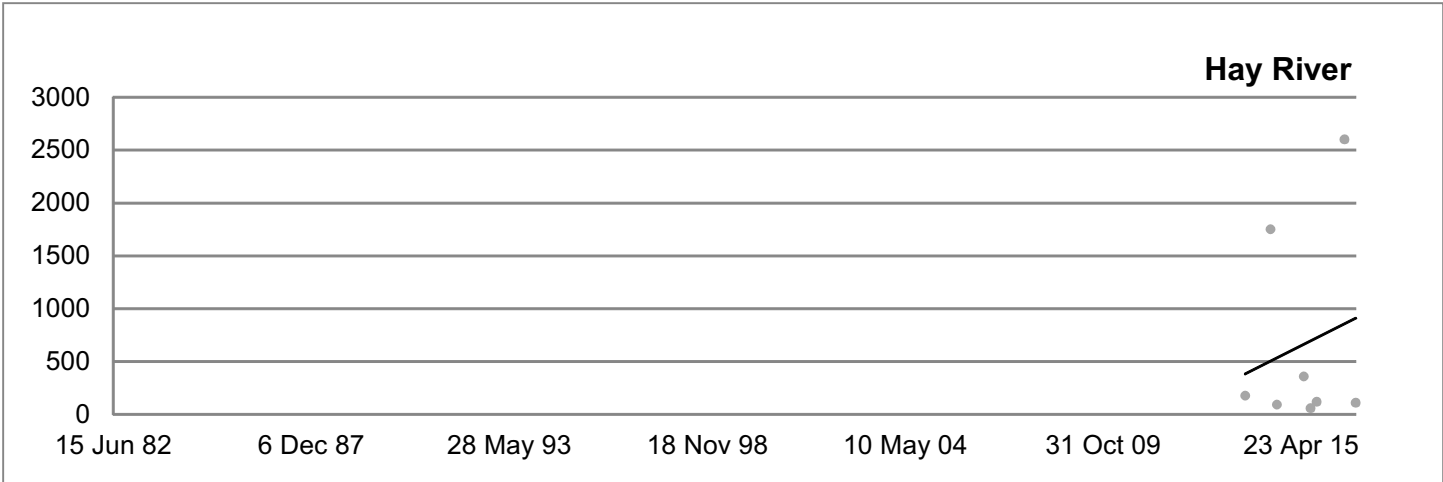
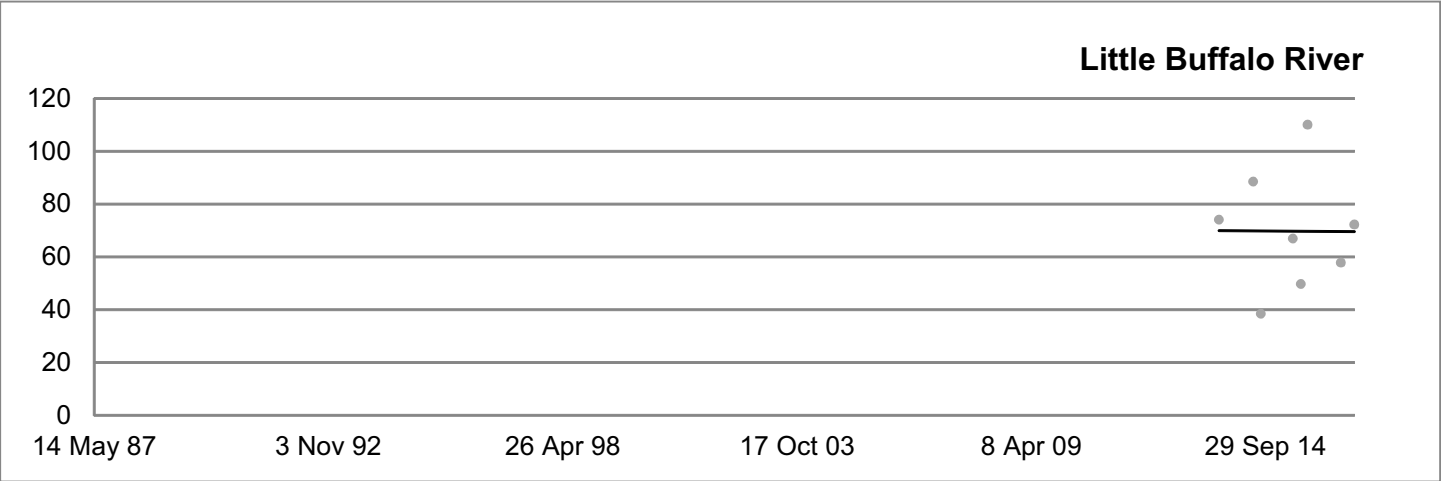
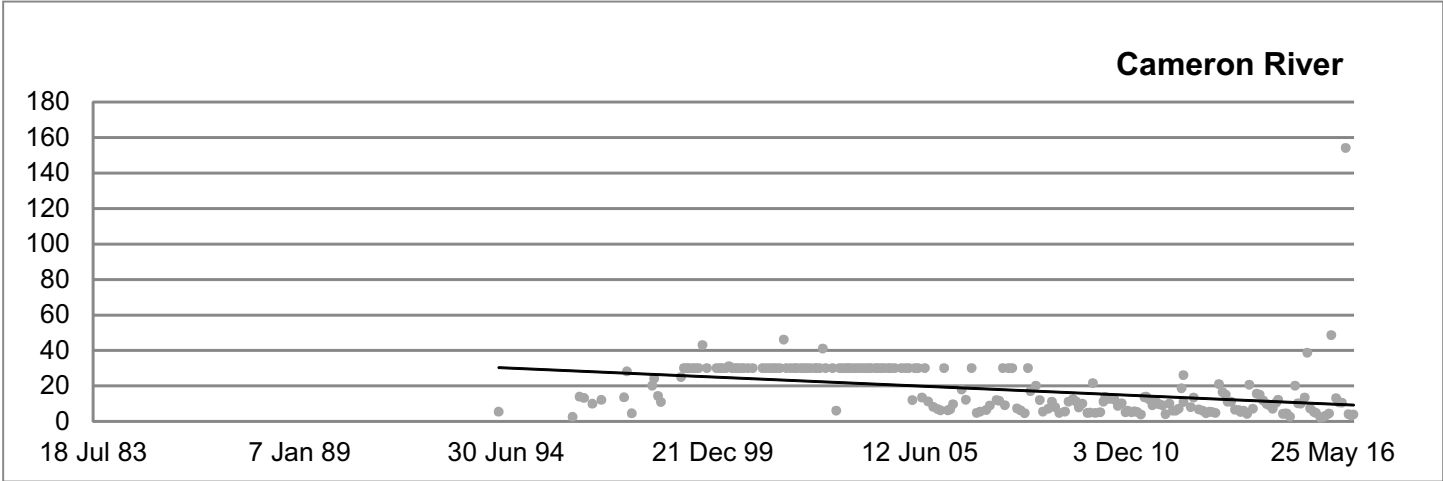
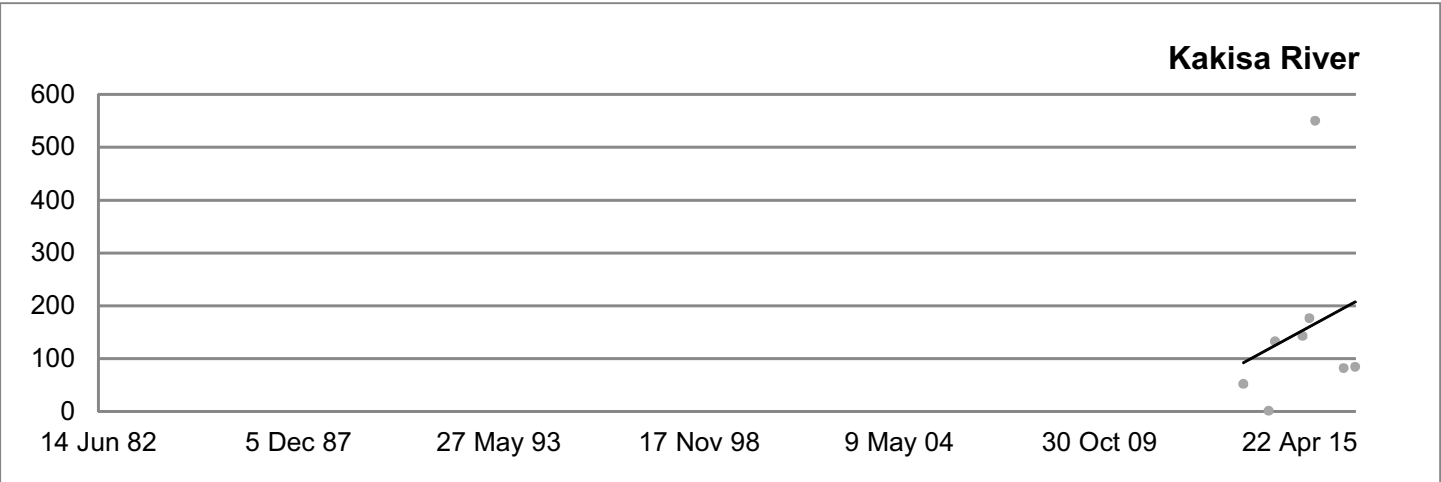
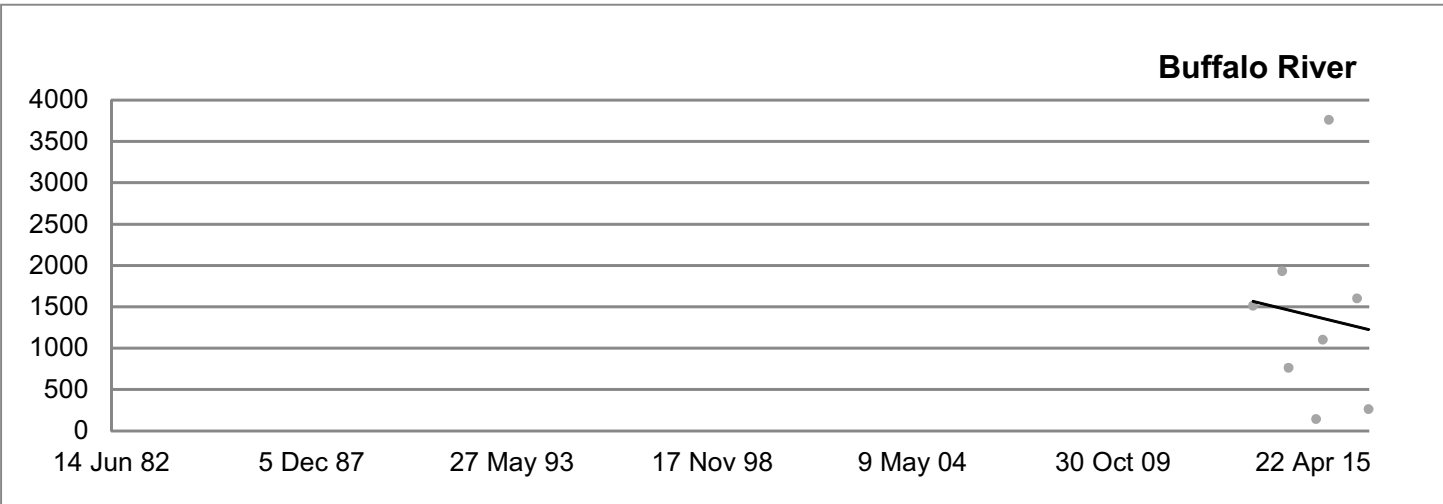
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DATE

March 30, 2017

Figure B.11c

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Aluminum (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

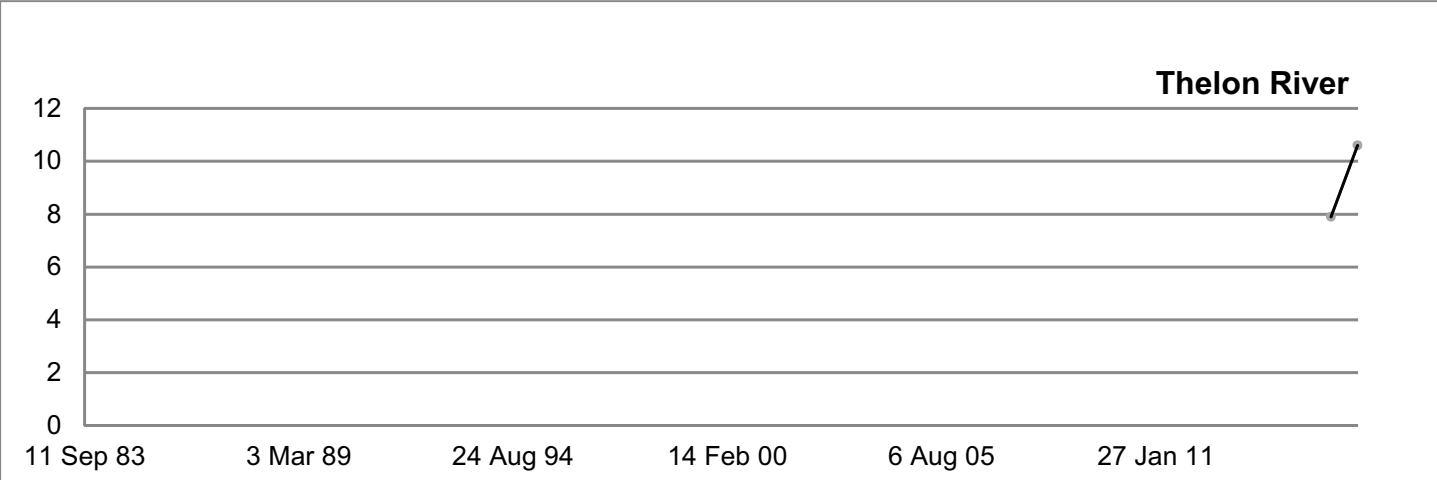
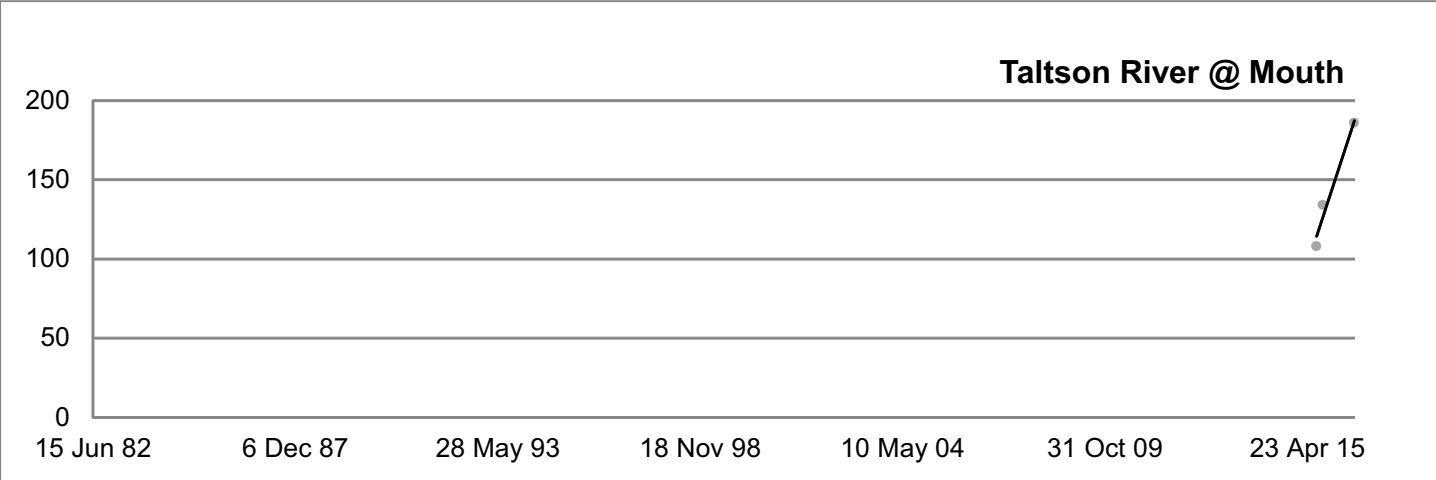
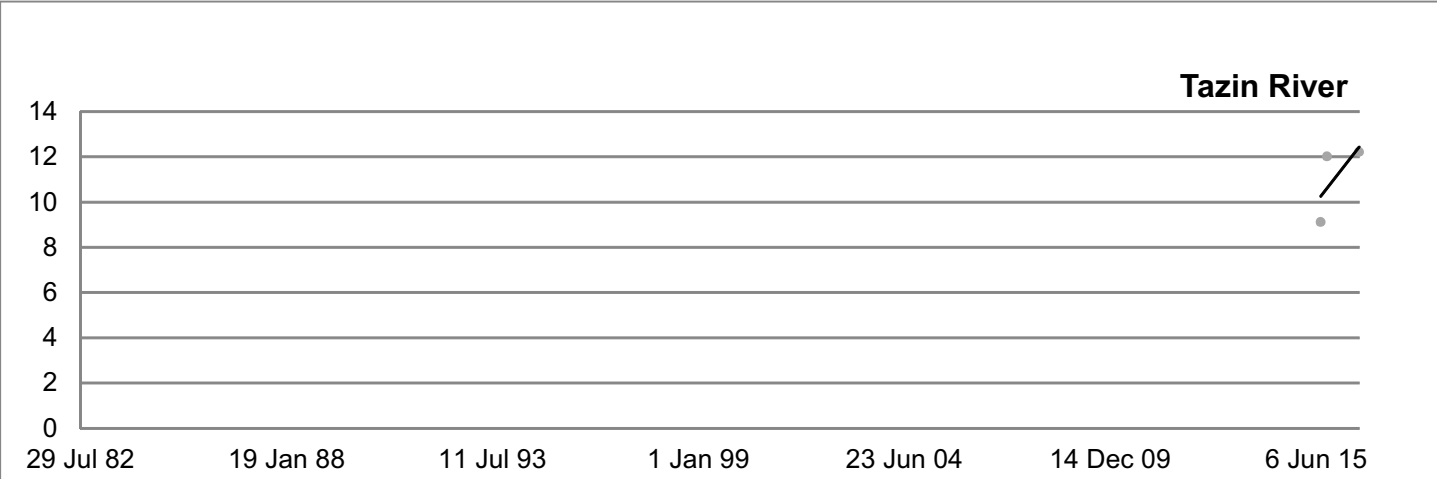
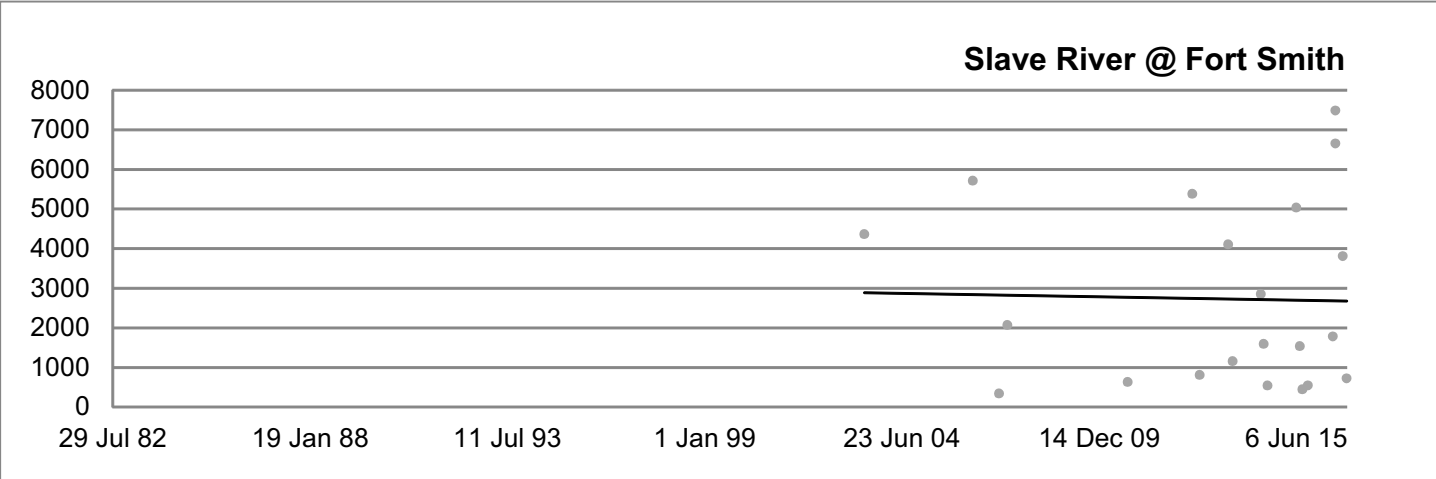
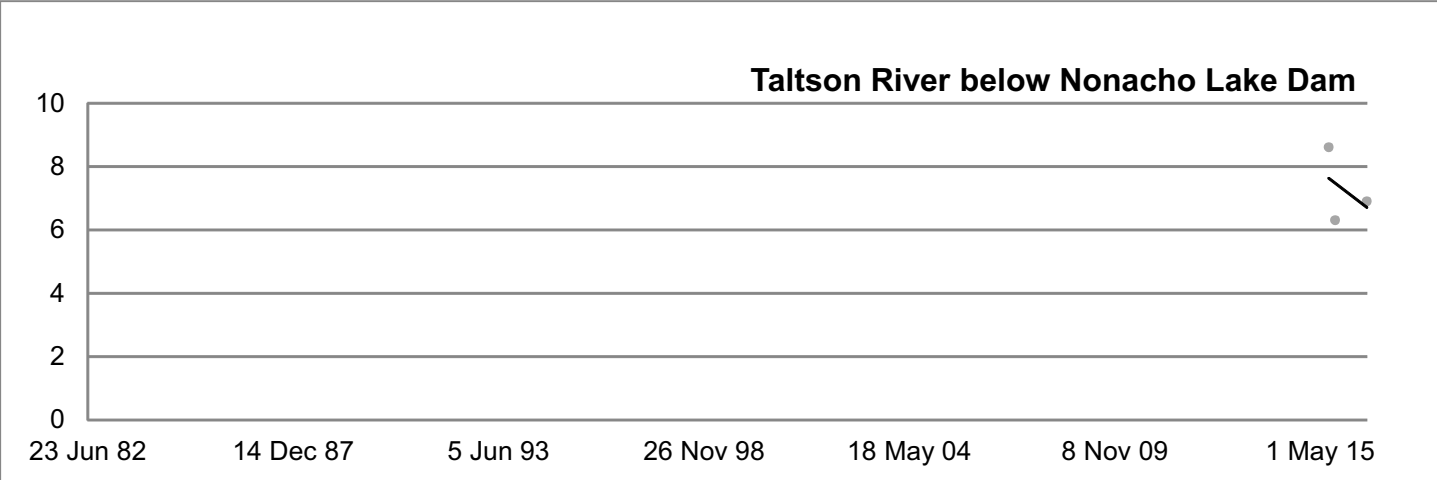
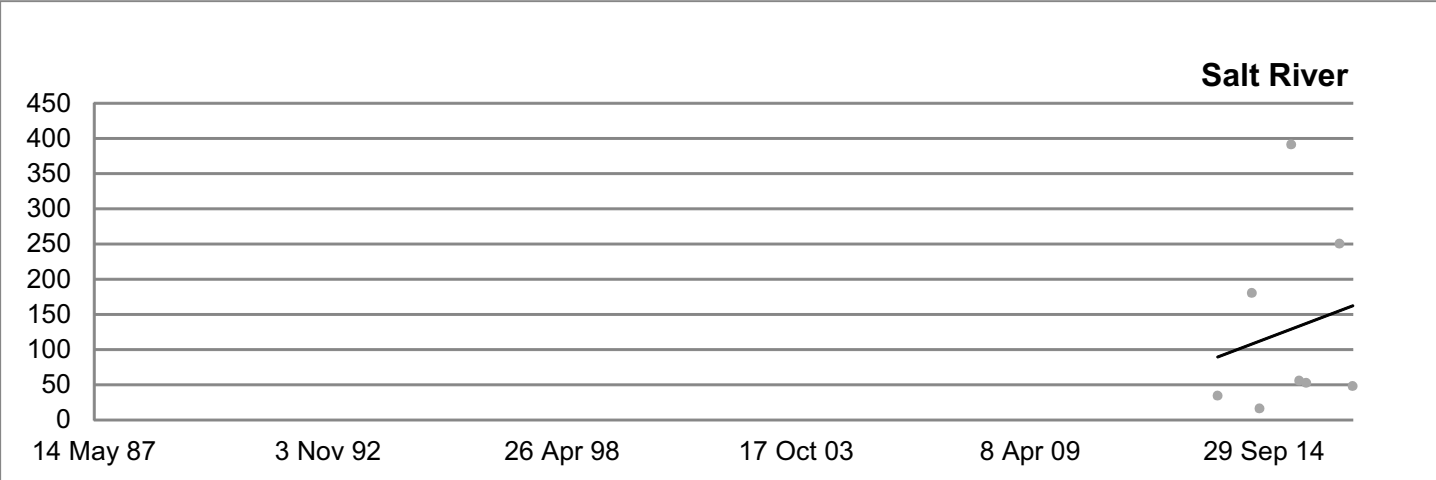
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DATE
March 30, 2017

Figure B.12a

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

**Aluminum (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

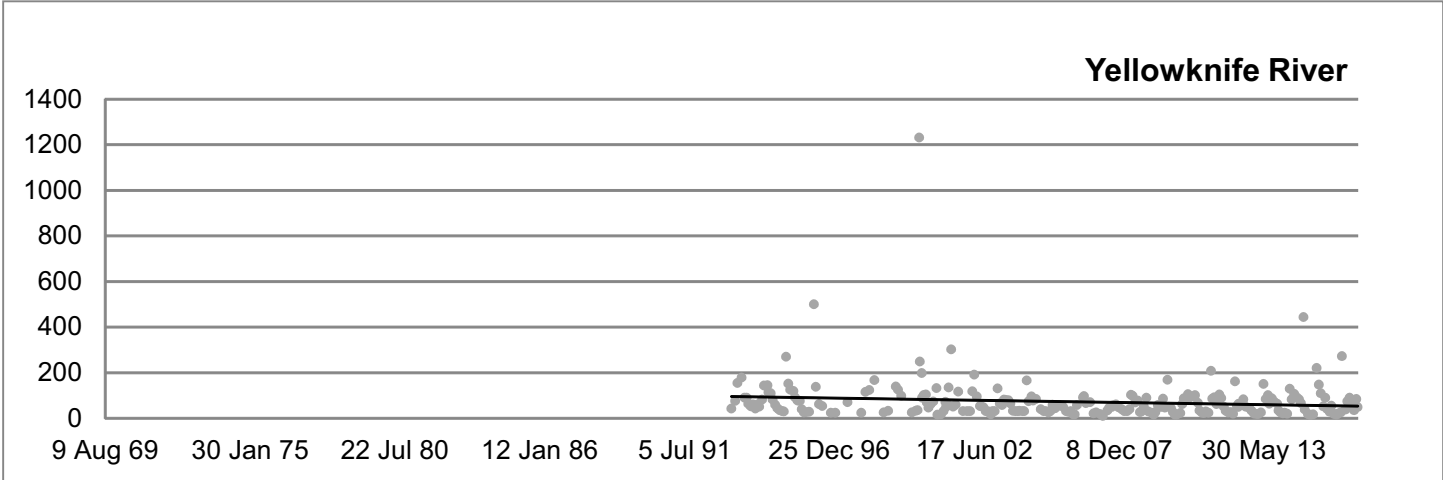
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DATE
March 30, 2017

Figure B.12b

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LEGEND

Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



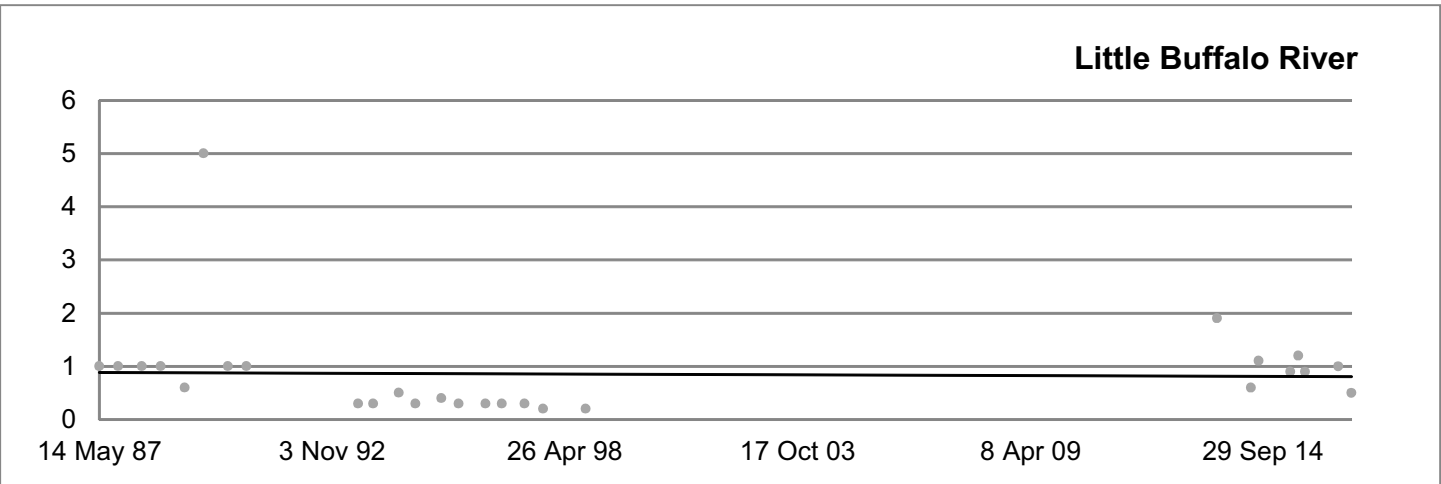
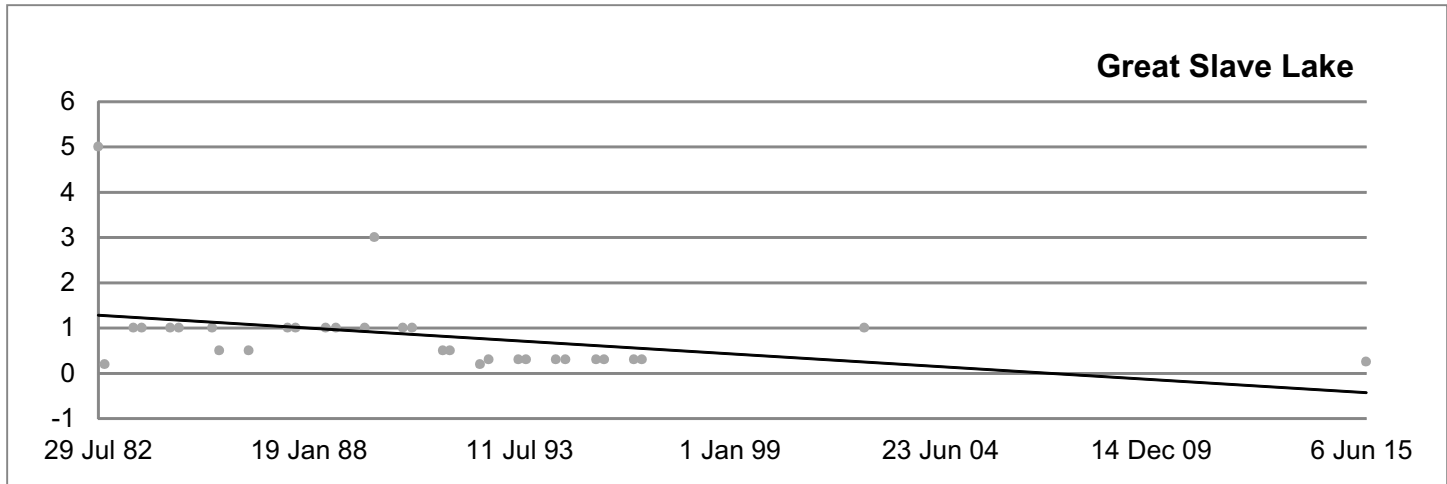
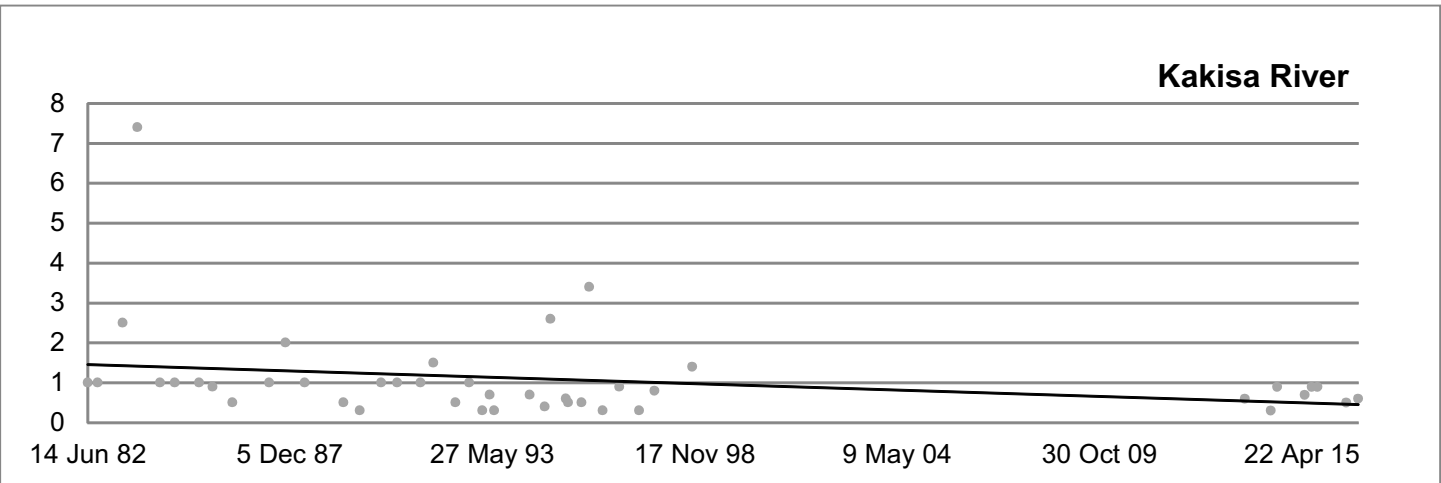
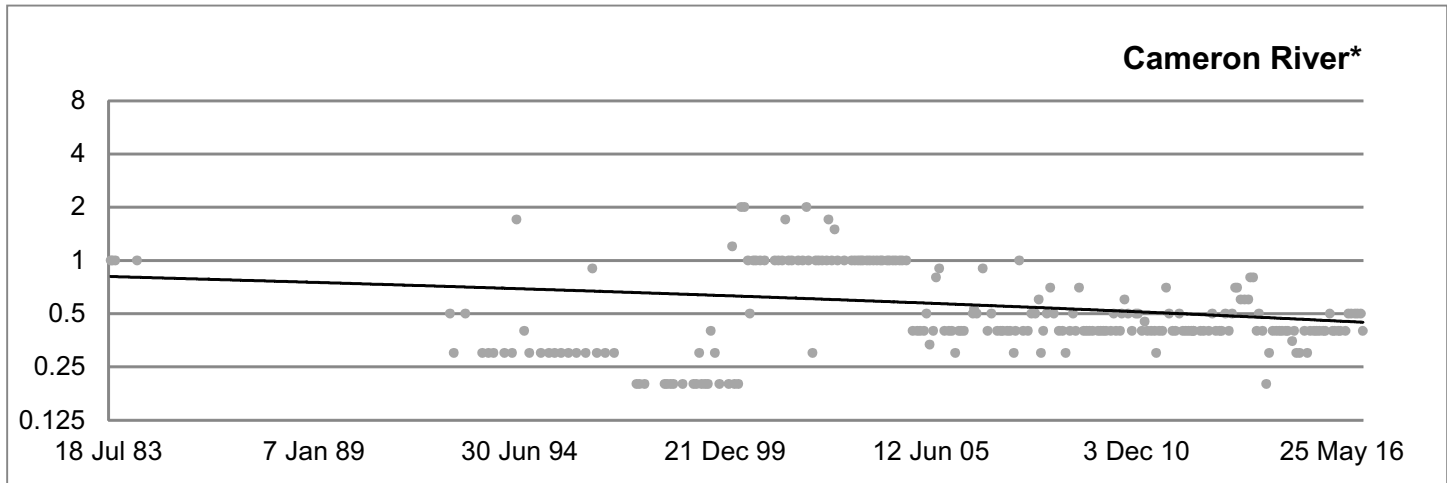
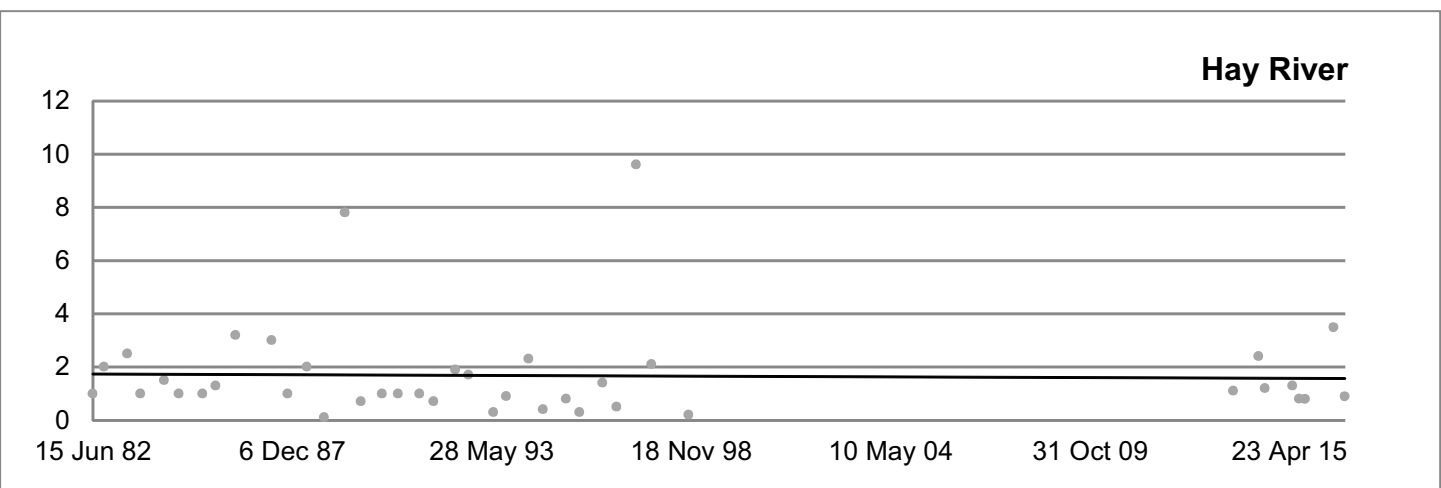
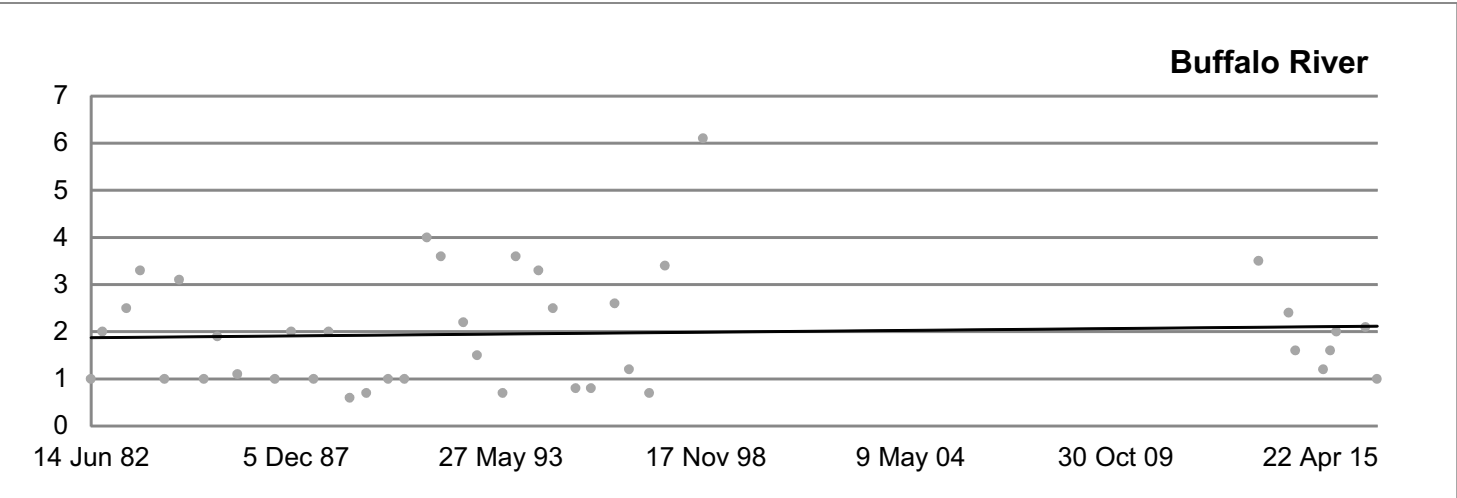
STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Aluminum (µg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.12c

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Arsenic (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

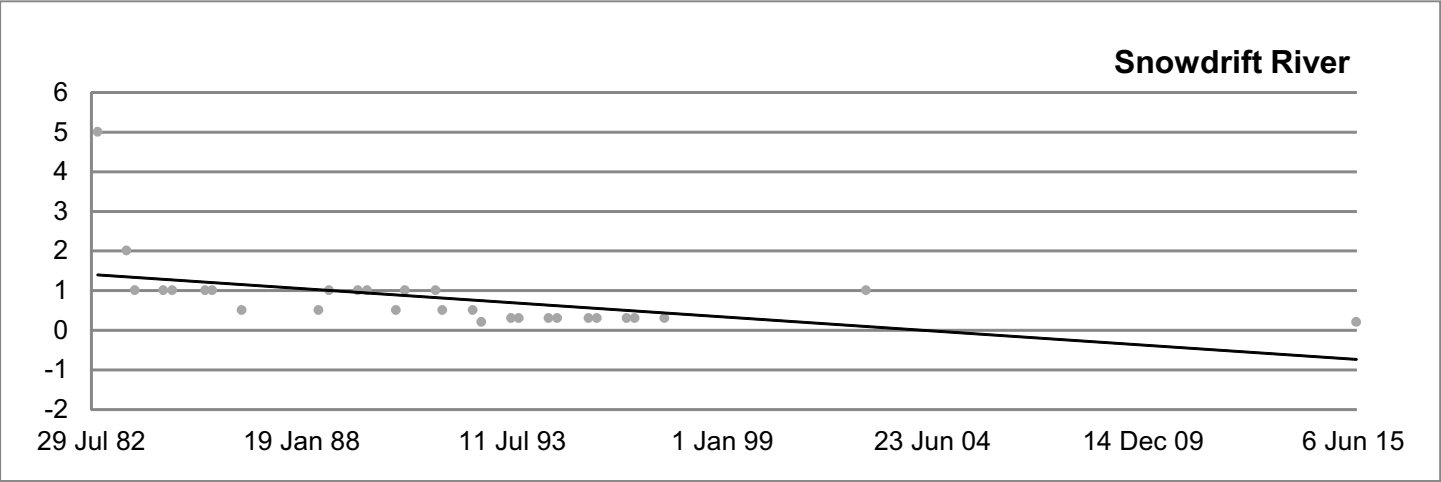
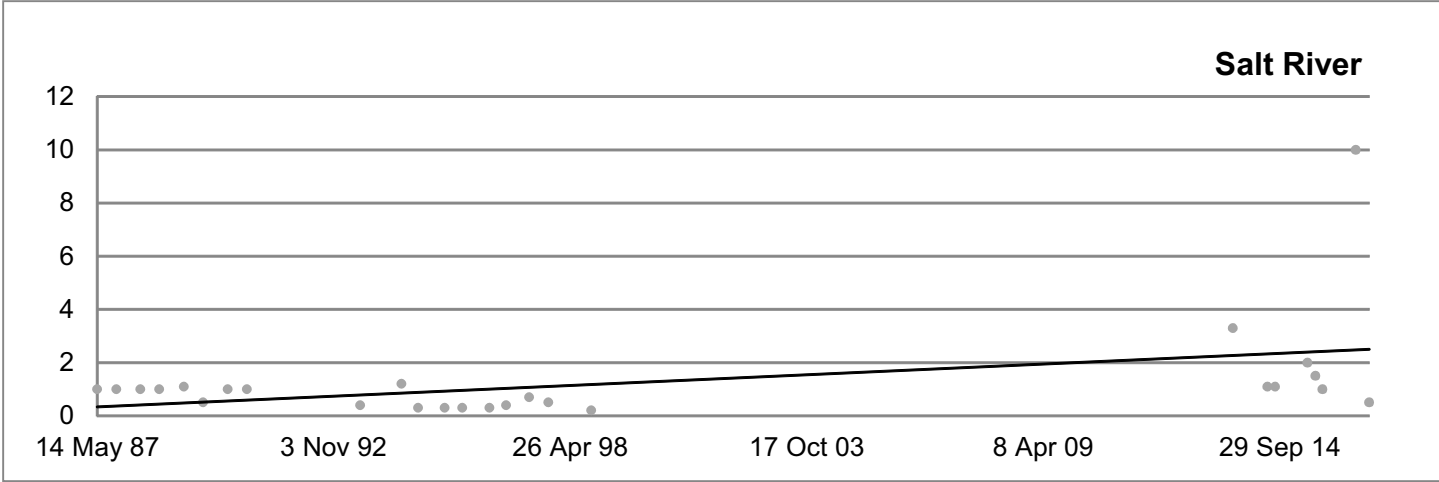
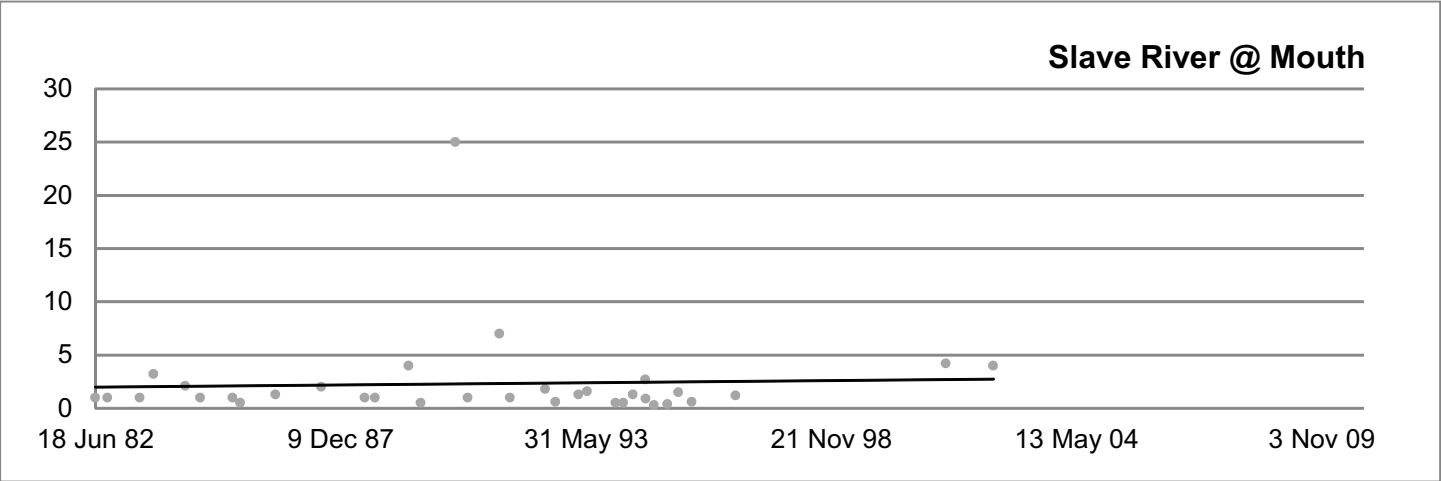
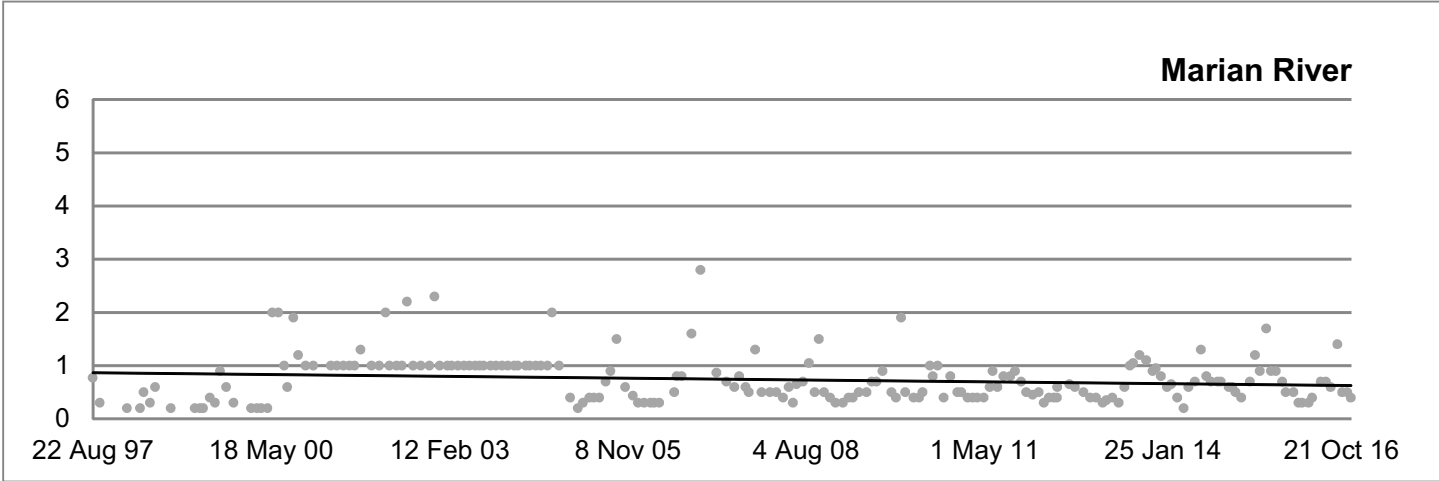
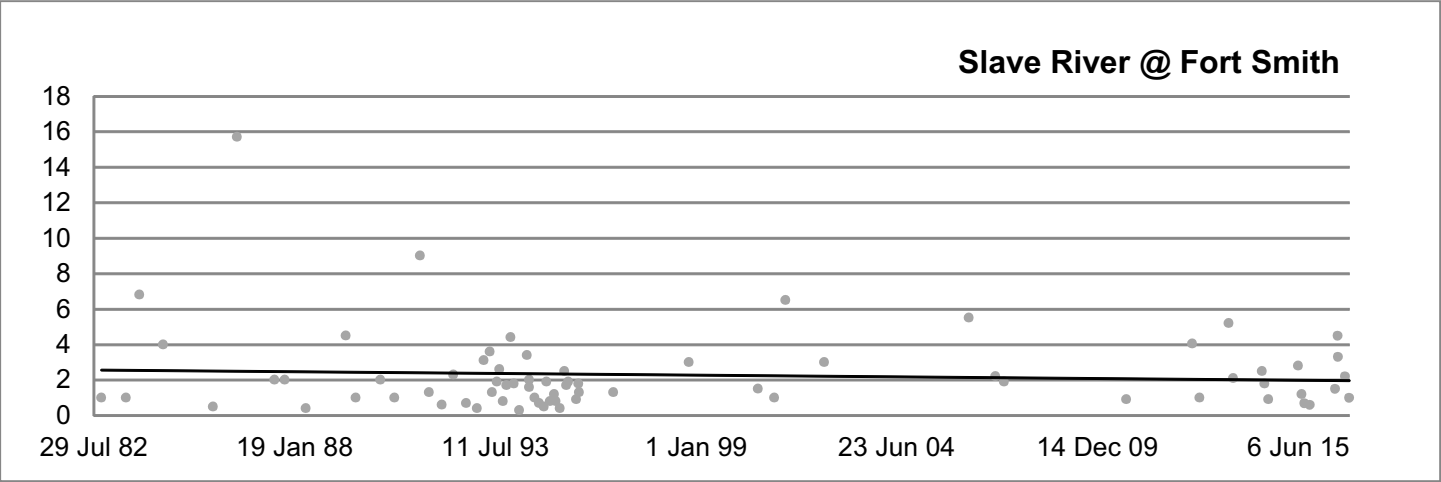
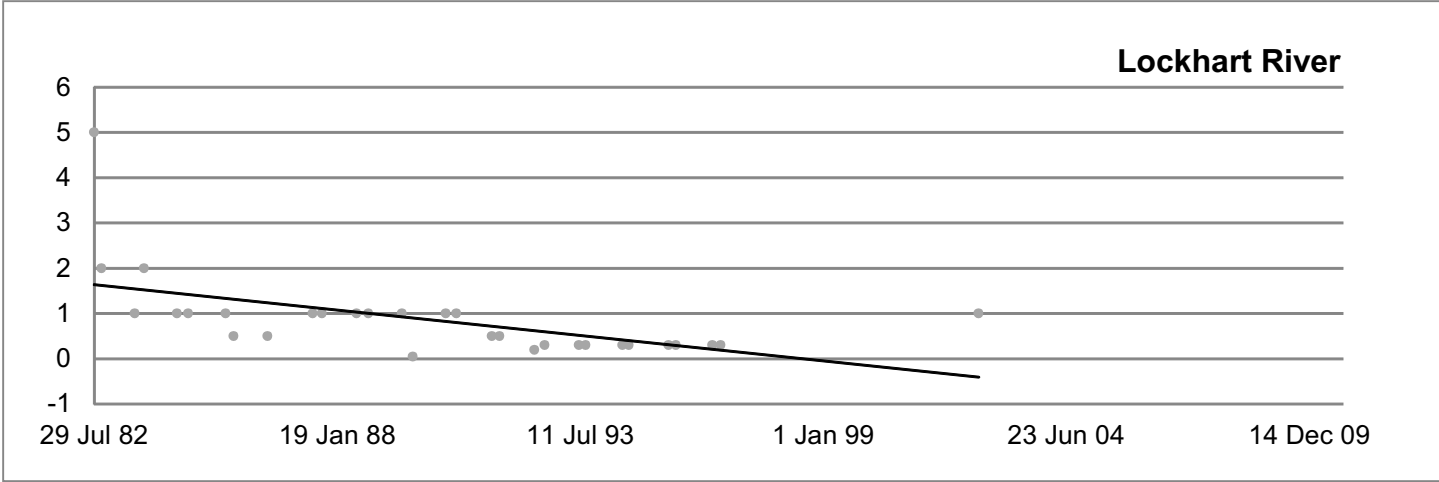
REV
0

OFFICE
Tt-VANC

DATE
March 30, 2017

Figure B.13a

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

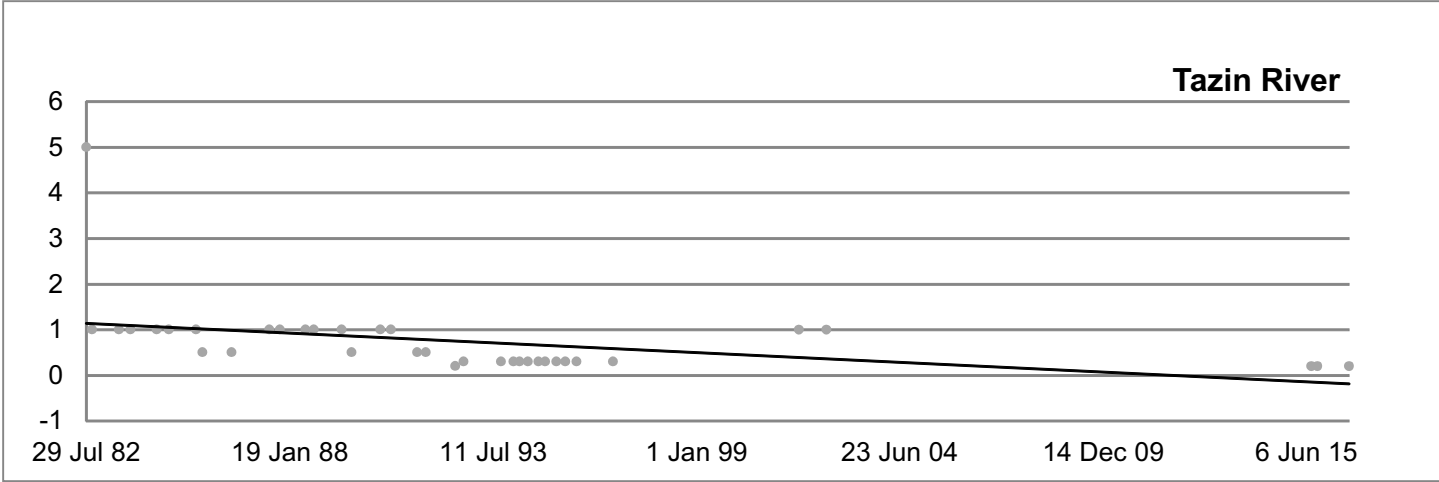
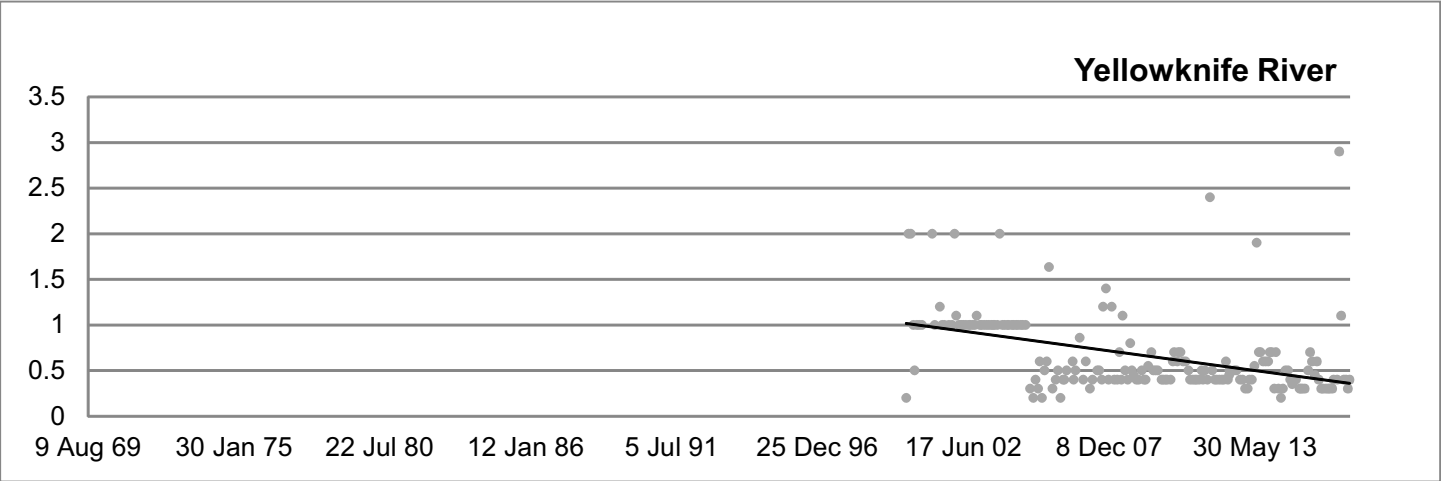
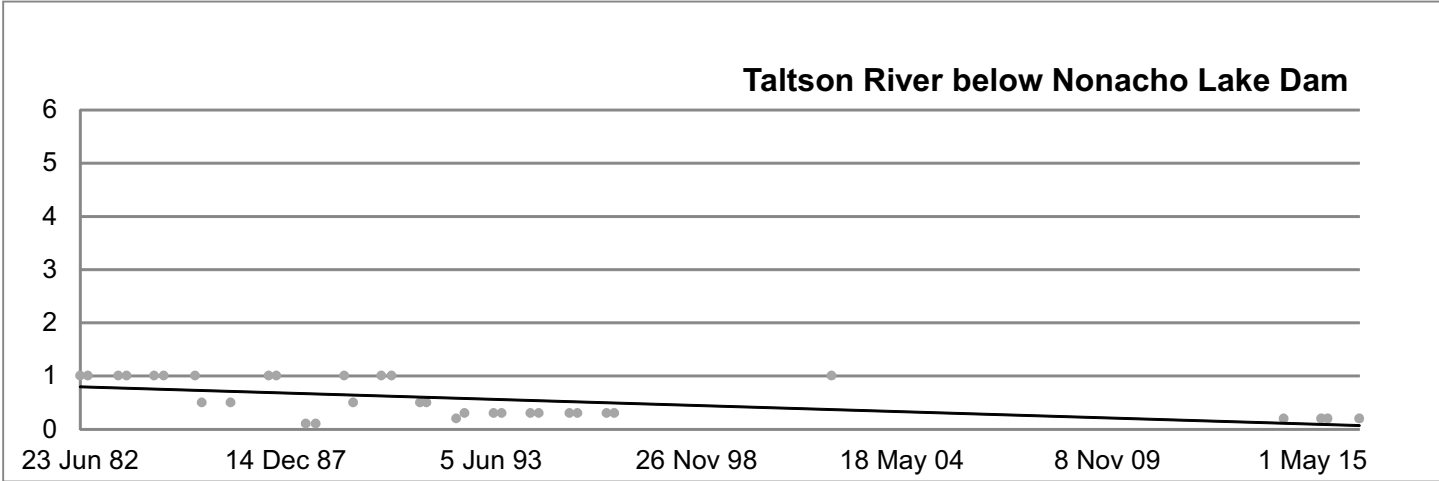
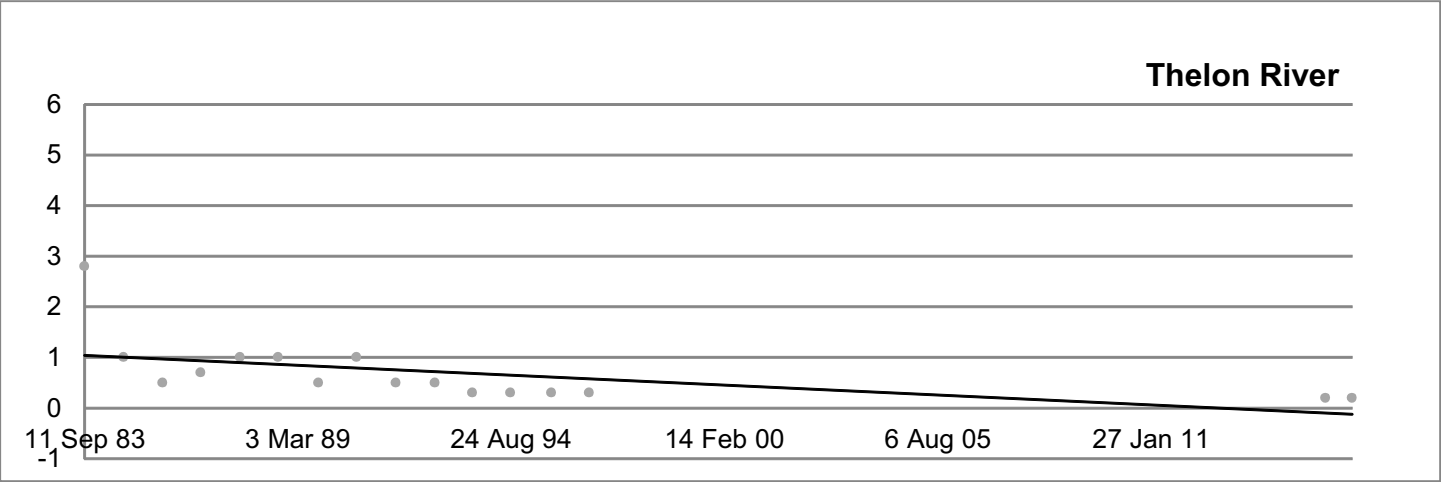
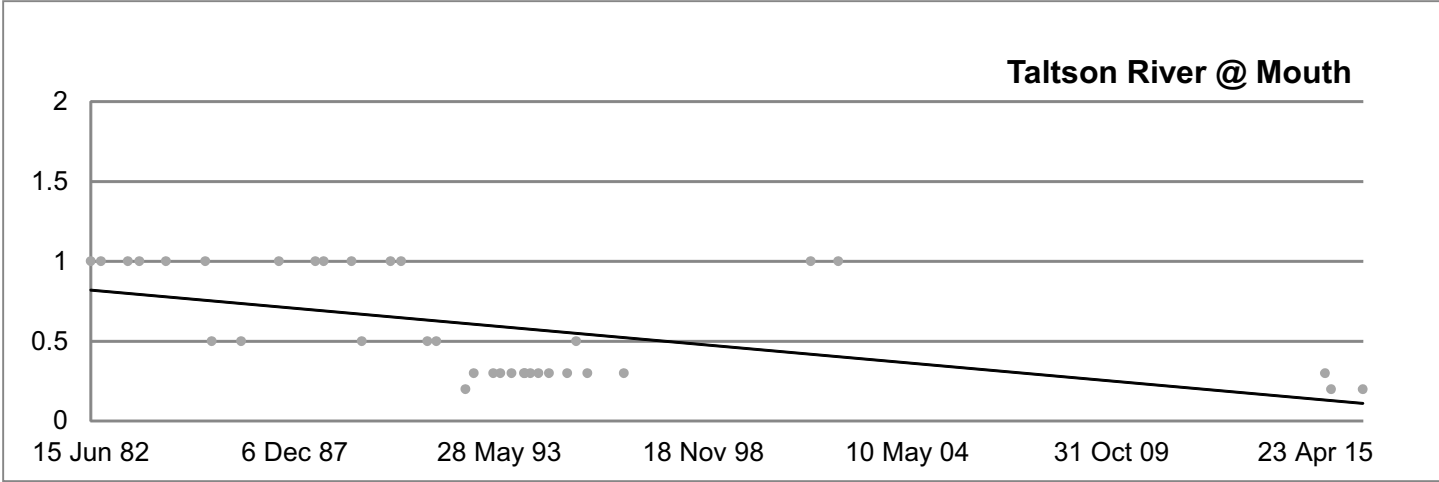
Arsenic (µg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO.
ENW.VENW03044-01
OFFICE
Tt-VANC

DWN
SL
CKD
MEZ
APVD
SW
REV
0
DATE
March 30, 2017

Figure B.13b

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

**Arsenic (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

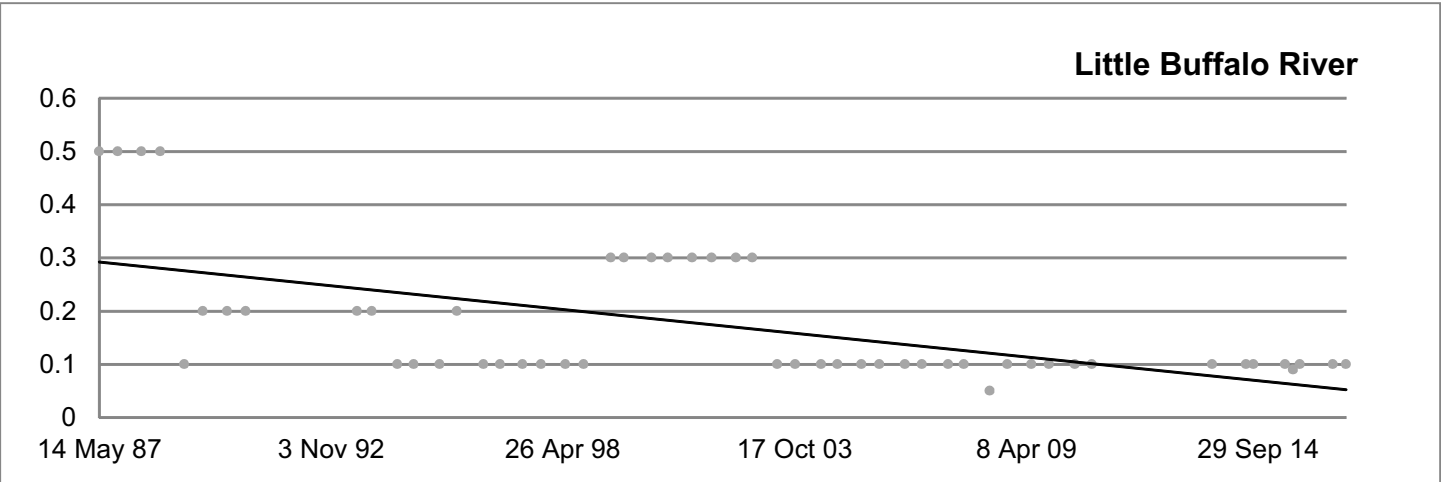
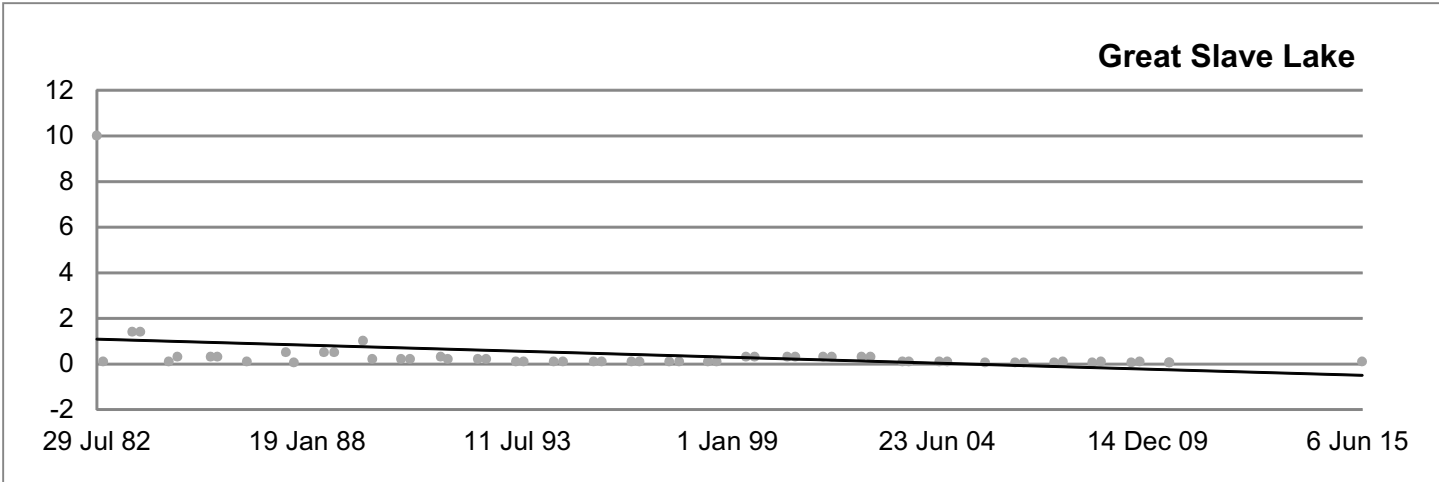
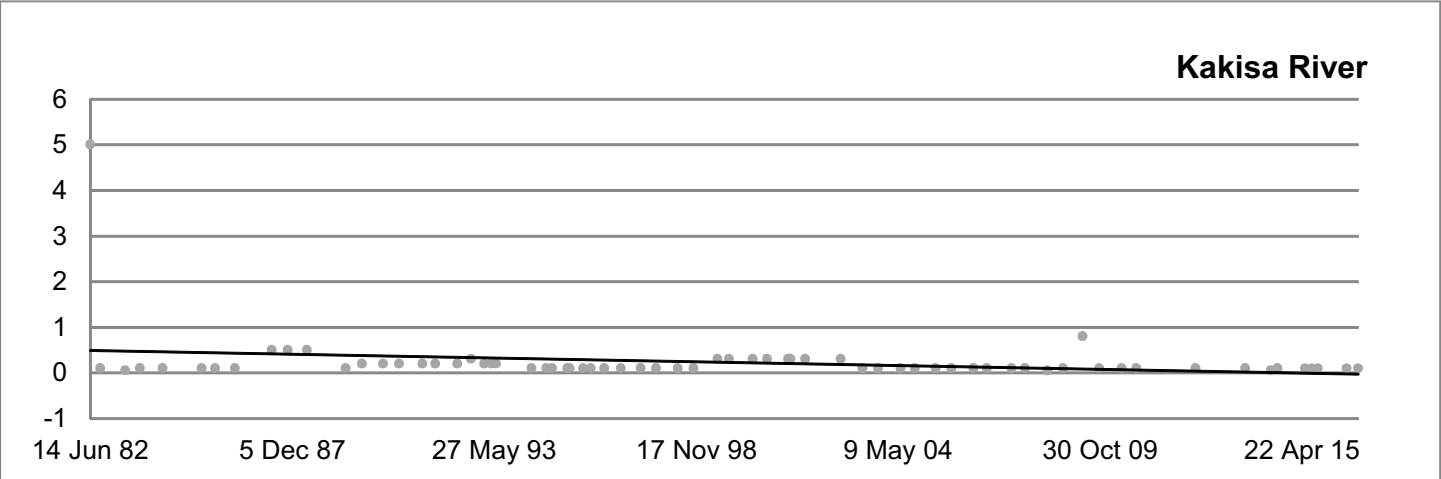
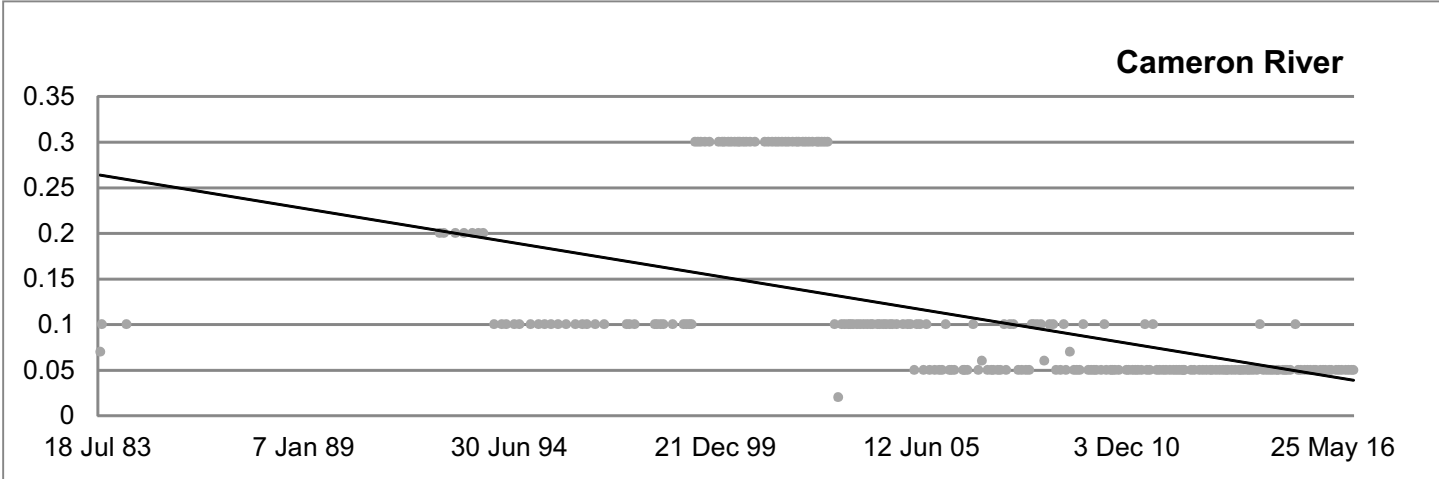
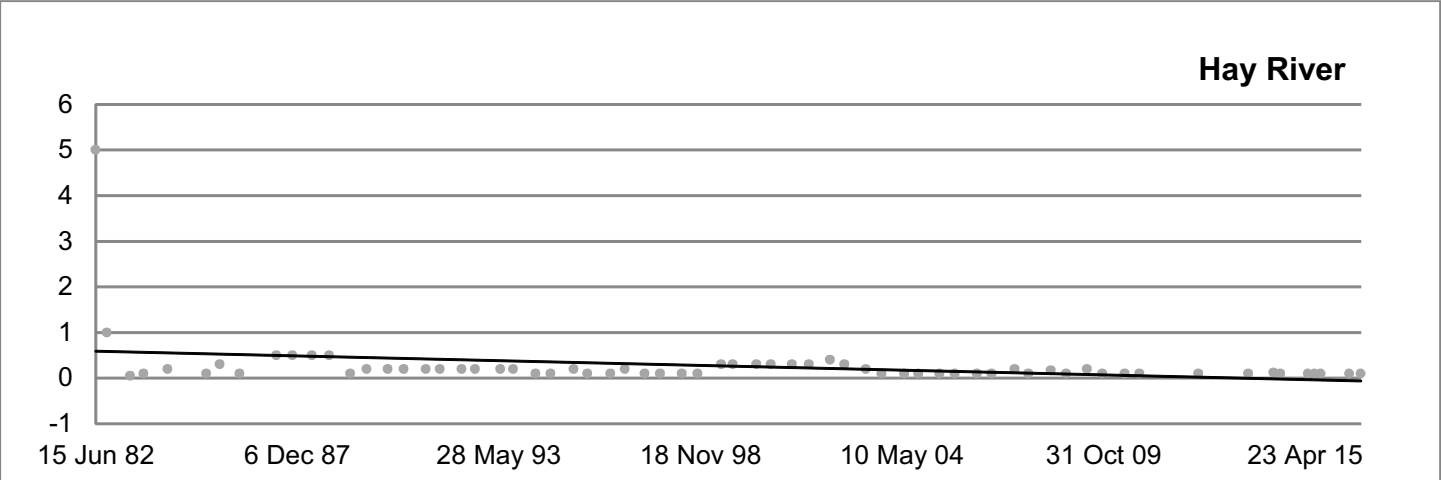
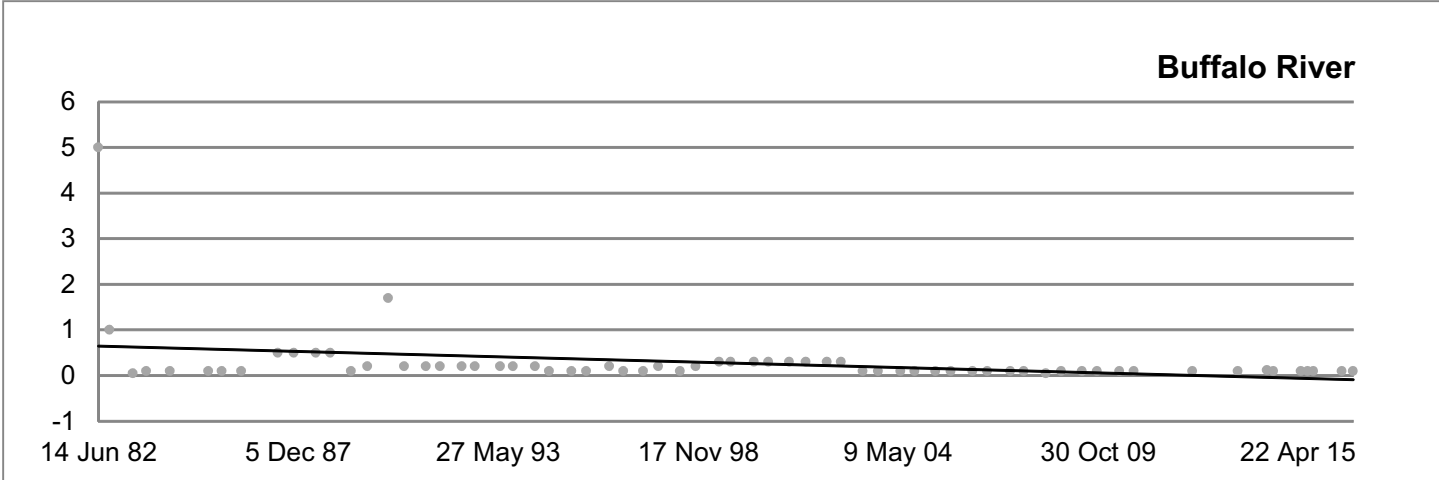
REV
0

OFFICE
Tt-VANC

DATE
March 30, 2017

Figure B.13c

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

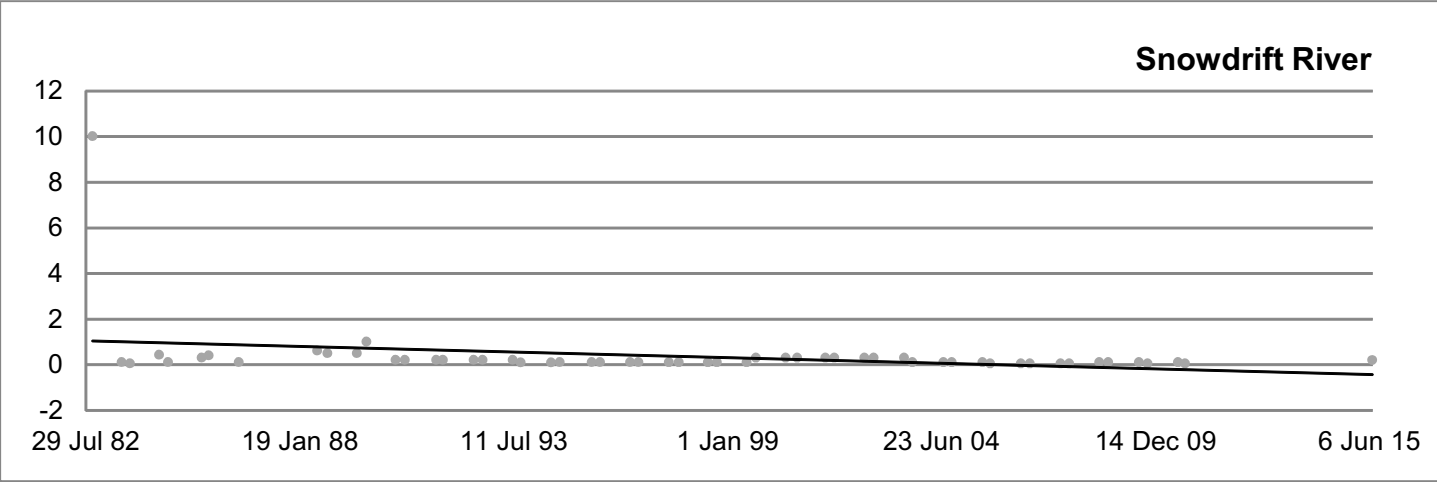
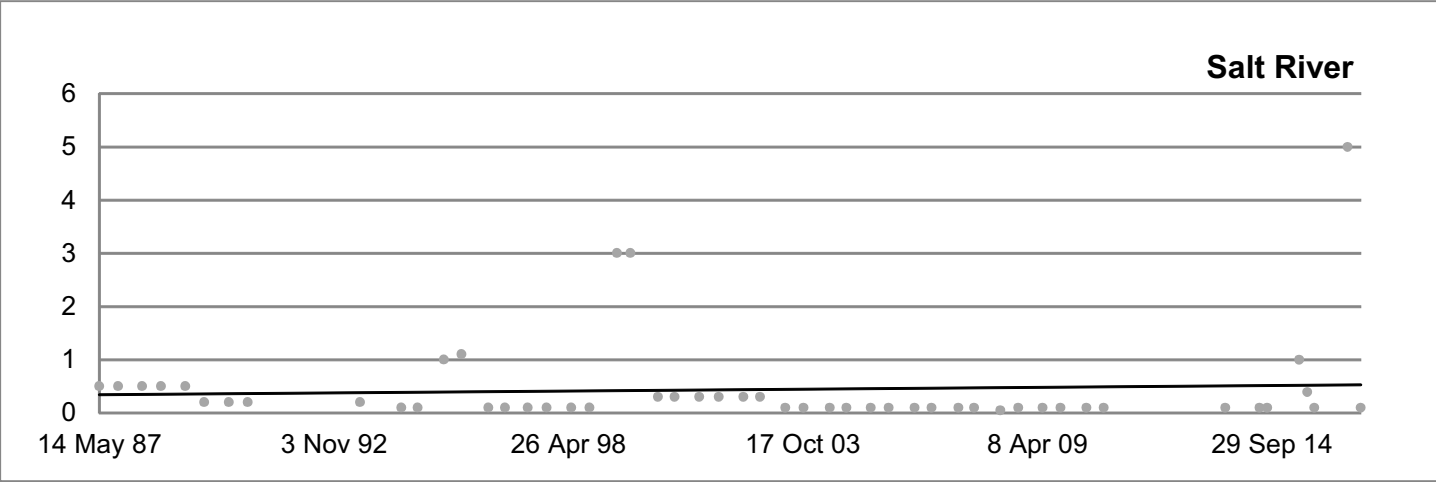
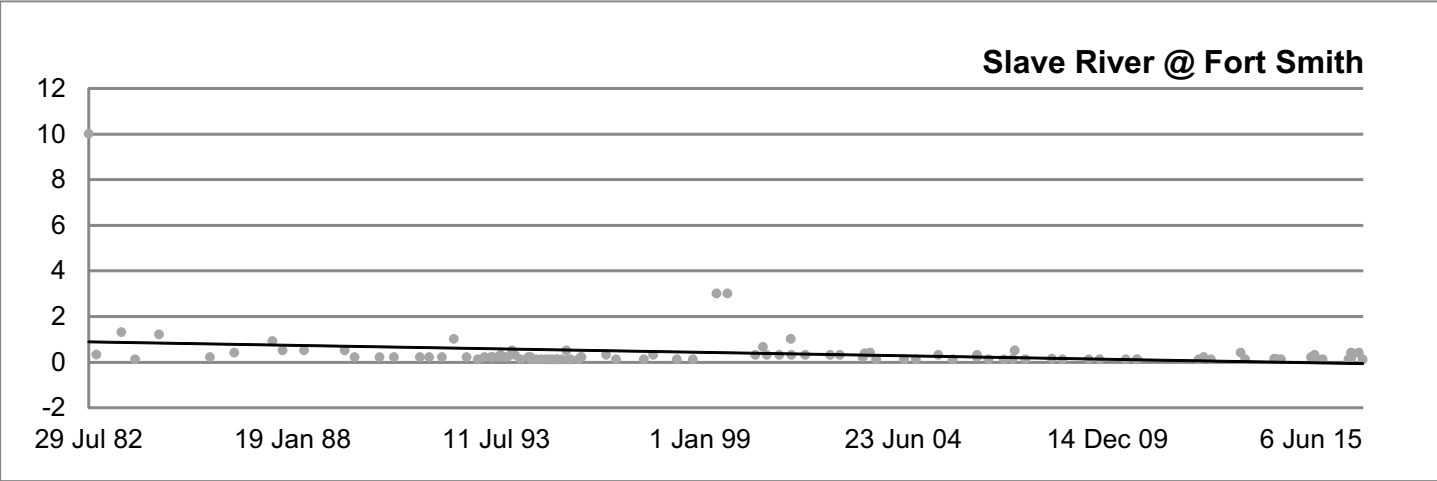
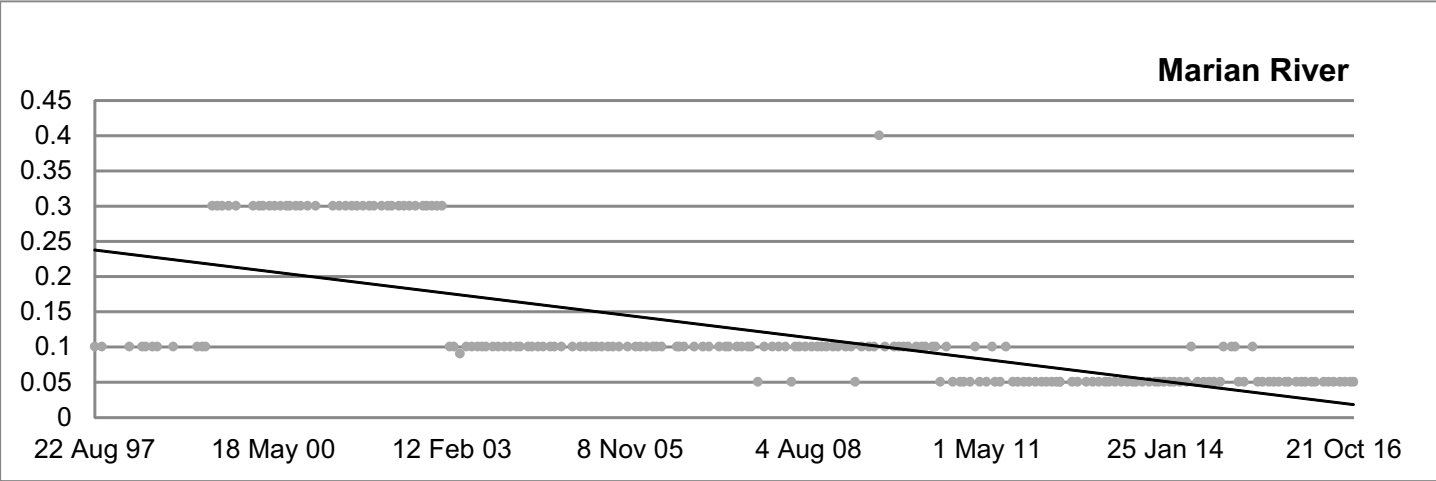
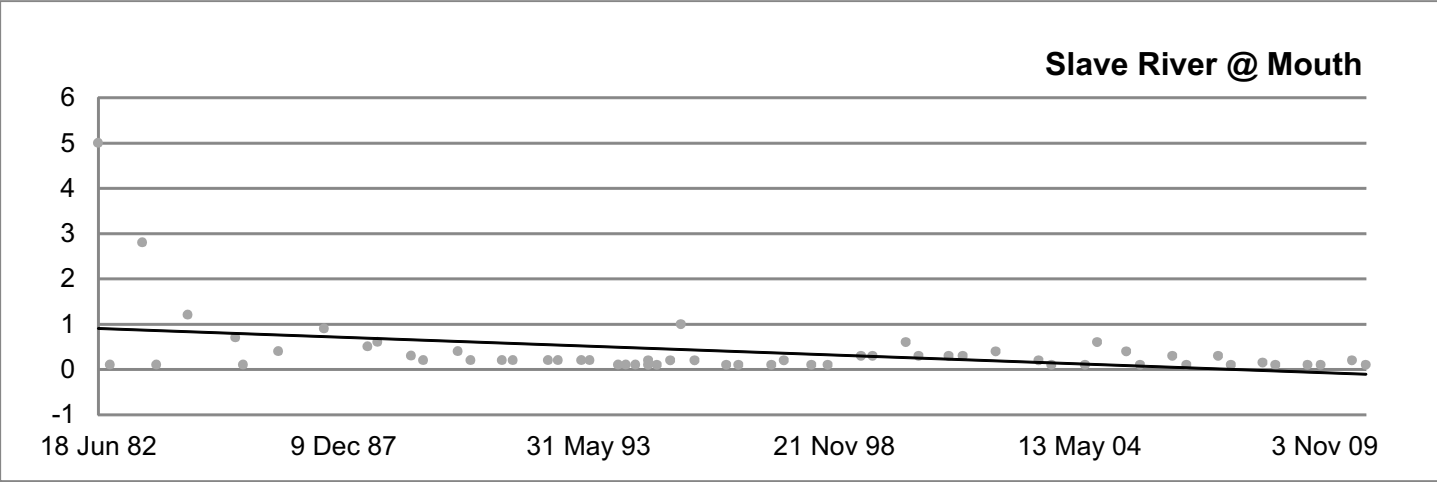
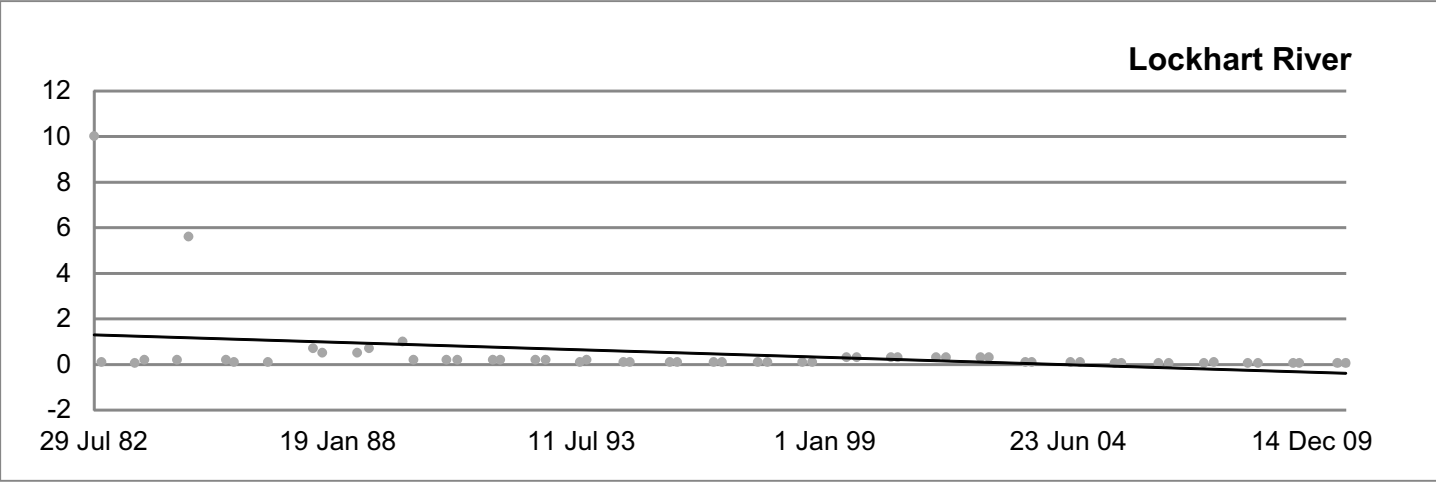
STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Cadmium (µg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.14a

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

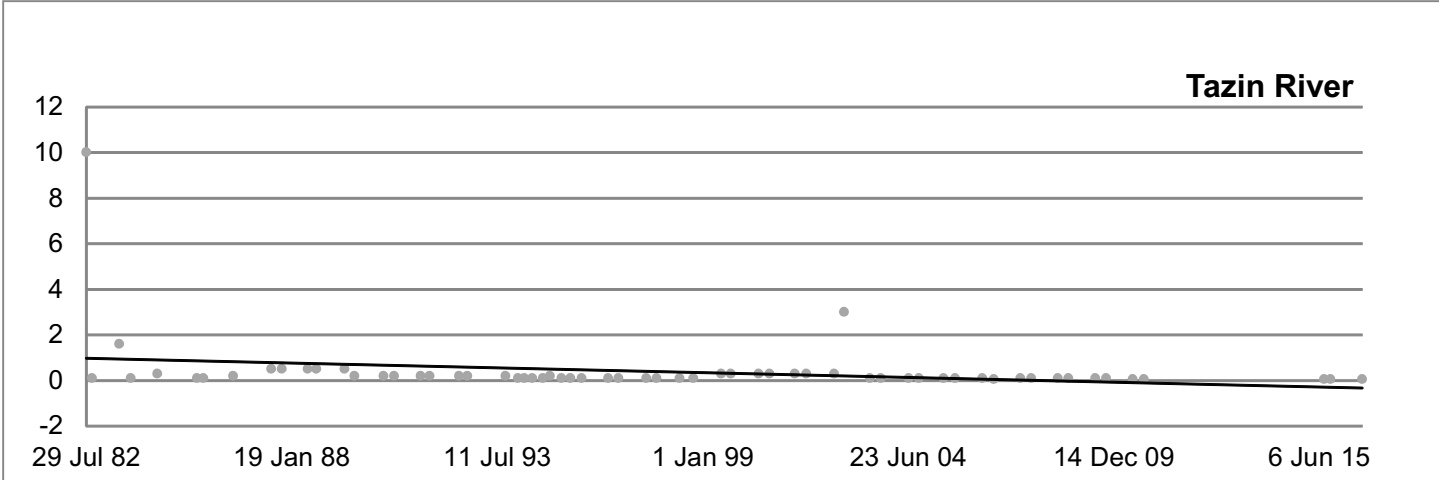
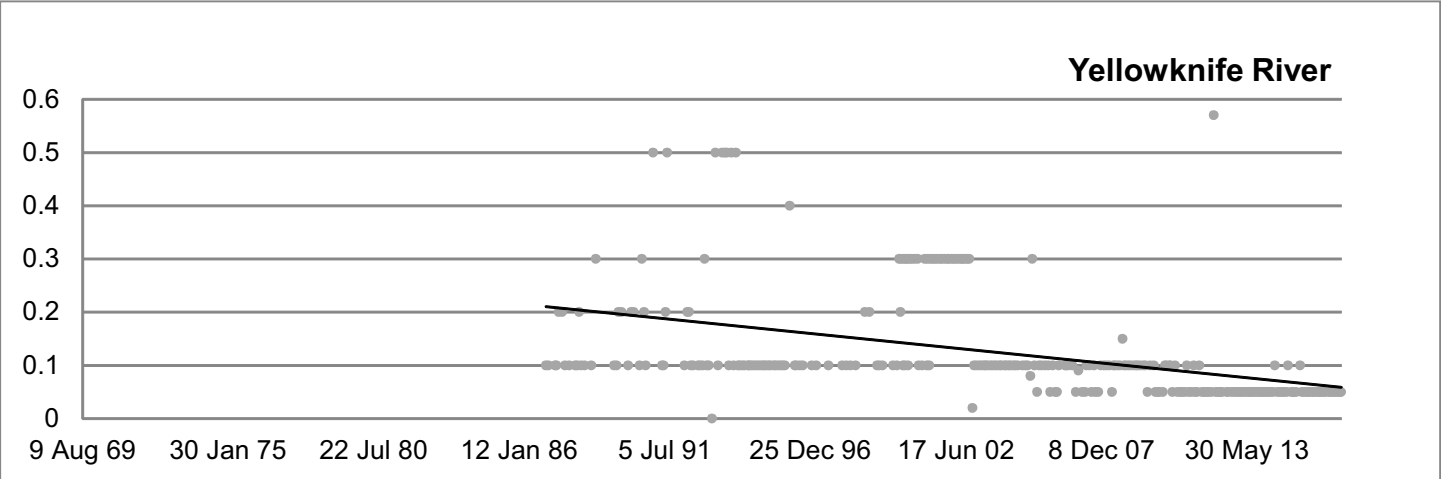
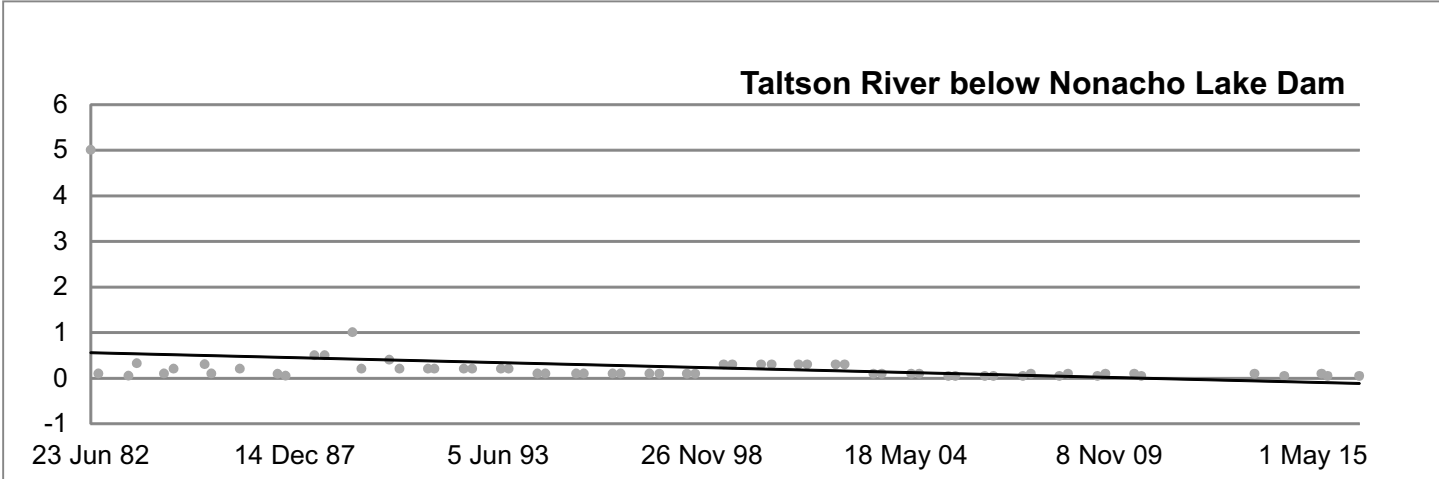
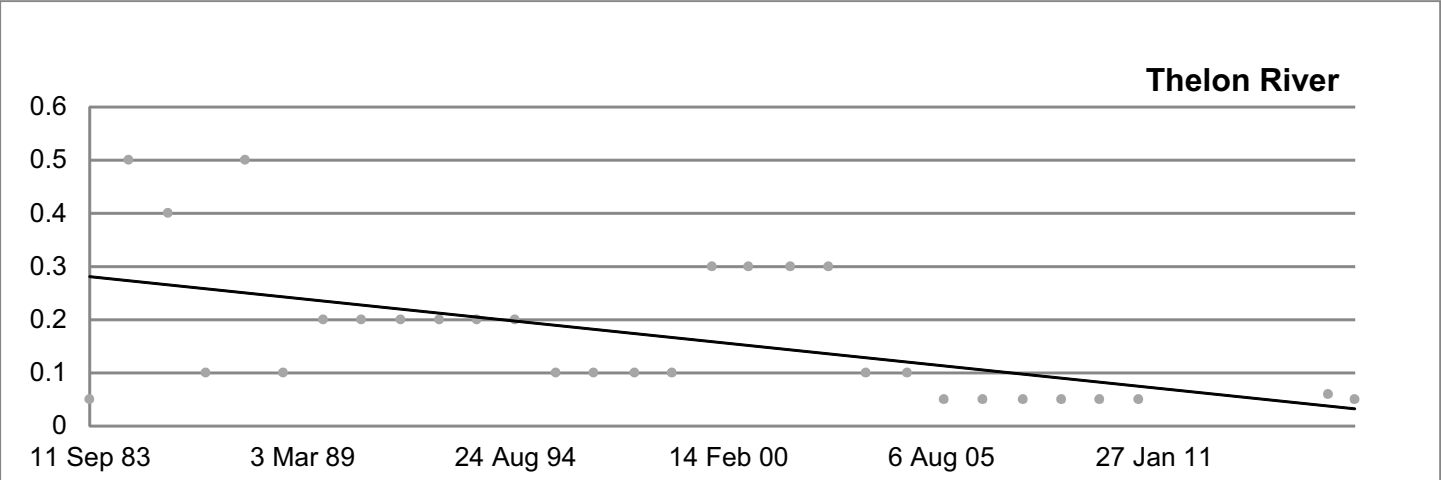
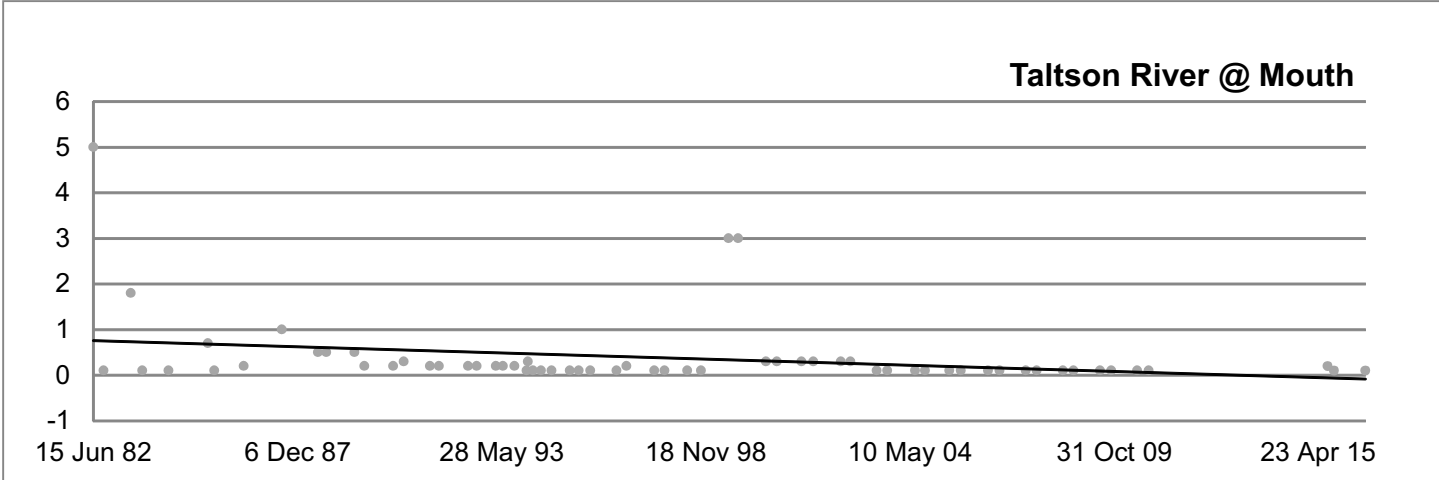
**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Cadmium (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.14b

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



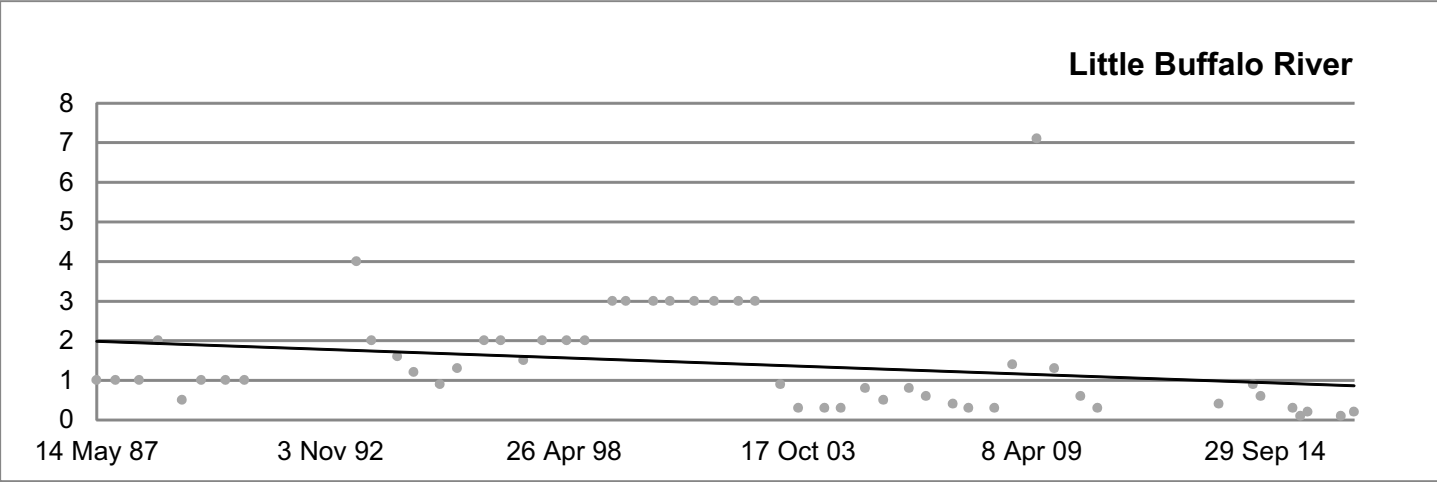
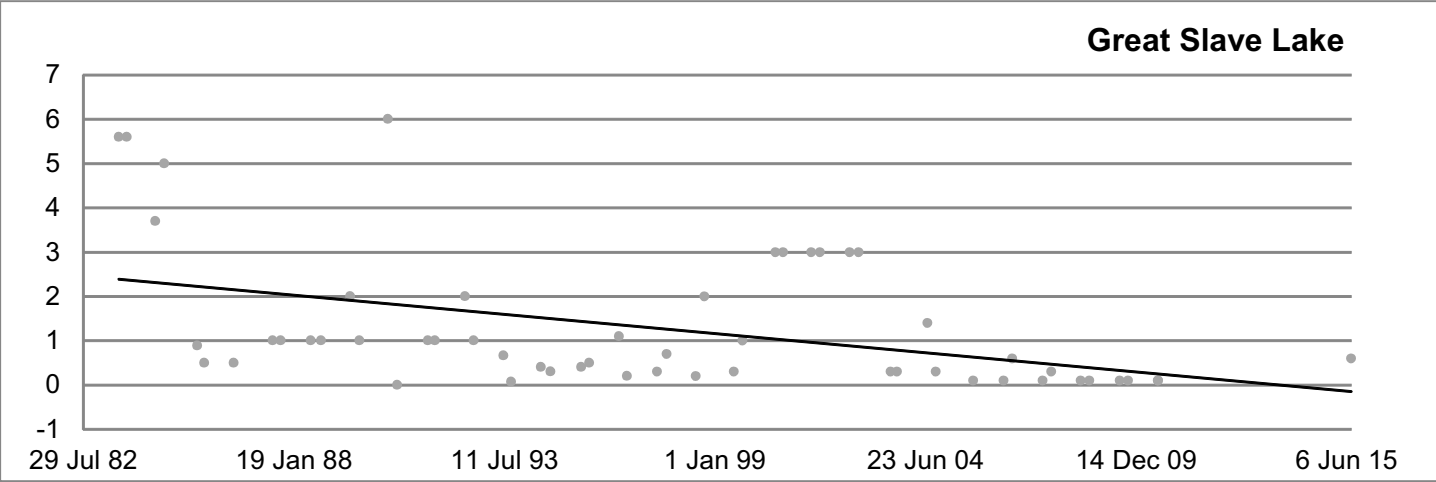
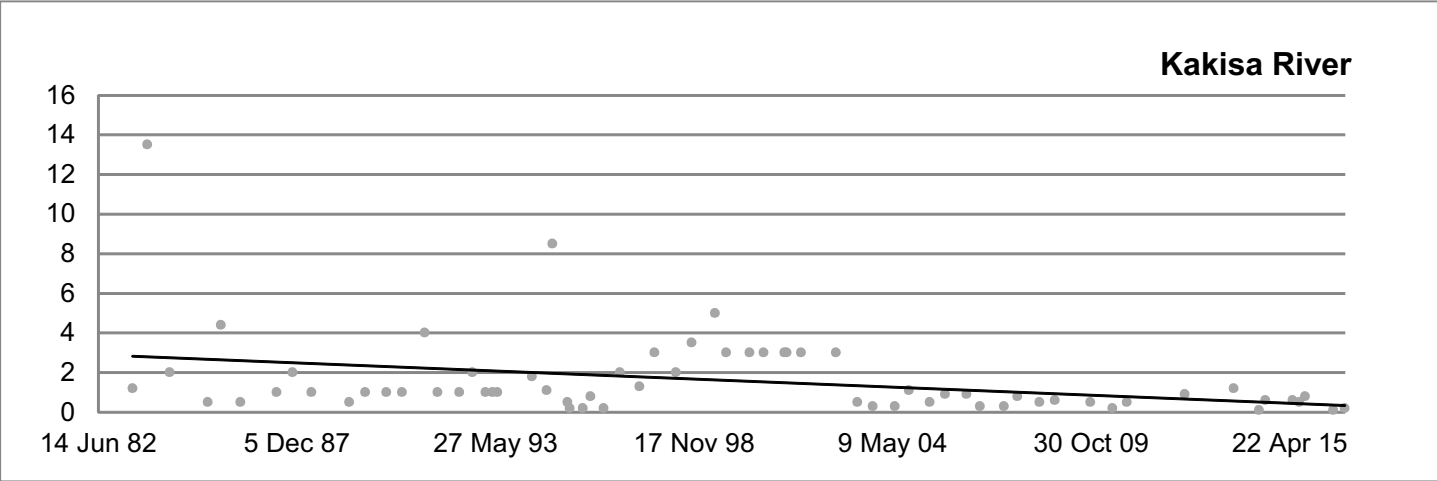
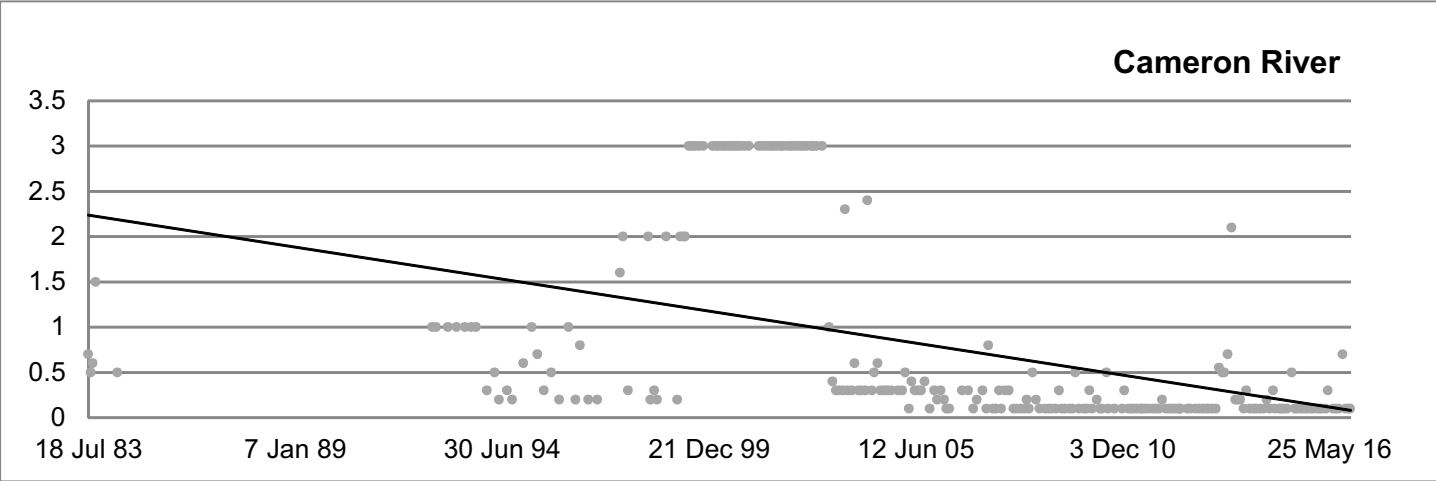
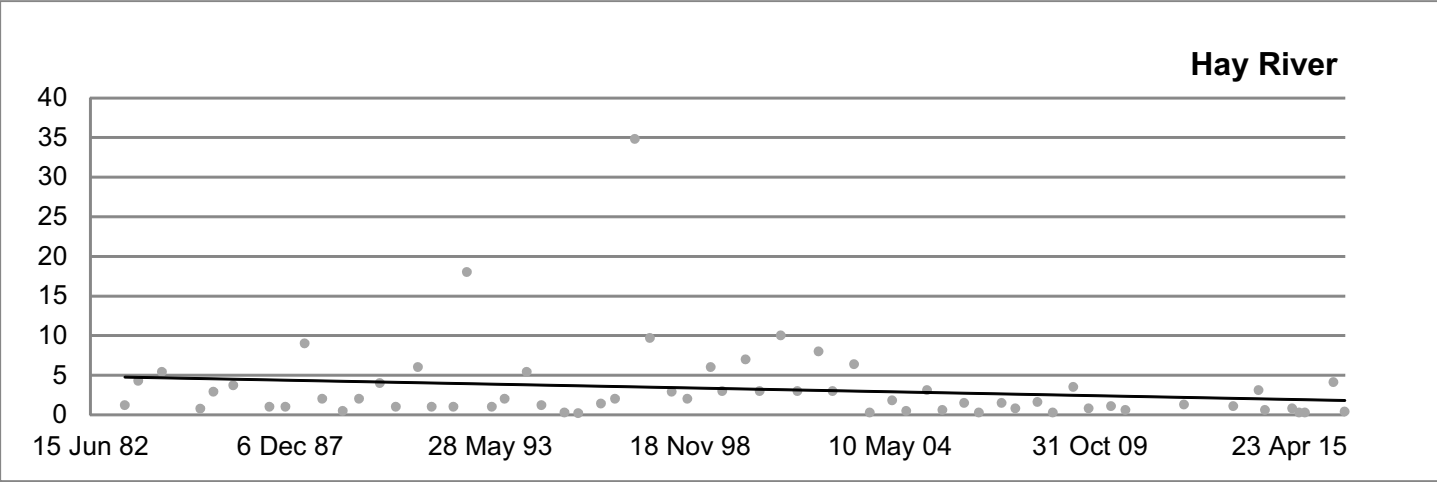
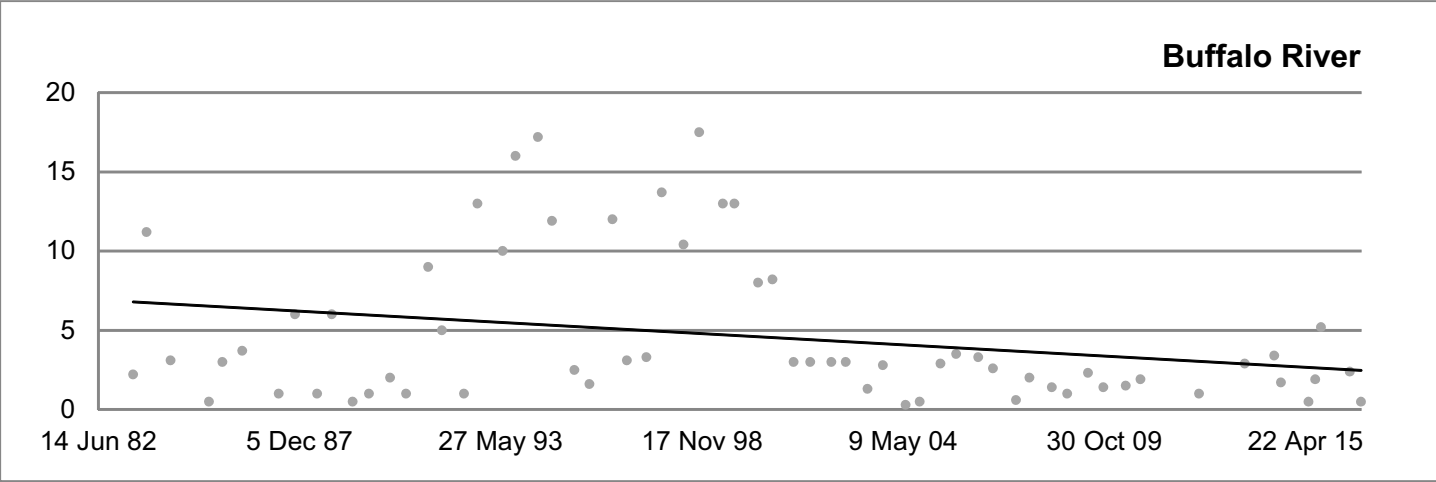
TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Cadmium (µg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0	Figure B.14c
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

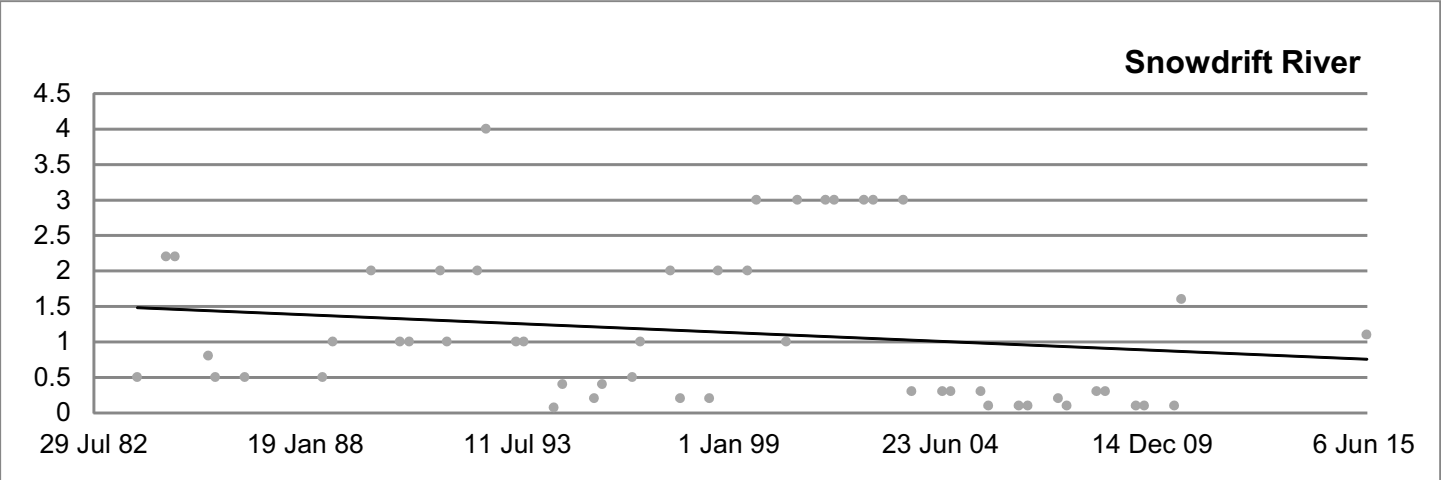
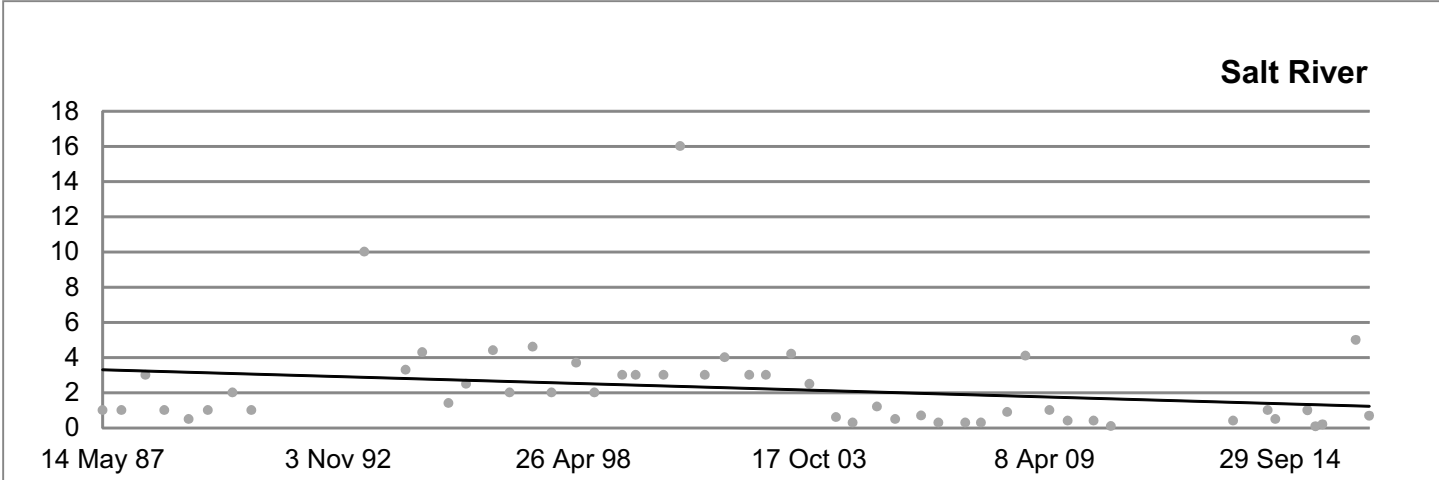
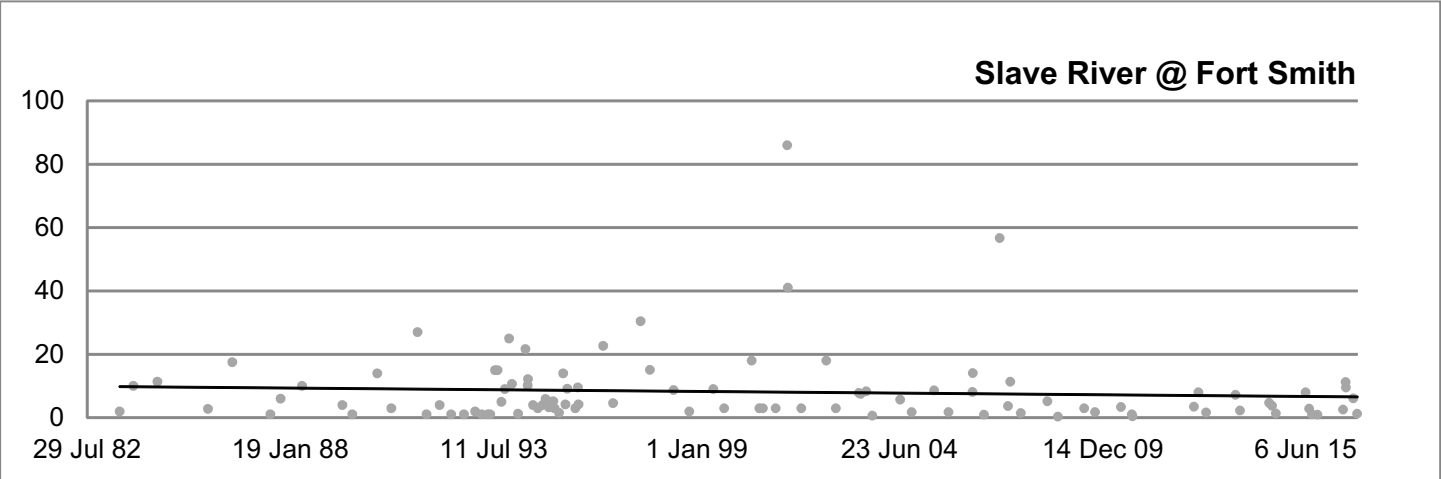
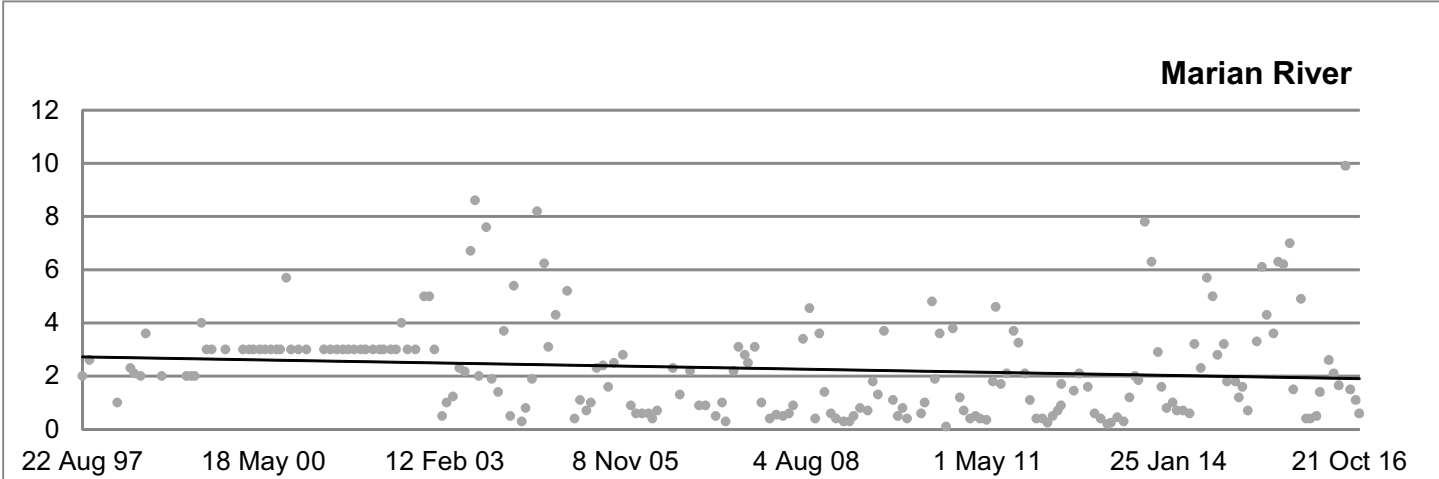
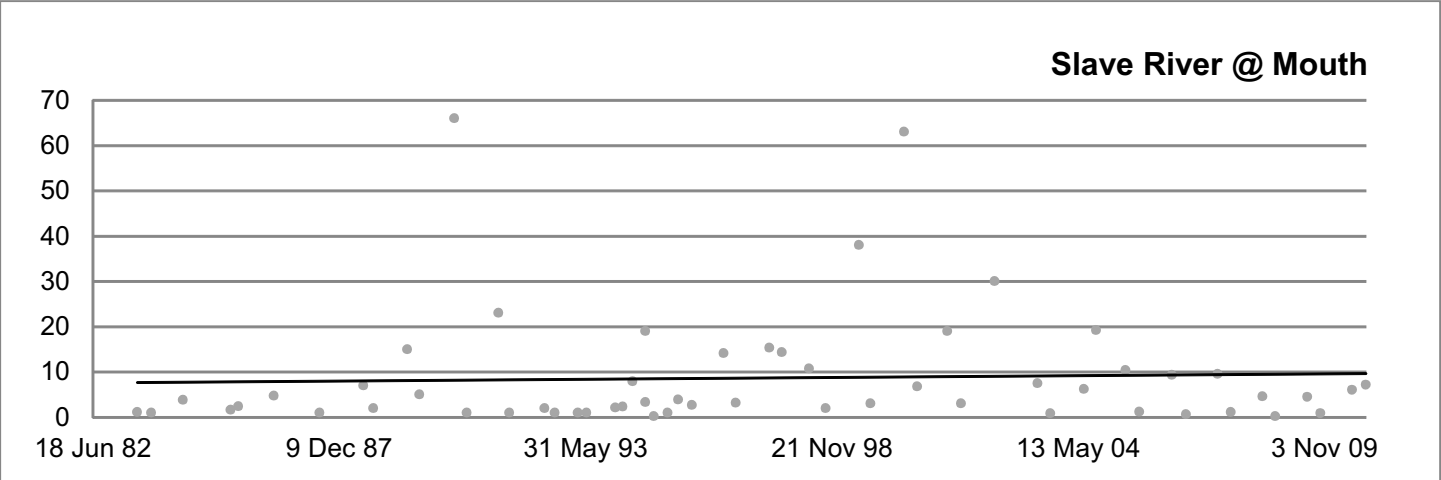
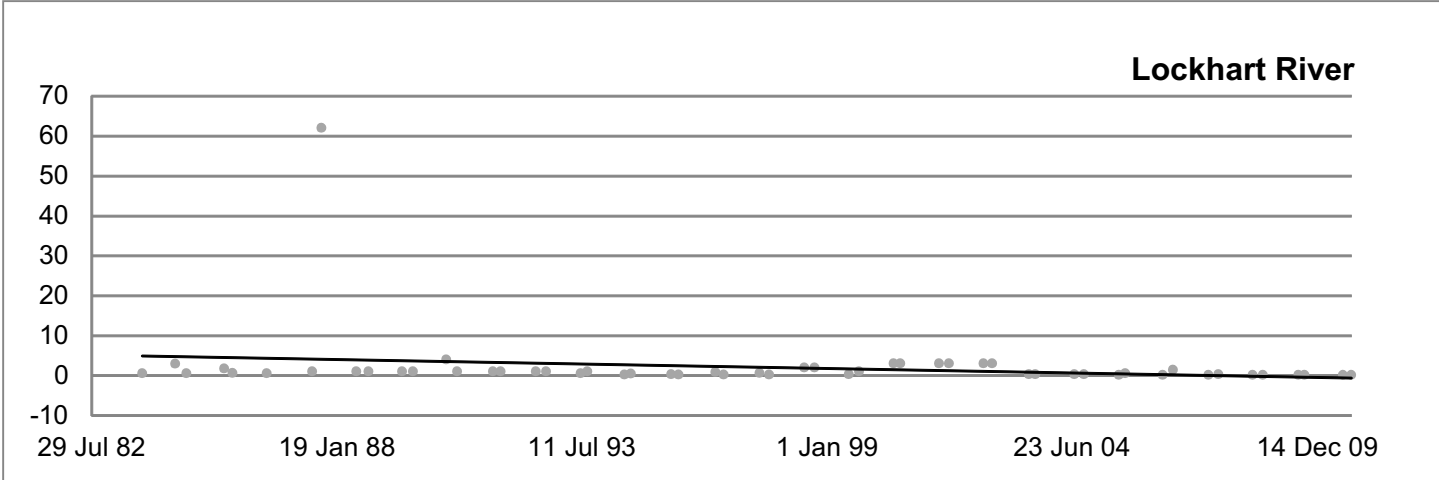
**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Chromium (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.15a

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Chromium (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.
ENW.VENW03044-01

OFFICE
Tt-VANC

DWN
MEZ

CKD
SL

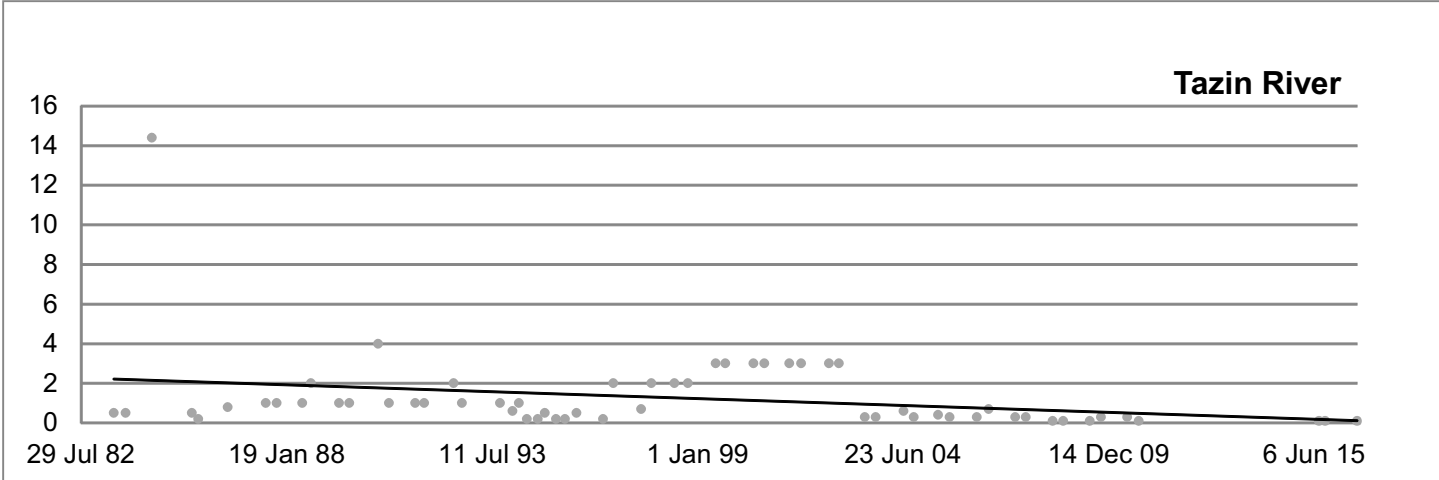
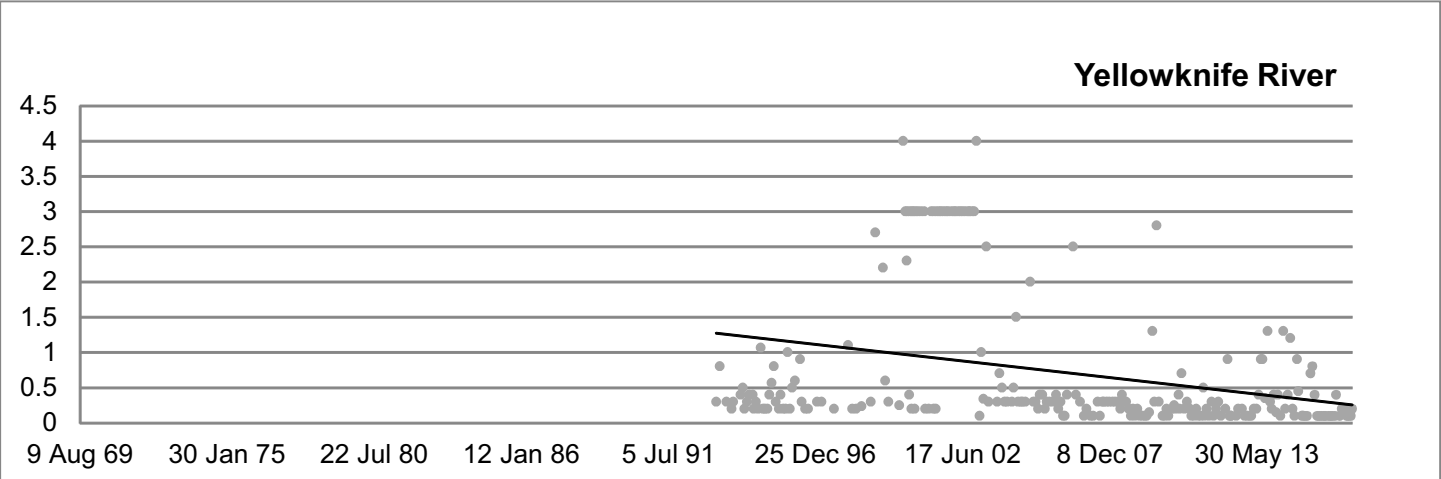
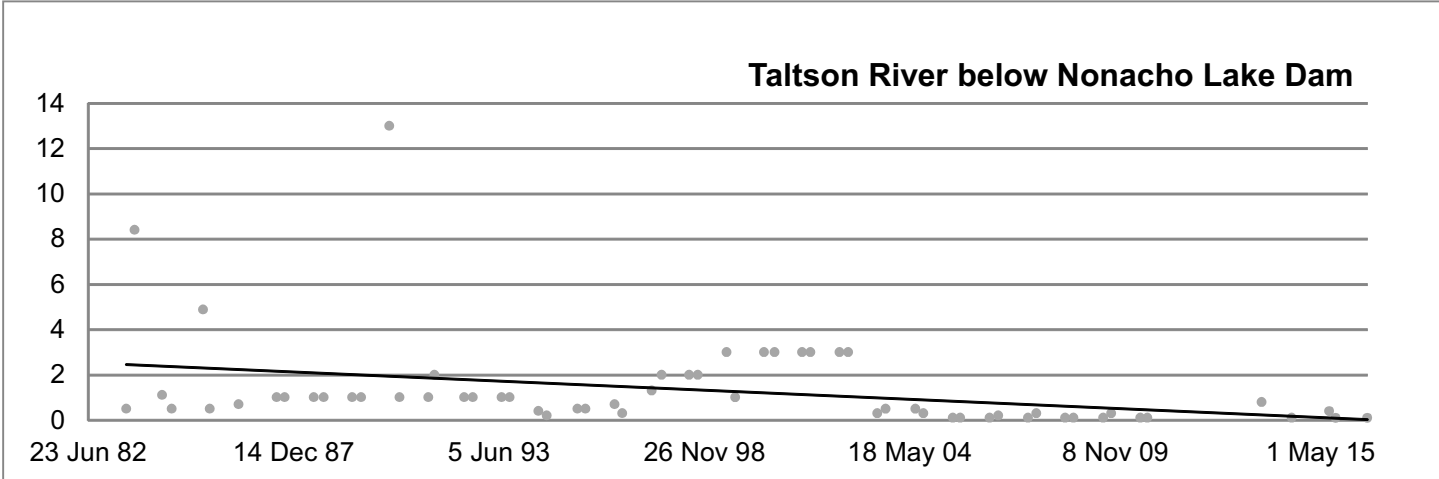
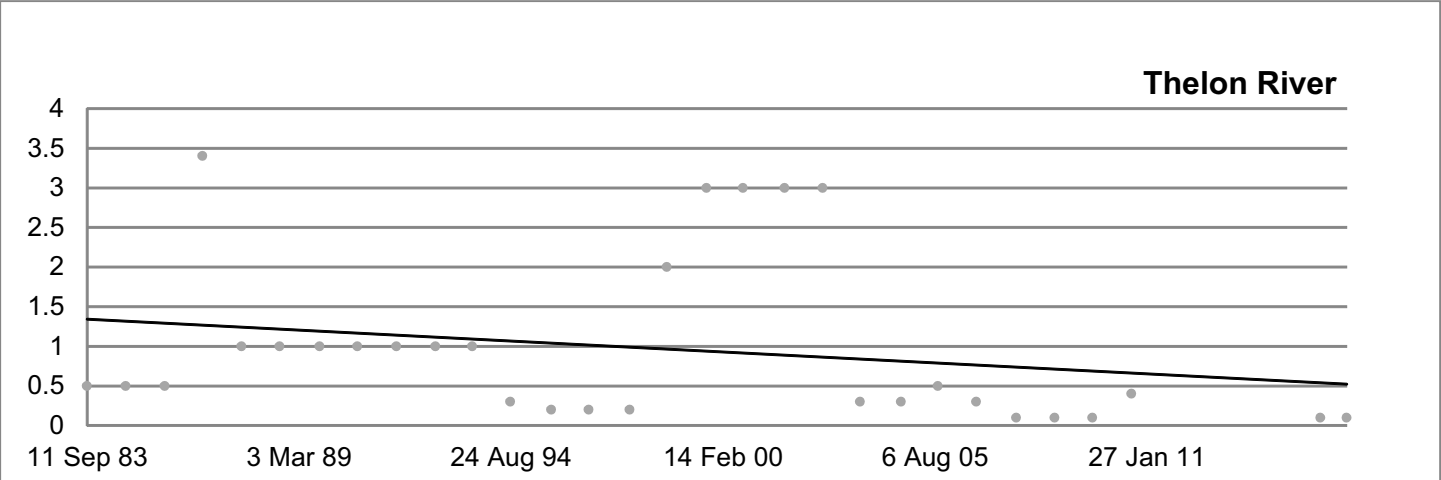
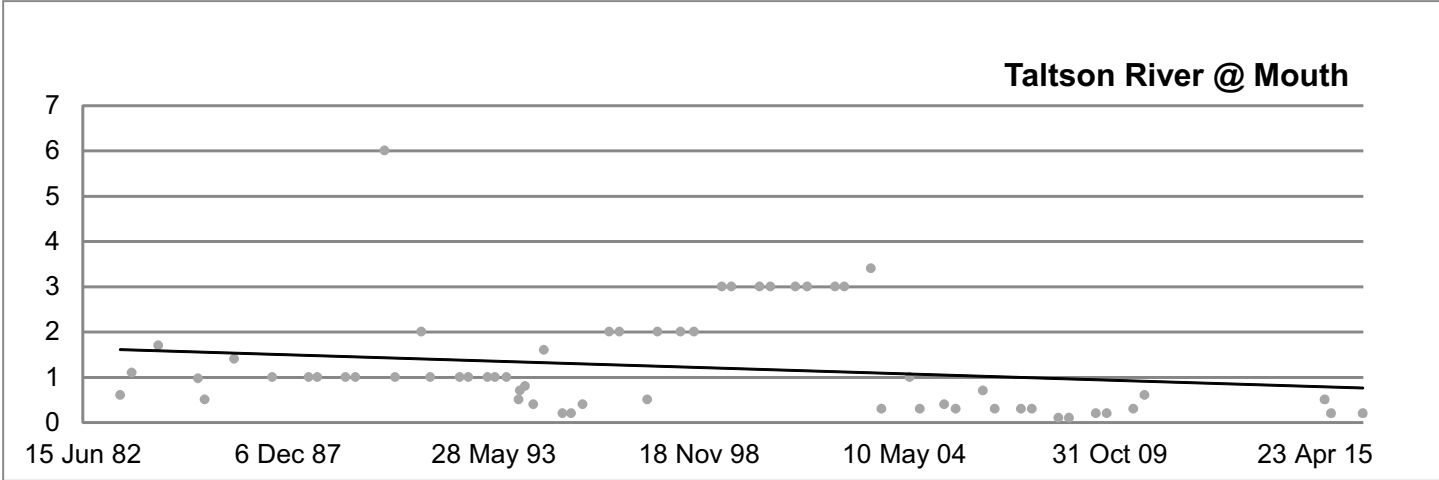
APVD
SW

REV
0

DATE
March 30, 2017

Figure B.15b

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Chromium (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.
ENW.VENW03044-01

OFFICE
Tt-VANC

DWN
MEZ

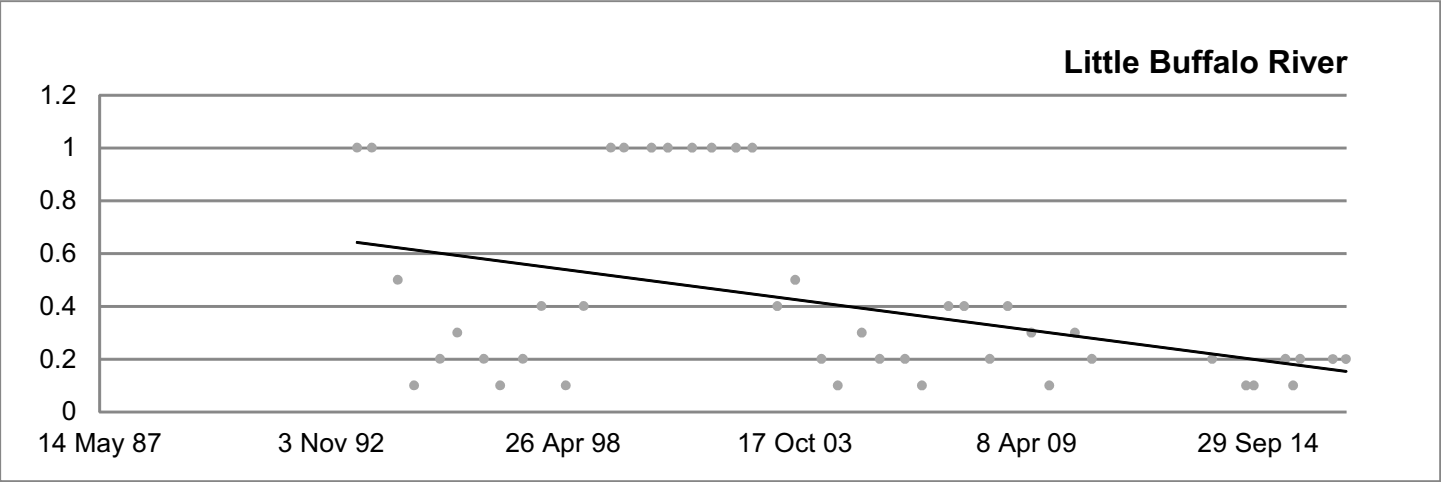
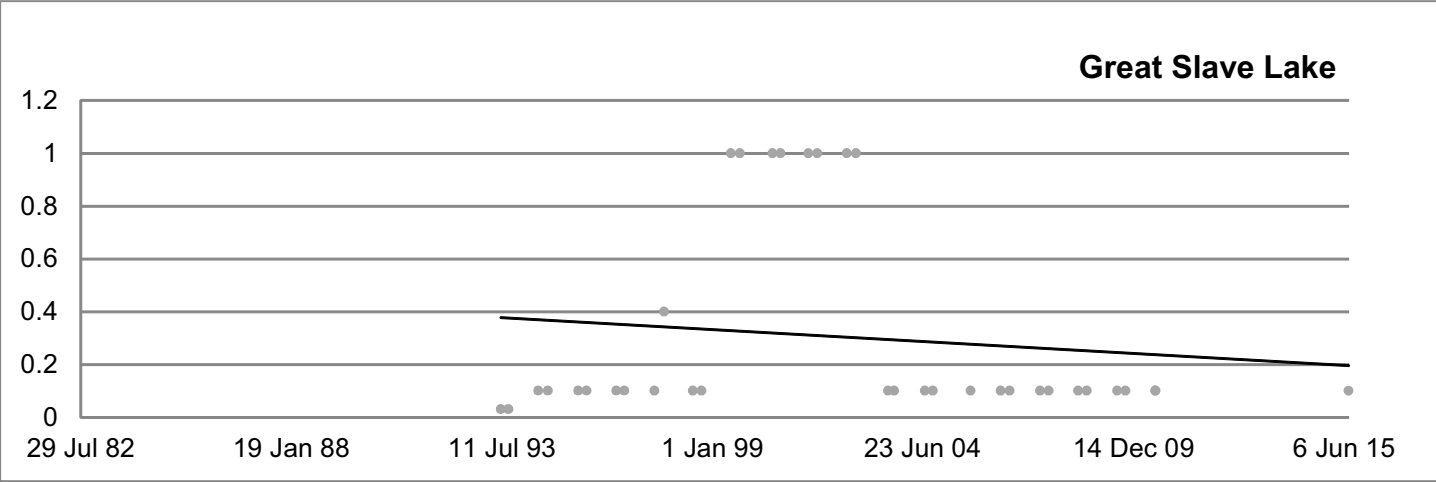
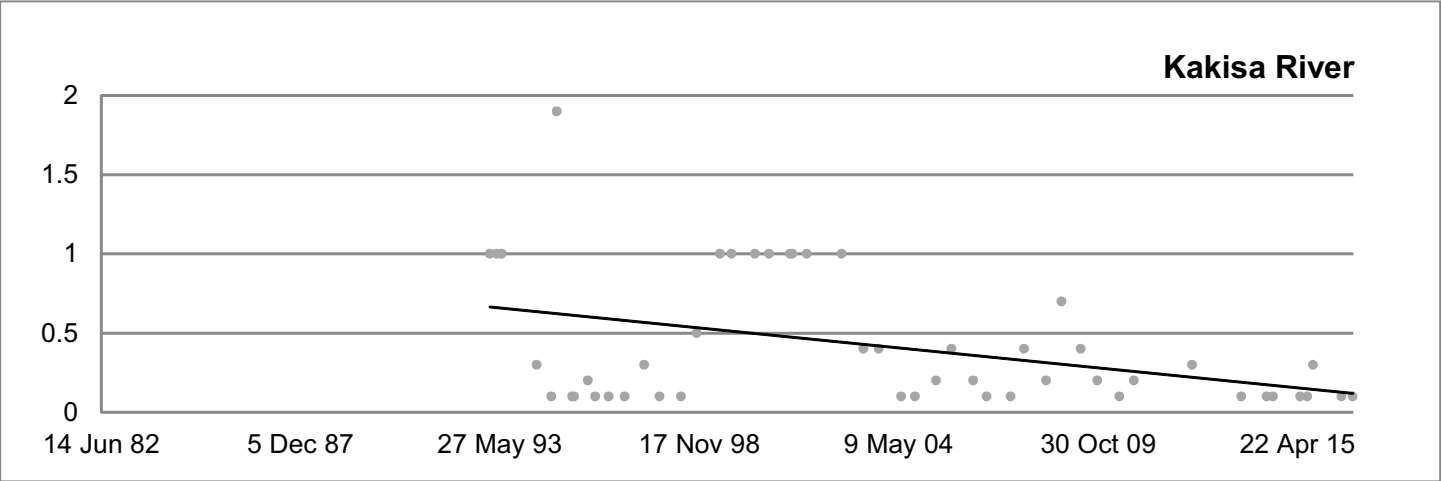
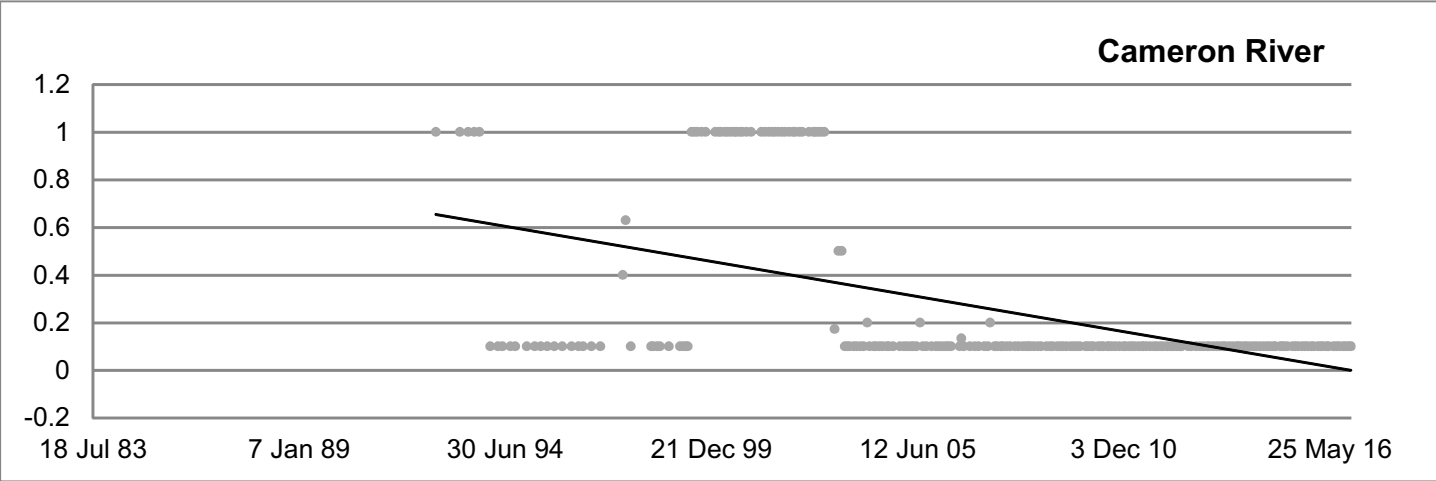
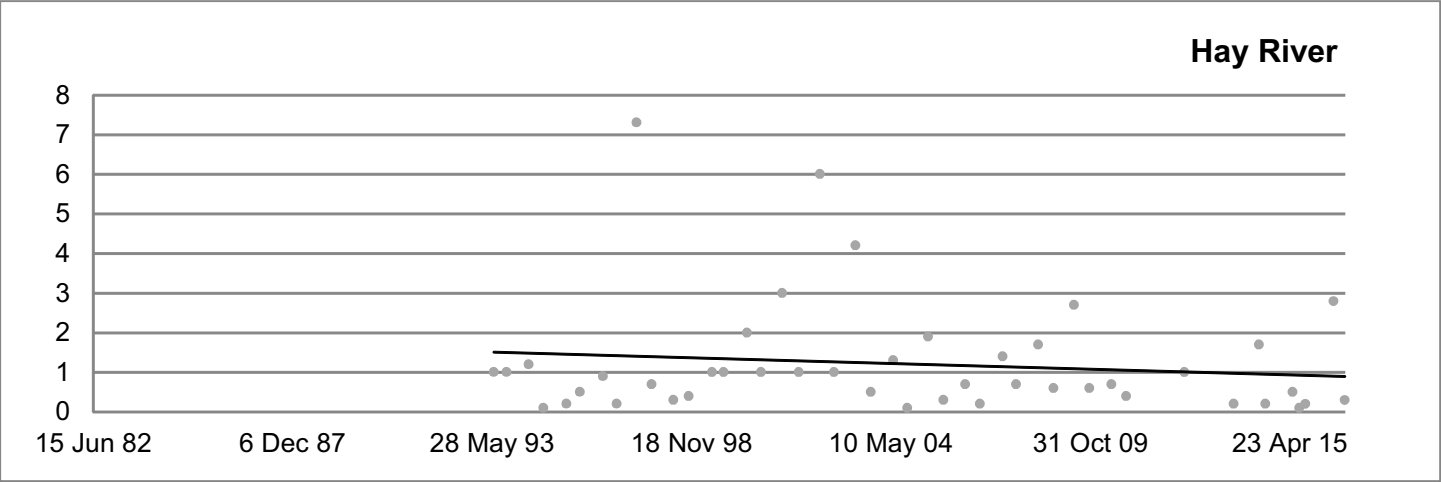
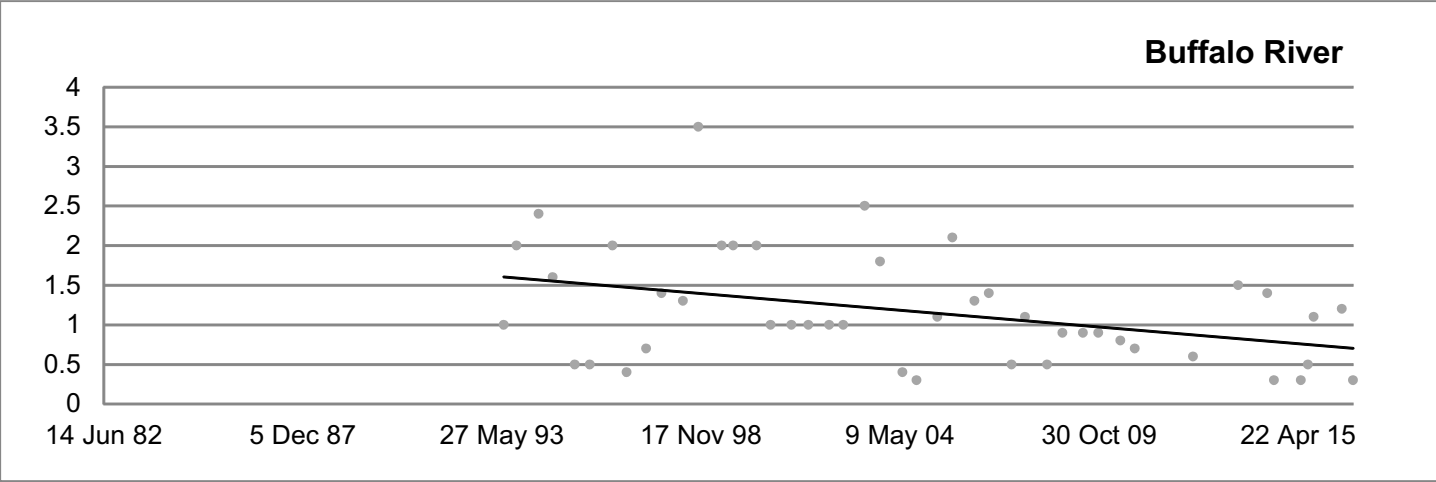
CKD
SL

APVD
SW

REV
0

DATE
March 30, 2017

Figure B.15c



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

CLIENT



TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

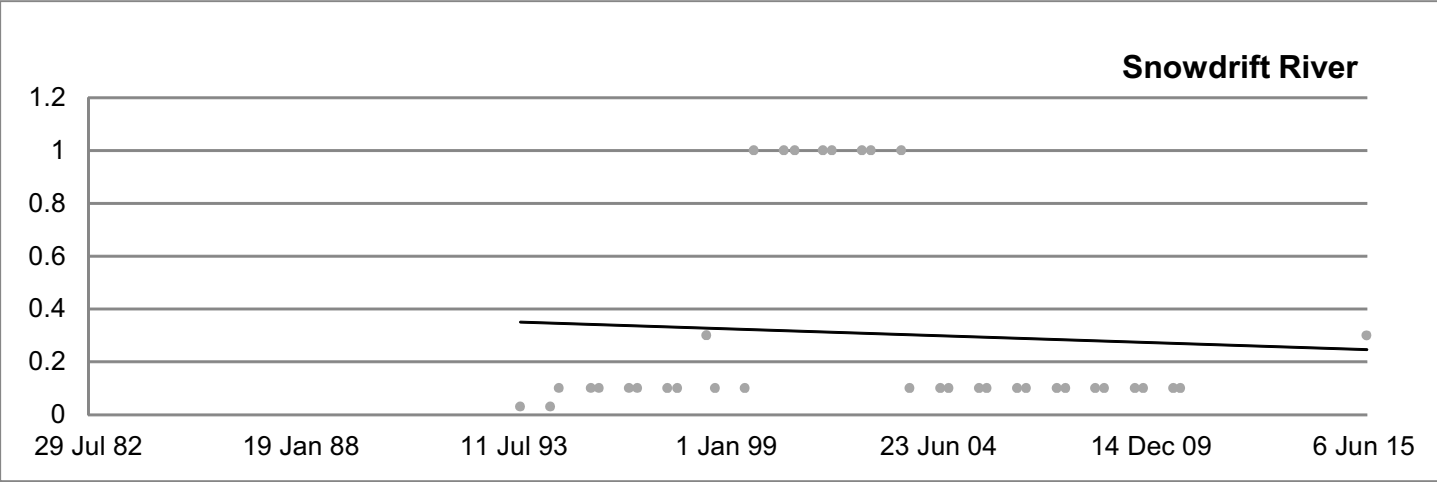
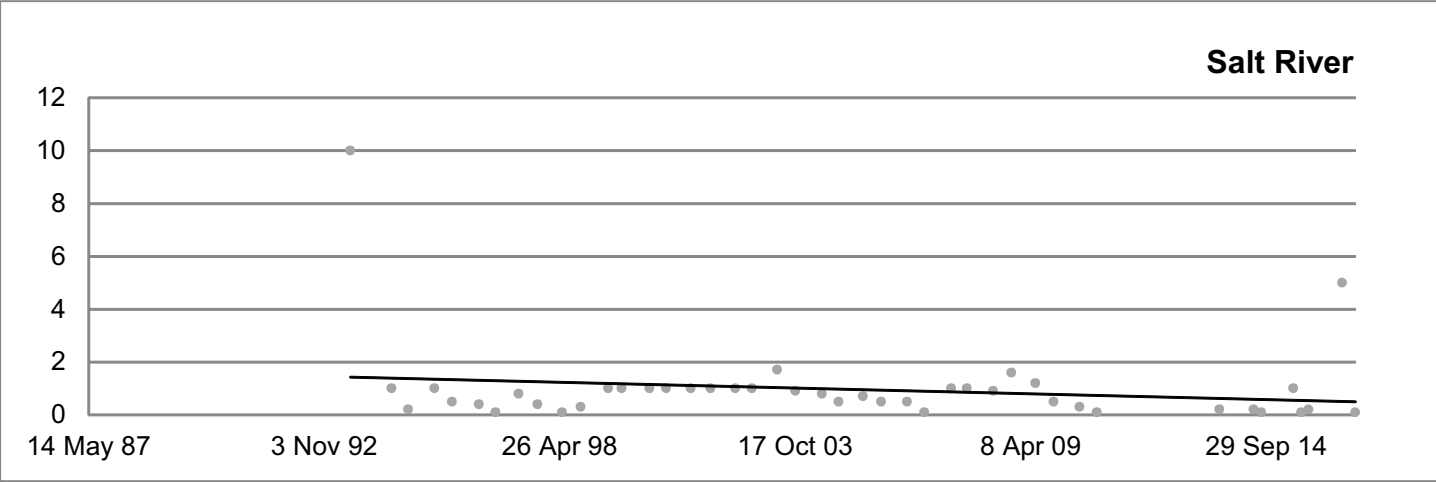
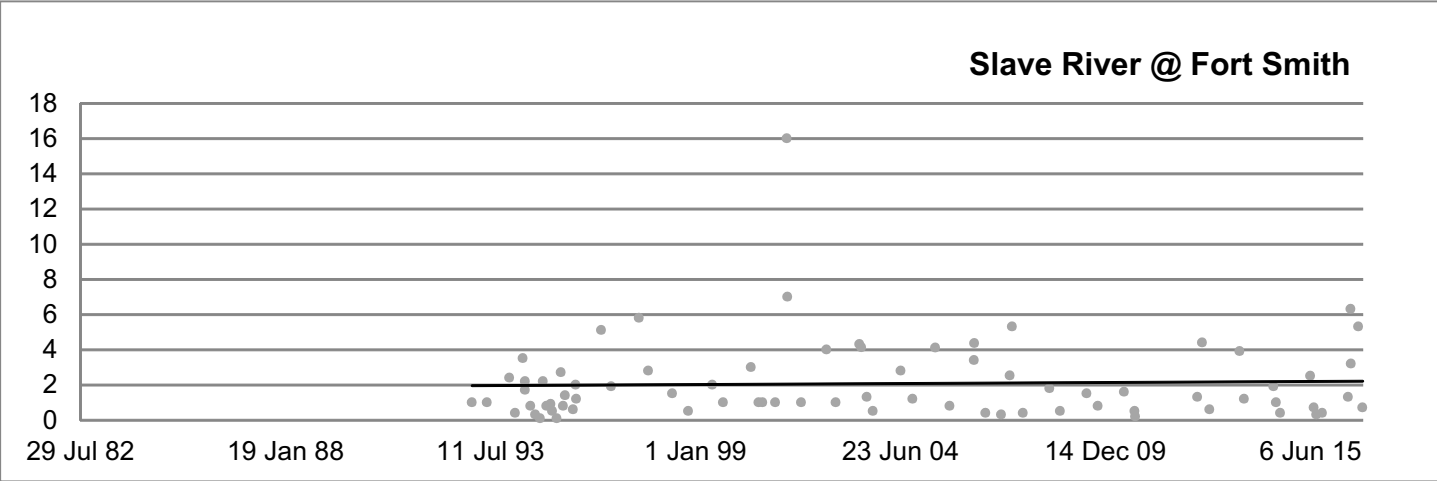
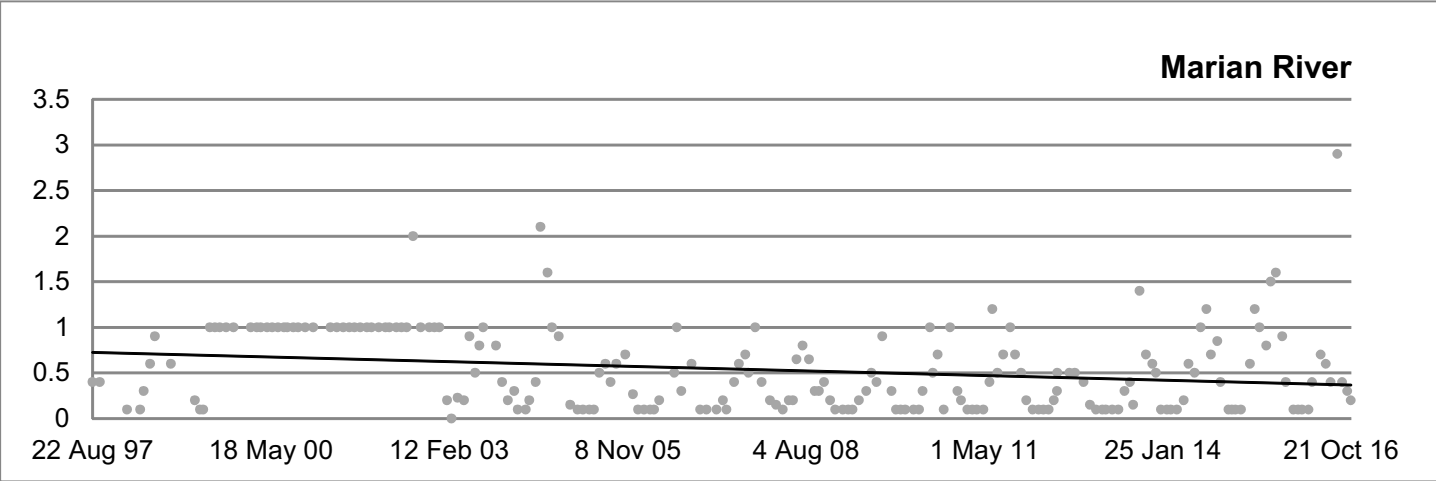
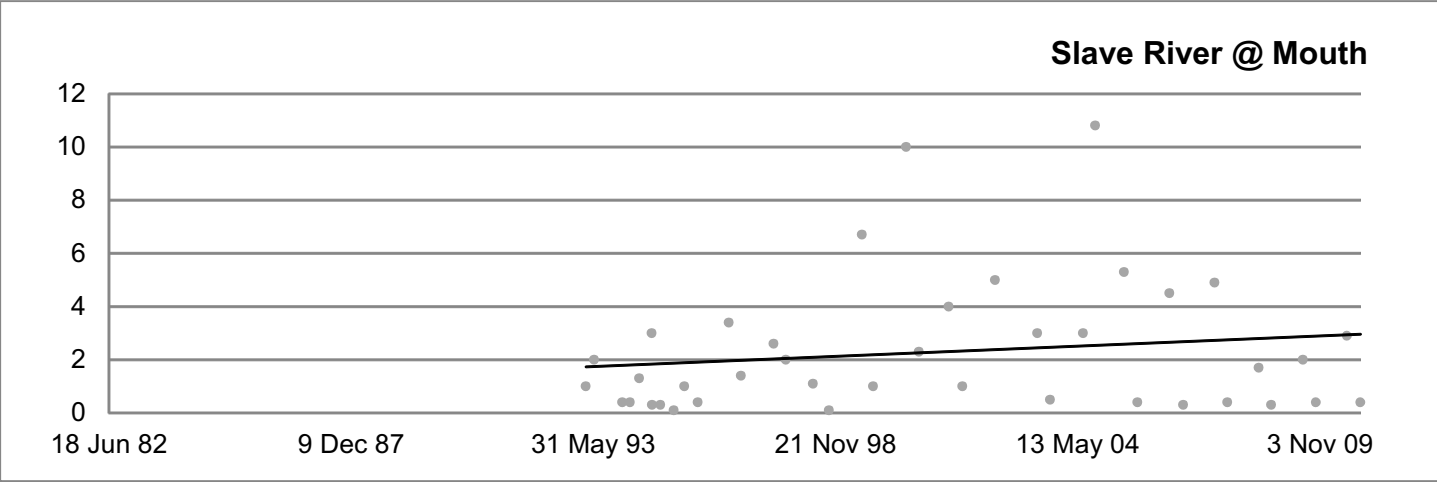
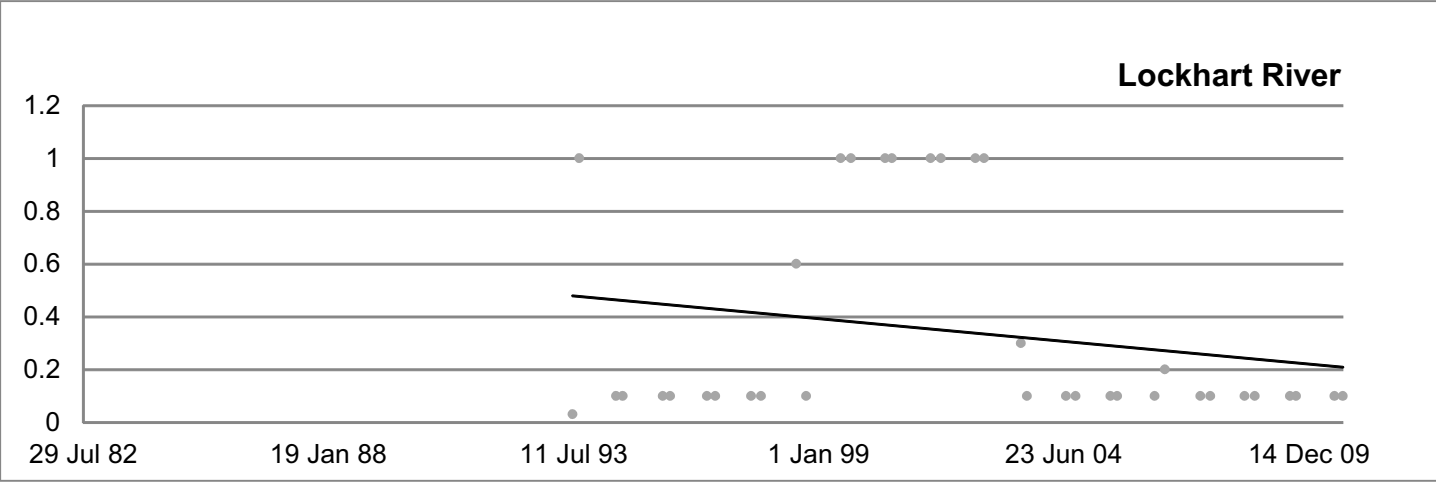
Cobalt (µg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0	Figure B.16a
OFFICE Tt-VANC	DATE March 30, 2017				

STATUS
ISSUED FOR USE

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

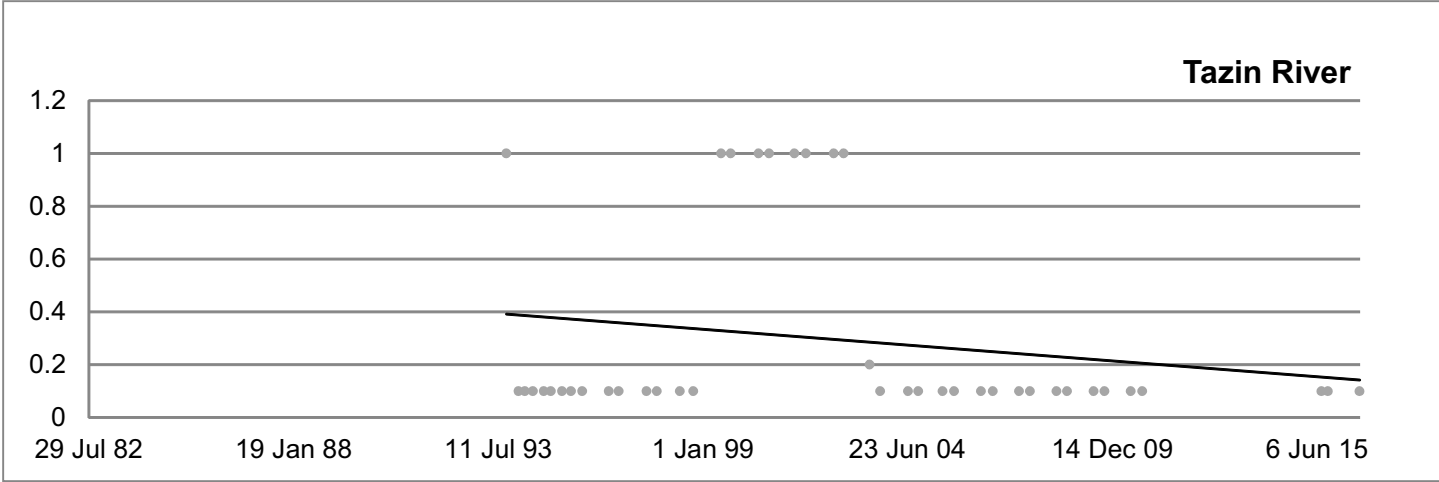
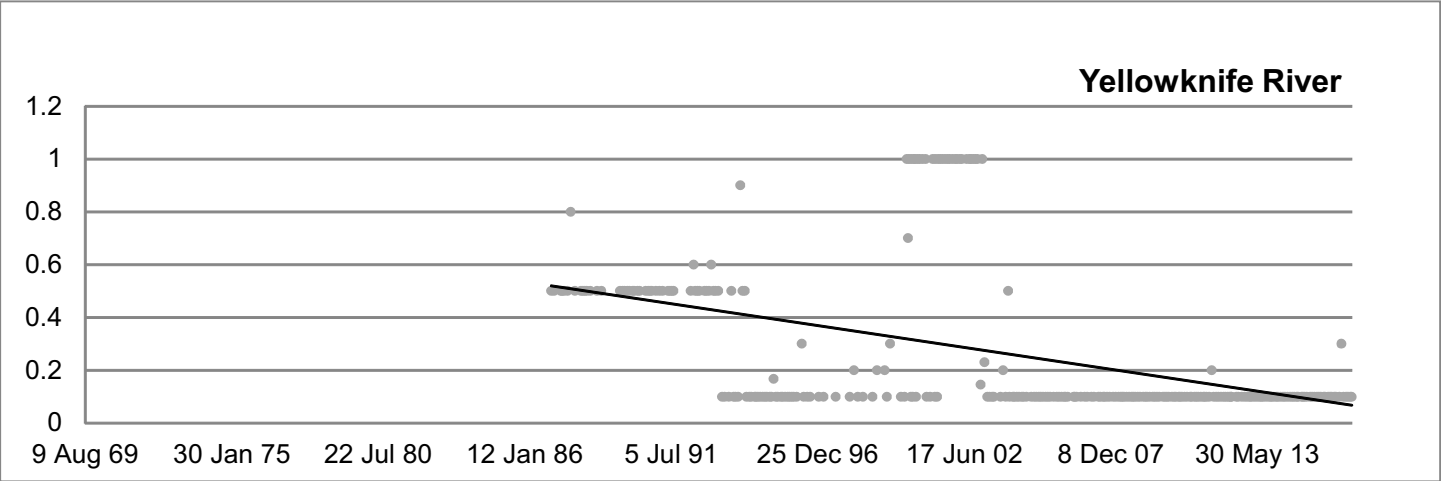
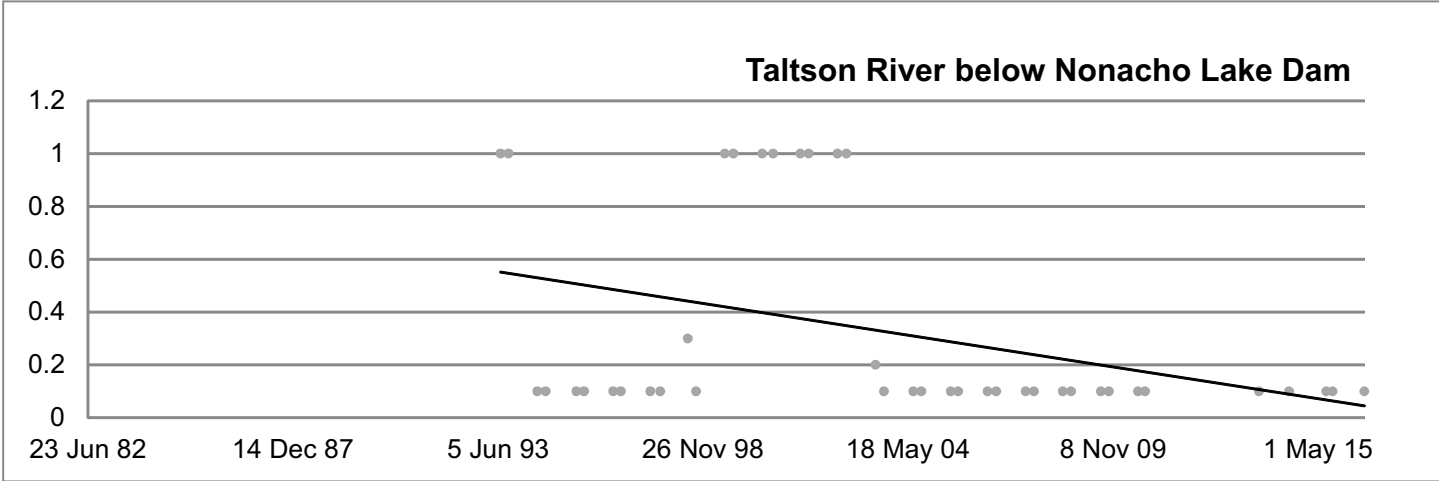
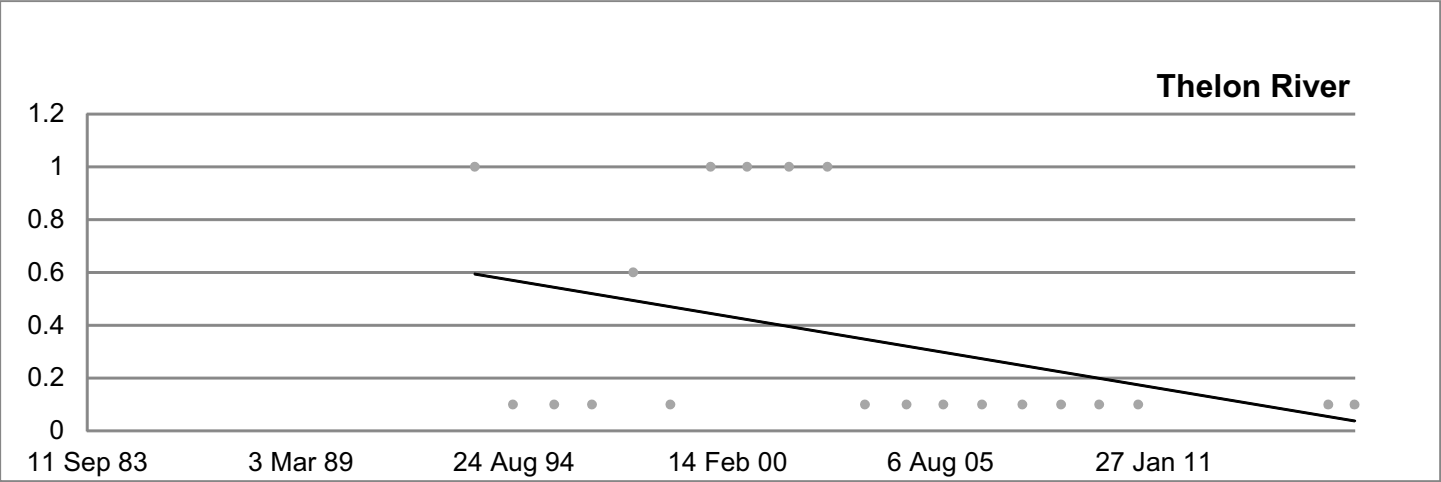
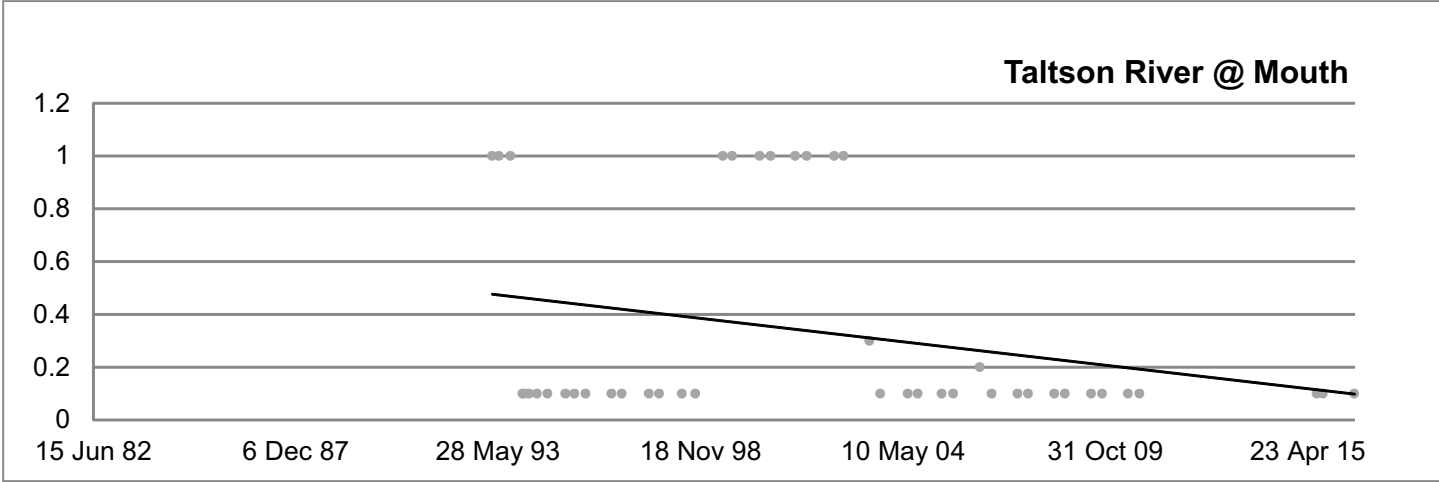
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

**Cobalt (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.16b

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



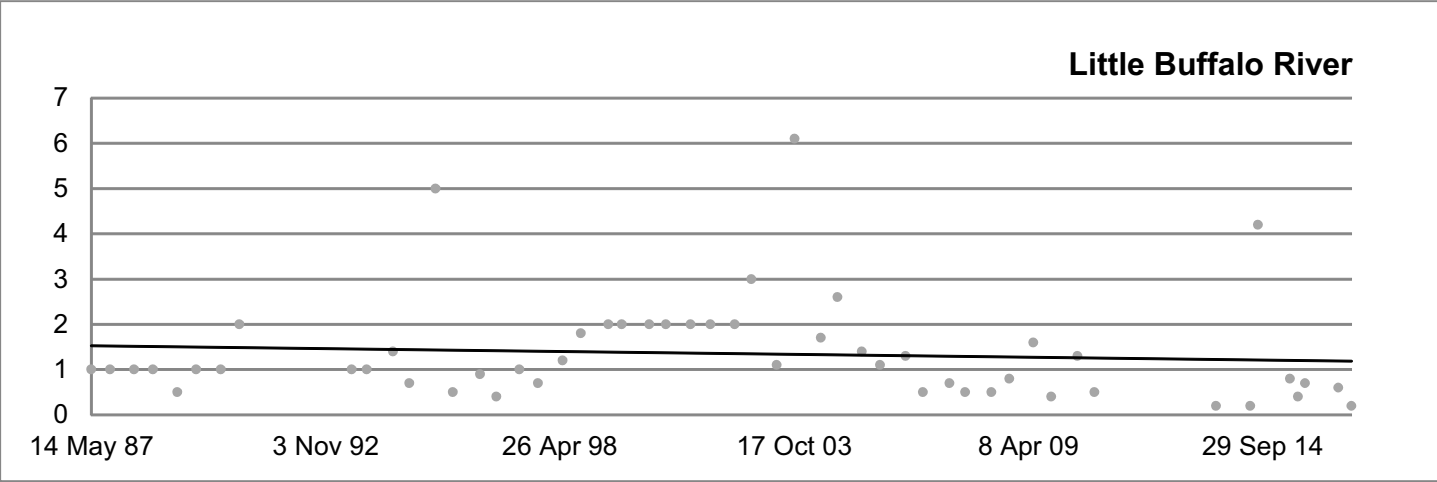
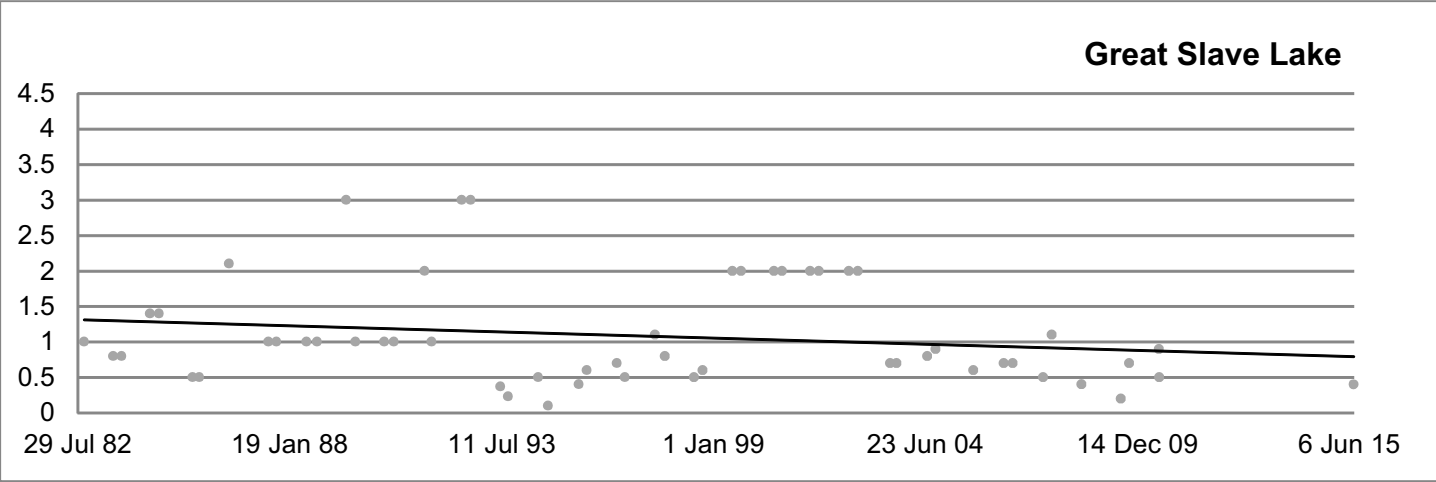
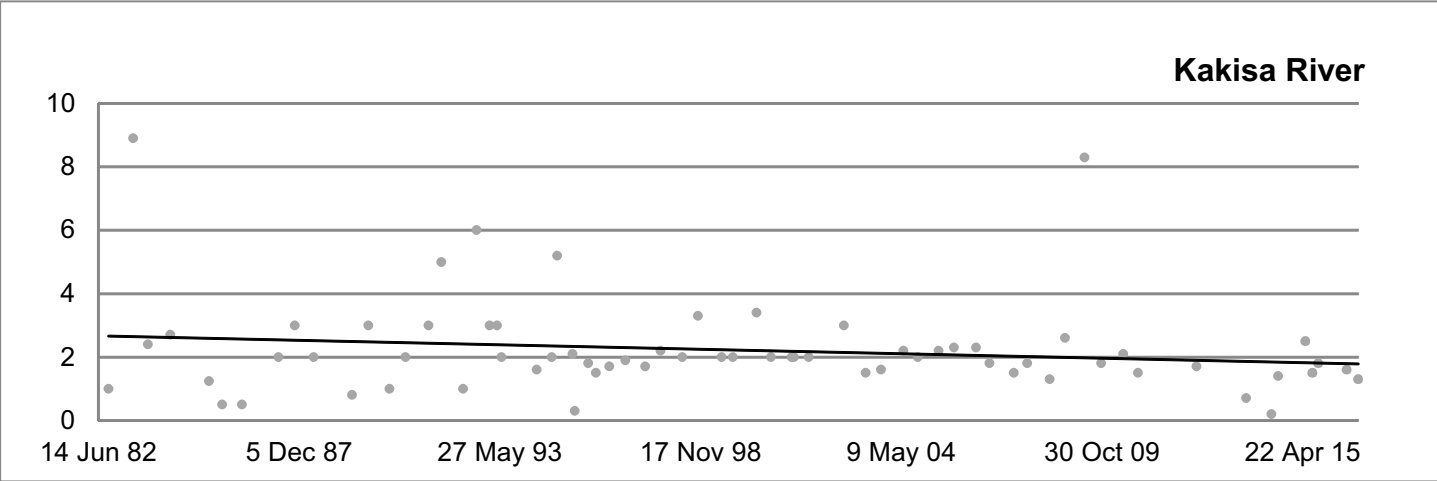
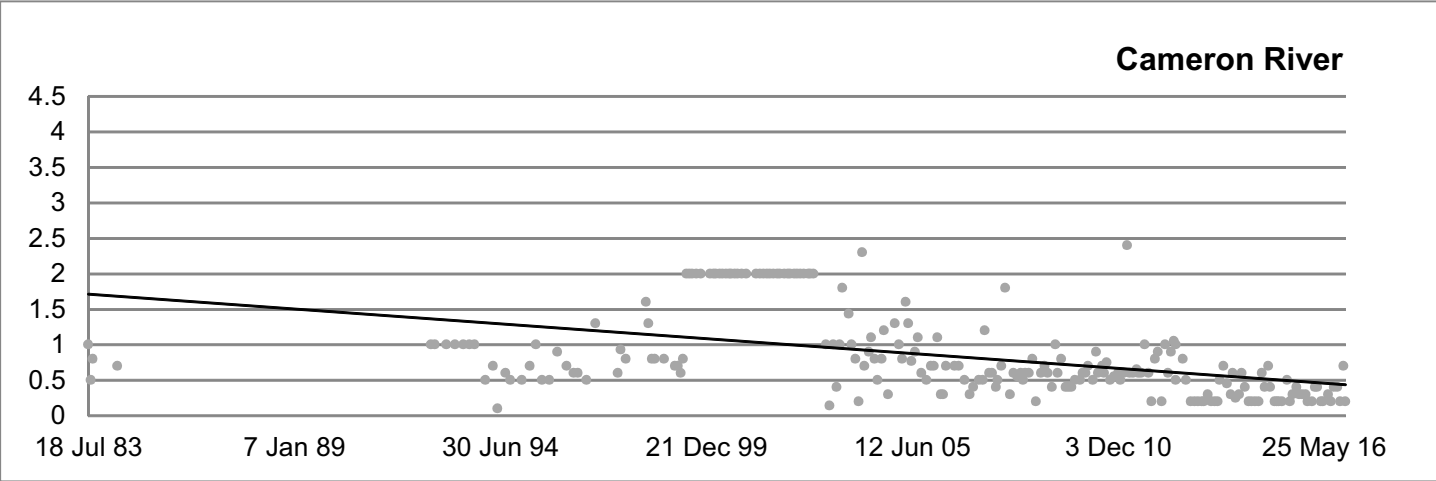
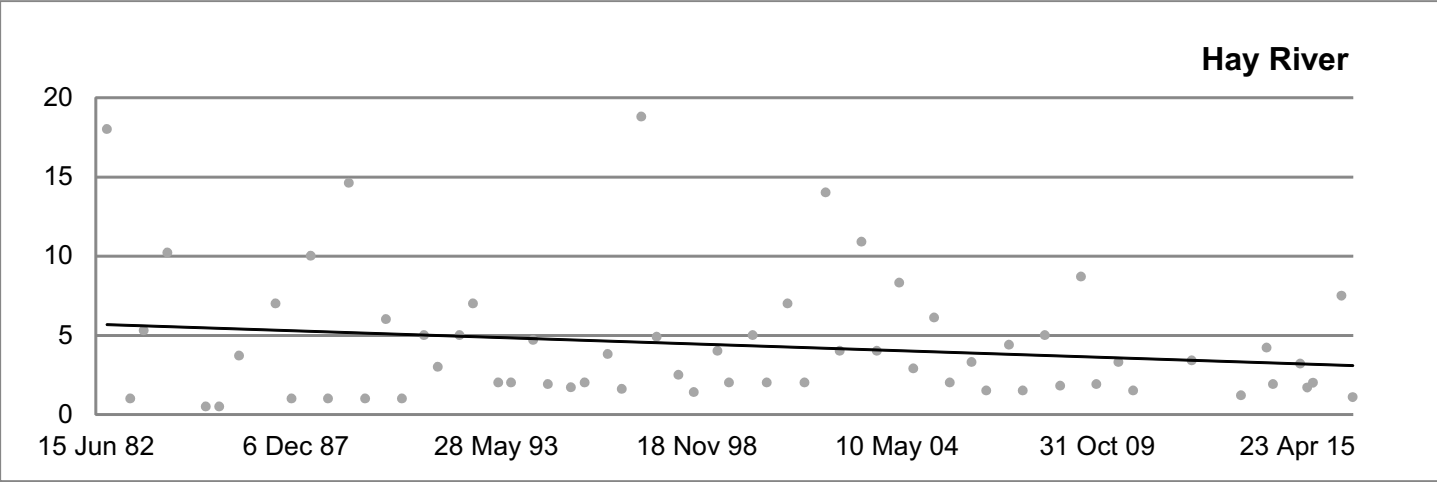
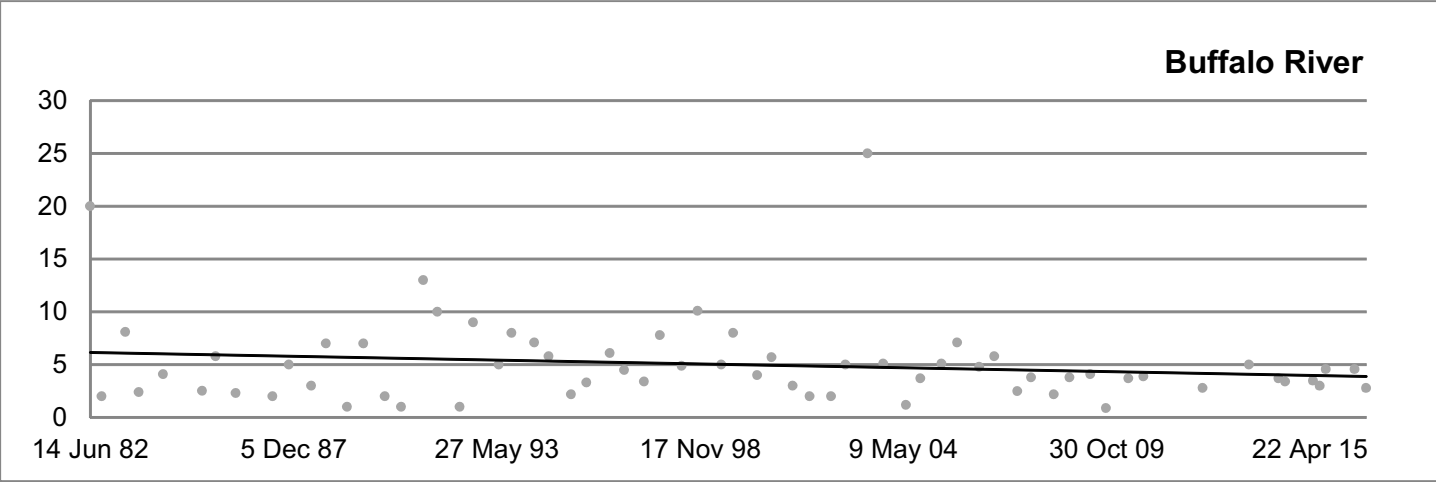
TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Cobalt (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0	Figure B.16c
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



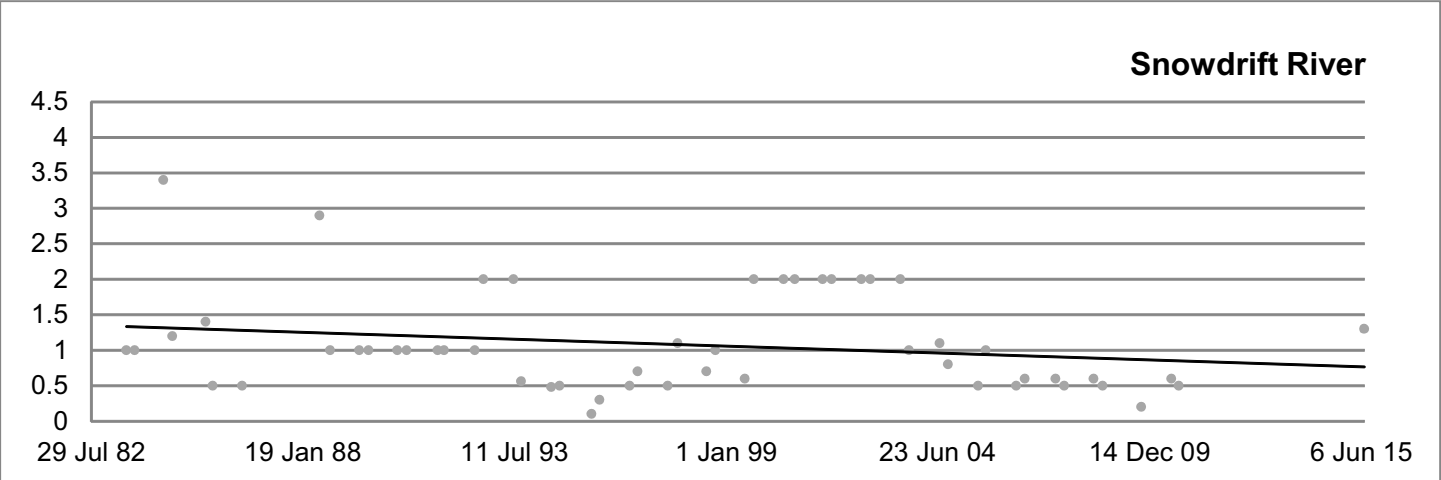
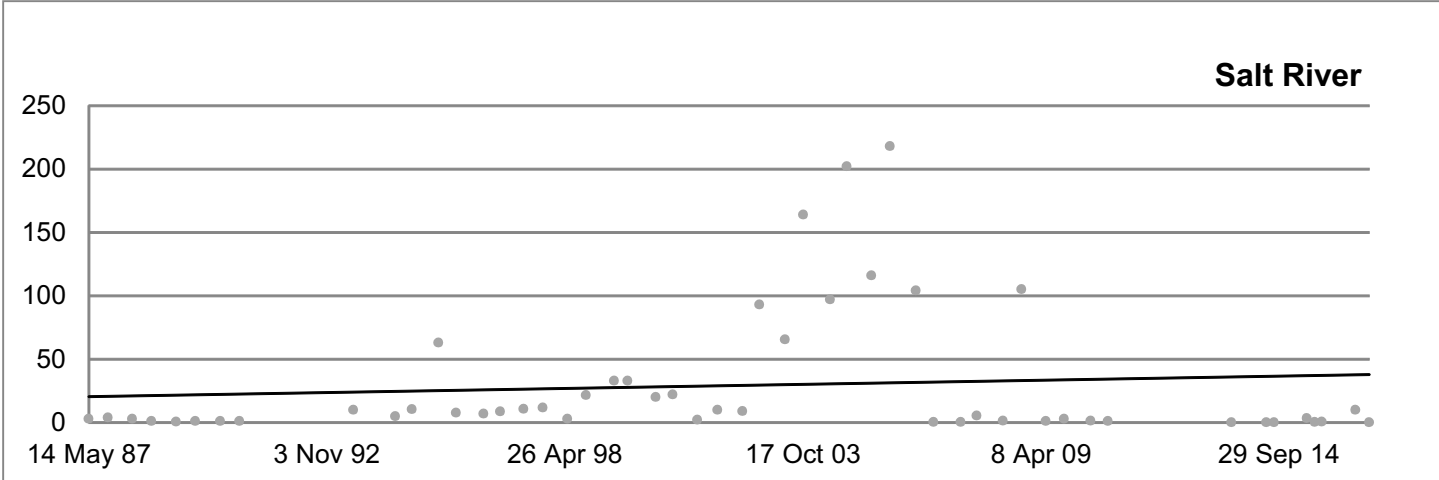
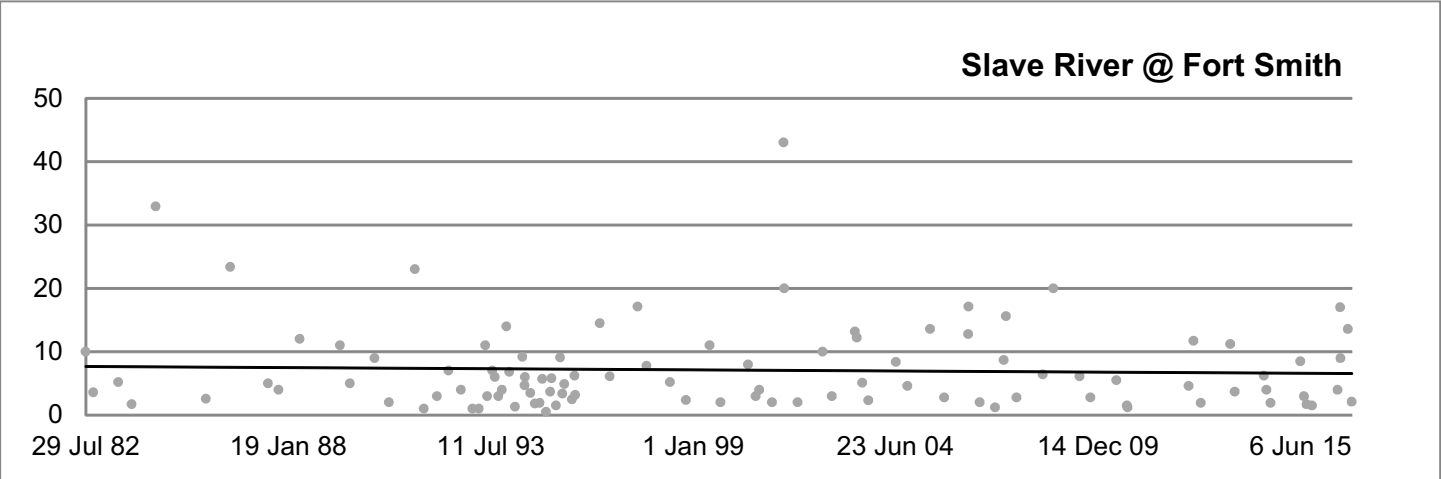
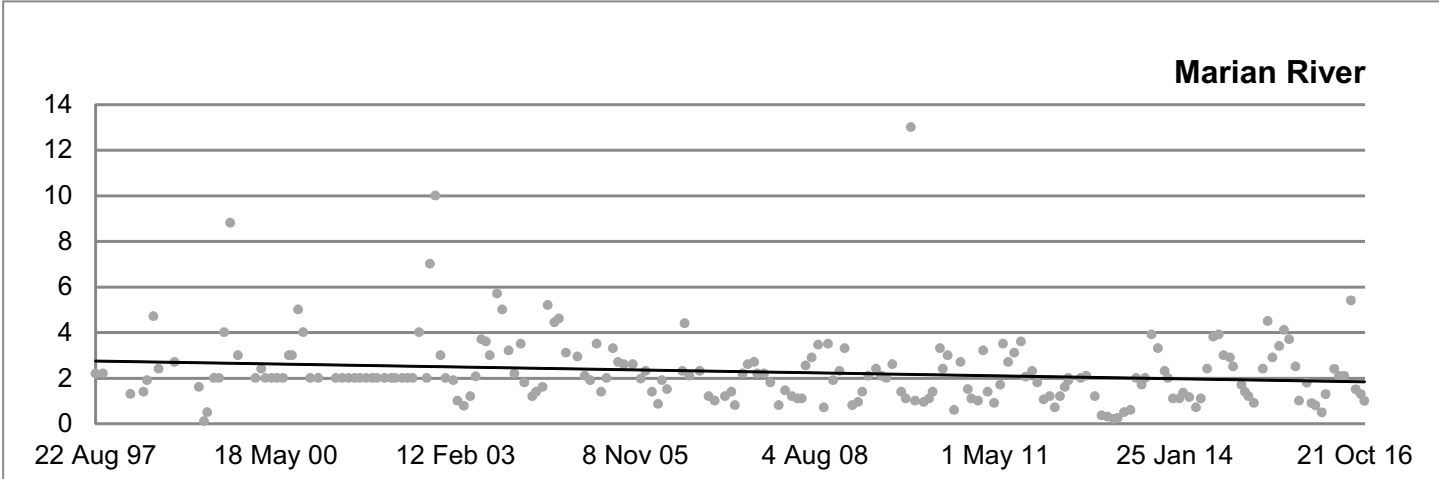
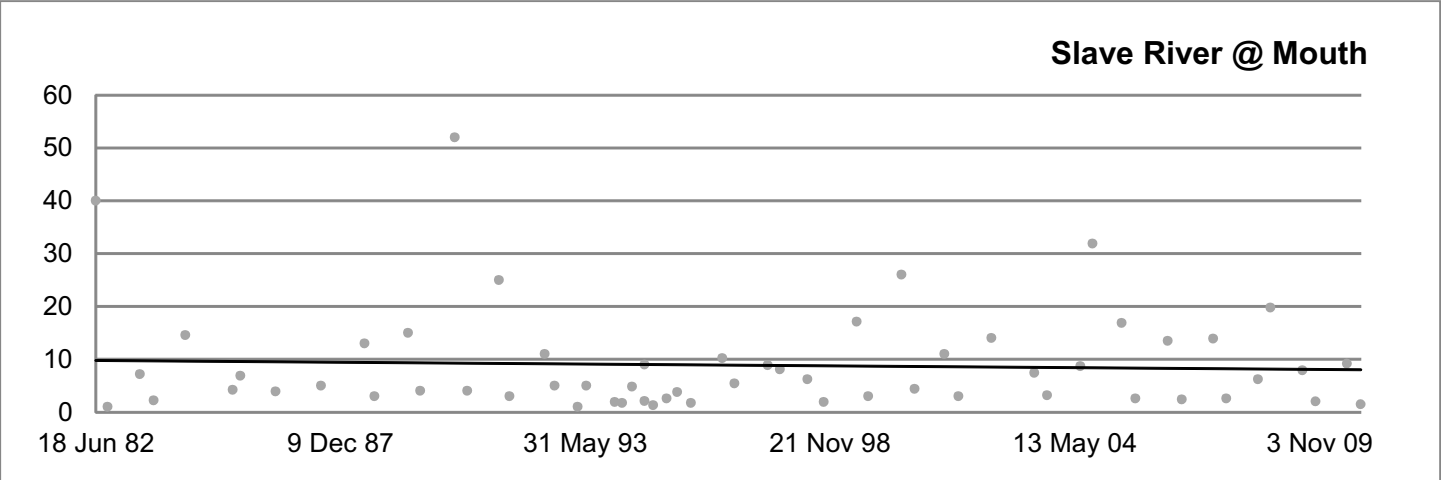
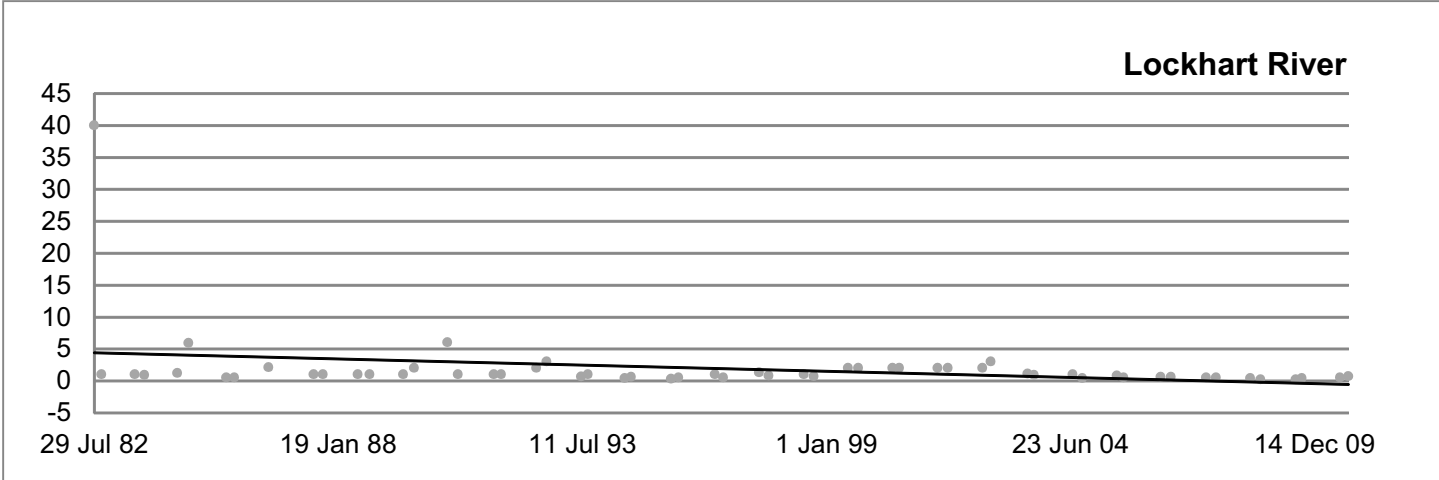
TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Copper (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0	Figure B.17a
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



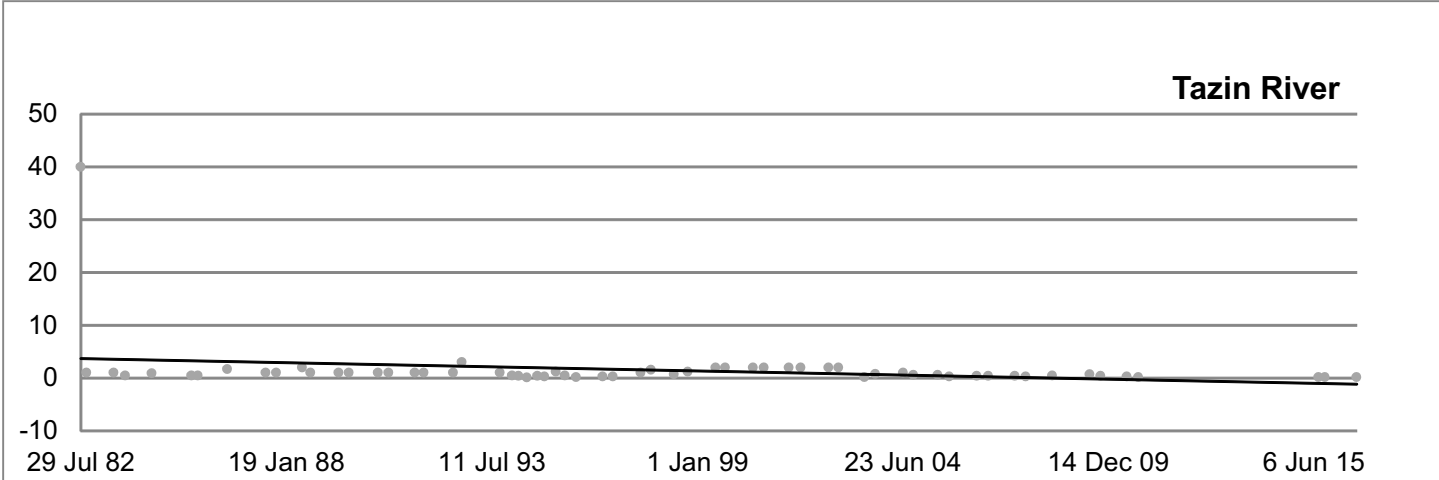
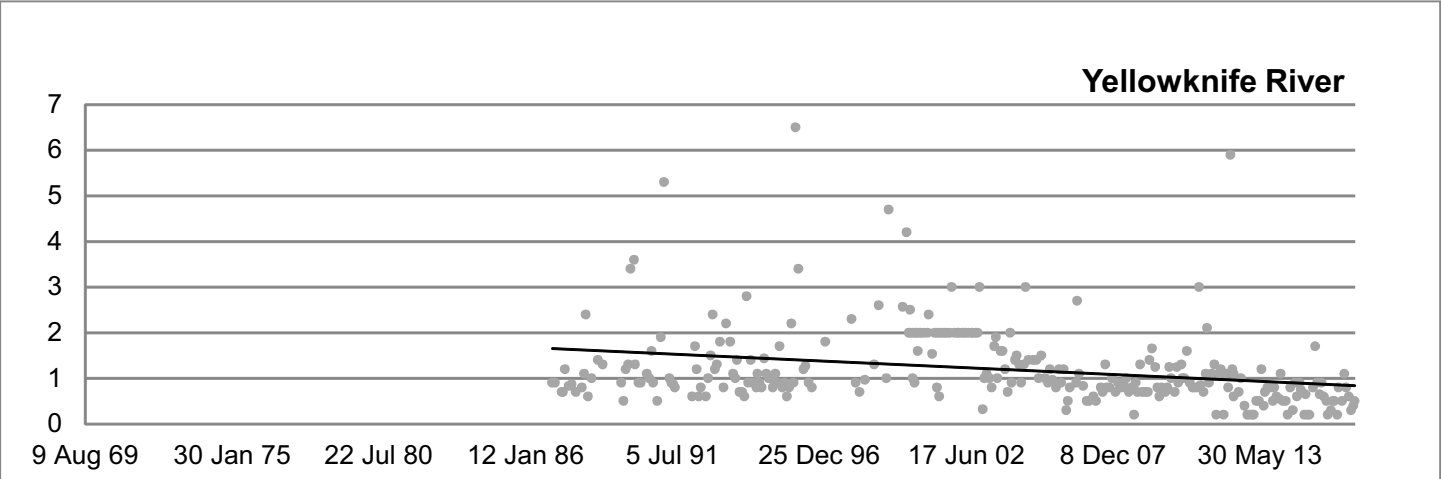
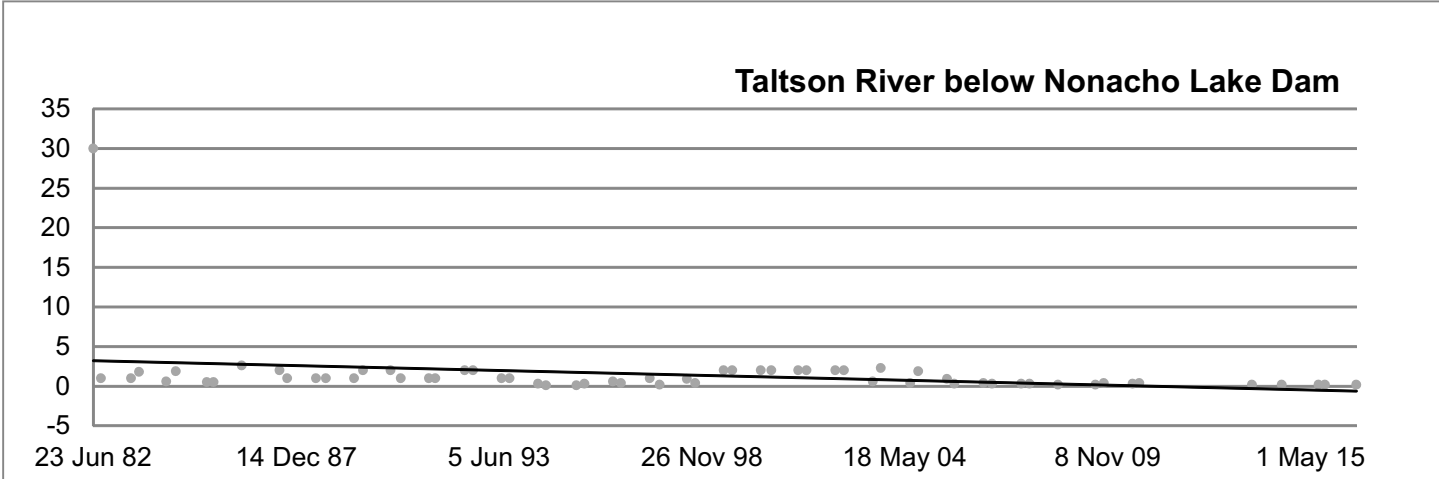
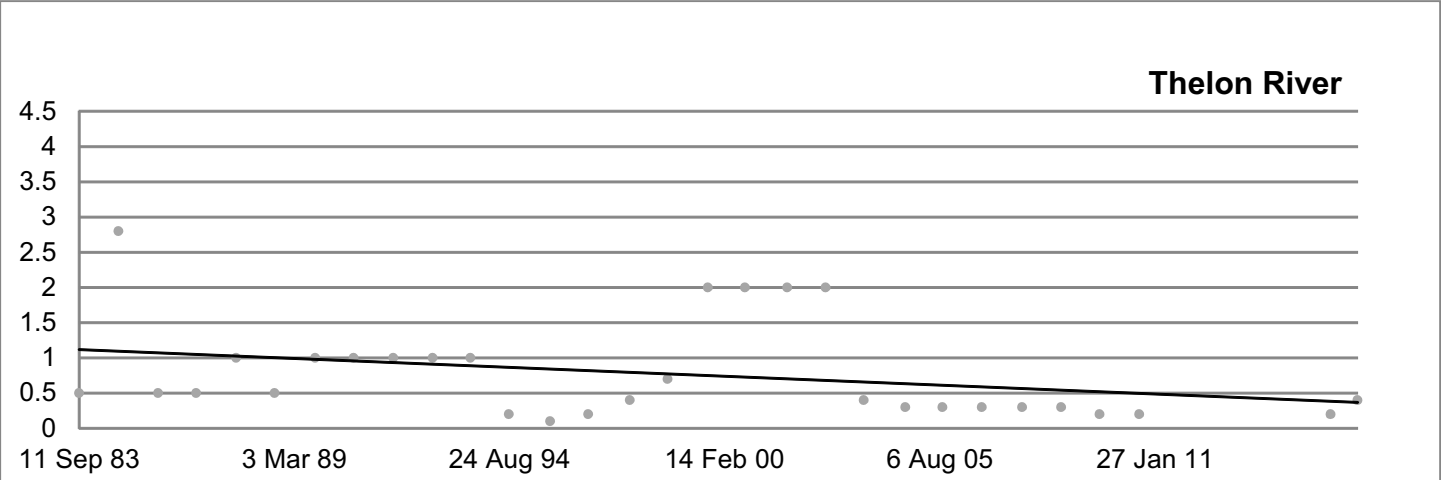
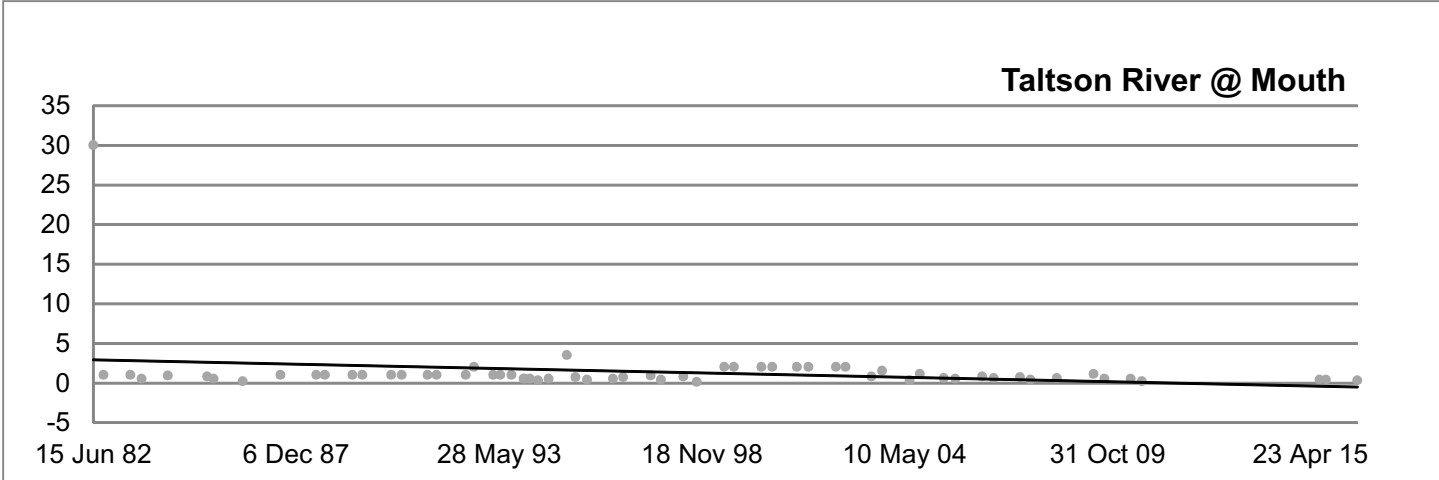
TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Copper ($\mu\text{g/L}$)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0	Figure B.17b
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

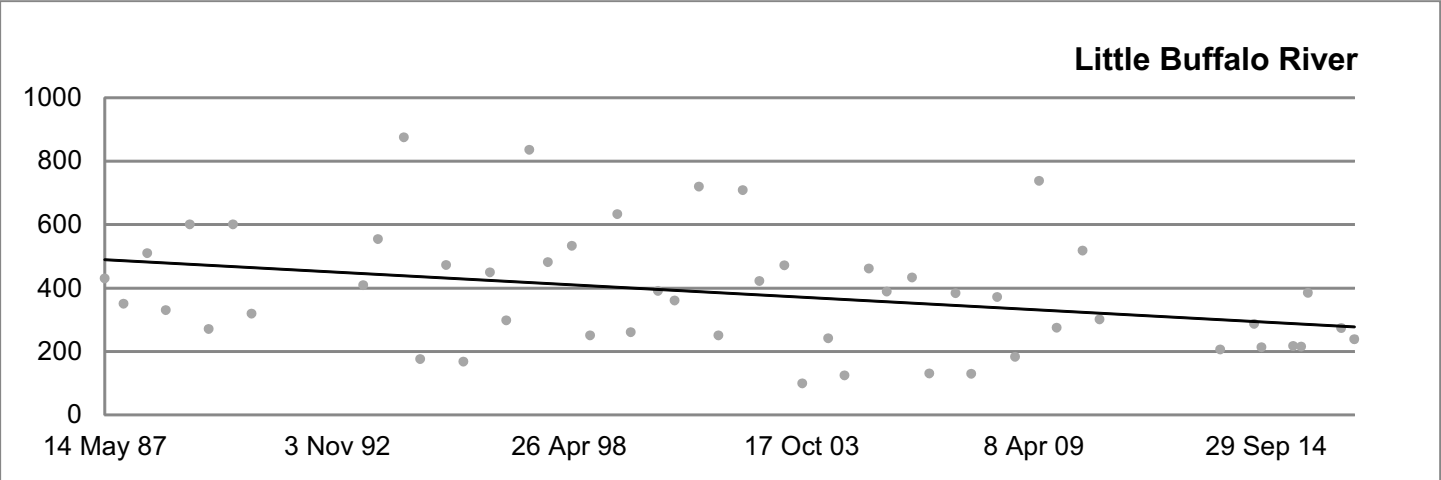
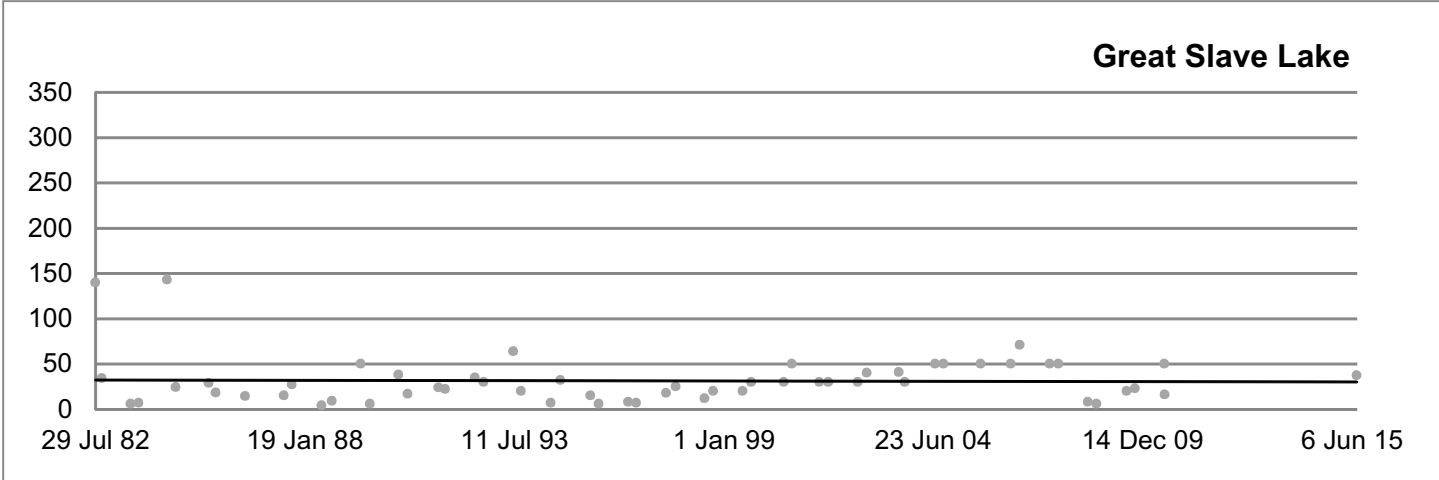
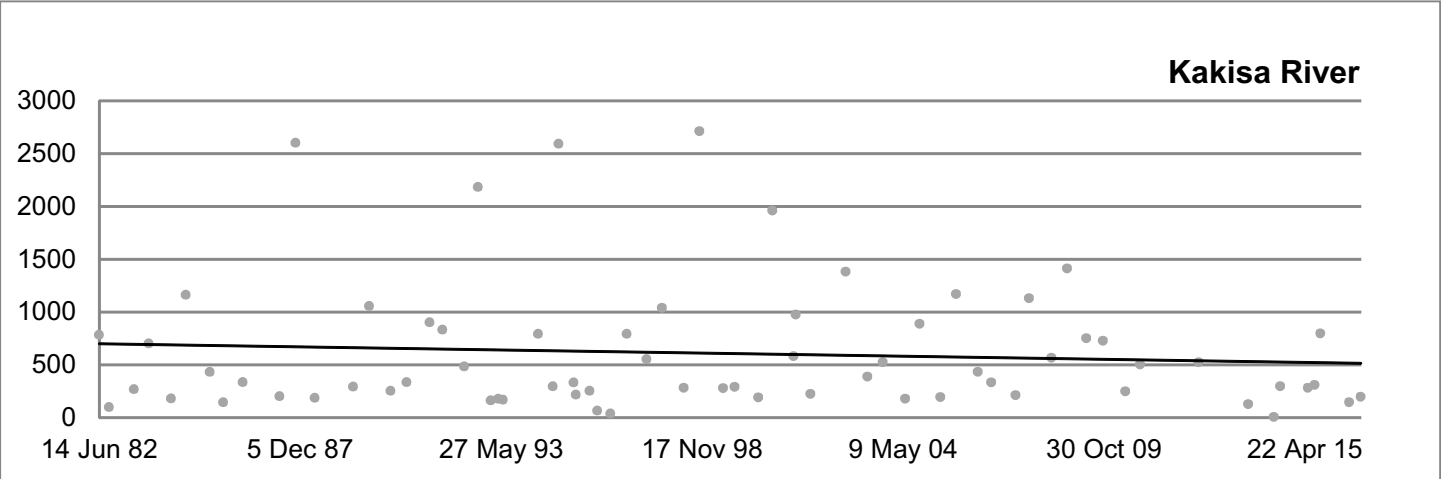
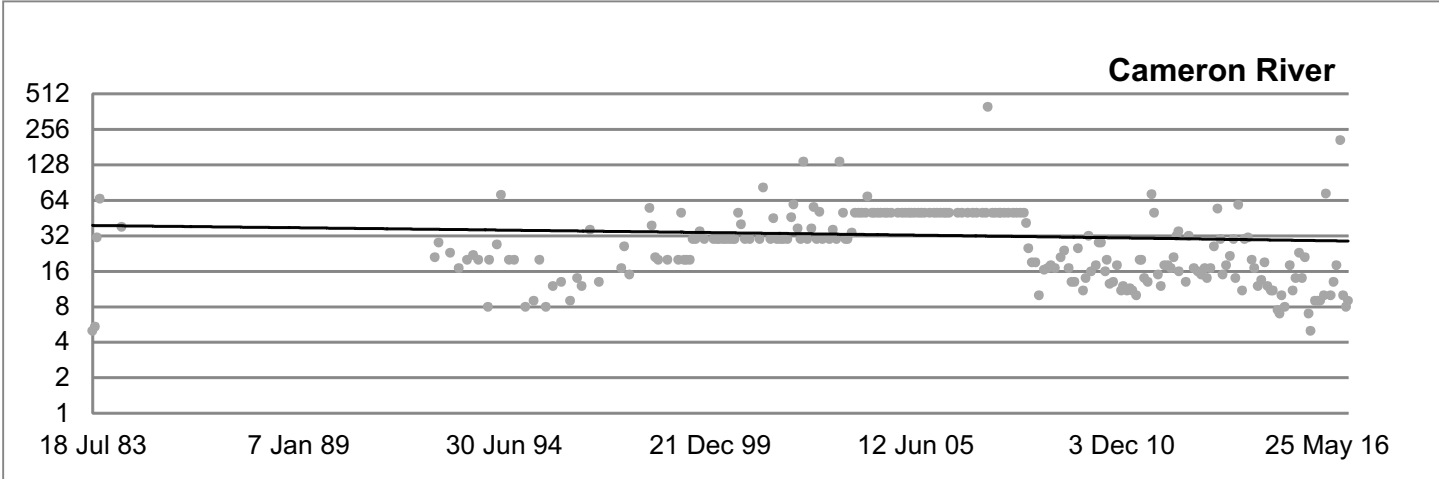
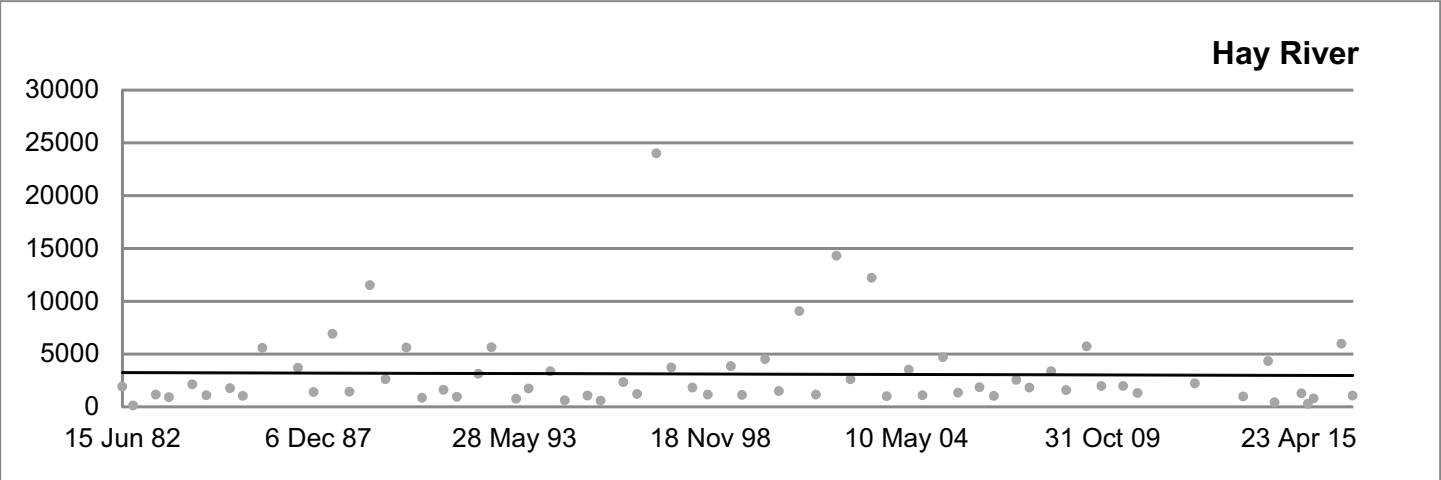
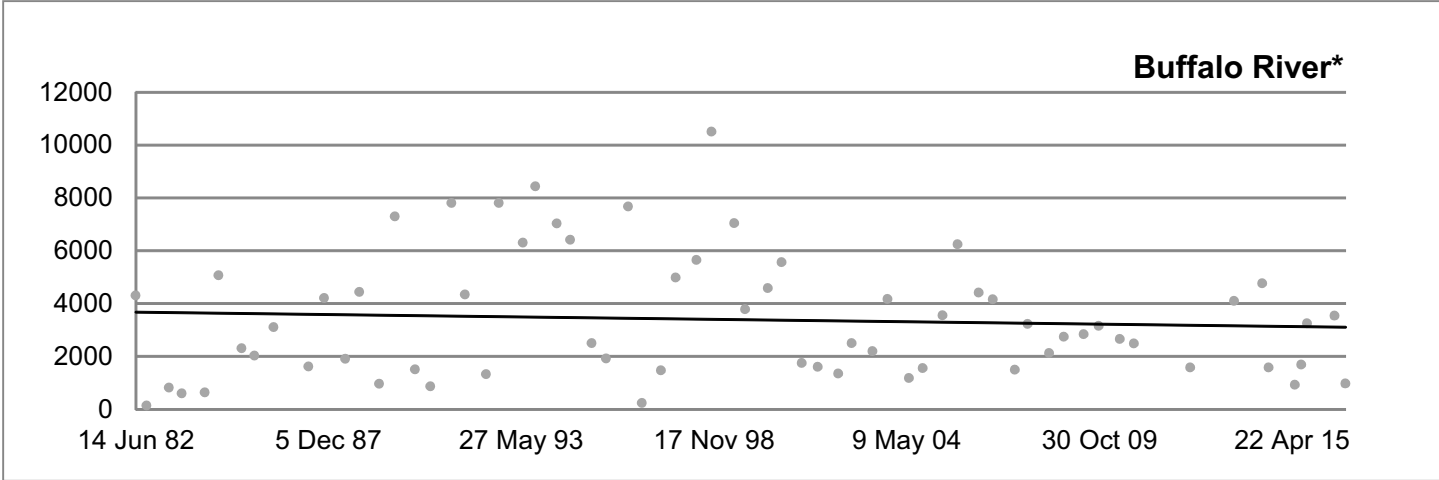
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

**Copper (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.17c

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Iron ($\mu\text{g/L}$)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.

ENW.VENW03044-01

DWN

MEZ

CKD

SL

APVD

SW

REV

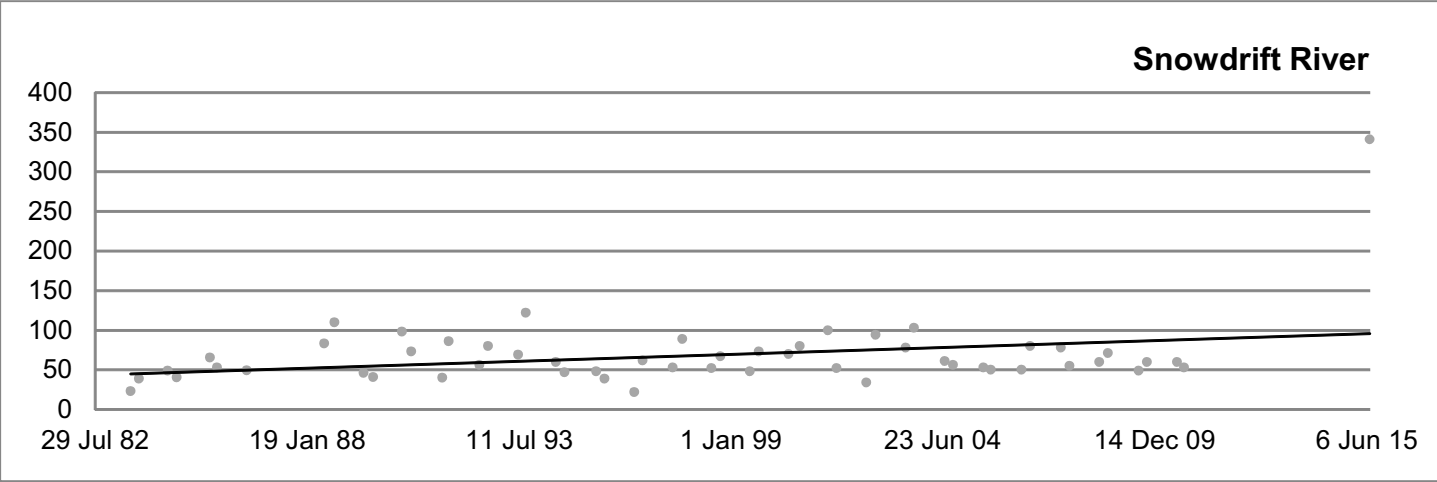
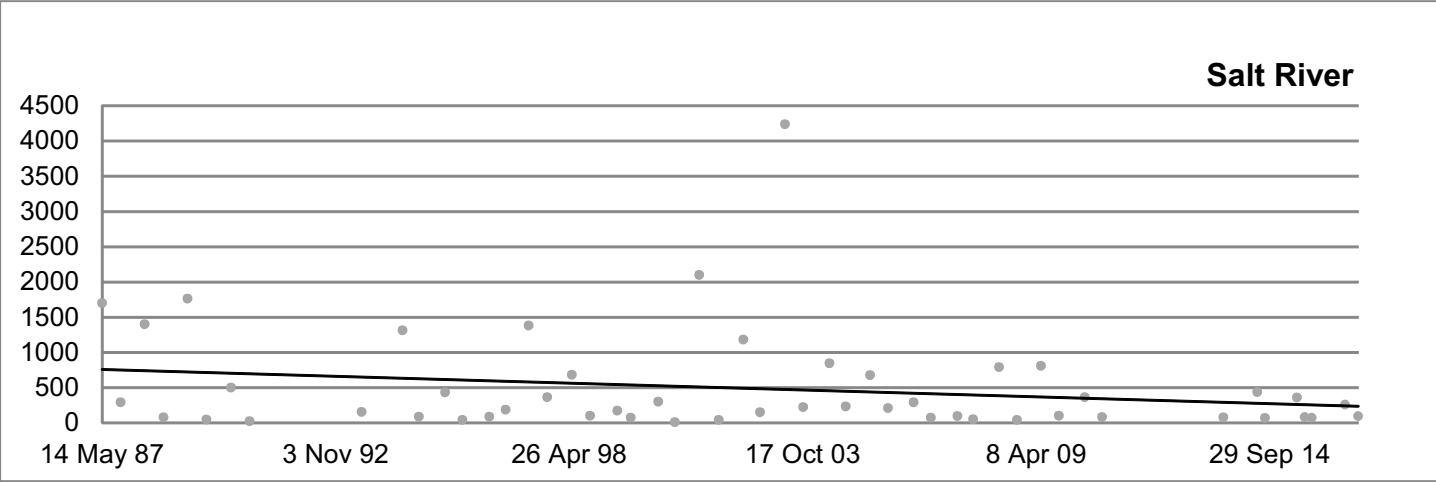
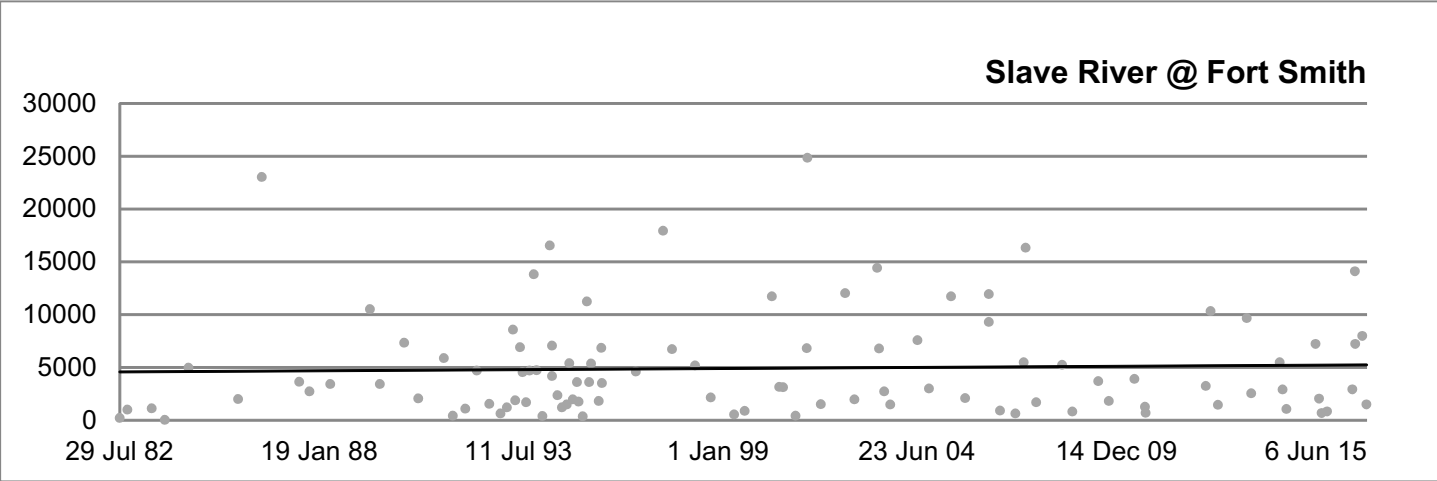
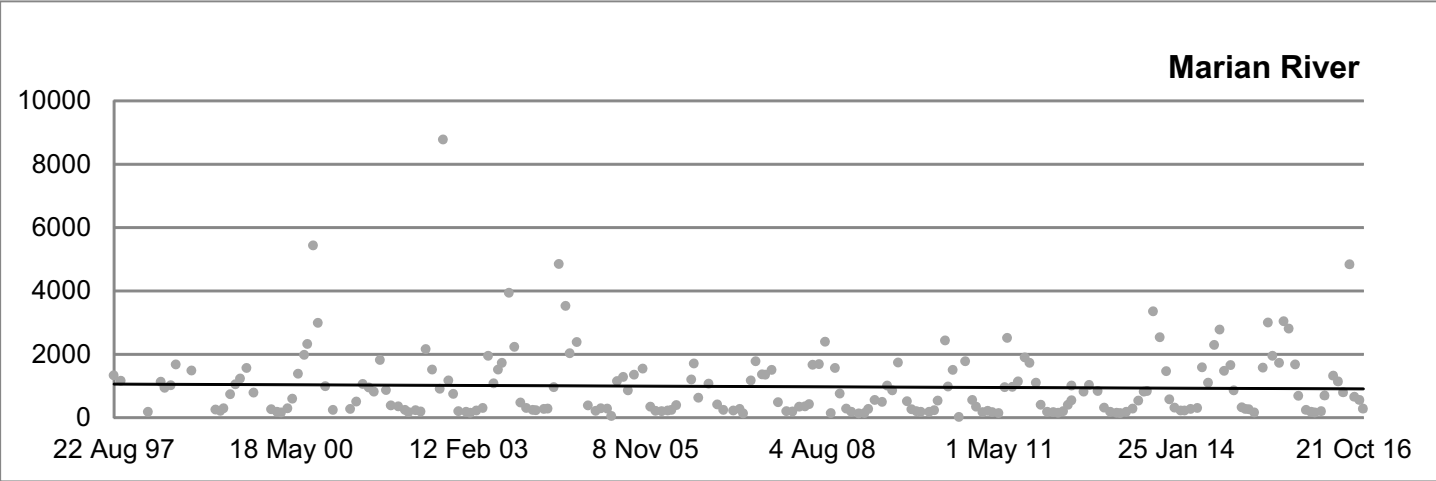
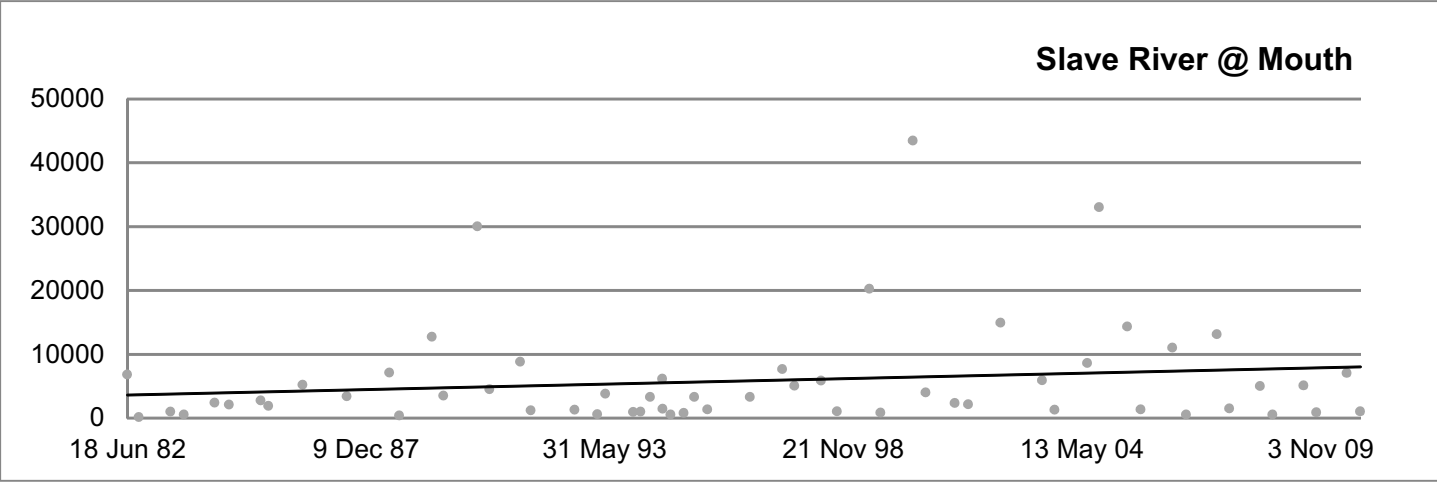
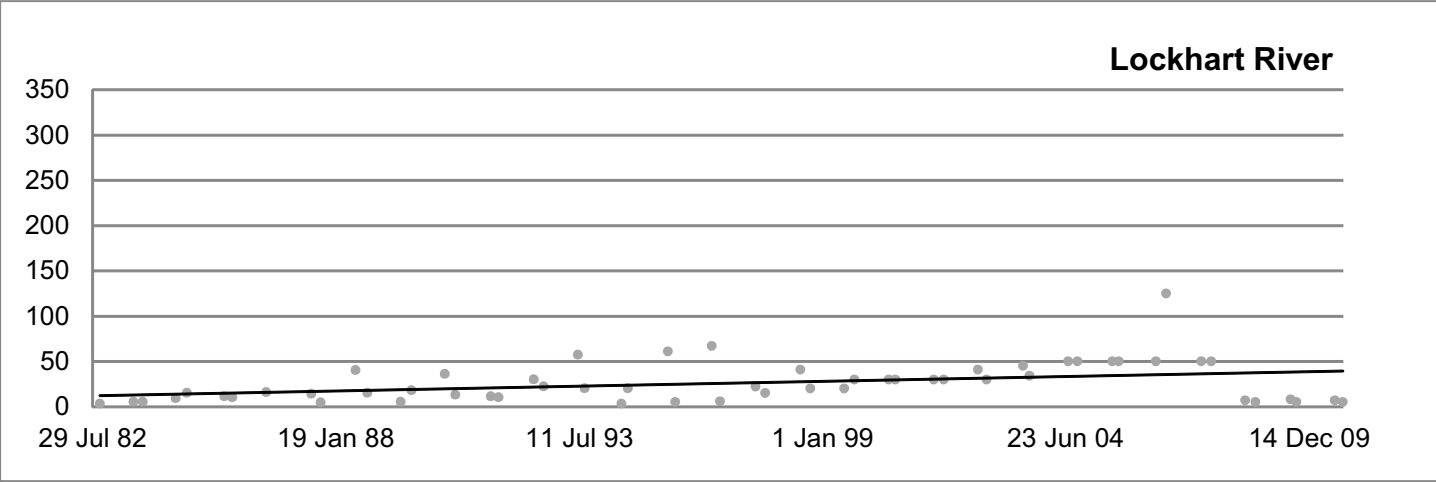
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DATE

March 30, 2017

Figure B.18a

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Iron ($\mu\text{g/L}$)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.

ENW.VENW03044-01

DWN

MEZ

CKD

SL

APVD

SW

REV

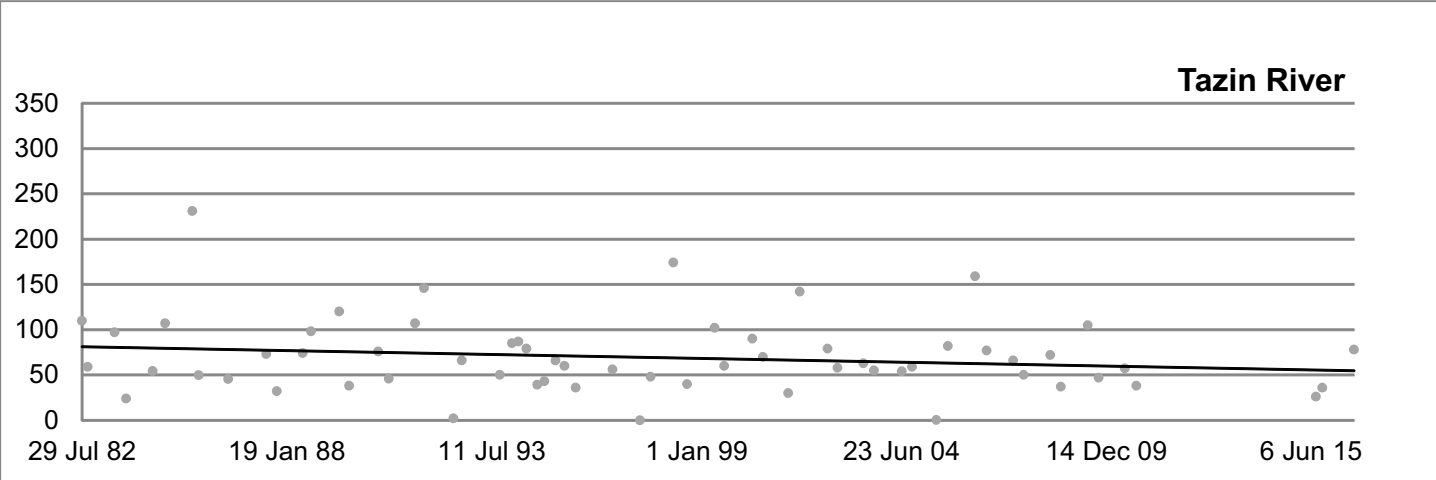
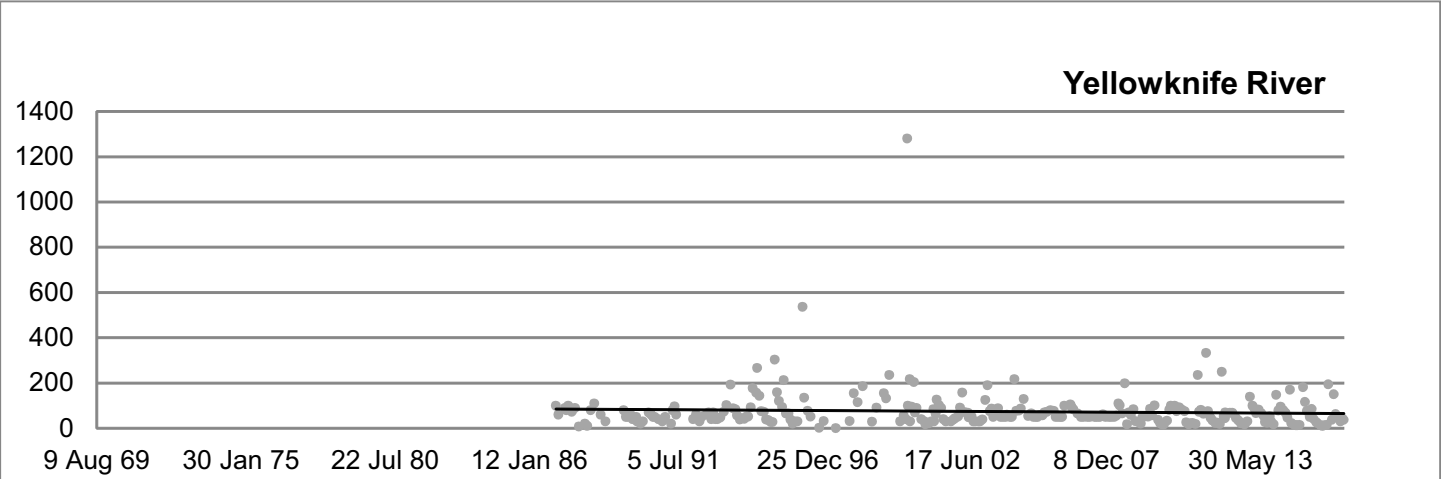
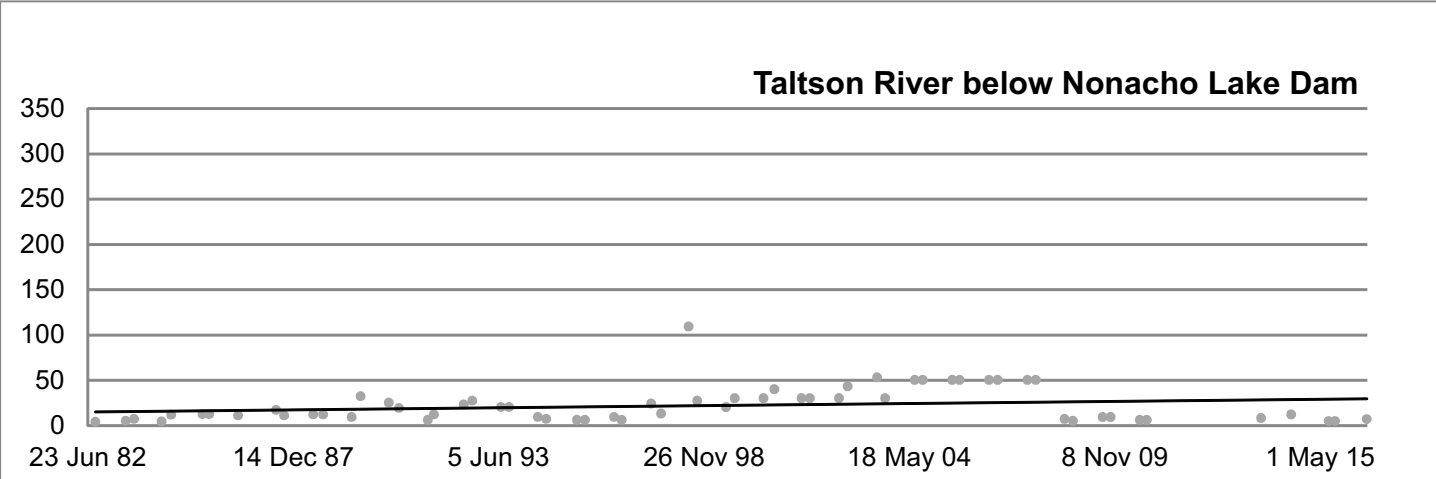
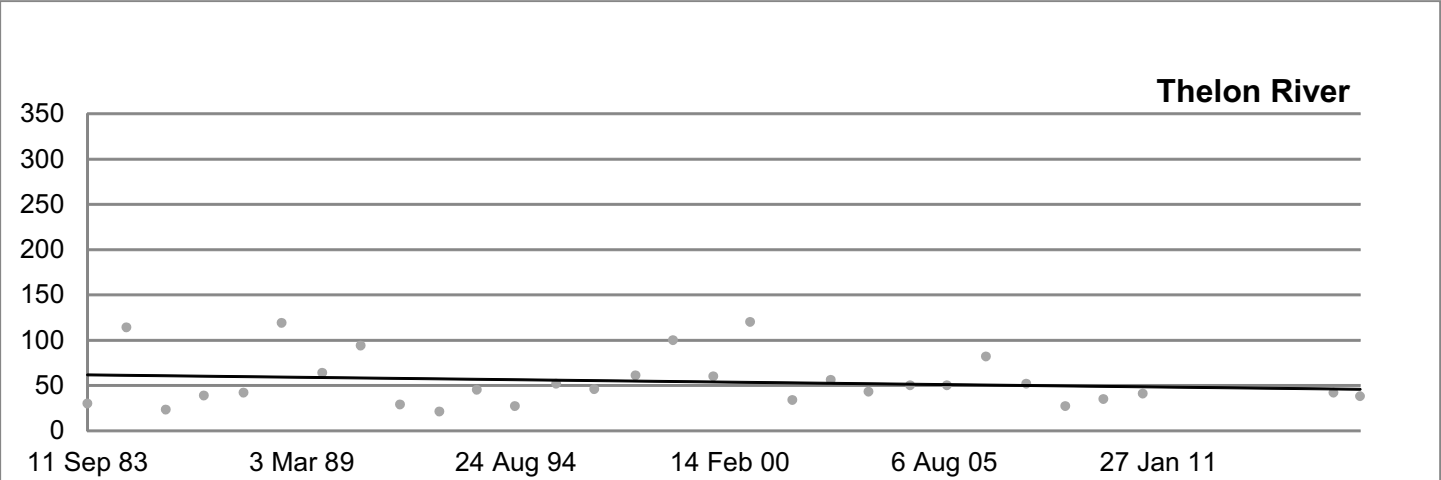
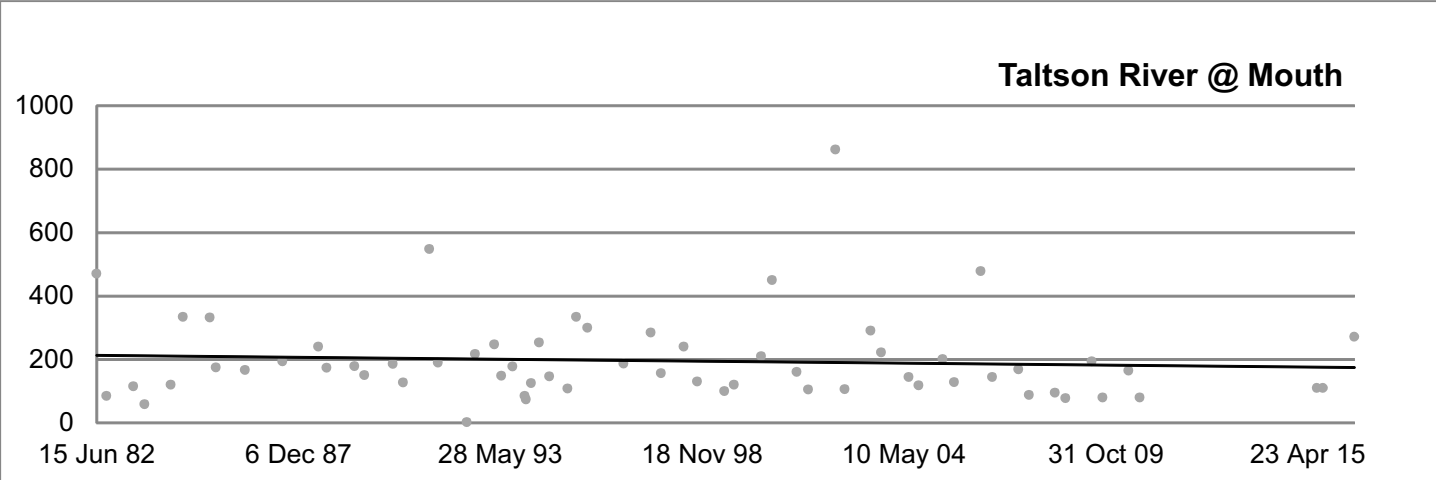
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DATE

March 30, 2017

Figure B.18b

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



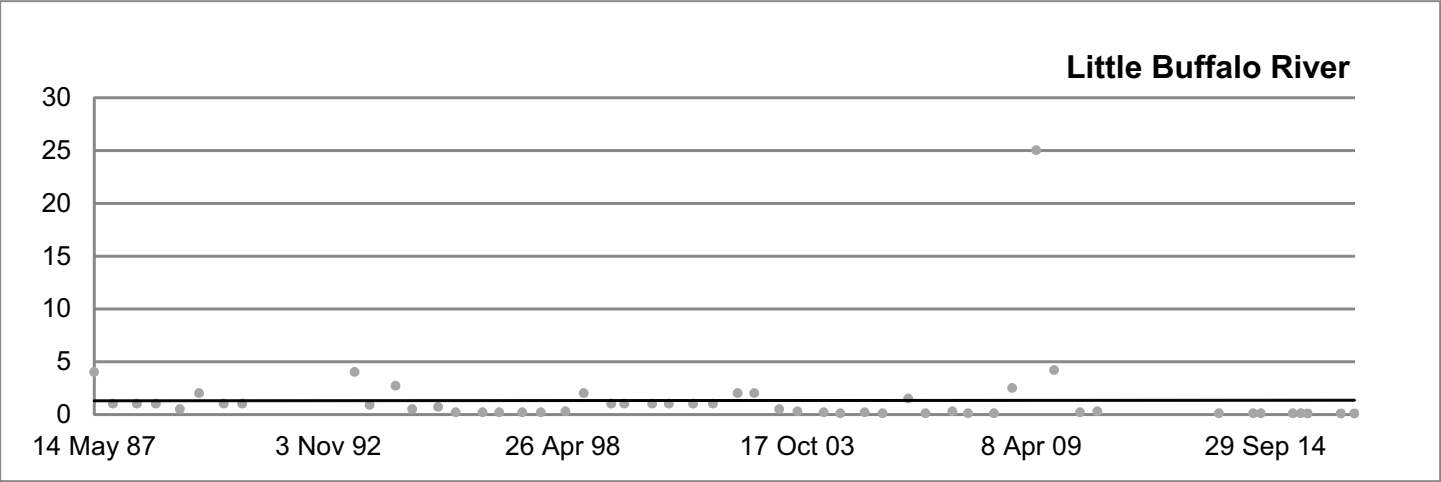
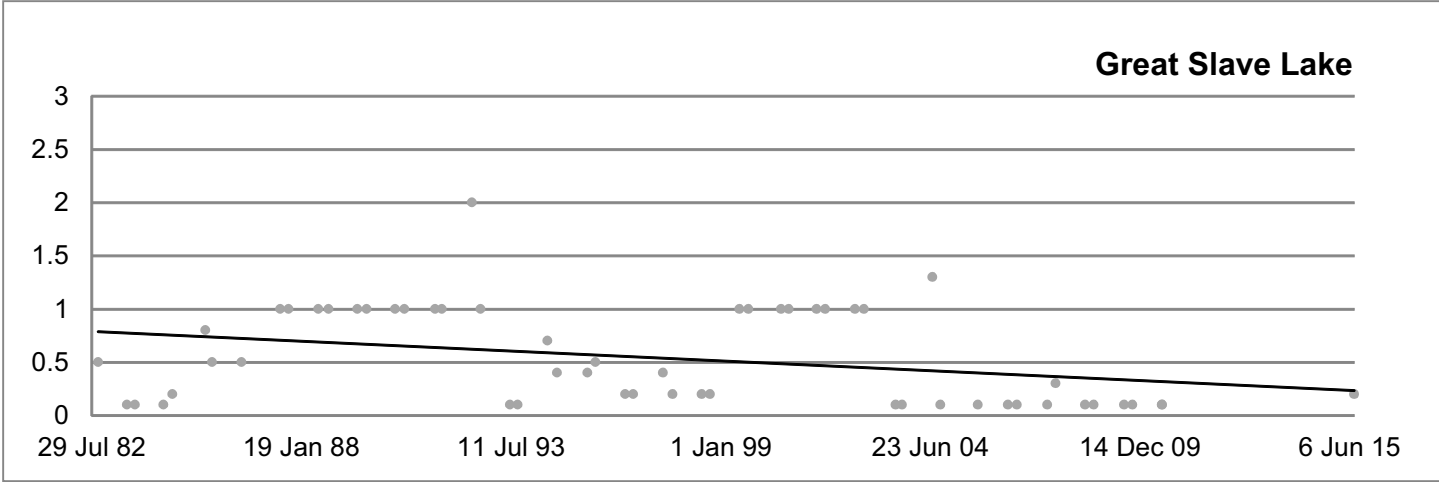
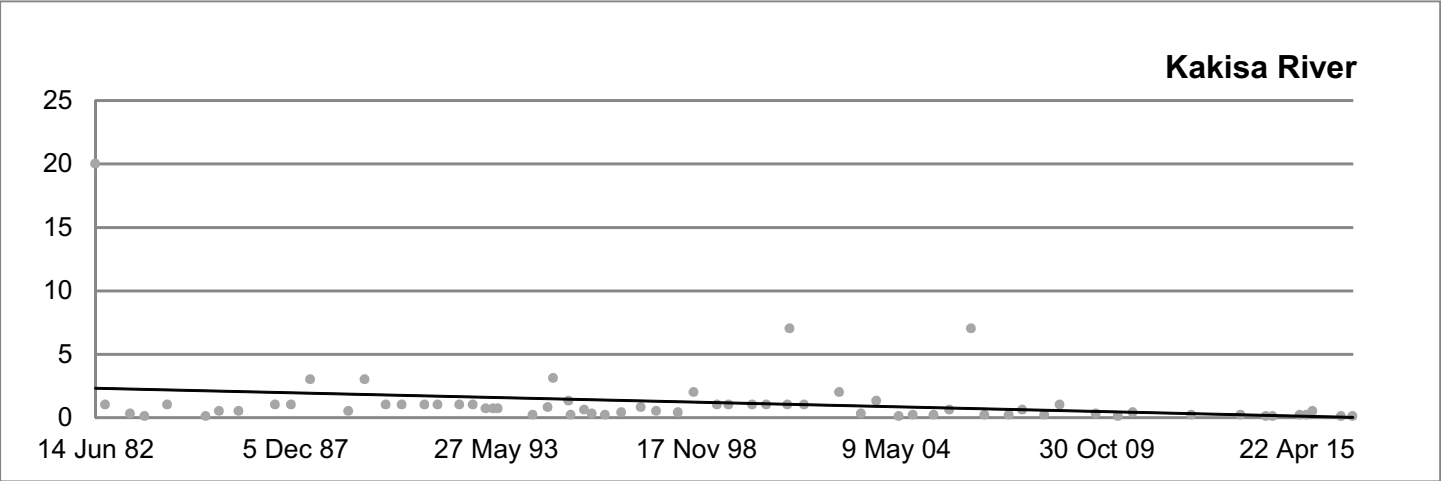
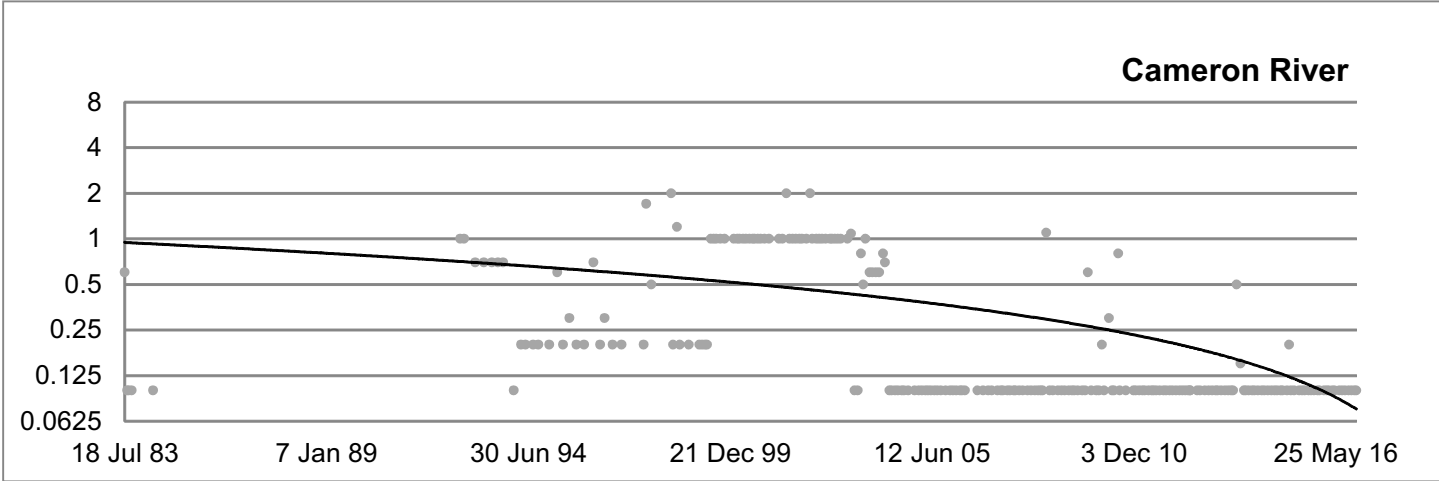
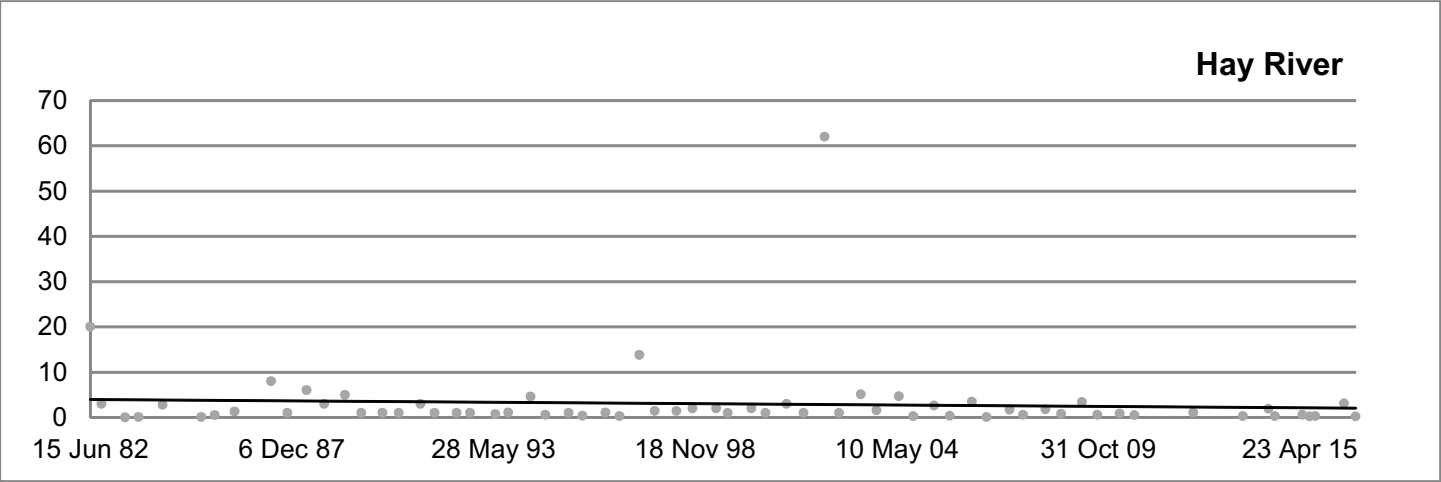
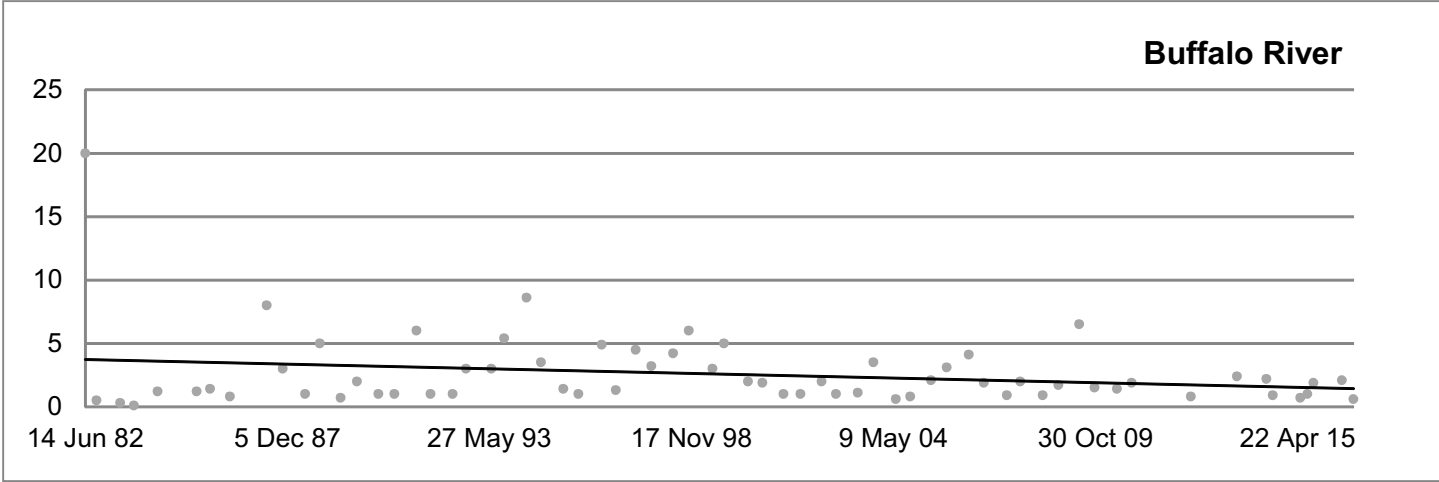
TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Iron ($\mu\text{g/L}$)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0	Figure B.18c
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



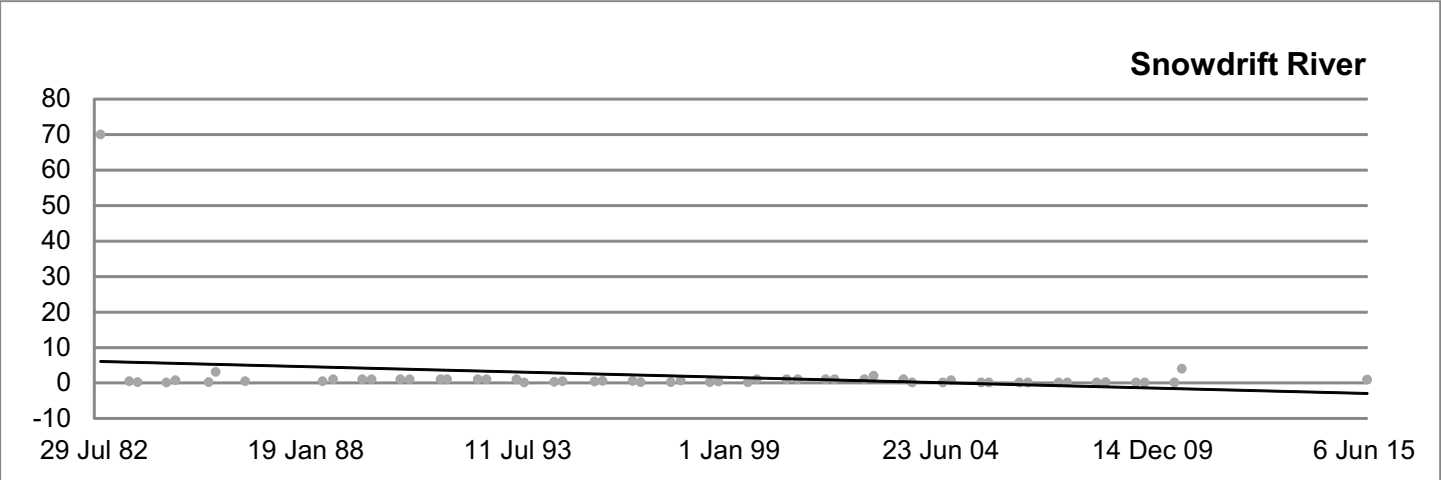
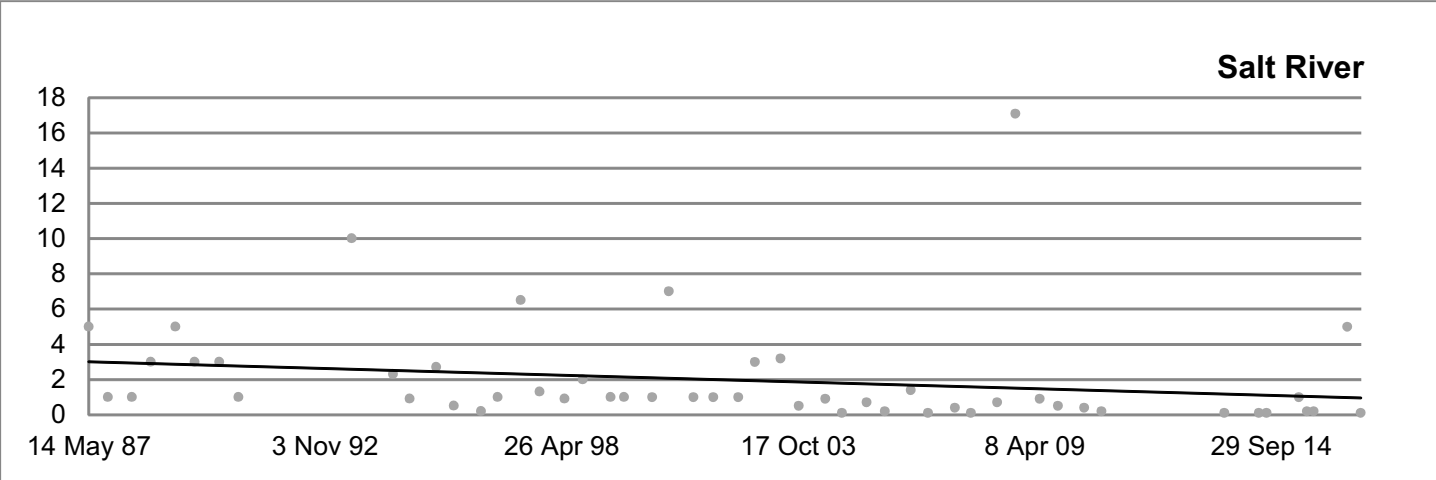
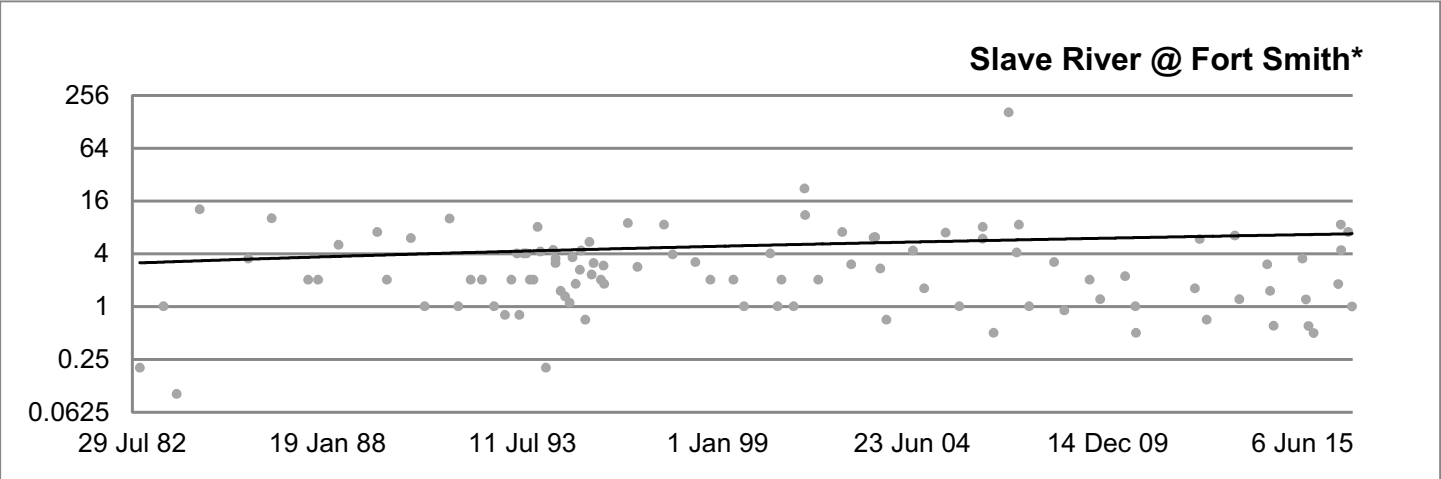
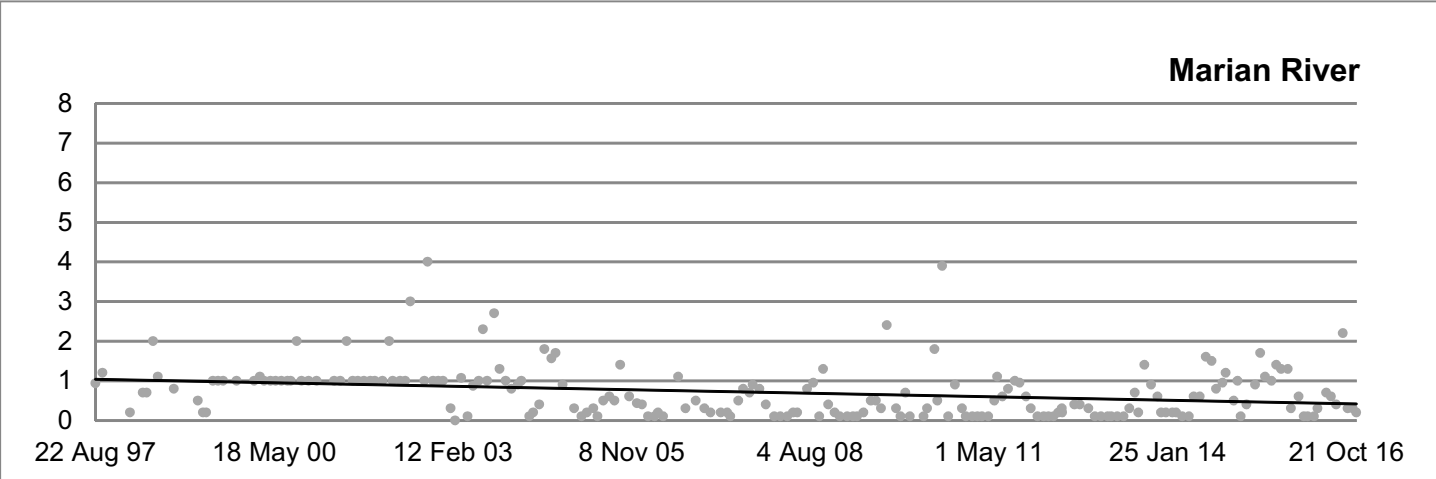
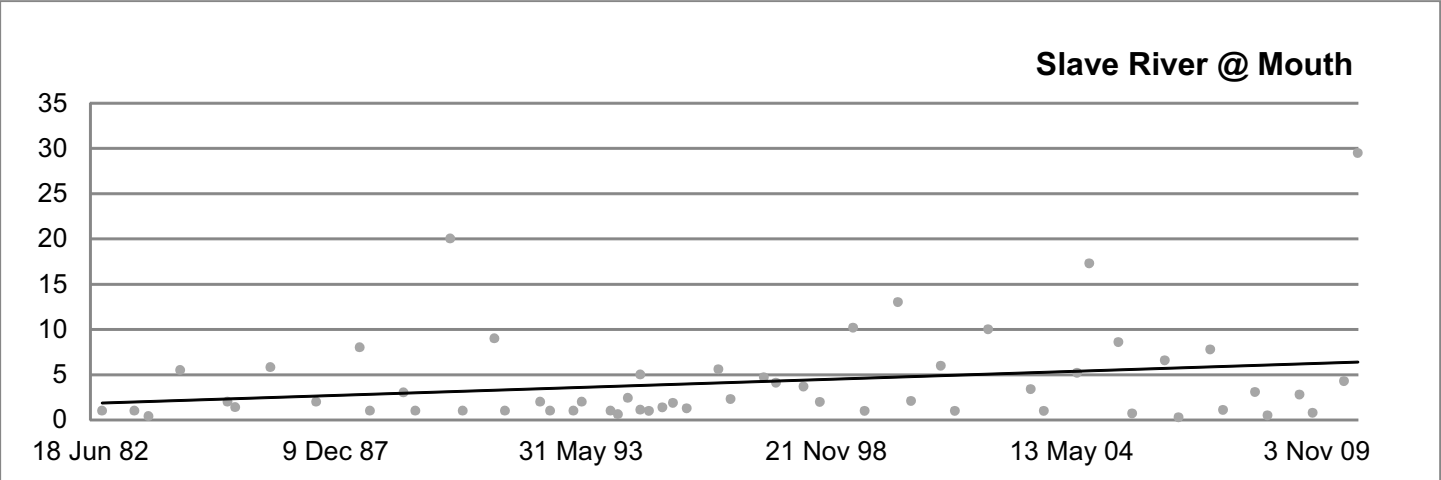
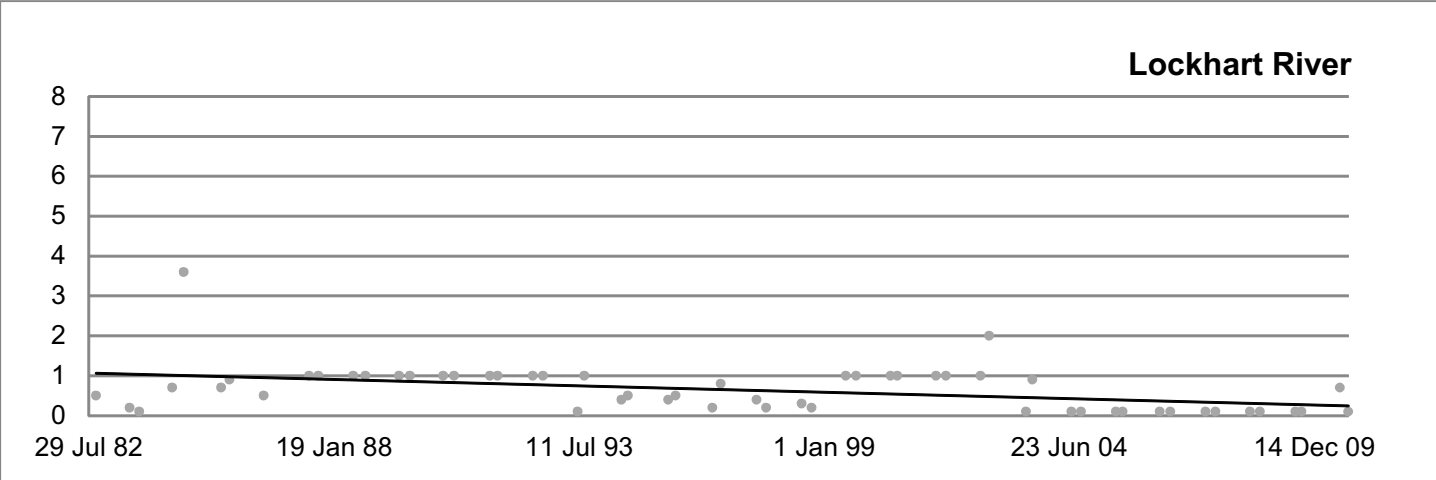
TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Lead (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0	Figure B.19a
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

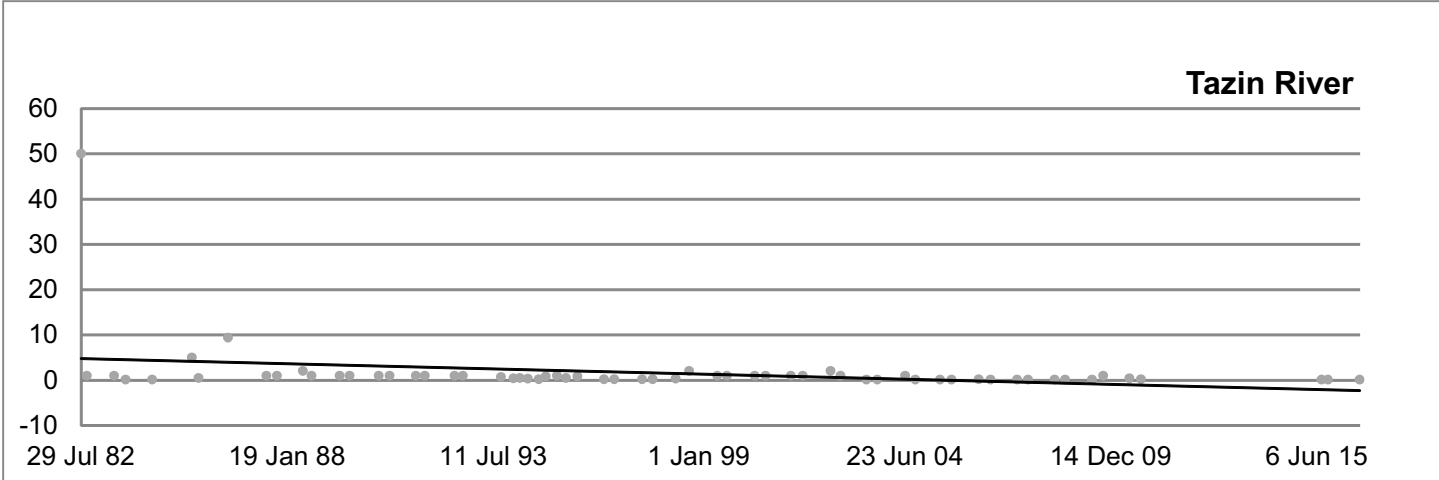
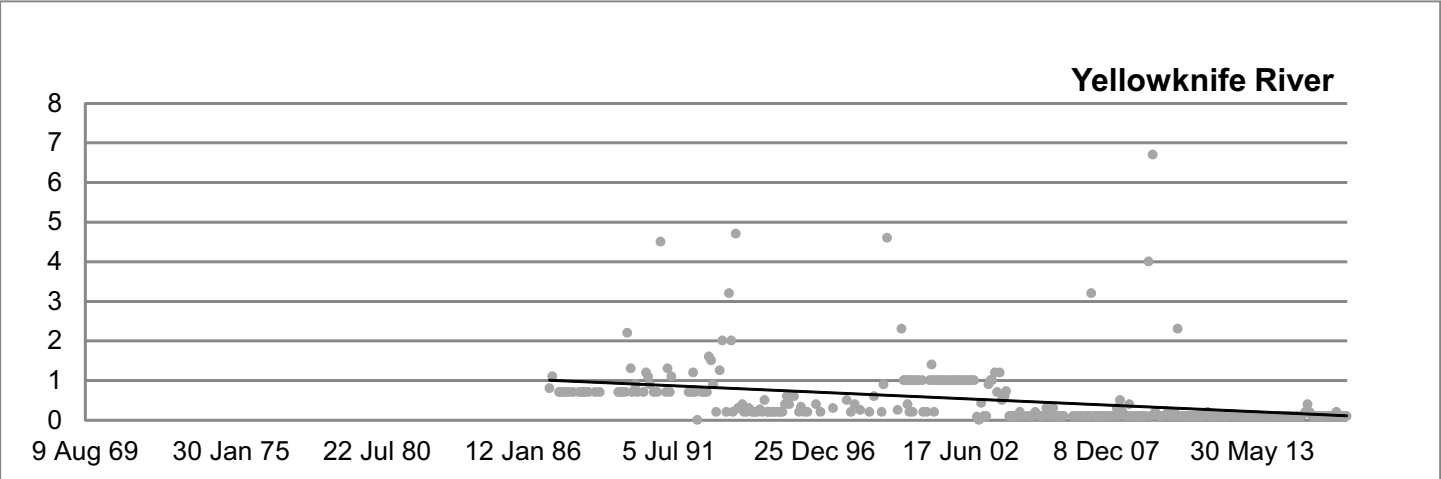
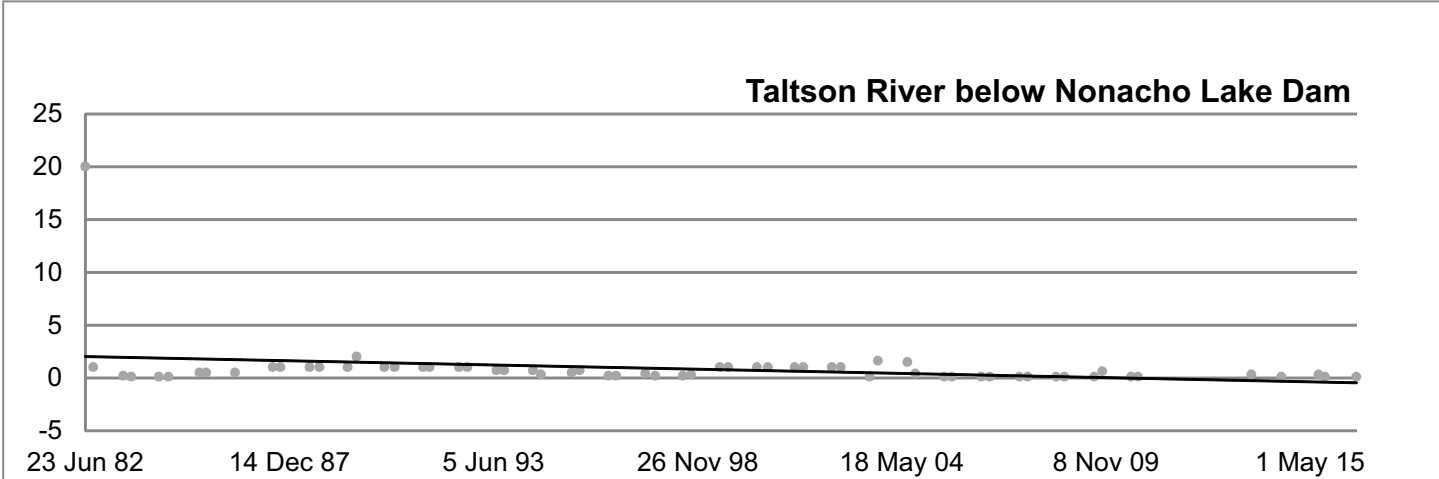
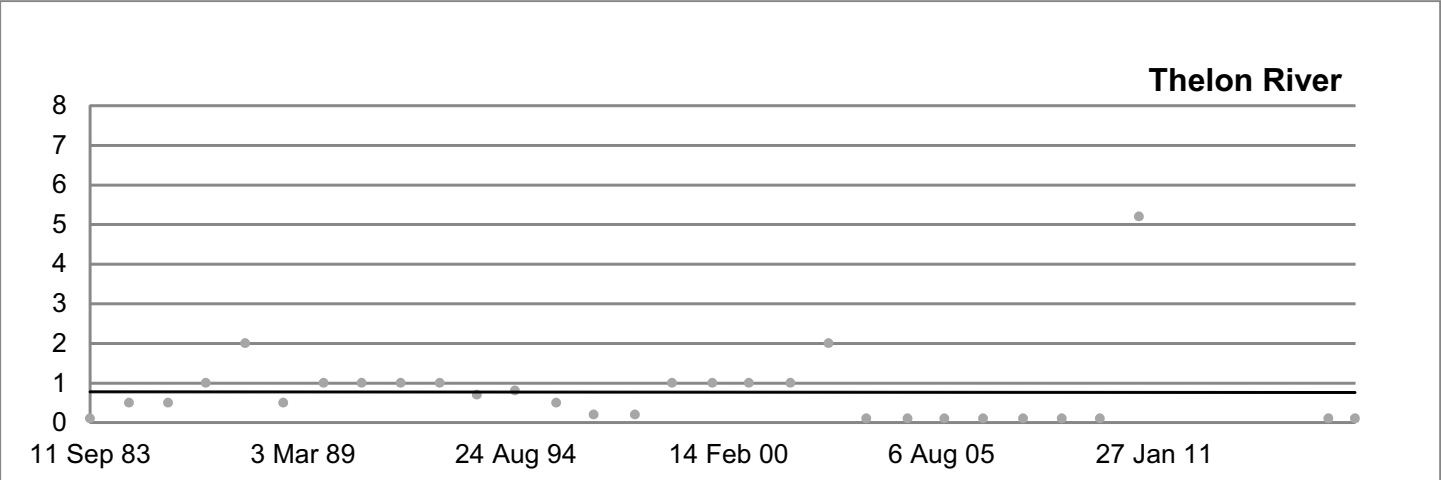
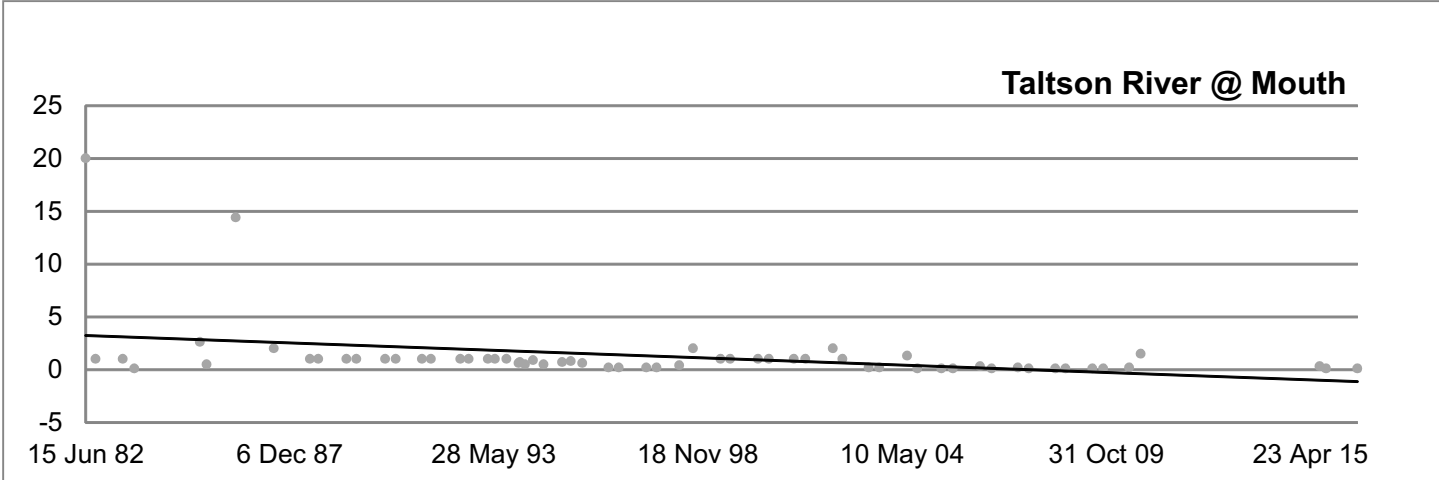
STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Lead (µg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.19b

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

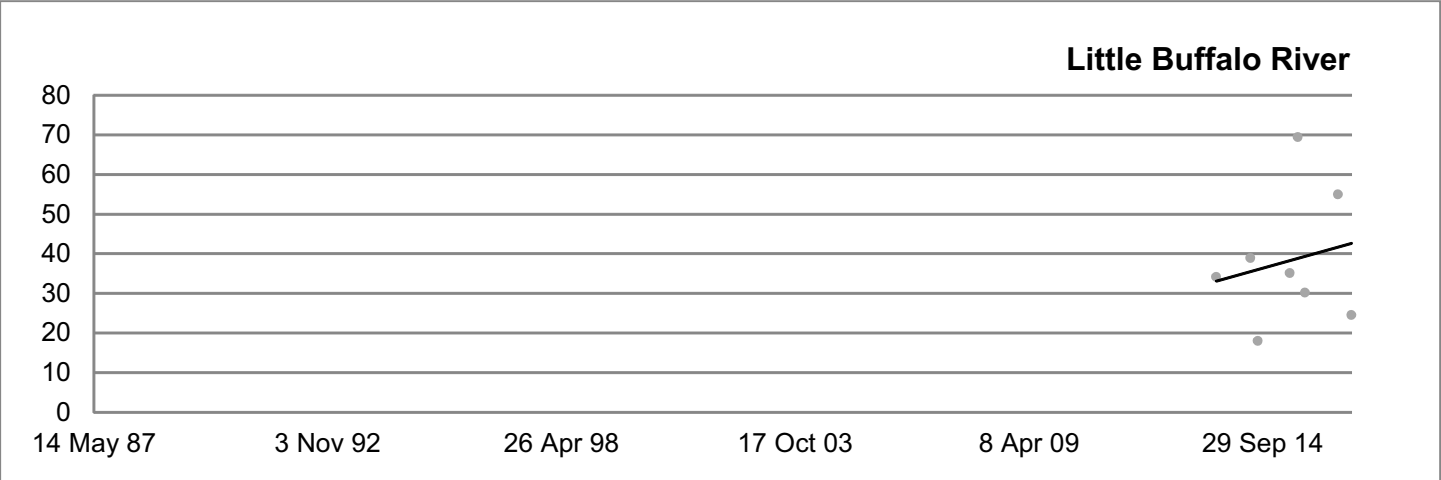
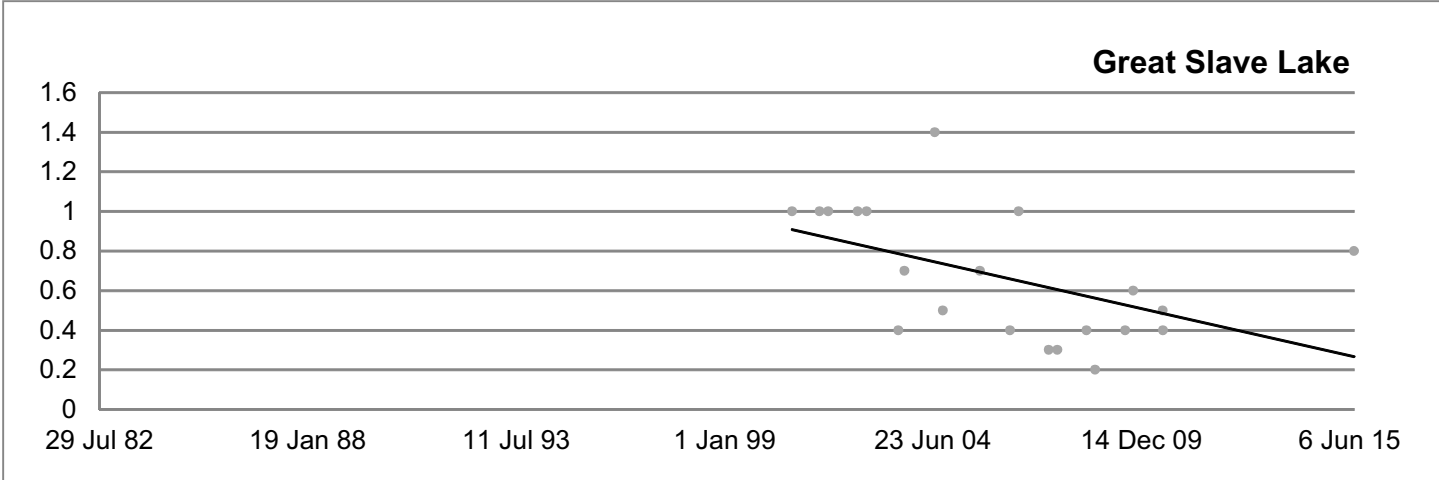
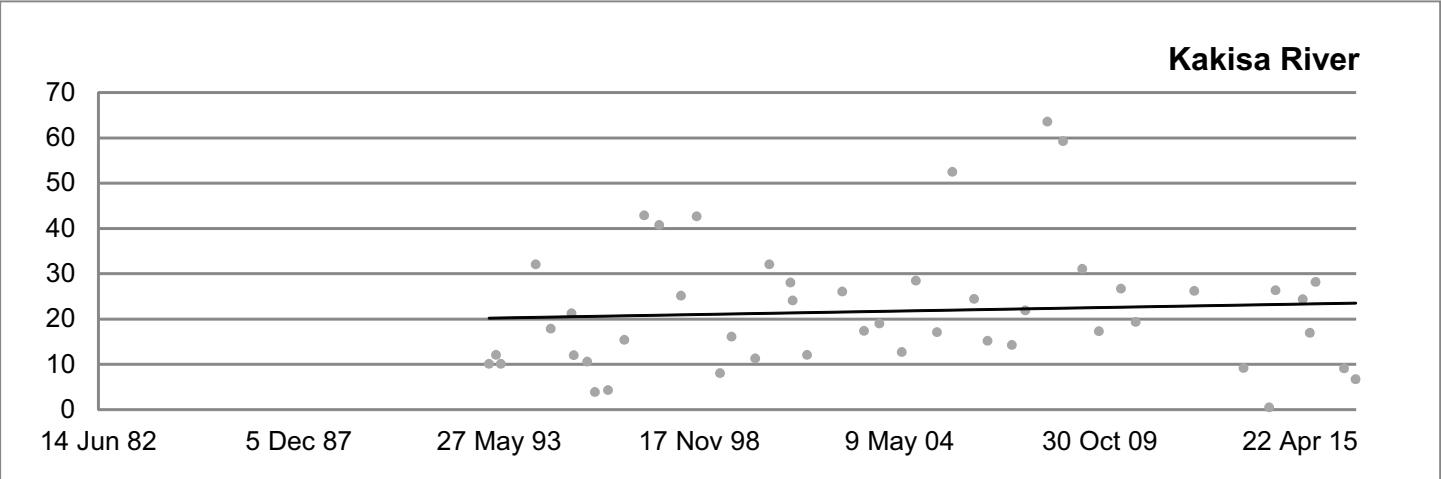
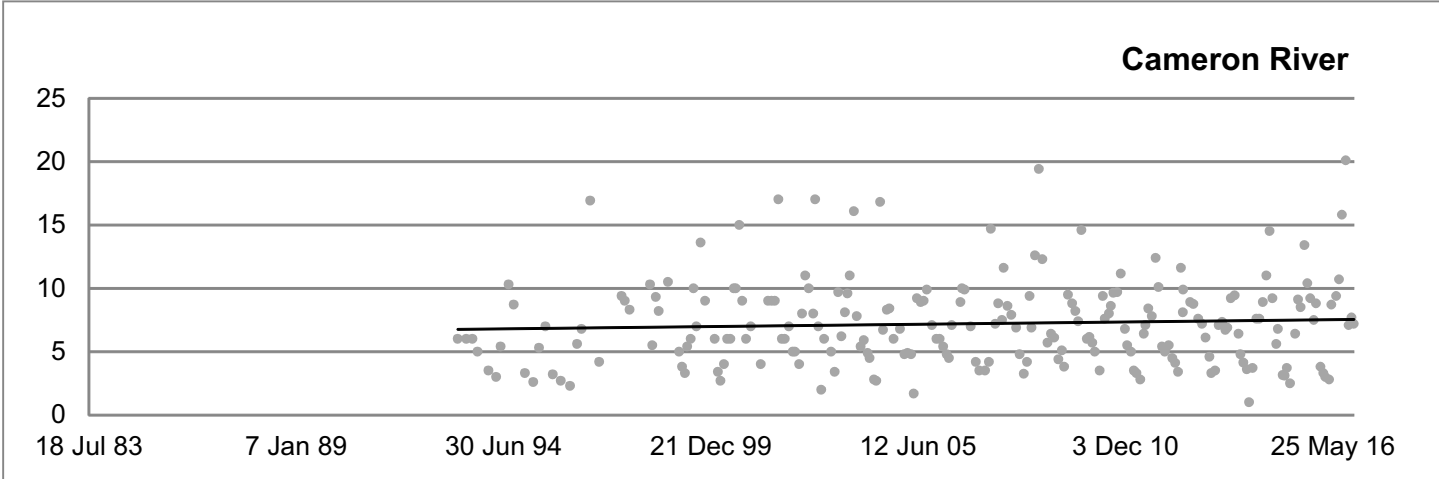
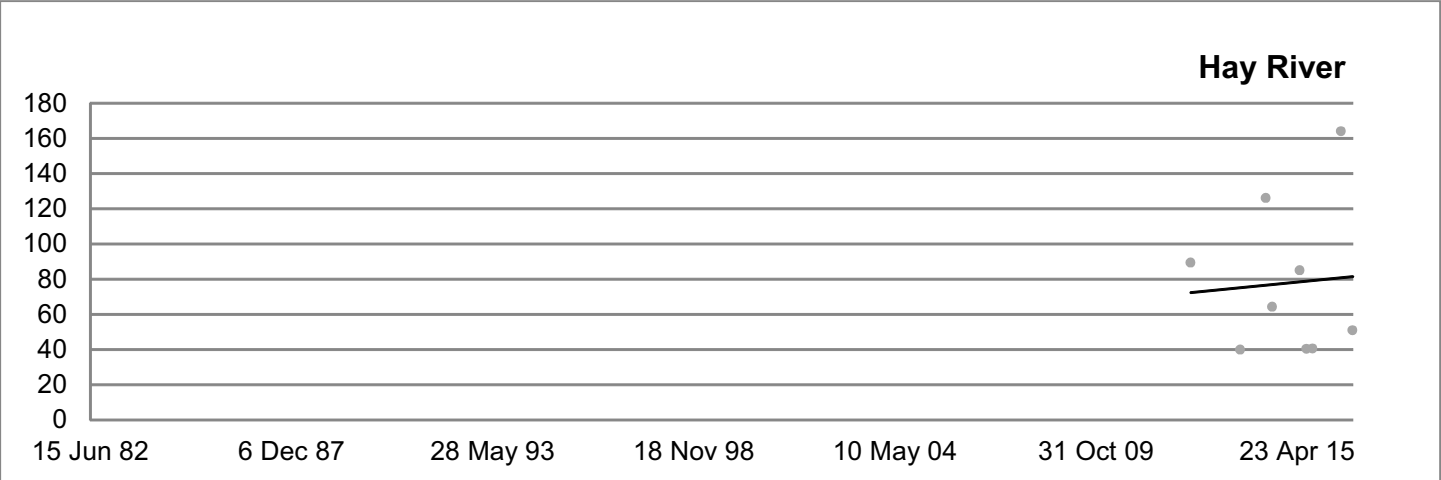
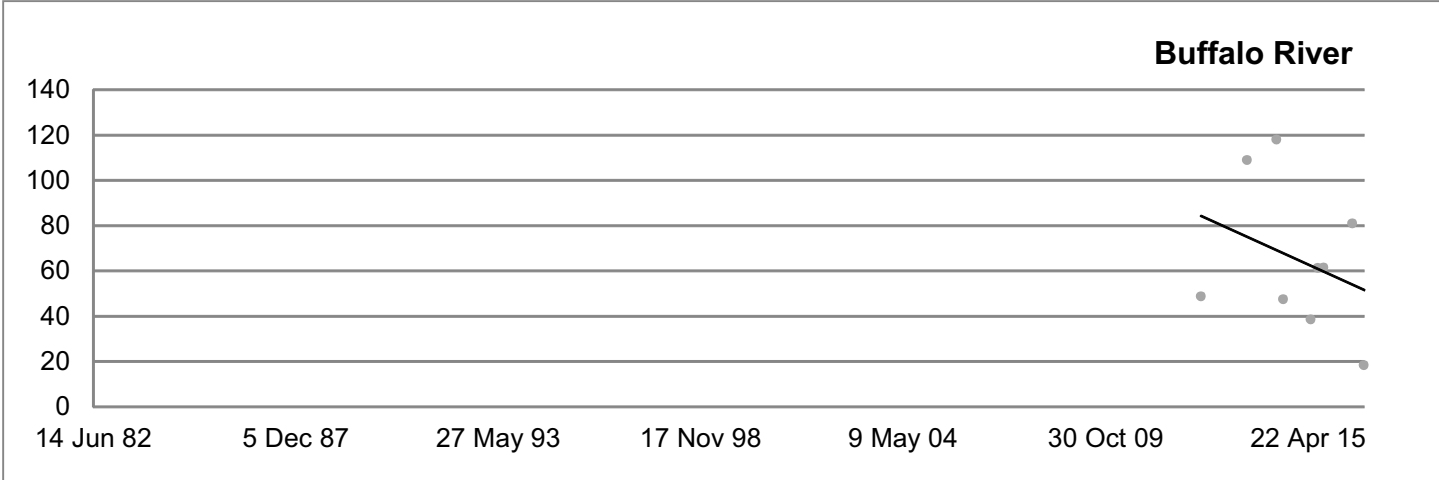
**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Lead (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.19c

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



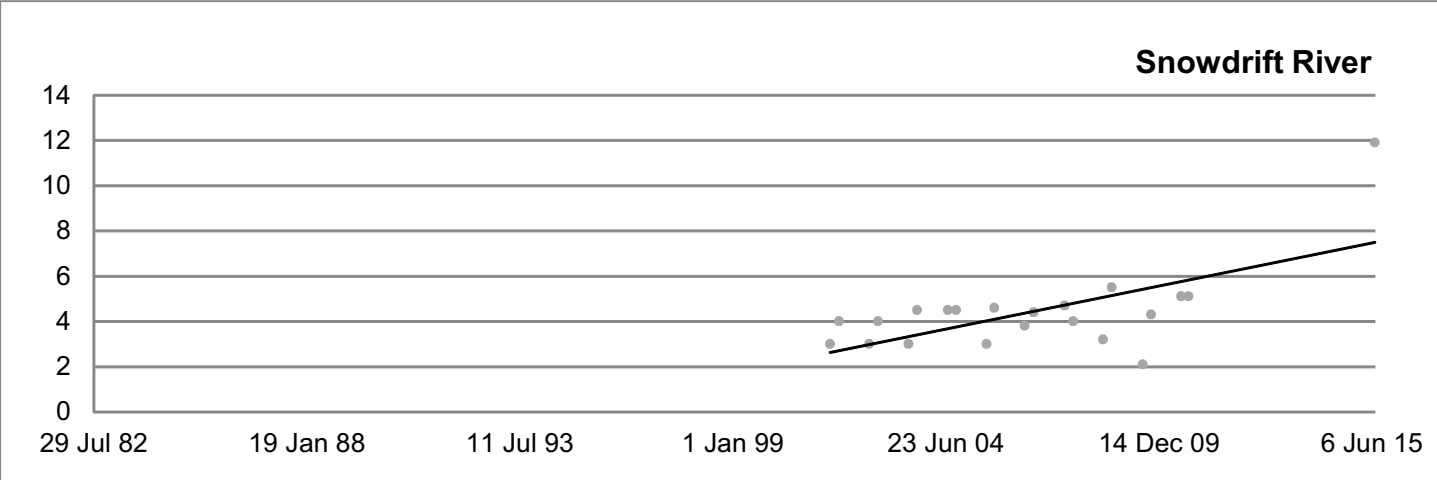
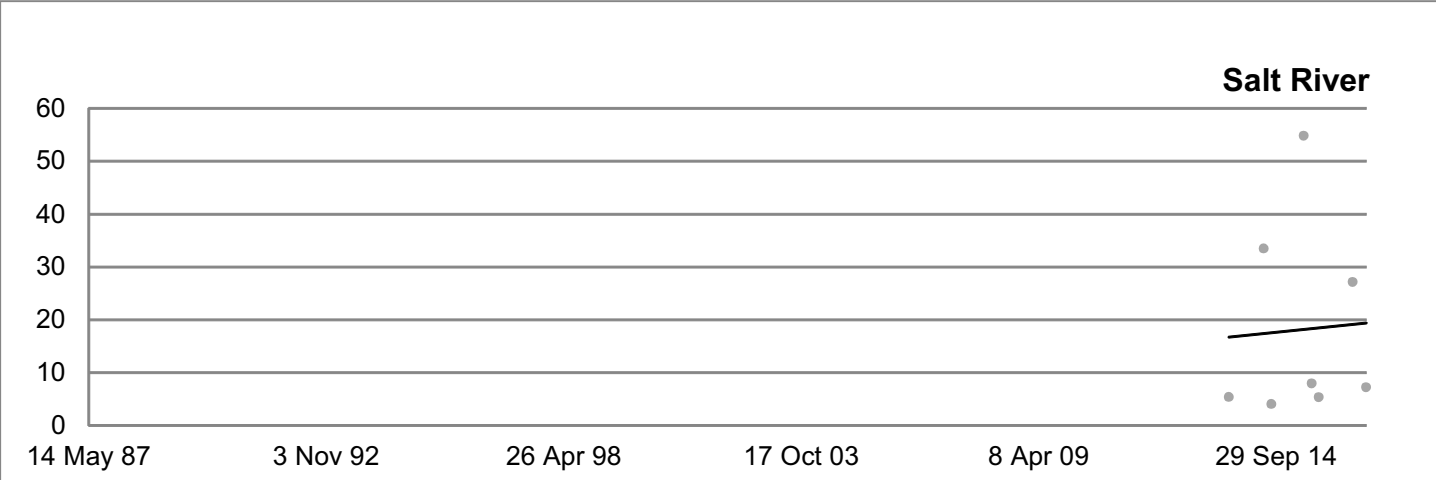
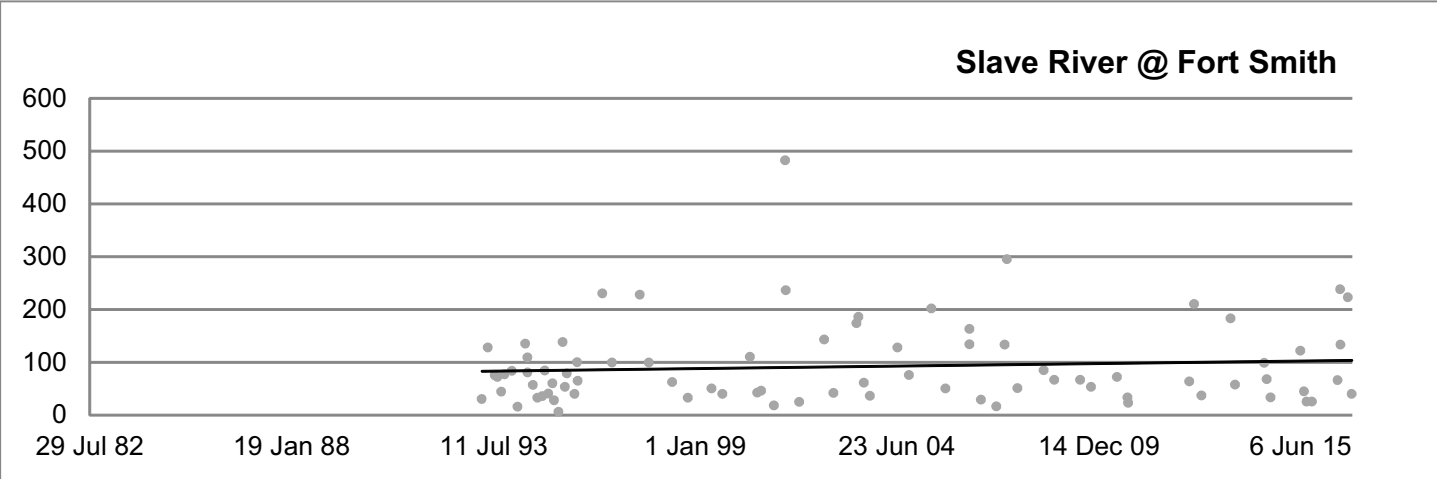
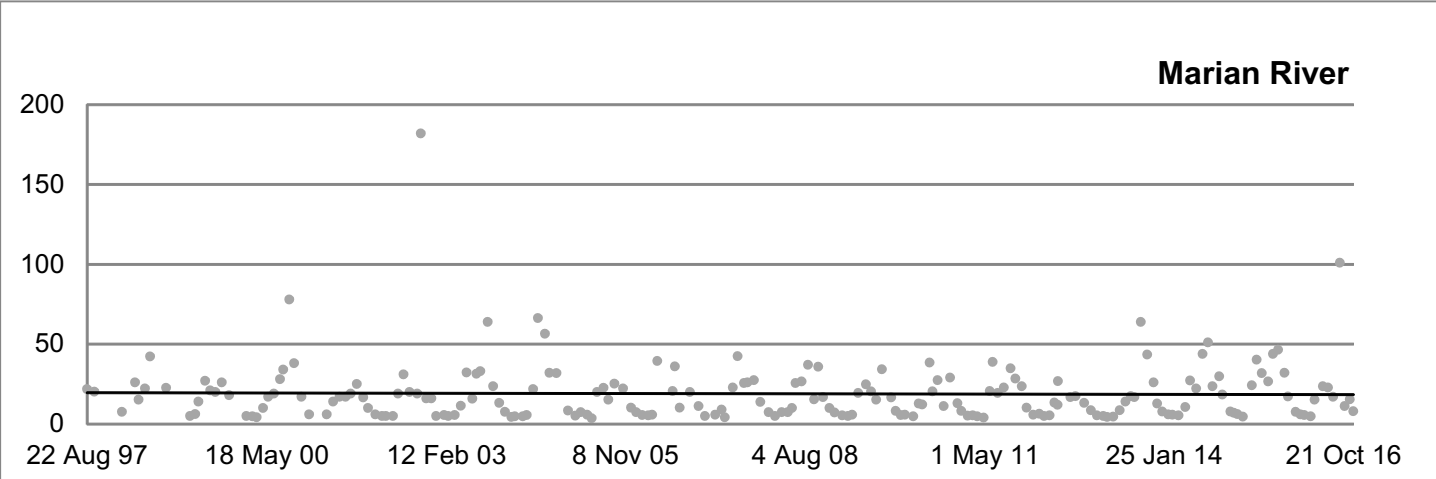
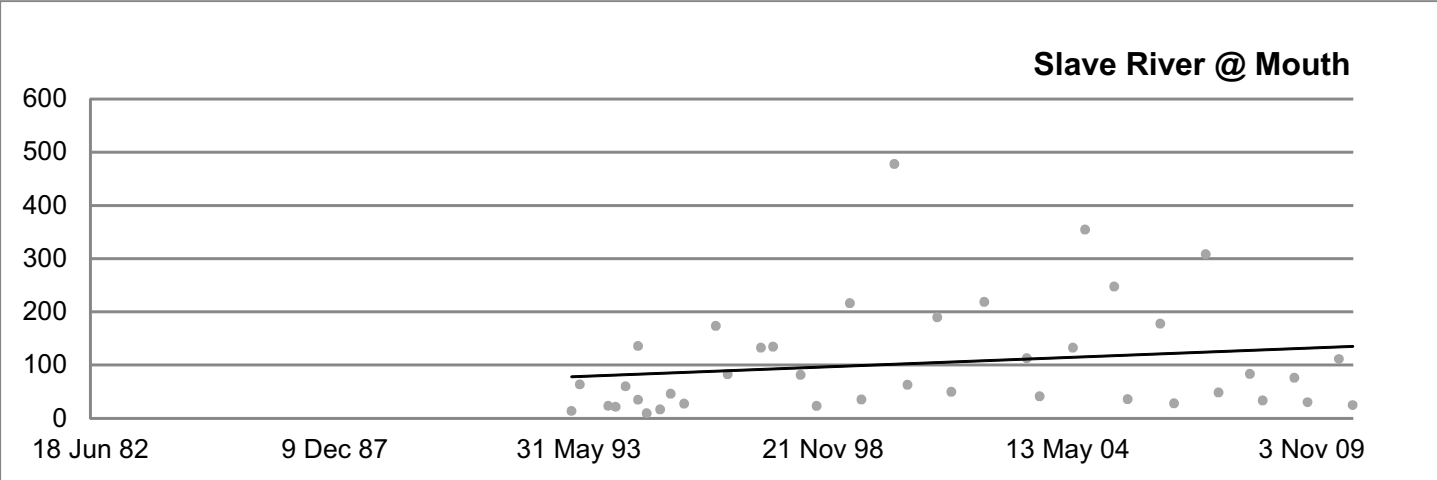
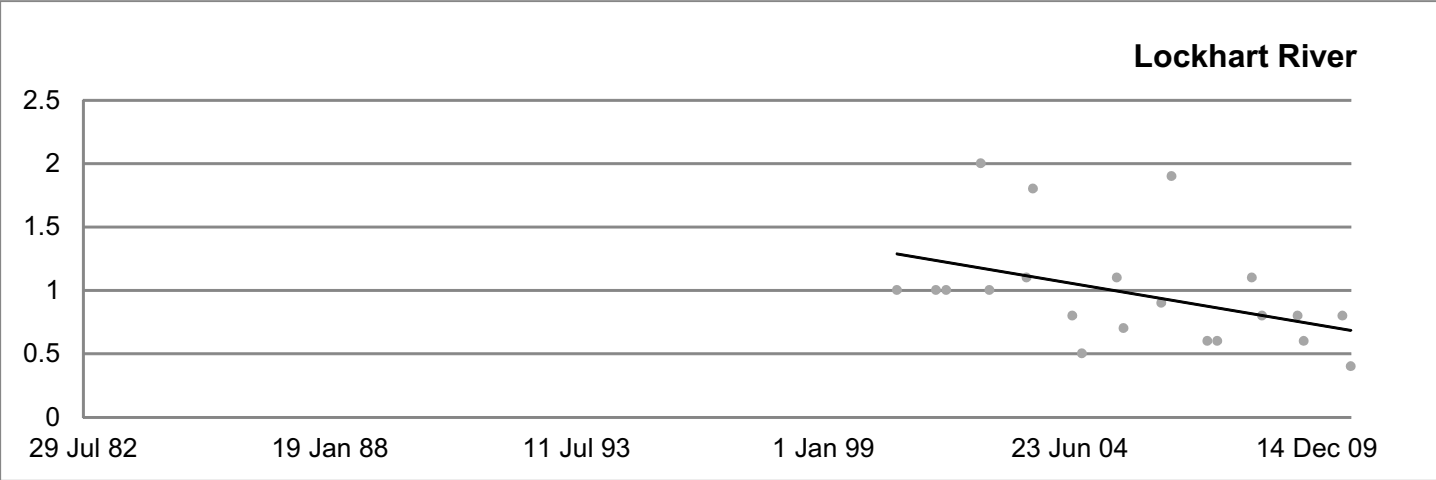
TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Manganese (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0	Figure B.20a
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

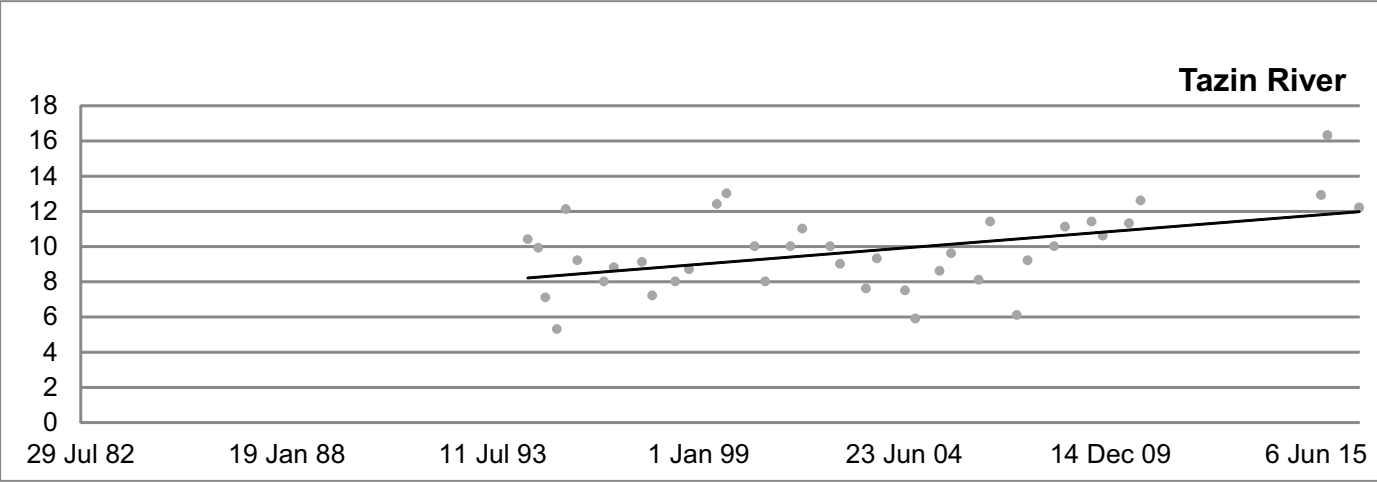
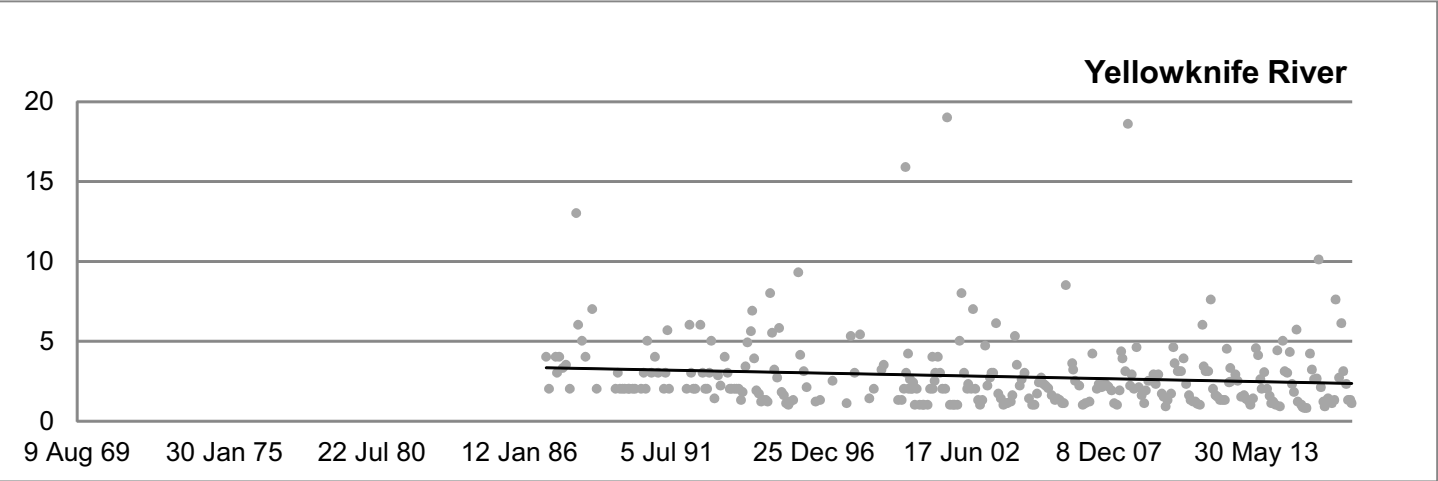
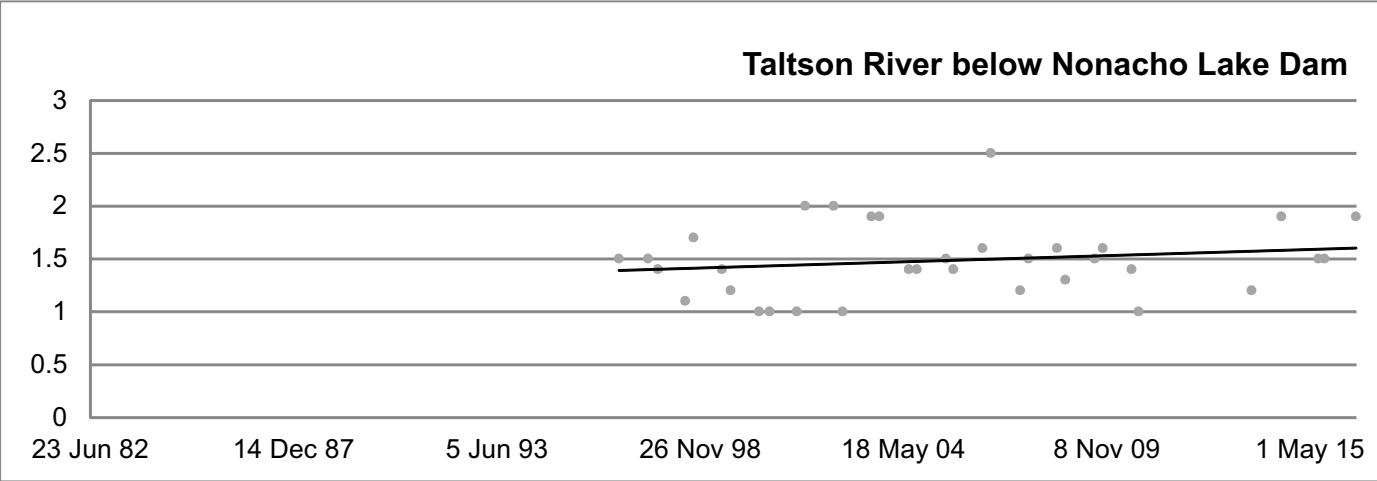
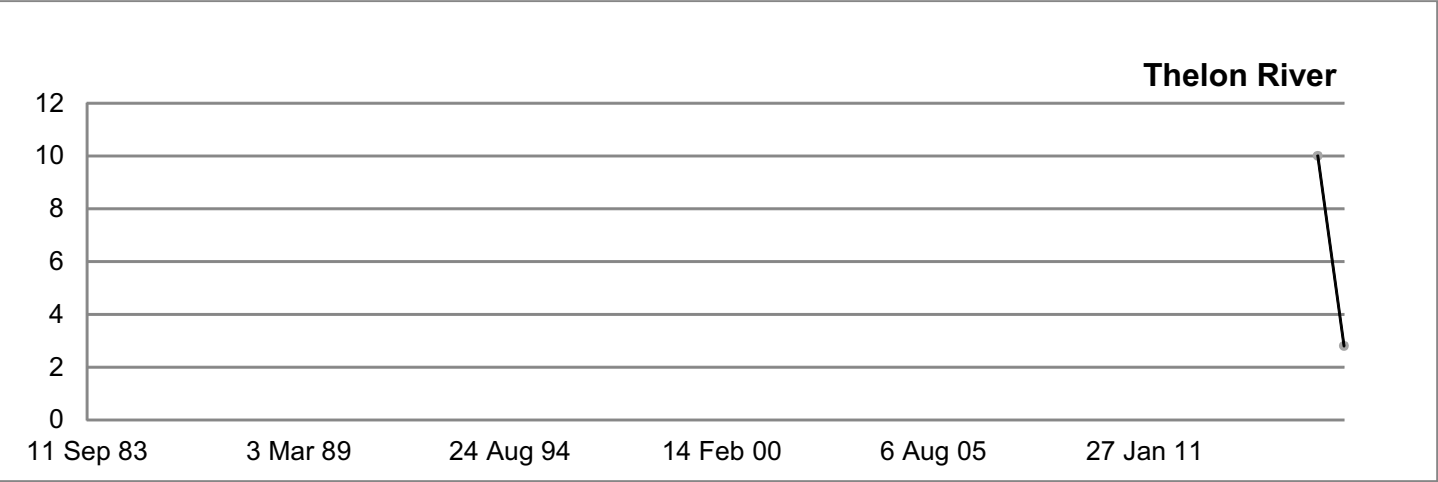
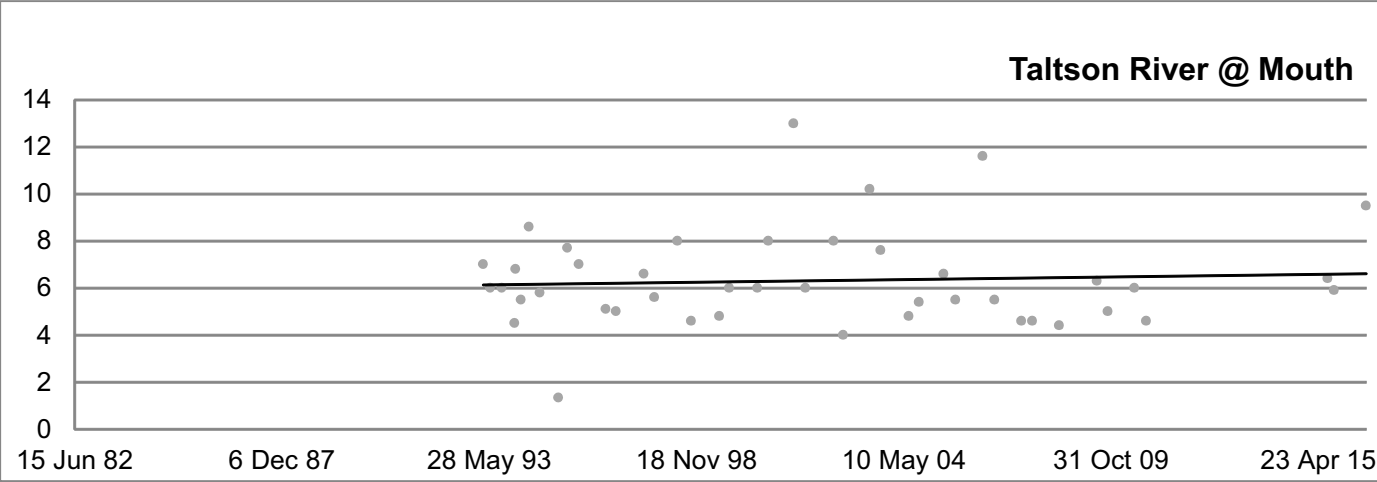
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

**Manganese (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.20b

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



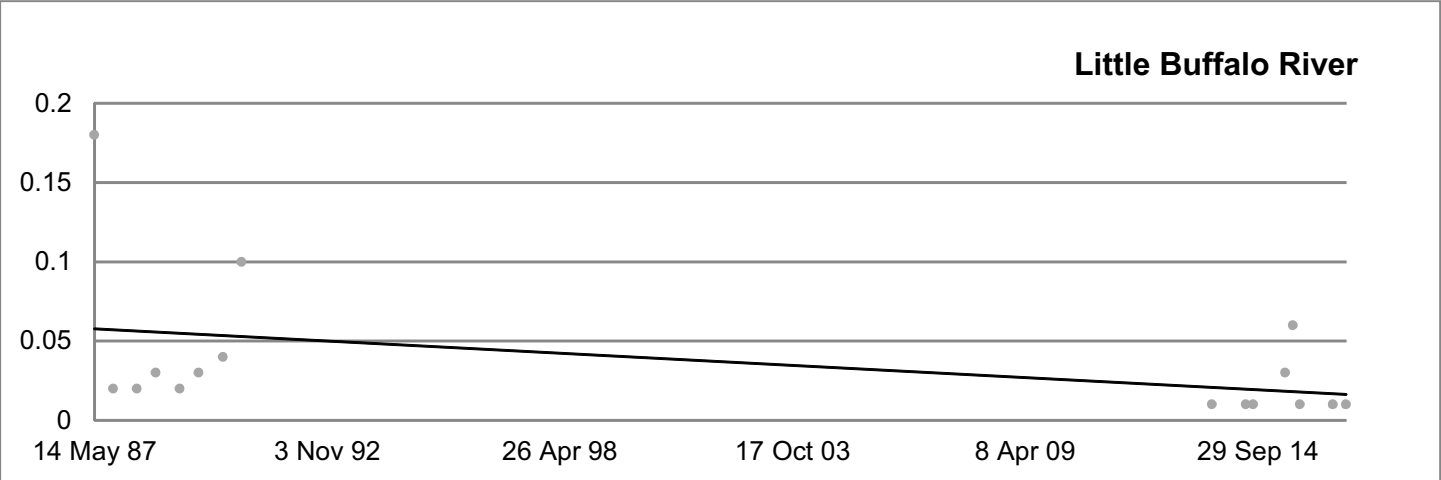
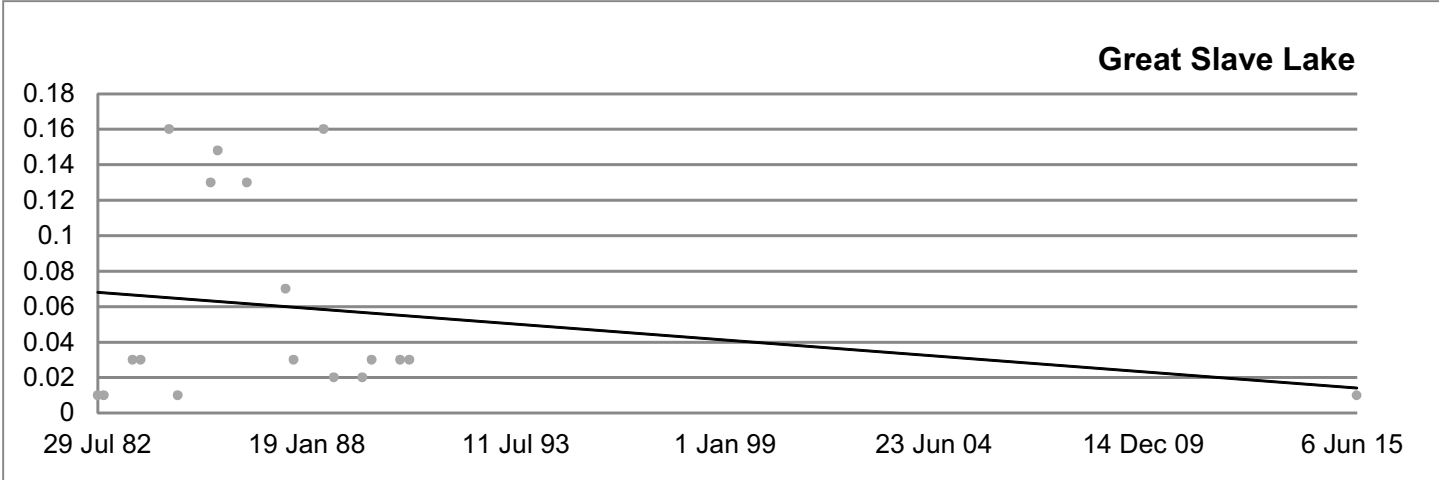
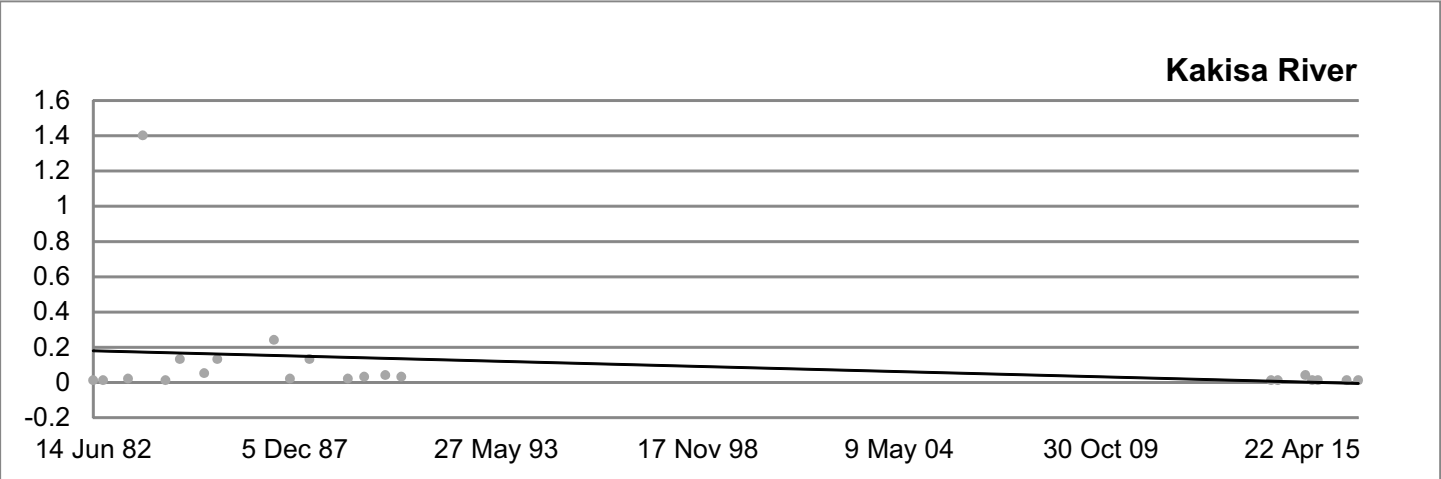
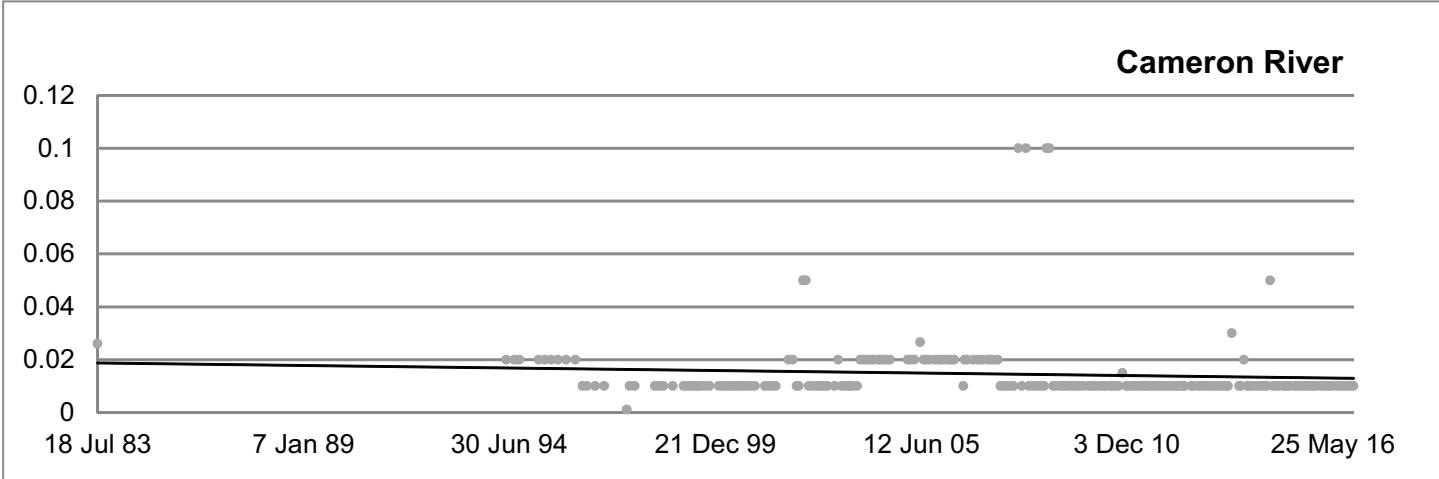
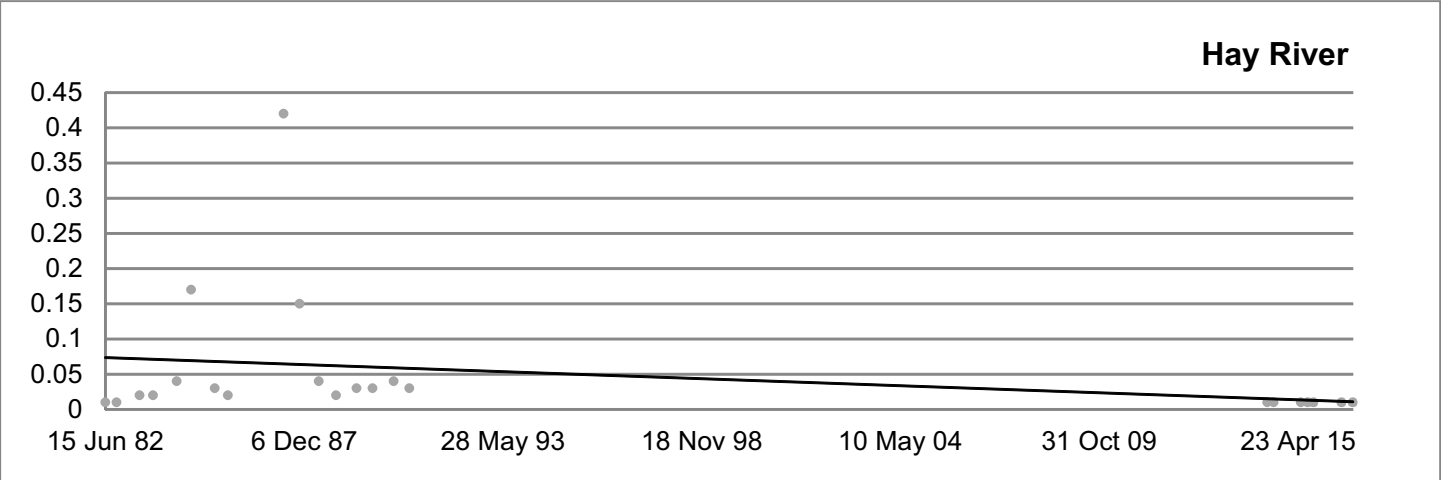
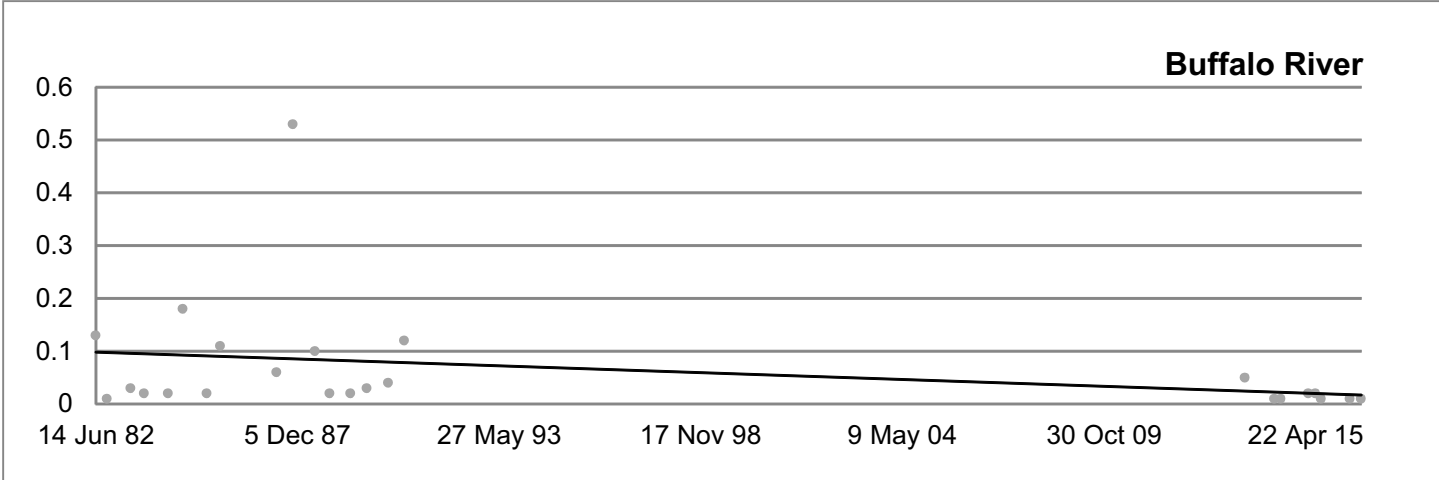
TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Manganese (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0	Figure B.20c
OFFICE Tt-VANC	DATE March 30, 2017				

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

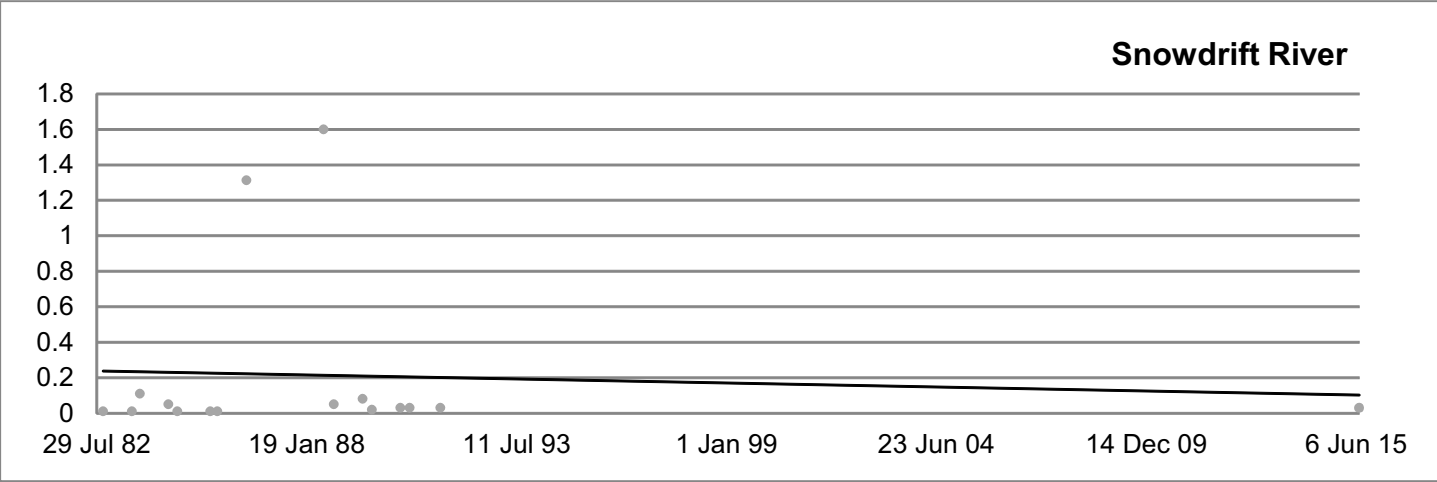
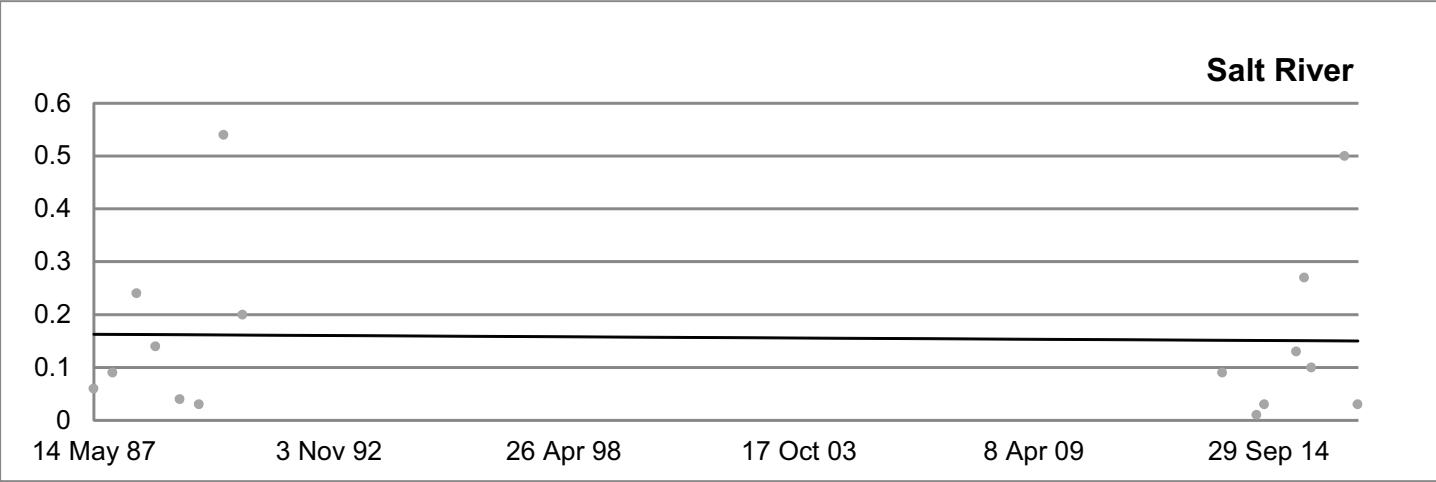
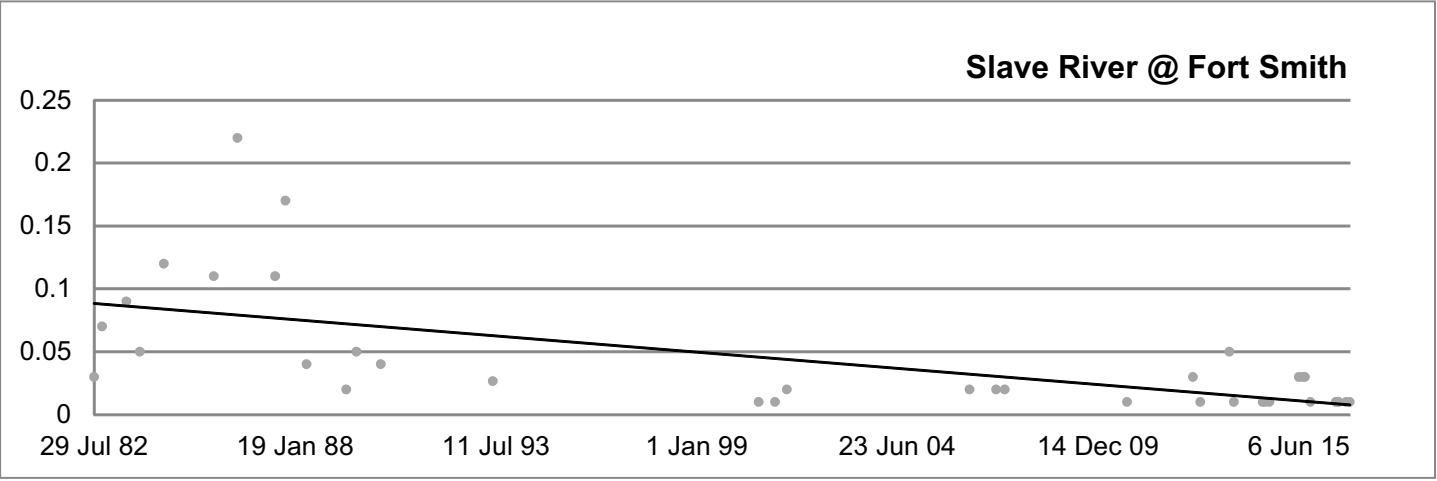
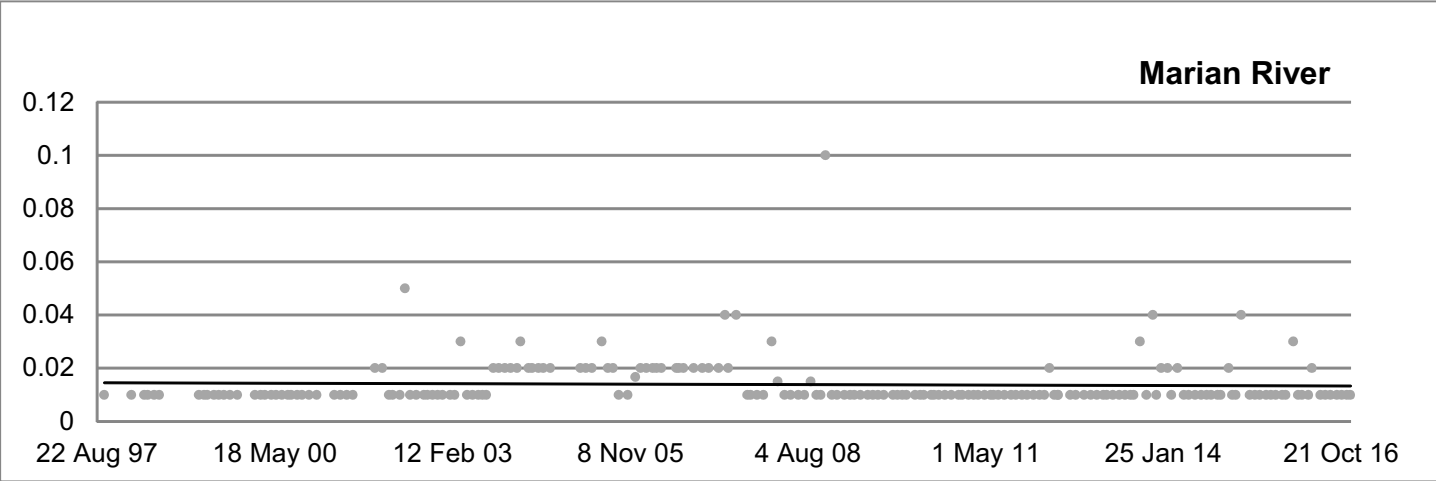
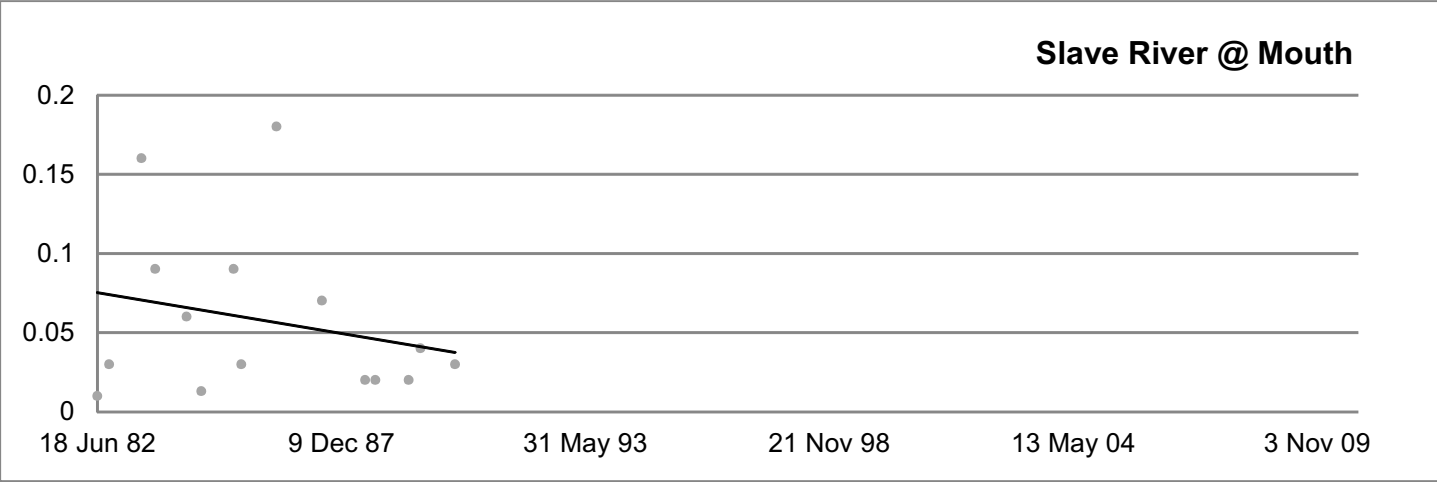
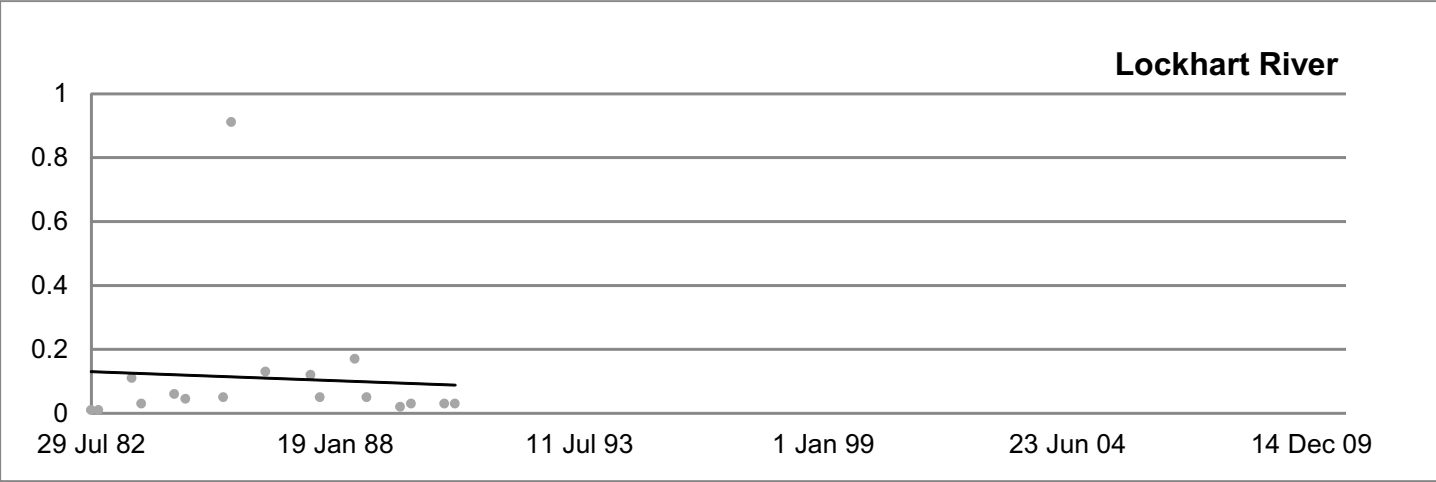
STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Mercury (µg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.21a

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

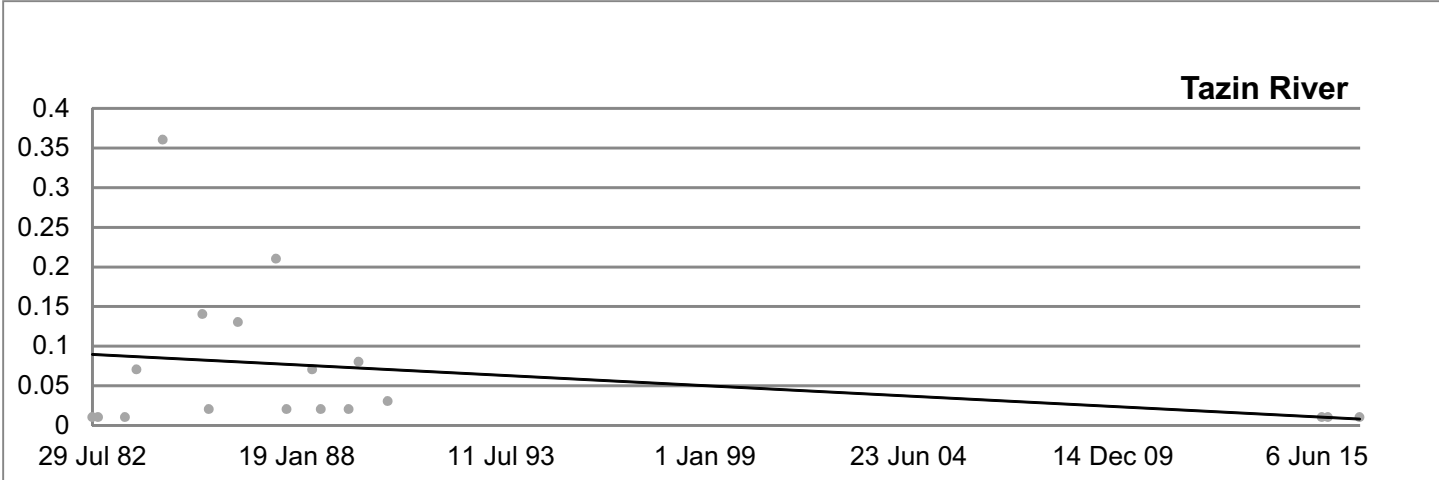
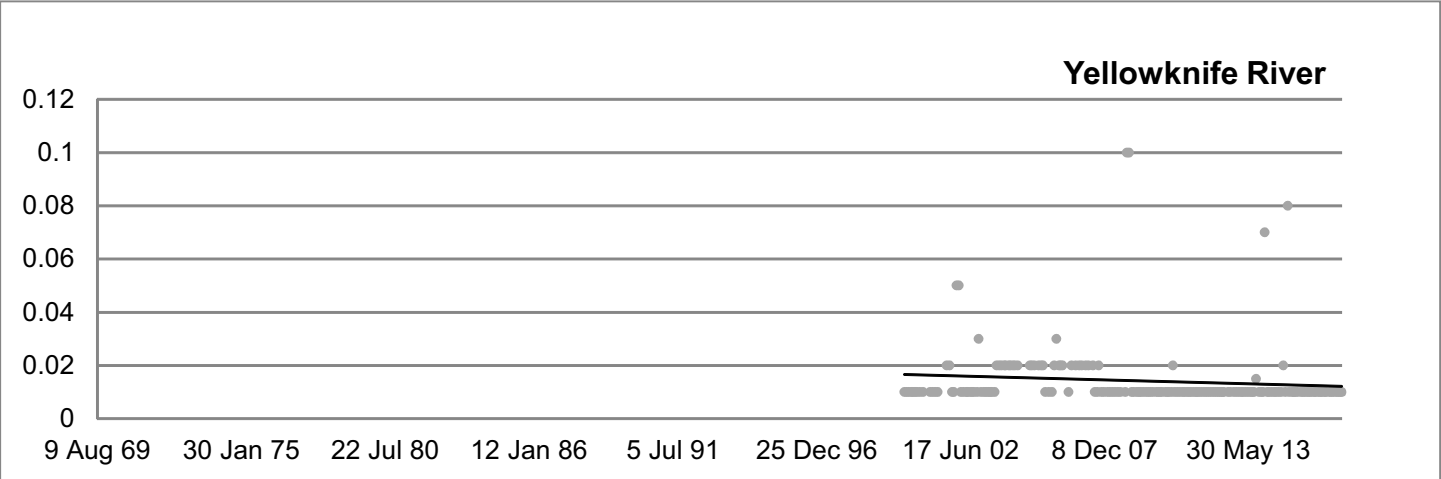
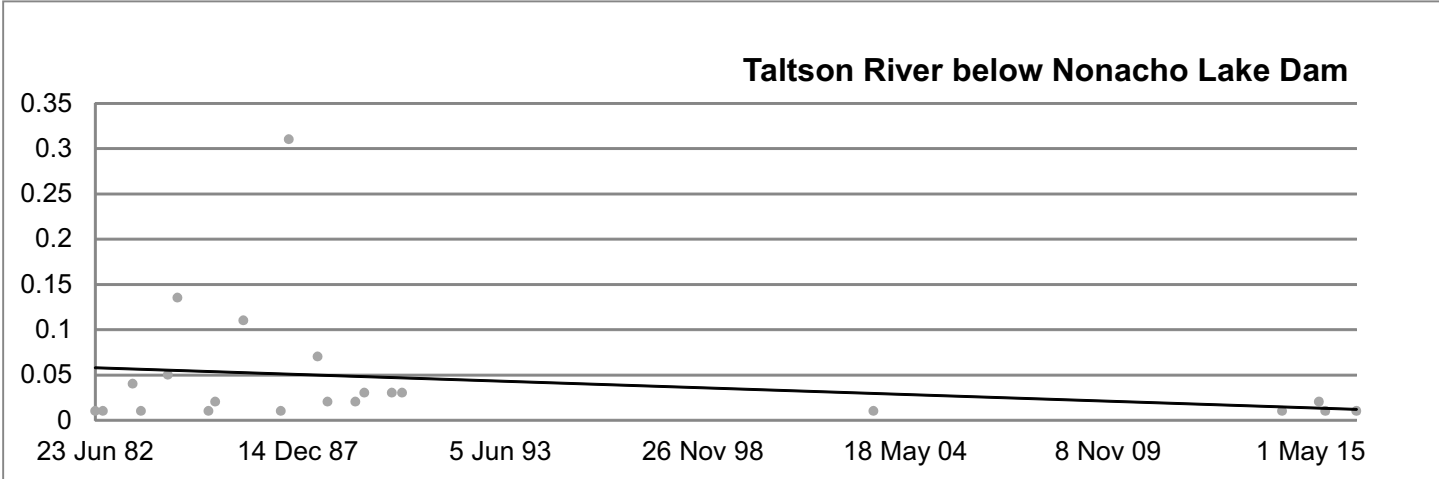
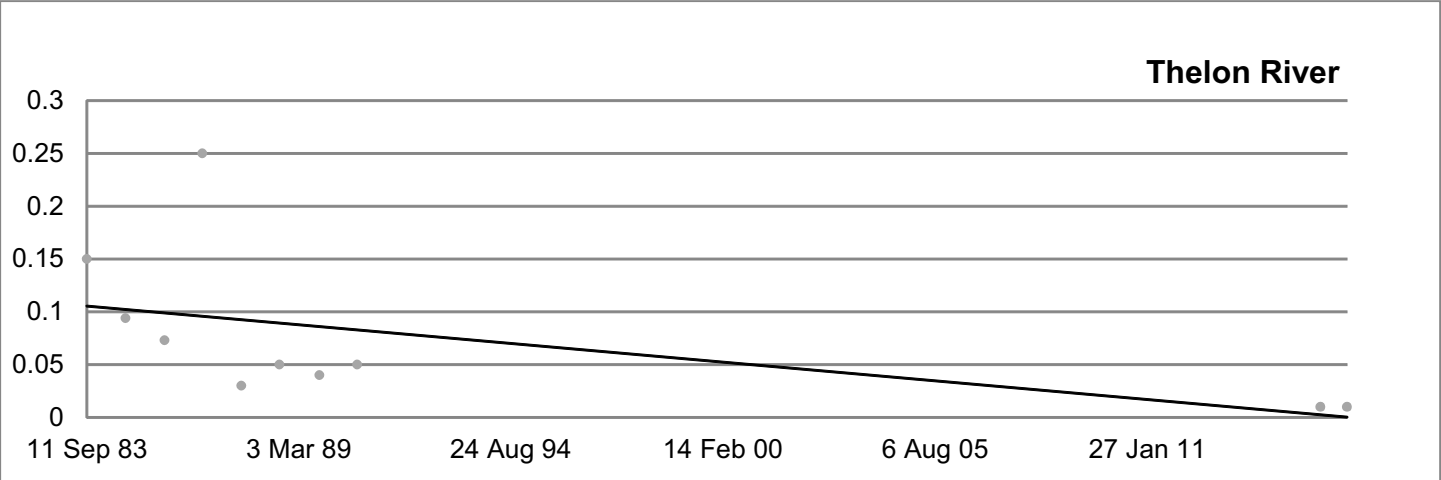
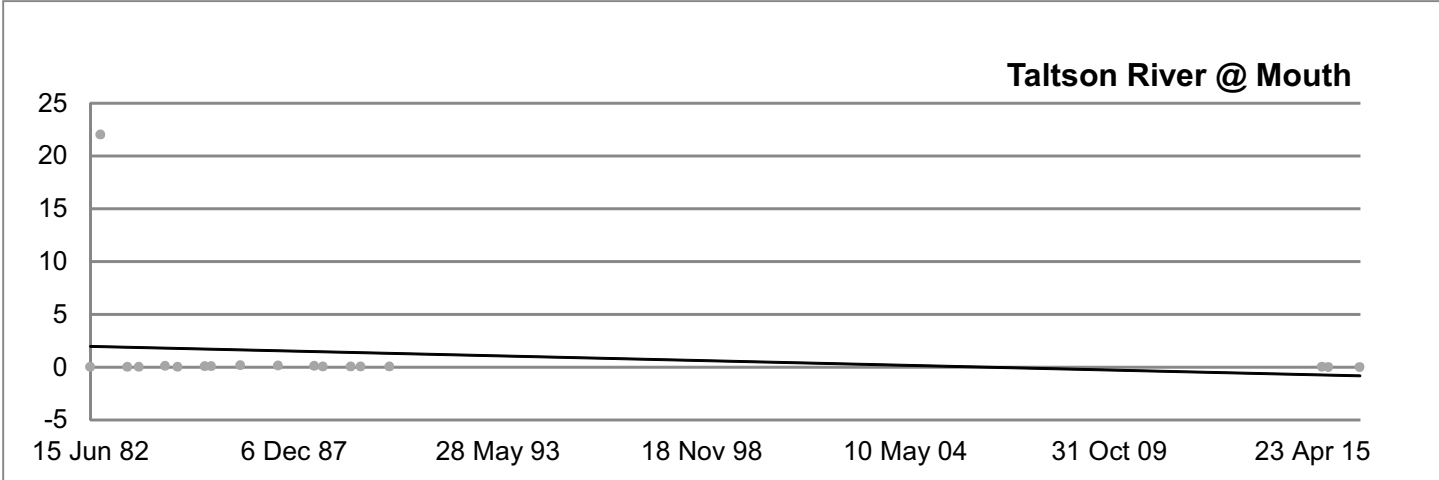
**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Mercury (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.21b

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

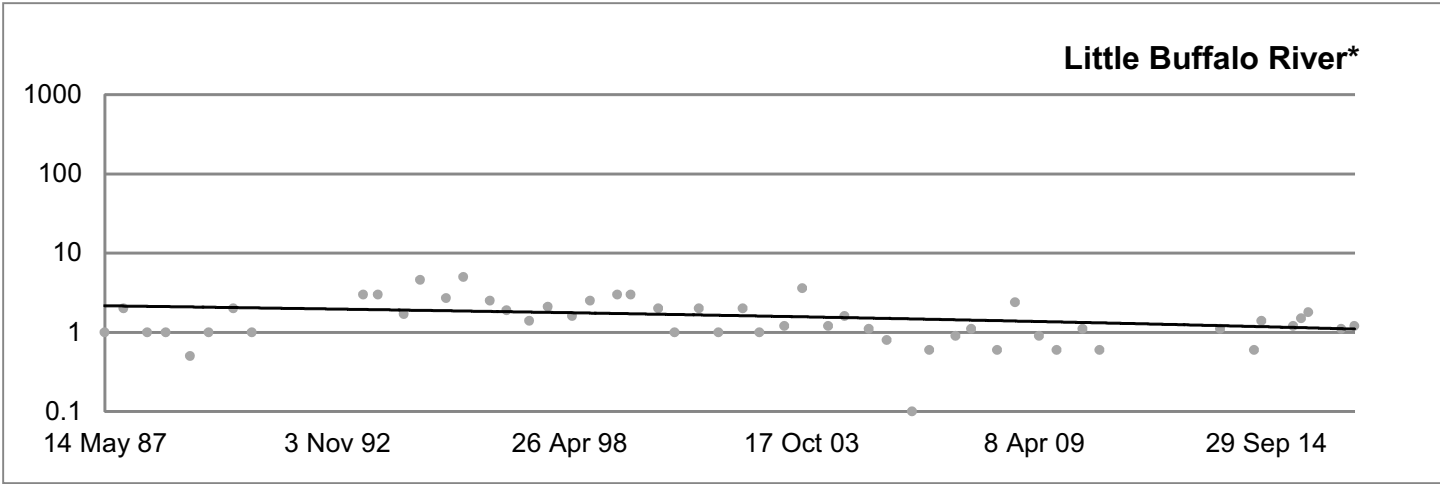
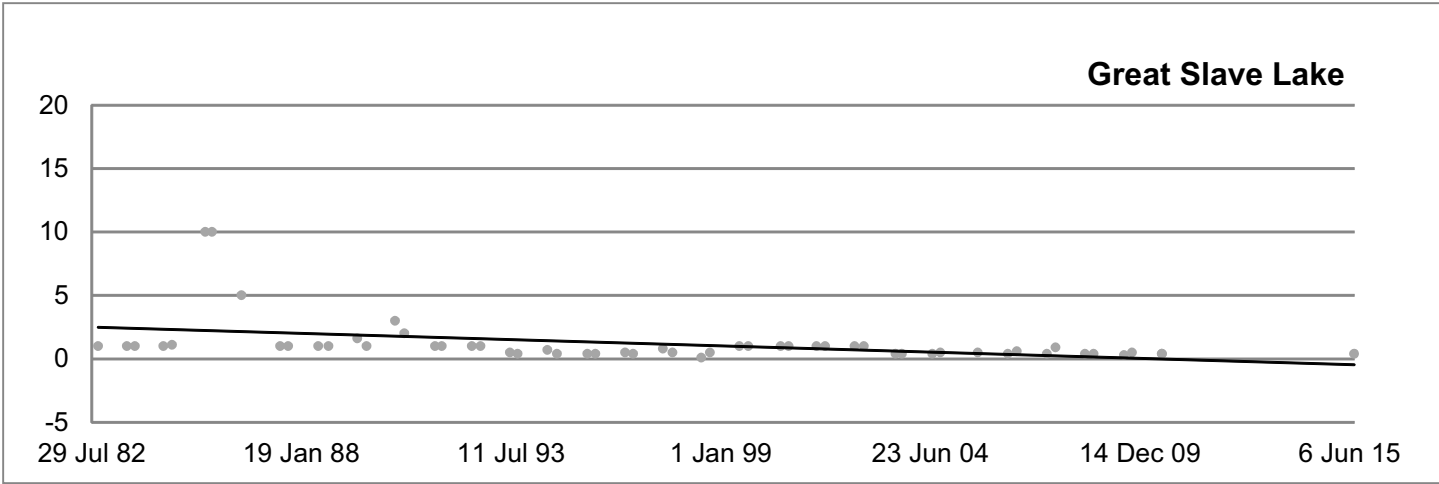
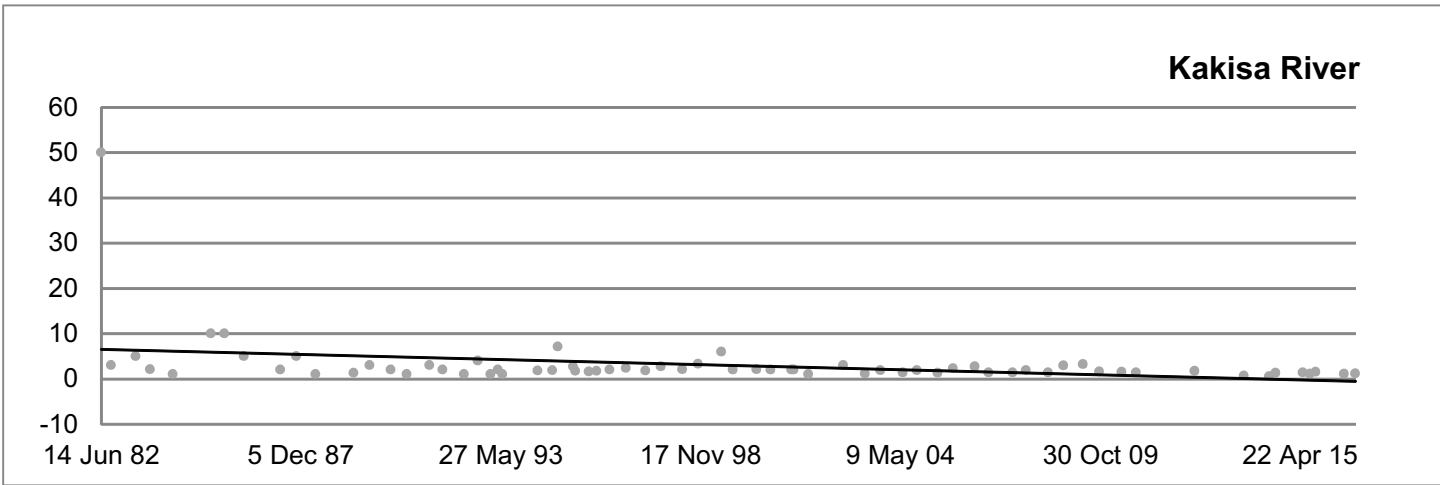
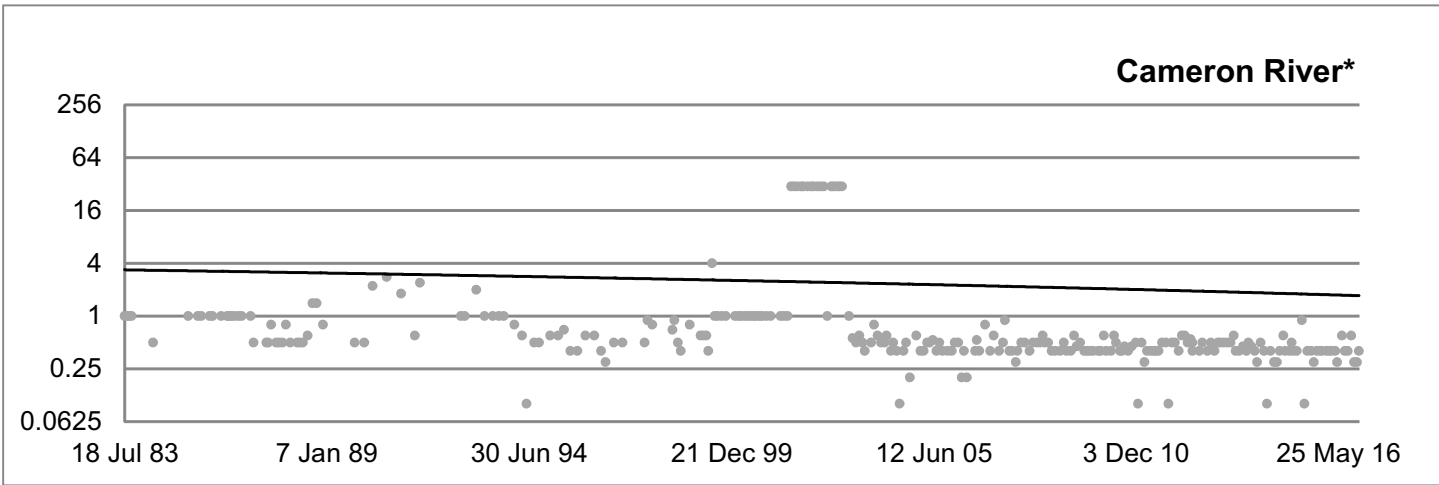
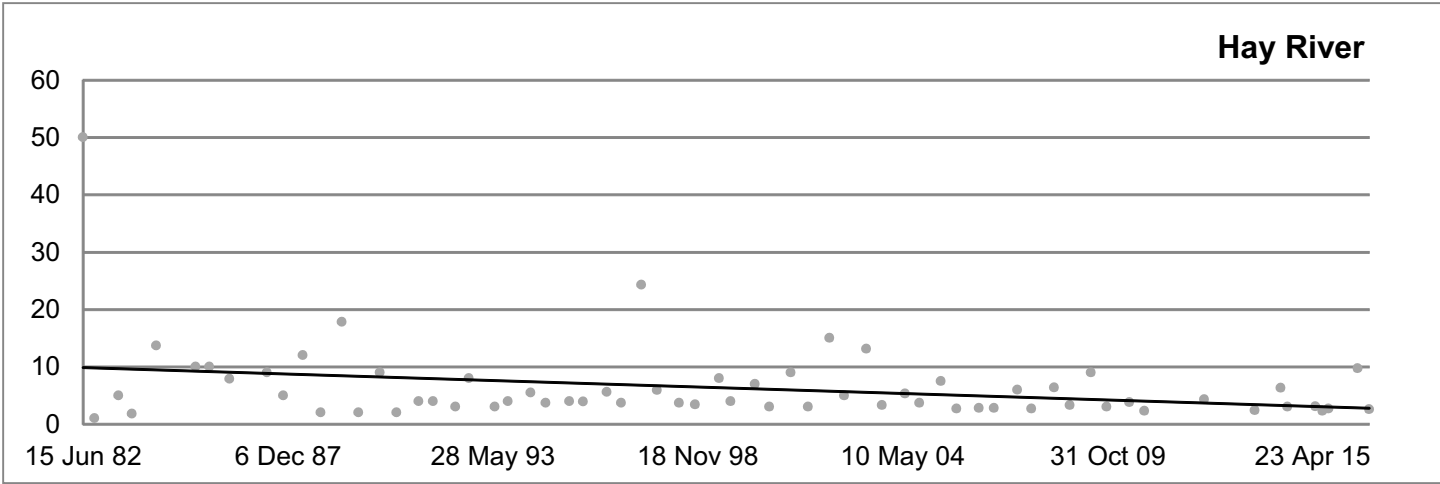
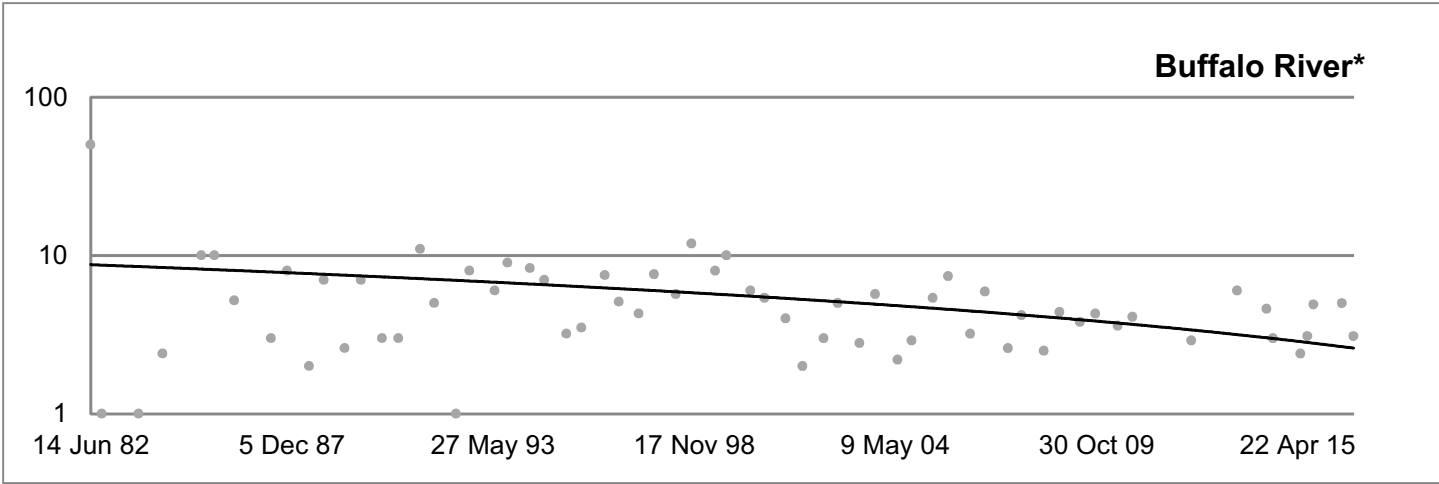
**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Mercury (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.	DWN	CKD	APVD	REV
ENW.VENW03044-01	MEZ	SL	SW	0
OFFICE	DATE			
Tt-VANC	March 30, 2017			

Figure B.21c

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Scatterplots



LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

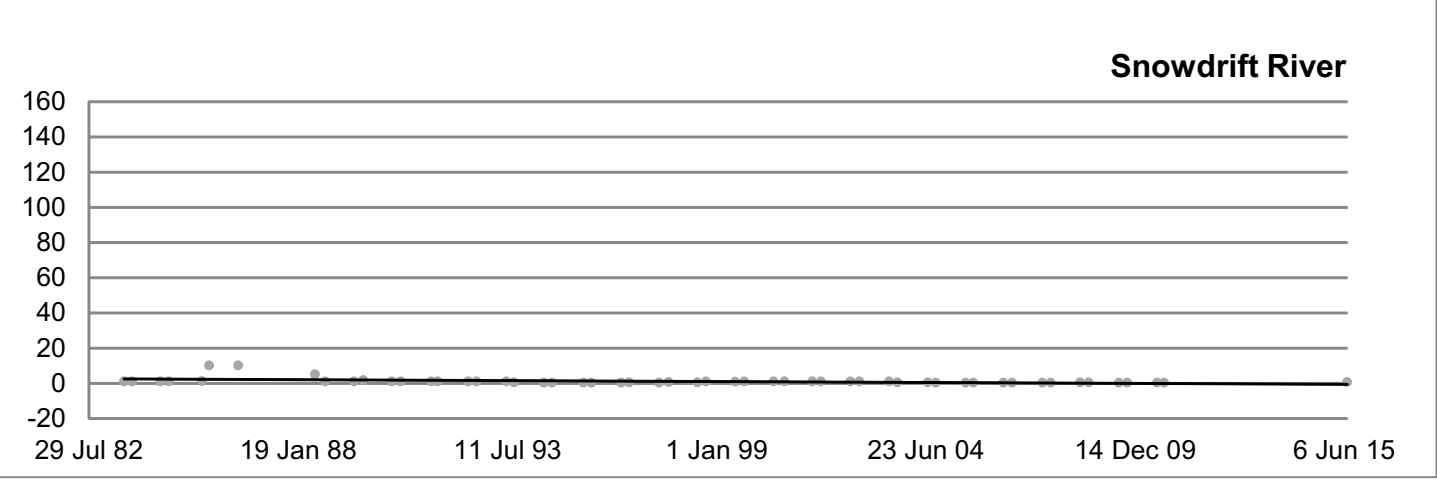
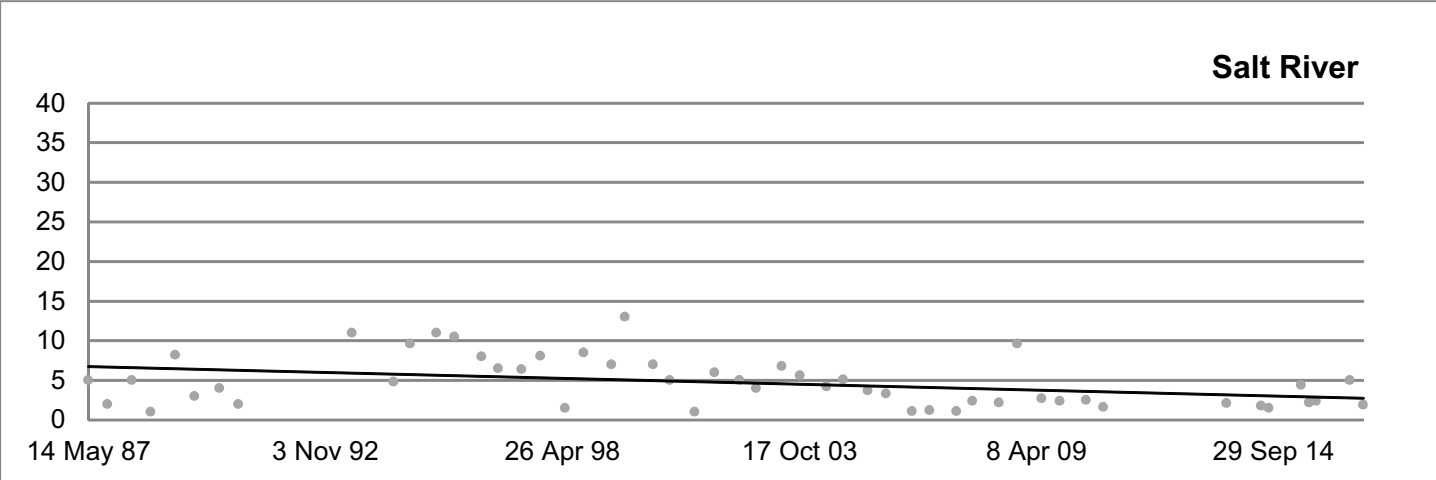
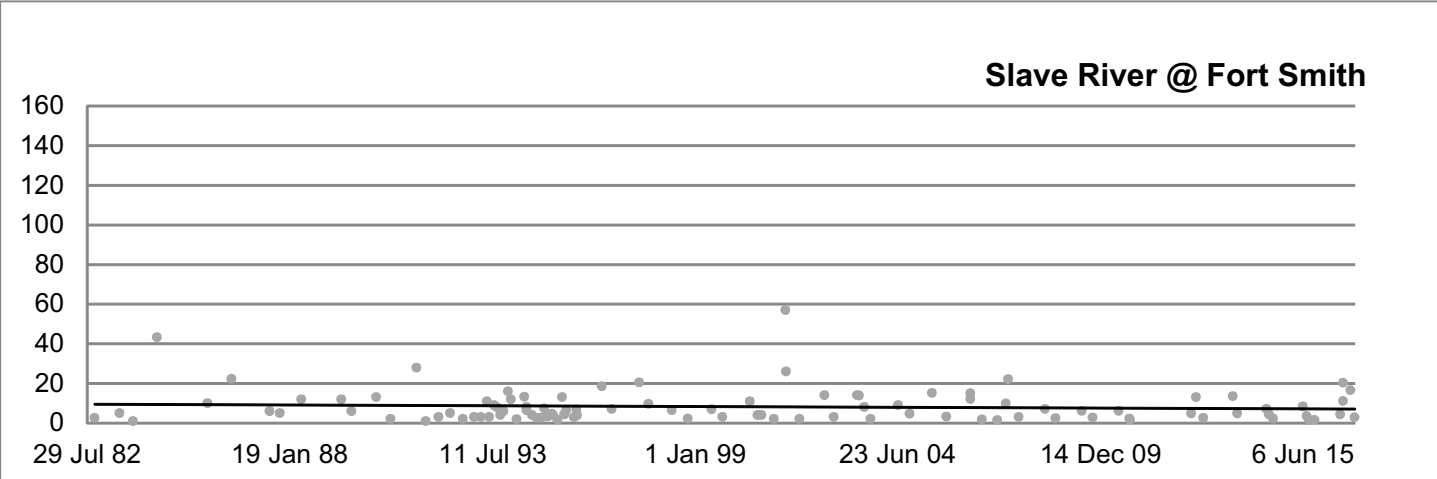
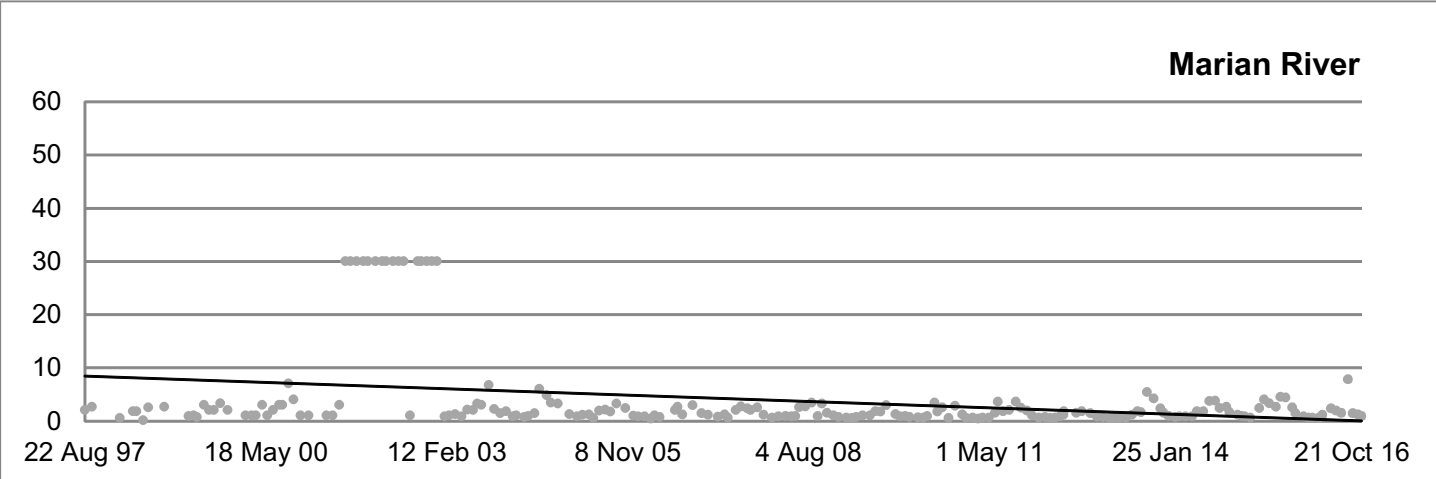
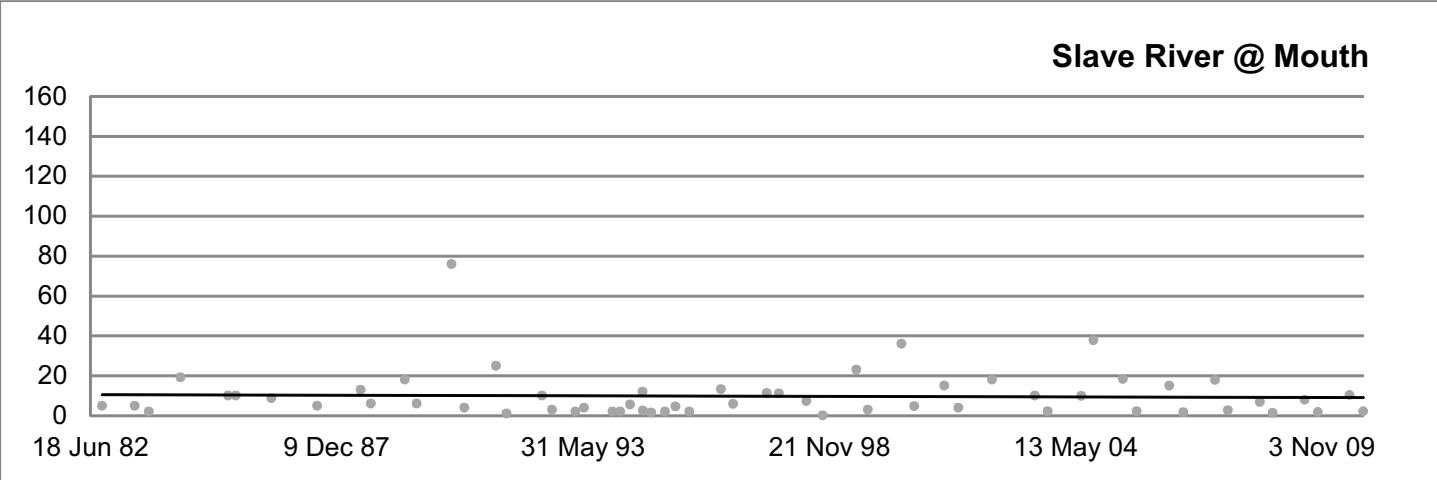
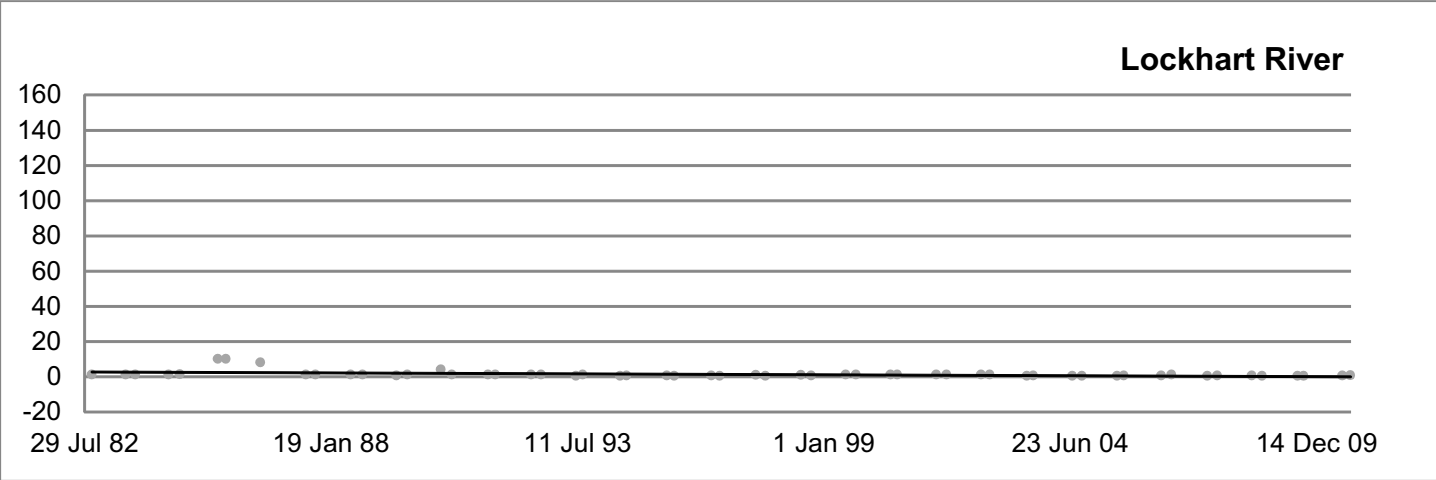
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

**Nickel (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.22a

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

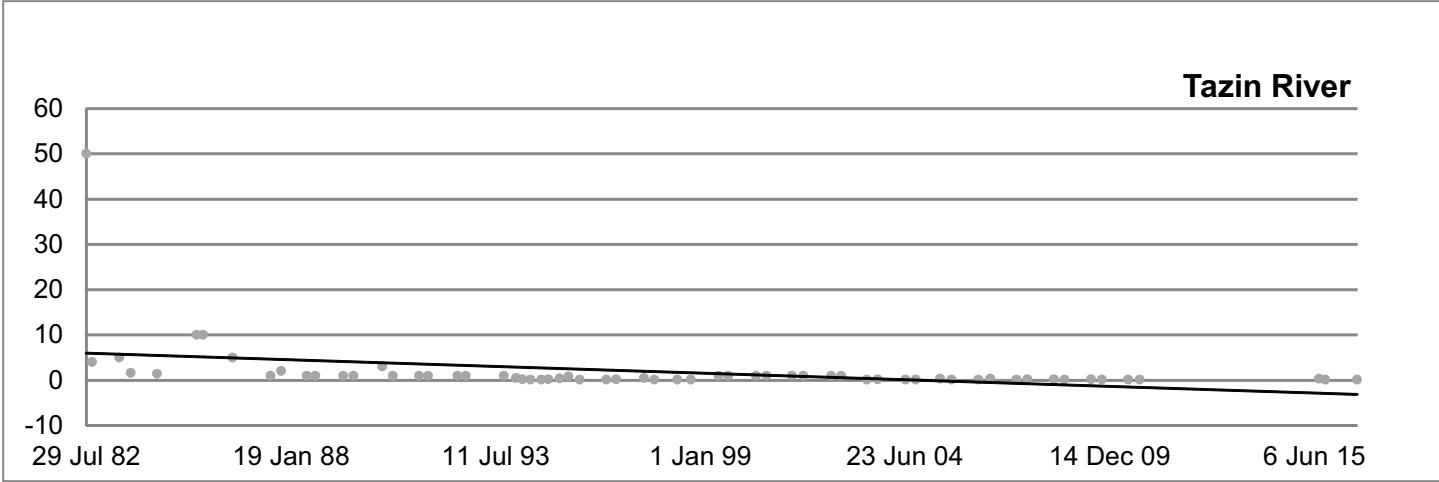
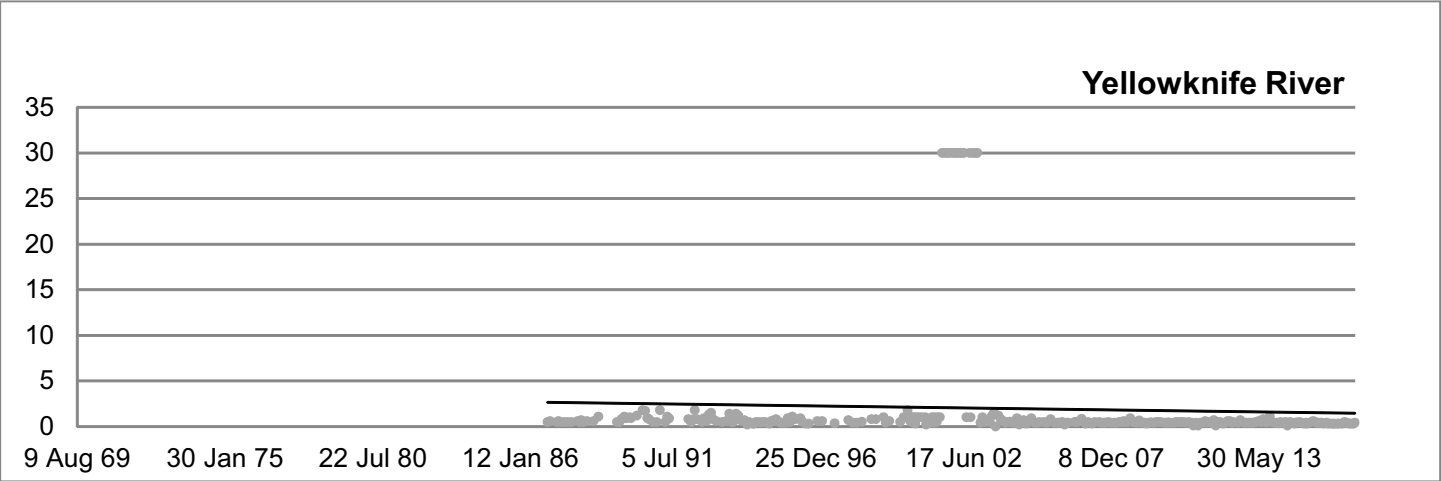
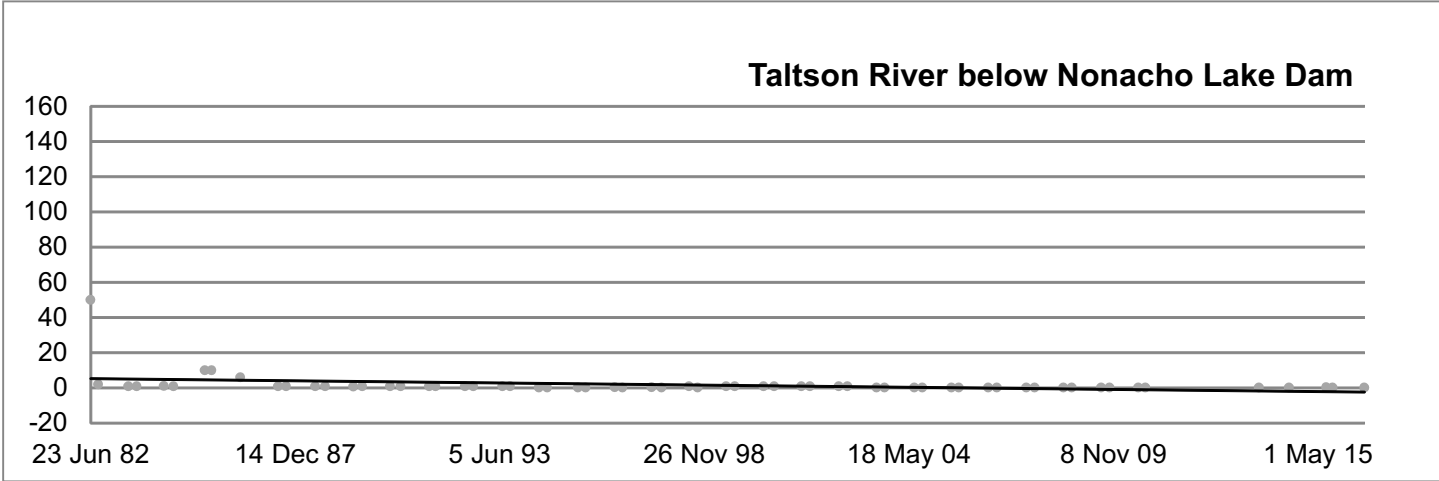
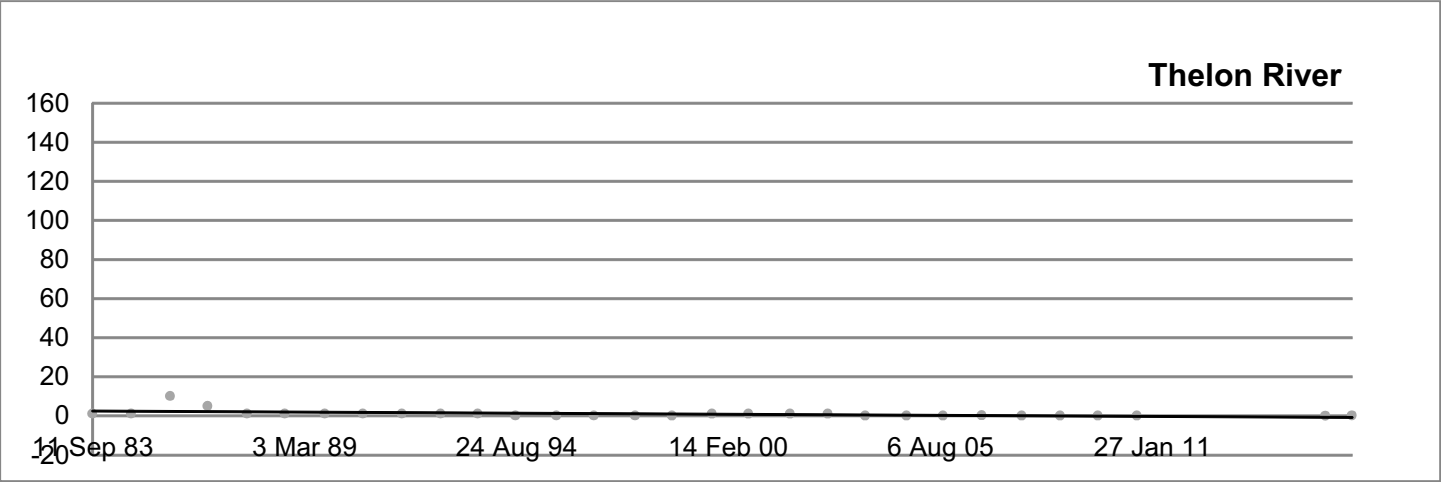
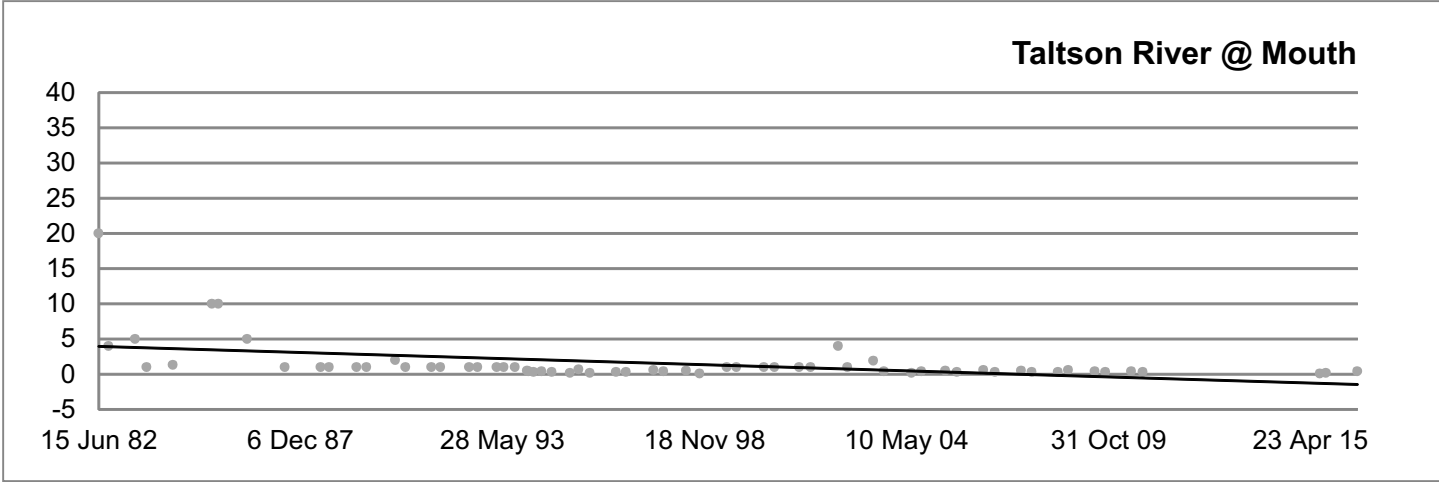
**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Nickel (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.	DWN	CKD	APVD	REV
ENW.VENW03044-01	MEZ	SL	SW	0
OFFICE	DATE			
Tt-VANC	March 30, 2017			

Figure B.22b

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



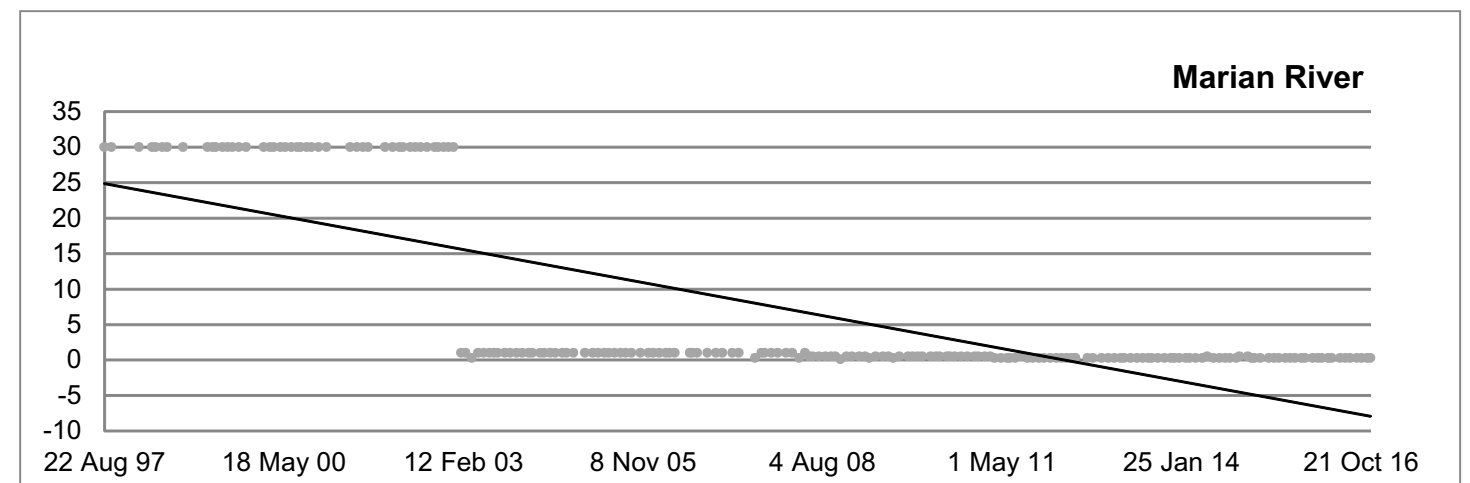
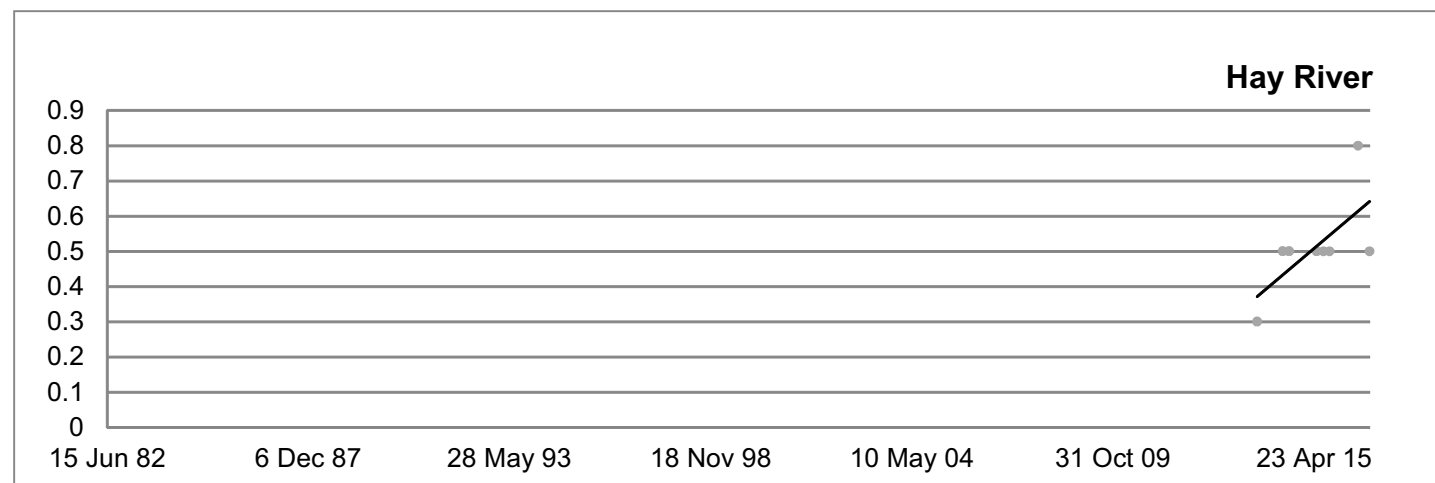
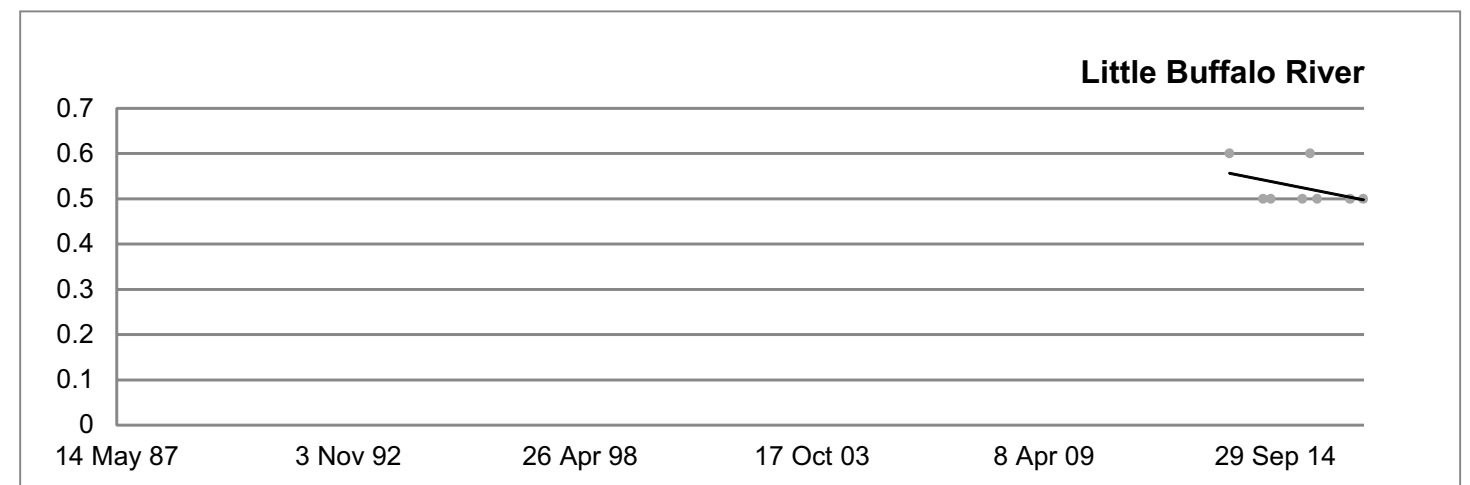
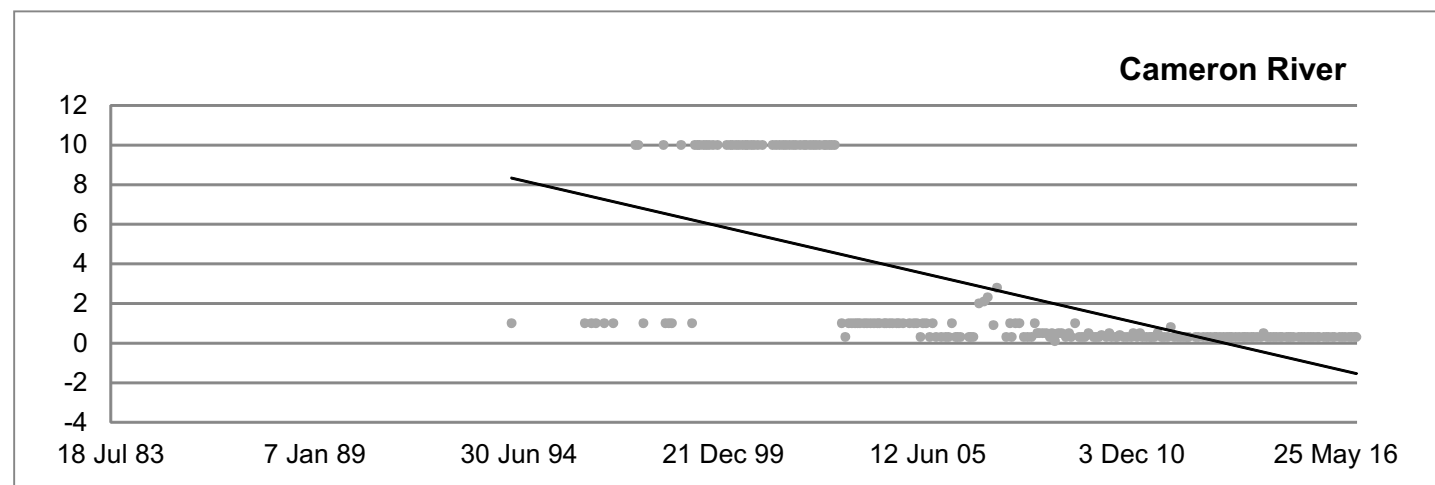
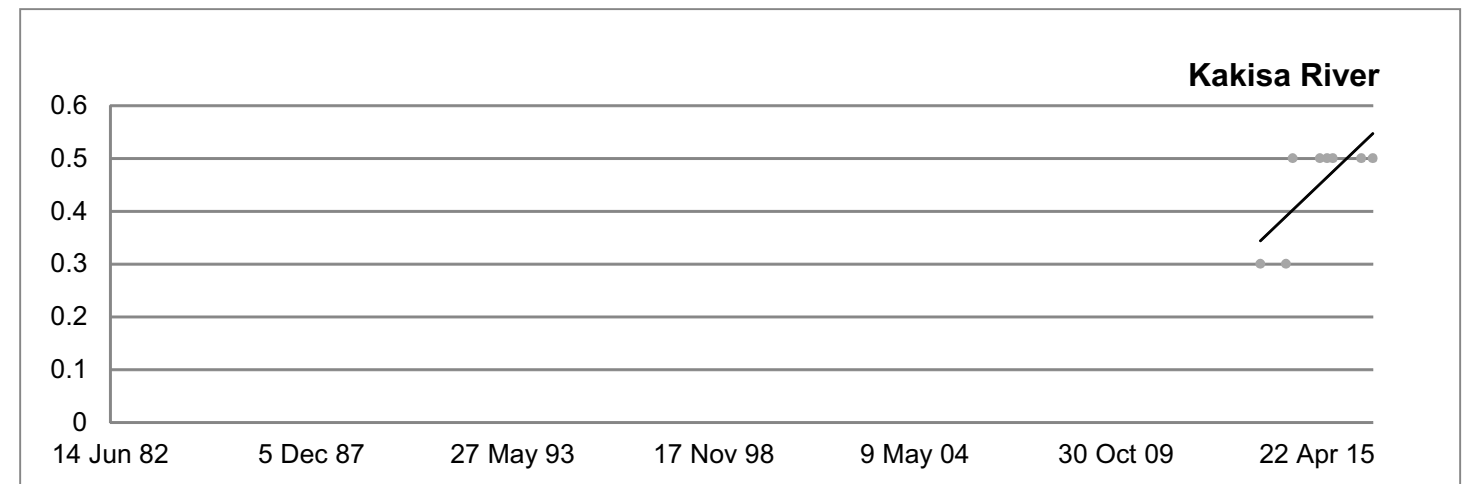
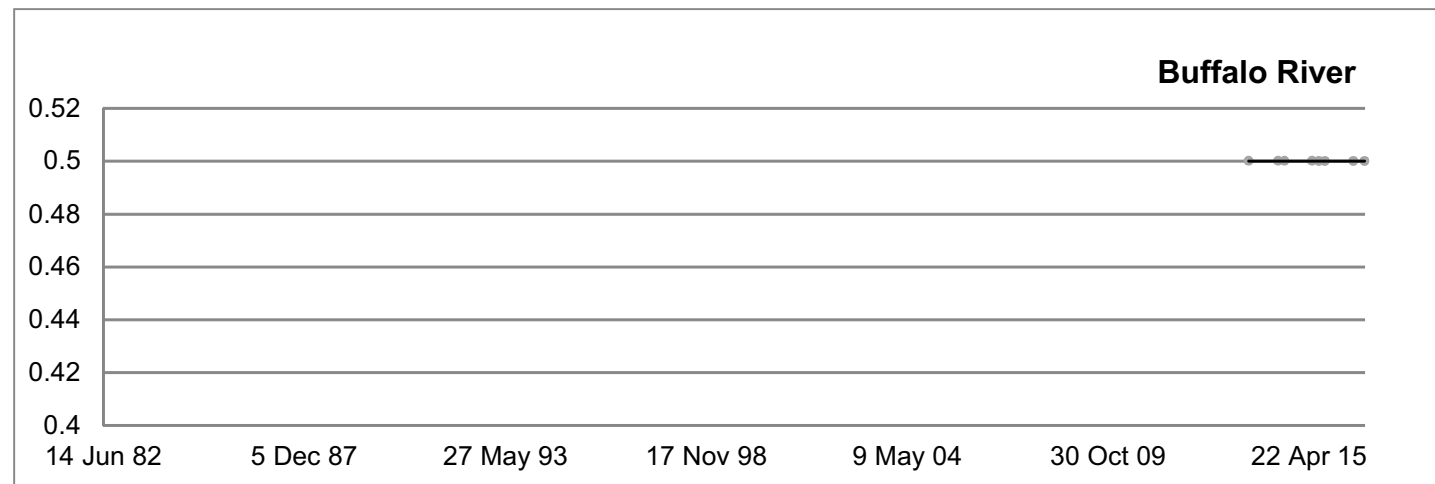
TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Nickel (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.22c



LEGEND

—— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



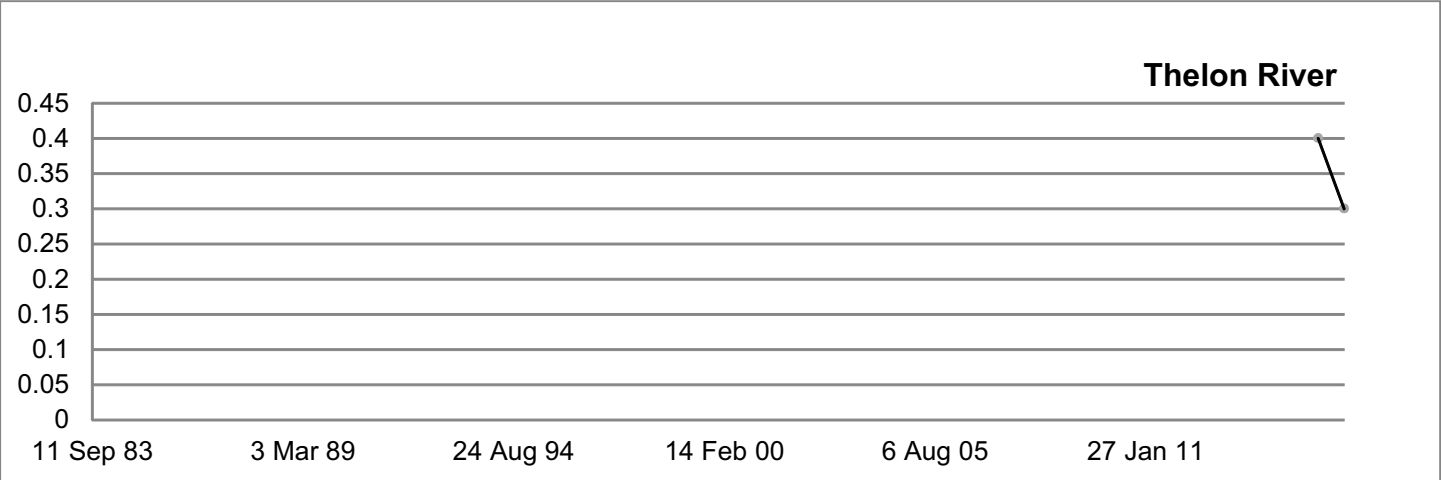
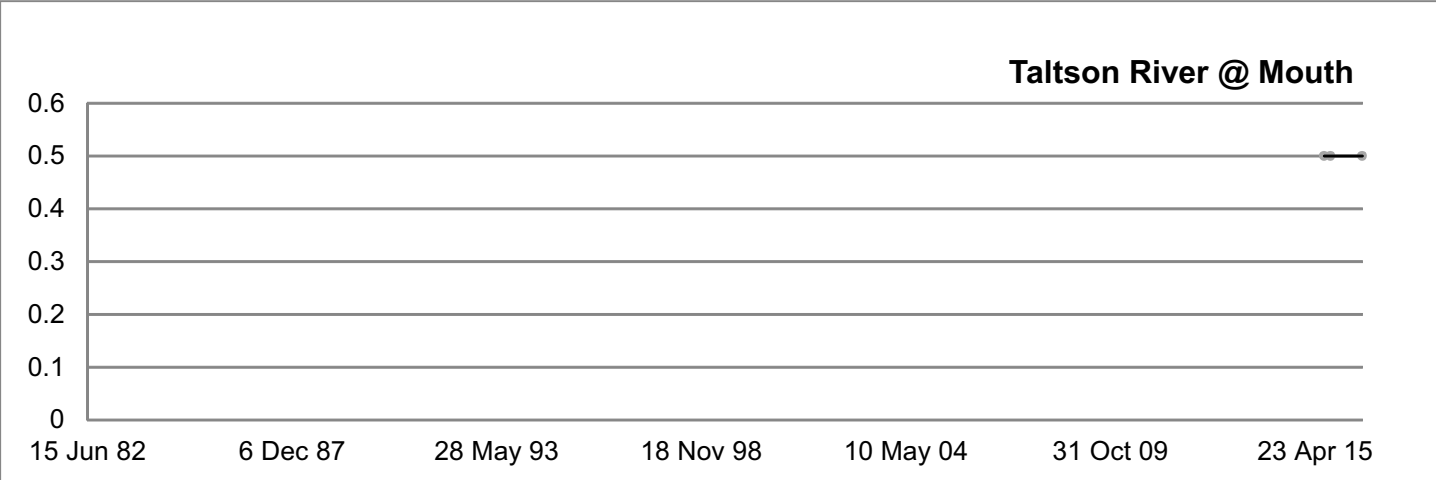
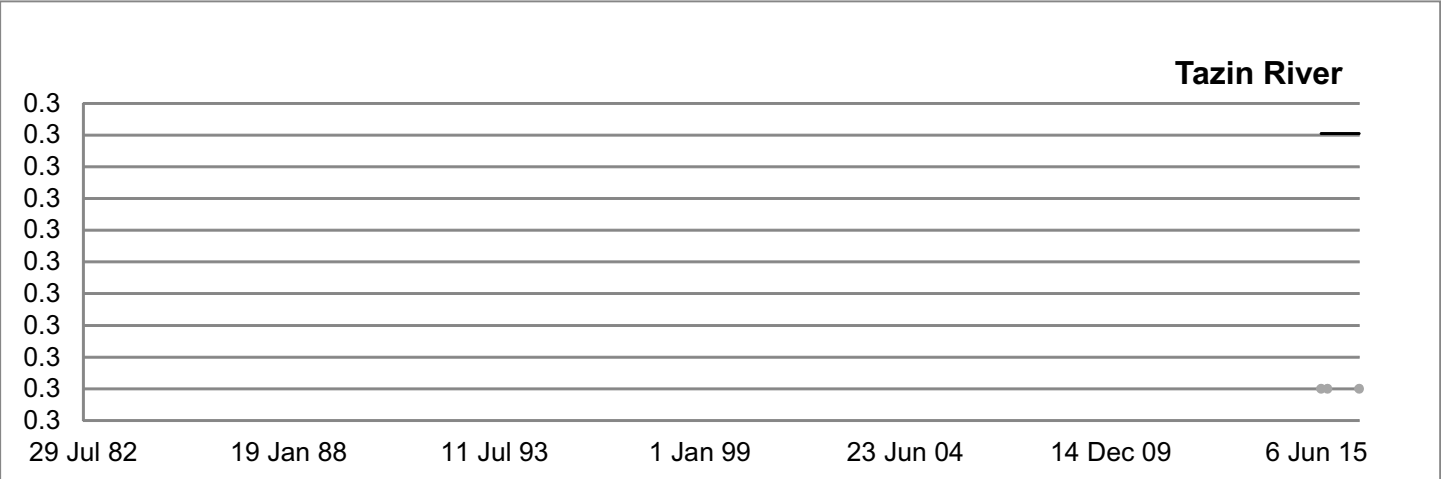
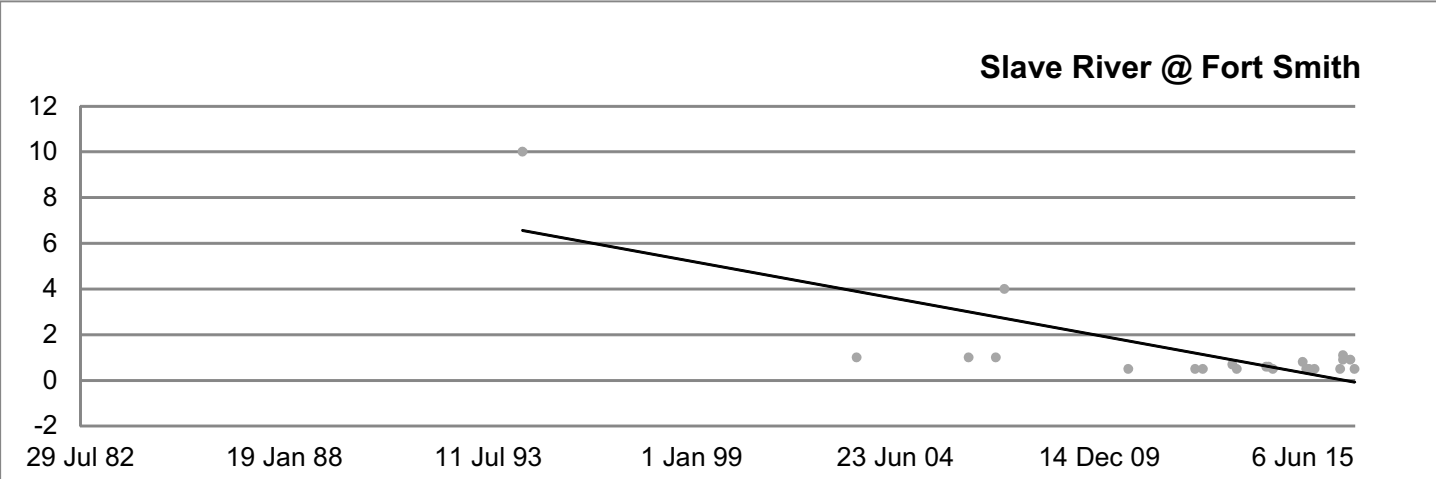
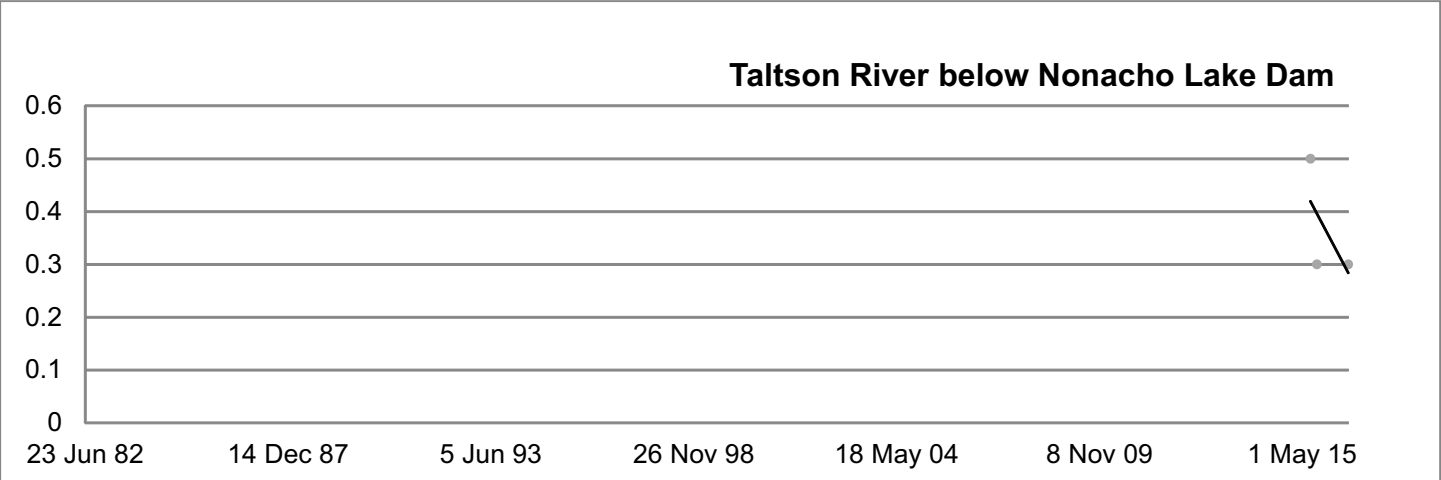
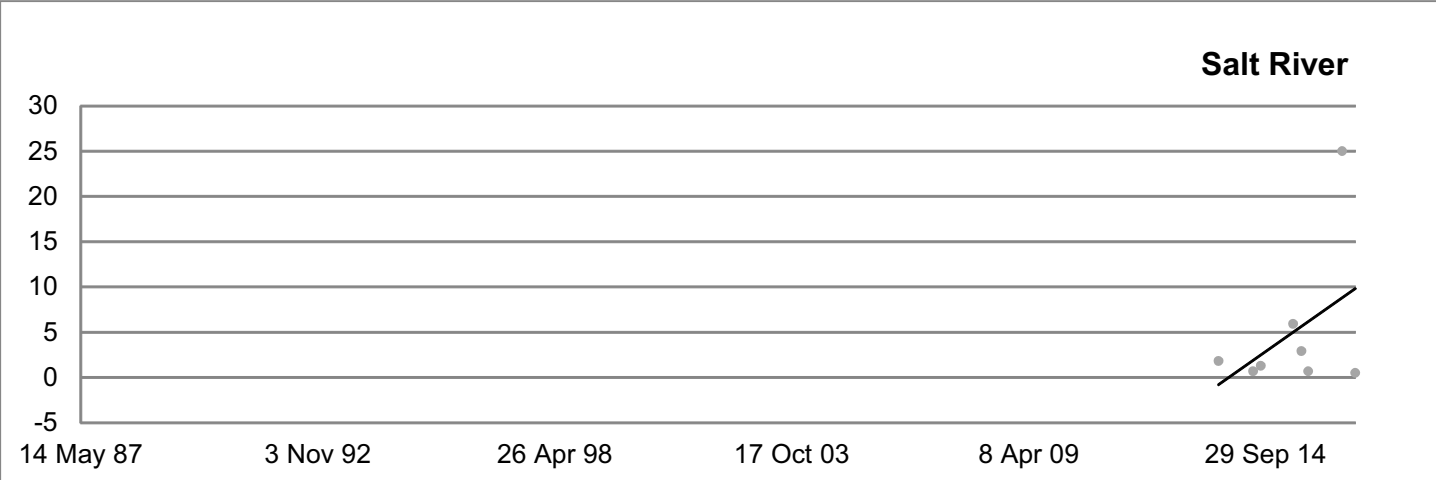
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Selenium (µg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.23a

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

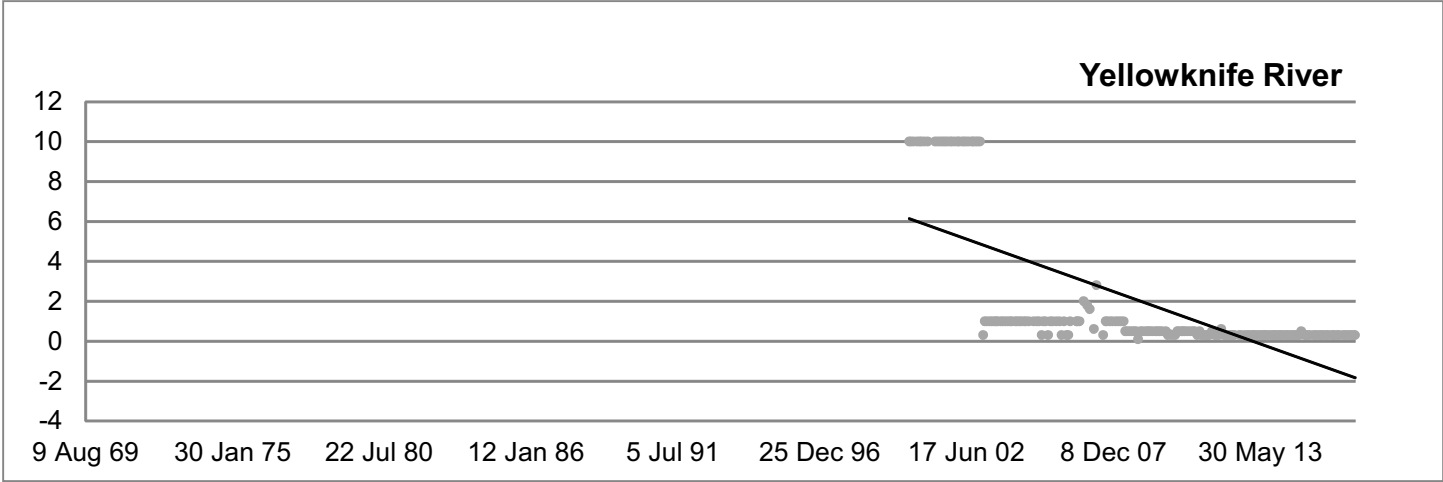
**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Selenium (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.	DWN	CKD	APVD	REV
ENW.VENW03044-01	MEZ	SL	SW	0
OFFICE	DATE			
Tt-VANC	March 30, 2017			

Figure B.23b

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LEGEND

Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT

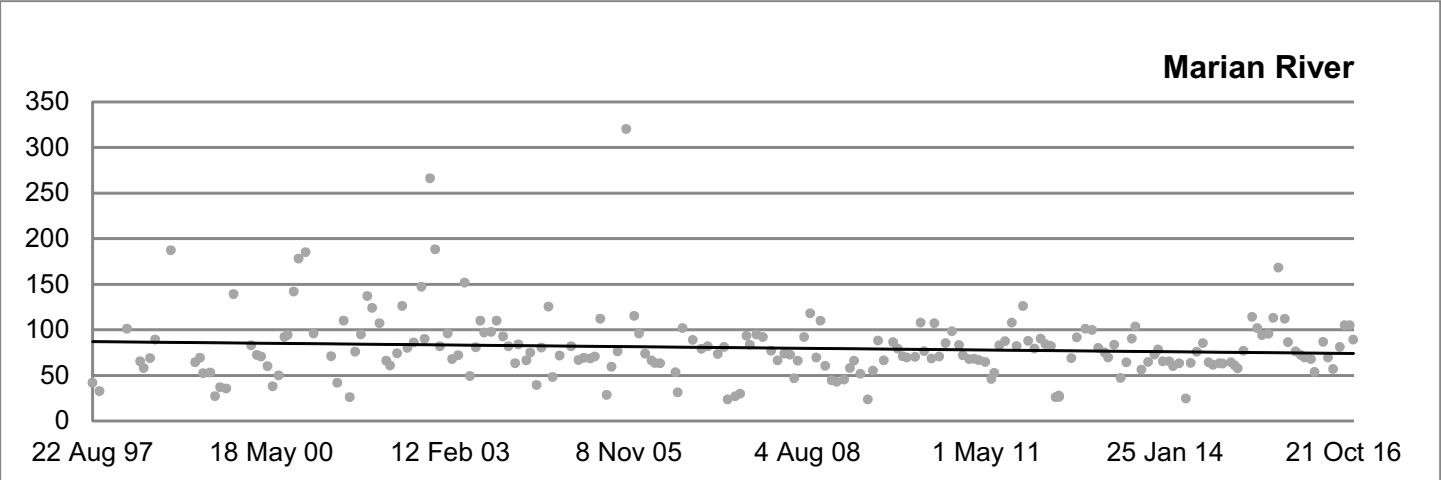
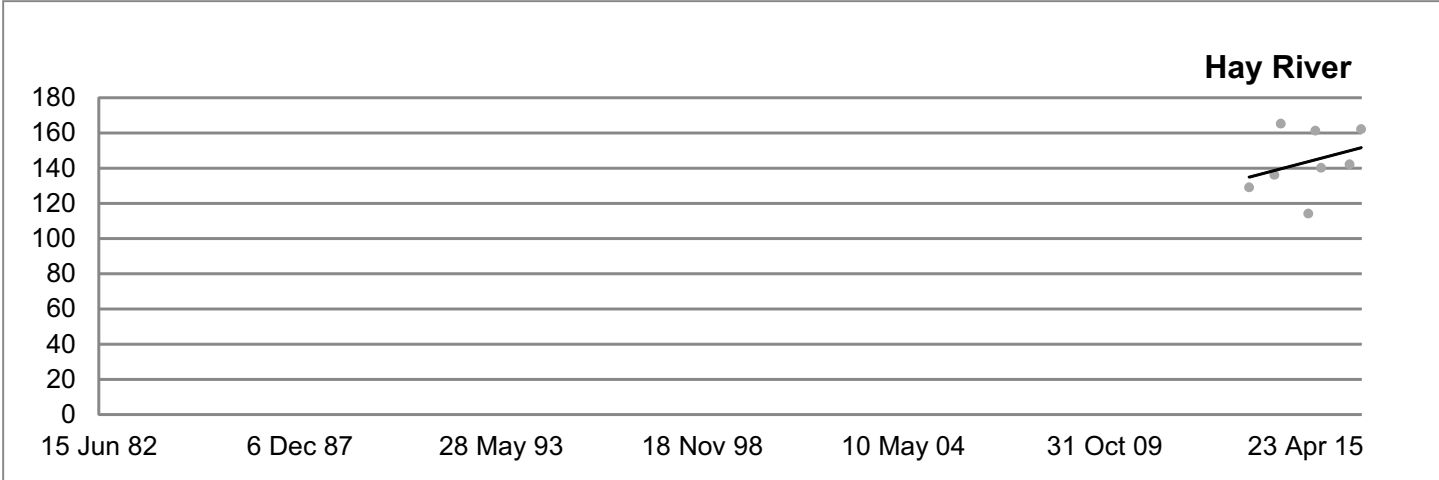
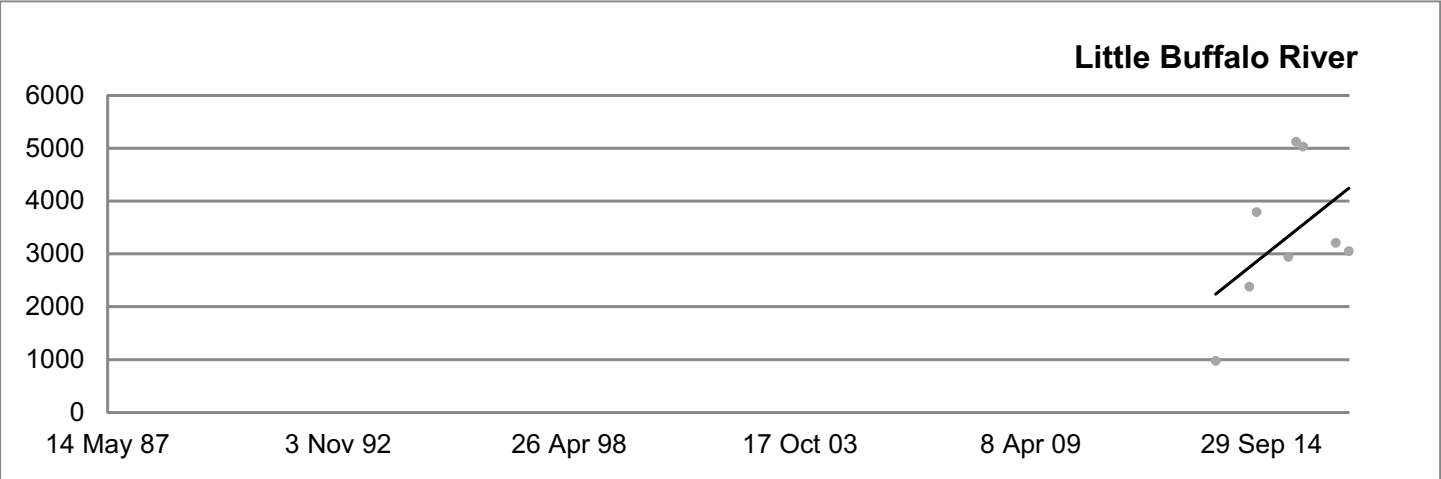
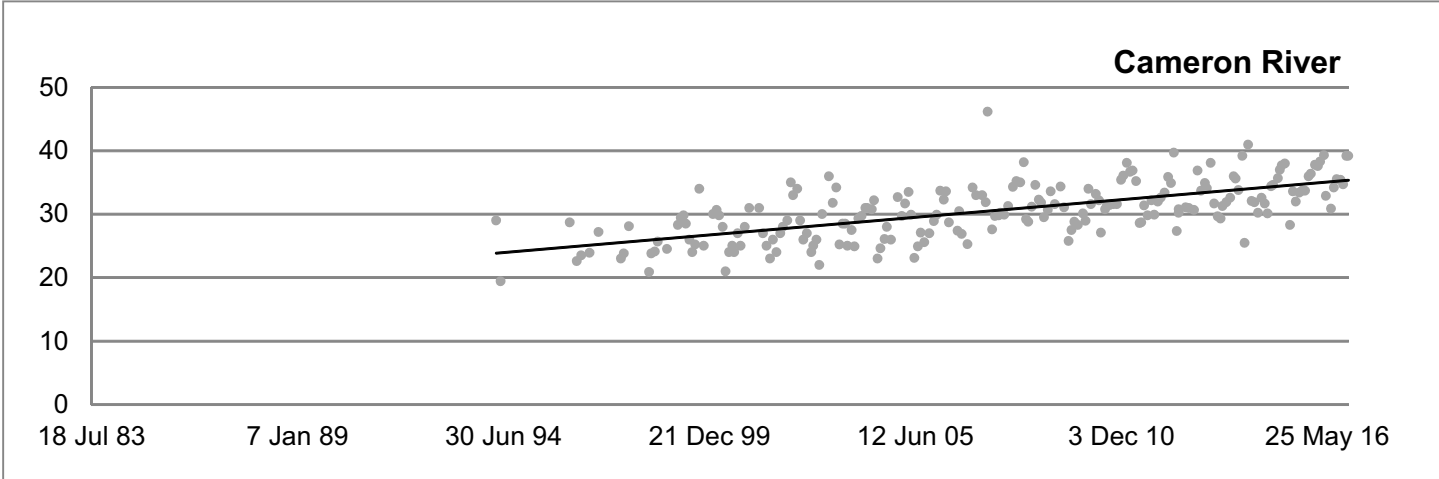
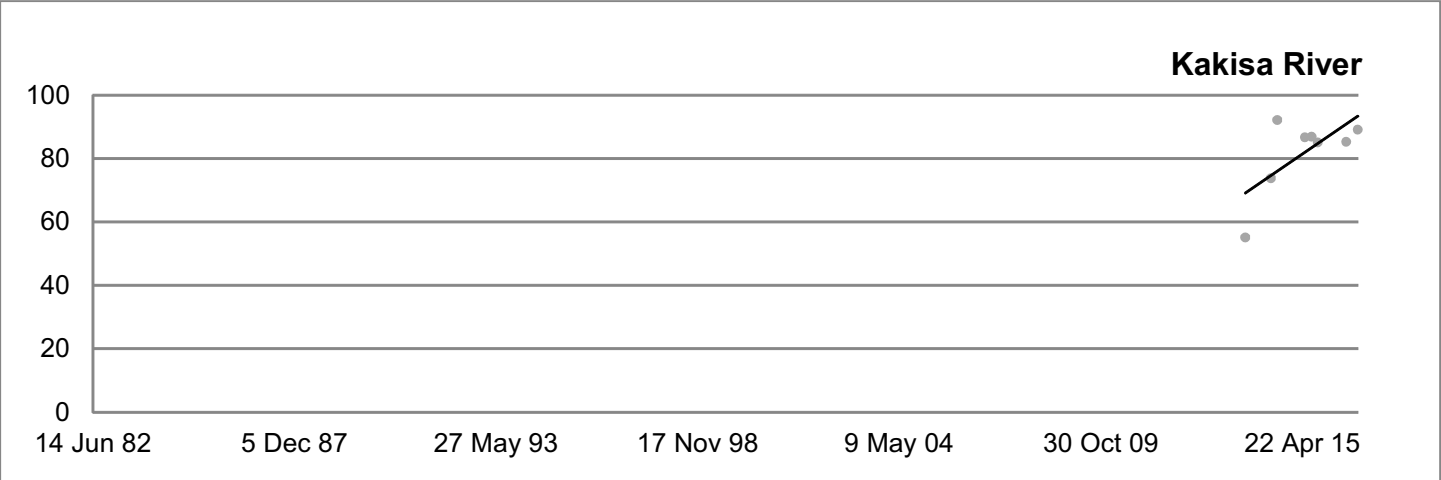
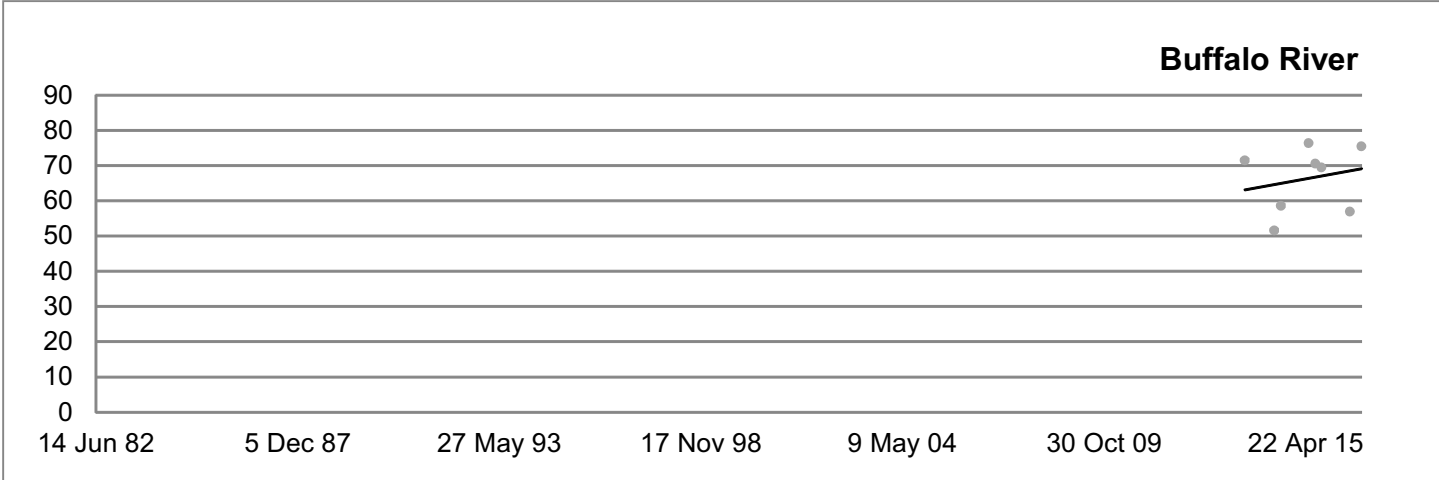


STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Selenium (µg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0	Figure B.23c
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



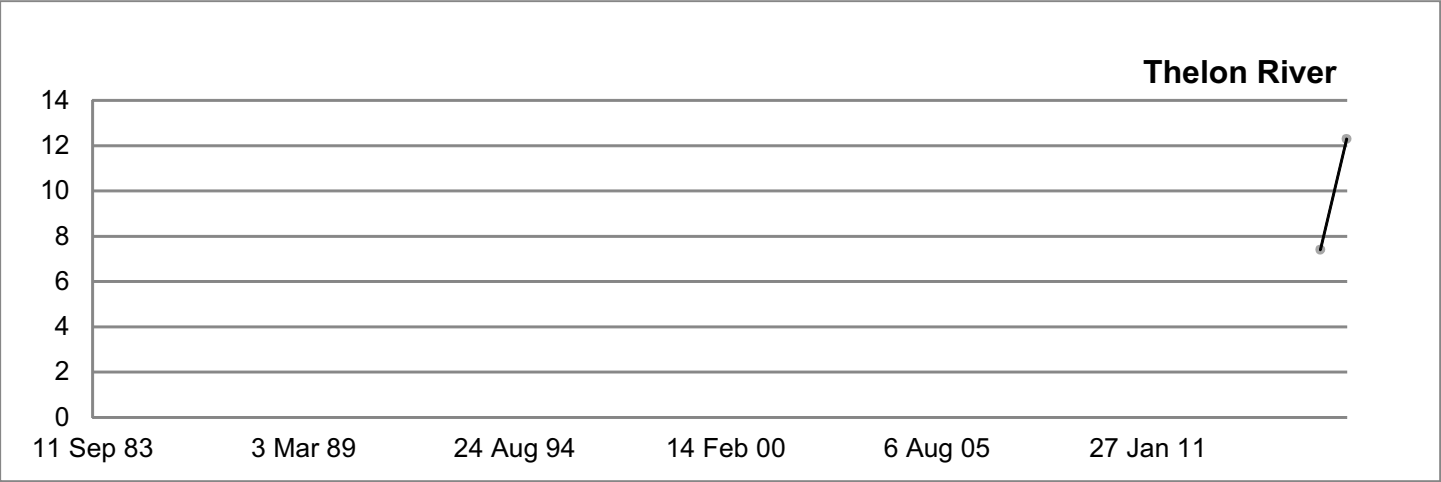
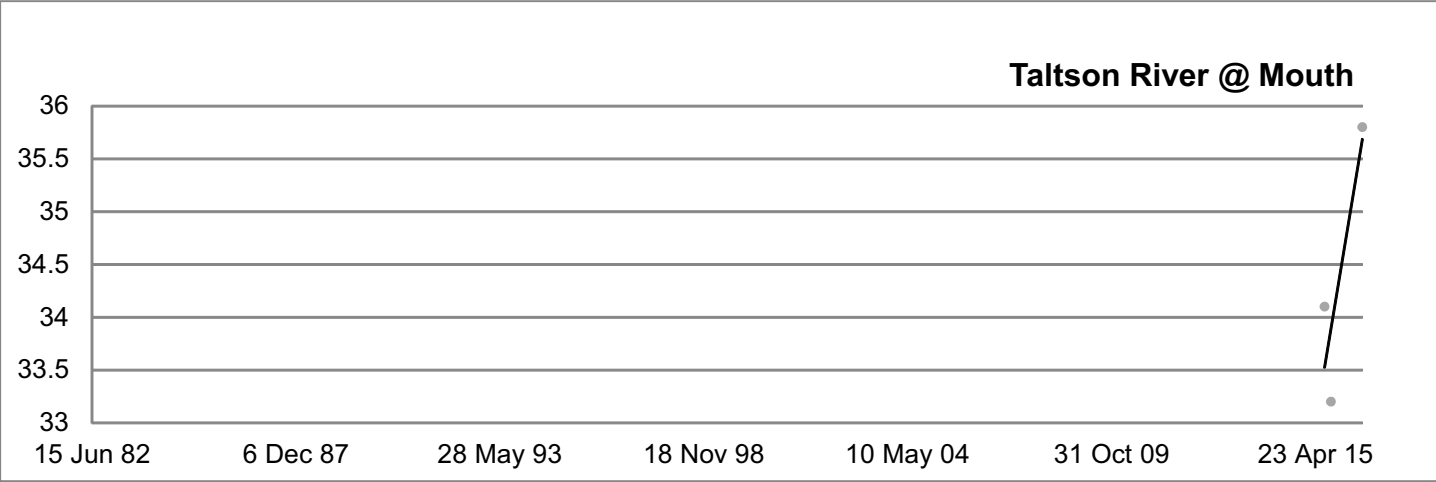
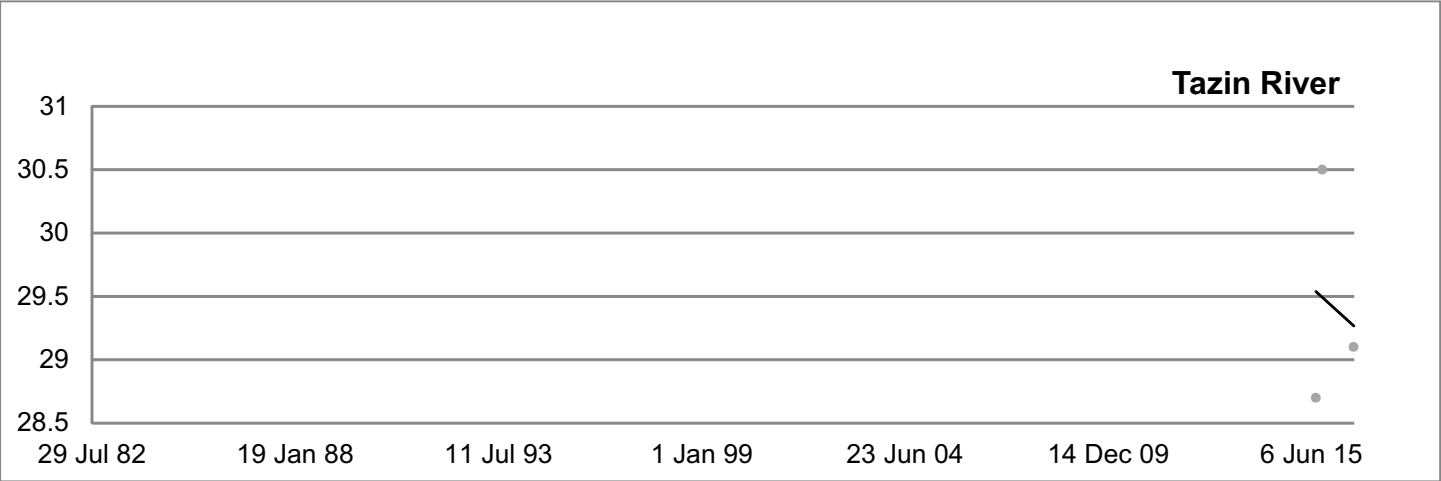
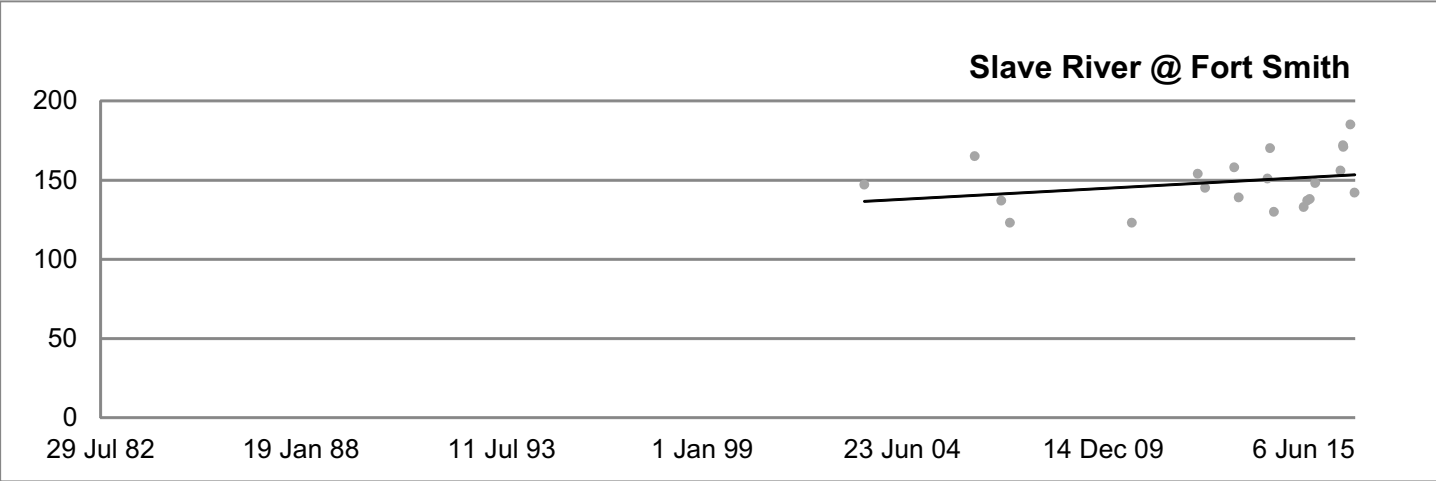
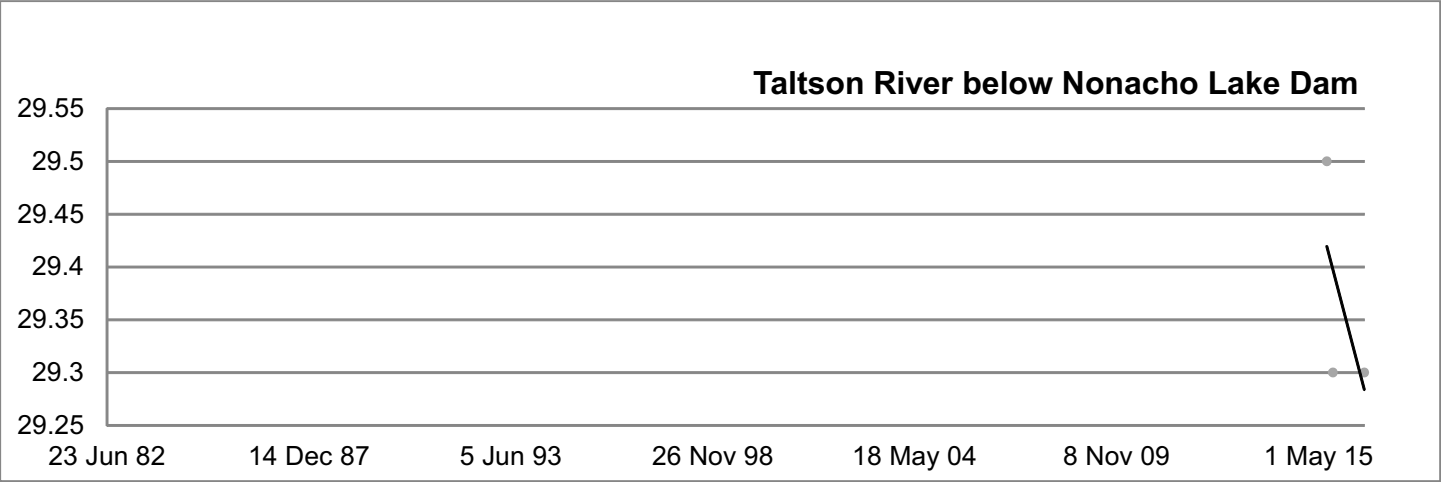
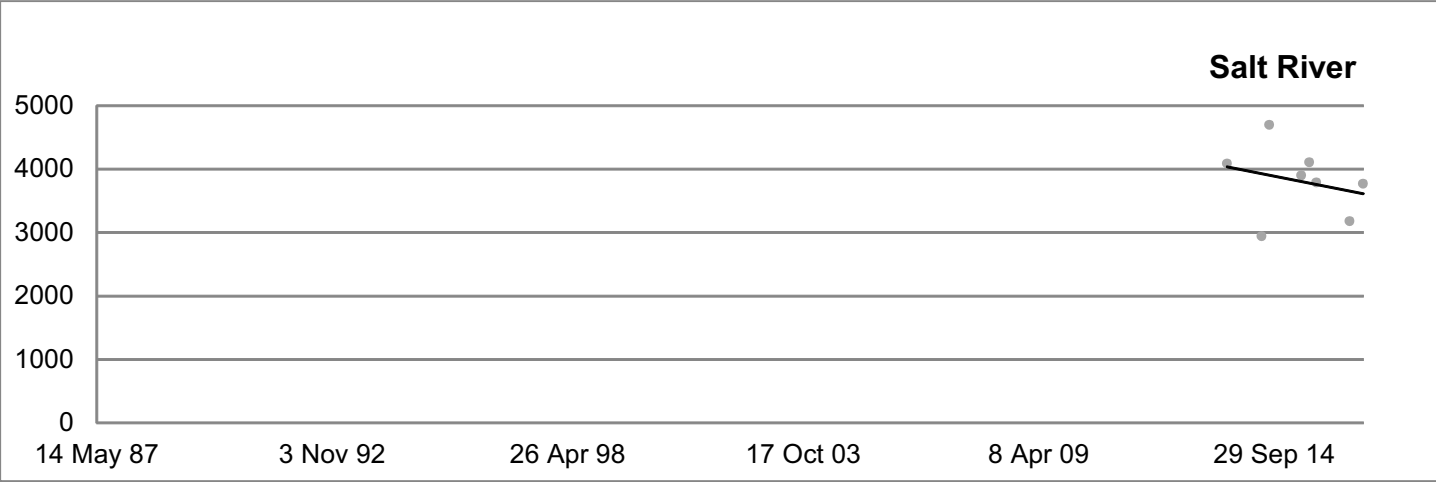
TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Strontium (µg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0	Figure B.24a
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Strontium (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO.

ENW.VENW03044-01

DWN

MEZ

CKD

SL

APVD

SW

REV

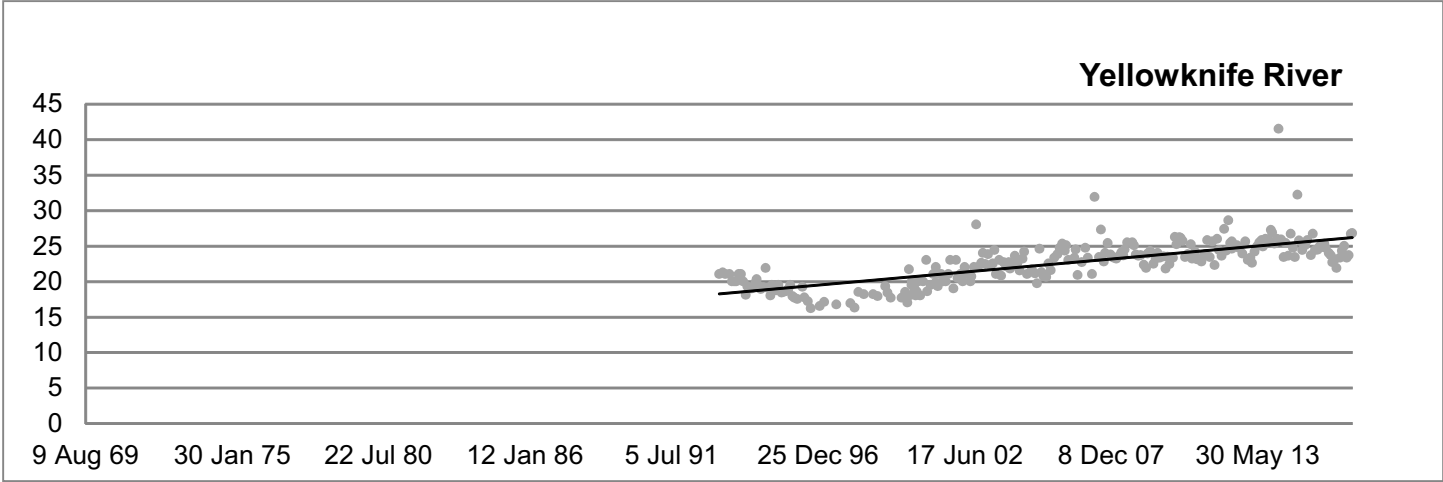
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DATE

March 30, 2017

Figure B.24b

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LEGEND

Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT

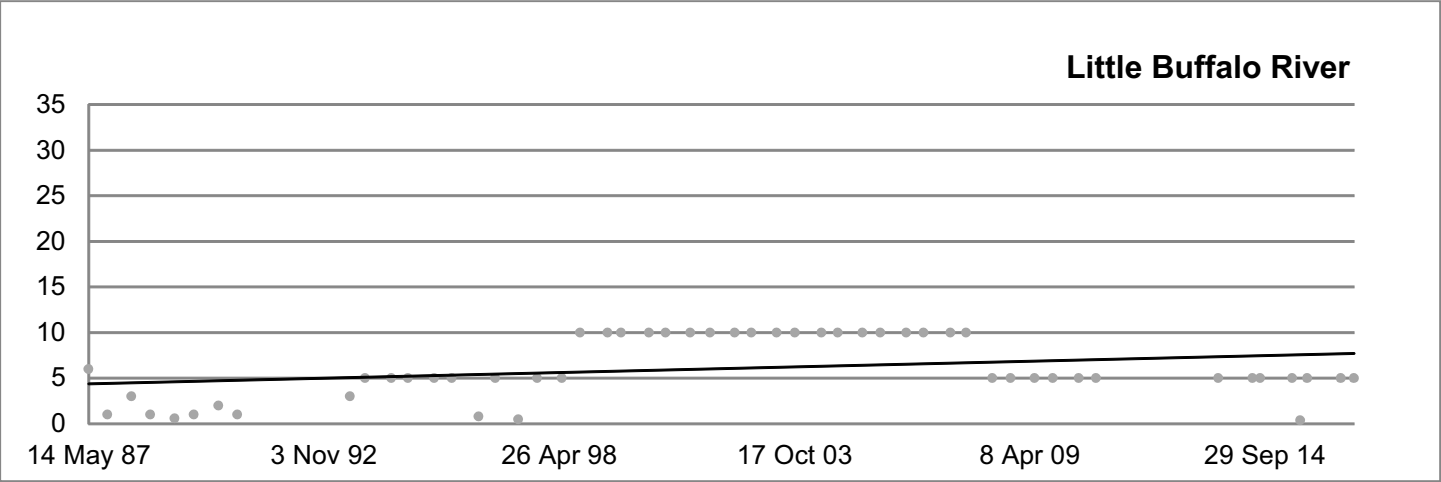
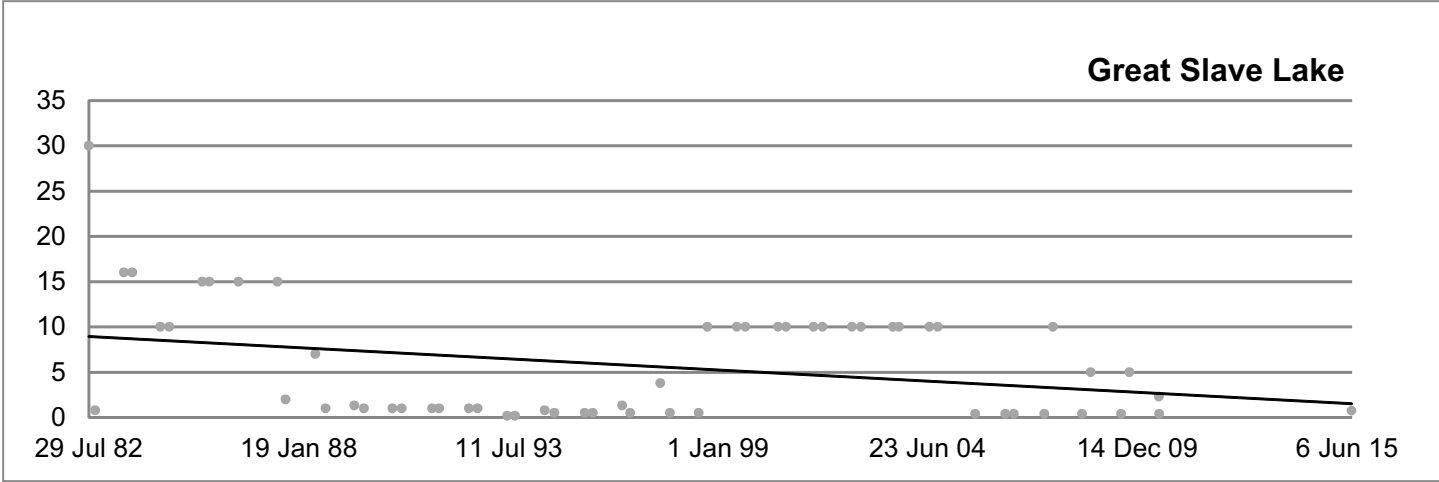
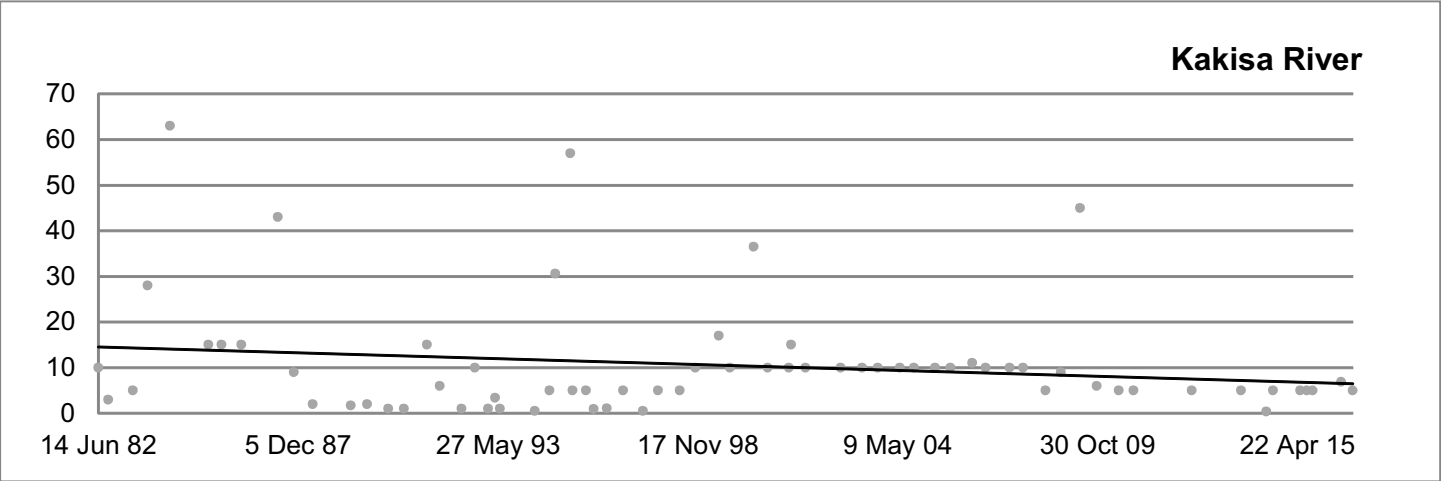
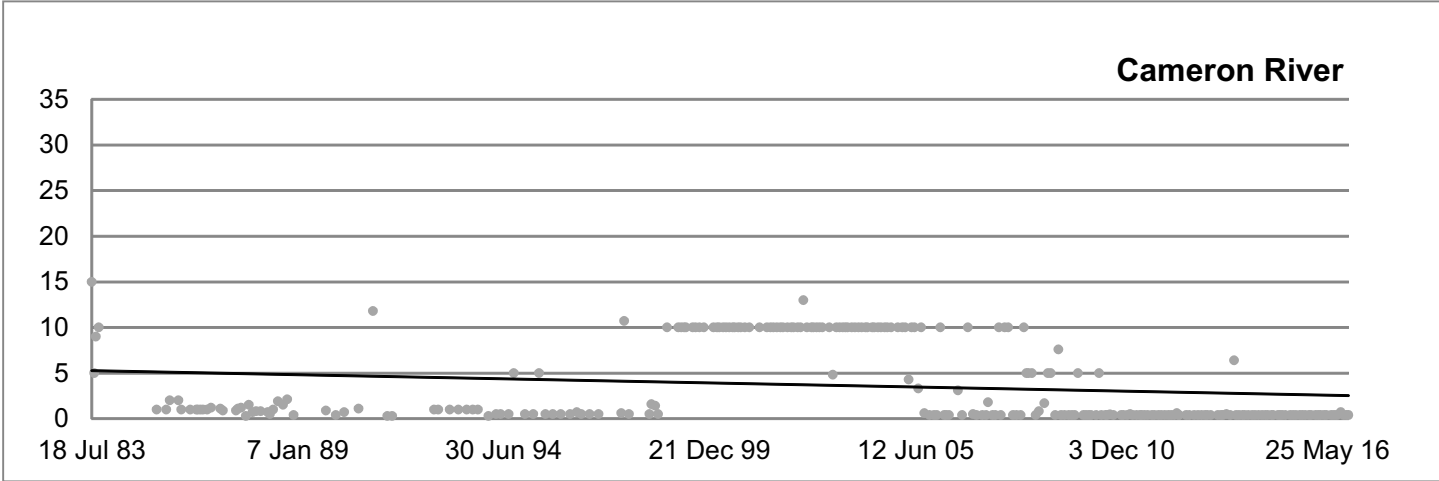
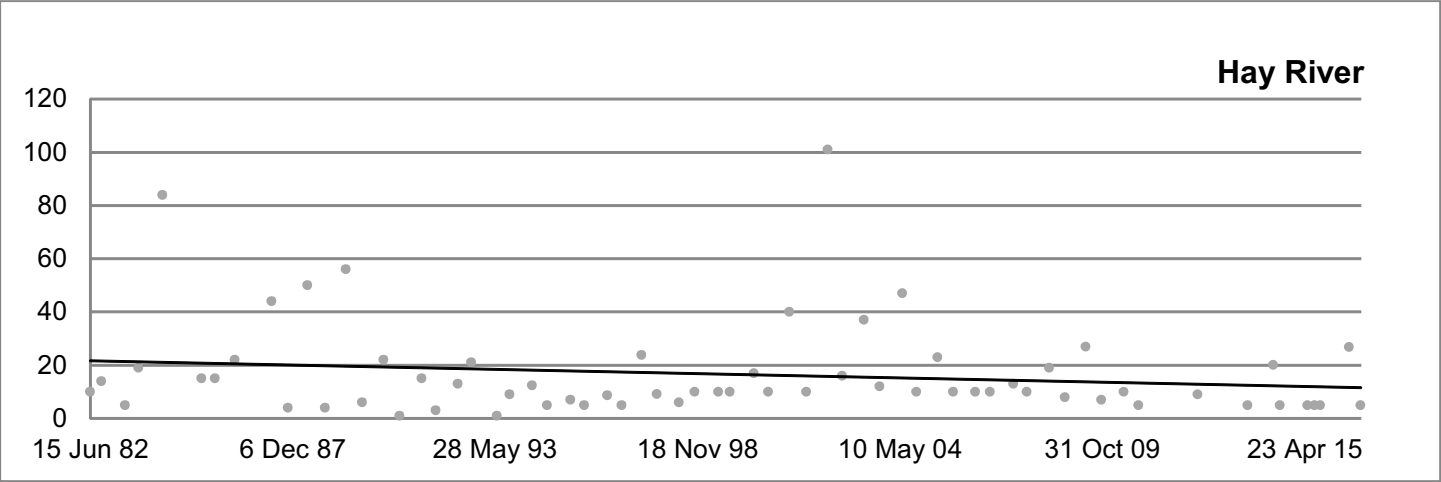
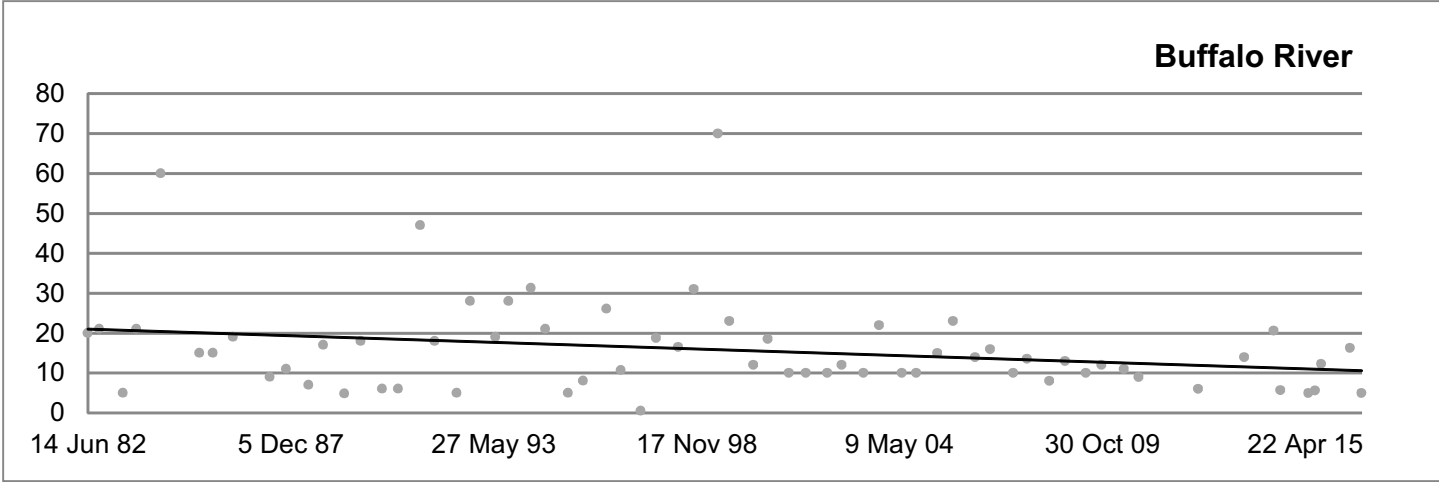


STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Strontium (µg/L)
Scatter Plot of all Water Quality Site Data

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0	Figure B.24c
OFFICE Tt-VANC	DATE March 30, 2017				

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LEGEND

— Linear Trendline

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STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

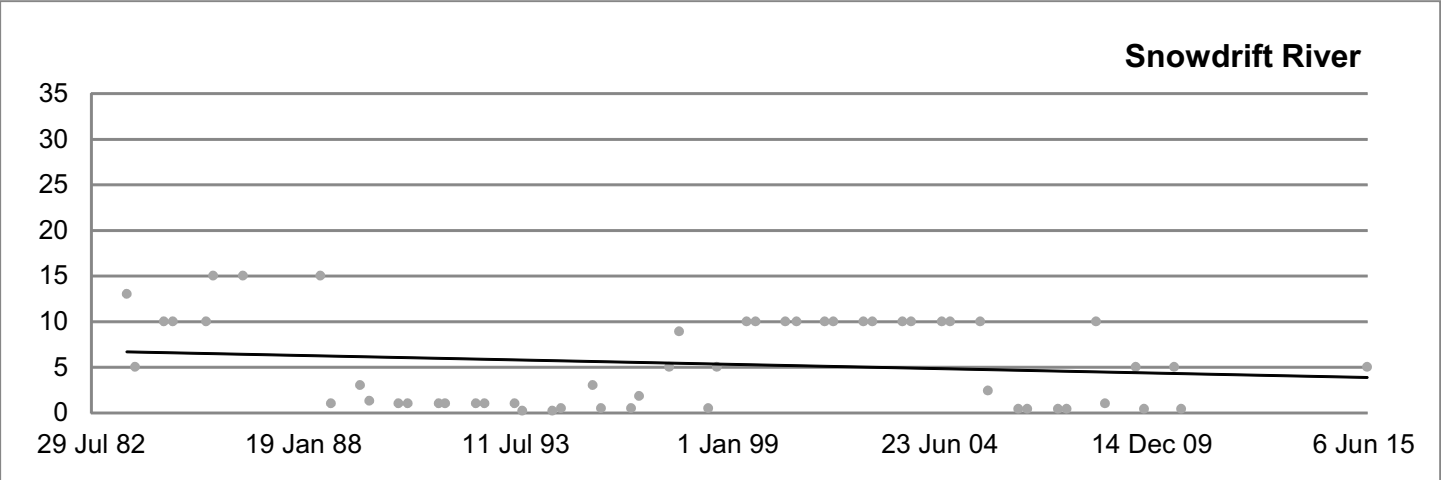
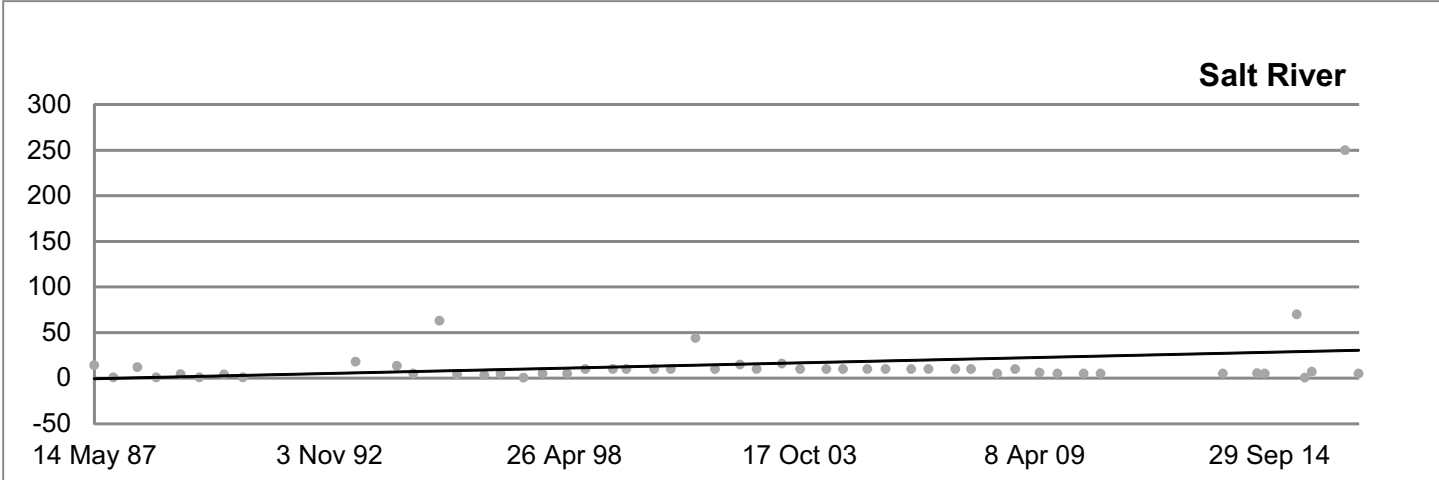
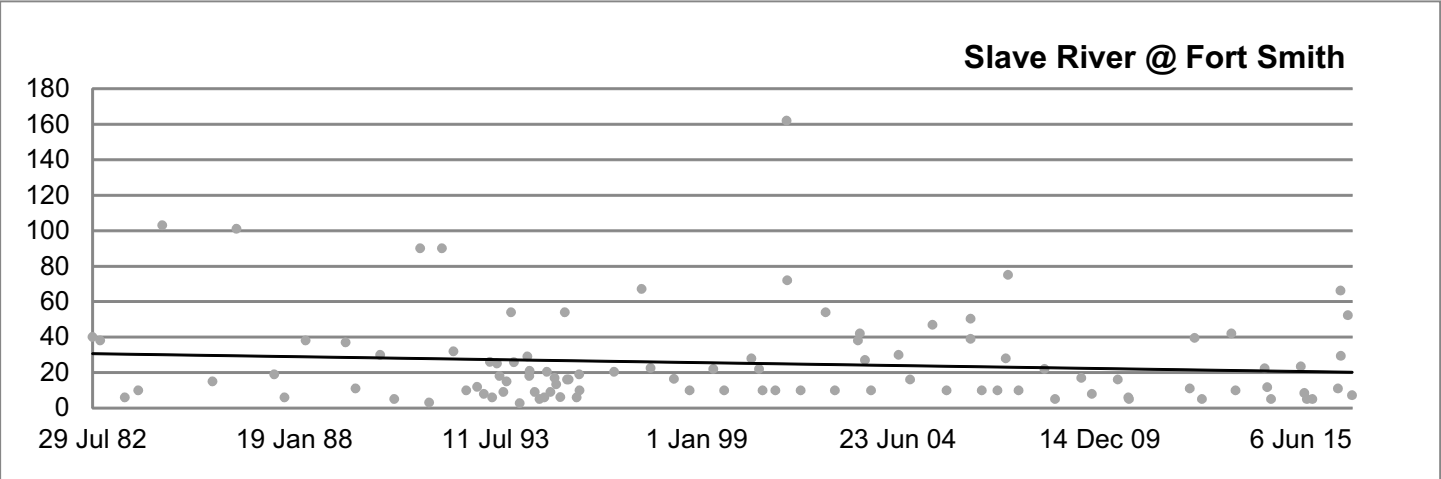
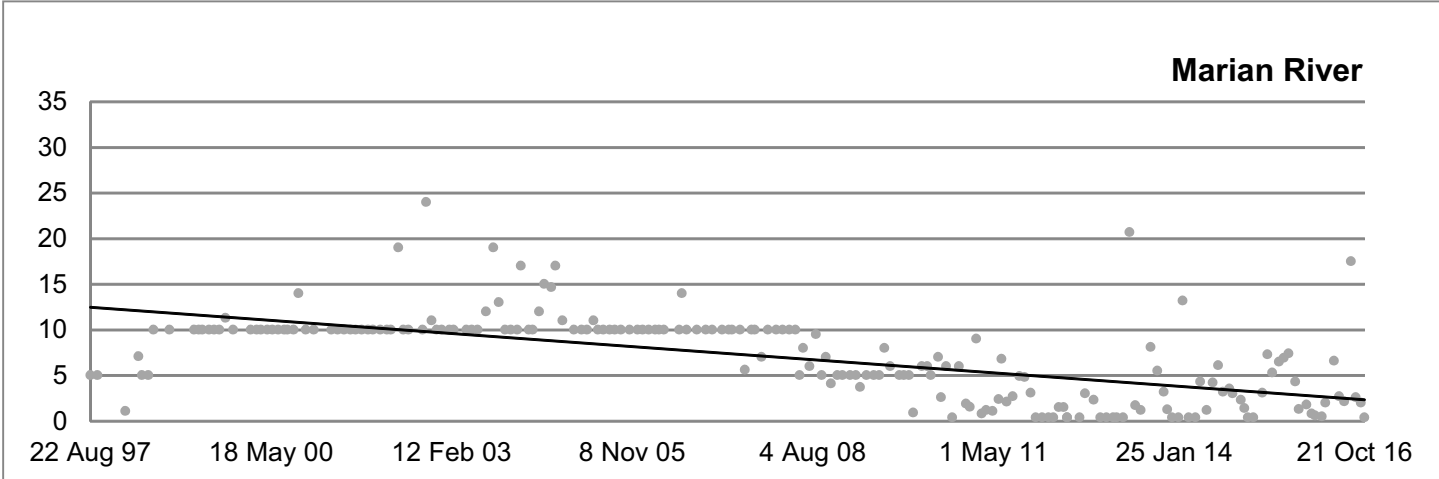
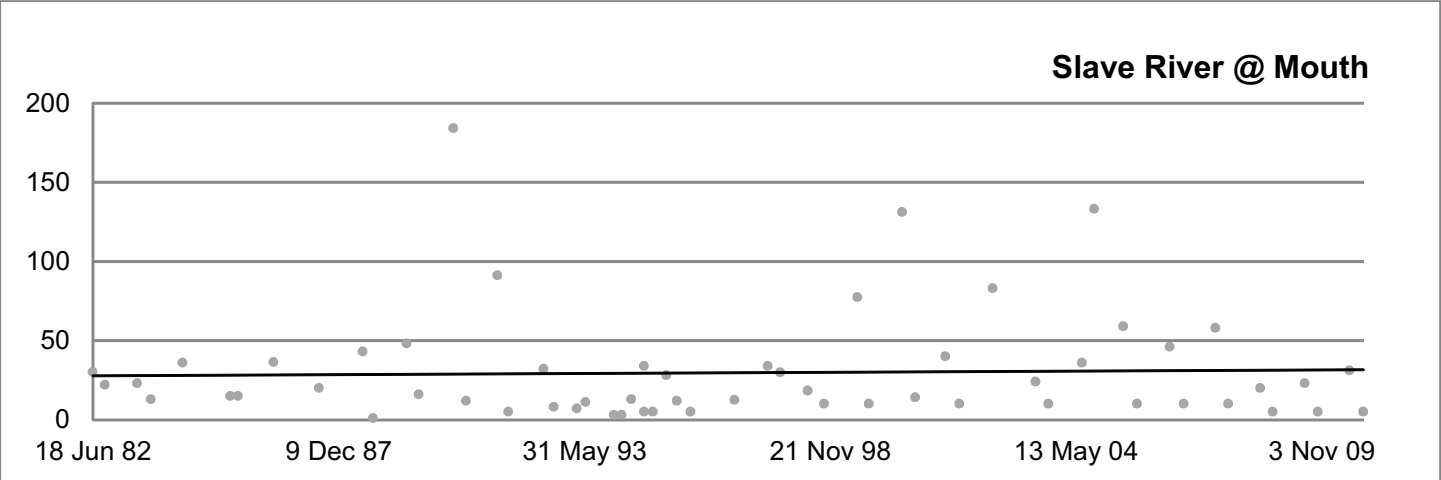
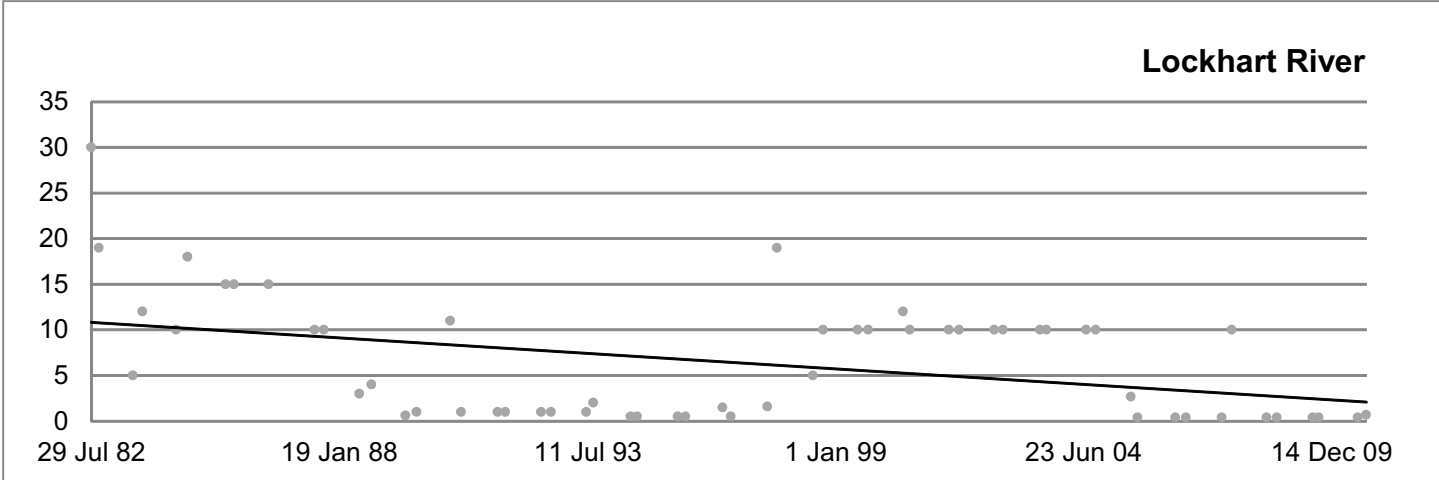
**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Zinc (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.25a

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



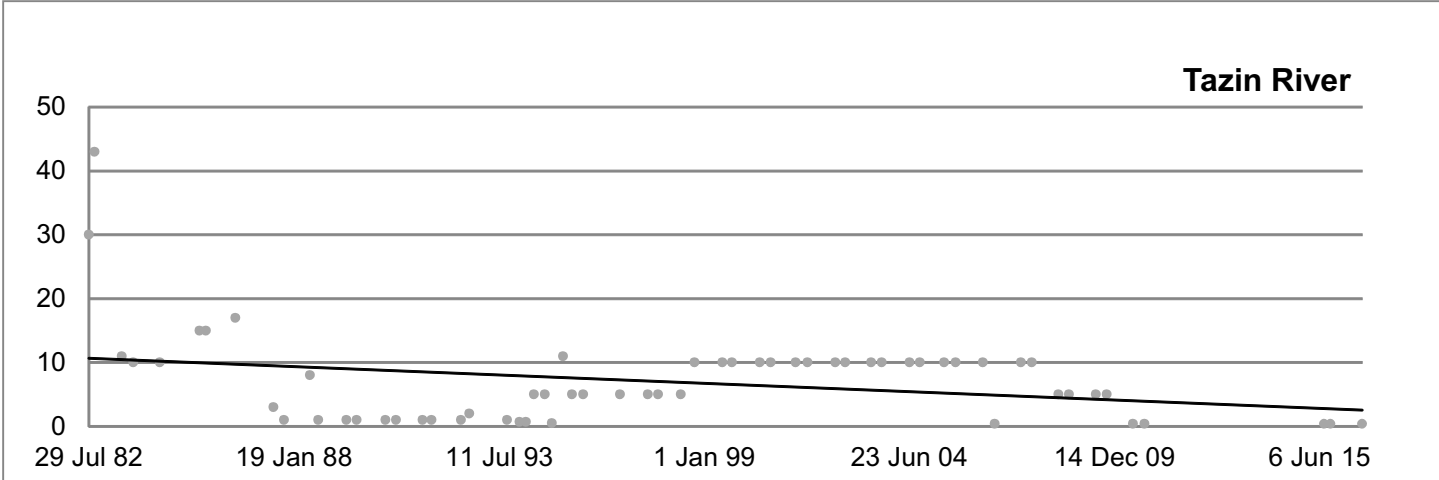
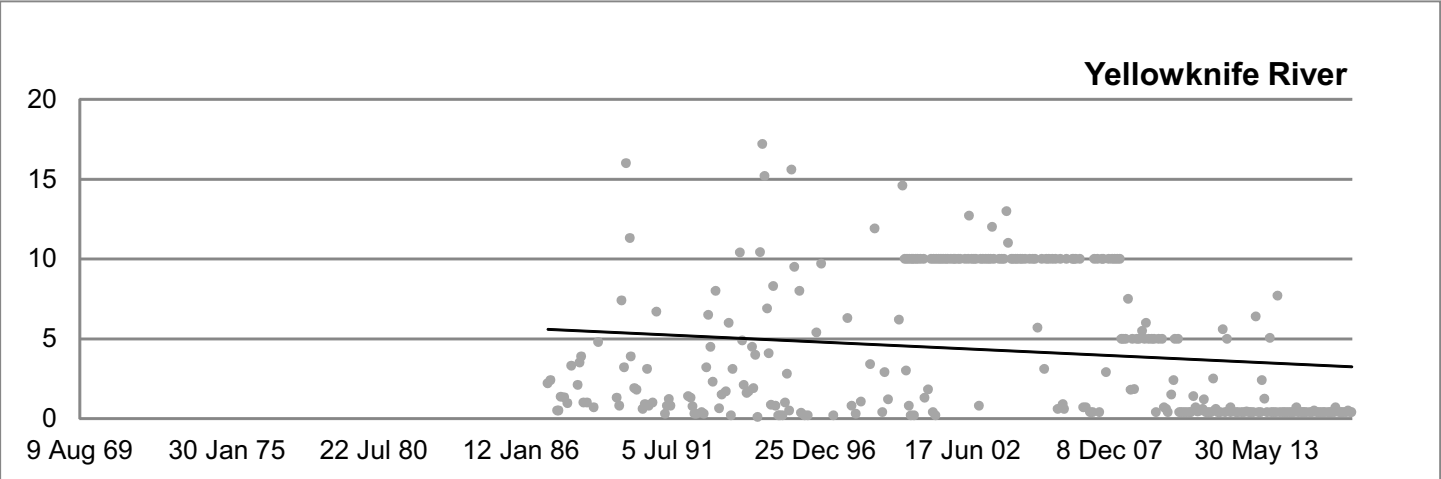
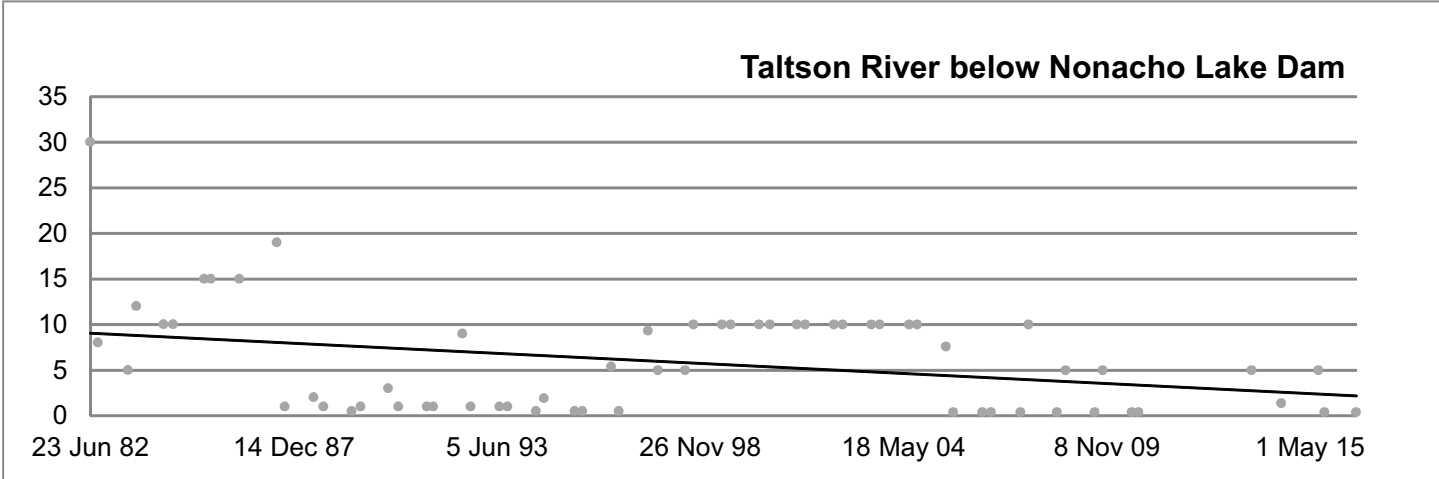
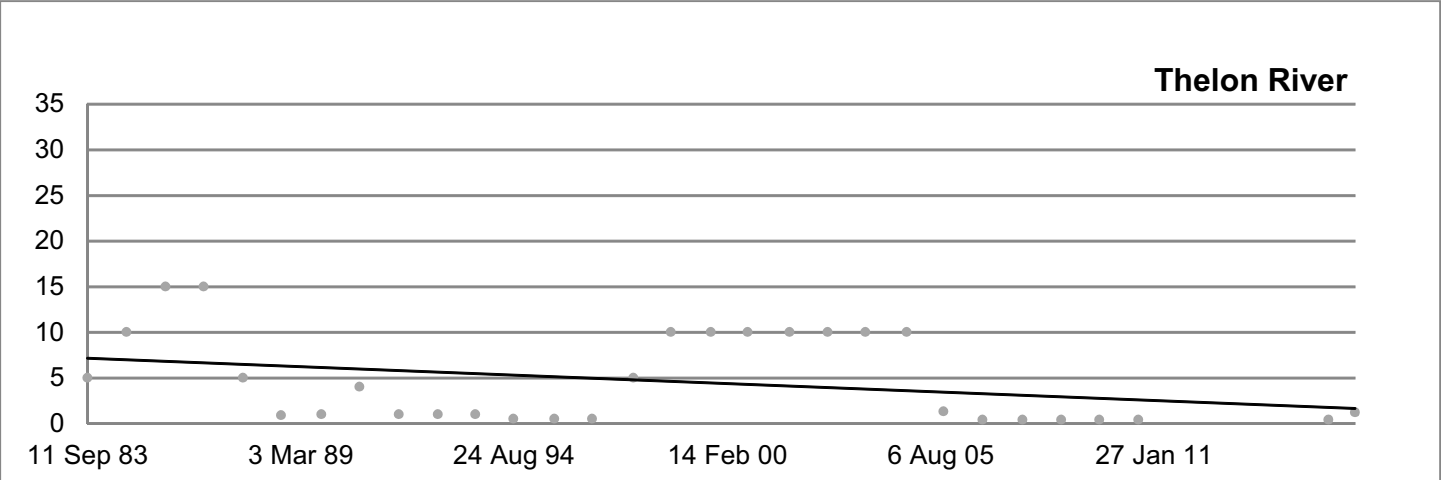
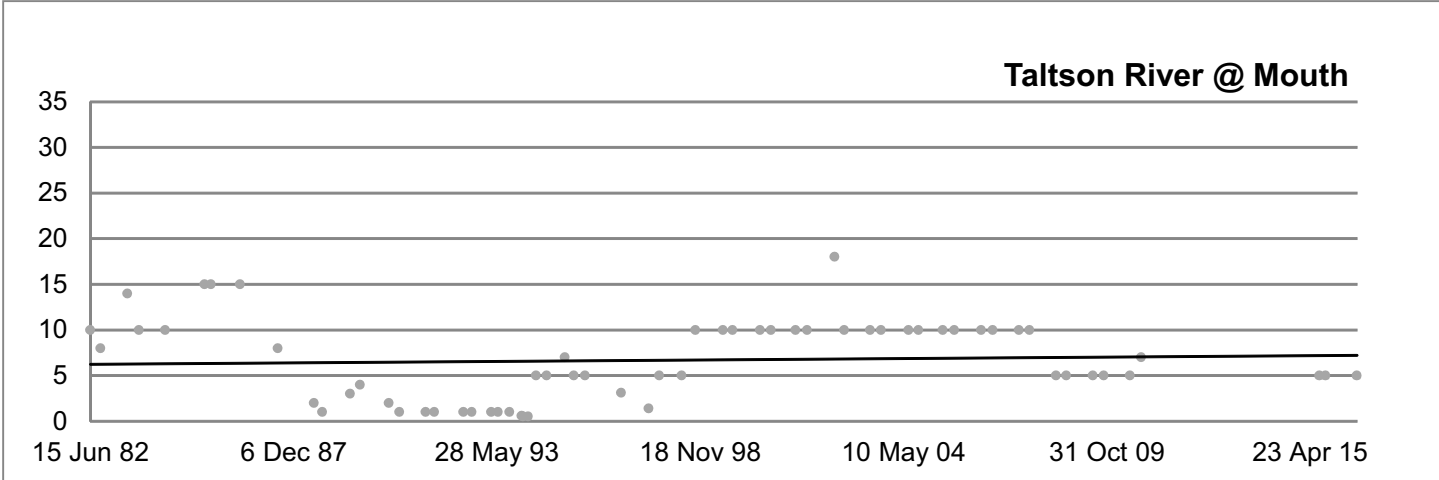
**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Zinc ($\mu\text{g/L}$)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure B.25b

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LEGEND

— Linear Trendline

NOTE: The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

**STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE**

**Zinc (µg/L)
Scatter Plot of all Water Quality Site Data**

PROJECT NO. ENW.VENW03044-01	DWN MEZ	CKD SL	APVD SW	REV 0	Figure B.25c
OFFICE Tt-VANC	DATE March 30, 2017				

APPENDIX C

SUMMARY STATISTICS – ANALYTES OF INTEREST AT ALL WATER QUALITY SITES (ANNUAL)

Table C.1: Summary Statistics - Analyses of Interest at each Water Quality Site (Annual)

Physical/Major Ions	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical/Major Ions																					
pH																					
Buffalo River @ Hwy 5 Bridge	66	66	0	0.00	6.9	7.49375	7.40	7.77	7.96	8.08	8.24	8.53625	9	7.91	0.0343	28.2566	0.31	0.46	0.28	1	1.52
Cameron River	268	268	0	0.00	6.77	7.038125	7.20	7.38	7.50	7.61	7.81	7.953125	8.11	7.80	0.0119	37.5000	0.23	0.34	0.2	0	0.00
Great Slave Lake @ Tatthelei Narrows	57	57	0	0.00	6.5	6.85	6.99	7.22	7.45	7.69	8.04	8.25	8	7.20	0.0475	23.2268	0.18	0.25	0.31	2	3.51
Hay River @ West Channel Bridge	66	66	0	0.00	7.2	7.4175	7.51	7.82	7.95	8.08	8.30	8.4775	8.81	7.90	0.0302	31.0000	0.27	0.40	0.25	0	0.00
Kakisa River @ Hwy 1 Bridge	69	69	0	0.00	6.95	7.695	7.67	8.00	8.13	8.23	8.48	8.575	8.58	8.10	0.0312	31.1538	0.23	0.35	0.26	0	0.00
Little Buffalo River @ Hwy 5 Bridge	52	52	0	0.00	7.4	7.61625	7.76	7.88	7.97	8.06	8.16	8.2825	8.23	8.00	0.0199	57.1429	0.18	0.27	0.14	0	0.00
Lockhart River @ mouth	57	57	0	0.00	6.2	6.44	6.39	6.80	6.92	7.04	7.39	7.4	7.82	6.90	1.0809	24.6429	0.24	0.36	0.28	6	10.53
Marian River	205	205	0	0.00	7.24	7.0425	7.41	7.56	7.73	7.91	8.07	8.4225	8.38	7.70	0.0259	36.6667	0.35	0.52	0.21	0	0.00
Salt River @ Hwy 5 Bridge	51	51	0	0.00	7.74	7.75	7.86	7.96	8.01	8.11	8.23	8.35	8.35	8.00	0.0182	61.5385	0.15	0.22	0.13	0	0.00
Slave River at Fort Smith	124	123	1	0.81	4.15	7.35625	7.56	7.80	8.01	8.10	8.18	8.54625	8.4	7.90	0.0357	19.7500	0.30	0.45	0.4	1	0.81
Slave River @ Mouth	58	58	0	0.00	7.44	7.5425	7.55	7.87	7.97	8.08	8.19	8.4025	8.2	7.90	0.0230	43.8889	0.22	0.32	0.18	0	0.00
Snowdrift River @ mouth of Stark Lake	56	56	0	0.00	6.5	6.51625	6.60	6.99	7.17	7.30	7.52	7.76625	7.76	7.10	0.0322	27.3077	0.31	0.47	0.26	1	1.79
Talton River @ mouth	62	62	0	0.00	6.6	6.26375	6.71	7.00	7.30	7.46	7.60	7.81375	7.71	7.20	0.0370	24.8276	0.49	0.73	0.29	0	0.00
Talton River below Nonacho Lake dam	62	62	0	0.00	6.5	6.41625	6.70	7.05	7.30	7.47	7.60	8.10625	7.77	7.20	0.0372	24.8276	0.42	0.63	0.29	2	3.23
Tazin River @ mouth	62	62	0	0.00	4.21	6.22125	6.56	6.89	7.24	7.34	7.54	8.01125	7.88	7.10	0.0608	14.7917	0.45	0.67	0.48	2	3.23
Thelon River @ Catling Lake	30	30	0	0.00	6.34	5.9625	6.27	6.47	6.68	6.80	7.02	7.3025	7.34	6.70	0.0676	18.1681	0.34	0.50	0.37	9	30.00
Yellowknife River	300	300	0	0.00	6.40667	NC	6.96	7.23	7.36	7.50	7.72	7.5	8.41	7.40	0.0144	29.6000	0.27	NC	0.25	2	0.67
Electrical Conductivity (EC)																					
Buffalo River @ Hwy 5 Bridge	66	66	0	0.00	126	142.25	142.80	193.75	221.50	253.25	312.45	342.5	340	224.92	5.8683	4.6858	59.50	89.25	48	0	0.00
Cameron River	269	269	0	0.00	53.8	46.4	59.75	68.45	75.80	83.15	92.55	105.2	97.15	78.00	2.9308	7.6000	14.70	22.05	10	0	0.00
Great Slave Lake @ Tatthelei Narrows	57	57	0	0.00	30	24.85	30.90	34.00	36.00	40.10	67.61	49.25	174	41.00	2.7985	1.9524	4.10	9.15	21	0	0.00
Hay River @ West Channel Bridge	66	66	0	0.00	188	78.875	206.75	267.50	328.50	393.25	510.65	581.875	541	332.00	10.1611	4.0000	125.75	188.63	83	0	0.00
Kakisa River @ Hwy 1 Bridge	69	69	0	0.00	178	180.85	189.00	228.60	245.00	290.40	302.50	308.25	401	248.00	4.0756	7.2531	31.80	47.85	34	0	0.00
Little Buffalo River @ Hwy 5 Bridge	52	52	0	0.00	482	-601.25	492.95	671.50	855.00	1520.00	3631.00	2792.75	4540	1238.00	127.3111	1.3486	848.50	1272.75	918	0	0.00
Lockhart River @ mouth	57	57	0	0.00	15.3	13.35	15.98	17.40	19.00	20.10	22.12	24.15	26	19.00	0.9547	9.5000	2.70	4.05	2	0	0.00
Marian River	206	206	0	0.00	48.6	47.125	57.50	133.00	165.00	180.55	220.00	276.125	333	158.00	7.7233	3.2917	57.25	85.88	48	0	0.00
Salt River @ Hwy 5 Bridge	50	50	0	0.00	1020	843.75	847.50	1045.00	1350.00	1714.00	2100.00	2193.50	3880	1092.50	59.7122	2.9020	5062.50	7593.75	3767	0	0.00
Slave River at Fort Smith	107	106	1	0.93	5	-100	5.80	20.00	40.00	100.00	430.00	220	1250	96.00	15.8293	0.5854	80.00	120.00	164	0	0.00
Slave River @ Mouth	57	57	0	0.00	7	-90	9.80	30.00	55.00	110.00	531.70	230	890	120.00	23.8463	0.6667	80.00	120.00	180	0	0.00
Snowdrift River @ mouth of Stark Lake	56	56	0	0.00	6.5	24.1	22.60	33.70	37.00	43.10	46.51	69.75	49	38.00	1.0295	4.3902	6.40	9.60	8.2	0	0.00
Talton River @ mouth	64	64	0	0.00	6.9	37	42.05	46.00	48.55	52.00	55.55	61	57	48.00	0.8162	7.3846	6.00	9.00	6.5	0	0.00
Talton River below Nonacho Lake dam	62	62	0	0.00	33	26.65	33.00	34.68	37.45	40.03	44.07	48.05	44.4	38.00	0.4176	11.5152	5.35	8.02	3.3	0	0.00
Tazin River @ mouth	57	57	0	0.00	23	23.60	23.20	25.00	25.00	25.00	25.00	25.00	25.00	25.00	0.0687	1.1500	0.687	1.00	4.0	0	0.00
Thelon River @ Catling Lake	30	30	0	0.00	10.7	8.9	10.76	11.30	11.95	12.90	13.85	15.3	21.7	12.00	0.3681	6.0000	1.60	2.40	2	0	0.00
Yellowknife River	302	302	0	0.00	29.8	NC	43.52	49.00	54.20	57.60	61.60	57.6	95.2	54.00	0.3887	7.9412	8.60	NC	6.8	0	0.00
Hardness as CaCO3																					
Buffalo River @ Hwy 5 Bridge	61	61	0	0.00	60	63	67.13	91.50	108.00	121.50	156.20	166.5	180	106.76	3.1277	4.4485	30.00	45.00	24	0	0.00
Cameron River	261	261	0	0.00	13.9	13.13121	22.89	27.52	32.50	37.11	42.50	51.49785	46.4	32.00	0.3858	5.1633	9.59	14.39	6.2	0	0.00
Great Slave Lake @ Tatthelei Narrows	54	54	0	0.00	108	7	1.19	13.00	14.20	17.00	28.26	23	76.3	16.00	1.3655	1.6000	4.00	6.00	10	0	0.00
Hay River @ West Channel Bridge	69	69	0	0.00	88.1	90	98.75	109.50	125.50	140.10	169.75	184.5	237	109.50	3.8000	59.50	129.75	189.63	89	0	0.00
Kakisa River @ Hwy 1 Bridge	64	64	0	0.00	87.8	90	100.25	114.00	122.00	130.00	163.25	154	238	126.00	2.6723	6.0000	16.00	24.00	21	0	0.00
Little Buffalo River @ Hwy 5 Bridge	47	47	0	0.00	217	-485.5	251.60	350.00	467.00	907.00	1626.26	1742.5	1750	668.00	62.1925	1.5681	557.00	835.50	426	0	0.00
Lockhart River @ mouth	54	54	0	0.00	4.3	2.1225	5.23	6.60	8.60	9.99	13.65	14.0625	14.7	8.30	1.0923	3.4583	2.99	4.46	2.4	0	0.00
Marian River	202	202	0	0.00	19.67136	18.875	27.82	65.05	81.38	92.65	117.00	142.4075	159	79.00	0.0236	2.9259	30.98	46.46	27	0	0.00
Salt River @ Hwy 5 Bridge	44	44	0	0.00	229	615.4875	717.25	123.00	1495.00	1639.68	1997.50	2254.188	2280	1418.00	55.8731	3.8221	409.68	614.51	371	0	0.00
Slave River at Fort Smith	118	117	1	0.85	1.5	62.125	76.65	88.00	97.00	105.25	122.20	131.125	152	97.00	1.6668	5.3889	17.25	25.88	18	0	0.00
Slave River @ Mouth	57	57	0	0.00	10	69.7	69.25	72.82	75.80	78.80	81.80	84.80	87.80	78.00	0.0236	5.4444	16.25	24.38	13	0	0.00
Snowdrift River @ mouth of Stark Lake	53	53	0	0.00	10	6.55	10.82	13.30	15.00	17.00	23.05	24.55	25.4	16.00	0						

Table C.1: Summary Statistics - Analyses of Interest at each Water Quality Site (Annual)

	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE	
Cadmium																						
Buffalo River @ Hwy 5 Bridge	65	11	54	83.08	0.05	-0.05	0.10	0.10	0.10	0.20	0.85	0.35	5	0.28	0.0796	0.4380	0.10	0.15	0.64	63	96.92	
Cameron River	230	12	218	94.78	0.02	-0.0125	NC	0.05	0.05	0.10	NC	0.1675	0.3	0.06	0.0065	1.2667	0.05	0.07	0.045	117	50.87	
Great Slave Lake @ Taltheihei Narrows	57	12	45	78.95	0.06	-0.1	0.05	0.10	0.10	0.30	1.40	0.6	10	0.40	0.1733	0.3077	0.20	0.30	1.3	48	84.21	
Hay River @ West Channel Bridge	65	20	45	69.23	0.05	-0.05	0.10	0.10	0.10	0.20	0.50	0.35	5	0.27	0.0763	0.4355	0.10	0.15	0.62	64	98.46	
Kakisa River @ Hwy 1 Bridge	68	5	63	92.65	0.05	-0.05	0.07	0.10	0.10	0.20	0.50	0.35	5	0.24	0.0728	0.4000	0.10	0.15	0.6	65	95.59	
Little Buffalo River @ Hwy 5 Bridge	52	2	50	96.15	0.05	-0.05	0.10	0.10	0.10	0.20	0.50	0.35	5	0.17	0.0169	1.2167	0.10	0.15	0.12	51	98.08	
Lockhart River @ mouth	57	8	49	86.06	0.05	-0.2	0.05	0.10	0.10	0.30	1.40	0.6	10	0.46	0.2153	0.3817	0.20	0.30	1.5	45	78.95	
Marian River	206	2	204	99.03	0.05	-0.025	0.05	0.05	0.10	0.10	0.30	0.175	0.4	0.12	0.0123	1.3333	0.05	0.08	0.09	136	66.02	
Salt River @ Hwy 5 Bridge	51	5	46	90.20	0.05	-0.2	0.10	0.10	0.10	0.30	3.00	0.6	5	0.44	0.1232	0.5000	0.20	0.30	0.88	50	98.04	
Slave River at Fort Smith	103	51	52	50.49	0.1	-0.2	0.10	0.10	0.20	0.30	1.16	0.6	10	0.40	0.1038	0.3636	0.20	0.30	1	103	100.00	
Slave River @ Mouth	59	36	23	38.98	0.1	-0.2	0.10	0.10	0.20	0.30	1.20	0.6	5	0.38	0.0953	0.5342	0.20	0.30	0.73	59	100.00	
Snowdrift River @ mouth of Stark Lake	55	11	44	80.00	0.05	-0.2	0.05	0.10	0.10	0.30	0.68	0.6	10	0.37	0.1680	0.2846	0.20	0.30	1.3	47	85.45	
Tatillon River @ mouth	63	10	53	84.13	0.1	-0.2	0.10	0.10	0.10	0.30	2.76	0.6	5	0.38	0.1021	0.4691	0.20	0.30	0.81	63	100.00	
Tatillon River below Nonacho Lake dam	62	9	53	85.48	0.05	-0.0875	0.05	0.10	0.10	0.23	0.50	0.4125	5	0.25	0.0803	0.3968	0.13	0.19	0.63	49	79.03	
Tazin River @ mouth	62	5	57	91.94	0.05	-0.2	0.05	0.10	0.10	0.30	1.43	0.6	10	0.40	0.1661	0.3077	0.20	0.30	1.3	56	90.32	
Thelon River @ Catling Lake	30	5	25	83.33	0.05	-0.2125	0.05	0.05	0.10	0.23	0.50	0.4875	0.5	0.17	0.0242	1.3077	0.18	0.26	0.13	21	70.00	
Yellowknife River	288	46	242	84.03	0.0003	NC	0.05	0.05	0.10	0.10	0.30	0.1	0.57	0.13	0.0061	1.3000	0.05	NC	0.1	201	69.79	
Chromium																						
Buffalo River @ Hwy 5 Bridge	63	50	13	20.63	0.3	-4	0.50	1.40	2.90	6.00	15.54	12.9	17.5	4.64	0.5913	0.9875	4.60	6.90	4.7	0	0.00	
Cameron River	228	82	146	64.04	0.1	-0.34375	0.10	0.20	0.20	0.56	1.94	1.0625	3	0.46	0.0544	0.9421	0.36	0.54	0.57	0	0.00	
Great Slave Lake @ Taltheihei Narrows	55	25	30	54.55	0	-2.25	0.09	0.30	0.66	2.00	5.60	4.55	6	1.30	0.2086	0.8667	1.70	2.55	1.5	0	0.00	
Hay River @ West Channel Bridge	63	48	15	23.81	0.2	-3.55	0.30	0.80	1.60	3.70	9.94	8.05	34.8	3.30	0.6422	0.6471	2.90	4.35	5.1	0	0.00	
Kakisa River @ Hwy 1 Bridge	65	39	26	40.00	0.1	-1.75	0.20	0.50	1.00	2.00	4.82	4.25	13.5	1.60	0.2588	0.7619	1.50	2.25	2.1	0	0.00	
Little Buffalo River @ Hwy 5 Bridge	52	28	24	46.15	0.1	-1.9375	0.17	0.43	1.00	2.00	3.25	3.095	7.1	1.40	0.1791	1.0769	1.58	2.36	1.3	0	0.00	
Lockhart River @ mouth	54	19	35	64.81	0.1	-0.9625	0.10	0.28	0.60	1.10	3.25	2.335	62	2.10	1.5179	0.2500	0.83	1.24	8.4	0	0.00	
Marian River	201	163	38	18.91	0.1	-2.75	0.36	0.70	2.00	3.00	6.23	4.65	9.9	2.30	0.2038	1.2778	2.30	3.45	1.8	0	0.00	
Salt River @ Hwy 5 Bridge	51	29	22	43.14	0.1	-3.25	0.15	0.50	1.20	3.00	7.00	2.75	16	2.30	0.3781	0.8519	2.50	3.75	2.7	0	0.00	
Slave River at Fort Smith	101	88	13	12.87	0.3	-9.75	0.91	1.95	4.00	9.75	26.80	21.45	86	8.10	1.1613	0.6750	7.80	11.70	12	0	0.00	
Slave River @ Mouth	57	52	5	8.77	0.2	-12.175	0.56	1.10	3.80	9.95	40.50	23.225	66	8.70	1.7528	0.6692	8.85	13.28	13	0	0.00	
Snowdrift River @ mouth of Stark Lake	53	22	30	56.69	0.07	-2.25	0.10	0.30	0.90	2.00	3.00	4.55	4	1.10	0.1000	1.0000	1.70	2.55	1.1	0	0.00	
Tatillon River @ mouth	61	30	31	50.82	0.1	-2.125	0.20	0.30	0.90	2.00	4.75	4.25	14.3	2.10	0.1459	1.0909	1.65	2.48	2.1	0	0.00	
Tatillon River below Nonacho Lake dam	60	20	40	66.67	0.1	-1.125	0.10	0.30	0.75	1.25	4.79	2.675	13	1.30	0.2685	0.6190	0.95	1.43	2.1	0	0.00	
Tazin River @ mouth	60	22	38	63.33	0.1	-2.25	0.10	0.30	0.65	2.00	3.00	4.55	14.4	1.30	0.2594	0.8500	1.70	2.55	2	0	0.00	
Thelon River @ Catling Lake	30	10	20	66.67	0.1	-1.0	0.10	0.10	0.10	0.50	1.00	1.97	3.4	0.17	0.0818	0.8182	0.80	1.20	1.1	0	0.00	
Yellowknife River	236	143	93	39.41	0.1	NC	0.10	0.20	0.30	0.59	3.00	0.591667	4	0.72	0.0061	0.7200	0.39	NC	1	0	0.00	
Cobalt																						
Buffalo River @ Hwy 5 Bridge	45	41	4	8.89	0.3	-0.5	0.30	0.55	1.00	1.55	2.47	3.95	3.5	1.17	0.1046	1.6730	1.00	1.50	0.7	0	0.00	
Cameron River	224	16	208	92.86	0.1	-0.4625	NC	0.10	0.05	0.48	NC	1.0375	1	0.15	0.0645	0.7895	0.38	0.56	0.19	0	0.00	
Great Slave Lake @ Taltheihei Narrows	36	2	34	94.44	0.03	-0.2375	0.03	0.10	0.10	0.33	1.00	0.6625	1	0.30	0.0635	0.7895	0.23	0.34	0.38	0	0.00	
Hay River @ West Channel Bridge	45	40	5	11.11	0.1	-1.275	0.10	0.30	0.70	1.35	5.46	2.925	7.3	1.20	0.2201	0.8000	1.05	1.58	1.5	0	0.00	
Kakisa River @ Hwy 1 Bridge	48	31	18	37.50	0.1	-1.025	0.10	0.10	0.20	0.85	1.00	1.975	1.9	0.42	0.0597	1.0000	0.75	1.13	0.42	0	0.00	
Little Buffalo River @ Hwy 5 Bridge	44	28	16	36.36	0.1	-0.25	0.10	0.20	0.25	0.50	1.00	0.95	1	0.41	0.0513	1.2059	0.30	0.45	0.34	0	0.00	
Lockhart River @ mouth	36	6	30	83.33	0.03	-1.1	0.09	0.10	0.10	0.90	1.00	2.1	1	0.35	1.1119	0.8974	0.80	1.20	0.39	0	0.00	
Marian River	204	134	70	34.58	0	-1.25	0.10	0.10	0.40	1.00	1.15	2.35	2.9	0.53	0.0536	1.1778	0.90	1.35	0.45	0	0.00	
Salt River @ Hwy 5 Bridge	43	28	15	34.88	0.1	-1	0.10	0.20	0.80	1.00	4.34	2.2	10	0.98	0.2459	0.6125	0.80	1.20	1.6	0	0.00	
Slave River at Fort Smith	77	73	4	5.19	0.1	-2.45	0.29	0.70	1.30	2.80	5.85	5.95	16	2.10	0.2613	0.9130	2.10	3.15	2.3	0	0.00	
Slave River @ Mouth	40	38	2	5.00	0.1	-3.5	0.11	0.40	1.35	3.00	9.83	6.9	10.8	2.80	0.4000	0.9200	2.80	3.80	5	0	0.00	
Snowdrift River @ mouth of Stark Lake	36	6	30	83.33	0.03	-1.1	0.02	0.03	0.10	0.10	0.30	1.00	0.6	1	0.31	0.0571	0.8100	0.70	1.00	0.30	0.38	0.00
Tatillon River @ mouth	44	7	37	84.09	0.1	-0.9875	0.10	0.10	0.10	0.83	1.00	1.9125	1	0.33	0.0590	0.8462	0.73	1.09	0.39	0	0.00	
Tatillon River below Nonacho Lake dam	41	3	38	92.68	0.1	-0.725	0.10	0.10	0.10	0.65	1.00	1.475	1	0.33	0.0607	0.8462	0.55	0.83	0.39	0	0.00	
Tazin River @ mouth	42	1	41	97.62	0.1	-0.6125	0.10	0.10	0.10</													

APPENDIX D

SUMMARY STATISTICS – ALL WATER QUALITY SITES, ALL PARAMETERS (ANNUAL)

Table D.2: Summary Statistics - Cameron River, Annual (All Parameters)

Chem_Group		n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical/Major Ions	Cyanide Total	112	112	66	58.93	0.001	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.0002	1.2381	0.00	0.00	0.0021	0	0
	Temperature	54	54	0	0.00	-0.27	-20.40	-0.12	3.08	11.67	18.74	21.30	42.22	21.58	11.00	1.0513	1.4286	15.66	23.48	7.7000	0	0
	Chlorophyll A	15	15	2	13.33	0.001	-1.31	NC	1.00	1.83	2.54	NC	4.85	7	2.10	0.4333	1.2353	1.54	2.31	1.7000	0	0
	Bicarbonate as CaCO3	11	11	0	0.00	29.9	25.35	NC	30.90	32.40	34.60	NC	40.15	35.6	33.00	0.6185	15.7143	3.70	5.55	2.1000	0	0
	Silica	51	51	0	0.00	0.31	0.09	0.36	0.46	0.57	0.70	0.94	1.07	1.12	0.60	0.0258	3.3333	0.24	0.36	0.1800	0	0
	pH	268	268	0	0.00	6.77	7.04	7.20	7.38	7.50	7.61	7.81	7.95	8.11	7.50	0.0119	37.5000	0.23	0.34	0.2000	0	0
	Electrical Conductivity (EC)	269	269	0	0.00	53.8	46.03	59.75	68.30	75.80	83.15	92.55	105.43	97.15	76.00	0.6108	7.6000	14.85	22.28	10.0000	0	0
	Total Suspended Solids (TSS)	263	263	201	76.43	1	3.00	1.00	3.00	3.00	3.00	4.24	3.00	8	3.10	0.0580	3.2979	0.00	0.00	0.9400	0	0
	Hardness as CaCO3	261	261	0	0.00	13.9	13.04	22.89	27.48	32.50	37.11	42.50	51.55	46.4	32.00	0.3858	5.1613	9.63	14.44	6.2000	0	0
	Alkalinity (total as CaCO3)	269	269	0	0.00	18.4	15.20	21.05	25.10	29.10	31.70	35.65	41.60	37.6	29.00	0.2620	6.7442	6.60	9.90	4.3000	0	0
	Calcium	270	270	0	0.00	3.1	3.42	6.14	7.37	8.80	10.00	11.40	13.95	13.2	8.70	0.1065	5.1176	2.63	3.95	1.7000	0	0
	Magnesium	269	269	0	0.00	0.7	1.15	1.85	2.20	2.54	2.90	3.33	3.95	4.1	2.60	0.0302	5.2000	0.70	1.05	0.5000	0	0
	Potassium	267	267	0	0.00	0.76	0.68	0.90	1.05	1.17	1.30	1.40	1.68	1.5	1.20	0.0100	7.5000	0.25	0.38	0.1600	0	0
	Sodium	268	268	0	0.00	1.4	1.13	1.70	1.95	2.30	2.50	3.00	3.33	3.1	2.30	0.0235	6.0526	0.55	0.83	0.3800	0	0
	Chloride	262	262	0	0.00	1.19	0.84	1.69	2.02	2.40	2.80	3.20	3.98	4.9	2.40	0.0317	4.7059	0.79	1.18	0.5100	0	0
	Fluoride	96	96	45	46.88	0.05	0.05	0.06	0.08	0.10	0.10	0.10	0.13	0.2	0.09	0.0021	4.4762	0.02	0.03	0.0210	3	3.13
	Sulphate	266	266	12	4.51	2.1	2.50	3.00	4.00	4.00	5.00	6.00	6.50	12	4.40	0.0747	3.6667	1.00	1.50	1.2000	0	0
	Colour	81	81	11	13.58	5	-2.50	5.00	5.00	5.00	10.00	20.00	17.50	20	8.30	0.4929	1.8864	5.00	7.50	4.4000	0	0
	Dissolved Organic Carbon (DOC) (Filtered)	219	219	0	0.00	5.3	5.05	5.90	6.40	6.80	7.30	8.21	8.65	9.6	6.90	0.0470	9.8571	0.90	1.35	0.7000	0	0
	Total Organic Carbon (TOC)	174	174	0	0.00	5.8	5.51	6.10	6.80	7.20	7.66	8.60	8.95	10.8	7.30	0.0594	9.3590	0.86	1.29	0.7800	0	0
Total Solids (Filtered)	227	227	7	3.08	10	26.00	24.40	44.00	50.00	56.00	72.00	74.00	83	49.00	0.8478	3.7692	12.00	18.00	13.0000	0	0	
Turbidity	264	264	0	0.00	0.175	-0.25	0.27	0.40	0.60	0.84	1.68	1.49	4.05	0.71	0.0300	1.4490	0.44	0.65	0.4900	0	0	
Nutrients	Ammonia as N	227	227	115	50.66	0.002	-0.01	0.01	0.01	0.01	0.01	0.03	0.03	0.047	0.01	0.0006	1.2941	0.01	0.01	0.0085	30	13.22
	Nitrate (as NO3-N)	93	93	44	47.31	0.005	-0.05	0.01	0.01	0.02	0.05	0.10	0.11	0.17	0.04	0.0037	1.0000	0.04	0.06	0.0360	0	0
	Nitrite (as NO2-N)	86	86	78	90.70	0.001	0.01	0.00	0.01	0.01	0.01	0.05	0.01	0.05	0.01	0.0012	1.0000	0.00	0.00	0.0110	0	0
	Nitrate and Nitrite (as N) (mg/L)	209	209	94	44.98	0.0051	-0.07	0.01	0.01	0.02	0.06	0.13	0.14	0.2	0.04	0.0029	0.9286	0.05	0.08	0.0420	0	0
	Nitrogen (Total)	19	19	0	0.00	0.312	0.31	0.31	0.34	0.35	0.36	0.41	0.39	0.405	0.35	0.0046	17.5000	0.02	0.03	0.0200	0	0
	Nitrogen (Total) (Filtered)	19	19	0	0.00	0.314	0.29	0.31	0.33	0.35	0.36	0.39	0.40	0.391	0.35	0.0048	16.6667	0.03	0.04	0.0210	0	0
	Orthophosphate (as P)	105	105	75	71.43	0.001	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.0002	1.0435	0.00	0.00	0.0023	0	0
	Phosphorus	231	231	69	25.75	2	2.50	2.24	7.00	10.00	10.00	44.00	14.50	132	13.00	0.9529	0.9286	3.00	4.50	14.0000	214	92.64
	Phosphorus (filtered) (Filtered)	30	30	31	93.94	0.001	-0.01	0.00	0.00	0.01	0.01	0.08	0.02	0.098	0.02	0.0047	0.6538	0.01	0.01	0.0260	0	0
	Biochemical Oxygen Demand (BOD)	12	12	67	29.00	2	2.00	NC	2.00	2.00	2.00	NC	2.00	5	2.30	0.2500	2.6437	0.00	0.00	0.8700	0	0
Demand Parameters	Total Coliforms	175	175	11	36.67	1	1.00	1.00	1.00	1.00	1.00	3.00	1.00	488	4.10	2.7829	0.1108	0.00	0.00	37.0000	0	0
	E. Coli	172	172	11	91.67	1	1.00	1.00	1.00	1.00	1.00	6.30	1.00	12.2	1.60	0.1311	0.9412	0.00	0.00	1.7000	0	0
Metals	Aluminum (Filtered)	33	33	136	77.71	0.6	-5.18	0.60	0.98	1.70	5.08	11.69	11.23	13.3	3.20	0.5526	1.0000	4.10	6.15	3.2000	0	0
	Aluminum Total	206	206	129	75.00	2.1	-28.25	4.04	6.70	12.85	30.00	30.00	64.95	154	18.00	1.0270	1.2000	23.30	34.95	15.0000	0	0
	Antimony	200	200	3	9.09	0.1	-0.50	0.10	0.10	0.13	0.50	1.20	1.10	2.45	0.38	0.0312	0.8636	0.40	0.60	0.4400	0	0
	Antimony (Filtered)	33	33	68	33.01	0.1	0.10	0.10	0.10	0.10	0.10	0.30	0.10	0.3	0.12	0.0088	2.3529	0.00	0.00	0.0510	0	0
	Arsenic	230	230	104	52.00	0	-0.09	0.20	0.40	0.40	0.73	1.00	1.21	2	0.56	0.0228	1.6000	0.33	0.49	0.3500	0	0
	Arsenic (Filtered)	33	33	30	90.91	0.2	0.21	0.20	0.33	0.40	0.40	0.40	0.51	0.4	0.37	0.0112	5.7813	0.08	0.11	0.0640	0	0
	Barium	206	206	71	30.87	1	2.15	3.34	4.10	4.90	5.40	6.00	7.35	8.8	4.80	0.0610	5.5172	1.30	1.95	0.8700	0	0
	Barium (Filtered)	33	33	1	3.03	3.1	1.90	3.45	4.00	4.80	5.40	6.00	7.50	6	4.80	0.1412	5.9259	1.40	2.10	0.8100	0	0
	Beryllium	213	213	1	0.49	0.02	0.10	0.10	0.10	0.10	0.10	2.00	0.10	2	0.43	0.0494	0.5972	0.00	0.00	0.7200	0	0
	Beryllium (Filtered)	33	33	0	0.00	0.1	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.1	0.10	0.0000	NC	0.00	0.00	0.0000	0	0
	Bismuth	55	55	208	97.65	0.1	-1.40	0.10	0.10	0.40	1.10	10.00	2.60	10	1.80	0.4160	0.5806	1.00	1.50	3.1000	0	0
	Bismuth (Filtered)	8	8	33	100.00	0.2	0.20	NC	0.20	0.20	0.20	NC	0.20	0.3	0.21	0.0125	6.0000	0.00	0.00	0.0350	0	0
	Boron - soluble	8	8	50	90.91	6.4	6.45	NC	6.90	7.10	7.20	NC	7.65	9.7	7.30	0.3533	7.3000	0.30	0.45	1.0000	0	0
	Boron - soluble (Filtered)	8	8	7	87.50	6.6	5.83	NC	6.65	6.90	7.20	NC	8.03	9.7	7.20	0.3615	7.2000	0.55	0.83	1.0000	0	0
	Cadmium	230	230	0	0.00	0.02	-0.03	0.05	0.05	0.05	0.10	0.30	0.18	0.3	0.11	0.0059	1.2360	0.05	0.08	0.0890	117	50.87
	Cadmium (Filtered)	33	33	0	0.00	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.0000	NC	0.00	0.00	0.0000	0	0
	Cesium	213	213	218	94.78	0.008	0.10	0.10	0.10	0.10	0.10	0.40	0.10	0.4	0.15	0.0078	1.3636	0.00	0.00	0.1100	0	0
	Cesium (Filtered)	33	33	33	100.00	0.1	0.10	0.10	0.10	0.10	0.10	0.10	0.10.									

Table D.3: Summary Statistics - Great Slave Lake @ Taltheilei Narrows, Annual (All Parameters)

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE	
Physical/Major Ions	Chlorophyll A	1	1	0	0.00	83.35	NC	NC	NC	83.35	NC	NC	NC	83.35	83.35	NC	NC	NC	NC	0.0000	0	0	
	Bicarbonate as CaCO3	1	1	0	0.00	14.65	NC	NC	NC	14.65	NC	NC	NC	14.65	14.65	NC	NC	NC	NC	0.0000	0	0	
	Nitrogen (Organic) (Filtered)	1	1	0	0.00	0.166	NC	NC	NC	0.17	NC	NC	NC	0.166	0.17	NC	NC	NC	NC	0.0000	0	0	
	Silica	1	1	0	0.00	0.5885	NC	NC	NC	0.59	NC	NC	NC	0.5885	0.59	NC	NC	NC	NC	0.0000	0	0	
	Total Organic Carbon(TOC)	54	54	0	0.00	-0.005	0.01	-0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.00	0.0008	0.7742	0.00	0.00	0.0061	0	0	
	pH	57	57	0	0.00	6.5	6.36	6.59	7.00	7.22	7.43	7.71	8.08	8	7.21	0.0415	23.2258	0.43	0.65	0.3108	0	0	
	Electrical Conductivity (EC)	57	57	0	0.00	30	24.85	30.90	34.00	36.00	40.10	67.61	49.25	174	41.39	2.7985	1.9524	6.10	9.15	20.9418	0	0	
	Total Suspended Solids (TSS)	30	6	24	80.00	-3	-2.50	-3.00	2.00	3.00	5.00	7.25	9.50	10	3.14	0.4424	1.2917	3.00	4.50	2.3822	0	0	
	Hardness as CaCO3	54	54	0	0.00	5.2	6.63	10.51	13.00	14.35	17.25	31.05	23.63	76.3	17.07	1.3518	1.7172	4.25	6.38	9.8409	0	0	
	Alkalinity (total as CaCO3)	57	57	0	0.00	9.5	8.70	10.45	11.55	12.50	13.45	22.85	16.30	59.6	14.15	0.9531	1.9444	1.90	2.85	7.1322	0	0	
	Calcium	57	56	1	1.75	0.1	1.30	2.91	3.40	3.86	4.80	13.86	6.90	177	7.50	3.0496	0.3261	1.40	2.10	22.8211	0	0	
	Magnesium	57	57	0	0.00	0.7	0.83	1.01	1.13	1.20	1.33	2.56	1.63	5.4	1.39	0.0862	2.1538	0.20	0.30	0.6453	0	0	
	Potassium	48	48	0	0.00	0.05	0.25	0.25	0.40	0.45	0.50	0.63	0.65	0.8	0.46	0.0165	4.1818	0.10	0.15	0.1134	0	0	
	Sodium	48	48	0	0.00	0.5	0.55	0.90	1.00	1.10	1.30	2.07	1.75	5.6	1.26	0.1016	1.8571	0.30	0.45	0.6968	0	0	
	Chloride	57	57	0	0.00	0.7	0.52	0.80	1.00	1.10	1.31	2.53	1.78	5.5	1.30	0.0959	1.8056	0.32	0.47	0.7174	0	0	
	Fluoride	1	0	1	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	NC	0.1	0.10	NC	NC	NC	NC	0.0000	0	0
	Sulphate	57	48	9	15.79	-1	1.25	1.79	2.90	3.00	4.00	8.60	5.65	16	3.71	0.3446	1.4231	1.10	1.65	2.5788	0	0	
	Colour	53	25	28	52.83	-5	5.00	-5.00	5.00	5.00	5.00	9.30	5.00	40	4.83	0.8543	0.7742	0.00	0.00	6.1605	0	0	
	Dissolved Organic Carbon (DOC) (Filtered)	1	1	0	0.00	2.3	NC	NC	NC	2.30	NC	NC	NC	2.3	2.30	NC	NC	NC	NC	0.0000	0	0	
	Total Solids (Filtered)	56	51	5	8.93	-10	-7.25	5.64	16.00	24.00	31.50	67.15	54.75	100	26.03	2.3621	1.4444	15.50	23.25	17.5177	0	0	
	Turbidity	32	30	2	6.25	0.2	-0.50	0.25	0.40	0.60	1.00	1.34	1.90	1.4	0.70	0.0620	2.0000	0.60	0.90	0.3451	0	0	
Nutrients	Ammonia as N	57	22	35	61.40	0.002	-0.03	0.00	0.01	0.01	0.03	0.08	0.06	0.32	0.02	0.0075	0.4035	0.02	0.03	0.0562	15	26.32	
	Total Kjeldahl Nitrogen (TKN)	10	8	2	20.00	0.04	-0.17	NC	0.08	0.17	0.25	NC	0.49	6.6	0.80	0.6455	0.4000	0.17	0.25	1.9364	0	0	
	Nitrate (as NO3-N)	1	1	0	0.00	0.08335	NC	NC	NC	0.08	NC	NC	NC	0.08335	0.08	NC	NC	NC	NC	0.0000	0	0	
	Nitrite (as NO2-N)	1	0	1	100.00	0.001	NC	NC	NC	0.00	NC	NC	NC	0.001	0.00	NC	NC	NC	NC	0.0000	0	0	
	Nitrate and Nitrite (as N) (mg/L)	57	57	0	0.00	0.04	0.03	0.05	0.07	0.08	0.09	0.32	0.12	0.42	0.10	0.0090	1.3971	0.02	0.03	0.0680	0	0	
	Nitrogen (Total)	1	1	0	0.00	0.166	NC	NC	NC	0.17	NC	NC	NC	0.166	0.17	NC	NC	NC	NC	0.0000	0	0	
	Phosphorus	57	24	33	57.89	2	-40.00	2.00	5.00	10.00	35.00	60.20	80.00	88	18.98	2.8133	0.9048	30.00	45.00	21.0000	47	82.46	
	Aluminum Total	1	1	0	0.00	38.9	NC	NC	NC	38.90	NC	NC	NC	38.9	38.90	NC	NC	NC	NC	0.0000	1	100	
	Aluminum Total (Filtered)	1	1	0	0.00	2.45	NC	NC	NC	2.45	NC	NC	NC	2.45	2.45	NC	NC	NC	NC	0.0000	0	0	
	Antimony	1	0	1	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.10	NC	NC	NC	NC	0.0000	0	0	
Antimony (Filtered)	1	0	1	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.10	NC	NC	NC	NC	0.0000	0	0		
Arsenic	31	4	27	87.10	0.2	-0.75	0.20	0.30	0.50	1.00	3.80	2.05	5	0.85	0.1690	0.9043	0.70	1.05	0.9255	0	0		
Arsenic (Filtered)	1	0	1	100.00	0.2	NC	NC	NC	0.20	NC	NC	NC	0.2	0.20	NC	NC	NC	NC	0.0000	0	0		
Barium	1	1	0	0.00	9.85	NC	NC	NC	9.85	NC	NC	NC	9.85	9.85	NC	NC	NC	NC	0.0000	0	0		
Barium (Filtered)	1	1	0	0.00	8.95	NC	NC	NC	8.95	NC	NC	NC	8.95	8.95	NC	NC	NC	NC	0.0000	0	0		
Beryllium	1	0	1	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.10	NC	NC	NC	NC	0.0000	0	0		
Beryllium (Filtered)	1	0	1	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.10	NC	NC	NC	NC	0.0000	0	0		
Cadmium	57	12	45	78.95	0.05	-0.20	0.05	0.10	0.10	0.30	1.40	0.60	10	0.40	0.1753	0.3077	0.20	0.30	1.3119	46	80.7		
Cadmium (Filtered)	1	0	1	100.00	0.09	NC	NC	NC	0.09	NC	NC	NC	0.09	0.09	NC	NC	NC	NC	0.0000	0	0		
Cesium	1	0	1	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.10	NC	NC	NC	NC	0.0000	0	0		
Cesium (Filtered)	1	0	1	100.00	0.15	NC	NC	NC	0.15	NC	NC	NC	0.15	0.15	NC	NC	NC	NC	0.0000	0	0		
Chromium	55	25	30	54.55	0	-2.25	0.09	0.30	0.66	2.00	5.60	4.55	6	1.28	0.2086	0.8667	1.70	2.55	1.5328	0	0		
Chromium (Filtered)	1	1	0	0.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.10	NC	NC	NC	NC	0.0000	0	0		
Cobalt	36	2	34	94.44	0.03	-0.24	0.03	0.10	0.10	0.33	1.00	0.66	1	0.30	0.0635	0.7895	0.23	0.34	0.3755	0	0		
Cobalt (Filtered)	1	1	0	0.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.10	NC	NC	NC	NC	0.0000	0	0		
Copper	55	36	19	34.55	0.1	-0.85	0.22	0.50	0.90	1.40	3.00	2.75	3	1.09	0.0982	1.5068	0.90	1.35	0.7213	0	0		
Copper (Filtered)	1	1	0	0.00	0.85	NC	NC	NC	0.85	NC	NC	NC	0.85	0.85	NC	NC	NC	NC	0.0000	0	0		
Iron	57	41	16	28.07	4	-23.25	6.00	15.00	27.00	40.50	77.90	78.75	143	31.39	3.5330	1.1481	25.50	38.25	26.4387	0	0		
Iron (Filtered)	1	0	1	100.00	5	NC	NC	NC	5.00	NC	NC	NC	5	5.00	NC	NC	NC	NC	0.0000	0	0		
Lead	56	16	40	71.43	0.1	-1.25	0.10	0.10	0.40	1.00	1.05	2.35	2	0.54	0.0604	1.2000	0.90	1.35	0.4480	0	0		
Lead (Filtered)	1	0	1	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.10	NC	NC	NC	NC	0.0000	0	0		
Lithium	1	1	0	0.00	1.45	NC	NC	NC	1.45	NC	NC	NC	1.45	1.45	NC	NC	NC	NC	0.0000	0	0		
Lithium (Filtered)	1	1	0	0.00	1.15	NC	NC	NC	1.15	NC	NC	NC	1.15	1.15	NC	NC	NC	NC	0.0000	0	0		
Manganese	21	11	10	47.62	0.2	-0.50	0.21	0.40	0.60	1.00	1.36	1.90	1.4	0.67	0.0712	2.0303	0.60	0.90	0.3182	0	0		
Manganese (Filtered)	1	1	0	0.00	0.2	NC	NC	NC	0.20	NC	NC	NC	0.2	0.20	NC	NC	NC	NC	0.0000	0	0		
Mercury	18	7	11	61.11	0.01	-0.15	NC	0.02	0.03	0.13	NC	0.30	0.16	0.06	0.0136	1.0172	0.11	0.17	0.0559	12	66.67		
Mercury (Filtered)	1	0	1	100.00	0.01	NC	NC	NC	0.01	NC	NC	NC	0.01	0.01	NC	NC	NC	NC	0.0000	0	0		
Molybdenum	1	1	0	0.00	0.15	NC	NC	NC	0.15	NC	NC	NC	0.15	0.15	NC	NC	NC	NC	0.0000	0	0		
Molybdenum (Filtered)	1	1	0	0.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.10	NC	NC	NC	NC	0.0000	0	0		
Nickel	56	31	25																				

Table D.4: Summary Statistics - Hay River @ West Channel Bridge, Annual (All Parameters)

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE	
Physical/Major Ions	Chlorophyll A	1	1	0	0.00	10300	NC	NC	NC	10300.00	NC	NC	NC	NC	10300	10300.00	NC	NC	NC	NC	0	0	
	Nitrogen (Organic) (Filtered)	2	2	0	0.00	0.893	NC	NC	NC	0.93	NC	NC	NC	NC	0.972	0.93	0.0395	NC	NC	NC	0	0	
	Silica	2	2	0	0.00	5.13	NC	NC	NC	5.38	NC	NC	NC	NC	5.62	5.38	0.2450	NC	NC	NC	0	0	
	Total Organic Carbon(TOC)	2	2	0	0.00	0.0296	NC	NC	NC	0.03	NC	NC	NC	NC	0.03	0.03	0.0002	NC	NC	NC	0	0	
	pH	66	66	0	0.00	7.2	7.42	7.51	7.82	7.95	8.08	8.30	8.48	8.81	7.90	0.0302	31.6000	0.27	0.40	0.2500	0	0	
	Electrical Conductivity (EC)	66	66	0	0.00	188	78.88	206.75	267.50	328.50	393.25	510.65	581.88	541	332.00	10.1611	4.0000	125.75	188.63	83.0000	0	0	
	Total Suspended Solids (TSS)	63	58	5	7.94	3	-166.00	3.00	8.00	30.00	124.00	331.40	298.00	406	78.00	12.2911	0.7959	116.00	174.00	98.0000	0	0	
	Hardness as CaCO3	60	60	0	0.00	88.1	30.38	90.79	120.00	145.50	179.75	240.10	269.38	266	152.00	5.1999	3.8000	59.75	89.63	40.0000	0	0	
	Alkalinity (total as CaCO3)	66	66	0	0.00	45	-8.94	56.00	68.43	86.85	120.00	178.31	197.36	207	97.00	4.2880	2.7714	51.58	77.36	35.0000	0	0	
	Calcium	64	64	0	0.00	23.9	9.41	25.43	33.08	39.45	48.85	62.78	72.51	78.7	41.00	1.3936	3.7273	15.78	23.66	11.0000	0	0	
	Magnesium	65	65	0	0.00	4.7	0.93	6.35	9.07	11.50	14.50	18.78	22.65	20	12.00	0.4562	3.2432	5.43	8.15	3.7000	0	0	
	Potassium	59	59	0	0.00	0.7	0.36	1.00	1.60	2.00	2.43	3.30	3.68	7.5	2.10	0.1271	2.1429	0.83	1.25	0.9800	0	0	
	Sodium	59	59	0	0.00	5.87	2.70	7.70	10.50	12.90	15.70	18.80	23.50	21.2	13.00	0.4342	3.9394	5.20	7.80	3.3000	0	0	
	Chloride	66	66	0	0.00	1.6	-1.14	1.67	2.80	3.65	5.43	8.59	9.36	9.59	4.20	0.2447	2.1000	2.63	3.94	2.0000	0	0	
	Fluoride	4	2	2	50.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.10	0.0000	NC	0.00	0.00	0.0000	0	0	
	Sulphate	66	65	1	1.52	1	-8.63	23.70	45.75	70.50	82.00	106.20	136.38	124	65.00	3.1129	2.6000	36.25	54.38	25.0000	0	0	
	Colour	64	62	2	3.13	40	-50.00	50.00	100.00	120.00	200.00	460.50	350.00	786	168.00	15.4793	1.3548	100.00	150.00	124.0000	0	0	
	Dissolved Organic Carbon (DOC) (Filtered)	2	2	0	0.00	27.3	NC	NC	NC	NC	27.60	NC	NC	NC	27.9	27.60	0.3000	NC	NC	NC	1112.4975	0	0
	Total Solids (Filtered)	65	65	0	0.00	188	83.75	173.60	219.50	268.00	310.00	378.40	445.75	478	268.00	7.6172	4.3934	90.50	135.75	61.0000	0	0	
	Turbidity	66	66	0	0.00	3.4	-106.94	5.42	11.38	26.40	90.25	234.40	208.56	488	61.00	10.5072	0.7176	78.88	118.31	85.0000	0	0	
Nutrients	Ammonia as N	65	50	15	23.08	0.005	-0.02	0.01	0.01	0.02	0.03	0.16	0.06	0.225	0.03	0.0055	0.7333	0.02	0.03	0.0450	31	47.69	
	Total Kjeldahl Nitrogen (TKN)	9	9	0	0.00	0.093	-0.30	NC	0.63	0.94	1.25	NC	2.18	2.2	0.98	0.1956	1.6610	0.62	0.93	0.5900	0	0	
	Nitrate (as NO3-N)	3	3	0	0.00	0.0481	-0.22	NC	0.05	0.05	0.23	NC	0.50	0.23	0.11	0.0600	1.1000	0.18	0.27	0.1000	0	0	
	Nitrite (as NO2-N)	3	1	2	66.67	0.001	-0.01	NC	0.00	0.00	0.01	NC	0.02	0.01	0.00	0.0030	0.7692	0.01	0.01	0.0052	0	0	
	Nitrate and Nitrite (as N) (mg/L)	65	40	25	38.46	0.008	-0.12	0.01	0.01	0.04	0.10	0.25	0.23	0.9	0.08	0.0156	0.6154	0.09	0.13	0.1300	0	0	
	Nitrogen (Total)	7	7	0	0.00	0.72	0.25	NC	0.79	1.01	1.15	NC	1.69	1.2	0.97	0.0709	5.1053	0.36	0.54	0.1900	0	0	
	Orthophosphate (as P)	2	2	0	0.00	0.0027	NC	NC	NC	0.01	NC	NC	NC	NC	0.0103	0.01	0.0038	NC	NC	NC	0	0	
	Phosphorus	65	59	6	9.23	19	-123.25	21.00	50.00	80.00	165.50	461.20	338.75	620	129.00	15.8779	1.0078	115.50	173.25	128.0000	65	100	
	Phosphorus (filtered) (Filtered)	2	2	0	0.00	0.0177	NC	NC	NC	0.05	NC	NC	NC	NC	0.0914	0.01	0.0038	NC	NC	NC	0	0	
	Metals	Aluminum (Filtered)	7	7	0	0.00	3.2	-8.15	NC	4.30	6.00	12.60	NC	25.05	17.4	8.40	1.9490	1.6154	8.30	12.45	5.2000	0	0
Aluminum Total		8	8	0	0.00	57.5	-1865.81	NC	94.58	145.00	1401.50	NC	3361.89	2600	656.00	342.4868	0.6770	1306.93	1960.39	969.0000	0	0	
Antimony		8	6	2	25.00	0.1	-0.01	NC	0.10	0.10	0.18	NC	0.29	0.2	0.13	0.0164	2.8261	0.08	0.11	0.0460	0	0	
Antimony (Filtered)		7	3	4	57.14	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.10	0.0000	NC	0.00	0.00	0.0000	0	0	
Arsenic		40	30	10	25.00	0.1	-1.00	0.21	0.80	1.00	2.00	7.58	3.80	9.6	1.70	0.2900	0.9444	1.20	1.80	1.8000	2	5	
Arsenic (Filtered)		7	7	0	0.00	0.4	-0.10	NC	0.50	0.60	0.90	NC	1.50	1.8	0.77	0.1822	1.6042	0.40	0.60	0.4800	0	0	
Barium		8	8	0	0.00	35.6	-7.74	NC	40.45	46.65	72.58	NC	120.76	118	57.00	9.9239	2.0357	32.13	48.19	28.0000	0	0	
Barium (Filtered)		7	7	0	0.00	34	29.80	NC	35.80	36.90	39.80	NC	45.80	43	38.00	1.1285	12.6667	4.00	6.00	3.0000	0	0	
Beryllium		8	3	5	62.50	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.2	0.11	0.0125	3.1429	0.00	0.00	0.0350	0	0	
Beryllium (Filtered)		7	0	7	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.10	0.0000	NC	0.00	0.00	0.0000	0	0	
Bismuth		6	1	5	83.33	0.2	0.16	NC	0.20	0.20	0.23	NC	0.26	0.3	0.22	0.0167	5.3659	0.03	0.04	0.0410	0	0	
Bismuth (Filtered)		6	1	5	83.33	0.2	0.20	NC	0.20	0.20	0.20	NC	0.20	0.2	0.20	0.0000	NC	0.00	0.00	0.0000	0	0	
Boron - soluble		6	6	0	0.00	28	9.14	NC	29.73	35.45	43.45	NC	64.04	47.8	37.00	3.0146	5.0000	13.73	20.59	7.4000	0	0	
Boron - soluble (Filtered)		6	6	0	0.00	27.3	15.34	NC	28.88	33.20	37.90	NC	51.44	42.7	34.00	2.2970	6.0714	9.03	13.54	5.6000	0	0	
Boron (Filtered)		6	6	0	0.00	27.3	15.34	NC	28.88	33.20	37.90	NC	51.44	42.7	34.00	2.2970	6.0714	9.03	13.54	5.6000	0	0	
Cadmium		65	20	45	69.23	0.05	-0.05	0.10	0.10	0.10	0.20	0.50	0.35	5	0.27	0.0763	0.4355	0.10	0.15	0.6200	64	98.46	
Cadmium (Filtered)		7	1	6	85.71	0.05	0.05	NC	0.05	0.05	0.05	NC	0.05	0.07	0.05	0.0029	6.9737	0.00	0.00	0.0076	0	0	
Cesium		8	3	5	62.50	0.1	-0.35	NC	0.10	0.10	0.40	NC	0.85	0.8	0.24	0.0944	0.8889	0.30	0.45	0.2700	0	0	
Cesium (Filtered)		7	0	7	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.10	0.0000	NC	0.00	0.00	0.0000	0	0	
Chromium		63	48	15	23.81	0.2	-3.55	0.30	0.80	1.60	3.70	9.94	8.05	34.8	3.30	0.6422	0.6471	2.90	4.35	5.1000	0	0	
Chromium (Filtered)		7	4	3	42.86	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.10	0.0000	NC	0.00	0.00	0.0000	0	0	
Cobalt		45	40	5	11.11	0.1	-1.28	0.10	0.30	0.70	1.35	5.46	2.93	7.3	1.20	0.2201	0.8000	1.05	1.58	1.5000	0	0	
Cobalt (Filtered)		7	3	4	57.14	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.2	0.11	0.0143	2.8947	0.00	0.00	0.0380	0	0	
Copper		64	59	5	7.81	0.5	-3.53	1.00	1.73	3.25	5.23	14.45	10.48	18.8	4.40	0.5027	1.1000	3.50	5.25	4.0000	27	42.19	
Copper (Filtered)		7	7	0	0.00	0.8	0.05	NC	1.10	1.50	1.80	NC	2.85	2.8	1.60	0.2405	2.5000	0.70	1.05	0.6400	0	0	

Table D.5: Summary Statistics - Kakisa River @ Hwy 1 Bridge, Annual (All Parameters)

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical/Major Ions	Chlorophyll A	1	1	0	0.00	3000	NC	NC	NC	3000.00	NC	NC	NC	3000.00	3000	NC	NC	NC	NC	NC	0	0
	Nitrogen (Organic) (Filtered)	2	2	0	0.00	0.39	NC	NC	NC	0.43	NC	NC	NC	0.46	0.426	0.0360	NC	NC	NC	NC	0	0
	Silica	2	2	0	0.00	4.21	NC	NC	NC	4.85	NC	NC	NC	5.48	4.845	0.6350	NC	NC	NC	NC	0	0
	Total Organic Carbon(TOC)	2	2	0	0.00	0.0126	NC	NC	NC	0.01	NC	NC	NC	0.01	0.013	0.0004	NC	NC	NC	NC	0	0
	pH	69	69	0	0.00	6.95	7.66	7.67	8.00	8.13	8.23	8.48	8.58	8.58	8.1	0.0312	31.1538	0.23	0.35	0.2600	0	0
	Electrical Conductivity (EC)	69	69	0	0.00	178	180.65	199.00	228.50	245.00	260.40	302.50	308.25	401.00	246	4.0756	7.2353	31.90	47.85	34.0000	0	0
	Total Suspended Solids (TSS)	62	58	4	6.45	3	-18.00	3.00	6.75	12.50	23.25	47.10	48.00	69.00	16	1.8162	1.1429	16.50	24.75	14.0000	0	0
	Hardness as CaCO3	64	64	0	0.00	87.8	90.00	100.25	114.00	122.00	130.00	163.25	154.00	238.00	126	2.6723	6.0000	16.00	24.00	21.0000	0	0
	Alkalinity (total as CaCO3)	69	69	0	0.00	81.5	81.93	87.80	99.25	104.00	110.80	132.00	128.13	185.00	106	1.8044	7.0667	11.55	17.33	15.0000	0	0
	Calcium	68	68	0	0.00	25.2	25.50	28.18	33.60	36.55	39.00	49.76	47.10	75.30	37	0.8586	5.2113	5.40	8.10	7.1000	0	0
	Magnesium	69	69	0	0.00	5.5	5.83	6.18	7.25	7.68	8.20	10.00	9.63	12.10	7.8	0.1280	7.0909	0.95	1.43	1.1000	0	0
	Potassium	61	61	0	0.00	0.4	0.19	0.61	0.90	1.10	1.38	1.90	2.09	3.70	1.2	0.0674	2.2642	0.48	0.71	0.5300	0	0
	Sodium	61	61	0	0.00	2.6	2.09	3.02	3.70	4.40	4.78	6.19	6.39	7.55	4.4	0.1177	4.7826	1.08	1.61	0.9200	0	0
	Chloride	69	69	0	0.00	0.8	0.09	1.00	1.24	1.51	2.00	3.84	3.15	6.00	1.8	0.1098	1.9780	0.77	1.15	0.9100	0	0
	Fluoride	4	1	3	75.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Sulphate	69	69	0	0.00	1	7.00	12.00	16.00	19.00	22.00	28.75	31.00	33.00	19	0.6049	3.8000	6.00	9.00	5.0000	0	0
	Colour	67	67	0	0.00	5	-40.00	10.00	20.00	30.00	60.00	151.80	120.00	655.00	56	10.3458	0.6588	40.00	60.00	85.0000	0	0
	Dissolved Organic Carbon (DOC) (Filtered)	2	2	0	0.00	12.2	NC	NC	NC	12.75	NC	NC	NC	13.30	12.75	0.5500	NC	NC	NC	NC	0	0
	Total Solids (Filtered)	68	68	0	0.00	116	117.88	118.90	158.00	168.00	184.75	225.50	224.88	251.00	171	3.1033	6.5769	26.75	40.13	26.0000	0	0
	Turbidity	69	69	0	0.00	1.2	-20.73	2.15	5.21	12.00	22.50	56.35	48.44	85.00	17	2.0464	1.0000	17.29	25.94	17.0000	0	0
Nutrients	Ammonia as N	68	37	31	45.59	0.002	-0.03	0.01	0.01	0.01	0.03	0.06	0.07	1.13	0.034	0.0165	0.2429	0.03	0.04	0.1400	21	30.88
	Total Kjeldahl Nitrogen (TKN)	8	8	0	0.00	0.27	-0.02	NC	0.31	0.37	0.52	NC	0.85	0.78	0.43	0.0595	2.5294	0.22	0.32	0.1700	0	0
	Nitrate (as NO3-N)	3	1	2	66.67	0.005	-0.26	NC	0.01	0.01	0.18	NC	0.44	0.18	0.063	0.0583	0.6300	0.18	0.26	0.1000	0	0
	Nitrite (as NO2-N)	3	1	2	66.67	0.001	-0.01	NC	0.00	0.00	0.01	NC	0.02	0.01	0.004	0.0030	0.7692	0.01	0.01	0.0052	0	0
	Nitrate and Nitrite (as N) (mg/L)	68	25	43	63.24	0.0051	-0.05	0.01	0.01	0.02	0.05	0.17	0.10	2.00	0.068	0.0294	0.2833	0.04	0.06	0.2400	0	0
	Nitrogen (Total)	7	7	0	0.00	0.4	0.35	NC	0.41	0.45	0.45	NC	0.51	0.48	0.44	0.0110	15.1724	0.04	0.06	0.0290	0	0
	Orthophosphate (as P)	2	0	2	100.00	0.001	NC	NC	NC	0.00	NC	NC	NC	0.00	0.001	0.0000	NC	NC	NC	NC	0	0
	Phosphorus	69	57	12	17.39	2	-30.00	9.00	18.00	30.00	50.00	95.50	98.00	124.00	36	3.1543	1.3846	32.00	48.00	26.0000	68	98.55
	Phosphorus (filtered) (Filtered)	2	2	0	0.00	0.0036	NC	NC	NC	0.03	NC	NC	NC	0.06	0.0327	0.0291	NC	NC	NC	NC	0	0
Metals	Aluminum (Filtered)	7	6	1	14.29	1	-2.80	NC	1.10	1.50	3.70	NC	7.60	71.00	12	9.9110	0.4615	2.60	3.90	26.0000	0	0
	Aluminum Total	8	8	0	0.00	0.6	-103.81	NC	58.98	107.95	167.50	NC	330.29	550.00	152	60.0746	0.8941	108.53	162.79	170.0000	0	0
	Antimony	8	2	6	75.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Antimony (Filtered)	7	0	7	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Arsenic	43	27	16	37.21	0.3	-0.25	0.30	0.50	0.90	1.00	3.24	1.75	7.40	1.1	0.1797	0.9167	0.50	0.75	1.2000	1	2.33
	Arsenic (Filtered)	7	7	0	0.00	0.4	0.35	NC	0.50	0.50	0.60	NC	0.75	0.70	0.54	0.0369	5.5102	0.10	0.15	0.0980	0	0
	Barium	8	8	0	0.00	25.5	10.41	NC	33.78	45.00	49.35	NC	72.71	50.40	42	3.2329	4.6154	15.58	23.36	9.1000	0	0
	Barium (Filtered)	7	7	0	0.00	38.3	33.50	NC	39.20	41.80	43.00	NC	48.70	43.70	41	0.8127	18.6364	3.80	5.70	2.2000	0	0
	Beryllium	8	1	7	87.50	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Beryllium (Filtered)	7	0	7	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Bismuth	6	2	4	66.67	0.2	0.05	NC	0.20	0.20	0.30	NC	0.45	0.60	0.27	0.0667	1.6875	0.10	0.15	0.1600	0	0
	Bismuth (Filtered)	6	1	5	83.33	0.2	0.20	NC	0.20	0.20	0.20	NC	0.20	0.20	0.2	0.0000	NC	0.00	0.00	0.0000	0	0
	Boron - soluble	6	6	0	0.00	15.9	9.60	NC	16.28	18.55	20.73	NC	27.40	23.80	19	1.1597	6.7857	4.45	6.68	2.8000	0	0
	Boron - soluble (Filtered)	6	6	0	0.00	14.5	11.50	NC	15.25	16.95	17.75	NC	21.50	19.70	17	0.7204	9.4444	2.50	3.75	1.8000	0	0
	Boron (Filtered)	6	6	0	0.00	14.5	11.50	NC	15.25	16.95	17.75	NC	21.50	19.70	17	0.7204	9.4444	2.50	3.75	1.8000	0	0
	Cadmium	68	5	63	92.65	0.05	-0.05	0.07	0.10	0.10	0.20	0.50	0.35	5.00	0.24	0.0728	0.4000	0.10	0.15	0.6000	65	95.59
	Cadmium (Filtered)	7	1	6	85.71	0.05	-0.03	NC	0.05	0.05	0.10	NC	0.18	0.11	0.066	0.0102	2.4444	0.05	0.08	0.0270	2	28.57
	Cesium	8	2	6	75.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.20	0.11	0.0125	3.1429	0.00	0.00	0.0350	0	0
	Cesium (Filtered)	7	0	7	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Chromium	65	39	26	40.00	0.1	-1.75	0.20	0.50	1.00	2.00	4.82	4.25	13.50	1.6	0.2588	0.7619	1.50	2.25	2.1000	0	0
	Chromium (Filtered)	7	1	6	85.71	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.50	0.16	0.0571	1.0667	0.00	0.00	0.1500	0	0
	Cobalt	49	31	18	36.73	0.1	-1.03	0.10	0.10	0.20	0.85	1.00	1.98	1.90	0.42	0.0597	1.0000	0.75	1.13	0.4200	0	0
	Cobalt (Filtered)	7	0	7	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Copper	67	58	9	13.43	0.2	0.15	0.50	1.50	2.00	2.40	5.68	3.75	8.90	2.2	0.1849	1.4667	0.90	1.35	1.5000	5	7.46
	Copper (Filtered)	7	7	0	0.00	0.3	0.20	NC	0.80	1.00	1.20	NC	1.80	1.30	0.94	0.1232	2.8485	0.40	0.60	0.3300	0	0
	Iron	69	68	1	1.45	5	-673.25	79.00	206.50	334.00	793.00	2385.00	16727.75									

Table D.6: Summary Statistics - Little Buffalo River @ Hwy 5 Bridge, Annual (All Parameters)

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical/Major Ions	Chlorophyll A	1	0	1	100.00	1000	NC	NC	NC	1000.00	NC	NC	NC	1000	1000	NC	NC	NC	NC	NC	0	0
	Nitrogen (Organic) (Filtered)	2	2	0	0.00	0.955	NC	NC	NC	1.00	NC	NC	NC	1.05	1.0025	0.0475	NC	NC	NC	NC	0	0
	Silica	2	2	0	0.00	7.89	NC	NC	NC	9.70	NC	NC	NC	11.5	9.695	1.8050	NC	NC	NC	NC	0	0
	Total Organic Carbon(TOC)	3	3	0	0.00	0.0224	0.01	NC	0.02	0.03	0.03	NC	0.04	0.0309	0.026	0.0025	6.0465	0.01	0.01	0.0043	0	0
	pH	52	52	0	0.00	7.4	7.62	7.76	7.88	7.97	8.06	8.16	8.33	8.23	8	0.0199	57.1429	0.18	0.27	0.1400	0	0
	Electrical Conductivity (EC)	52	52	0	0.00	482	-601.25	492.95	671.50	855.00	1520.00	3631.00	2792.75	4540	1238	127.3111	1.3486	848.50	1272.75	918.0000	0	0
	Total Suspended Solids (TSS)	50	42	8	16.00	2	-9.50	3.00	4.75	9.00	14.25	22.00	28.50	23	10	0.8053	1.7544	9.50	14.25	5.7000	0	0
	Hardness as CaCO3	47	47	0	0.00	217	-485.50	251.60	350.00	467.00	907.00	1626.26	1742.50	1750	668	62.1925	1.5681	557.00	835.50	426.0000	0	0
	Alkalinity (total as CaCO3)	52	52	0	0.00	85.3	53.50	97.56	124.00	146.50	171.00	237.80	241.50	244.5	154	5.6875	3.7561	47.00	70.50	41.0000	0	0
	Calcium	52	52	0	0.00	65.6	-154.13	79.15	110.25	146.00	286.50	511.14	550.88	546	205	18.3948	1.5414	176.25	264.38	133.0000	0	0
	Magnesium	52	52	0	0.00	12.7	-18.66	13.07	17.38	23.90	41.40	80.38	77.44	93.4	32	2.8526	1.5238	24.03	36.04	21.0000	0	0
	Potassium	51	50	1	1.96	0.1	-0.30	1.11	1.50	1.90	2.70	3.40	4.50	3.4	2.1	0.1055	2.8000	1.20	1.80	0.7500	0	0
	Sodium	51	51	0	0.00	5.85	-20.50	7.23	10.70	14.10	31.50	327.00	62.70	457	48	12.8946	0.5217	20.80	31.20	92.0000	0	0
	Chloride	52	52	0	0.00	3.5	-24.44	4.68	7.85	12.10	29.38	492.95	61.67	751	63	20.3344	0.4286	21.53	32.29	147.0000	7	13.46
	Fluoride	2	2	0	0.00	0.4	NC	NC	NC	0.45	NC	NC	NC	0.5	0.45	0.0500	NC	NC	NC	NC	2	100
	Sulphate	52	50	2	3.85	1	-478.75	24.40	204.50	307.50	660.00	1223.00	1343.25	1580	437	51.3422	1.1811	455.50	683.25	370.0000	0	0
	Colour	48	48	0	0.00	10	14.13	17.25	55.00	70.00	82.25	115.55	123.13	147	68	3.8836	2.5185	27.25	40.88	27.0000	0	0
	Dissolved Organic Carbon (DOC) (Filtered)	3	3	0	0.00	21.1	7.45	NC	21.10	25.10	30.20	NC	43.85	30.2	25	2.6333	5.4348	9.10	13.65	4.6000	0	0
	Total Solids (Filtered)	51	51	0	0.00	356	-666.50	362.00	514.00	631.00	1301.00	2896.00	2481.50	3490	985	104.8839	1.3151	787.00	1180.50	749.0000	0	0
	Turbidity	52	52	0	0.00	1.5	-2.85	2.37	3.53	5.05	7.78	15.58	14.15	45.9	6.9	0.8988	1.0615	4.25	6.38	6.5000	0	0
Nutrients	Ammonia as N	52	36	16	30.77	0.003	-0.01	0.00	0.01	0.01	0.02	0.06	0.04	0.34	0.02	0.0065	0.4255	0.01	0.02	0.0470	9	17.31
	Total Kjeldahl Nitrogen (TKN)	1	1	0	0.00	0.29	NC	NC	NC	0.29	NC	NC	NC	0.29	0.29	NC	NC	NC	NC	NC	0	0
	Nitrate (as NO3-N)	2	0	2	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.1	0.0000	NC	NC	NC	NC	0	0
	Nitrite (as NO2-N)	2	0	2	100.00	0.02	NC	NC	NC	0.02	NC	NC	NC	0.02	0.02	0.0000	NC	NC	NC	NC	0	0
	Nitrate and Nitrite (as N) (mg/L)	51	22	29	56.86	0.008	-0.04	0.01	0.01	0.01	0.04	0.32	0.09	2	0.081	0.0397	0.2893	0.03	0.05	0.2800	0	0
	Nitrogen (Total)	7	7	0	0.00	0.61	0.24	NC	0.66	0.80	0.94	NC	1.36	1.13	0.82	0.0702	4.3158	0.28	0.42	0.1900	0	0
	Orthophosphate (as P)	2	2	0	0.00	0.0017	NC	NC	NC	0.00	NC	NC	NC	0.0021	0.0019	0.0002	NC	NC	NC	NC	0	0
	Phosphorus	51	49	2	3.92	9	-11.00	9.60	22.00	33.00	44.00	98.40	77.00	210	39	4.3310	1.2581	22.00	33.00	31.0000	51	100
	Phosphorus (Filtered) (Filtered)	3	3	0	0.00	0.0074	-0.01	NC	0.01	0.01	0.02	NC	0.04	0.022	0.013	0.0047	1.5854	0.01	0.02	0.0082	0	0
	Aluminum (Filtered)	7	7	0	0.00	0.7	-0.95	NC	0.70	1.10	1.80	NC	3.45	2.5	1.3	0.2492	1.9697	1.10	1.65	0.6600	0	0
Metals	Aluminum Total	8	8	0	0.00	38.4	2.00	NC	51.73	69.55	84.88	NC	134.60	110	70	7.9411	3.1818	33.15	49.73	22.0000	0	0
	Antimony	7	0	8	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Antimony (Filtered)	7	0	7	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Arsenic	27	14	13	48.15	0.2	-0.75	0.20	0.30	0.60	1.00	3.76	2.05	5	0.86	0.1779	0.9348	0.70	1.05	0.9200	1	3.7
	Arsenic (Filtered)	7	7	0	0.00	0.5	0.05	NC	0.50	0.70	0.80	NC	1.25	1.1	0.7	0.0845	3.1818	0.30	0.45	0.2200	0	0
	Barium	8	8	0	0.00	21.2	8.89	NC	21.60	25.05	30.08	NC	42.79	33.3	26	1.5921	5.7778	8.48	12.71	4.5000	0	0
	Barium (Filtered)	7	7	0	0.00	19.3	10.80	NC	19.80	23.30	25.80	NC	34.80	26.3	23	1.0745	8.2143	6.00	9.00	2.8000	0	0
	Beryllium	8	0	8	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Beryllium (Filtered)	7	0	7	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Bismuth	6	1	5	83.33	0.2	0.16	NC	0.20	0.20	0.23	NC	0.26	0.3	0.22	0.0167	5.3659	0.03	0.04	0.0410	0	0
	Bismuth (Filtered)	6	0	6	100.00	0.2	0.20	NC	0.20	0.20	0.20	NC	0.20	0.2	0.2	0.0000	NC	0.00	0.00	0.0000	0	0
	Boron - soluble	6	6	0	0.00	179	-18.25	NC	239.75	281.50	411.75	NC	669.75	435	307	39.0499	3.1979	172.00	258.00	96.0000	0	0
	Boron - soluble (Filtered)	6	6	0	0.00	186	-52.50	NC	223.50	277.00	407.50	NC	683.50	409	299	37.2368	3.2857	184.00	276.00	91.0000	0	0
	Cadmium	52	2	50	96.15	0.05	-0.05	0.10	0.10	0.10	0.20	0.50	0.35	0.5	0.17	0.0169	1.4167	0.10	0.15	0.1200	51	98.08
	Cadmium (Filtered)	7	1	6	85.71	0.05	0.05	NC	0.05	0.05	0.05	NC	0.05	0.09	0.056	0.0057	3.7333	0.00	0.00	0.0150	1	14.29
	Cesium	8	0	8	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Cesium (Filtered)	7	0	7	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Chromium	52	28	24	46.15	0.1	-1.94	0.17	0.43	1.00	2.00	3.35	4.36	7.1	1.4	0.1791	1.0769	1.58	2.36	1.3000	0	0
	Chromium (Filtered)	7	0	7	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Cobalt	44	28	16	36.36	0.1	-0.25	0.10	0.20	0.25	0.50	1.00	0.95	1	0.41	0.0513	1.2059	0.30	0.45	0.3400	0	0
	Cobalt (Filtered)	7	4	3	42.86	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Copper	52	34	18	34.62	0.2	-1.36	0.20	0.63	1.00	1.95	4.48	3.94	6.1	1.4	0.1594	1.2727	1.33	1.99	1.1000	3	5.77
	Copper (Filtered)	7	4	3	42.86	0.2	-0.10	NC	0.20	0.40	0.40	NC	0.70	0.4	0.34	0.0369	3.4694	0.20	0.30	0.0900	0	0
	Iron	52	52	0	0.00	99	-110.00	127.25	243.25	365.50	478.75	772.30	832.00	875	383	25.7668	2.0591	235.50	353.25	186.0000	31	59.62
	Iron (Filtered)	7	7	0	0.00	12	-44.00	NC	22.00	24.00	66.00	NC	132.00	73	39	8.3514	1.5600	44.00</				

Table D.7: Summary Statistics - Lockhart River @ Mouth, Annual (All Parameters)

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical/Major Ions	pH	57	57	0	0.00	6.2	6.44	6.39	6.80	6.92	7.04	7.39	7.40	7.82	6.9	0.0374	24.6429	0.24	0.36	0.28	6	10.53
	Electrical Conductivity (EC)	57	57	0	0.00	15.3	13.35	15.98	17.40	19.00	20.10	22.12	24.15	26	19	0.2705	9.5000	2.70	4.05	2	0	0
	Total Suspended Solids (TSS)	41	10	31	75.61	0.7	0.00	2.00	3.00	3.00	5.00	9.90	8.00	33	4.3	0.7640	0.8776	2.00	3.00	4.9	0	0
	Hardness as CaCO3	54	54	0	0.00	4.3	2.12	5.23	6.60	7.60	9.59	13.65	14.06	14.7	8.3	0.3284	3.4583	2.99	4.48	2.4	0	0
	Alkalinity (total as CaCO3)	57	57	0	0.00	3.1	2.20	4.80	5.35	6.50	7.45	14.72	10.60	79	8.4	1.4123	0.7636	2.10	3.15	11	0	0
	Calcium	57	56	1	1.75	1	0.33	1.00	1.40	1.70	2.11	3.17	3.18	3.7	1.8	0.0780	3.0508	0.71	1.07	0.59	0	0
	Magnesium	57	57	0	0.00	0.6	0.25	0.60	0.70	0.80	1.00	1.31	1.45	1.5	0.88	0.0296	4.0000	0.30	0.45	0.22	0	0
	Potassium	48	48	0	0.00	0.2	0.31	0.25	0.40	0.41	0.46	0.60	0.55	0.6	0.43	0.0120	5.1807	0.06	0.09	0.083	0	0
	Sodium	48	47	1	2.08	0.1	0.24	0.29	0.41	0.48	0.52	0.96	0.68	1.8	0.51	0.0338	2.2174	0.11	0.17	0.23	0	0
	Chloride	57	33	24	42.11	0.2	-0.05	0.20	0.40	0.50	0.70	0.77	1.15	1	0.52	0.0233	2.8889	0.30	0.45	0.18	0	0
	Sulphate	56	40	16	28.57	0.9	-2.00	1.00	1.00	2.10	3.00	5.60	6.00	15	2.6	0.2926	1.1818	2.00	3.00	2.2	0	0
	Colour	55	17	38	69.09	5	5.00	5.00	5.00	5.00	5.00	10.00	5.00	10	5.4	0.1589	4.5000	0.00	0.00	1.2	0	0
	Total Solids (Filtered)	57	43	14	24.56	5	-8.75	9.60	10.00	16.00	22.50	43.40	41.25	76	19	1.7702	1.4615	12.50	18.75	13	0	0
	Turbidity	49	45	4	8.16	0	-0.48	0.03	0.23	0.40	0.70	1.85	1.41	3.3	0.59	0.0845	1.0000	0.47	0.71	0.59	0	0
Nutrients	Ammonia as N	57	22	35	61.40	0.002	-0.02	0.00	0.01	0.01	0.02	0.04	0.04	0.58	0.023	0.0101	0.3026	0.01	0.02	0.076	13	22.81
	Total Kjeldahl Nitrogen (TKN)	10	9	1	10.00	0.0043	-0.19	NC	0.07	0.12	0.24	NC	0.50	0.6	0.17	0.0542	1.0000	0.17	0.26	0.17	0	0
	Nitrate and Nitrite (as N) (mg/L)	57	36	21	36.84	0.008	-0.03	0.01	0.01	0.02	0.04	0.20	0.08	0.28	0.039	0.0073	0.7091	0.03	0.04	0.055	0	0
	Phosphorus	57	23	34	59.65	0	-29.50	2.00	5.00	10.00	28.00	50.00	62.50	68	18	2.5519	0.9474	23.00	34.50	19	53	92.98
Metals	Arsenic	30	1	29	96.67	0.05	-0.75	0.13	0.30	0.75	1.00	3.35	2.05	5	0.87	0.1675	0.9457	0.70	1.05	0.92	1	3.33
	Cadmium	57	8	49	85.96	0.05	-0.20	0.05	0.10	0.10	0.30	1.46	0.60	10	0.46	0.1965	0.3067	0.20	0.30	1.5	45	78.95
	Chromium	54	19	35	64.81	0.1	-0.96	0.10	0.28	0.60	1.10	3.25	2.34	62	2.1	1.1381	0.2500	0.83	1.24	8.4	0	0
	Cobalt	36	6	30	83.33	0.03	-1.10	0.09	0.10	0.10	0.90	1.00	2.10	1	0.35	0.0656	0.8974	0.80	1.20	0.39	0	0
	Copper	57	39	18	31.58	0.2	-1.75	0.29	0.50	1.00	2.00	5.91	4.25	40	1.9	0.6961	0.3585	1.50	2.25	5.3	3	5.26
	Iron	56	35	21	37.50	3	-40.44	4.28	8.28	20.00	40.75	61.90	89.48	125	26	2.9770	1.1818	32.48	48.71	22	0	0
	Lead	56	16	40	71.43	0.1	-1.25	0.10	0.10	0.60	1.00	1.15	2.35	3.6	0.65	0.0789	1.1017	0.90	1.35	0.59	0	0
	Manganese	21	8	13	61.90	0.4	-0.03	0.41	0.65	0.90	1.10	1.99	1.78	2	0.98	0.0953	2.2273	0.45	0.68	0.44	0	0
	Mercury	17	10	7	41.18	0.01	-0.10	NC	0.03	0.05	0.12	NC	0.24	0.912	0.11	0.0514	0.5238	0.09	0.13	0.21	14	82.35
	Nickel	56	34	22	39.29	0.3	-0.25	0.39	0.50	1.00	1.00	8.22	1.75	10	1.3	0.2687	0.6500	0.50	0.75	2	0	0
	Zinc	57	23	34	59.65	0.4	-13.63	0.40	0.55	4.00	10.00	19.00	24.18	30	6.4	0.8656	0.9846	9.45	14.18	6.5	1	1.75

Notes:
bold - DL ≥50%
NC - not calculatable

Table D.8: Summary Statistics - Marian River, Annual (All Parameters)

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE	
Physical/Major Ions	Cyanide Total	61	39	22	36.07	0.001	0.0005	0.001	0.002	0.003	0.003	0.01	0.0045	0.043	0.0043	0.000786	0.704918	0.001	0.0015	0.0061	0	0	
	Field Temperature	56	56	0	0.00	-0.26	-23.3775	-0.165	1.11	8.225	17.435	21.611	41.9225	22.95	9.5	NC	1.202532	16.325	24.4875	7.9	0	0	
	Chlorophyll A	15	14	1	6.67	0.001	-1.2025	NC	0.539	1.2	1.7	NC	3.4415	2.7	1.2	NC	1.558442	1.161	1.7415	0.77	0	0	
	Bicarbonate as CaCO3	11	11	0	0.00	47	37.1	NC	58.4	66.2	72.6	NC	93.9	76.5	65	NC	7.647059	14.2	21.3	8.5	0	0	
	Nitrogen (Organic) (Filtered)	18	18	0	0.00	0.257	0.237125	NC	0.30575	0.334	0.3515	NC	0.420125	0.424	0.33	NC	7.857143	0.04575	0.068625	0.042	0	0	
	Silica	51	51	0	0.00	0.643333	0.075	0.7756	1.5	1.92	2.45	3.092	3.875	3.18	1.9	0.130744	2.835821	0.95	1.425	0.67	0	0	
	pH	205	205	0	0.00	7.24	7.0425	7.413	7.56	7.73	7.905	8.07	8.4225	8.38	7.7	0.025875	36.66667	0.345	0.5175	0.21	0	0	
	Electrical Conductivity (EC)	206	206	0	0.00	49.6	47.125	57.5	133	165	190.25	220	276.125	333	158	6.722321	3.291667	57.25	85.875	48	0	0	
	Total Suspended Solids (TSS)	205	172	33	16.10	2	-23.75	3	4	10	22.5	52.8	50.25	222	18	4.108354	0.666667	18.5	27.75	27	0	0	
	Hardness as CaCO3	202	202	0	0.00	19.67136	18.5875	27.92	65.05	81.35	96.025	117	142.4875	158	79	4.022615	2.925926	30.975	46.4625	27	0	0	
	Alkalinity (total as CaCO3)	203	203	0	0.00	13	-10.525	18.3	41	64.1	75.35	92.08	126.875	98.6	59	3.332199	2.681818	34.35	51.525	22	0	0	
	Calcium	206	206	0	0.00	4.86	3.5125	6.763	14.575	18.85	21.95	27.665	33.0125	44.3	18	0.973992	2.769231	7.375	11.0625	6.5	0	0	
	Magnesium	206	206	0	0.00	1.4	0.7	2.4515	6.1	8.38	9.7	11.865	15.1	13.6	7.9	0.353452	2.821429	3.6	5.4	2.8	0	0	
	Potassium	205	205	0	0.00	0.3	0.6025	0.8	1	1.17	1.265	1.497	1.6625	4.27	1.1	0.051179	3.666667	0.285	0.3975	0.3	0	0	
	Sodium	204	204	0	0.00	0.93125	1.475	1.8125	2.2	2.4	2.7	3.28125	2.81	2.1	0.045867	5.675676	0.5875	0.88125	0.37	0	0		
	Chloride	199	199	0	0.00	0.6	0.775	1.1	1.33	1.5	1.7	2	2.255	2.5	1.5	0.04452	5.172414	0.37	0.555	0.29	0	0	
	Fluoride	95	70	25	26.32	0.06	0.055	0.07	0.1	0.1	0.13	0.2	0.175	0.2	0.12	0.005827	3.243243	0.03	0.045	0.037	29	30.52632	
	Sulphate	203	203	0	0.00	3	-1	4	11	14	19	32.8	31	95	16	1.754128	1.454545	8	12	11	0	0	
	Dissolved Organic Carbon (DOC) (Filtered)	179	179	0	0.00	4.6	4.3	5.1	6.1	6.6	7.3	8.6	9.1	11.9	6.7	0.167915	6.090909	1.2	1.8	1.1	0	0	
	Total Organic Carbon (TOC)	172	172	0	0.00	0	3.61875	5.065	6	6.8	7.5875	9.035	9.96875	10.85	6.8	0.162869	5.230769	1.5875	2.38125	1.3	0	0	
	Total Solids (Filtered)	205	204	1	0.49	10	33.25	48	86.5	108	122	158.7	175.25	248	106	4.485011	3.028571	35.5	53.25	35	0	0	
	Turbidity	206	206	0	0.00	1.8	-46.15625	3.8555	6.3175	20.56667	41.3	95.745	93.77375	219	30	4.709501	0.882353	34.9825	52.47375	34	0	0	
Nutrients	Ammonia as N	205	153	52	25.37	0.005	-0.0125	0.005	0.007	0.01	0.02	0.04	0.0395	0.113	0.016	0.00241	1.066667	0.013	0.0195	0.015	46	22.43902	
	Nitrate (as NO3-N)	92	69	23	25.00	0.005	-0.095	0.005	0.01	0.04	0.08	0.15	0.185	0.215	0.051	0.009211	1.085106	0.07	0.105	0.047	0	0	
	Nitrite (as NO2-N)	87	12	75	86.21	0.001	0.0075	0.001	0.009	0.01	0.01	0.05	0.0115	0.05	0.011	0.004421	1	0.001	0.0015	0.011	0	0	
	Nitrate and Nitrite (as N) (mg/L)	188	139	49	26.06	0.0051	-0.122	0.008	0.01	0.04925	0.098	0.2	0.23	0.27	0.064	0.00649	1.084746	0.088	0.132	0.059	0	0	
	Nitrogen (Total)	18	18	0	0.00	0.287	0.238625	NC	0.32	0.3485	0.37425	NC	0.455625	0.477	0.35	NC	7.777778	0.05425	0.081375	0.045	0	0	
	Orthophosphate (as P)	81	53	28	34.57	0.001	-0.004	0.001	0.002	0.002	0.006	0.014	0.012	0.038	0.0044	0.000748	0.830189	0.004	0.006	0.0053	0	0	
	Phosphorus	206	195	11	5.34	2.6	-37.5	10	15	29.5	50	116.15	102.5	329	42	7.075171	0.933333	35	52.5	45	205	99.51456	
	Phosphorus (filtered) (Filtered)	32	22	10	31.25	0.002	-0.012325	0.002065	0.005325	0.01	0.017092	0.1079	0.034742	0.13	0.023	0.006302	0.17875	0.011767	0.01765	0.032	0	0	
	Total Coliforms	191	75	116	60.73	1	-0.5	1	1	1	1	2	10.4	3.5	54	2.8	1.173911	0.538462	1	1.5	5.2	0	0
	E. Coli	175	75	100	57.14	1	-0.5	1	1	1	1	2	8.8	3.5	14	2	0.594642	0.869565	1	1.5	2.3	0	0
Metals	Aluminum (Filtered)	33	33	0	0.00	2	-3.525	2.35	3.9	5.3	8.85	30.49	16.275	40.5	8.5	NC	1.0625	4.95	7.425	8	0	0	
	Aluminum Total	206	205	1	0.49	15.5	-1987.5	134.7	244.5	669.5	1732.5	3711.5	3964.5	7440	1173	200.2409	0.933174	1488	2232	1257	0	0	
	Antimony	202	105	97	48.02	0.1	-0.5	0.1	0.1	0.2	0.5	1.3	1.1	1.9	0.38	0.046107	1	0.4	0.6	0.38	0	0	
	Antimony (Filtered)	33	3	30	90.91	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.3	0.12	NC	2.352941	0	0	0.051	0	0		
	Arsenic	202	173	29	14.36	0.2	-0.5	0.2	0.4	0.625	1	1.685	1.9	2.8	0.74	0.06283	1.681818	0.6	0.9	0.44	0	0	
	Arsenic (Filtered)	33	31	2	6.06	0.2	0.15	0.2	0.3	0.3	0.4	0.4	0.55	0.4	0.31	NC	4.769231	0.1	0.15	0.065	0	0	
	Barium	204	204	0	0.00	4.1	2.775	15.125	24	28.05	38.15	62.4	59.375	98	32	2.029778	2.285714	14.15	21.225	14	0	0	
	Barium (Filtered)	33	33	0	0.00	6.2	9.15	8.93	17.7	21.1	23.4	24.83	31.95	24.9	20	NC	4.444444	5.7	8.55	4.5	0	0	
	Beryllium	206	9	197	95.63	0.02	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	2	0.44	0.116735	0.60274	0	0	0.73	0	0
	Beryllium (Filtered)	33	0	33	100.00	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	NC	NC	0	0	0	0	0
	Bismuth	48	7	41	85.42	0.1	-6.775	0.1	0.2	0.4	4.85	10	11.825	10	2.2	0.568277	0.647059	4.65	6.975	3.4	0	0	
	Bismuth (Filtered)	8	1	7	87.50	0.2	0.2	NC	0.2	0.2	0.2	NC	0.2	0.2	0.2	NC	NC	0	0	0	0	0	
	Boron - soluble	8	8	0	0.00	5.6	6.1375	NC	8.5	9.6	10.075	NC	12.4375	10.7	9.1	NC	5.6875	1.575	2.3625	1.6	0	0	
	Boron - soluble (Filtered)	8	8	0	0.00	4.3	4.175	NC	7.625	8	9.925	NC	13.375	10.4	8.1	NC	4.263158	2.3	3.45	1.9	0	0	
	Cadmium	206	2	204	99.03	0.05	-0.025	0.05	0.05	0.05	0.1	0.3	0.175	0.4	0.12	0.012334	1.333333	0.05	0.075	0.09	136	66.01942	
	Cadmium (Filtered)	33	0	33	100.00	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	NC	NC	0	0	0	0	0
	Cesium	202	69	133	65.84	0.051	-0.2	0.1	0.1	0.1	0.3	0.4	0.6	0.9	0.2	0.021259	1.428571	0.2	0.3	0.14	0	0	
	Cesium (Filtered)	33	1	32	96.97	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	NC	NC	0	0	0	0	0	
	Chromium	201	163	38	18.91	0.1	-2.75	0.355	0.7	2	3	6.23	6.45	9.9	2.3	0.203822	1.277778	2.3	3.45	1.8	0	0	
	Chromium (Filtered)	33	2	31	93.94	0.1	0.1	0.1	0.1	0.1	0.1	0.16	0.1	0.3	0.11	NC	3.142857	0	0				

Table D.9: Summary Statistics - Salt River @ Hwy 5 Bridge, Annual (All Parameters)

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical/Major Ions	Chlorophyll A	1	0	1	100.00	1000	NC	NC	NC	1000.00	NC	NC	NC	1000		NC	NC	NC	NC	NC	0	0
	Nitrogen (Organic) (Filtered)	2	2	0	0.00	0.513	NC	NC	NC	0.65	NC	NC	NC	0.779		0.1330	NC	NC	NC	NC	0	0
	Silica	2	2	0	0.00	5.56	NC	NC	NC	6.89	NC	NC	NC	8.22		1.3300	NC	NC	NC	NC	0	0
	Total Organic Carbon(TOC)	3	3	0	0.00	0.0113	0.00	NC	0.01	0.01	0.02	NC	0.03	0.0196	0.014	0.0026	3.0435	0.01	0.01	0.0046	0	0
	pH	51	51	0	0.00	7.74	7.74	7.80	7.96	8.01	8.11	8.23	8.34	8.35	8	0.0182	61.5385	0.15	0.22	0.1300	0	0
	Electrical Conductivity (EC)	50	50	0	0.00	1020	843.75	3250.50	8437.50	11450.00	13500.00	17170.00	21093.75	18800	10932	532.7122	2.9020	5062.50	7593.75	3767.0000	0	0
	Total Suspended Solids (TSS)	49	49	0	0.00	5	-25.00	6.50	17.00	25.00	45.00	99.00	87.00	156	34	4.0447	1.2143	28.00	42.00	28.0000	0	0
	Hardness as CaCO3	44	44	0	0.00	229	615.49	717.25	1230.00	1495.00	1639.68	1997.50	2254.19	2280	1418	55.8731	3.8221	409.68	614.51	371.0000	0	0
	Alkalinity (total as CaCO3)	51	51	0	0.00	106	116.25	130.80	190.50	215.00	240.00	308.00	314.25	362	218	6.3461	4.8444	49.50	74.25	45.0000	0	0
	Calcium	49	49	0	0.00	26.8	135.00	230.00	408.00	523.00	590.00	731.00	863.00	824	492	20.9890	3.3469	182.00	273.00	147.0000	0	0
	Magnesium	50	50	0	0.00	30.2	21.65	31.00	42.43	51.85	56.28	70.11	77.05	77.8	50	1.5210	4.5455	13.85	20.78	11.0000	0	0
	Potassium	48	48	0	2.04	2.6	0.51	2.70	3.46	4.34	5.43	10.75	8.39	12	4.8	0.2906	2.4000	1.97	2.96	2.0000	0	0
	Sodium	48	48	0	0.00	685	98.75	878.50	1580.00	2100.00	2567.50	3109.50	4048.75	3460	2090	91.3799	3.3017	987.50	1481.25	633.0000	0	0
	Chloride	51	51	0	0.00	1240	880.00	1498.80	2590.00	3200.00	3730.00	4986.00	5440.00	5750	3177	132.1836	3.3655	1140.00	1710.00	944.0000	51	100
	Fluoride	2	2	0	0.00	0.3	NC	NC	NC	0.40	NC	NC	NC	0.5		0.1000	NC	NC	NC	NC	2	100
	Sulphate	49	45	4	8.16	1	-410.00	2.00	727.00	1160.00	1485.00	1695.00	2622.00	1840	1065	71.7288	2.1215	758.00	1137.00	502.0000	0	0
	Colour	47	44	3	6.38	5	-50.00	5.00	10.00	30.00	50.00	146.00	110.00	203	42	6.0093	1.0244	40.00	60.00	41.0000	0	0
	Dissolved Organic Carbon (DOC) (Filtered)	3	3	0	0.00	11	-1.15	NC	11.00	11.90	19.10	NC	31.25	19.1	14	2.5632	3.1818	8.10	12.15	4.4000	0	0
	Total Solids (Filtered)	50	50	0	0.00	3246	1360.00	3359.00	5777.50	7530.50	8722.50	10945.00	13140.00	11700	7234	287.3964	3.5600	2945.00	4417.50	2032.0000	0	0
	Turbidity	51	50	1	1.96	1	-22.43	1.12	2.01	3.90	18.30	54.58	42.74	105	14	2.7754	0.7000	16.29	24.44	20.0000	0	0
Nutrients	Ammonia as N	51	35	16	31.37	0.002	-0.03	0.00	0.01	0.01	0.03	0.10	0.07	0.68	0.035	0.0133	0.3684	0.03	0.04	0.0950	18	35.29
	Total Kjeldahl Nitrogen (TKN)	1	1	0	0.00	0.35	NC	NC	NC	0.35	NC	NC	NC	NC		NC	NC	NC	NC	NC	0	0
	Nitrate (as NO3-N)	2	0	2	100.00	0.25	NC	NC	NC	0.25	NC	NC	NC	0.25		0.0000	NC	NC	NC	NC	0	0
	Nitrite (as NO2-N)	2	0	2	100.00	0.05	NC	NC	NC	0.05	NC	NC	NC	0.05		0.0000	NC	NC	NC	NC	0	0
	Nitrate and Nitrite (as N) (mg/L)	49	20	29	59.18	0.008	-0.04	0.01	0.01	0.01	0.04	1.69	0.09	3.59	0.18	0.0939	0.2727	0.03	0.05	0.6600	0	0
	Nitrogen (Total)	7	7	0	0.00	0.24	-0.09	NC	0.47	0.52	0.84	NC	1.40	1	0.6	0.0952	2.4000	0.37	0.56	0.2500	0	0
	Orthophosphate (as P)	2	0	2	100.00	0.001	NC	NC	NC	0.00	NC	NC	NC	0.001		0.0000	NC	NC	NC	NC	0	0
	Phosphorus	50	40	10	20.00	2	-50.00	3.65	10.00	25.00	50.00	109.65	110.00	200	35	5.2004	0.9459	40.00	60.00	37.0000	48	96
	Phosphorus (filtered) (Filtered)	3	3	0	0.00	0.004	0.00	NC	0.00	0.01	0.01	NC	0.01	0.0062	0.0051	0.0006	4.6364	0.00	0.00	0.0011	0	0
	Aluminum (Filtered)	7	6	1	14.29	1.1	-42.25	NC	1.10	3.10	30.00	NC	73.35	317	51	44.4451	0.4322	28.90	43.35	118.0000	1	14.29
Aluminum Total	8	7	1	12.50	16.1	-255.19	NC	37.43	53.90	232.50	NC	525.11	391	128	47.3492	0.9552	195.08	292.61	134.0000	0	0	
Antimony	8	5	3	37.50	0.1	-0.95	NC	0.10	0.20	0.80	NC	1.85	5	0.86	0.6006	0.5059	0.70	1.05	1.7000	0	0	
Antimony (Filtered)	7	3	4	57.14	0.1	-1.25	NC	0.10	0.20	1.00	NC	2.35	5	0.96	0.6848	0.5333	0.90	1.35	1.8000	0	0	
Arsenic	26	16	10	38.46	0.2	-0.65	0.24	0.40	1.00	1.10	7.65	2.15	10	1.3	0.3722	0.6842	0.70	1.05	1.9000	1	3.85	
Arsenic (Filtered)	7	5	2	28.57	0.5	-1.00	NC	0.80	0.90	2.00	NC	3.80	10	2.3	1.3005	0.6765	1.20	1.80	3.4000	1	14.29	
Barium	8	8	0	0.00	21.5	-5.09	NC	26.00	33.05	46.73	NC	77.81	50.7	35	3.8400	3.1818	20.73	31.09	11.0000	0	0	
Barium (Filtered)	7	7	0	0.00	22.3	-4.45	NC	24.20	35.80	43.30	NC	71.95	46.2	35	3.4766	3.8043	19.10	28.65	9.2000	0	0	
Beryllium	8	0	8	100.00	0.1	-0.91	NC	0.10	0.10	0.78	NC	1.79	5	0.83	0.6067	0.4882	0.68	1.01	1.7000	0	0	
Beryllium (Filtered)	7	0	7	100.00	0.1	-1.25	NC	0.10	0.10	1.00	NC	2.35	5	0.93	0.6903	0.5167	0.90	1.35	1.8000	0	0	
Bismuth	6	5	1	16.67	0.2	-8.16	NC	0.20	0.65	5.78	NC	14.14	16.8	3.4	2.6886	0.5152	5.58	8.36	6.6000	0	0	
Bismuth (Filtered)	6	5	1	16.67	0.2	-17.35	NC	0.20	0.25	11.90	NC	29.45	18.5	4.9	3.1380	0.6364	11.70	17.55	7.7000	0	0	
Boron - soluble	6	6	0	0.00	174	82.50	NC	212.25	267.50	298.75	NC	428.50	352	261	24.2589	4.4237	86.50	129.75	59.0000	0	0	
Boron - soluble (Filtered)	6	6	0	0.00	171	75.00	NC	209.25	250.50	298.75	NC	433.00	334	253	22.6668	4.5179	89.50	134.25	56.0000	0	0	
Cadmium	51	5	46	90.20	0.05	-0.20	0.10	0.10	0.10	0.30	3.00	0.60	5	0.44	0.1232	0.5000	0.20	0.30	0.8800	50	98.04	
Cadmium (Filtered)	7	1	6	85.71	0.05	-0.63	NC	0.05	0.05	0.50	NC	1.18	2.5	0.51	0.3391	0.5667	0.45	0.68	0.9000	3	42.86	
Cesium	8	1	7	87.50	0.1	-0.91	NC	0.10	0.10	0.78	NC	1.79	5	0.83	0.6067	0.4882	0.68	1.01	1.7000	0	0	
Cesium (Filtered)	7	1	6	85.71	0.1	-1.25	NC	0.10	0.10	1.00	NC	2.35	5	0.94	0.6876	0.5222	0.90	1.35	1.8000	0	0	
Chromium	51	29	22	43.14	0.1	-3.25	0.16	0.50	1.20	3.00	7.00	6.75	16	2.3	0.3761	0.8519	2.50	3.75	2.7000	0	0	
Chromium (Filtered)	7	5	2	28.57	0.1	-1.00	NC	0.20	0.30	1.00	NC	2.20	5	1	0.6693	0.5556	0.80	1.20	1.8000	0	0	
Cobalt	43	28	15	34.88	0.1	-1.00	0.10	0.20	0.80	1.00	4.34	2.20	10	0.98	0.2459	0.6125	0.80	1.20	1.6000	0	0	
Cobalt (Filtered)	7	3	4	57.14	0.1	-1.25	NC	0.10	0.10	1.00	NC	2.35	5	0.94	0.6876	0.5222	0.90	1.35	1.8000	0	0	
Copper	51	41	10	19.61	0.2	-30.50	0.20	1.00	5.50	22.00	179.20	53.50	218	29	7.3449	0.5577	21.00	31.50	52.0000	28	54.9	
Copper (Filtered)	7	4	3	42.86	0.2	-5.20	NC	0.20	0.30	3.80	NC	9.20	26.7	4.5	3.7265	0.4545	3.60	5.40	9.9000	1	14.29	
Iron	51	51	0	0.00	7	-820.50	31.60	78.00	210.00	677.00	1896.00	1575.50	4238	494	103.8714	0.6658	599.00	898.50	742.0000	20	39.22	
Iron (Filtered)	7																					

Table D.10: Summary Statistics - Slave River @ Fort Smith, Annual (All Parameters)

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical/Major Ions	Chlorophyll A	12	11	1	8.33	1	-3.85	NC	2.00	3.27	5.90	NC	11.75	5000	420	416.3371	0.2913	3.90	5.85	1442.0000	0	0
	Nitrogen (Organic) (Filtered)	6	6	0	0.00	0.309	0.12	NC	0.31	0.41	0.44	NC	0.62	0.483	0.39	0.0277	5.7353	0.12	0.19	0.0680	0	0
	Silica	17	16	1	5.88	2.18	1.13	NC	3.53	4.49	5.13	NC	7.53	5.99	4.4	0.2535	4.4000	1.60	2.40	1.0000	0	0
	Total Organic Carbon(TOC)	20	20	0	0.00	0.0029	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.0139	0.0092	0.0007	2.8750	0.01	0.01	0.0032	0	0
	pH	124	123	1	0.81	4.15	7.36	7.56	7.80	8.01	8.10	8.18	8.55	8.4	7.9	0.0357	19.7500	0.30	0.45	0.4000	1	0.81
	Electrical Conductivity (EC)	107	106	1	0.93	5	-100.00	5.80	20.00	40.00	100.00	430.60	220.00	1250	96	15.8293	0.5854	80.00	120.00	164.0000	0	0
	Total Suspended Solids (TSS)	119	118	1	0.84	16	-232.50	22.00	54.00	108.00	245.00	748.00	531.50	2800	227	33.5850	0.6202	191.00	286.50	366.0000	0	0
	Hardness as CaCO3	118	117	1	0.85	1.5	62.13	76.65	88.00	97.00	105.25	122.20	131.13	152	97	1.6668	5.3889	17.25	25.88	18.0000	0	0
	Alkalinity (total as CaCO3)	7	6	1	14.29	71	-271.00	NC	74.00	178.00	304.00	NC	649.00	626	223	74.8129	1.1263	230.00	345.00	198.0000	0	0
	Calcium	112	111	1	0.89	7.3	16.02	21.97	25.00	28.40	30.99	35.78	39.97	44.9	28	0.4554	5.8333	5.99	8.98	4.8000	0	0
	Magnesium	114	113	1	0.88	2.5	4.52	5.52	6.20	6.80	7.32	8.24	9.00	10.6	6.8	0.0943	6.8000	1.12	1.68	1.0000	0	0
	Potassium	91	90	1	1.10	0.5	0.20	0.64	0.80	0.99	1.20	1.95	1.80	3.17	1.1	0.0462	2.5000	0.40	0.60	0.4400	0	0
	Sodium	92	91	1	1.09	1.07	3.34	4.71	5.52	6.29	6.97	8.34	9.15	15.7	6.4	0.1588	4.2667	1.45	2.18	1.5000	0	0
	Chloride	125	124	1	0.80	1.4	0.87	2.43	4.05	5.00	6.17	8.51	9.35	18.02	5.2	0.1896	2.4762	2.12	3.17	2.1000	0	0
	Fluoride	14	3	11	78.57	0.07	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.098	0.0021	12.2500	0.00	0.00	0.0080	0	0
	Sulphate	124	123	1	0.81	3	8.50	13.10	16.00	18.00	21.00	28.75	28.50	61	19	0.5378	3.1667	5.00	7.50	6.0000	0	0
	Colour	125	124	1	0.80	59.4	49.53	70.51	78.70	85.00	98.15	210.00	127.33	250	106	4.2634	2.2083	19.45	29.18	48.0000	0	0
	Dissolved Organic Carbon (DOC) (Filtered)	18	17	1	5.56	2.8	-0.18	NC	7.33	9.63	12.33	NC	19.83	14.6	9.5	0.7573	2.9688	5.00	7.50	3.2000	0	0
	Total Solids (Filtered)	90	89	1	1.11	46	76.13	98.20	126.00	137.50	159.25	198.35	209.13	240	141	3.2966	4.5484	33.25	49.88	31.0000	0	0
	Turbidity	123	122	1	0.81	4.1	-152.75	10.92	28.90	62.00	150.00	548.80	331.65	1870	145	22.3764	0.5847	121.10	181.65	248.0000	0	0
Nutrients	Ammonia as N	100	80	20	20.00	0.002	-0.03	0.01	0.01	0.01	0.03	0.09	0.07	0.52	0.032	0.0067	0.4776	0.03	0.04	0.0670	36	36
	Total Kjeldahl Nitrogen (TKN)	7	6	1	14.29	0.0026	-0.58	NC	0.13	0.30	0.60	NC	1.31	1.6	0.46	0.2050	0.8519	0.47	0.71	0.5400	0	0
	Nitrate (as NO3-N)	11	10	1	9.09	0.0378	0.01	NC	0.06	0.08	0.09	NC	0.14	0.12	0.076	0.0083	2.7143	0.03	0.05	0.0280	0	0
	Nitrite (as NO2-N)	15	4	11	73.33	0.001	-0.01	NC	0.00	0.01	0.01	NC	0.02	0.06	0.012	0.0042	0.7500	0.01	0.01	0.0160	1	6.67
	Nitrate and Nitrite (as N) (mg/L)	99	77	22	22.22	0.008	-0.07	0.01	0.02	0.04	0.08	0.15	0.17	0.22	0.057	0.0046	1.2391	0.06	0.09	0.0460	0	0
	Nitrogen (Total)	8	7	1	12.50	0.17	-0.67	NC	0.29	0.42	0.94	NC	1.90	0.99	0.56	0.1163	1.6970	0.64	0.96	0.3300	0	0
	Orthophosphate (as P)	20	17	3	15.00	0.002	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.012	0.0042	0.0005	1.7500	0.00	0.01	0.0024	0	0
	Phosphorus	100	95	5	5.00	14	-159.75	23.40	60.00	107.50	206.50	747.90	426.25	4400	227	47.1094	0.4820	146.50	219.75	471.0000	100	100
	Phosphorus (filtered) (Filtered)	21	21	0	0.00	0.002	-0.01	0.00	0.00	0.01	0.01	0.05	0.02	0.0593	0.01	0.0026	0.8333	0.01	0.01	0.0120	0	0
	Aluminum (Filtered)	16	13	3	18.75	2.6	-41.94	NC	11.13	25.55	46.50	NC	99.56	85.2	30	5.7680	1.3043	35.38	53.06	23.0000	0	0
	Aluminum Total	21	20	1	4.76	338	-5355.00	348.60	675.00	1780.00	4695.00	7397.00	10725.00	7480	2738	497.7962	1.2004	4020.00	6030.00	2281.0000	0	0
	Antimony	21	17	4	19.05	0.1	-0.28	0.10	0.10	0.20	0.35	4.01	0.73	4.4	0.41	0.2015	0.4457	0.25	0.38	0.9200	0	0
	Antimony (Filtered)	16	11	5	31.25	0.1	-0.16	NC	0.10	0.20	0.28	NC	0.54	0.7	0.23	0.0403	1.4375	0.18	0.26	0.1600	0	0
	Arsenic	72	66	6	8.33	0.3	-1.63	0.40	1.00	1.75	2.75	6.61	5.38	15.7	2.3	0.2721	1.0000	1.75	2.63	2.3000	6	8.33
	Arsenic (Filtered)	16	13	3	18.75	0.3	0.14	NC	0.40	0.40	0.58	NC	0.84	0.8	0.48	0.0348	3.4286	0.18	0.28	0.1400	0	0
	Barium	21	20	1	4.76	49.5	-125.13	49.59	62.00	95.90	186.75	301.20	373.88	303	132	18.1883	1.5904	124.75	187.13	83.0000	0	0
	Barium (Filtered)	16	13	3	18.75	40.5	23.43	NC	43.30	48.25	56.55	NC	76.43	60.9	49	1.7510	7.0000	13.25	19.88	7.0000	0	0
	Beryllium	21	16	5	23.81	0.1	-0.20	0.10	0.10	0.10	0.30	0.43	0.60	0.433	0.19	0.0259	1.5833	0.20	0.30	0.1200	0	0
	Beryllium (Filtered)	16	5	11	68.75	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Bismuth	13	6	7	53.85	0.2	-0.02	NC	0.20	0.20	0.35	NC	0.58	2.7	0.55	0.2156	0.7051	0.15	0.23	0.7800	0	0
Bismuth (Filtered)	12	1	11	91.67	0.2	0.20	NC	0.20	0.20	0.20	NC	0.20	0.2	0.2	0.0000	NC	0.00	0.00	0.0000	0	0	
Boron - soluble	16	15	1	6.25	8.3	2.90	NC	15.20	20.10	23.40	NC	35.70	31.8	20	1.4296	3.5088	8.20	12.30	5.7000	0	0	
Boron - soluble (Filtered)	15	12	3	20.00	10.8	8.05	NC	13.60	15.80	17.30	NC	22.85	19.8	16	0.6407	6.4000	3.70	5.55	2.5000	0	0	
Cadmium	103	51	52	50.49	0.1	-0.20	0.10	0.10	0.20	0.30	1.16	0.60	10	0.4	0.1038	0.3636	0.20	0.30	1.1000	103	100	
Cadmium (Filtered)	16	6	10	62.50	0.05	0.05	NC	0.05	0.05	0.05	NC	0.05	0.44	0.075	0.0243	0.7732	0.00	0.00	0.0970	1	6.25	
Cesium	21	19	2	9.52	0.1	-1.01	0.10	0.20	0.40	1.01	1.53	2.22	1.53	0.6	0.1032	1.2766	0.81	1.21	0.4700	0	0	
Cesium (Filtered)	16	6	10	62.50	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.2	0.11	0.0062	4.4000	0.00	0.00	0.0250	0	0	
Chromium	101	88	13	12.87	0.3	-9.75	0.91	1.95	4.00	9.75	26.80	21.45	86	8.1	1.1613	0.6750	7.80	11.70	12.0000	0	0	
Chromium (Filtered)	16	8	8	50.00	0.1	-0.01	NC	0.10	0.10	0.18	NC	0.29	0.4	0.14	0.0202	1.7284	0.08	0.11	0.0810	0	0	
Cobalt	77	73	4	5.19	0.1	-2.45	0.29	0.70	1.30	2.80	5.85	5.95	16	2.1	0.2613	0.9130	2.10	3.15	2.3000	0	0	
Cobalt (Filtered)	16	4	12	75.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.4	0.12	0.0188	1.6000	0.00	0.00	0.0750	0	0	
Copper	103	101	2	1.94	0.5	-7.30	1.20	2.60	5.00	9.20	20.00	19.10	43	7.1	0.6699	1.0441	6.60	9.90	6.8000	62	60.19	
Copper (Filtered)	16	13	3	18.75	0.7	-1.33	NC	1.23	1.75	2.93	NC	5.48	4.4	2	0.2615	2.0000	1.70	2.55	1.0000	1	6.25	
Iron	102	101	1	0.98	8	-6546.25	408.30															

Table D.11: Summary Statistics - Slave River @Mouth, Annual (All Parameters)

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical/Major Ions	pH	58	58	0	0.00	7.44	7.54	7.55	7.87	7.97	8.08	8.19	8.40	8.2	7.9	0.0230	43.8889	0.22	0.32	0.1800	0	0
	Electrical Conductivity (EC)	57	57	0	0.00	7	-90.00	9.80	30.00	55.00	110.00	531.70	230.00	890	120	23.8463	0.6667	80.00	120.00	180.0000	0	0
	Total Suspended Solids (TSS)	58	58	0	0.00	3	-333.63	13.90	46.25	135.00	299.50	975.00	679.38	1960	233	43.4516	0.7039	253.25	379.88	331.0000	0	0
	Hardness as CaCO3	57	57	0	0.00	12.9	66.88	69.32	91.25	100.00	107.50	122.80	131.88	151	98	2.3864	5.4444	16.25	24.38	18.0000	0	0
	Calcium	60	60	0	0.00	18.4	19.54	21.82	26.18	29.00	30.60	35.18	37.24	43.1	29	0.5368	6.9048	4.43	6.64	4.2000	0	0
	Magnesium	60	60	0	0.00	2.8	4.41	5.61	6.20	6.78	7.40	8.10	9.19	10.5	6.8	0.1311	6.8000	1.20	1.79	1.0000	0	0
	Potassium	50	50	0	0.00	0.6	-0.04	0.70	0.88	1.10	1.49	3.00	2.41	8.7	1.4	0.1684	1.1667	0.61	0.92	1.2000	0	0
	Sodium	50	50	0	0.00	5.7	3.88	6.00	7.11	8.05	9.27	11.64	12.51	14.1	8.3	0.2365	4.8824	2.16	3.24	1.7000	0	0
	Chloride	60	60	0	0.00	2.4	0.56	4.71	5.86	7.95	9.39	13.05	14.70	18.2	8	0.3529	2.9630	3.54	5.30	2.7000	0	0
	Sulphate	59	59	0	0.00	12	7.00	14.00	16.60	20.00	23.00	32.00	32.60	66	21	0.9745	2.8000	6.40	9.60	7.5000	0	0
	Colour	60	60	0	0.00	68.8	56.15	70.15	76.10	83.40	89.40	103.80	109.35	196	85	2.2469	5.0000	13.30	19.95	17.0000	0	0
	Total Solids (Filtered)	59	59	0	0.00	43	79.00	95.00	130.00	150.00	164.00	194.00	215.00	345	151	5.7453	3.4318	34.00	51.00	44.0000	0	0
	Turbidity	59	59	0	0.00	7.2	-193.00	13.00	32.00	72.70	182.00	1260.00	407.00	1920	196	45.1860	0.5648	150.00	225.00	347.0000	0	0
Nutrients	Ammonia as N	59	54	5	8.47	0.002	-0.02	0.01	0.01	0.03	0.04	0.14	0.07	0.268	0.037	0.0060	0.8043	0.02	0.04	0.0460	36	61.02
	Total Kjeldahl Nitrogen (TKN)	8	8	0	0.00	0.039	-0.05	NC	0.31	0.45	0.55	NC	0.91	0.97	0.46	0.0935	1.7692	0.24	0.36	0.2600	0	0
	Nitrate and Nitrite (as N) (mg/L)	59	49	10	16.95	0.008	-0.06	0.01	0.02	0.04	0.07	0.19	0.16	0.23	0.057	0.0064	1.1633	0.05	0.08	0.0490	0	0
	Phosphorus	58	56	2	3.45	10	-290.13	23.00	50.00	122.50	276.75	1026.50	616.88	1800	229	42.5531	0.7068	226.75	340.13	324.0000	58	100
Metals	Arsenic	34	32	2	5.88	0.3	-0.98	0.38	0.83	1.00	2.03	11.50	3.83	25	2.3	0.7294	0.5349	1.20	1.80	4.3000	2	5.88
	Cadmium	59	36	23	38.98	0.1	-0.20	0.10	0.10	0.20	0.30	1.20	0.60	5	0.39	0.0953	0.5342	0.20	0.30	0.7300	59	100
	Chromium	57	52	5	8.77	0.2	-12.18	0.56	1.10	3.80	9.95	40.50	23.23	66	8.7	1.7528	0.6692	8.85	13.28	13.0000	0	0
	Cobalt	40	38	2	5.00	0.1	-3.50	0.11	0.40	1.35	3.00	9.83	6.90	10.8	2.3	0.4000	0.9200	2.60	3.90	2.5000	0	0
	Copper	59	57	2	3.39	1	-10.00	1.30	2.60	5.00	11.00	31.90	23.60	52	8.9	1.2651	0.9175	8.40	12.60	9.7000	37	62.71
	Iron	58	58	0	0.00	131	-7727.50	493.00	1022.00	3270.00	6855.00	30150.00	15604.50	43400	5842	1086.5478	0.7060	5833.00	8749.50	8275.0000	57	98.28
	Lead	58	55	3	5.17	0.3	-5.79	0.50	1.00	2.00	5.53	17.44	12.31	29.5	4.2	0.6953	0.7925	4.53	6.79	5.3000	10	17.24
	Manganese	40	40	0	0.00	8.6	-125.31	13.15	30.73	62.65	134.75	351.70	290.79	477	104	16.4038	1.0000	104.03	156.04	104.0000	0	0
	Mercury	15	14	1	6.67	0.01	-0.09	NC	0.02	0.03	0.09	NC	0.20	0.18	0.058	0.0136	1.0943	0.07	0.11	0.0530	10	66.67
	Nickel	58	57	1	1.72	0.1	-12.88	1.38	2.20	5.95	12.25	36.09	27.33	76	9.8	1.5733	0.8167	10.05	15.08	12.0000	0	0
	Zinc	58	48	10	17.24	1	-29.00	3.10	10.00	17.15	36.00	131.10	75.00	184	30	4.5928	0.8571	26.00	39.00	35.0000	20	34.48

Notes:
bold - DL ≥50%
NC - not calculatable

Table D.12: Summary Statistics - Snowdrift River @ Mouth Stark Lake, Annual (All Parameters)

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical/Major Ions	pH	56	56	0	0.00	6.5	6.52	6.60	6.99	7.17	7.30	7.52	7.77	7.76	7.129821	0.0322	27.3077	0.31	0.47	0.2592	1	1.79
	Electrical Conductivity (EC)	56	56	0	0.00	3.2	24.10	22.60	33.70	37.00	40.10	46.51	49.70	49	35.75536	1.0295	4.3902	6.40	9.60	8.1624	0	0
	Total Suspended Solids (TSS)	43	10	33	76.74	2	0.00	2.00	3.00	3.00	5.00	8.00	8.00	9	3.883721	0.2371	2.2941	2.00	3.00	1.6734	0	0
	Hardness as CaCO3	53	53	0	0.00	10	6.55	10.82	13.30	15.00	17.80	23.05	24.55	25.4	15.69245	0.4530	4.5714	4.50	6.75	3.5042	0	0
	Alkalinity (total as CaCO3)	56	56	0	0.00	7	5.86	8.47	10.25	11.75	13.18	15.76	17.56	21.1	11.96607	0.2971	5.0000	2.93	4.39	2.3551	0	0
	Calcium	56	56	0	0.00	2.03	1.56	2.84	3.61	3.92	4.98	6.20	7.02	6.8	4.226786	0.1278	4.2000	1.37	2.05	1.0134	0	0
	Magnesium	56	56	0	0.00	0.7	0.55	0.90	1.00	1.10	1.30	1.65	1.75	1.9	1.188036	0.0314	4.8000	0.30	0.45	0.2486	0	0
	Potassium	49	48	1	2.04	0.3	0.34	0.35	0.50	0.50	0.60	0.71	0.76	0.75	0.525857	0.0126	5.5789	0.11	0.16	0.0940	0	0
	Sodium	49	49	0	0.00	0.1	0.40	0.80	1.00	1.14	1.40	1.65	2.00	2.2	1.172857	0.0405	3.8710	0.40	0.60	0.3026	0	0
	Chloride	56	55	1	1.79	1	0.61	1.19	1.50	1.89	2.10	2.86	3.00	3.3	1.896071	0.0594	3.9583	0.60	0.90	0.4707	0	0
	Sulphate	56	46	10	17.86	1	-0.51	1.00	2.00	3.00	3.68	6.15	6.19	10	2.880357	0.1970	1.8125	1.68	2.51	1.5621	0	0
	Colour	53	53	0	0.00	5	-5.00	8.50	10.00	17.00	20.00	30.00	35.00	47	17.37736	0.9595	2.2667	10.00	15.00	7.4231	0	0
	Total Solids (Filtered)	56	54	2	3.57	-10	0.00	10.00	23.25	29.50	38.75	55.20	62.00	271	34.875	4.3714	1.0000	15.50	23.25	34.3860	0	0
	Turbidity	49	47	2	4.08	0.3	0.11	0.38	0.59	0.70	0.90	2.05	1.37	5.45	0.889388	0.1020	1.1558	0.32	0.47	0.7620	0	0
Nutrients	Ammonia as N	56	25	31	55.36	0.002	-0.03	0.00	0.01	0.01	0.03	0.04	0.06	0.05	0.013982	0.0015	1.1687	0.02	0.03	0.0120	15	26.79
	Total Kjeldahl Nitrogen (TKN)	9	9	0	0.00	0.0082	-0.16	NC	0.18	0.24	0.40	NC	0.74	0.43	0.262022	0.0348	1.8571	0.23	0.34	0.1312	0	0
	Nitrate and Nitrite (as N) (mg/L)	56	25	31	55.36	0.008	-0.04	0.01	0.01	0.02	0.04	0.14	0.09	0.3	0.032589	0.0060	0.6875	0.03	0.05	0.0479	0	0
	Nitrogen (Total)	1	1	0	0.00	0.23	NC	NC	NC	0.23	NC	NC	NC	NC	0.23	NC	NC	NC	NC	0.0000	0	0
	Phosphorus	56	28	28	50.00	2	-8.88	4.00	5.00	10.00	14.25	50.00	28.13	62	16.60714	2.1910	0.9444	9.25	13.88	17.3706	55	98.21
Metals	Aluminum (Filtered)	1	1	0	0.00	4.1	NC	NC	NC	4.10	NC	NC	NC	4.1	4.1	NC	NC	NC	NC	0.0000	0	0
	Aluminum (Total)	1	1	0	0.00	332	NC	NC	NC	332.00	NC	NC	NC	332	332	NC	NC	NC	NC	0.0000	0	0
	Antimony	1	0	1	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.1	NC	NC	NC	NC	0.0000	0	0
	Antimony (Filtered)	1	0	1	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.1	NC	NC	NC	NC	0.0000	0	0
	Arsenic	29	1	28	96.55	0.2	-0.75	0.20	0.30	0.50	1.00	3.50	2.05	5	0.813793	0.1488	0.8901	0.70	1.05	0.8893	1	3.44
	Arsenic (Filtered)	1	0	1	100.00	0.2	NC	NC	NC	0.20	NC	NC	NC	0.2	0.2	NC	NC	NC	NC	0.0000	0	0
	Barium	1	1	0	0.00	12.1	NC	NC	NC	12.10	NC	NC	NC	12.1	12.1	NC	NC	NC	NC	0.0000	0	0
	Barium (Filtered)	1	1	0	0.00	7.8	NC	NC	NC	7.80	NC	NC	NC	7.8	7.8	NC	NC	NC	NC	0.0000	0	0
	Beryllium	1	0	1	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.1	NC	NC	NC	NC	0.0000	0	0
	Beryllium (Filtered)	1	1	0	0.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.1	NC	NC	NC	NC	0.0000	0	0
	Bismuth	1	1	0	0.00	1.2	NC	NC	NC	1.20	NC	NC	NC	1.2	1.2	NC	NC	NC	NC	0.0000	0	0
	Bismuth (Filtered)	1	0	1	100.00	0.2	NC	NC	NC	0.20	NC	NC	NC	0.2	0.2	NC	NC	NC	NC	0.0000	0	0
	Boron - soluble	1	1	0	0.00	5.8	NC	NC	NC	5.80	NC	NC	NC	5.8	5.8	NC	NC	NC	NC	0.0000	0	0
	Boron - soluble (Filtered)	1	1	0	0.00	4.2	NC	NC	NC	4.20	NC	NC	NC	4.2	4.2	NC	NC	NC	NC	0.0000	0	0
	Cadmium	55	11	44	80.00	0.05	-0.20	0.05	0.10	0.10	0.30	0.68	0.60	10	0.370909	0.1680	0.2846	0.20	0.30	1.3212	47	85.45
	Cadmium (Filtered)	1	1	0	0.00	0.08	NC	NC	NC	0.08	NC	NC	NC	0.08	0.08	NC	NC	NC	NC	0.0000	0	0
	Cesium	1	0	1	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.1	NC	NC	NC	NC	0.0000	0	0
	Cesium (Filtered)	1	0	1	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.1	NC	NC	NC	NC	0.0000	0	0
	Chromium	52	22	30	57.69	0.07	-2.25	0.10	0.30	0.90	2.00	3.00	4.55	4	1.145577	0.1391	1.0000	1.70	2.55	1.0669	0	0
	Chromium (Filtered)	1	0	1	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	NC	NC	NC	NC	NC	0.0000	0	0
	Cobalt	36	6	30	83.33	0.03	-0.20	0.03	0.10	0.10	0.30	1.00	0.60	1	0.307222	0.0571	0.8158	0.20	0.30	0.3736	0	0
	Cobalt (Filtered)	1	0	1	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.1	NC	NC	NC	NC	0.0000	0	0
	Copper	53	34	19	35.85	0.1	-0.78	0.27	0.50	1.00	1.35	2.27	2.63	3.4	1.08	0.0892	1.5714	0.85	1.28	0.6904	0	0
	Copper (Filtered)	1	0	1	100.00	0.2	NC	NC	NC	0.20	NC	NC	NC	0.2	0.2	NC	NC	NC	NC	0.0000	0	0
	Iron	54	52	2	3.70	22	4.75	31.25	49.00	60.00	78.50	113.00	122.75	341	67.98519	5.5067	1.5814	29.50	44.25	42.9564	1	1.85
	Iron (Filtered)	1	1	0	0.00	19	NC	NC	NC	19.00	NC	NC	NC	19	19	NC	NC	NC	NC	0.0000	0	0
	Lead	55	19	36	65.45	0.1	-1.25	0.10	0.10	0.50	1.00	3.28	2.35	70	1.934545	1.1811	0.2021	0.90	1.35	9.2892	1	1.82
	Lead (Filtered)	1	1	0	0.00	0.3	NC	NC	NC	0.30	NC	NC	NC	0.3	0.3	NC	NC	NC	NC	0.0000	0	0
	Lithium	1	1	0	0.00	1	NC	NC	NC	1.00	NC	NC	NC	1	1	NC	NC	NC	NC	0.0000	0	0
	Lithium (Filtered)	1	1	0	0.00	0.7	NC	NC	NC	0.70	NC	NC	NC	0.7	0.7	NC	NC	NC	NC	0.0000	0	0
	Manganese	21	21	0	0.00	2.1	0.78	2.19	3.10	4.30	4.65	11.26	6.98	11.9	4.390476	0.3572	2.3158	1.55	2.33	1.8774	0	0
	Manganese (Filtered)	1	1	0	0.00	0.9	NC	NC	NC	0.90	NC	NC	NC	0.9	0.9	NC	NC	NC	NC	0.0000	0	0
	Mercury	16	9	7	43.75	0.01	-0.08	NC	0.01	0.03	0.07	NC	0.17	1.6	0.212063	0.1020	0.4286	0.06	0.09	0.4738	10	62.5
	Mercury (Filtered)	1	1	0	0.00	0.02	NC	NC	NC	0.02	NC	NC	NC	0.02	0.02	NC	NC	NC	NC	0.0000	0	0
	Molybdenum	1	1	0	0.00	0.3	NC	NC	NC	0.30	NC	NC	NC	0.3	0.3	NC	NC	NC	NC	0.0000	0	0
	Molybdenum (Filtered)	1	1	0	0.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.1	NC	NC	NC	NC	0.0000	0	0
	Nickel	54	32	22	40.74	0.2	-0.75	0.28	0.30	0.80	1.00	6.25	2.05	10	1.094444	0.2402	0.5789	0.70	1.05	1.8735	0	0
	Nickel (Filtered)	1	1	0	0.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.1	NC	NC	NC	NC	0.0000	0	0
	Rubidium	1	1	0	0.00	2.1	NC	NC	NC	2.10	NC	NC	NC	2.1	2.1	NC	NC	NC	NC	0.0000	0	0
	Rubidium (Filtered)	1	1	0	0.00	1.6	NC	NC	NC	1.60	NC	NC	NC	1.6	1.6	NC	NC	NC	NC	0.0000	0	0
	Selenium	1	0	1	100.00	0.5	NC	NC	NC	0.50	NC	NC	NC	0.5	0.5	NC	NC	NC	NC	0.0000	0	0
	Selenium (Filtered)	1	0	1	100.00	0.3	NC	NC	NC	0.30	NC	NC	NC	0.3	0.3	NC	NC	NC	NC	0.0000	0	

Table D.13: Summary Statistics - Taltson River @ Mouth, Annual (All Parameters)

Chem. Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE	
Physical/Major Ions	Nitrogen (Organic) (Filtered)	1	1	0	0.00	0.272	NC	NC	NC	0.27	NC	NC	NC	NC	0.27	0.272	NC	NC	NC	NC	0.00	0	0
	Silica	1	1	0	0.00	2.13	NC	NC	NC	2.13	NC	NC	NC	NC	2.13	2.13	NC	NC	NC	NC	0.00	0	0
	Total Organic Carbon(TOC)	1	1	0	0.00	0.0068	NC	NC	NC	0.01	NC	NC	NC	NC	0.01	0.0068	NC	NC	NC	NC	0.00	0	0
	pH	62	62	0	0.00	6.6	6.26	6.71	7.00	7.30	7.48	7.67	8.21	7.70	7.2	0.0370	24.8276	0.49	0.73	0.29	0	0	
	Electrical Conductivity (EC)	64	64	0	0.00	6.9	37.00	42.05	46.00	48.55	52.00	55.55	61.00	57.00	48	0.8162	7.3846	6.00	9.00	6.50	0	0	
	Total Suspended Solids (TSS)	58	37	21	36.21	0.3	-2.89	1.95	3.00	5.00	6.93	14.10	12.81	24.00	5.8	0.5373	1.4146	3.93	5.89	4.10	0	0	
	Hardness as CaCO3	62	61	1	1.61	0.8	13.36	16.09	18.43	20.00	21.80	28.74	26.86	30.20	20	0.5165	4.8780	3.38	5.06	4.10	0	0	
	Alkalinity (total as CaCO3)	64	63	1	1.56	10	12.99	15.25	17.00	18.00	19.68	21.90	23.69	23.80	18	0.2706	8.1818	2.68	4.01	2.20	0	0	
	Calcium	64	64	0	0.00	4.2	3.61	4.60	5.13	5.60	6.15	7.90	7.67	8.80	5.7	0.1094	6.5517	1.02	1.52	0.87	0	0	
	Magnesium	64	63	1	1.56	0.7	0.95	1.20	1.37	1.50	1.64	2.00	2.06	2.80	1.5	0.0352	5.3571	0.28	0.42	0.28	0	0	
	Potassium	54	53	1	1.85	0.5	0.62	0.62	0.79	0.80	0.90	1.05	1.07	1.40	0.83	0.0183	6.3846	0.11	0.17	0.13	0	0	
	Sodium	54	53	1	1.85	1.13	1.06	1.20	1.40	1.50	1.63	2.08	1.98	19.40	1.9	0.3323	0.7917	0.23	0.35	2.40	0	0	
	Chloride	64	64	0	0.00	1.2	0.98	1.30	1.50	1.66	1.85	2.18	2.36	7.72	1.8	0.0996	2.2500	0.35	0.52	0.80	0	0	
	Fluoride	1	0	1	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.10	0.1	NC	NC	NC	NC	0.00	0	0	
	Sulphate	63	51	12	19.05	1	-0.25	1.00	1.70	3.00	3.00	5.00	4.95	8.00	2.7	0.1713	1.9286	1.30	1.95	1.40	0	0	
	Colour	62	59	3	4.84	5	-12.50	5.15	10.00	15.00	25.00	31.85	47.50	49.00	17	1.1478	1.8889	15.00	22.50	9.00	0	0	
	Dissolved Organic Carbon (DOC) (Filtered)	1	1	0	0.00	7	NC	NC	NC	7.00	NC	NC	NC	7.00	7	NC	NC	NC	NC	0.00	0	0	
	Total Solids (Filtered)	63	63	0	0.00	13	5.50	14.00	31.00	38.00	48.00	54.80	73.50	57.00	37	1.4964	3.0833	17.00	25.50	12.00	0	0	
	Turbidity	62	62	0	0.00	0.6	-1.32	1.30	2.99	3.90	5.86	15.70	10.17	18.00	5.1	0.4752	1.3784	2.87	4.31	3.70	0	0	
	Nutrients	Ammonia as N	63	31	32	50.79	0.002	-0.01	0.00	0.01	0.01	0.02	0.05	0.04	0.06	0.014	0.0017	1.0769	0.01	0.02	0.01	15	23.81
Total Kjeldahl Nitrogen (TKN)		8	8	0	0.00	0.24	0.07	NC	0.27	0.32	0.41	NC	0.62	0.48	0.34	0.0291	4.1463	0.14	0.21	0.08	0	0	
Nitrate (as NO3-N)		1	1	0	0.00	0.0067	NC	NC	NC	0.01	NC	NC	NC	0.01	0.0067	NC	NC	NC	NC	0.00	0	0	
Nitrite (as NO2-N)		1	1	0	0.00	0.001	NC	NC	NC	0.00	NC	NC	NC	0.00	0.001	NC	NC	NC	NC	0.00	0	0	
Nitrate and Nitrite (as N) (mg/L)		63	34	29	46.03	0.0067	-0.04	0.01	0.01	0.02	0.04	0.19	0.09	0.45	0.042	0.0093	0.5676	0.03	0.05	0.07	0	0	
Nitrogen (Total)		3	3	0	0.00	0.23	0.15	NC	0.23	0.27	0.29	NC	0.37	0.29	0.26	0.0167	8.9655	0.06	0.08	0.03	0	0	
Orthophosphate (as P)		1	1	0	0.00	0.001	NC	NC	NC	0.00	NC	NC	NC	0.00	0.001	NC	NC	NC	NC	0.00	0	0	
Phosphorus		62	44	18	29.03	4	-8.38	6.00	10.00	14.00	22.25	50.00	40.63	90.00	21	2.2532	1.1667	12.25	18.38	18.00	62	100	
Phosphorus (filtered) (Filtered)		1	1	0	0.00	0.0063	NC	NC	NC	0.01	NC	NC	NC	0.01	0.0063	NC	NC	NC	NC	0.00	0	0	
Metals		Aluminum (Filtered)	3	3	0	0.00	2.3	-1.00	NC	2.30	2.40	4.50	NC	7.80	4.50	3.1	0.7172	2.5833	2.20	3.30	1.20	0	0
	Aluminum Total	3	3	0	0.00	108	-9.00	NC	108.00	134.00	186.00	NC	303.00	186.00	143	22.9298	3.5750	78.00	117.00	40.00	0	0	
	Antimony	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.1	0.0000	NC	0.00	0.00	0.00	0	0	
	Antimony (Filtered)	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.1	0.0000	NC	0.00	0.00	0.00	0	0	
	Arsenic	36	2	34	94.44	0.2	-0.75	0.20	0.30	0.50	1.00	1.00	2.05	1.00	0.6	0.0560	1.7647	0.70	1.05	0.34	0	0	
	Arsenic (Filtered)	3	0	3	100.00	0.2	0.20	NC	0.20	0.20	0.20	NC	0.20	0.20	0.2	0.0000	NC	0.00	0.00	0.00	0	0	
	Barium	3	3	0	0.00	7.2	4.35	NC	7.20	7.30	9.10	NC	11.95	9.10	7.9	0.6173	7.1818	1.90	2.85	1.10	0	0	
	Barium (Filtered)	3	3	0	0.00	4.8	1.65	NC	4.80	5.60	6.90	NC	10.05	6.90	5.8	0.6119	5.2727	2.10	3.15	1.10	0	0	
	Beryllium	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.1	0.0000	NC	0.00	0.00	0.00	0	0	
	Beryllium (Filtered)	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.1	0.0000	NC	0.00	0.00	0.00	0	0	
	Bismuth	3	2	1	33.33	0.2	-2.05	NC	0.20	1.00	1.70	NC	3.95	1.70	0.97	0.4333	1.2933	1.50	2.25	0.75	0	0	
	Bismuth (Filtered)	3	0	3	100.00	0.2	0.20	NC	0.20	0.20	0.20	NC	0.20	0.20	0.2	0.0000	NC	0.00	0.00	0.00	0	0	
	Boron - soluble	3	3	0	0.00	5	1.85	NC	5.00	5.20	7.10	NC	10.25	7.10	5.8	0.6692	4.8333	2.10	3.15	1.20	0	0	
	Boron - soluble (Filtered)	3	3	0	0.00	4.2	2.70	NC	4.20	4.60	5.20	NC	6.70	5.20	4.7	0.2906	9.4000	1.00	1.50	0.50	0	0	
	Cadmium	63	10	53	84.13	0.1	-0.20	0.10	0.10	0.10	0.30	2.76	0.60	5.00	0.38	0.1021	0.4691	0.20	0.30	0.81	63	100	
	Cadmium (Filtered)	3	0	3	100.00	0.05	0.05	NC	0.05	0.05	0.05	NC	0.05	0.05	0.05	0.0000	NC	0.00	0.00	0.00	0	0	
	Cesium	3	1	2	66.67	0.1	-0.05	NC	0.10	0.10	0.20	NC	0.35	0.20	0.13	0.0333	2.2414	0.10	0.15	0.06	0	0	
	Cesium (Filtered)	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.1	0.0000	NC	0.00	0.00	0.00	0	0	
	Chromium	61	30	31	50.82	0.1	-2.13	0.20	0.35	1.00	2.00	3.00	4.48	6.00	1.2	0.1459	1.0909	1.65	2.48	1.10	0	0	
	Chromium (Filtered)	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.1	0.0000	NC	0.00	0.00	0.00	0	0	
	Cobalt	44	7	37	84.09	0.1	-0.99	0.10	0.10	0.10	0.83	1.00	1.91	1.00	0.33	0.0590	0.8462	0.73	1.09	0.39	0	0	
	Cobalt (Filtered)	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.1	0.0000	NC	0.00	0.00	0.00	0	0	
	Copper	62	37	25	40.32	0.1	-0.25	0.22	0.50	0.85	1.00	2.00	1.75	30.00	1.4	0.4754	0.3784	0.50	0.75	3.70	1	1.61	
	Copper (Filtered)	3	1	2	66.67	0.2	0.20	NC	0.20	0.20	0.20	NC	0.20	0.20	0.2	0.0000	NC	0.00	0.00	0.00	0	0	
	Iron	63	61	2	3.17	2	-85.00	74.00	110.00	164.00	240.00	476.40	435.00	862.00	196	17.2161	1.4307	130.00	195.00	137.00	9	14.29	
	Iron (Filtered)	3	2	1	33.33	5	-29.50	NC	5.00	5.00	28.00	NC	62.50	28.00	13	7.6667	1.0000	23.00	34.50	13.00	0	0	
	Lead	62	25	37	59.68	0.1	-1.00	0.10	0.20	0.85	1.00	2.51	2.20	20.00	1.2	0.3848	0.4000	0.80	1.20	3.00	2	3.23	
	Lead (Filtered)	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.1	0.0000	NC	0.00	0.00	0.00	0	0	
	Lithium	3	3	0	0.00	1	0.85	NC	1.														

Table D.14: Summary Statistics - Taltson River @ Nonacho Lake Dam, Annual (All Parameters)

Chem_Group		n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE	
Physical/Major Ions	Nitrogen (Organic) (Filtered)	1	1	0	0.00	0.174	NC	NC	NC	0.17	NC	NC	NC	NC	0.174	0.174	NC	NC	NC	NC	0.0000	0	0
	Silica	1	1	0	0.00	2.4	NC	NC	NC	2.40	NC	NC	NC	NC	2.4	2.4	NC	NC	NC	NC	0.0000	0	0
	Total Organic Carbon(TOC)	1	1	0	0.00	0.0045	NC	NC	NC	0.00	NC	NC	NC	NC	0.0045	0.0045	NC	NC	NC	NC	0.0000	0	0
	pH	62	62	0	0.00	6.5	6.42	6.70	7.05	7.30	7.47	7.60	8.11	7.77	7.2	0.0372	24.8276	0.42	0.63	0.2900	2	3.23	
	Electrical Conductivity (EC)	62	62	0	0.00	33	26.65	33.00	34.68	37.45	40.03	44.07	48.05	44.4	38	0.4176	11.5152	5.35	8.02	3.3000	0	0	
	Total Suspended Solids (TSS)	49	11	38	77.55	0.5	0.00	2.00	3.00	3.00	5.00	12.00	8.00	46	4.6	0.9141	0.7188	2.00	3.00	6.4000	0	0	
	Hardness as CaCO3	59	59	0	0.00	12.2	9.50	13.00	14.60	15.80	18.00	31.60	23.10	143	19	2.2108	1.1176	3.40	5.10	17.0000	0	0	
	Alkalinity (total as CaCO3)	62	62	0	0.00	10	8.50	11.58	13.00	14.05	16.00	16.90	20.50	17	14	0.2057	8.7500	3.00	4.50	1.6000	0	0	
	Calcium	62	62	0	0.00	3.1	2.26	3.52	4.00	4.39	5.16	6.59	6.91	9.45	4.7	0.1329	4.7000	1.16	1.74	1.0000	0	0	
	Magnesium	62	62	0	0.00	0.5	0.71	0.95	1.06	1.10	1.30	1.77	1.66	3.77	1.2	0.0509	3.0000	0.24	0.36	0.4000	0	0	
	Potassium	51	51	0	0.00	0.4	0.50	0.50	0.62	0.70	0.70	0.94	0.82	1.61	0.7	0.0227	4.3750	0.08	0.12	0.1600	0	0	
	Sodium	51	51	0	0.00	0.75	0.58	0.90	0.95	1.04	1.20	1.40	1.58	2.21	1.1	0.0303	5.0000	0.25	0.38	0.2200	0	0	
	Chloride	62	61	1	1.61	0.08	0.49	0.13	0.80	0.90	1.00	1.58	1.30	10	1	0.1520	0.8333	0.20	0.30	1.2000	0	0	
	Fluoride	3	1	2	66.67	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0	
	Sulphate	62	45	17	27.42	1	-2.00	1.00	1.00	2.05	3.00	4.85	6.00	13	2.5	0.2475	1.3158	2.00	3.00	1.9000	0	0	
	Colour	58	48	10	17.24	5	-2.88	5.00	5.00	5.50	10.25	15.00	18.13	23	8	0.5056	2.0513	5.25	7.88	3.9000	0	0	
	Dissolved Organic Carbon (DOC) (Filtered)	1	1	0	0.00	4.4	NC	NC	NC	4.40	NC	NC	NC	NC	4.4	4.4	NC	NC	NC	NC	0.0000	0	0
	Total Solids (Filtered)	62	56	6	9.68	5	4.50	10.00	21.75	27.00	33.25	47.70	50.50	55	28	1.3464	2.5455	11.50	17.25	11.0000	0	0	
	Turbidity	55	53	2	3.64	0	-0.05	0.23	0.40	0.54	0.70	1.54	1.15	4.1	0.68	0.0777	1.1724	0.30	0.45	0.5800	0	0	
	Nutrients	Ammonia as N	62	28	34	54.84	0.002	-0.02	0.01	0.01	0.01	0.02	0.05	0.05	0.202	0.018	0.0036	0.6429	0.02	0.03	0.0280	16	25.81
Total Kjeldahl Nitrogen (TKN)		9	9	0	0.00	0.06	-0.08	NC	0.13	0.22	0.27	NC	0.48	0.41	0.21	0.0343	2.1000	0.14	0.21	0.1000	0	0	
Nitrate (as NO3-N)		3	2	1	33.33	0.005	-0.06	NC	0.01	0.05	0.05	NC	0.12	0.05	0.035	0.0150	1.3462	0.05	0.07	0.0260	0	0	
Nitrite (as NO2-N)		60	32	28	46.67	0.001	-0.04	0.01	0.01	0.02	0.04	0.13	0.09	0.36	0.035	0.0070	0.6481	0.03	0.05	0.0540	6	10	
Nitrate and Nitrite (as N) (mg/L)		5	4	1	20.00	0.0051	-0.03	NC	0.03	0.06	0.07	NC	0.12	0.07	0.049	0.0114	1.8846	0.04	0.06	0.0260	0	0	
Nitrogen (Total)		3	3	0	0.00	0.18	0.14	NC	0.18	0.20	0.21	NC	0.26	0.21	0.2	0.0087	13.3333	0.03	0.05	0.0150	0	0	
Orthophosphate (as P)		1	1	0	0.00	0.001	NC	NC	NC	0.00	NC	NC	NC	0.001	0.001	NC	NC	NC	NC	0.0000	0	0	
Phosphorus		62	31	31	50.00	2	-5.88	3.00	5.00	9.50	12.25	50.00	23.13	90	17	2.5538	0.8500	7.25	10.88	20.0000	58	93.55	
Phosphorus (filtered) (Filtered)		1	1	0	0.00	0.0016	NC	NC	NC	0.00	NC	NC	NC	0.0016	0.0016	NC	NC	NC	NC	0.0000	0	0	
Metals		Aluminum (Filtered)	3	2	1	33.33	0.6	-1.35	NC	0.60	1.40	1.90	NC	3.85	1.9	1.3	0.3786	1.9697	1.30	1.95	0.6600	0	0
	Aluminum Total	3	3	0	0.00	6.3	2.85	NC	6.30	6.90	8.60	NC	12.05	8.6	7.3	0.6888	6.0833	2.30	3.45	1.2000	0	0	
	Antimony	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0	
	Antimony (Filtered)	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0	
	Arsenic	34	1	33	97.06	0.1	-0.75	0.10	0.30	0.50	1.00	1.00	2.05	1	0.57	0.0613	1.5833	0.70	1.05	0.3600	0	0	
	Arsenic (Filtered)	3	0	3	100.00	0.2	0.20	NC	0.20	0.20	0.20	NC	0.20	0.2	0.2	0.0000	NC	0.00	0.00	0.0000	0	0	
	Barium	3	3	0	0.00	4.2	3.45	NC	4.20	4.50	4.70	NC	5.45	4.7	4.5	0.1453	18.0000	0.50	0.75	0.2500	0	0	
	Barium (Filtered)	3	2	1	33.33	0.1	-6.95	NC	0.10	4.40	4.80	NC	11.85	4.8	3.1	1.5044	1.1923	4.70	7.05	2.6000	0	0	
	Beryllium	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0	
	Beryllium (Filtered)	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0	
	Bismuth	3	2	1	33.33	0.2	-0.40	NC	0.20	0.50	0.60	NC	1.20	0.6	0.43	0.1202	2.0476	0.40	0.60	0.2100	0	0	
	Bismuth (Filtered)	3	1	2	66.67	0.2	-0.10	NC	0.20	0.20	0.40	NC	0.70	0.4	0.27	0.0667	2.2500	0.20	0.30	0.1200	0	0	
	Boron - soluble	3	3	0	0.00	2.5	-0.35	NC	2.50	2.90	4.40	NC	7.25	4.4	3.3	0.5783	3.3000	1.90	2.85	1.0000	0	0	
	Boron - soluble (Filtered)	3	2	1	33.33	0.9	-2.85	NC	0.90	3.20	3.40	NC	7.15	3.4	2.5	0.8021	1.7857	2.50	3.75	1.4000	0	0	
	Cadmium	62	9	53	85.48	0.05	-0.09	0.05	0.10	0.10	0.23	0.50	0.41	5	0.25	0.0803	0.3968	0.13	0.19	0.6300	49	79.03	
	Cadmium (Filtered)	3	0	3	100.00	0.05	0.05	NC	0.05	0.05	0.05	NC	0.05	0.05	0.05	0.0000	NC	0.00	0.00	0.0000	0	0	
	Cesium	3	1	2	66.67	0.1	-0.05	NC	0.10	0.10	0.20	NC	0.35	0.2	0.13	0.0333	2.2414	0.10	0.15	0.0580	0	0	
	Cesium (Filtered)	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0	
	Chromium	60	20	40	66.67	0.1	-1.13	0.10	0.30	0.75	1.25	4.79	2.68	13	1.3	0.2685	0.6190	0.95	1.43	2.1000	0	0	
	Chromium (Filtered)	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0	
	Cobalt	41	3	38	92.68	0.1	-0.73	0.10	0.10	0.10	0.65	1.00	1.48	1	0.33	0.0607	0.8462	0.55	0.83	0.3900	0	0	
	Cobalt (Filtered)	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0	
	Copper	61	32	29	47.54	0.1	-2.25	0.20	0.30	1.00	2.00	2.27	4.55	30	1.5	0.4849	0.3947	1.70	2.55	3.8000	1	1.64	
	Copper (Filtered)	3	0	3	100.00	0.2	0.20	NC	0.20	0.20	0.20	NC	0.20	0.2	0.2	0.0000	NC	0.00	0.00	0.0000	0	0	
	Iron	61	43	18	29.51	4	-27.50	5.00	7.00	12.20	30.00	50.00	64.50	109	22	2.4772	1.1579	23.00	34.50	19.0000	0	0	
	Iron (Filtered)	3	0	3	100.00	5	5.00	NC	5.00	5.00	5.00	NC	5.00	5	5	0.0000	NC	0.00	0.00	0.0000	0	0	
	Lead	62	17	45	72.58	0.1	-1.25	0.10	0.10	0.50	1.00	1.59	2.35	20	0.89	0.3186	0.3560	0.90	1.35	2.5000	1	1.61	
	Lead (Filtered)	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00					

Table D.14: Summary Statistics - Tazin River @ Mouth, Annual (All Parameters)

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical/Major Ions	Nitrogen (Organic) (Filtered)	1	1	0	0.00	0.292	NC	NC	NC	0.29	NC	NC	NC	0.292		NC	NC	NC	NC	0.0000	0	0
	Silica	1	1	0	0.00	3	NC	NC	NC	3.00	NC	NC	NC	3		NC	NC	NC	NC	0.0000	0	0
	Total Organic Carbon(TOC)	1	1	0	0.00	0.0089	NC	NC	NC	0.01	NC	NC	NC	0.0089		NC	NC	NC	NC	0.0000	0	0
	pH	62	62	0	0.00	4.21	6.22	6.56	6.89	7.24	7.34	7.54	8.01	7.88	7.1	0.0608	14.7917	0.45	0.67	0.4800	2	3.23
	Electrical Conductivity (EC)	63	63	0	0.00	23	30.15	33.20	37.50	39.60	42.40	56.98	49.75	350	46	5.0657	1.1500	4.90	7.35	40.0000	0	0
	Total Suspended Solids (TSS)	57	20	37	64.91	0.5	1.50	1.72	3.00	3.00	4.00	7.20	5.50	16	3.7	0.2863	1.6818	1.00	1.50	2.2000	0	0
	Hardness as CaCO3	60	60	0	0.00	11.1	10.46	12.05	15.00	16.00	18.03	22.39	22.56	25.6	17	0.3625	6.0714	3.03	4.54	2.8000	0	0
	Alkalinity (total as CaCO3)	63	63	0	0.00	11.8	11.45	12.00	14.00	14.50	15.70	17.76	18.25	21	15	0.2161	8.8235	1.70	2.55	1.7000	0	0
	Calcium	63	63	0	0.00	3.4	2.87	3.55	4.20	4.50	5.09	6.30	6.43	7.6	4.7	0.1033	5.7317	0.89	1.34	0.8200	0	0
	Magnesium	63	63	0	0.00	0.5	0.70	0.82	1.00	1.10	1.20	1.58	1.50	2	1.1	0.0265	5.2381	0.20	0.30	0.2100	0	0
	Potassium	50	50	0	0.00	0.4	0.51	0.60	0.70	0.80	0.83	1.00	1.03	2.4	0.81	0.0355	3.2400	0.13	0.20	0.2500	0	0
	Sodium	50	50	0	0.00	1.13	1.00	1.20	1.30	1.40	1.50	1.69	1.80	1.8	1.4	0.0201	10.0000	0.20	0.30	0.1400	0	0
	Chloride	63	63	0	0.00	0.07	0.50	0.80	1.10	1.30	1.50	1.80	2.10	2.6	1.3	0.0419	3.9394	0.40	0.60	0.3300	0	0
	Fluoride	1	0	1	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1		NC	NC	NC	NC	0.0000	0	0
	Sulphate	62	36	26	41.94	0.9	-2.00	1.00	1.00	2.85	3.00	5.88	6.00	19	2.7	0.3185	1.0800	2.00	3.00	2.5000	0	0
	Colour	60	60	0	0.00	5	-9.13	10.00	10.00	17.50	22.75	30.95	41.88	42	18	1.0250	2.2785	12.75	19.13	7.9000	0	0
	Dissolved Organic Carbon (DOC) (Filtered)	1	1	0	0.00	8.3	NC	NC	NC	8.30	NC	NC	NC	8.3		NC	NC	NC	NC	0.0000	0	0
	Total Solids (Filtered)	63	58	5	7.94	10	7.50	10.00	30.00	37.00	45.00	58.00	67.50	75	37	1.6459	2.8462	15.00	22.50	13.0000	0	0
	Turbidity	61	60	1	1.64	0.4	0.14	0.76	1.07	1.35	2.99	2.24	7.5	1.3	0.1324	1.3000	0.80	0.89	1.0000	0	0	
	Nutrients	Ammonia as N	62	32	30	48.38	0.002	-0.02	0.00	0.01	0.01	0.02	0.07	0.05	0.082	0.016	0.0022	0.9412	0.02	0.03	0.0170	15
Total Kjeldahl Nitrogen (TKN)		9	9	0	0.00	0.018	0.00	NC	0.28	0.32	0.46	NC	0.74	0.48	0.33	0.0477	2.3571	0.19	0.28	0.1400	0	0
Nitrate (as NO3-N)		1	0	1	100.00	0.005	NC	NC	NC	0.01	NC	NC	NC	0.005		NC	NC	NC	NC	0.0000	0	0
Nitrite (as NO2-N)		1	1	0	0.00	0.001	NC	NC	NC	0.00	NC	NC	NC	0.001		NC	NC	NC	NC	0.0000	0	0
Nitrate and Nitrite (as N) (mg/L)		62	21	41	66.13	0.0051	-0.04	0.01	0.01	0.01	0.04	0.08	0.09	0.39	0.033	0.0070	0.6000	0.03	0.05	0.0550	0	0
Nitrogen (Total)		3	3	0	0.00	0.28	0.21	NC	0.28	0.29	0.33	NC	0.39	0.325	0.3	0.0136	12.5000	0.05	0.07	0.0240	0	0
Orthophosphate (as P)		1	1	0	0.00	0.001	NC	NC	NC	0.00	NC	NC	NC	0.001		NC	NC	NC	NC	0.0000	0	0
Phosphorus		61	38	23	37.70	4	-3.75	4.10	7.50	10.00	15.00	71.60	26.25	100	19	2.7242	0.9048	7.50	11.25	21.0000	61	100
Phosphorus (filtered) (Filtered)		1	1	0	0.00	0.0029	NC	NC	NC	0.00	NC	NC	NC	0.0029		NC	NC	NC	NC	0.0000	0	0
Aluminum (Filtered)		3	3	0	0.00	1.5	-4.50	NC	1.50	1.70	5.50	NC	11.50	5.5	2.9	1.3013	1.2609	4.00	6.00	2.3000	0	0
Metals	Aluminum Total	3	3	0	0.00	9.1	4.45	NC	9.10	12.00	12.20	NC	16.85	12.2	11	1.0017	6.4706	3.10	4.65	1.7000	0	0
	Antimony	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Antimony (Filtered)	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Arsenic	36	0	36	100.00	0.2	-0.75	0.20	0.30	0.50	1.00	1.60	2.05	5	0.74	0.1344	0.9136	0.70	1.05	0.8100	1	2.78
	Arsenic (Filtered)	3	0	3	100.00	0.2	0.20	NC	0.20	0.20	0.20	NC	0.20	0.2	0.2	0.0000	NC	0.00	0.00	0.0000	0	0
	Barium	3	3	0	0.00	4	2.65	NC	4.00	4.30	4.90	NC	6.25	4.9	4.4	0.2646	9.5652	0.90	1.35	0.4600	0	0
	Barium (Filtered)	3	3	0	0.00	3.5	1.55	NC	3.50	3.90	4.80	NC	6.75	4.8	4.1	0.3844	6.1194	1.30	1.95	0.6700	0	0
	Beryllium	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Beryllium (Filtered)	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Bismuth	3	0	3	100.00	0.2	0.20	NC	0.20	0.20	0.20	NC	0.20	0.2	0.2	0.0000	NC	0.00	0.00	0.0000	0	0
	Bismuth (Filtered)	3	0	3	100.00	0.2	0.20	NC	0.20	0.20	0.20	NC	0.20	0.2	0.2	0.0000	NC	0.00	0.00	0.0000	0	0
	Boron - soluble	3	3	0	0.00	3	2.25	NC	3.00	3.20	3.50	NC	4.25	3.5	3.2	0.1453	12.8000	0.50	0.75	0.2500	0	0
	Boron - soluble (Filtered)	3	3	0	0.00	3.3	2.40	NC	3.30	3.90	3.90	NC	4.80	3.9	3.7	0.2000	10.5714	0.60	0.90	0.3500	0	0
	Cadmium	62	5	57	91.94	0.05	-0.20	0.05	0.10	0.10	0.30	1.43	0.60	10	0.4	0.1661	0.3077	0.20	0.30	1.3000	56	90.32
	Cadmium (Filtered)	3	1	2	66.67	0.05	-0.01	NC	0.05	0.05	0.09	NC	0.15	0.09	0.063	0.0133	2.7391	0.04	0.06	0.0230	1	33.33
	Cesium	3	1	2	66.67	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Cesium (Filtered)	3	1	2	66.67	0.1	-0.05	NC	0.10	0.10	0.20	NC	0.35	0.2	0.13	0.0333	2.2414	0.10	0.15	0.0580	0	0
	Chromium	60	22	38	63.33	0.1	-2.25	0.10	0.30	0.65	2.00	3.00	4.55	14.4	1.3	0.2594	0.6500	1.70	2.55	2.0000	0	0
	Chromium (Filtered)	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Cobalt	42	1	41	97.62	0.1	0.06	0.10	0.10	0.10	0.13	1.00	0.16	1	0.3	0.0575	0.8108	0.03	0.04	0.3700	0	0
	Cobalt (Filtered)	3	0	3	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Copper	61	34	27	44.26	0.1	-0.65	0.20	0.40	0.90	1.10	2.00	2.15	40	1.5	0.6462	0.3000	0.70	1.05	5.0000	1	1.64
	Copper (Filtered)	3	0	3	100.00	0.2	0.20	NC	0.20	0.20	0.20	NC	0.20	0.2	0.2	0.0000	NC	0.00	0.00	0.0000	0	0
	Iron	62	60	2	3.23	0.07	-15.88	5.30	44.95	60.00	85.50	157.05	146.33	231	70	5.2001	1.7073	40.55	60.83	41.0000	0	0
	Iron (Filtered)	3	2	1	33.33	5	-43.00	NC	5.00	5.00	37.00	NC	85.00	37	16	10.6667	0.8889	32.00	48.00	18.0000	0	0
	Lead	62	20	42	67.74	0.1	-1.25	0.10	0.10	0.75	1.00	4.55	2.35	50	1.6	0.8106	0.2500	0.90	1.35	6.4000	2	3.23
	Lead (Filtered)	3	1	2	66.67	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.1	0.1	0.0000	NC	0.00	0.00	0.0000	0	0
	Lithium	3	3	0	0.00	0.6	0.45	NC	0.60	0.70	0.70	NC	0.									

Table D.16: Summary Statistics - Thelon River @ Catling Lake, Annual (All Parameters)

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical/Major Ions	Bicarbonate as CaCO3	2	2	0	0.00	3.6	NC	NC	NC	5.00	NC	NC	NC	6.4	5	1.4000	NC	NC	NC	1.4000	0	0
	Nitrogen (Organic) (Filtered)	2	2	0	0.00	0.171	NC	NC	NC	0.25	NC	NC	NC	0.333	0.252	0.0810	NC	NC	NC	0.0810	0	0
	Silica	2	2	0	0.00	0.225	NC	NC	NC	0.61	NC	NC	NC	0.988	0.6065	0.3815	NC	NC	NC	0.3815	0	0
	Total Organic Carbon(TOC)	2	2	0	0.00	0.0031	NC	NC	NC	0.00	NC	NC	NC	0.0044	0.00375	0.0007	NC	NC	NC	0.0007	0	0
	pH	30	30	0	0.00	6.24	5.96	6.27	6.47	6.68	6.80	7.70	7.30	7.94	6.714667	0.0676	18.1081	0.34	0.50	0.3641	9	30
	Electrical Conductivity (EC)	30	30	0	0.00	10.7	8.90	10.76	11.30	11.95	12.90	18.35	15.30	21.7	12.38333	0.3681	6.0000	1.60	2.40	1.9823	0	0
	Total Suspended Solids (TSS)	25	4	21	84.00	0.2	2.25	0.74	3.00	3.00	3.50	5.00	4.25	5	3.248	0.2054	3.2000	0.50	0.75	1.0060	0	0
	Hardness as CaCO3	29	28	1	3.45	1.6	1.84	2.30	4.04	4.43	5.50	10.60	7.70	11.9	5.136897	0.3992	2.4286	1.47	2.20	2.1125	0	0
	Alkalinity (total as CaCO3)	29	29	0	0.00	1.3	1.85	2.05	3.20	3.60	4.10	6.00	5.45	6.4	3.772414	0.1883	3.8000	0.90	1.35	0.9965	0	0
	Calcium	30	26	4	13.33	0.88	0.36	0.89	1.00	1.02	1.43	2.81	2.06	3.3	1.295333	0.1025	2.3214	0.43	0.64	0.5517	0	0
	Magnesium	30	30	0	0.00	0.37	0.19	0.38	0.40	0.43	0.54	0.85	0.75	0.9	0.495433	0.0266	3.3333	0.14	0.21	0.1431	0	0
	Potassium	27	26	1	3.70	0.2	0.25	0.20	0.28	0.30	0.30	0.66	0.33	0.7	0.323963	0.0221	2.9091	0.02	0.03	0.1124	0	0
	Sodium	27	26	1	3.70	0.1	0.34	0.15	0.40	0.40	0.44	0.92	0.50	1	0.453333	0.0342	2.5000	0.04	0.06	0.1741	0	0
	Chloride	30	15	15	50.00	0.18	-0.30	0.19	0.30	0.50	0.70	0.70	1.30	0.7	0.475667	0.0323	2.6667	0.40	0.60	0.1738	0	0
	Fluoride	2	1	1	50.00	0.1	NC	NC	NC	0.15	NC	NC	NC	0.2	0.15	0.0500	NC	NC	NC	0.0500	1	50
	Sulphate	29	10	19	65.52	0.5	-2.00	0.75	1.00	2.00	3.00	4.50	6.00	5	2.089655	0.2066	1.9091	2.00	3.00	1.0930	0	0
	Colour	26	16	10	38.46	0.5	-3.25	2.08	5.00	5.00	10.50	18.95	18.75	20	7.596154	0.8936	1.6522	5.50	8.25	4.4679	0	0
	Dissolved Organic Carbon (DOC) (Filtered)	2	2	0	0.00	3.3	NC	NC	NC	3.75	NC	NC	NC	4.2	3.75	0.4500	NC	NC	NC	0.4500	0	0
	Total Solids (Filtered)	30	23	7	23.33	5	-11.00	7.75	10.00	16.50	24.00	39.50	45.00	45	18.03333	1.6592	1.9780	14.00	21.00	8.9349	0	0
	Turbidity	28	27	1	3.57	0.06	0.04	0.17	0.52	0.61	0.84	1.89	1.31	2.3	0.718929	0.0772	1.7561	0.32	0.48	0.4011	0	0
Nutrients	Ammonia as N	30	10	20	66.67	0.004	0.00	0.00	0.01	0.01	0.01	0.03	0.02	0.04	0.0105	0.0017	1.1828	0.01	0.01	0.0091	4	13.33
	Total Kjeldahl Nitrogen (TKN)	4	4	0	0.00	0.11	-0.24	NC	0.14	0.26	0.40	NC	0.78	0.44	0.265	0.0679	1.9286	0.26	0.38	0.1176	0	0
	Nitrate (as NO3-N)	2	1	1	50.00	0.005	NC	NC	NC	0.04	NC	NC	NC	0.0759	0.04045	0.0355	NC	NC	NC	0.0355	0	0
	Nitrite (as NO2-N)	2	0	2	100.00	0.001	NC	NC	NC	0.00	NC	NC	NC	0.001	0.001	0.0000	NC	NC	NC	0.0000	0	0
	Nitrate and Nitrite (as N) (mg/L)	30	4	26	86.67	0.0051	-0.04	0.01	0.01	0.01	0.04	0.36	0.09	0.718	0.043967	0.0235	0.3385	0.03	0.05	0.1263	0	0
	Nitrogen (Total)	2	2	0	0.00	0.189	NC	NC	NC	0.26	NC	NC	NC	0.327	0.258	0.0690	NC	NC	NC	0.0690	0	0
	Orthophosphate (as P)	2	0	2	100.00	0.001	NC	NC	NC	0.00	NC	NC	NC	0.001	0.001	0.0000	NC	NC	NC	0.0000	0	0
	Phosphorus	30	13	17	56.67	2	-62.50	2.00	5.00	10.00	50.00	3649.50	117.50	8000	4.4	266.0567	0.1956	45.00	67.50	1.4000	27	90
	Aluminum (Filtered)	2	2	0	0.00	3	NC	NC	NC	4.40	NC	NC	NC	5.8	9.25	1.4000	NC	NC	NC	1.3500	1	50
	Aluminum Total	2	2	0	0.00	7.9	NC	NC	NC	9.25	NC	NC	NC	10.6	0.1	1.3500	NC	NC	NC	0.0000	0	0
Antimony	2	0	2	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.1	0.0000	NC	NC	NC	0.0000	0	0	
Antimony (Filtered)	2	0	2	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.69375	0.0000	NC	NC	NC	0.6159	0	0	
Arsenic	16	2	14	87.50	0.2	-0.75	NC	0.30	0.50	1.00	NC	2.05	2.8	0.2	0.1590	1.0781	0.70	1.05	0.0000	0	0	
Arsenic (Filtered)	2	0	2	100.00	0.2	NC	NC	NC	0.20	NC	NC	NC	0.2	5.45	0.0000	NC	NC	NC	1.4500	0	0	
Barium	2	2	0	0.00	4	NC	NC	NC	5.45	NC	NC	NC	6.9	5.25	1.4500	NC	NC	NC	1.7500	0	0	
Barium (Filtered)	2	2	0	0.00	3.5	NC	NC	NC	5.25	NC	NC	NC	7	0.1	1.7500	NC	NC	NC	0.0000	0	0	
Beryllium	2	0	2	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.1	0.0000	NC	NC	NC	0.0000	0	0	
Beryllium (Filtered)	2	0	2	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.168667	0.0000	NC	NC	NC	0.1304	0	0	
Cadmium	30	5	25	83.33	0.05	-0.21	0.05	0.05	0.10	0.23	0.50	0.49	0.5	0.075	0.0242	1.3077	0.18	0.26	0.0250	21	70	
Cadmium (Filtered)	2	1	1	50.00	0.05	NC	NC	NC	0.08	NC	NC	NC	0.1	0.1	0.0250	NC	NC	NC	0.0000	1	50	
Cesium	2	0	2	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.1	0.0000	NC	NC	NC	0.0000	0	0	
Cesium (Filtered)	2	0	2	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.97	0.0000	NC	NC	NC	1.0332	0	0	
Chromium	30	10	20	66.67	0.1	-1.00	0.10	0.20	0.50	1.00	3.18	2.20	3.4	0.1	0.1919	0.8818	0.80	1.20	0.0000	0	0	
Chromium (Filtered)	2	1	1	50.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.35	0.0000	NC	NC	NC	0.3905	0	0	
Cobalt	20	2	18	90.00	0.1	-1.10	0.10	0.10	0.10	0.90	1.00	2.10	1	0.1	0.0896	0.8750	0.80	1.20	0.0000	0	0	
Cobalt (Filtered)	2	1	1	50.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.776667	0.0000	NC	NC	NC	0.6922	0	0	
Copper	30	10	20	66.67	0.1	-0.75	0.16	0.30	0.50	1.00	2.36	2.05	2.8	0.7	0.1285	1.1143	0.70	1.05	0.5000	0	0	
Copper (Filtered)	2	1	1	50.00	0.2	NC	NC	NC	0.70	NC	NC	NC	1.2	54.53333	0.5000	NC	NC	NC	28.0292	0	0	
Iron	30	28	2	6.67	21	-5.75	22.21	34.75	45.50	61.75	119.45	102.25	120	9.5	5.2049	1.8966	27.00	40.50	4.5000	0	0	
Iron (Filtered)	2	1	1	50.00	5	NC	NC	NC	9.50	NC	NC	NC	14	0.77	4.5000	NC	NC	NC	0.9758	0	0	
Lead	30	8	22	73.33	0.1	-1.25	0.10	0.10	0.50	1.00	3.44	2.35	5.2	0.1	0.1812	0.7778	0.90	1.35	0.0000	0	0	
Lead (Filtered)	2	0	2	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.55	0.0000	NC	NC	NC	0.1500	0	0	
Lithium	2	2	0	0.00	0.4	NC	NC	NC	0.55	NC	NC	NC	0.7	0.5	0.1500	NC	NC	NC	0.1000	0	0	
Lithium (Filtered)	2	2	0	0.00	0.4	NC	NC	NC	0.50	NC	NC	NC	0.6	6.4	0.1000	NC	NC	NC	3.6000	0	0	
Manganese	2	2	0	0.00	2.8	NC	NC	NC	6.40	NC	NC	NC	10	0.7	3.6000	NC	NC	NC	0.6000	0	0	
Manganese (Filtered)	2	2	0	0.00	0.1	NC	NC	NC	0.70	NC	NC	NC	1.3	0.0757	0.6000	NC	NC	NC	0.0704	0	0	
Mercury	10	5	5	50.00	0.01	-0.10	NC	0.03	0.05	0.11	NC	0.23	0.25	0.01	0.0235	1.0270	0.08	0.12	0.0000	8	80	
Mercury (Filtered)	2	1	1	50.00	0.01	NC	NC	NC	0.01	NC	NC	NC	0.01	0.1	0.0000	NC	NC	NC	0.0000	0	0	
Molybdenum	2	0	2	100.00	0.1	NC	NC	NC	0.10	NC	NC	NC	0.1	0.1	0.0000	NC	NC	NC	0.0000	0	0	
Molybdenum (Filtered)	2	0</																				

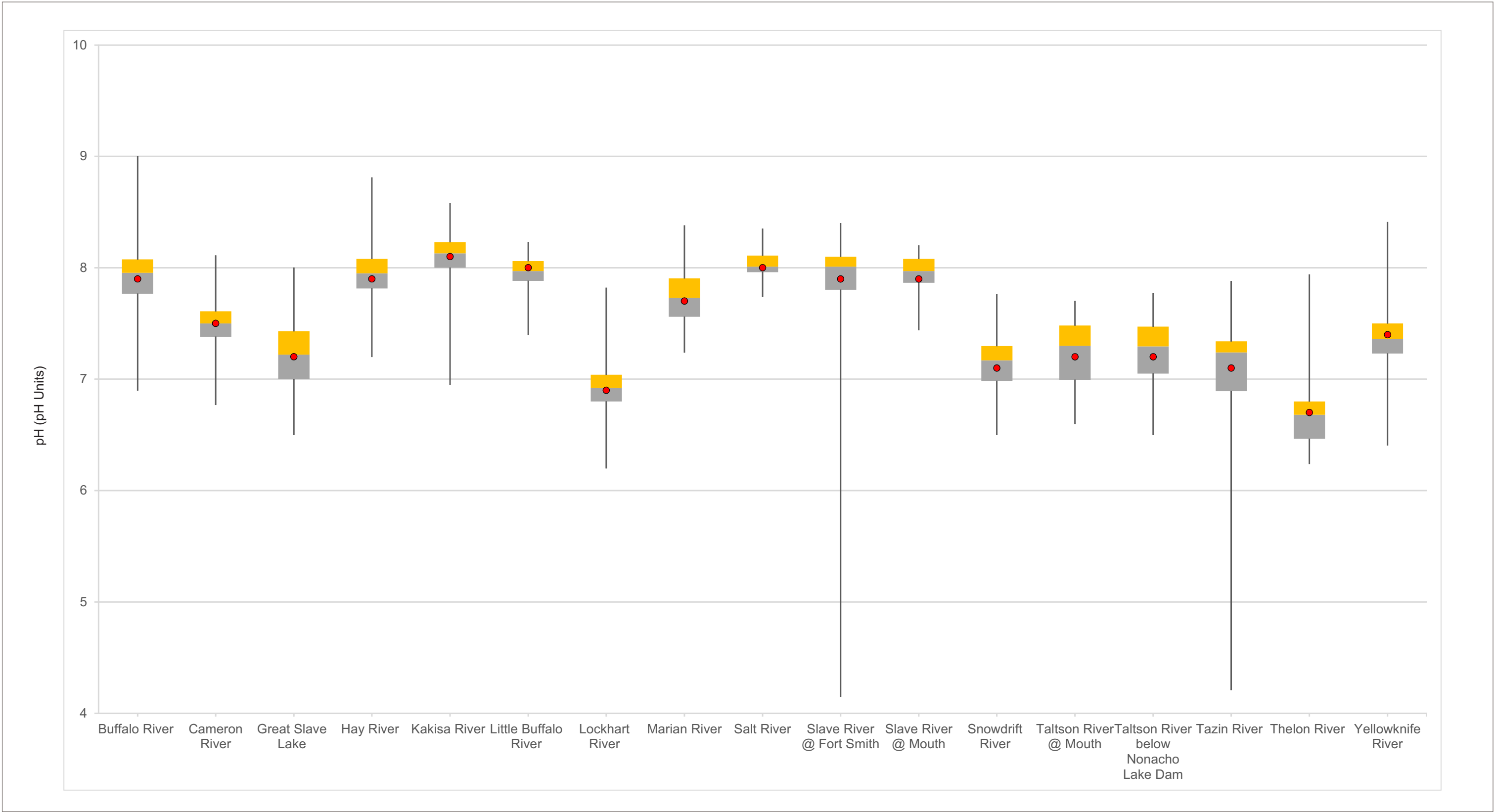
Table D.17: Summary Statistics - Yellowknife River, Annual (All Parameters)

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE	
Physical/Major Ions	Cyanide Total	151	55	96	63.58	0.001	NC	0.00	0.00	0.00	0.00	0.01	0.00	0.016	0.0024	0.0002	1.0000	0.00	NC	0.00	0	0	
	Field Temperature	56	56	0	0.00	-0.28	NC	-0.25	3.09	10.10	17.80	20.37	17.80	21.15	10	0.9569	1.3889	14.71	NC	7.20	0	0	
	Chlorophyll A	15	13	2	13.33	0.001	NC	NC	0.64	1.10	2.00	NC	2.00	2.54	1.2	0.1857	1.6667	1.36	NC	0.72	0	0	
	Bicarbonate as CaCO3	11	11	0	0.00	17.9	NC	NC	20.10	20.70	21.10	NC	21.10	21.3	20	0.3743	16.6667	1.00	NC	1.20	0	0	
	Nitrogen (Organic) (Filtered)	19	19	0	0.00	0.2	NC	0.20	0.21	0.24	0.25	0.27	0.25	0.273	0.23	0.0049	10.9524	0.04	NC	0.02	0	0	
	Silica	150	150	0	0.00	0.21	NC	0.27	0.35	0.42	0.48	0.63	0.48	0.733333	0.43	0.0088	3.9091	0.13	NC	0.11	0	0	
	pH	300	300	0	0.00	6.406667	NC	6.98	7.23	7.36	7.50	7.72	7.50	8.41	7.4	0.0144	29.6000	0.27	NC	0.25	2	0.67	
	Electrical Conductivity (EC)	302	302	0	0.00	29.8	NC	43.52	49.00	54.20	57.60	61.60	57.60	95.2	54	0.3887	7.9412	8.60	NC	6.80	0	0	
	Total Suspended Solids (TSS)	297	108	189	63.64	1	NC	1.00	3.00	3.00	3.00	8.10	3.00	64	3.9	0.2729	0.8298	0.00	NC	4.70	0	0	
	Hardness as CaCO3	268	268	0	0.00	5.9	NC	15.84	18.54	22.10	24.90	29.76	24.90	42.9	22	0.2963	4.4898	6.36	NC	4.90	0	0	
	Alkalinity (total as CaCO3)	282	282	0	0.00	12.6	NC	14.11	16.27	20.20	21.20	22.59	21.20	49.2	19	0.2094	5.4286	4.93	NC	3.50	0	0	
	Calcium	295	295	0	0.00	2.2	NC	3.90	4.47	5.17	6.10	7.52	6.10	12.9	5.4	0.0769	4.1538	1.63	NC	1.30	0	0	
	Magnesium	293	293	0	0.00	0.1	NC	1.42	1.68	1.94	2.20	2.60	2.20	3.6	2	0.0253	4.6512	0.52	NC	0.43	0	0	
	Potassium	294	294	0	0.00	0.5	NC	0.70	0.89	1.00	1.07	1.18	1.07	1.9	0.97	0.0088	6.4667	0.18	NC	0.15	0	0	
	Sodium	293	293	0	0.00	0.44	NC	0.97	1.63	1.86	2.10	2.30	2.10	7.6	1.8	0.0340	3.1034	0.47	NC	0.58	0	0	
	Chloride	295	295	0	0.00	1	NC	1.40	1.60	1.80	1.90	2.22	1.90	6.7	1.8	0.0317	3.3333	0.30	NC	0.54	0	0	
	Fluoride	200	152	48	24.00	0.03	NC	0.05	0.06	0.07	0.10	0.10	0.10	0.4	0.079	0.0022	2.4688	0.04	NC	0.03	5	2.5	
	Sulphate	287	285	2	0.70	2	NC	2.40	3.00	3.00	4.00	5.00	4.00	10	3.5	0.0555	3.7234	1.00	NC	0.94	0	0	
	Colour	152	121	31	20.39	5	NC	5.00	5.00	5.00	9.58	16.75	9.58	30	7.5	0.3186	1.9231	4.58	NC	3.90	0	0	
	Dissolved Organic Carbon (DOC) (Filtered)	283	283	0	0.00	2.3	NC	4.12	4.61	5.00	5.30	6.10	5.30	10.33333	5	0.0421	7.0423	0.69	NC	0.71	0	0	
	Total Organic Carbon (TOC)	216	216	0	0.00	4	NC	4.49	4.85	5.20	5.53	6.57	5.53	9	5.3	0.0450	8.0303	0.69	NC	0.66	0	0	
Nutrients	Total Solids (Filtered)	288	9	3.03	10	NC	14.00	24.00	32.00	38.67	54.00	38.67	98	33	0.6968	2.7500	14.67	NC	12.00	0	0		
	Turbidity	298	298	0	0.00	0.26	NC	0.56	1.03	1.80	2.60	4.81	2.60	29	2.2	0.1345	0.9565	1.57	NC	2.30	0	0	
	Ammonia as N	251	94	157	62.55	0.0025	NC	0.01	0.01	0.01	0.01	0.03	0.01	0.099	0.012	0.0009	0.8571	0.01	NC	0.01	28	11.16	
	Nitrate (as NO3-N)	87	60	27	31.03	0.005	NC	0.01	0.01	0.04	0.05	0.10	0.05	0.14	0.037	0.0031	1.2759	0.04	NC	0.03	0	0	
	Nitrite (as NO2-N)	87	10	77	88.51	0.001	NC	0.00	0.01	0.01	0.01	0.01	0.05	0.01	0.05	0.012	0.0013	1.0000	0.00	NC	0.01	0	0
	Nitrate and Nitrite (as N) (mg/L)	275	196	79	28.73	0.005	NC	0.01	0.01	0.04	0.06	0.13	0.06	0.2	0.043	0.0024	1.0750	0.05	NC	0.04	0	0	
	Nitrogen (Total)	19	19	0	0.00	0.213	NC	0.21	0.23	0.23	0.24	0.26	0.24	0.256	0.23	0.0025	20.9091	0.02	NC	0.01	0	0	
	Orthophosphate (as P)	63	18	45	71.43	0.001	NC	0.00	0.00	0.00	0.00	0.00	0.00	0.043	0.0026	0.0007	0.4906	0.00	NC	0.01	0	0	
	Phosphorus	299	189	110	36.79	2	NC	3.40	6.00	10.00	10.00	36.00	10.00	273	14	1.5375	0.5185	4.00	NC	27.00	282	94.31	
	Phosphorus (filtered) (Filtered)	144	103	41	28.47	0.0017	NC	0.00	0.00	0.01	0.01	0.05	0.01	0.087	0.0093	0.0012	0.6200	0.01	NC	0.02	0	0	
	Biochemical Oxygen Demand (BOD)	16	4	12	75.00	2	NC	NC	2.00	2.00	2.00	NC	2.00	5	2.4	0.2310	2.6087	0.00	NC	0.92	0	0	
	Demand Parameters	Total Coliforms	234	68	166	70.94	1	NC	1.00	1.00	1.00	1.00	3.00	1.00	197	2.6	0.9504	0.1733	0.00	NC	15.00	0	0
		E. Coli	174	50	124	71.26	1	NC	1.00	1.00	1.00	1.00	4.10	1.00	13.5	1.5	0.1163	1.0000	0.00	NC	1.50	0	0
	Biological																						
	Metals																						
	Metals	Aluminum (Filtered)	35	34	1	2.86	1.8	NC	1.88	3.30	4.10	6.30	21.04	6.30	30	6	0.9472	1.0714	3.00	NC	5.60	0	0
		Aluminum Total	244	226	18	7.38	8.9	NC	16.01	30.00	54.25	89.00	174.75	89.00	1230	74	6.1672	0.7708	59.00	NC	96.00	0	0
		Antimony	183	95	88	48.09	0.1	NC	0.10	0.10	0.10	0.50	1.30	0.50	5.1	0.39	0.0408	0.7091	0.40	NC	0.55	0	0
		Antimony (Filtered)	36	5	31	86.11	0.1	NC	0.10	0.10	0.10	0.10	0.53	0.10	0.89	0.15	0.0248	1.0000	0.00	NC	0.15	0	0
Arsenic		183	142	41	22.40	0.2	NC	0.30	0.40	0.50	1.00	1.59	1.00	2.9	0.67	0.0319	1.5581	0.60	NC	0.43	0	0	
Arsenic (Filtered)		143	137	6	4.20	0.1	NC	0.10	0.20	0.30	0.40	0.78	0.40	3.7	0.33	0.0281	0.9706	0.20	NC	0.34	0	0	
Barium		287	243	44	15.33	3.7	NC	4.00	4.50	5.00	6.00	80.00	6.00	80	17	1.5974	0.6296	1.50	NC	27.00	0	0	
Barium (Filtered)		36	36	0	0.00	4	NC	4.00	4.20	4.30	4.60	5.30	4.60	5.3	4.4	0.0524	14.1935	0.40	NC	0.31	0	0	
Beryllium		244	3	241	98.77	0.02	NC	0.10	0.10	0.10	2.00	50.00	2.00	50	10	1.2746	0.5000	1.90	NC	20.00	0	0	
Beryllium (Filtered)		36	0	36	100.00	0.1	NC	0.10	0.10	0.10	0.10	0.20	0.10	0.2	0.11	0.0039	4.7826	0.00	NC	0.02	0	0	
Bismuth		29	4	25	86.21	0.2	NC	0.20	0.20	0.40	5.00	10.00	5.00	10	3	0.6952	0.8108	4.80	NC	3.70	0	0	
Bismuth (Filtered)		8	1	7	87.50	0.2	NC	NC	0.20	0.20	0.20	NC	0.20	0.6	0.25	0.0500	1.7857	0.00	NC	0.14	0	0	
Boron - soluble		8	8	0	0.00	4.7	NC	NC	4.93	5.15	5.78	NC	5.78	5.9	5.3	0.1569	12.0455	0.85	NC	0.44	0	0	
Boron - soluble (Filtered)		8	8	0	0.00	4.5	NC	NC	5.00	5.10	5.53	NC	5.53	5.9	5.2	0.1505	12.0930	0.52	NC	0.43	0	0	
Cadmium		288	46	242	84.03	0.0003	NC	0.05	0.05	0.10	0.10	0.30	0.10	0.57	0.13	0.0061	1.3000	0.05	NC	0.10	201	69.79	
Cadmium (Filtered)		36	0	36	100.00	0.02	NC	0.05	0.05	0.05	0.05	0.06	0.05	0.1	0.051	0.0016	5.2041	0.00	NC	0.01	1	2.78	
Cesium		185	2	183	98.92	0.03	NC	0.10	0.10	0.10	0.10	0.40	0.10	0.4	0.15	0.0081	1.3636	0.00	NC	0.11	0	0	
Cesium (Filtered)		36	0	36	100.00	0.008	NC	0.09	0.10	0.10	0.10	0.10	0.10	0.1	0.097	0.0026	6.4667	0.00					

APPENDIX E

SPATIAL BOX PLOTS – ALL WATER QUALITY SITES (ANNUAL)

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NOTES

- 1. Line between box colours indicates MEDIAN value.
- 2. Red dot indicates MEAN value.
- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- 4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

pH Spatial Box Plot

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

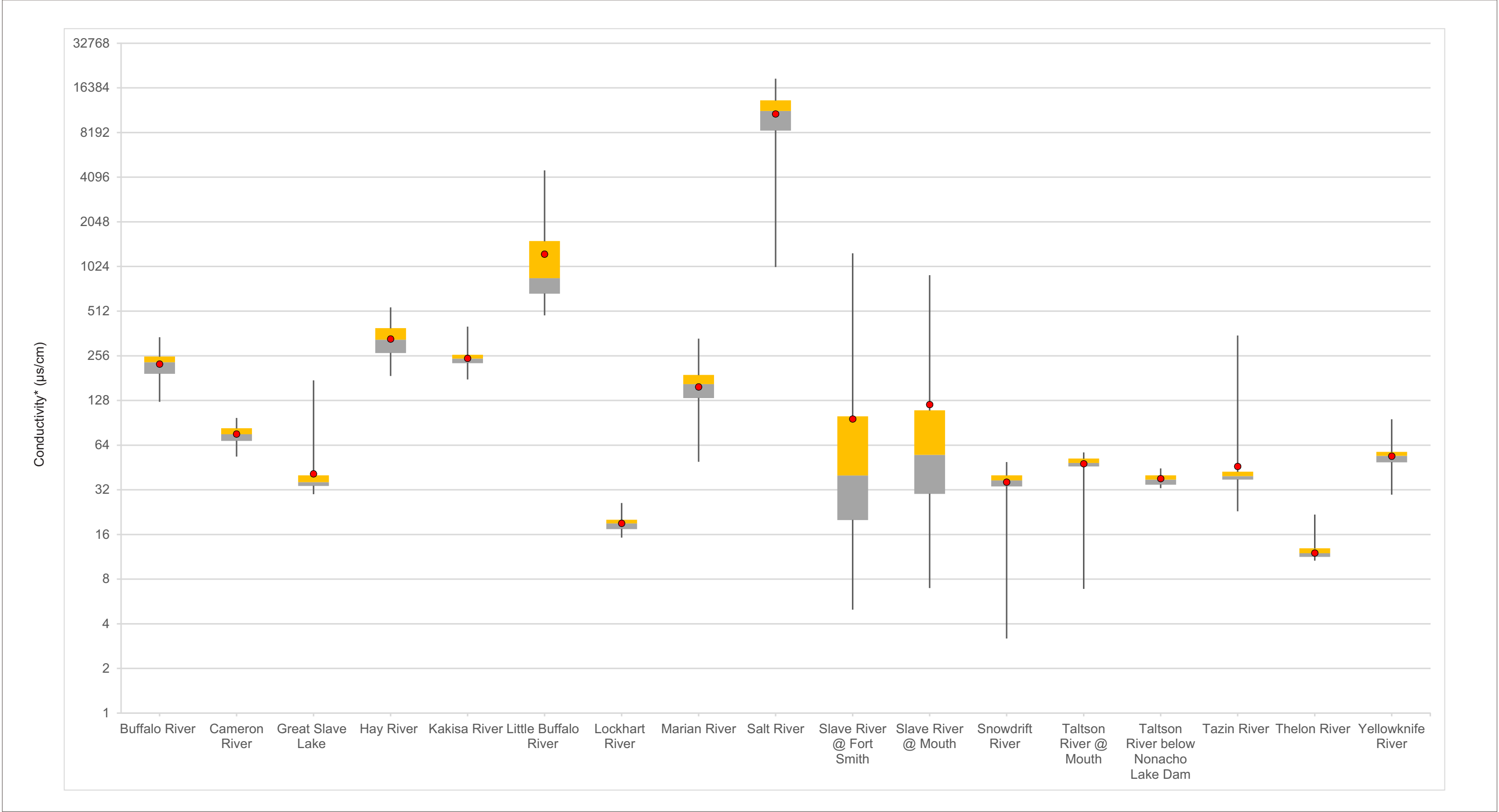
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0

OFFICE
Tt-VANC

DATE
March 30, 2017

Figure E.1

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Boxplot_Annual\VENW03044-01_FigureE-02_Conductivity.cdr



NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS

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PROJECT NO.

ENW.VENW03044-01

DWN

SL

CKD

MEZ

APVD

SW

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OFFICE

Tt-VANC

DATE

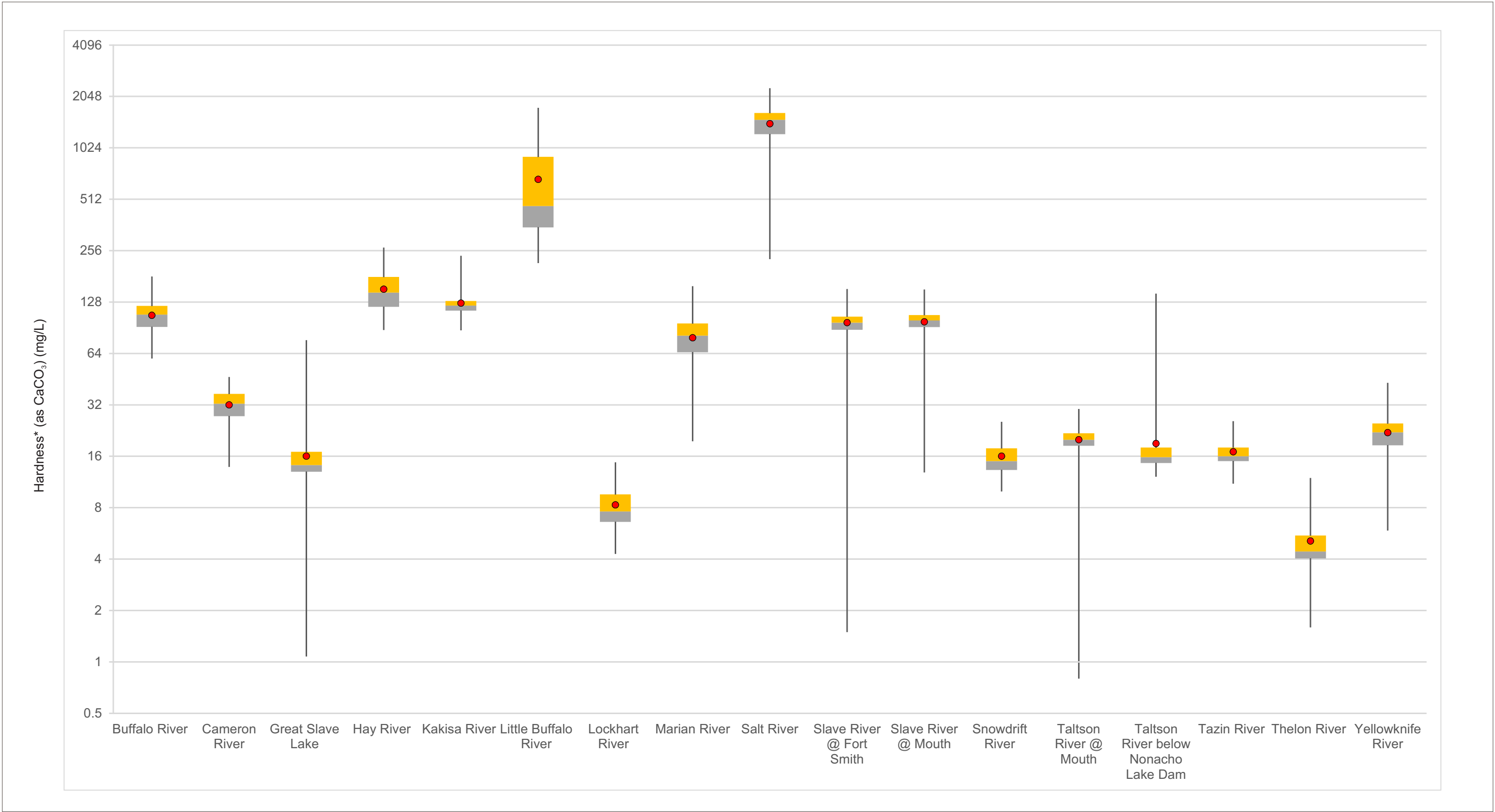
March 30, 2017

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Conductivity Spatial Box Plot

Figure E.2

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplot_Annual\VENW03044-01_FigureE-03_Hardness.cdr



NOTES

- 1. Line between box colours indicates MEDIAN value.
- 2. Red dot indicates MEAN value.
- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- 4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

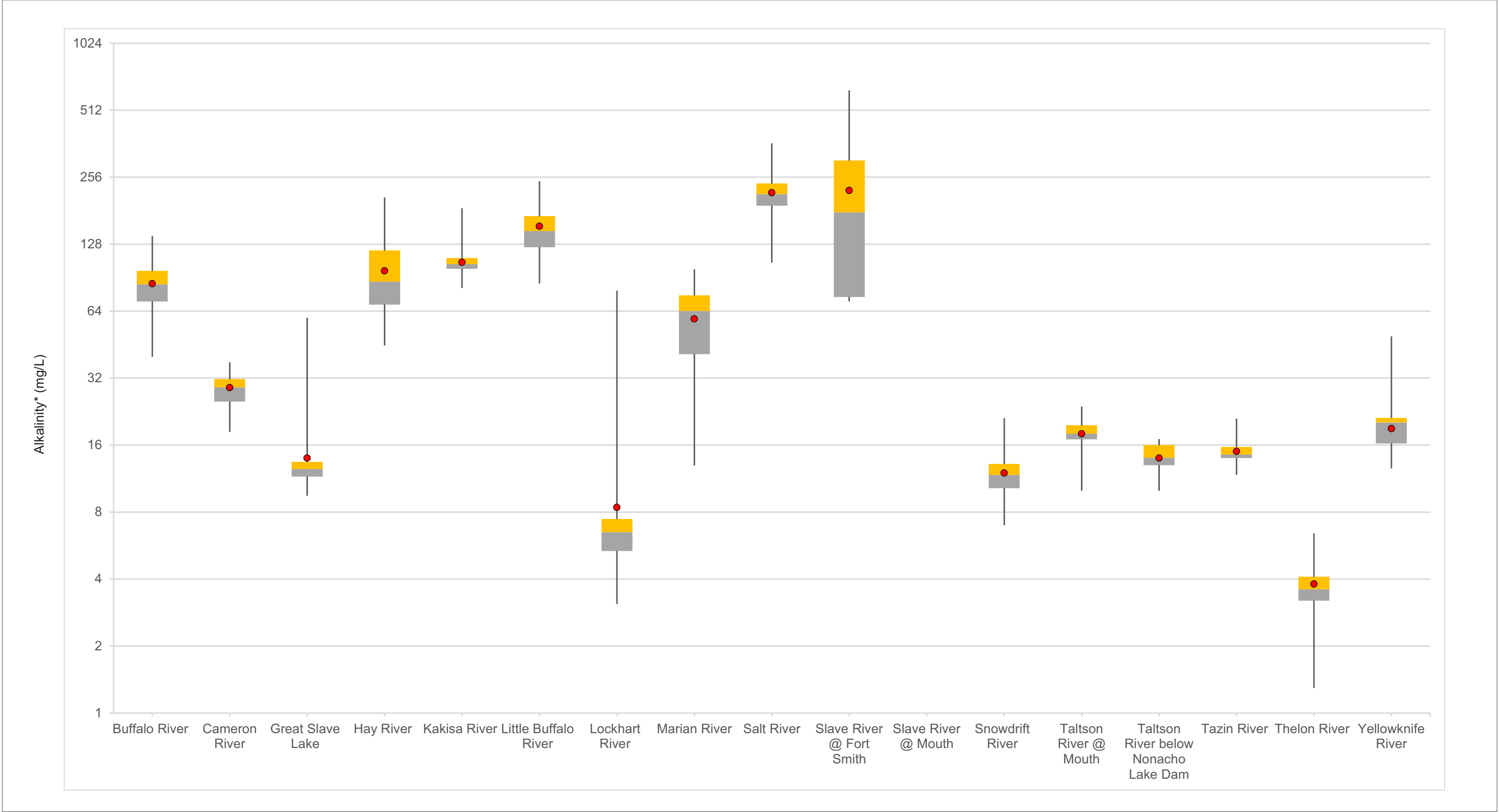
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Hardness (as CaCO₃) Spatial Box Plot

PROJECT NO.	DWN	CKD	APVD	REV
ENW.VENW03044-01	SL	MEZ	SW	0
OFFICE	DATE			
Tt-VANC	March 30, 2017			

Figure E.3

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplot_Annual\VENW03044-01_FigureE-04_Alkalinity.cdr



NOTES

1. Line between box colours indicates MEDIAN value.
2. Red dot indicates MEAN value.
3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS
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TETRA TECH

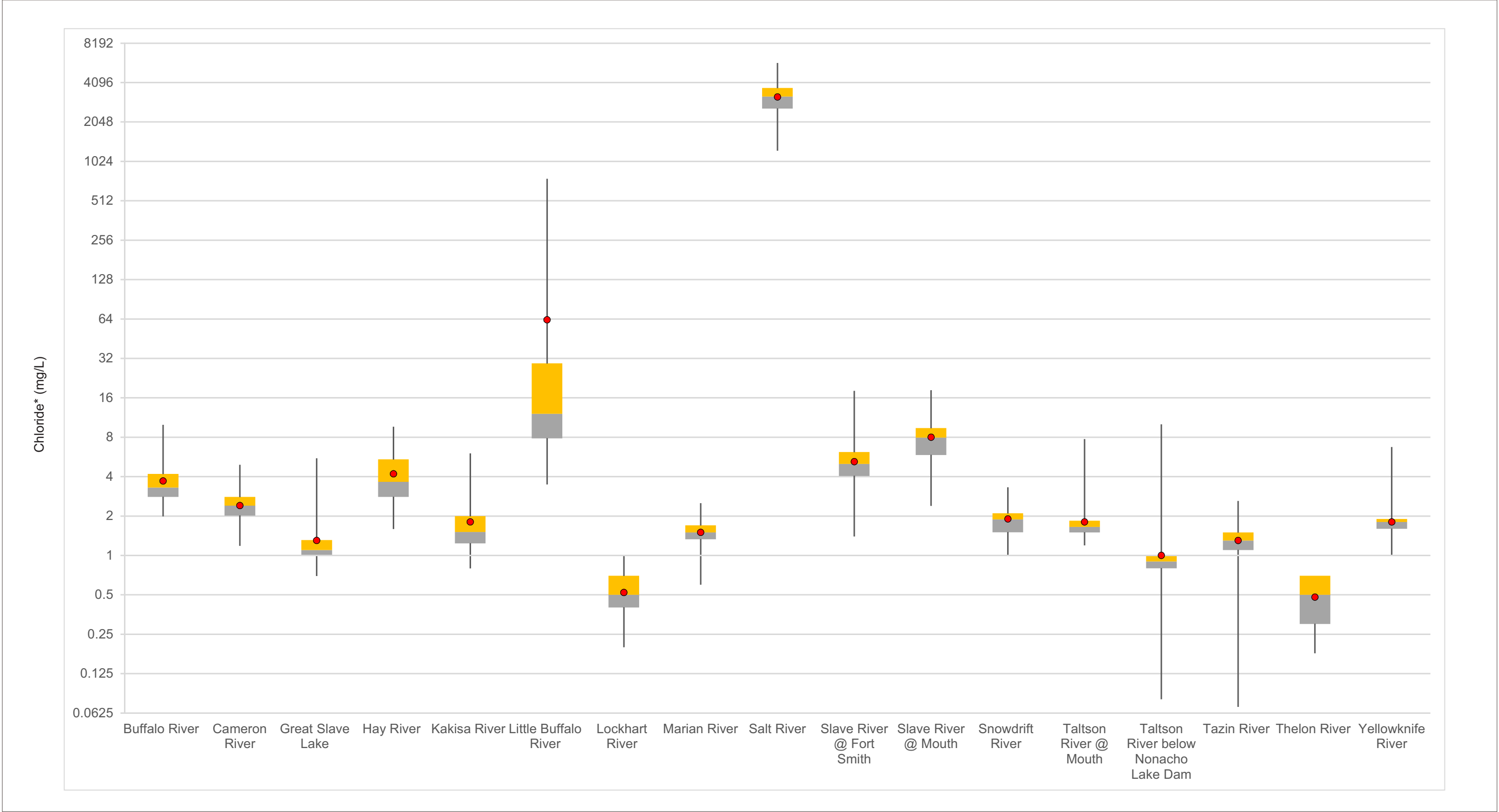
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Alkalinity Spatial Box Plot

PROJECT NO.	DWN	CKD	APVD	REV
ENW.VENW03044-01	SL	MEZ	SW	0
OFFICE	DATE			
Tt-VANC	March 30, 2017			

Figure E.4

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Boxplot_Annual\VENW03044-01_FigureE-05_Chloride.cdr



NOTES

1. Line between box colours indicates MEDIAN value.
2. Red dot indicates MEAN value.
3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS
ISSUED FOR USE

CLIENT



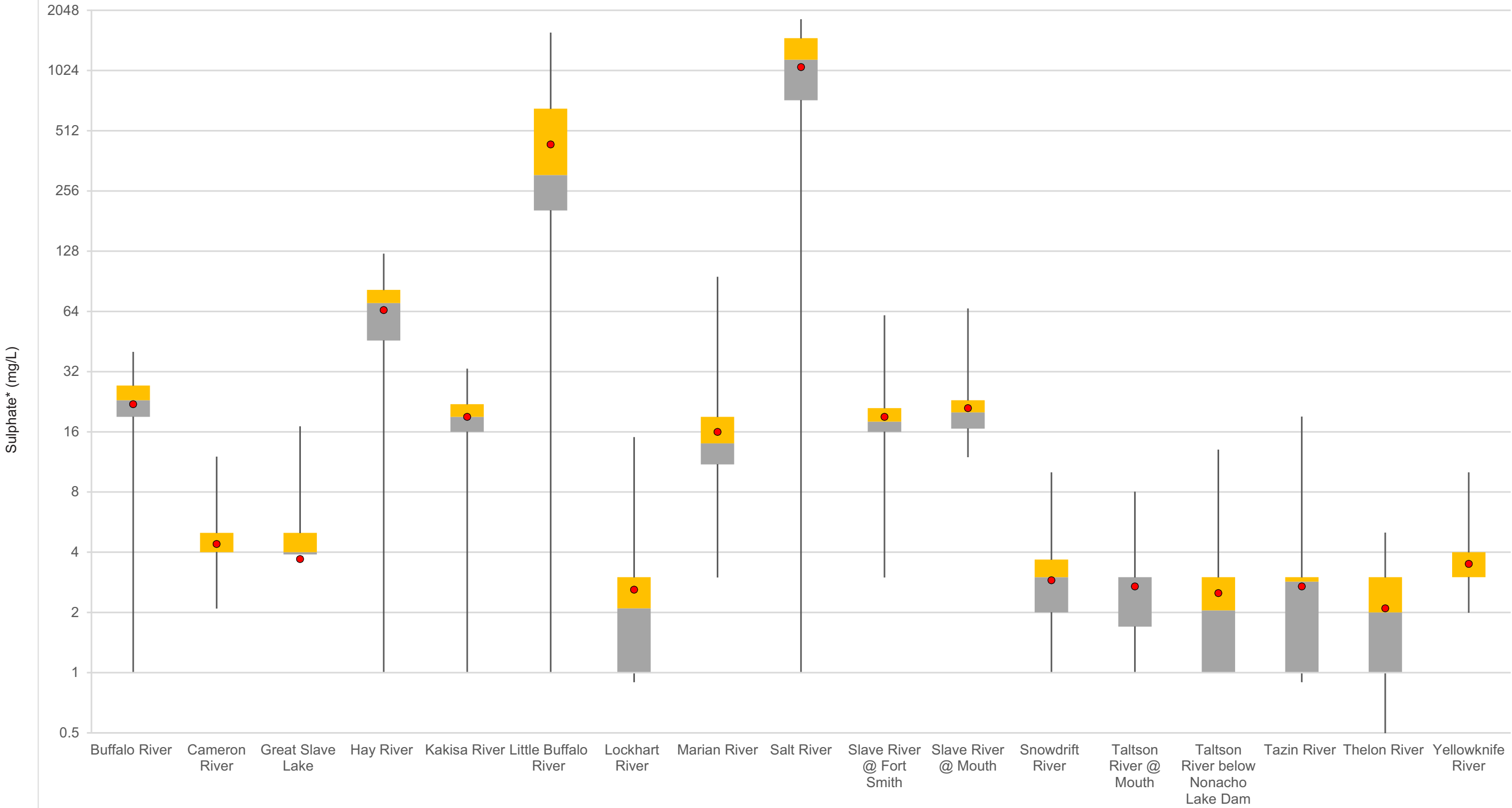
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Chloride Spatial Box Plot

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure E.5

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Annual\VENW03044-01_FigureE-05_Sulphate.cdr



NOTES

- 1. Line between box colours indicates MEDIAN value.
- 2. Red dot indicates MEAN value.
- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- 4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS
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STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Sulphate Spatial Box Plot

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

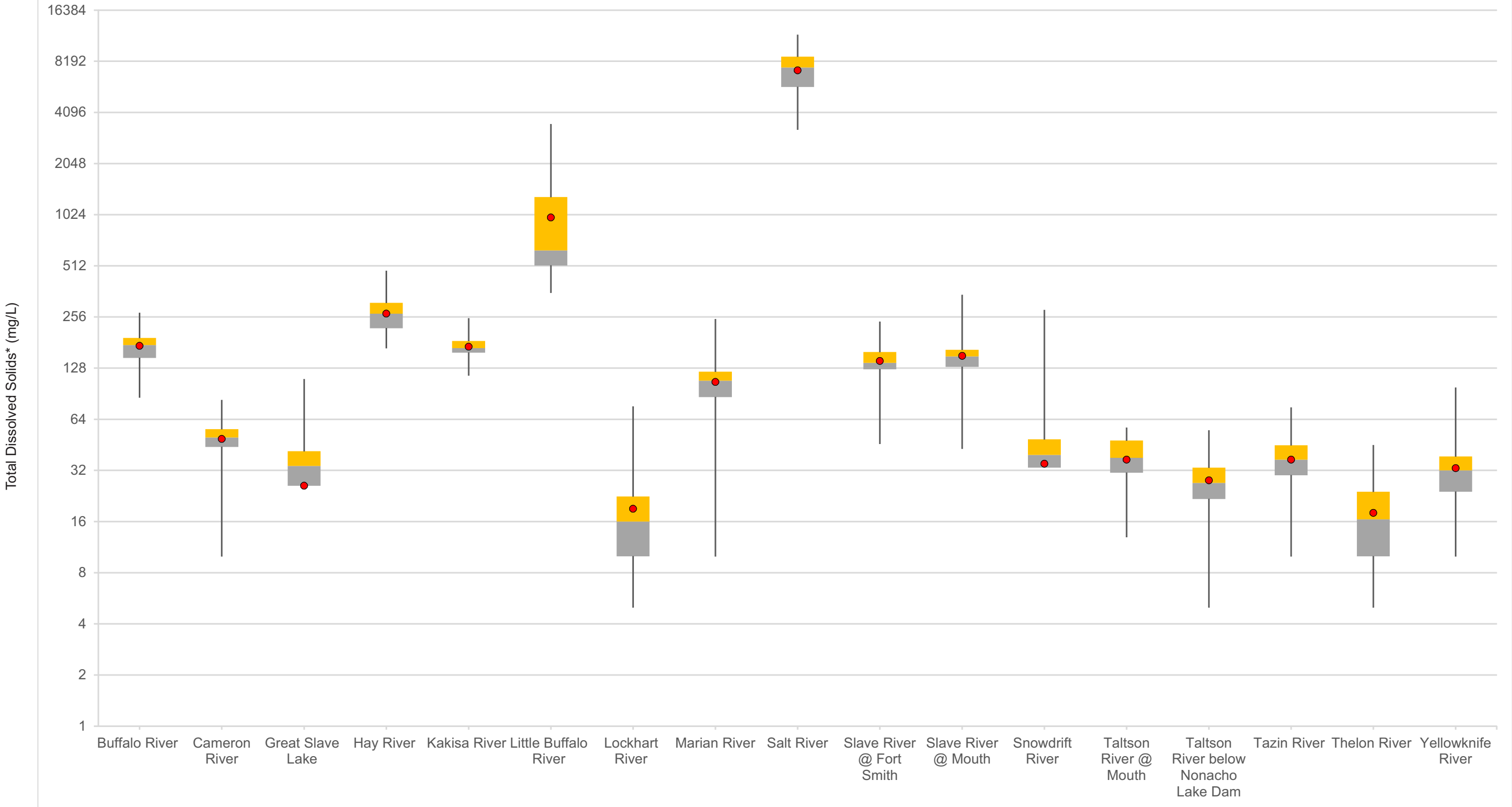
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DATE
March 30, 2017

Figure E.6

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NOTES

- 1. Line between box colours indicates MEDIAN value.
- 2. Red dot indicates MEAN value.
- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- 4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS
ISSUED FOR USE

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TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

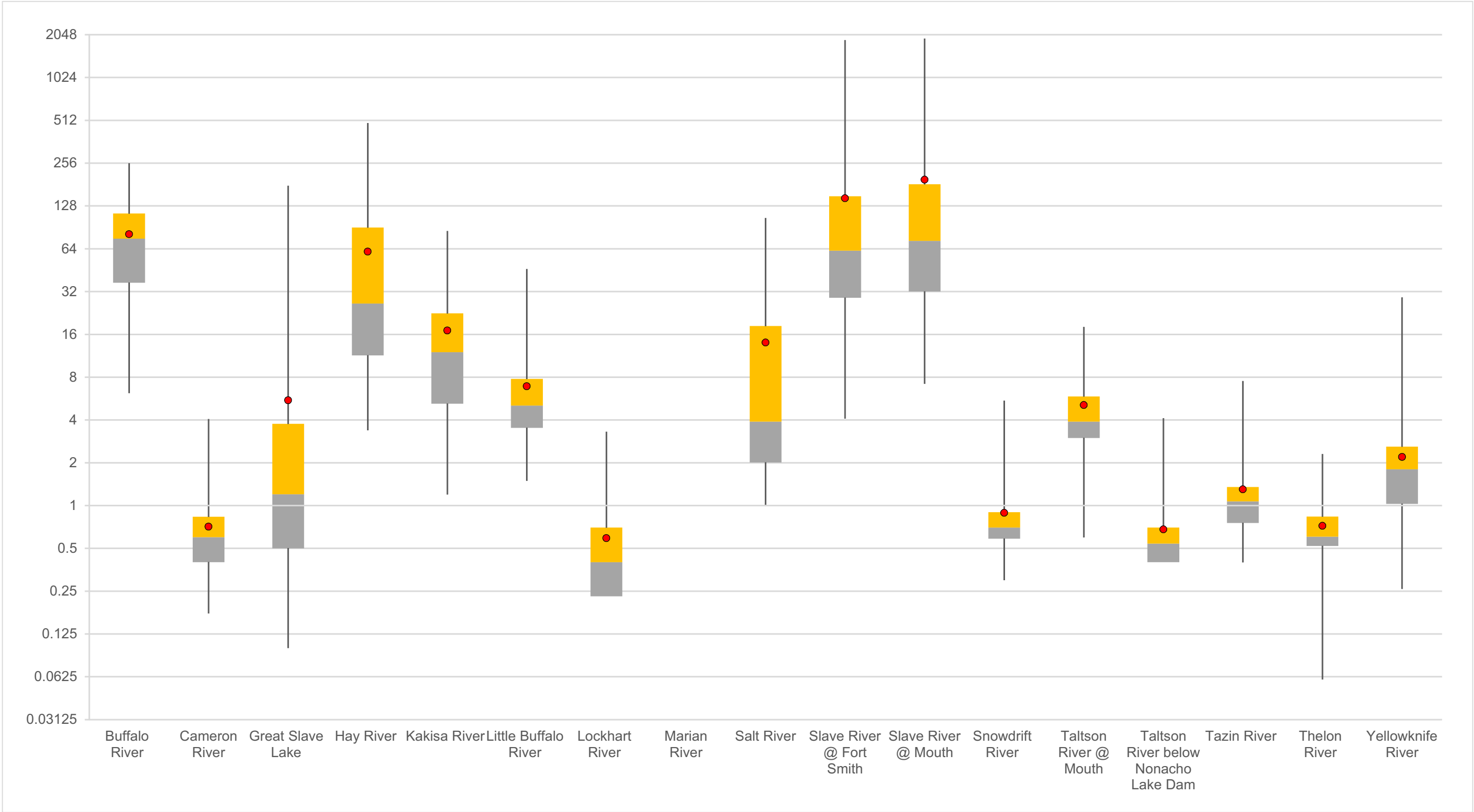
Total Dissolved Solids Spatial Box Plot

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure E.7

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Turbidity* (NTU)



NOTES

- 1. Line between box colours indicates MEDIAN value.
- 2. Red dot indicates MEAN value.
- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- 4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

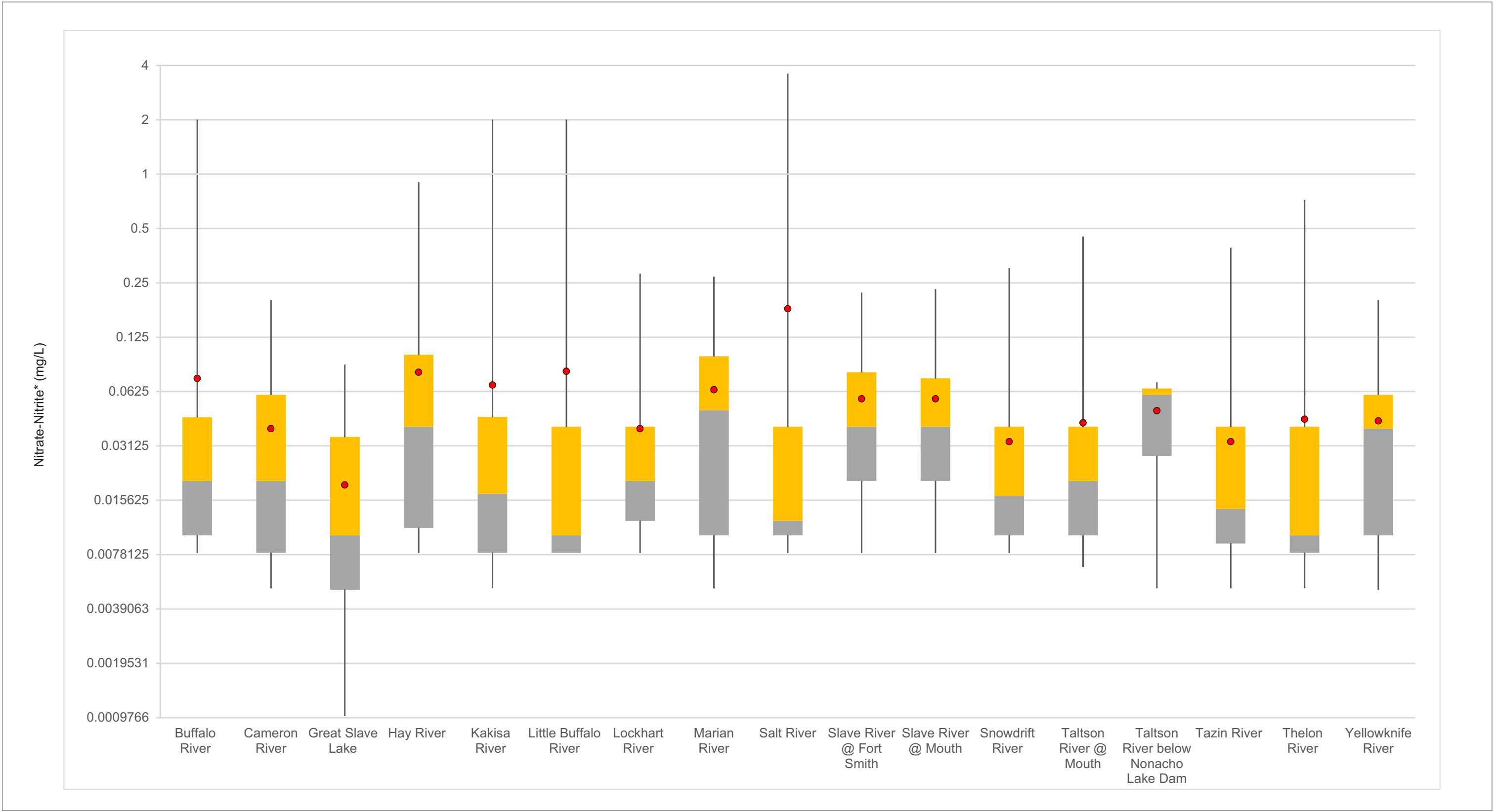
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Turbidity Spatial Box Plot

PROJECT NO.	DWN	CKD	APVD	REV
ENW.VENW03044-01	SL	MEZ	SW	0
OFFICE	DATE			
Tt-VANC	March 30, 2017			

Figure E.8

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Annual\VENW03044-01_FigureE-09_NitrateNitrite.cdr



NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS

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CLIENT

Northwest Territories

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TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Nitrate-Nitrite Spatial Box Plot

PROJECT NO.

ENW.VENW03044-01

DWN

SL

CKD

MEZ

APVD

SW

REV

0

OFFICE

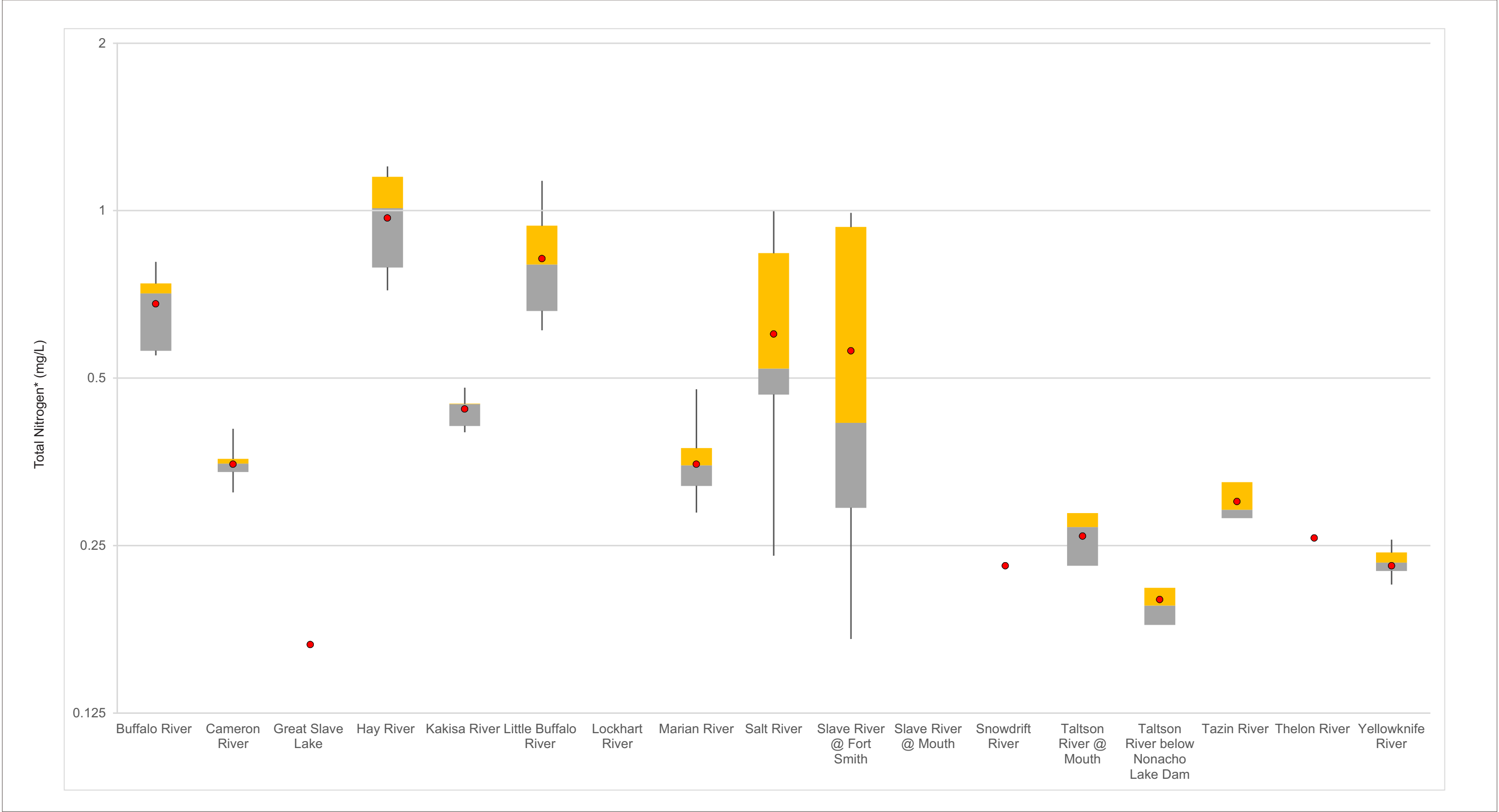
Tt-VANC

DATE

March 30, 2017

Figure E.9

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Annual\VENW03044-01_FigureE-10_Nitrogen.cdr



NOTES

- 1. Line between box colours indicates MEDIAN value.
- 2. Red dot indicates MEAN value.
- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- 4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS
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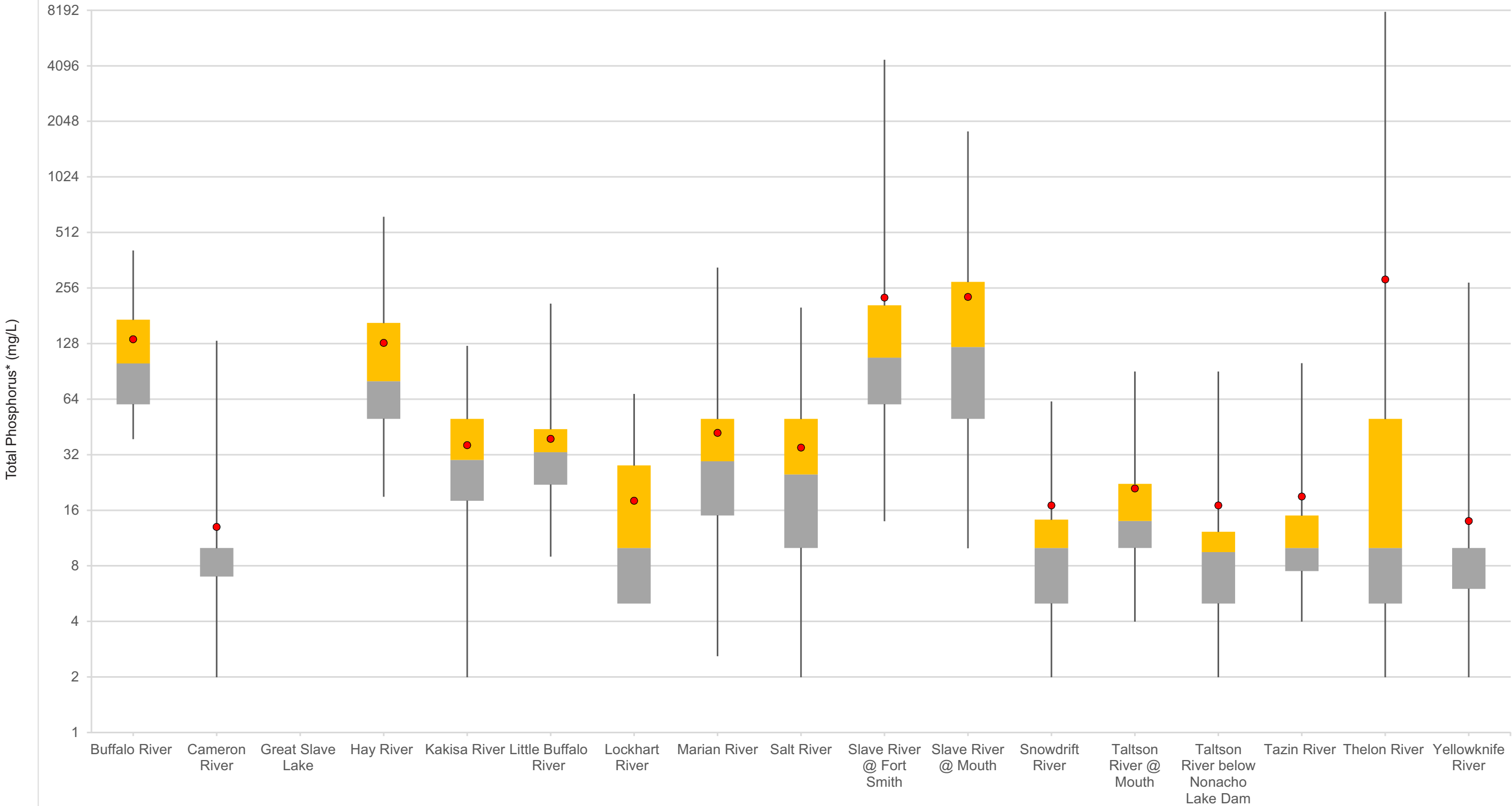
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Total Nitrogen Spatial Box Plot

PROJECT NO.	DWN	CKD	APVD	REV
ENW.VENW03044-01	SL	MEZ	SW	0
OFFICE	DATE			
Tt-VANC	March 30, 2017			

Figure E.10

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplot_Annual\VENW03044-01_FigureE-11_Phosphorus.cdr



NOTES

- 1. Line between box colours indicates MEDIAN value.
- 2. Red dot indicates MEAN value.
- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- 4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS
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TETRA TECH

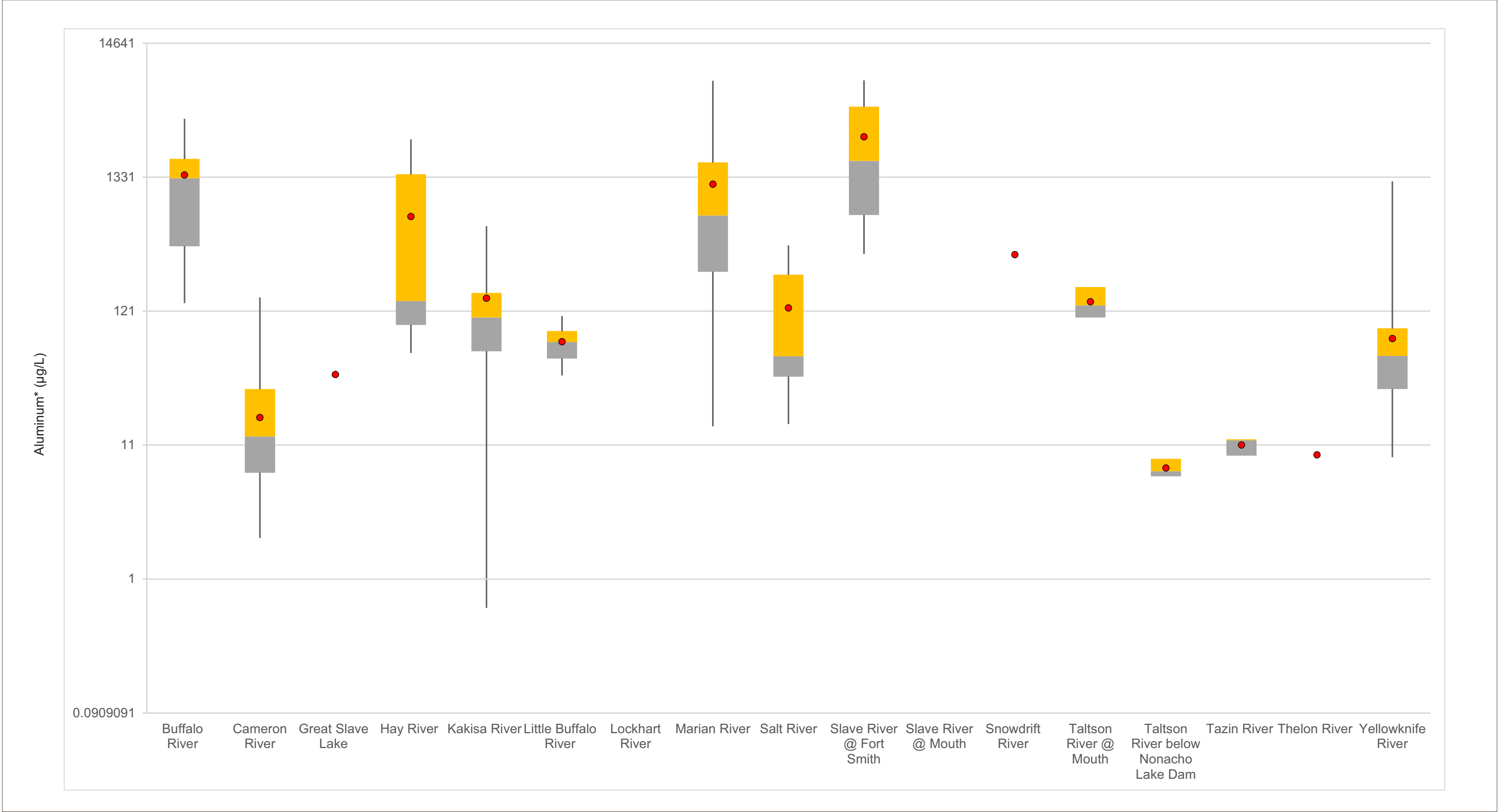
STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Total Phosphorus Spatial Box Plot

PROJECT NO.	DWN	CKD	APVD	REV
ENW.VENW03044-01	SL	MEZ	SW	0
OFFICE	DATE			
Tt-VANC	March 30, 2017			

Figure E.11

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Annual\VENW03044-01_FigureE-12_Aluminum.cdr



NOTES

- 1. Line between box colours indicates MEDIAN value.
- 2. Red dot indicates MEAN value.
- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- 4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS
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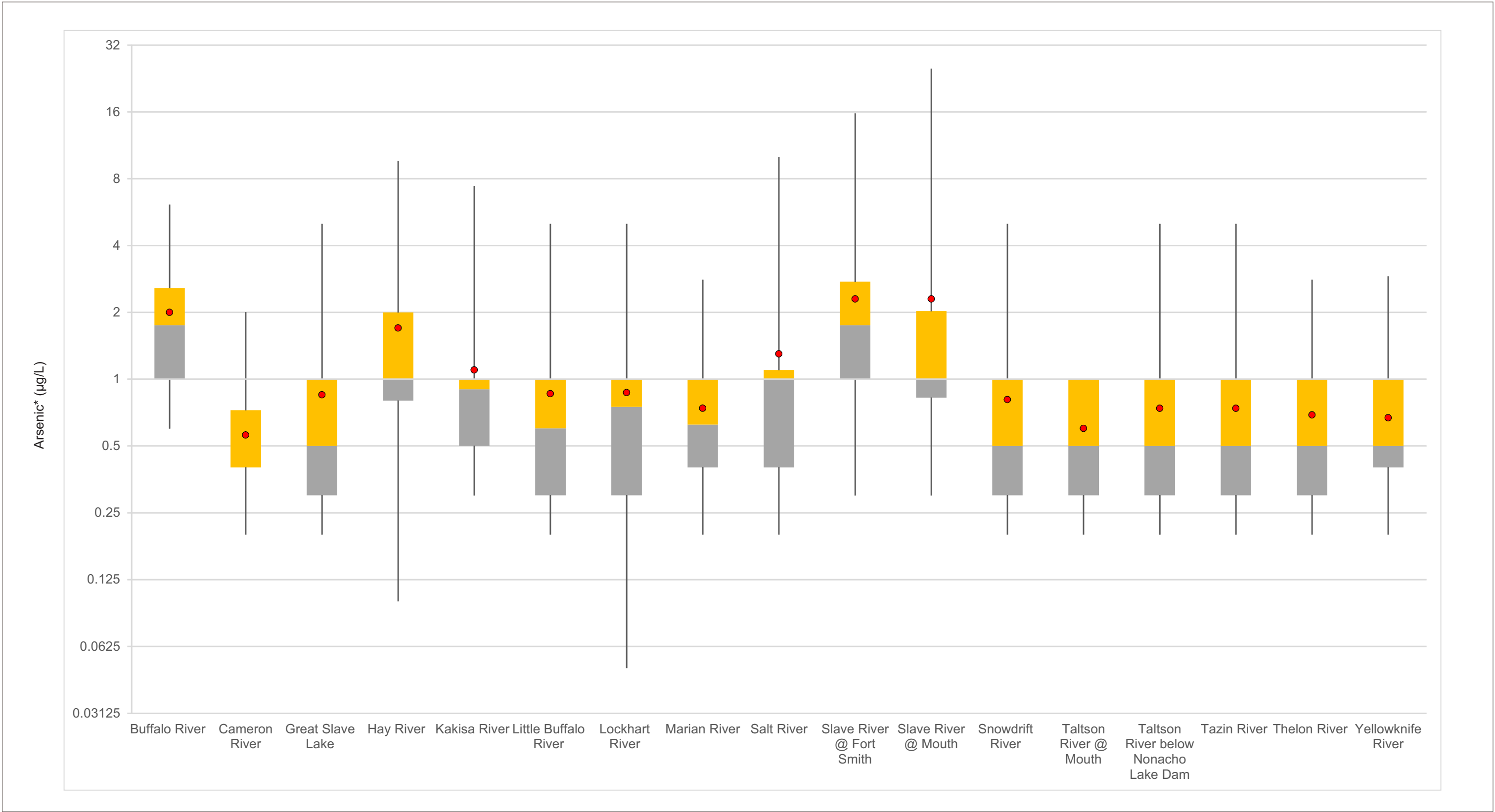
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Aluminum Spatial Box Plot

PROJECT NO.	DWN	CKD	APVD	REV
ENW.VENW03044-01	SL	MEZ	SW	0
OFFICE	DATE			
Tt-VANC	March 30, 2017			

Figure E.12

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Annual\VENW03044-01_FigureE-13_Arsenic.cdr



NOTES

- 1. Line between box colours indicates MEDIAN value.
- 2. Red dot indicates MEAN value.
- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- 4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS
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STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Arsenic Spatial Box Plot

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

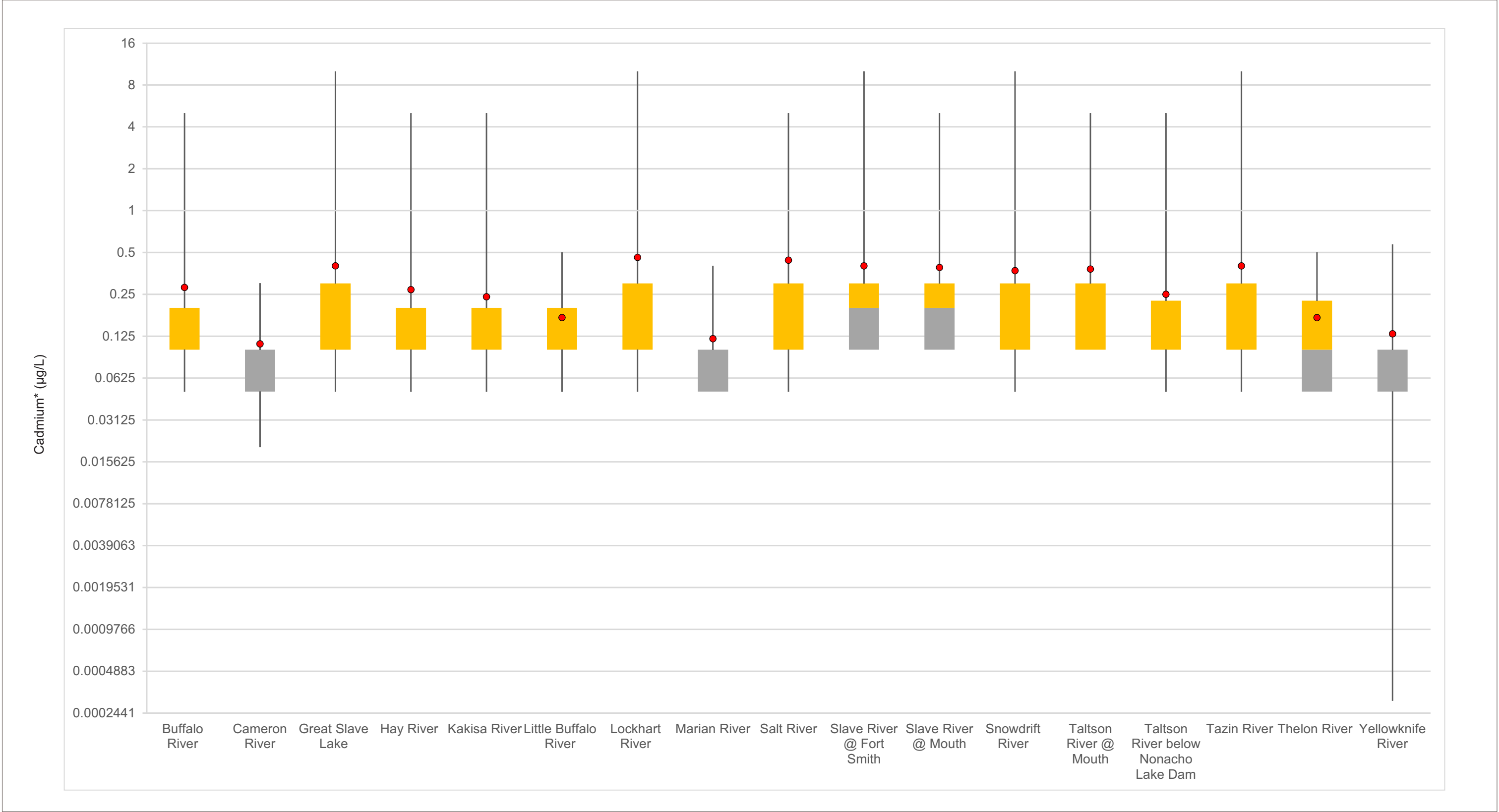
REV
0

OFFICE
Tt-VANC

DATE
March 30, 2017

Figure E.13

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Annual\VENW03044-01_FigureE-14_Cadmium.cdr



NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

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PROJECT NO.

ENW.VENW03044-01

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SL

CKD

MEZ

APVD

SW

REV

0

OFFICE

Tt-VANC

DATE

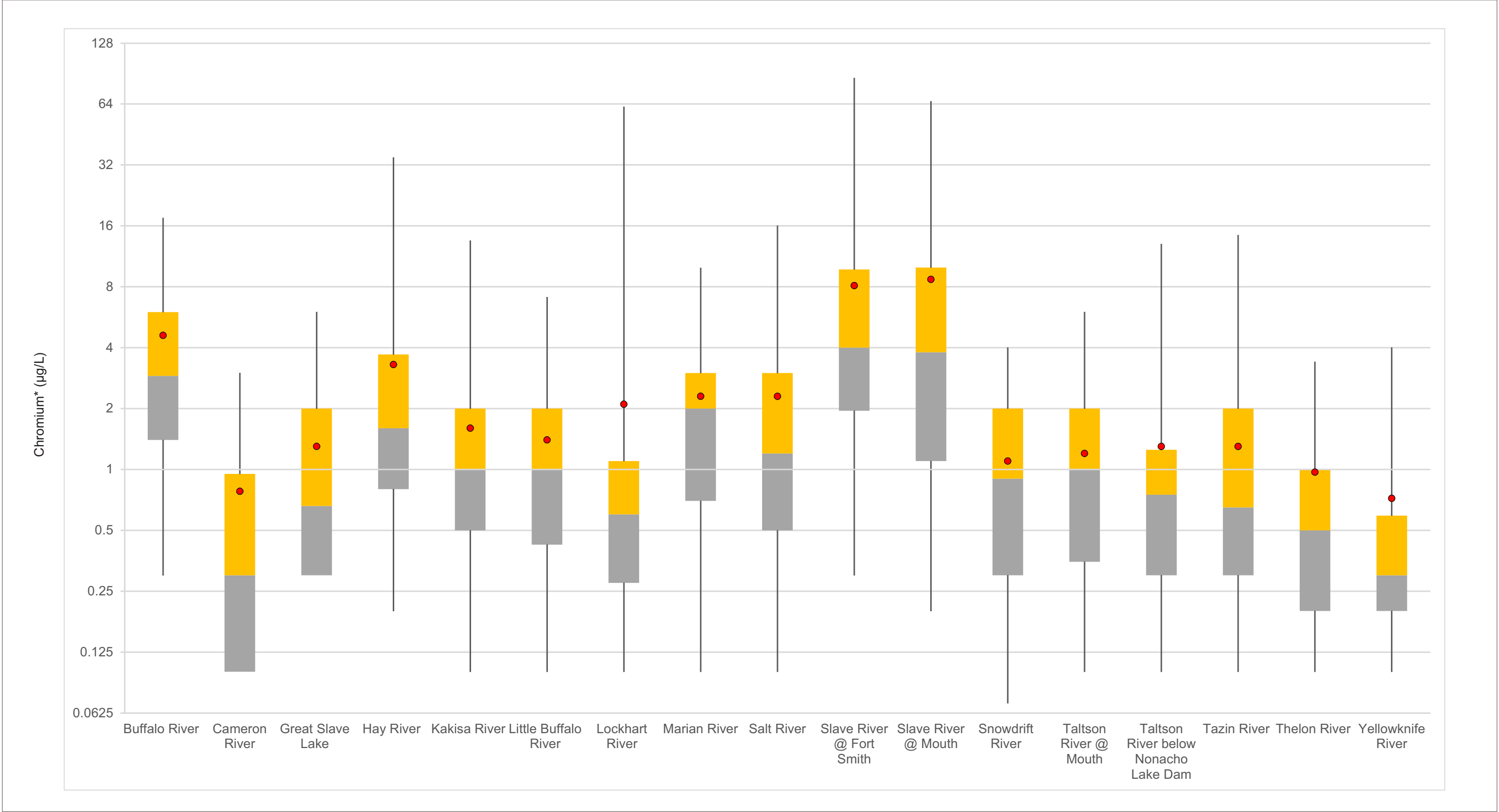
March 30, 2017

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Cadmium Spatial Box Plot

Figure E.14

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplot_Annual\VENW03044-01_FigureE-15_Chromium.cdr



NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS

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PROJECT NO.

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OFFICE

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MEZ

APVD

SW

REV

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DATE

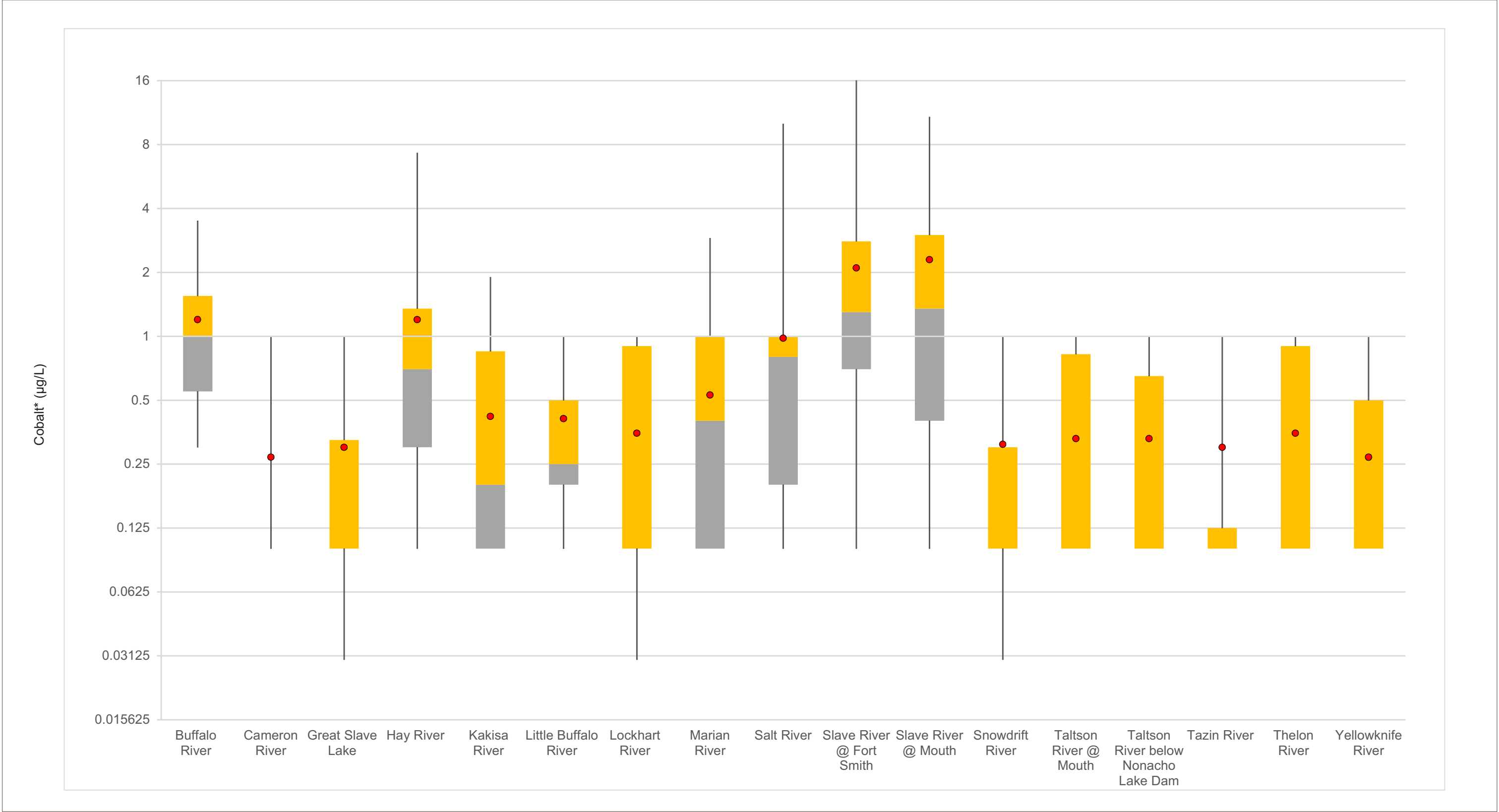
March 30, 2017

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Chromium Spatial Box Plot

Figure E.15

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Annual\VENW03044-01_FigureE-16_Cobalt.cdr



NOTES

- 1. Line between box colours indicates MEDIAN value.
- 2. Red dot indicates MEAN value.
- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- 4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

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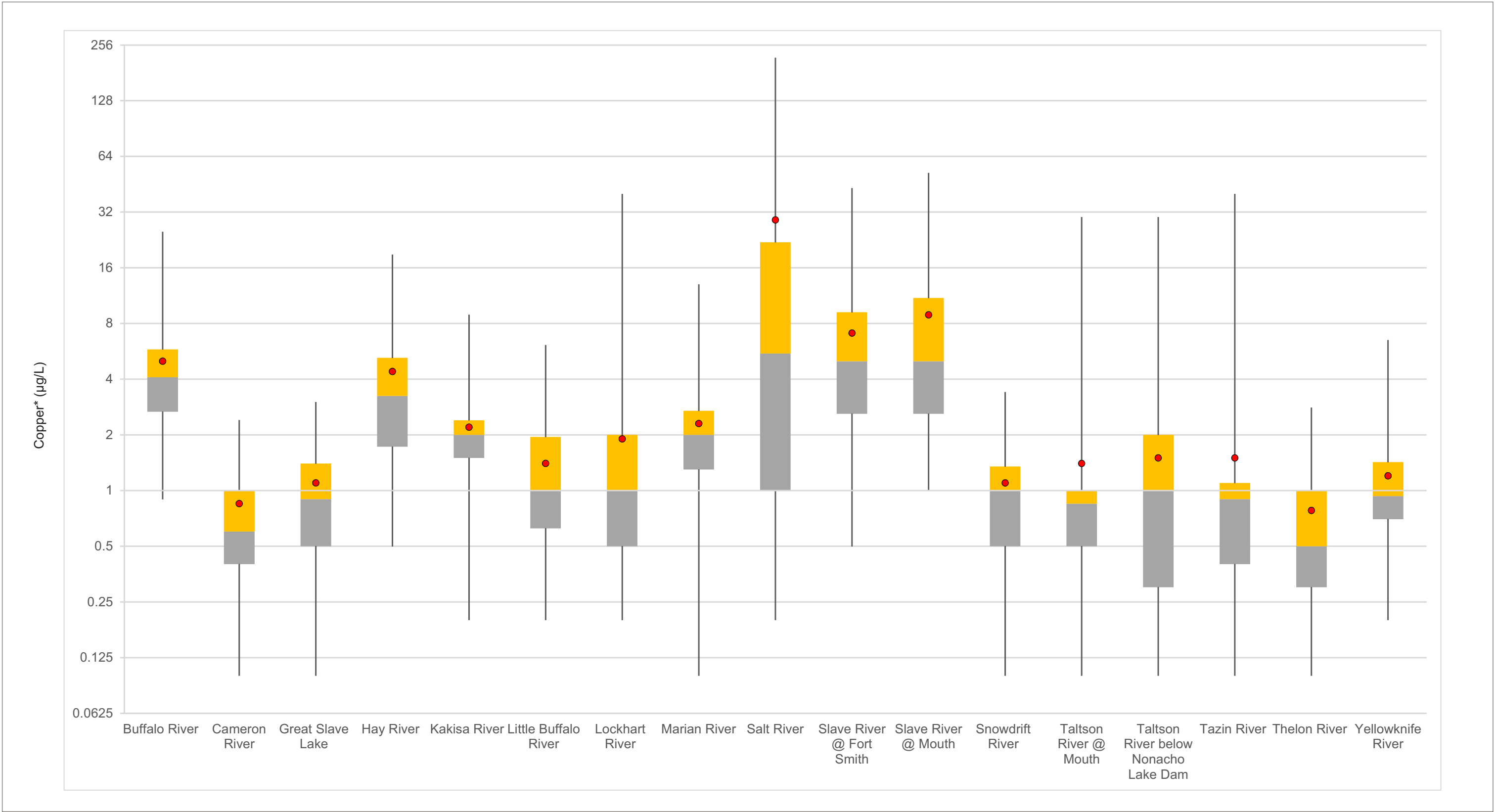
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Cobalt Spatial Box Plot

PROJECT NO. ENW.VENW03044-01		DWN SL	CKD MEZ	APVD SW	REV 0
OFFICE Tt-VANC		DATE March 30, 2017			

Figure E.16

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Annual\VENW03044-01_FigureE-17_Copper.cdr



NOTES

- 1. Line between box colours indicates MEDIAN value.
- 2. Red dot indicates MEAN value.
- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- 4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

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STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Copper Spatial Box Plot

PROJECT NO.

ENW.VENW03044-01

DWN

SL

CKD

MEZ

APVD

SW

REV

0

OFFICE

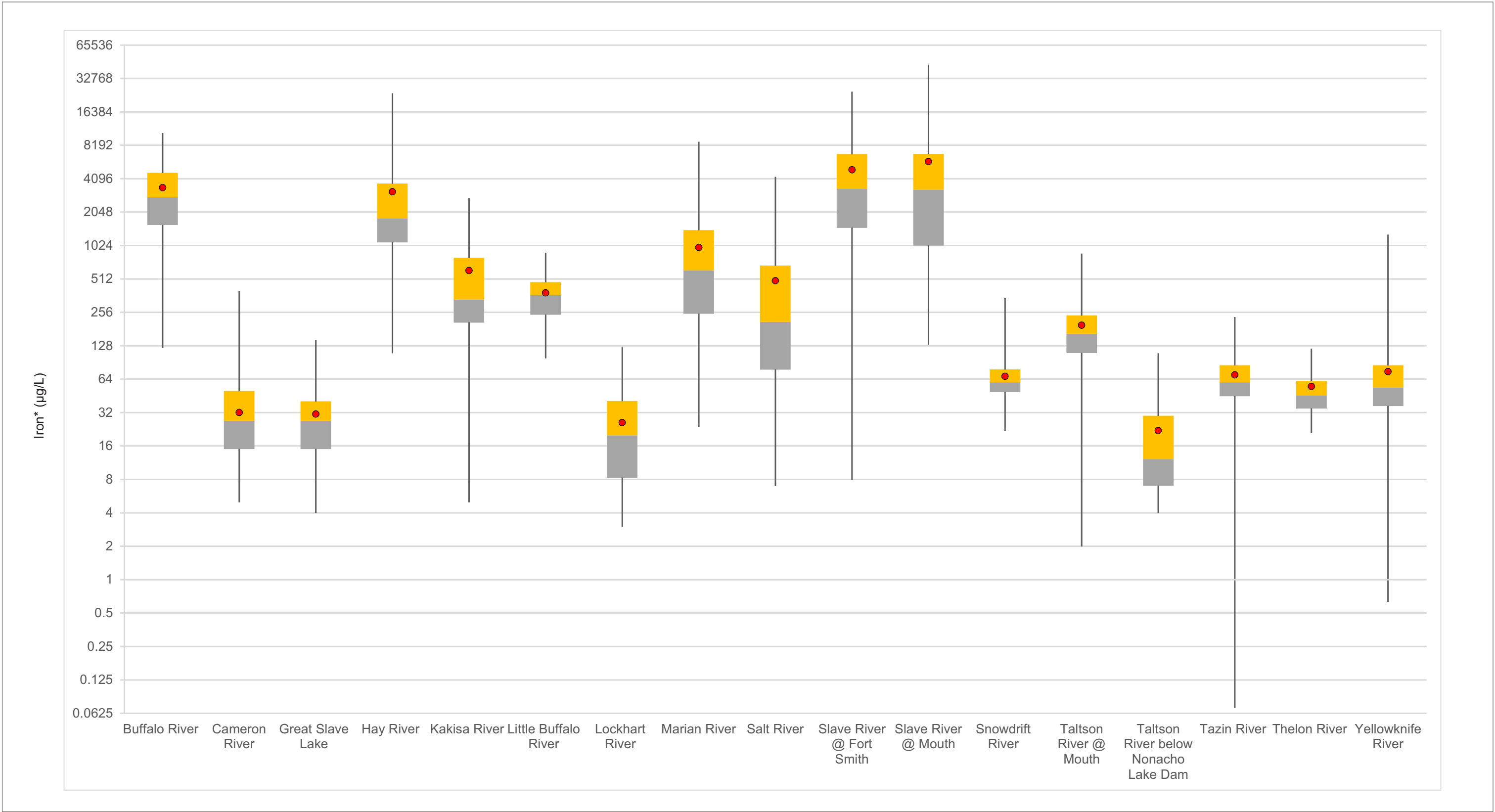
Tt-VANC

DATE

March 30, 2017

Figure E.17

Q:\Vancouver\Graphics\70-ENV\IRONMENT\ENW\VENW03044-01\Boxplot_Annual\VENW03044-01_FigureE-18_Iron.cdr



NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

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Northwest Territories

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PROJECT NO.

ENW.VENW03044-01

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CKD

MEZ

APVD

SW

REV

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DATE

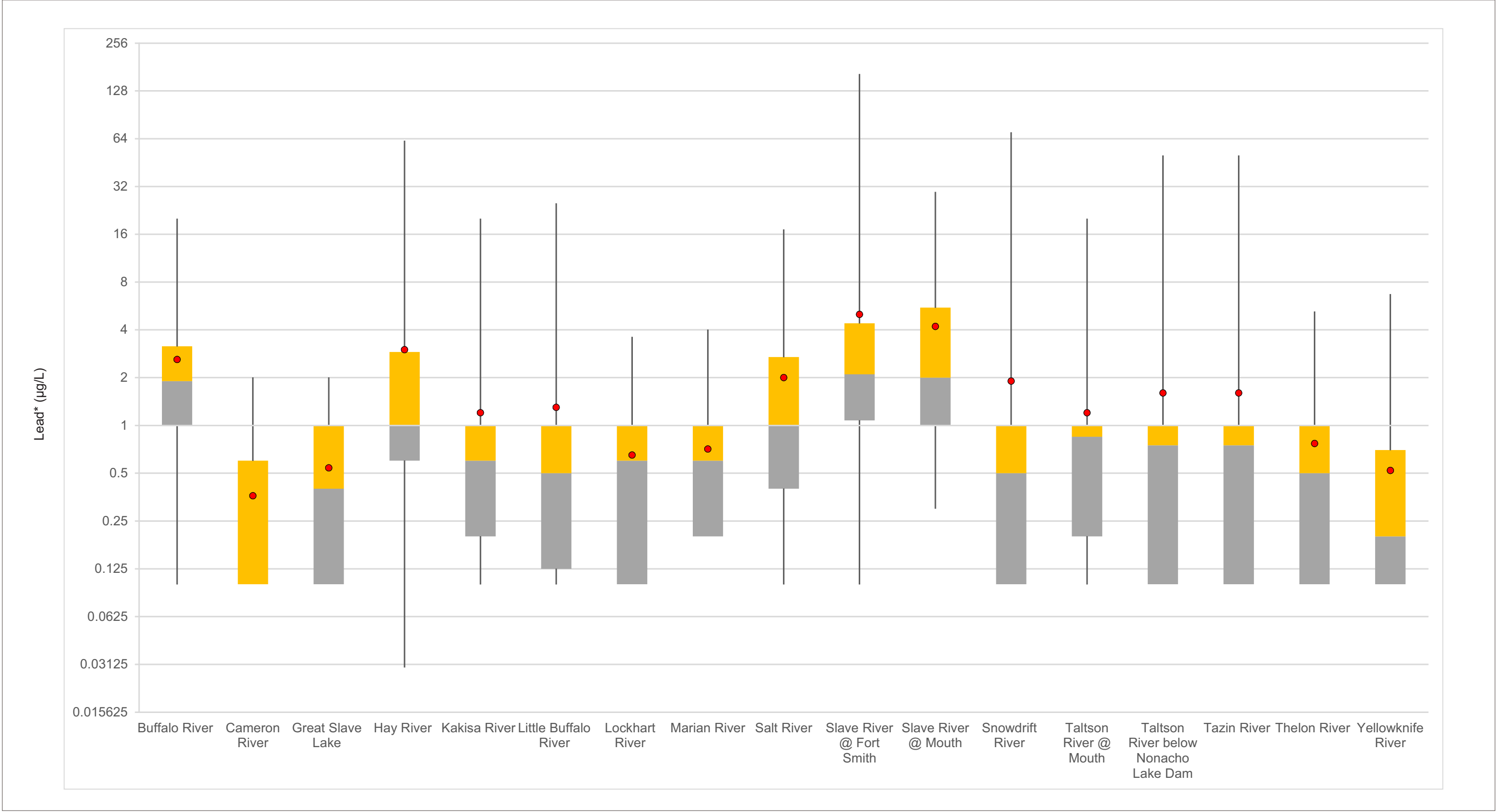
March 30, 2017

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Iron Spatial Box Plot

Figure E.18

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplot_Annual\VENW03044-01_FigureE-19_Lead.cdr



NOTES

- 1. Line between box colours indicates MEDIAN value.
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- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
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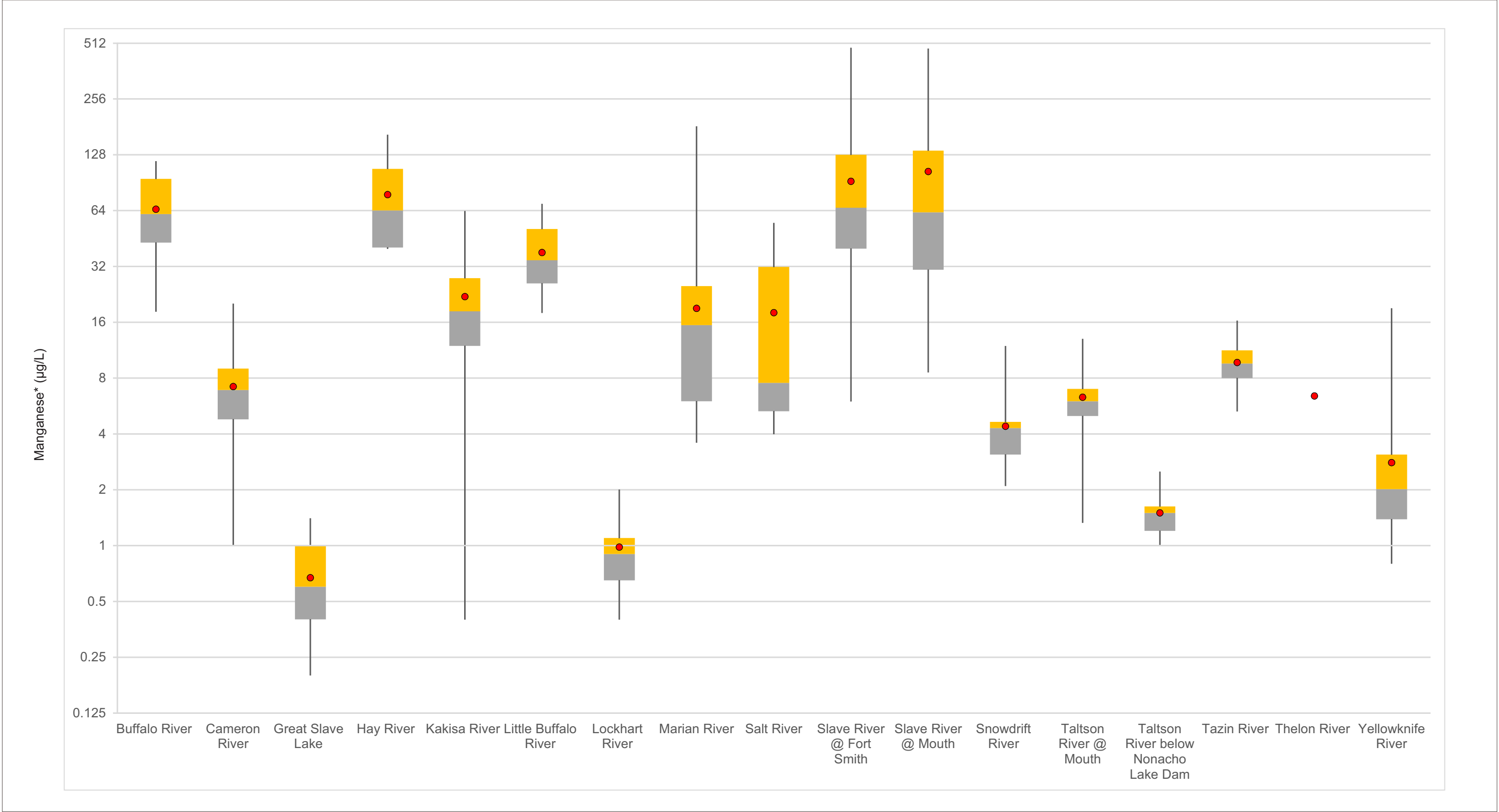
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Lead Spatial Box Plot

PROJECT NO.	DWN	CKD	APVD	REV
ENW.VENW03044-01	SL	MEZ	SW	0
OFFICE	DATE			
Tt-VANC	March 30, 2017			

Figure E.19

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Annual\VENW03044-01_FigureE-20_Manganese.cdr



NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS

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CLIENT

Northwest Territories

TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Manganese Spatial Box Plot

PROJECT NO.

ENW.VENW03044-01

DWN

SL

CKD

MEZ

APVD

SW

REV

0

OFFICE

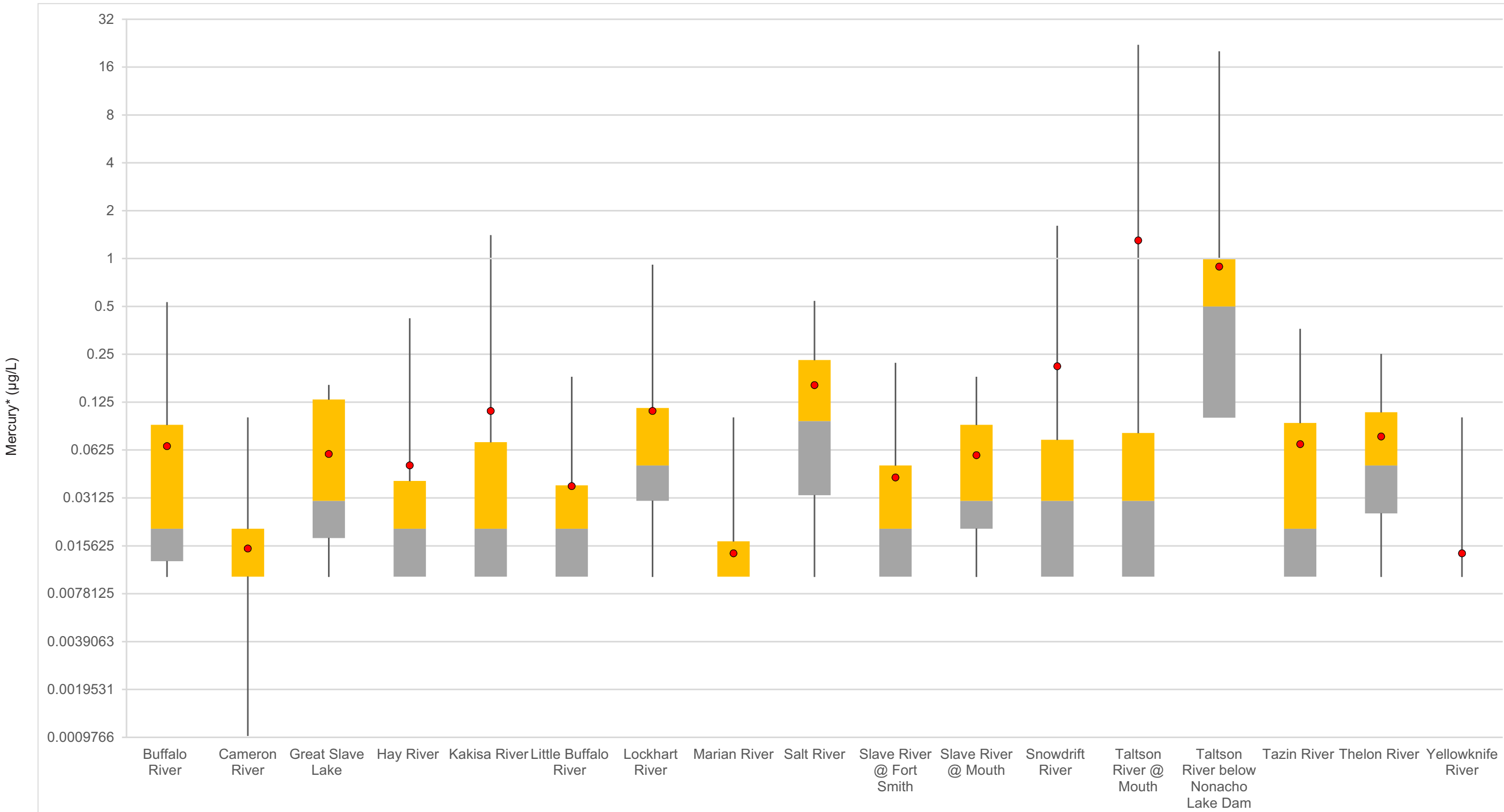
Tt-VANC

DATE

March 30, 2017

Figure E.20

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW03044-01\Boxplot_Annual\VENW03044-01_FigureE-21_Mercury.cdr



NOTES

- 1. Line between box colours indicates MEDIAN value.
- 2. Red dot indicates MEAN value.
- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- 4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS
ISSUED FOR USE

CLIENT



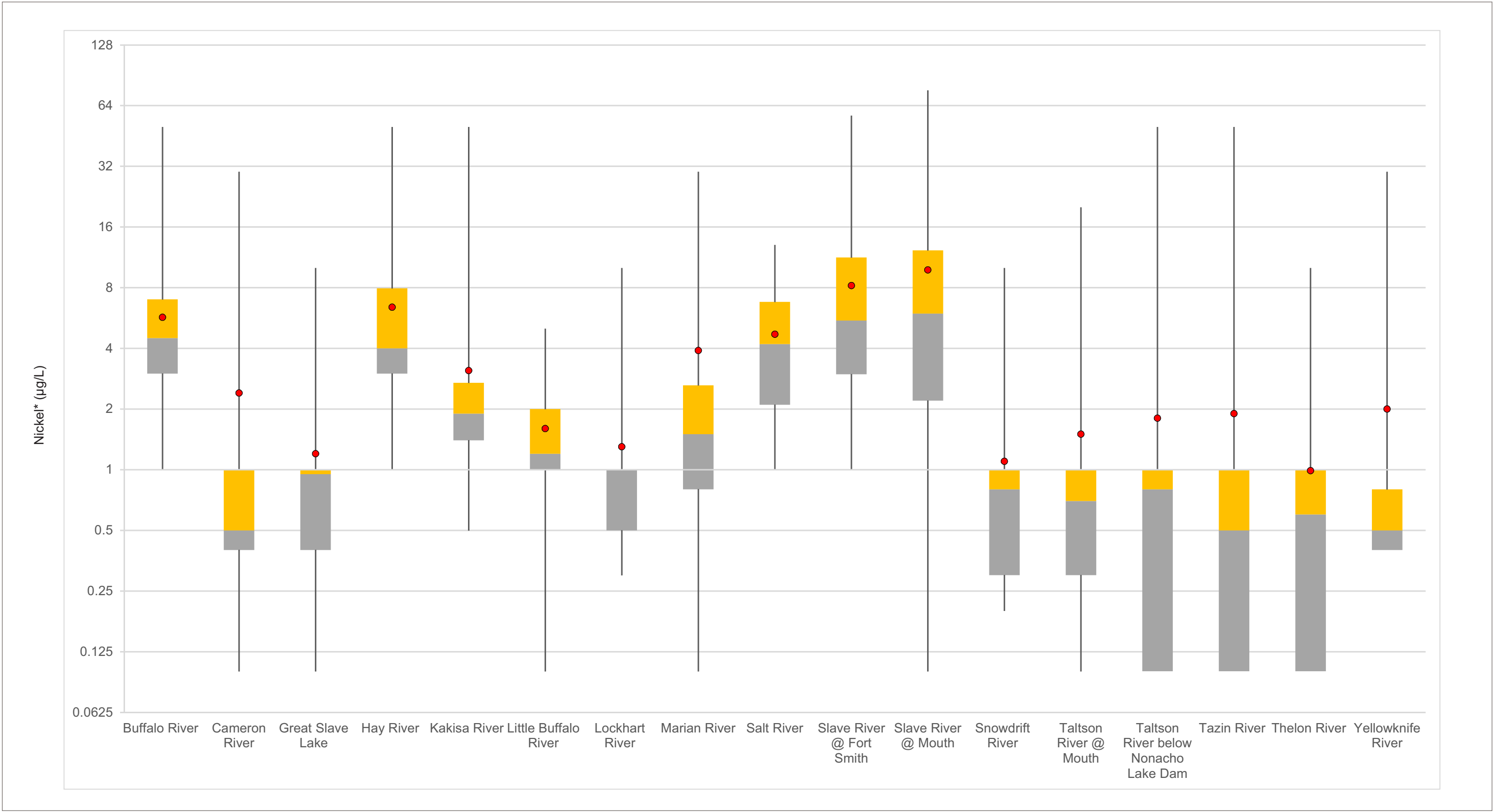
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Mercury Spatial Box Plot

PROJECT NO.	DWN	CKD	APVD	REV
ENW.VENW03044-01	SL	MEZ	SW	0
OFFICE	DATE			
Tt-VANC	March 30, 2017			

Figure E.21

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Annual\VENW03044-01_FigureE-22_Nickel.cdr



NOTES

- 1. Line between box colours indicates MEDIAN value.
- 2. Red dot indicates MEAN value.
- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- 4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS
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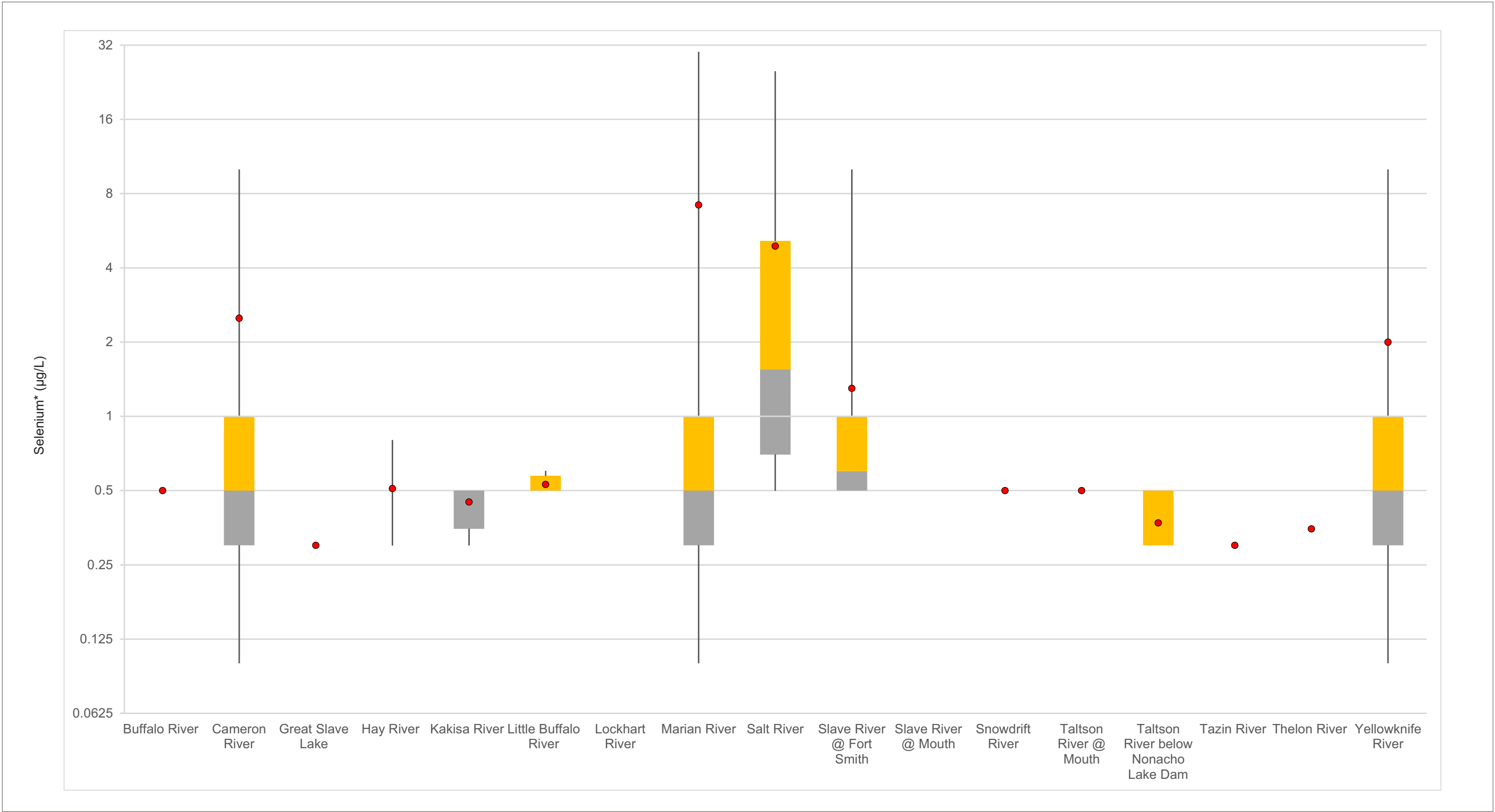
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Nickel Spatial Box Plot

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure E.22

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Annual\VENW03044-01_FigureE-23_Selenium.cdr



NOTES

1. Line between box colours indicates MEDIAN value.
2. Red dot indicates MEAN value.
3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS
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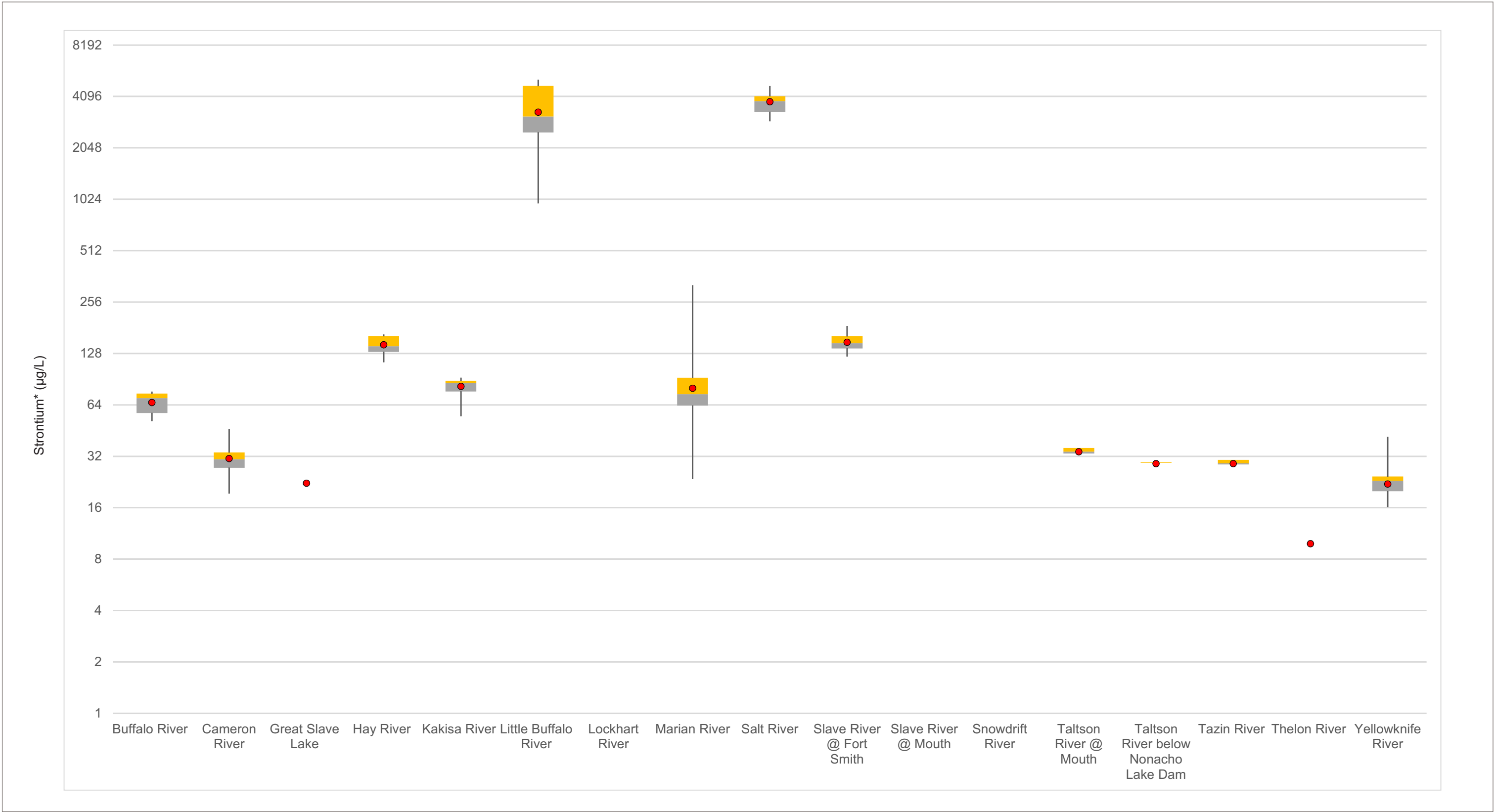
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Selenium Spatial Box Plot

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure E.23

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Annual\VENW03044-01_FigureE-24_Strontium.cdr



NOTES

1. Line between box colours indicates MEDIAN value.
2. Red dot indicates MEAN value.
3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS
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STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Strontium Spatial Box Plot

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

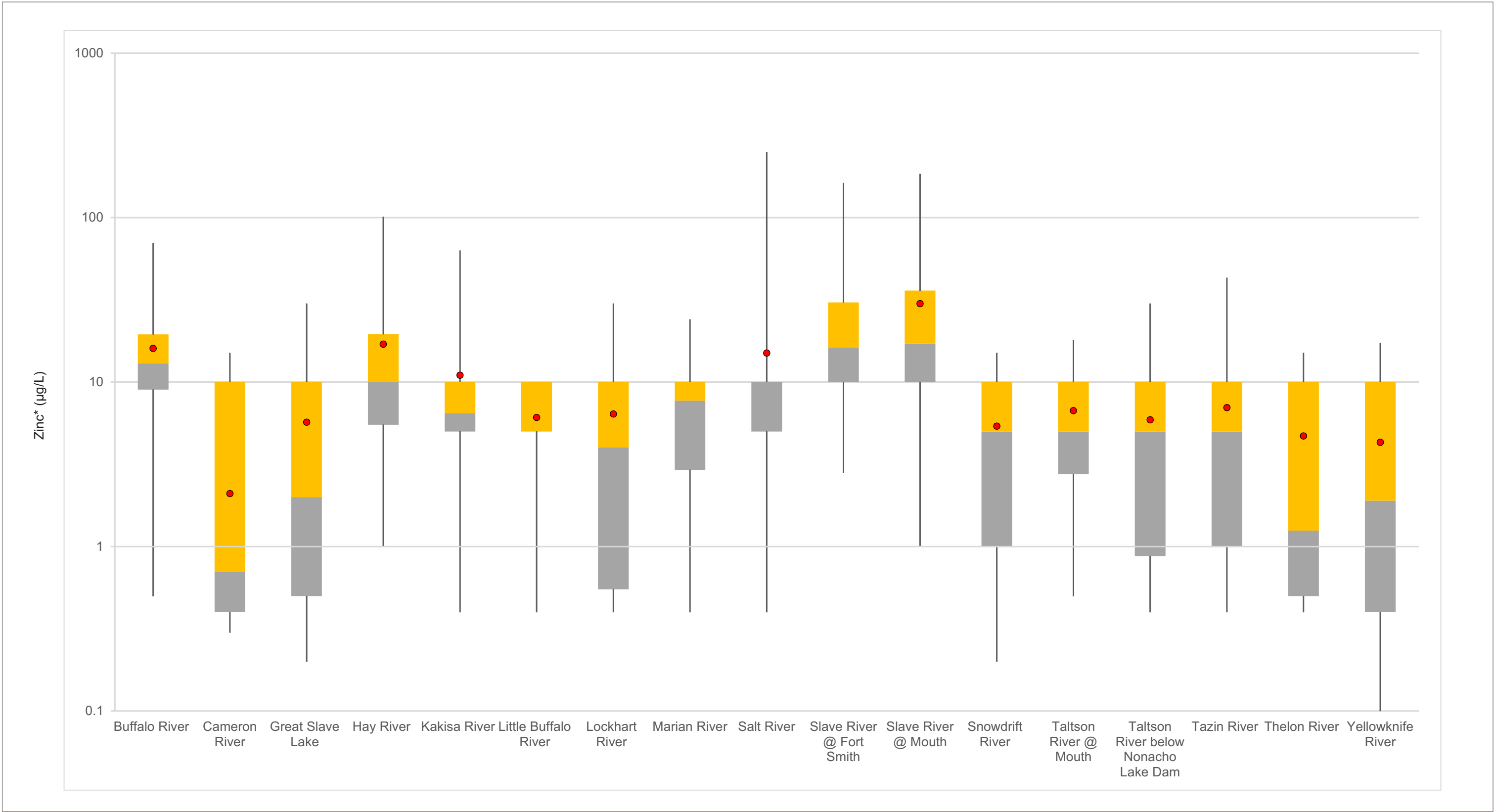
REV
0

OFFICE
Tt-VANC

DATE
March 30, 2017

Figure E.24

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplot_Annual\VENW03044-01_FigureE-25_Zinc.cdr



NOTES

- 1. Line between box colours indicates MEDIAN value.
- 2. Red dot indicates MEAN value.
- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- 4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the analyte name on the y-axis.

STATUS
ISSUED FOR USE

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TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Zinc Spatial Box Plot

PROJECT NO.	DWN	CKD	APVD	REV
ENW.VENW03044-01	SL	MEZ	SW	0
OFFICE	DATE			
Tt-VANC	March 30, 2017			

Figure E.25

APPENDIX F

MANN-KENDALL TRENDS – ALL WATER QUALITY SITES (ANNUAL) AND LOCAL RIVERS (SEASONAL)

Table F.1: Annual Mann-Kendall Trends for Analytes of Interest

Site	Physical/Major Ions								Nutrients			Metals															# Up/(# Significant Up)	# Down/(# Significant Down)	# No Trend	# NA
	Alkalinity (total as CaCO ₃)	Chloride	Electrical Conductivity (EC)	Hardness as CaCO ₃	pH	Sulphate	Total Dissolved Solids	Turbidity	Nitrate and Nitrite (as N) (mg/L)	Nitrogen (Total)	Phosphorus	Aluminum Total	Arsenic	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Strontium	Zinc					
Buffalo River @ Hwy 5	Up	Down	Up	Up	Up	Up	Down	Down	Down	No Trend	Up	No Trend	Up	Down	Down	Down	Down	Down	Down	No Trend	Down	Down	No Trend	No Trend	Down	7	13	5	0	
	0.416	0.069	0.719	0.316	0.000	0.161	0.278	0.638	0.308	-	0.193	-	0.558	0.007	0.035	0.009	0.241	0.316	0.065	-	0.000	0.022	-	-	0.042	5	6	-	-	
Cameron River	Up	Up	Up	Up	Up	Up	Down	Down	Up	No Trend	Down	Down	Down	Down	Down	Down	Down	Down	Down	Up	Down	Down	Down	Up	Down	9	15	1	0	
	0.000	0.000	0.000	0.000	0.000	0.000	0.487	0.006	1	-	0.000	0.000	0.302	0.000	0.000	0.000	0.000	0.000	0.000	0.411	0.000	0.000	0.000	0.000	0.000	6	13	-	-	
Great Slave Lake @ Taltheilei Narrows	Up	Up	Up	Up	Up	Up	Down	Up	No Trend	No Trend	NA	No Trend	Down	Down	Down	No Trend	Down	Up	Down	Down	No Trend	Down	No Trend	No Trend	Down	8	11	6	0	
	0.000	0.211	0.05	0.127	0.000	0.121	0.044	0.107	-	-	-	-	0.001	0.000	0.000	-	0.098	0.034	0.012	0.009	-	0.000	-	-	0.009	4	8	-	-	
Hay River @ West Channel Bridge	Up	Down	Up	Up	Up	Up	Down	Up	Up	No Trend	No Trend	No Trend	Down	Down	Down	Down	Down	No Trend	Down	No Trend	Down	Down	No Trend	No Trend	Down	7	11	7	0	
	0.193	0.05	0.603	0.096	0.001	0.273	0.455	0.744	0.674	-	-	-	0.38	0.000	0.041	0.431	0.538	-	0.106	-	0.003	0.022	-	-	0.277	1	5	-	-	
Kakisa River @ Hwy 1 Bridge	Down	Down	Down	Down	Up	Down	Down	Down	Down	No Trend	Down	No Trend	Down	Down	Down	Down	Down	Down	No Trend	Down	Up	Down	Down	No Trend	No Trend	Down	2	18	5	0
	0.791	0.000	0.179	0.75	0.000	0.578	0.000	0.531	0.469	-	0.041	-	0.013	0.011	0.002	0.016	0.791	-	0.001	0.413	0.062	0.000	-	-	0.66	1	10	-	-	
Little Buffalo River @ Hwy 5 Bridge	Up	Up	Up	Up	Up	Up	Up	Down	Up	No Trend	Down	No Trend	Down	Down	Down	Down	Down	Down	Down	No Trend	Down	Down	No Trend	No Trend	Up	9	11	5	0	
	0.066	0.001	0.008	0.009	0.239	0.063	0.006	0.813	0.006	-	0.016	-	0.000	0.000	0.001	0.007	0.12	0.011	0.000	-	0.062	0.032	-	-	0.071	6	8	-	-	
Lockhart River @ mouth	Up	Up	Up	Up	Up	Down	Down	Down	Down	NA	Down	NA	Down	Down	Down	Down	Down	Down	Up	Down	Down	No Trend	Down	NA	NA	Down	6	14	1	0
	0.000	0.650	0.000	0.000	0.000	0.667	0.378	0.616	0.000	-	0.342	-	0.000	0.000	0.000	0.459	0.000	0.000	0.000	0.000	-	0.000	-	-	0.000	5	9	-	-	
Marian River	Up	Up	Down	Down	Down	Down	Down	Up	Up	No Trend	Down	Down	Down	Down	Down	Down	Down	Down	Down	Up	Down	Down	Down	Down	Down	5	19	1	0	
	0.106	0.306	0.288	0.912	0.518	0.551	0.34	0.602	0.000	-	0.342	0.543	0.062	0.000	0.002	0.000	0.005	0.64	0.000	0.948	0.151	0.001	0.000	0.595	0.000	1	8	-	-	
Salt River @ Hwy 5 Bridge	Down	Up	Up	Up	No Trend	Up	Up	Down	Up	No Trend	Down	No Trend	Up	Down	Down	Down	Down	Down	Down	Down	No Trend	No Trend	Down	No Trend	No Trend	Up	8	10	7	0
	0.16	0.62	0.657	0.288	-	0.769	0.238	0.098	0.091	-	0.042	-	0.000	0.004	0.005	0.138	0.643	0.185	0.000	-	-	0.002	-	-	0.256	1	5	-	-	
Slave River at Fort Smith	No Trend	Down	Up	Up	Up	Up	Down	Up	Up	No Trend	Up	No Trend	Up	Down	Down	Up	Down	Up	Down	Up	Down	Down	Down	Up	Down	12	10	2	0	
	-	0.000	0.051	0.03	0.001	0.001	0.399	0.062	0.018	-	0.573	-	0.781	0.002	0.183	0.768	0.914	0.445	0.614	0.585	0.000	0.712	0.000	0.047	0.374	6	4	-	-	
Slave River @ Mouth	NA	Up	Up	Up	Up	Up	Up	Up	Up	NA	Up	NA	No Trend	Down	Up	Up	Up	Up	Up	Up	No Trend	Down	NA	NA	Down	15	3	2	0	
	-	0.898	0.051	0.03	0.001	0.001	0.749	0.444	0.28	-	0.097	-	-	0.009	0.282	0.38	0.734	0.254	0.134	0.13	-	0.712	-	-	0.793	3	1	-	-	
Snowdrift River @ mouth of Stark Lake	Up	Up	Up	Up	Up	Down	Down	Up	Down	No Trend	Up	No Trend	Down	Down	Down	Up	Down	Up	Down	Up	No Trend	Down	No Trend	No Trend	Down	10	10	5	0	
	0.000	0.007	0.000	0.000	0.000	0.17	0.151	0.628	0.041	-	0.034	-	0.019	0.001	0.028	0.587	0.117	0.135	0.007	0.008	-	0.000	-	-	0.256	7	6	-	-	
Taltson River @ Mouth	Up	Down	Up	Up	Up	Down	Down	Down	Down	No Trend	Down	No Trend	Down	Down	Down	Down	Down	Down	Down	Down	No Trend	Down	No Trend	No Trend	Up	5	15	5	0	
	0.000	0.723	0.772	0.026	0.000	0.004	0.004	0.416	0.041	-	0.034	-	0.000	0.000	0.011	0.085	0.081	0.213	0.000	0.652	-	0.000	-	-	0.191	3	9	-	-	
Taltson River below Nonacho Lake dam	Up	Up	Up	Up	Up	Down	Down	Down	No Trend	No Trend	Down	No Trend	Down	Down	Down	Down	Down	Up	Down	Up	Down	Down	No Trend	No Trend	Down	7	13	5	0	
	0.000	0.172	0.000	0.001	0.000	0.015	0.154	0.436	-	-	0.072	-	0.000	0.000	0.000	0.013	0.000	0.047	0.000	0.409	0.126	0.000	-	-	0.009	5	9	-	-	
Tazin River @ mouth	Up	No Trend	Up	Up	Up	Down	Down	Up	Down	No Trend	Down	No Trend	Down	Down	Down	Down	Down	Down	Down	Up	No Trend	Down	No Trend	No Trend	Down	6	13	6	0	
	0.000	-	0.011	0.001	0.000	0.023	0.000	0.458	0.115	-	0.058	-	0.000	0.000	0.003	0.868	0.004	0.198	0.000	0.1	-	0.000	-	-	0.22	2	8	-	-	
Thelon River @ Catling Lake	Up	Up	No Trend	Up	Up	Down	No Trend	Down	Down	No Trend	Down	No Trend	Down	Down	Down	Down	Down	No Trend	Down	No Trend	Down	Down	No Trend	No Trend	Down	4	13	8	0	
	0.000	0.373	-	0.000	0.204	0.000	-	0.000	0.092	-	0.101	-	0.000	0.001	0.014	0.086	0.021	-	0.047	-	0.004	0.000	-	-	0.022	2	10	-	-	
Yellowknife River	Up	Up	Up	Up	Up	Up	Up	Down	Up	Up	Up	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Up	Down	11	14	0	0	
	0.000	0.000	0.000	0.000	0.198	0.000	0.000	0.101	0.017	0.124	0.049	0.002	0.000	0.000	0.000	0.000	0.000	0.054	0.000	0.002	0.000	0.000	0.000	0.000	0.000	9	12	-	-	
# Up	13	11	14	15	15	9	4	7	8	1	5	0	3	0	1	3	1	6	1	8	0	0	0	3	3					
(# Significant Up)	9	4	8	11	12	4	2	0	4	0	2	0	1	0	0	0	0	3	0	1	0	0	0	3	0					
# Down	2	5	2	2	1	8	12	10	7	0	10	3	13	17	16	13	16	8	16	4	10	17	4	1	14					
(# Significant Down)	0	3	0	0	0	4	4	2	3	0	5	2	10	17	15	7	7	3	13	3	6	15	4	0	8					
# No Trend	1	1	1	0	1	0	1	0	2	14	1	12	1	0	0	1	0	3	0	5	7	0	11	11	0					
# NA	1	0	0	0	0	0	0	0	0	2	1	2	0	0	0	0	0	0	0	0	0	0	2	2	0					

Notes:
Trend direction = "Up", "Down", "No Trend"
NA = analyte not analyzed
Numerical value = p-value (two tailed, 0.05)
Bold - significant trend (p≤0.05)
Italic - Local River Water Quality Site

Table F.2: Summary of Seasonal Mann-Kendall Trends for Analytes of Interest at Local Rivers

	Physical/Major Ions								Nutrients			Metals																			
Analyte of Interest	Alkalinity (total as CaCO ₃)	Chloride	Electrical Conductivit y (EC)	Hardness as CaCO ₃	pH	Sulphate	Total Dissolved Solids	Turbidity	Nitrate and Nitrite (as N) (mg/L)	Nitrogen (Total)	Phosphorus	Aluminum Total	Arsenic	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Strontium	Zinc	# Up (# Significant Up)	# Down (# Significant Down)	# (No Trend)	(# NA)		
Cameron River																															
Annual	Up	Down	Up	Up	Up	Up	Down	Down	Up	No Trend	Down	Down	Down	Down	Down	Down	Up	Down	Down	Up	Down	Down	Down	Up	Down	9	15	1	0		
	0.000	0.000	0.000	0.000	0.000	0.000	0.487	0.006	1	-	0.000	0.000	0.302	0.000	0.000	0.000	0.000	0.000	0.000	0.411	0.000	0.000	0.000	0.000	0.000	6	13	-	-		
Spring Freshet	Up	Up	Up	Up	Up	Up	Down	Down	Up	No Trend	Down	Down	Down	Down	Down	Down	Down	Down	Down	Up	Down	Down	Down	Up	Down	9	15	1	0		
	0.000	0.001	0.000	0.000	0.000	0.001	0.501	0.026	0.152	-	0.032	0.000	0.342	0.000	0.000	0.000	0.000	0.005	0.000	0.005	0.005	0.000	0.000	0.000	0.000	8	13	-	-		
Summer Recession	Up	Up	Up	Up	Up	Down	Down	Down	Up	No Trend	Down	Down	Down	Down	Down	Down	Down	Down	Down	Up	Down	Down	Down	Up	Down	8	16	1	0		
	0.000	0.000	0.000	0.000	0.006	0.377	0.860	0.104	0.100	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.629	0.827	0.000	0.000	0.000	0.000	6	12	-	-		
Winter Baseline	Up	Up	Up	Up	Up	Up	Down	Down	Up	No Trend	Down	Down	Up	Down	Down	Down	Down	Down	Down	Up	Down	Down	Down	Up	Down	10	14	1	0		
	0.000	0.000	0.000	0.000	0.037	0.000	0.269	0.012	0.02	-	0.019	0.000	0.887	0.000	0.000	0.000	0.000	0.000	0.000	0.552	0.001	0.000	0.000	0.000	0.000	8	13				
Marian River																															
Annual	Up	Down	Up	Down	Down	Down	Down	Up	Up	No Trend	Down	Down	Down	Down	Down	Down	Down	Down	Down	Up	Down	Down	Down	Down	Down	5	19	1	0		
	0.106	0.002	0.306	0.288	0.518	0.551	0.34	0.602	0.000	-	0.342	0.543	0.062	0.000	0.000	0.005	0.912	0.64	0.000	0.948	0.151	0.001	0.000	0.595	0.000	1	8	-	-		
Spring Freshet	Up	Up	Down	Up	Up	Down	No Trend	Up	Up	No Trend	Down	Up	Up	Down	Down	Down	Up	Down	Up	Down	Down	Down	Down	Up	Down	11	12	2	0		
	0.198	0.817	0.693	0.771	0.337	0.710	-	0.272	0.392	-	0.670	0.706	0.365	0.000	0.047	0.181	0.831	0.540	0.038	0.644	0.424	0.579	0.000	0.572	0.000	0	5	-	-		
Summer Recession	Up	Up	Up	Up	Up	Down	No Trend	Up	Up	No Trend	Down	Down	No Trend	Down	Up	Down	Down	Up	Down	Up	Down	Down	Down	Down	Down	10	12	3	0		
	0.019	0.729	0.707	0.413	0.169	0.666	-	0.07	0.002	-	0.629	0.394	-	0.000	0.621	0.281	0.447	0.883	0.097	0.629	0.45	0.116	0.000	0.825	0.000	2	3	-	-		
Winter Baseline	Down	Up	Down	Down	Down	Down	Down	Up	Up	No Trend	Down	Up	Down	Down	Down	Down	Down	Down	Down	Up	Down	Down	Down	Down	Down	5	19	1	0		
	0.599	0.632	0.035	0.04	0.001	0.245	0.046	0.801	0.000	-	0.000	0.000	0.079	0.000	0.019	0.004	0.999	0.509	0.003	0.002	0.361	0.075	0.000	0.106	0.000	3	11	-	-		
Yellowknife River																															
Annual	Up	Down	Up	Up	Up	Up	Up	Down	Up	Up	Up	Down	Down	Down	Down	Down	Up	Down	Down	Down	Down	Down	Down	Up	Down	11	14	3	0		
	0.000	0.000	0.000	0.000	0.198	0.000	0.000	0.101	0.017	0.124	0.049	0.002	0.000	0.000	0.000	0.000	0.000	0.054	0.000	0.002	0.000	0.000	0.000	0.000	0.000	9	12	-	-		
Spring Freshet	Up	Up	Up	Up	Up	Up	Up	Up	No Trend	No Trend	Up	Down	Down	Down	Down	Down	Down	Down	Down	Up	Down	Down	Down	Up	Down	11	12	2	0		
	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.804	-	-	0.024	0.004	0.015	0.000	0.014	0.000	0.137	0.134	0.000	0.749	0.117	0.000	0.000	0.000	0.379	9	8	-	-		
Summer Recession	Up	Up	Up	Up	Up	Down	Up	No Trend	Up	No Trend	No Trend	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Up	Down	8	14	3	0		
	0.000	0.000	0.000	0.000	0.7	0.851	0.005	-	0.111	-	-	0.027	0.000	0.000	0.002	0.000	0.000	0.407	0.000	0.12	0.511	0.000	0.000	0.000	0.206	6	9	-	-		
Winter Baseline	Up	Up	Up	Up	Up	Up	Up	Down	Up	No Trend	Up	Up	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Up	Down	11	13	1	0		
	0.000	0.000	0.000	0.000	0.44	0.000	0.001	0.001	0.379	-	0.257	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.000	1.000	0.000	0.000	0.000	8	12	-	-		
# Up	11	9	10	10	10	6	4	5	11	1	3	3	2	0	1	0	2	2	0	9	0	0	0	9	0						
(# Significant Up)	9	5	8	8	5	5	4	0	5	0	1	2	0	0	0	0	2	0	0	2	0	0	0	8	0						
# Down	1	3	2	2	2	6	6	6	0	0	7	9	9	12	11	12	10	10	12	3	12	12	12	3	12						
(# Significant Down)	0	3	1	1	1	0	1	4	0	0	5	7	4	11	11	10	5	5	11	2	5	8	12	0	10						
# No Trend	0	0	0	0	0	0	2	1	1	11	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0						
# NA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						

Notes:
Trend direction = "Up", "Down", "No Trend"
NA = analyte not analyzed
Numerical value = p-value (two tailed, 0.05)
Bold - significant trend (p≤0.05)

APPENDIX G

SUMMARY STATISTICS - LOCAL RIVERS (SEASONAL)

Table G.1: Summary Statistics - Cameron River, Spring Freshet

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical / Major Ions	pH	79	79	0	0.00	6.93	7.01	7.13	7.40	7.53	7.66	7.87	8.05	8.10	7.50	0.0250	34.0909	0.26	0.39	0.2200	0	0
	Electrical Conductivity (EC)	79	79	0	0.00	55	47.25	57.90	65.10	73.45	77.00	89.00	94.85	95.20	72.00	1.0351	7.8261	11.90	17.85	9.2000	0	0
	Hardness as CaCO3	76	76	0	0.00	21.2335	10.77	22.11	26.25	32.08	36.58	41.57	52.05821	43.70	32.00	0.6793	5.4237	10.32	15.48	5.9000	0	0
	Alkalinity (total as CaCO3)	78	78	0	0.00	19.6	13.46	20.19	23.33	27.53	29.90	34.01	39.7625	37.20	27.00	0.4639	6.5854	6.58	9.86	4.1000	0	0
	Chloride	76	76	0	0.00	1.4	1.49	1.70	2.20	2.50	2.68	3.12	3.3875	3.40	2.40	0.0478	5.7143	0.48	0.71	0.4200	0	0
	Sulphate	78	74	4	5.13	2.4	1.46	2.90	3.45	4.00	4.78	6.05	6.7625	9.00	4.20	0.1230	3.8182	1.33	1.99	1.1000	0	0
	Total Solids (Filtered)	64	63	1	1.56	10	25.50	30.50	44.25	49.00	56.75	72.00	75.5	76.00	50.00	1.4477	4.1667	12.50	18.75	12.0000	0	0
	Turbidity	77	77	0	0.00	0.29	0.10	0.34	0.55	0.66	0.85	2.11	1.295	4.05	0.84	0.0664	1.4483	0.30	0.45	0.5800	0	0
Nutrients	Nitrate and Nitrite (as N) (mg/L)	58	22	36	62.07	0.0051	-0.05	0.01	0.01	0.01	0.05	0.20	0.105625	0.20	0.03	0.0058	0.7273	0.04	0.06	0.0440	0	0
	Nitrogen (Total)	6	6	0	0.00	0.312	0.27	NC	0.32	0.35	0.36	NC	0.413	0.37	0.34	0.0084	16.1905	0.04	0.05	0.0210	0	0
	Nitrogen (Total) (Filtered)	6	6	0	0.00	0.317	0.26	NC	0.32	0.34	0.36	NC	0.4285	0.39	0.34	0.0109	12.5926	0.04	0.06	0.0270	0	0
	Phosphorus	68	49	19	27.94	2	5.00	2.45	8.00	10.00	10.00	25.50	13	69.00	11.00	1.0728	1.2500	2.00	3.00	8.8000	63	92.65
Metals	Aluminum Total	60	42	18	30.00	3.9	-14.94	5.48	12.03	16.05	30.00	30.00	56.9625	48.60	19.00	1.2195	2.0213	17.98	26.96	9.4000	0	0
	Arsenic	66	45	21	31.82	0.2	-0.24	0.20	0.33	0.40	0.70	1.46	1.2625	2.00	0.56	0.0483	1.4359	0.38	0.56	0.3900	0	0
	Arsenic (Filtered)	10	9	1	10.00	0.2	0.09	NC	0.28	0.35	0.40	NC	0.5875	0.40	0.33	0.0260	4.0244	0.13	0.19	0.0820	0	0
	Cadmium	66	4	62	93.94	0.05	-0.03	0.05	0.05	0.10	0.10	0.30	0.175	0.30	0.11	0.0110	1.2360	0.05	0.08	0.0890	35	53.03
	Cadmium (Filtered)	10	0	10	100.00	0.05	0.05	NC	0.05	0.05	0.05	NC	0.05	0.05	0.05	0.0000	NC	0.00	0.00	0.0000	0	0
	Chromium	66	24	42	63.64	0.1	-0.84	0.10	0.10	0.30	0.73	3.00	1.6625	3.00	0.78	0.1312	0.7091	0.63	0.94	1.1000	0	0
	Chromium (Filtered)	10	3	7	70.00	0.1	0.06	NC	0.10	0.10	0.13	NC	0.1625	0.40	0.14	0.0306	1.4433	0.03	0.04	0.0970	0	0
	Cobalt	64	3	61	95.31	0.1	0.10	0.10	0.10	0.10	0.10	1.00	0.1	1.00	0.26	0.0427	0.7647	0.00	0.00	0.3400	0	0
	Cobalt (Filtered)	10	0	10	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.1	0.10	0.10	0.0000	NC	0.00	0.00	0.0000	0	0
	Copper	67	44	23	34.33	0.1	-0.33	0.20	0.50	0.70	1.05	2.00	1.875	2.00	0.86	0.0724	1.4576	0.55	0.83	0.5900	0	0
	Copper (Filtered)	10	5	5	50.00	0.2	0.05	NC	0.20	0.20	0.30	NC	0.45	0.30	0.23	0.0153	4.7917	0.10	0.15	0.0480	0	0
	Iron	66	45	21	31.82	5	-28.13	10.00	18.75	29.00	50.00	117.10	96.875	397.00	40.00	6.2876	0.7843	31.25	46.88	51.0000	1	1.52
	Iron (Filtered)	10	3	7	70.00	5	2.00	NC	5.00	5.00	7.00	NC	10	7.00	5.60	0.3055	5.7732	2.00	3.00	0.9700	0	0
	Lead	66	12	54	81.82	0.1	-0.84	0.10	0.10	0.10	0.73	1.17	1.6625	2.00	0.37	0.0576	0.7872	0.63	0.94	0.4700	0	0
	Lead (Filtered)	10	0	10	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.1	0.10	0.10	0.0000	NC	0.00	0.00	0.0000	0	0
	Manganese	64	64	0	0.00	1.7	1.24	2.80	6.00	7.60	9.18	12.35	13.9375	16.80	7.60	0.3426	2.8148	3.18	4.76	2.7000	0	0
	Manganese (Filtered)	10	9	1	10.00	0.1	-0.43	NC	0.10	0.20	0.45	NC	0.975	1.50	0.36	0.1360	0.8372	0.35	0.53	0.4300	0	0
	Mercury	63	3	60	95.24	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.01	0.05	0.01	0.0010	1.6250	0.00	0.00	0.0080	4	6.35
	Mercury (Filtered)	10	0	10	100.00	0.01	0.01	NC	0.01	0.01	0.01	NC	0.01	0.01	0.01	0.0000	NC	0.00	0.00	0.0000	0	0
	Nickel	79	58	21	26.58	0.1	-0.35	0.10	0.40	0.50	0.90	4.00	1.65	30.00	1.80	0.6379	0.3158	0.50	0.75	5.7000	0	0
	Nickel (Filtered)	10	8	2	20.00	0.1	-0.16	NC	0.18	0.30	0.40	NC	0.7375	0.40	0.28	0.0359	2.5455	0.23	0.34	0.1100	0	0
	Selenium	60	2	58	96.67	0.3	-0.75	0.30	0.30	0.50	1.00	10.00	2.05	10.00	2.60	0.5093	0.6667	0.70	1.05	3.9000	26	43.33
	Selenium (Filtered)	10	0	10	100.00	0.3	0.30	NC	0.30	0.30	0.30	NC	0.3	0.30	0.30	0.0000	NC	0.00	0.00	0.0000	0	0
	Strontium	63	63	0	0.00	19.4	16.95	21.32	25.80	28.80	31.70	38.48	40.55	46.20	29.00	0.5884	6.1702	5.90	8.85	4.7000	0	0
	Strontium (Filtered)	10	10	0	0.00	28.2	27.60	NC	30.98	32.00	33.23	NC	36.6	39.30	32.00	0.9067	11.0345	2.25	3.38	2.9000	0	0
	Zinc	75	19	56	74.67	0.3	-6.50	0.40	0.40	1.00	5.00	10.00	11.9	15.00	3.40	0.4887	0.8095	4.60	6.90	4.2000	0	0
	Zinc (Filtered)	10	0	10	100.00	0.4	0.40	NC	0.40	0.40	0.40	NC	0.4	0.40	0.40	0.0000	NC	0.00	0.00	0.0000	0	0

Notes:
bold - DL ≥50%
NC - not calculatable

Table G.2: Summary Statistics - Cameron River, Summer Recession

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical / Major Ions	pH	54	54	0	0.00	7.34	7.30	7.40	7.54	7.63	7.70	7.80875	7.95	7.90	7.60	0.0157	63.3333	0.16	0.24	0.12	0	0
	Electrical Conductivity (EC)	54	54	0	0.00	66.1	58.59	66.93	70.48	75.50	78.40	84.475	90.29	85.90	75.00	0.6920	14.7059	7.93	11.89	5.1	0	0
	Hardness as CaCO3	52	52	0	0.00	16	19.95	25.68	29.40	32.70	35.70	41.125	45.15	42.80	33.00	0.6681	6.8750	6.30	9.45	4.8	0	0
	Alkalinity (total as CaCO3)	54	54	0	0.00	22.6	22.56	23.35	27.10	28.60	30.13	32.725	34.66	33.20	28.00	0.3559	10.7692	3.03	4.54	2.6	0	0
	Chloride	53	53	0	0.00	1.5	1.34	1.67	2.05	2.40	2.53	3.03	3.24	3.20	2.30	0.0523	6.0526	0.48	0.71	0.38	0	0
	Sulphate	52	51	1	1.92	3	2.50	3.20	4.00	4.00	5.00	8.35	6.50	12.00	4.60	0.2098	3.0667	1.00	1.50	1.5	0	0
	Total Solids (Filtered)	53	52	1	1.89	10	25.75	17.90	41.50	47.33	52.00	62.3	67.75	74.00	45.00	1.6706	3.7500	10.50	15.75	12	0	0
	Turbidity	54	54	0	0.00	0.3	0.03	0.42	0.57	0.78	0.93	1.4525	1.47	2.06	0.80	0.0438	2.5000	0.36	0.54	0.32	0	0
Nutrients	Nitrate and Nitrite (as N) (mg/L)	48	16	32	66.67	0.0051	-0.01	0.01	0.01	0.01	0.02	0.1075	0.05	0.20	0.03	0.0053	0.6944	0.02	0.02	0.036	0	0
	Nitrogen (Total)	6	6	0	0.00	0.32	0.27	NC	0.33	0.35	0.38	NC	0.44	0.41	0.35	0.0119	12.0690	0.04	0.06	0.029	0	0
	Nitrogen (Total) (Filtered)	6	6	0	0.00	0.314	0.25	NC	0.32	0.34	0.37	NC	0.44	0.38	0.34	0.0101	13.6000	0.05	0.07	0.025	0	0
	Phosphorus	52	30	22	42.31	4	-20.84	6.15	9.66	13.35	30.00	40.17	60.51	154.00	22.00	2.9995	1.0000	20.34	30.51	22	0	0
	Aluminum Total	53	40	13	24.53	0.2	-0.50	0.30	0.40	0.53	1.00	1.21	1.90	1.70	0.68	0.0456	2.0606	0.60	0.90	0.33	0	0
Metals	Arsenic	9	9	0	0.00	0.3	0.28	NC	0.35	0.40	0.40	NC	0.48	0.40	0.38	0.0147	8.6364	0.05	0.08	0.044	0	0
	Arsenic (Filtered)	52	3	49	94.23	0.05	-0.03	0.05	0.05	0.08	0.10	0.3	0.18	0.30	0.12	0.0140	1.2000	0.05	0.08	0.1	26	50
	Cadmium	9	0	9	100.00	0.05	0.05	NC	0.05	0.05	0.05	NC	0.05	0.05	0.05	0.0000	NC	0.00	0.00	0	0	0
	Cadmium (Filtered)	50	13	37	74.00	0.1	-3.46	0.10	0.10	0.30	2.48	3	6.04	3.00	0.98	0.1724	0.8167	2.38	3.56	1.2	0	0
	Chromium	9	0	9	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.10	0.0000	NC	0.00	0.00	0	0	0
	Chromium (Filtered)	53	2	51	96.23	0.1	0.08	0.10	0.10	0.10	0.12	1	0.14	1.00	0.30	0.0522	0.7895	0.02	0.02	0.38	0	0
	Cobalt	9	0	9	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.10	0.0000	NC	0.00	0.00	0	0	0
	Cobalt (Filtered)	51	34	17	33.33	0.2	-1.70	0.20	0.40	0.60	1.80	2	3.90	2.00	0.93	0.0937	1.3881	1.40	2.10	0.67	0	0
	Copper	9	6	3	33.33	0.2	-0.10	NC	0.20	0.40	0.40	NC	0.70	0.40	0.32	0.0324	3.2990	0.20	0.30	0.097	0	0
	Copper (Filtered)	52	34	18	34.62	10	-30.00	11.30	18.00	30.00	50.00	61.6	98.00	207.00	35.00	4.0215	1.2069	32.00	48.00	29	0	0
	Iron	9	1	8	88.89	5	5.00	NC	5.00	5.00	5.00	NC	5.00	5.00	5.00	0.0000	NC	0.00	0.00	0	0	0
	Iron (Filtered)	50	7	43	86.00	0.1	-1.25	0.10	0.10	0.10	1.00	1	2.35	1.00	0.38	0.0559	0.9500	0.90	1.35	0.4	0	0
	Lead	9	0	9	100.00	0.1	0.10	NC	0.10	0.10	0.10	NC	0.10	0.10	0.10	0.0000	NC	0.00	0.00	0	0	0
	Lead (Filtered)	53	53	0	0.00	6	2.95	6.97	8.35	9.60	11.95	17.72	17.35	20.10	11.00	0.4509	3.3333	3.60	5.40	3.3	0	0
	Manganese	9	7	2	22.22	0.1	-1.03	NC	0.10	0.20	0.85	NC	1.98	1.80	0.49	0.1941	0.8448	0.75	1.13	0.58	0	0
	Manganese (Filtered)	49	4	45	91.84	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.02	0.10	0.02	0.0020	1.0714	0.00	0.00	0.014	3	6.12
	Mercury	9	0	9	100.00	0.01	0.01	NC	0.01	0.01	0.01	NC	0.01	0.01	0.01	0.0000	NC	0.00	0.00	0	0	0
	Mercury (Filtered)	52	39	13	25.00	0.1	-0.20	0.27	0.40	0.43	0.80	30	1.40	30.00	3.90	1.3201	0.4105	0.40	0.60	9.5	0	0
	Nickel	9	9	0	0.00	0.3	0.15	NC	0.30	0.30	0.40	NC	0.55	0.40	0.33	0.0167	6.6000	0.10	0.15	0.05	0	0
	Nickel (Filtered)	53	39	14	26.42	2	0.62	2.00	6.55	10.00	10.50	64.3	16.43	67.00	13.00	2.0088	0.8667	3.95	5.93	15	49	92.45
	Selenium	54	3	51	94.44	0.3	-1.13	0.30	0.30	0.45	1.25	10	2.68	10.00	2.60	0.5427	0.6500	0.95	1.43	4	23	42.59
	Selenium (Filtered)	9	0	9	100.00	0.3	0.30	NC	0.30	0.30	0.30	NC	0.30	0.30	0.30	0.0000	NC	0.00	0.00	0	0	0
	Strontium	54	54	0	0.00	23	17.21	24.00	26.00	29.80	31.86	34.875	40.66	35.50	29.00	0.4717	8.2857	5.86	8.79	3.5	0	0
	Strontium (Filtered)	9	9	0	0.00	30	27.08	NC	31.50	32.70	34.45	NC	38.88	34.70	33.00	0.5609	19.4118	2.95	4.43	1.7	0	0
	Zinc	51	6	45	88.24	0.4	-14.00	0.40	0.40	0.70	10.00	10	24.40	10.00	4.80	0.6674	1.0000	9.60	14.40	4.8	0	0
	Zinc (Filtered)	9	0	9	100.00	0.4	0.40	NC	0.40	0.40	0.40	NC	0.40	0.40	0.40	0.0000	NC	0.00	0.00	0	0	0

Notes:
bold - DL ≥50%
NC - not calculatable

Table G.3: Summary Statistics - Cameron River, Winter Baseline

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical / Major Ions	pH	107	107	0	0.00	6.86	7.14	7.14	7.36	7.42	7.51	7.68	7.74	7.84	7.40	0.0152	46.2500	0.15	0.22	0.16	0	0
	Electrical Conductivity (EC)	108	108	0	0.00	53.8	55.55	66.63	75.43	82.85	88.675	94.50	108.55	97.15	82.00	0.8654	9.1111	13.25	19.88	9	0	0
	Hardness as CaCO3	105	105	0	0.00	13.9	16.95	22.20	30.24	35.00	39.0925	44.51	52.38	46.40	34.00	0.6266	5.3125	8.86	13.28	6.4	0	0
	Alkalinity (total as CaCO3)	109	109	0	0.00	18.4	21.15	24.10	28.80	31.60	33.9	36.70	41.55	37.60	31.00	0.3607	8.1579	5.10	7.65	3.8	0	0
	Chloride	105	105	0	0.00	1.53	0.75	1.71	2.10	2.60	3	3.40	4.35	4.90	2.60	0.0572	4.4068	0.90	1.35	0.59	0	0
	Sulphate	108	105	3	2.78	2.3	2.50	3.00	4.00	4.80	5	6.00	6.50	10.00	4.60	0.1027	4.1818	1.00	1.50	1.1	0	0
	Total Solids (Filtered)	94	90	4	4.26	10	28.00	22.00	46.00	52.00	58	74.00	76.00	83.00	51.00	1.3575	3.9231	12.00	18.00	13	0	0
	Turbidity	107	107	0	0.00	0.175	-0.13	0.20	0.31	0.40	0.6	1.76	1.04	2.50	0.57	0.0447	1.2391	0.29	0.44	0.46	0	0
Nutrients	Nitrate and Nitrite (as N) (mg/L)	88	74	14	15.91	0.0051	-0.07	0.01	0.02	0.05	0.08	0.13	0.17	0.20	0.06	0.0043	1.3415	0.06	0.09	0.041	0	0
	Nitrogen (Total)	7	7	0	0.00	0.339	0.32	NC	0.34	0.35	0.358	NC	0.38	0.36	0.35	0.0031	42.6829	0.01	0.02	0.0082	0	0
	Nitrogen (Total) (Filtered)	7	7	0	0.00	0.329	0.32	NC	0.34	0.35	0.355	NC	0.38	0.38	0.35	0.0054	25.0000	0.01	0.02	0.014	0	0
	Phosphorus	86	61	25	29.07	2.1	-32.50	2.71	5.00	6.55	30	30.00	67.50	46.00	14.00	1.2915	1.1667	25.00	37.50	12	0	0
	Aluminum Total	92	68	24	26.09	0	0.25	0.20	0.40	0.40	0.5	1.00	0.65	2.00	0.52	0.0323	1.6774	0.10	0.15	0.31	0	0
Metals	Arsenic	14	14	0	0.00	0.2	0.40	NC	0.40	0.40	0.4	NC	0.40	0.40	0.38	0.0145	7.0370	0.00	0.00	0.054	0	0
	Arsenic (Filtered)	94	2	92	97.87	0.02	-0.03	0.05	0.05	0.05	0.1	0.30	0.18	0.30	0.10	0.0088	1.1765	0.05	0.08	0.085	40	42.55
	Cadmium	14	0	14	100.00	0.05	0.05	NC	0.05	0.05	0.05	NC	0.05	0.05	0.05	0.0000	NC	0.00	0.00	0	0	0
	Cadmium (Filtered)	93	35	58	62.37	0.1	-0.50	0.10	0.10	0.20	0.5	3.00	1.10	3.00	0.67	0.1037	0.6700	0.40	0.60	1	0	0
	Chromium	14	0	14	100.00	0.1	0.10	NC	0.10	0.10	0.1	NC	0.10	0.10	0.10	0.0000	NC	0.00	0.00	0	0	0
	Chromium (Filtered)	92	8	84	91.30	0.1	0.10	0.10	0.10	0.10	0.1	1.00	0.10	1.00	0.24	0.0338	0.7500	0.00	0.00	0.32	0	0
	Cobalt	14	0	14	100.00	0.1	0.10	NC	0.10	0.10	0.1	NC	0.10	0.10	0.10	0.0000	NC	0.00	0.00	0	0	0
	Cobalt (Filtered)	92	66	26	28.26	0.14	-0.75	0.20	0.30	0.60	1	2.00	2.05	2.40	0.79	0.0629	1.3167	0.70	1.05	0.6	0	0
	Copper	14	7	7	50.00	0.2	-0.10	NC	0.20	0.20	0.4	NC	0.70	0.50	0.28	0.0318	2.3333	0.20	0.30	0.12	0	0
	Copper (Filtered)	94	60	34	36.17	5	-45.00	7.88	12.00	20.00	50	50.25	107.00	69.00	27.00	1.7464	1.5882	38.00	57.00	17	0	0
	Iron	14	0	14	100.00	5	5.00	NC	5.00	5.00	5	NC	5.00	5.00	5.00	0.0000	NC	0.00	0.00	0	0	0
	Iron (Filtered)	94	19	75	79.79	0.1	-0.31	0.10	0.10	0.10	0.375	1.00	0.79	2.00	0.32	0.0393	0.8421	0.28	0.41	0.38	0	0
	Lead	14	2	12	85.71	0.1	0.10	NC	0.10	0.10	0.1	NC	0.10	0.20	0.11	0.0071	4.0741	0.00	0.00	0.027	0	0
	Lead (Filtered)	93	93	0	0.00	1	-0.25	2.57	3.50	4.90	6	7.63	9.75	10.50	4.90	0.1701	3.0625	2.50	3.75	1.6	0	0
	Manganese	14	14	0	0.00	0.1	-0.49	NC	0.20	0.45	0.6625	NC	1.36	2.10	0.58	0.1393	1.1154	0.46	0.69	0.52	0	0
	Manganese (Filtered)	87	3	84	96.55	0.01	-0.01	0.01	0.01	0.01	0.02	0.02	0.04	0.10	0.02	0.0018	0.9412	0.01	0.02	0.017	3	3.45
	Mercury	14	1	13	92.86	0.01	0.01	NC	0.01	0.01	0.01	NC	0.01	0.01	0.01	0.0000	NC	0.00	0.00	0	0	0
	Mercury (Filtered)	108	86	22	20.37	0.1	-0.13	0.35	0.40	0.50	0.75	30.00	1.28	30.00	2.50	0.7005	0.3425	0.35	0.53	7.3	0	0
	Nickel	14	14	0	0.00	0.3	0.36	NC	0.40	0.40	0.425	NC	0.46	0.50	0.40	0.0182	5.8824	0.03	0.04	0.068	0	0
	Nickel (Filtered)	94	60	34	36.17	2	2.50	2.00	7.00	10.00	10	53.75	14.50	132.00	14.00	1.8817	0.7778	3.00	4.50	18	86	91.49
	Selenium	88	6	82	93.18	0.1	-0.75	0.30	0.30	0.30	1	10.00	2.05	10.00	2.20	0.3937	0.5946	0.70	1.05	3.7	33	37.5
	Selenium (Filtered)	14	1	13	92.86	0.3	0.30	NC	0.30	0.30	0.3	NC	0.30	0.30	0.30	0.0000	NC	0.00	0.00	0	0	0
	Strontium	87	87	0	0.00	22	21.53	27.08	30.00	33.00	35.65	38.84	44.13	41.00	33.00	0.3935	8.9189	5.65	8.48	3.7	0	0
	Strontium (Filtered)	14	14	0	0.00	34.1	31.08	NC	35.20	36.75	37.95	NC	42.08	40.20	37.00	0.4549	21.7647	2.75	4.12	1.7	0	0
	Zinc	108	23	85	78.70	0.3	-14.00	0.40	0.40	0.50	10	10.00	24.40	11.80	3.40	0.4090	0.7907	9.60	14.40	4.3	0	0
	Zinc (Filtered)	14	2	12	85.71	0.4	0.40	NC	0.40	0.40	0.4	NC	0.40	0.60	0.43	0.0194	5.8904	0.00	0.00	0.073	0	0

Notes:
bold - DL ≥50%
NC - not calculatable

Table G.4: Summary Statistics - Marian River, Spring Freshet

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical / Major Ions	pH	62	62	0	0.00	7.26	7.19625	7.32	7.63	7.83	7.92	8.13	8.34625	8.38	7.8	0.0292	33.9130	0.29	0.43	0.2300	0	0
	Electrical Conductivity (EC)	62	62	0	0.00	51.4	-14.0625	55.39	93.98	136.50	166.00	207.75	274.0375	217	129	5.9217	2.7447	72.03	108.04	47.0000	0	0
	Hardness as CaCO3	62	62	0	0.00	21.6	-22.5402	24.65	43.09	67.38	86.85	108.85	152.4841	116	65	3.3825	2.4074	43.76	65.63	27.0000	0	0
	Alkalinity (total as CaCO3)	62	62	0	0.00	13	-28.85	17.41	27.70	43.20	65.40	85.72	121.95	98.6	47	2.7903	2.1364	37.70	56.55	22.0000	0	0
	Chloride	60	60	0	0.00	0.6	0.75	1.00	1.20	1.40	1.50	1.84	1.95	2.2	1.4	0.0350	5.1852	0.30	0.45	0.2700	0	0
	Sulphate	62	62	0	0.00	3	-1.5	3.15	9.00	12.00	16.00	31.55	26.5	41	14	0.9553	1.8667	7.00	10.50	7.5000	0	0
	Total Solids (Filtered)	62	61	1	1.61	<10	-0.5	19.00	70.00	95.00	117.00	144.00	187.5	186	91	4.6089	2.4595	47.00	70.50	37.0000	0	0
	Turbidity	62	62	0	0.00	4.06	-42.5188	5.39	8.12	28.15	41.88	67.31	92.51125	144	30	3.1765	1.2000	33.76	50.64	25.0000	0	0
Nutrients	Nitrate and Nitrite (as N) (mg/L)	55	30	25	45.45	<0.0051	-0.061	0.01	0.02	0.02	0.07	0.24	0.155	0.27	0.041	0.0116	0.7321	0.05	0.08	0.0560	0	0
	Nitrogen (Total)	5	5	0	0.00	0.299	0.26375	NC	0.31	0.32	0.34	NC	0.37775	0.341	0.32	0.0071	20.0000	0.03	0.04	0.0160	0	0
	Phosphorus	62	61	1	1.61	6	-25.75	10.00	20.00	33.00	50.50	73.00	96.25	220	37	3.8426	1.2333	30.50	45.75	30.0000	62	100
	Phosphorus (filtered) (Filtered)	9	5	4	44.44	<0.002	-0.00553	NC	0.00	0.01	0.01	NC	0.020008	0.014667	0.0053	0.0020	1.3590	0.01	0.01	0.0039	0	0
Metals	Aluminum (Filtered)	10	10	0	0.00	3.6	-15.35	NC	5.05	6.50	18.65	NC	39.05	40.5	12	3.6149	1.0909	13.60	20.40	11.0000	0	0
	Aluminum Total	62	61	1	1.61	<30	-1910	164.70	325.00	889.50	1815.00	3200.00	4050	4680	1203	135.4263	1.1349	1490.00	2235.00	1060.0000	0	0
	Arsenic	61	50	11	18.03	<0.2	-0.05	0.20	0.40	0.50	0.70	2.00	1.15	2.2	0.62	0.0606	1.5500	0.30	0.45	0.4000	0	0
	Arsenic (Filtered)	10	8	2	20.00	<0.2	-0.0375	NC	0.23	0.30	0.40	NC	0.6625	0.4	0.28	0.0313	2.3333	0.18	0.26	0.1200	0	0
	Cadmium	62	0	62	100.00	<0.05	NC	NC	NC	0.05	NC	NC	NC	<0.3	0.06	NC	1.3636	NC	NC	0.0440	42	67.74
	Cadmium (Filtered)	10	0	10	100.00	<0.05	NC	NC	NC	0.03	NC	NC	NC	<0.05	0.025	NC	NC	NC	NC	0.0000	0	0
	Chromium	61	50	11	18.03	0.3	-2.15	0.33	0.78	1.50	2.73	6.37	5.65	8.2	2	0.2452	1.2500	1.95	2.93	1.6000	0	0
	Chromium (Filtered)	10	1	9	90.00	<0.1	NC	NC	NC	0.05	NC	NC	NC	0.3	0.075	NC	0.9494	NC	NC	0.0790	0	0
	Cobalt	62	44	18	29.03	<0.1	-0.4	0.10	0.20	0.50	0.60	1.80	1.2	2.1	0.48	0.0653	1.2000	0.40	0.60	0.4000	0	0
	Cobalt (Filtered)	10	0	10	100.00	<0.1	NC	NC	NC	0.05	NC	NC	NC	<0.1	0.05	NC	NC	NC	NC	0.0000	0	0
	Copper	62	51	11	17.74	<0.5	-0.325	0.66	1.40	1.60	2.55	4.58	4.275	5.2	1.9	0.1483	1.7273	1.15	1.73	1.1000	4	6.45
	Copper (Filtered)	10	9	1	10.00	<0.2	-0.2	NC	0.70	0.90	1.30	NC	2.2	1.5	0.91	0.1155	2.1163	0.60	0.90	0.4300	0	0
	Iron	62	61	1	1.61	<50	-1138.75	195.80	330.50	951.50	1310.00	2512.00	2779.25	4850	984	105.9016	1.1855	979.50	1469.25	830.0000	50	80.64516
	Iron (Filtered)	10	2	8	80.00	<5	NC	NC	NC	2.50	NC	NC	NC	32	5.8	13.0000	0.6237	NC	NC	9.3000	0	0
	Lead	60	53	7	11.67	<0.1	-1	0.10	0.20	0.50	1.00	2.00	2.2	3	0.66	0.0817	1.1186	0.80	1.20	0.5900	0	0
	Lead (Filtered)	10	1	9	90.00	<0.1	NC	NC	NC	0.05	NC	NC	NC	0.2	0.065	NC	1.3830	NC	NC	0.0470	0	0
	Manganese	62	62	0	0.00	3.6	-7.85625	4.28	11.85	19.45	24.99	40.17	44.69375	66.4	20	1.4507	1.8182	13.14	19.71	11.0000	0	0
	Manganese (Filtered)	10	10	0	0.00	0.1	-3.2375	NC	0.18	0.85	2.45	NC	5.8625	4.4	1.3	0.4638	0.8667	2.28	3.41	1.5000	0	0
	Mercury	59	8	51	86.44	<0.01	-0.00625	NC	0.02	0.01	0.04	NC	0.06375	<0.05	0.0085	0.0038	1.0494	0.02	0.03	0.0081	4	6.78
	Mercury (Filtered)	10	0	10	100.00	<0.01	NC	NC	NC	0.01	NC	NC	NC	<0.01	0.005	NC	NC	NC	NC	0.0000	0	0
	Nickel	62	58	4	6.45	0.1	-1.1125	0.60	0.80	1.80	2.08	3.62	3.9875	<30	2.3	0.1404	0.7419	1.28	1.91	3.1000	0	0
	Nickel (Filtered)	10	7	3	30.00	<0.1	0.15	NC	0.30	0.30	0.40	NC	0.55	0.8	0.29	0.0800	1.2083	0.10	0.15	0.2400	0	0
	Selenium	60	0	60	100.00	<0.3	NC	NC	NC	0.25	NC	NC	NC	<30	4	NC	0.6250	NC	NC	6.4000	15	25
	Selenium (Filtered)	10	0	10	100.00	<0.3	NC	NC	NC	0.15	NC	NC	NC	<0.3	0.15	NC	NC	NC	NC	0.0000	0	0
	Strontium	62	62	0	0.00	23.6	-4.725	25.01	47.03	65.75	81.53	113.70	133.275	151.8	66	3.5378	2.3571	34.50	51.75	28.0000	0	0
	Strontium (Filtered)	10	10	0	0.00	25.6	14.1625	NC	55.30	72.65	82.73	NC	123.8625	108	70	7.0846	3.1818	27.43	41.14	22.0000	0	0
	Zinc	61	30	31	50.82	<0.4	-6.4125	0.46	1.65	5.00	7.03	19.77	15.0875	20.7	4.8	0.9453	1.2632	5.38	8.06	3.8000	0	0
	Zinc (Filtered)	10	0	10	100.00	<0.4	NC	NC	NC	0.20	NC	NC	NC	<0.4	0.2	NC	NC	NC	NC	0.0000	0	0

Notes:
bold - DL ≥50%
NC - not calculatable

Table G.5: Summary Statistics - Marian River, Summer Recession

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE	
Physical / Major Ions	pH	58	58	0	0.00	7.24	7.45	7.47	7.79	7.93	8.02	8.091833	8.355625	8.19	7.90	0.0250	41.5789	0.23	0.34	0.1900	0	0	
	Electrical Conductivity (EC)	58	58	0	0.00	49.6	25.88	55.40	127.50	170.50	195.25	247.3	296.875	333.00	162.00	7.4505	2.8421	67.75	101.63	57.0000	0	0	
	Hardness as CaCO3	58	58	0	0.00	19.67136	0.53	25.05	58.88	81.10	97.78	127.215	156.125	158.00	79.00	3.9648	2.6333	38.90	58.35	30.0000	0	0	
	Alkalinity (total as CaCO3)	56	56	0	0.00	17	0.44	17.43	41.88	59.80	69.50	89.9	110.9375	97.33	56.00	2.7996	2.6667	27.63	41.44	21.0000	0	0	
	Chloride	58	58	0	0.00	1	0.70	1.10	1.30	1.50	1.70	2.105	2.3	2.20	1.50	0.0361	5.3571	0.40	0.60	0.2800	0	0	
	Sulphate	56	56	0	0.00	4	-7.50	7.00	12.00	17.00	25.00	54.9	44.5	95.00	21.00	2.2430	1.2353	13.00	19.50	17.0000	0	0	
	Total Solids (Filtered)	57	57	0	0.00	46	31.00	57.60	97.00	122.00	141.00	197.6	207	248.00	121.00	5.2610	3.0250	44.00	66.00	40.0000	0	0	
	Turbidity	58	58	0	0.00	19	-39.93	20.55	30.35	49.60	77.20	181.75	147.475	219.00	61.00	5.5188	1.4524	46.85	70.28	42.0000	0	0	
Nutrients	Nitrate and Nitrite (as N) (mg/L)	53	31	22	41.51	<0.0051	-0.09	0.01	0.02	0.02	0.09	0.154	0.195	<0.2	0.04	0.0081	0.8372	0.07	0.11	0.0430	0	0	
	Nitrogen (Total)	6	6	0	0.00	0.287	0.16	NC	0.31	0.34	0.41	NC	0.565125	0.48	0.36	0.0276	5.2941	0.10	0.15	0.0680	0	0	
	Phosphorus	52	32	20	38.46	<1	-5.75	1.00	1.00	1.00	5.50	33.85	12.25	54.00	4.10	1.7920	0.4940	4.50	6.75	8.3000	0	0	
	Phosphorus (filtered) (Filtered)	46	31	15	32.61	<1	-2.15	1.00	1.00	1.00	3.10	11.8	6.25	13.00	2.20	0.5552	0.7857	2.10	3.15	2.8000	0	0	
Metals	Aluminum (Filtered)	57	29	28	49.12	<0.1	-0.33	0.10	0.35	0.20	0.80	1.6	1.475	1.70	0.34	0.0753	0.8718	0.45	0.68	0.3900	0	0	
	Aluminum Total	9	1	8	88.89	<0.1	NC	NC	NC	0.05	NC	NC	NC	NC	0.30	0.08	NC	0.9398	NC	NC	0.0830	0	0
	Arsenic	56	56	0	0.00	4.1	-6.32	21.55	29.30	40.50	53.05	78.74	88.675	98.00	43.00	2.3368	2.5294	23.75	35.63	17.0000	0	0	
	Arsenic (Filtered)	9	9	0	0.00	14.35	9.43	NC	18.20	20.80	24.05	NC	32.825	24.50	21.00	1.1813	6.0000	5.85	8.77	3.5000	0	0	
	Cadmium	56	35	21	37.50	<0.1	-0.10	0.10	0.20	0.20	0.40	0.74	0.7	0.90	0.24	0.0300	1.4118	0.20	0.30	0.1700	0	0	
	Cadmium (Filtered)	9	1	8	88.89	<0.1	NC	NC	NC	0.05	NC	NC	NC	NC	0.10	0.06	NC	3.2941	NC	NC	0.0170	0	0
	Chromium	56	41	15	26.79	<0.1	-0.25	0.30	0.50	0.60	1.00	1.6	1.75	2.90	0.72	0.0754	1.6000	0.50	0.75	0.4500	0	0	
	Chromium (Filtered)	9	1	8	88.89	<0.1	NC	NC	NC	0.05	NC	NC	NC	NC	0.10	0.06	NC	3.2941	NC	NC	0.0170	0	0
	Cobalt	58	55	3	5.17	0.6	-0.35	1.34	2.20	3.00	3.90	7.36	6.45	10.00	3.20	0.2270	1.8824	1.70	2.55	1.7000	13	22.41379	
	Cobalt (Filtered)	9	9	0	0.00	0.9	0.43	NC	1.10	1.40	1.55	NC	2.225	1.90	1.40	0.1014	4.6667	0.45	0.68	0.3000	0	0	
	Copper	58	58	0	0.00	24	-898.75	602.15	1025.00	1560.00	2307.50	4870	4231.25	8780.00	1873.00	181.7272	1.3533	1282.50	1923.75	1384.0000	56	96.55172	
	Copper (Filtered)	9	1	8	88.89	<5	NC	NC	NC	2.50	NC	NC	NC	NC	5.50	2.80	NC	2.8000	NC	NC	1.0000	0	0
	Iron	56	49	7	12.50	<0.1	-0.23	0.30	0.75	0.95	1.40	3.3	2.375	4.00	1.10	0.1153	1.3750	0.65	0.98	0.8000	0	0	
	Iron (Filtered)	9	0	9	100.00	<0.1	NC	NC	NC	0.05	NC	NC	NC	NC	<0.1	0.05	NC	NC	NC	NC	0.0000	0	0
	Lead	57	56	1	1.75	2.9	-0.12	3.00	3.76	4.80	6.35	10.115	10.23125	12.00	5.20	0.2812	2.4762	2.59	3.88	2.1000	0	0	
	Lead (Filtered)	9	9	0	0.00	2.25	1.18	NC	2.45	2.90	3.30	NC	4.575	3.70	2.90	0.1659	5.8000	0.85	1.28	0.5000	0	0	
	Manganese	53	7	46	86.79	<0.01	-0.01	NC	0.01	0.01	0.02	NC	0.035	0.03	0.01	0.0028	1.4894	0.01	0.02	0.0047	1	1.886792	
	Manganese (Filtered)	9	1	8	88.89	<0.01	NC	NC	NC	0.01	NC	NC	NC	NC	0.01	0.01	NC	3.2941	NC	NC	0.0017	0	0
	Mercury	57	35	22	38.60	0	0.05	0.08	0.20	0.20	0.30	2.12	0.45	3.00	0.32	0.0943	0.6957	0.10	0.15	0.4600	0	0	
	Mercury (Filtered)	9	7	2	22.22	<0.1	0.20	NC	0.20	0.20	0.20	NC	0.2	0.20	0.16	0.0143	2.3529	0.00	0.00	0.0680	0	0	
	Nickel	58	57	1	1.72	16	-45.50	20.00	34.00	48.00	87.00	177.7	166.5	329.00	68.00	7.2227	1.2593	53.00	79.50	54.0000	58	100	
	Nickel (Filtered)	47	47	0	0.00	2.2	-0.55	2.72	3.80	5.10	6.70	11.62	11.05	14.60	5.60	0.3701	2.2400	2.90	4.35	2.5000	0	0	
	Selenium	9	0	9	100.00	<0.3	NC	NC	NC	0.15	NC	NC	NC	NC	<0.3	0.15	NC	NC	NC	NC	0.0000	0	0
	Selenium (Filtered)	58	13	45	77.59	<0.1	-0.10	NC	0.20	0.05	0.40	NC	0.7	<1	0.15	0.0401	0.9375	0.20	0.30	0.1600	15	25.86207	
	Strontium	9	9	0	0.00	48.15	7.25	NC	62.45	75.30	99.25	NC	154.45	158.00	85.00	10.8092	2.6563	36.80	55.20	32.0000	0	0	
	Strontium (Filtered)	58	5	53	91.38	<0.1	-0.50	NC	0.10	0.05	0.50	NC	1.1	0.50	0.10	0.0917	1.0101	0.40	0.60	0.0990	0	0	
	Zinc	9	0	9	100.00	<0.4	NC	NC	NC	0.20	NC	NC	NC	NC	<0.4	0.20	NC	NC	NC	NC	0.0000	0	0
	Zinc (Filtered)	11	9	2	18.18	0.0021	-0.10	NC	0.01	0.02	0.09	NC	0.199	0.13	0.04	0.0152	0.9111	0.08	0.11	0.0450	0	0	

Notes:
bold - DL ≥50%
NC - not calculatable

Table G.6: Summary Statistics - Marian River, Winter Baseline

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical / Major Ions	pH	81	81	0	0.00	7.29	7.28	7.41	7.52	7.58	7.69	7.84	7.58	7.86	7.60	0.0136	63.3333	0.17	0.25	0.1200	0	0
	Electrical Conductivity (EC)	82	82	0	0.00	75.9	104.50	103.90	157.75	171.00	193.25	217.70	171	254.00	175.00	3.5096	5.4688	35.50	53.25	32.0000	0	0
	Hardness as CaCO3	78	78	0	0.00	40	42.31	46.67	77.68	87.90	101.25	123.35	87.9	147.00	90.00	2.2903	4.5000	23.58	35.36	20.0000	0	0
	Alkalinity (total as CaCO3)	81	81	0	0.00	14	39.55	31.10	64.00	71.90	80.30	93.95	71.9	97.90	69.00	1.9006	4.0588	16.30	24.45	17.0000	0	0
	Chloride	77	77	0	0.00	1	0.80	1.20	1.40	1.60	1.80	2.41	1.6	2.50	1.60	0.0299	6.1538	0.40	0.60	0.2600	0	0
	Sulphate	81	81	0	0.00	4	1.25	10.00	11.00	14.00	17.50	31.90	14	42.00	16.00	0.7698	2.3188	6.50	9.75	6.9000	0	0
	Total Solids (Filtered)	82	82	0	0.00	48	43.00	68.40	88.00	105.50	118.00	149.10	105.5	170.00	106.00	2.5992	4.4167	30.00	45.00	24.0000	0	0
	Turbidity	82	82	0	0.00	1.8	-4.15	3.43	4.70	6.27	10.59	39.55	6.27	62.85	11.00	1.1865	1.0000	5.90	8.85	11.0000	0	0
Nutrients	Nitrate and Nitrite (as N) (mg/L)	76	74	2	2.63	<0.008	-0.06	0.01	0.05	0.09	0.13	2.13	0.086	0.22	0.09	0.0060	1.7308	0.08	0.12	0.0520	0	0
	Nitrogen (Total)	7	7	0	0.00	0.344	-2.20	NC	0.35	0.37	2.06	NC	0.369	0.41	0.37	0.0082	16.8182	1.70	2.56	0.0220	0	0
	Phosphorus	82	73	9	10.98	2.6	-16.25	6.82	11.50	15.00	30.00	80.60	15	300.00	27.00	4.8612	0.6750	18.50	27.75	40.0000	81	98.782
	Phosphorus (filtered) (Filtered)	12	8	4	33.33	0.0029	-5.99	NC	0.00	0.01	4.00	NC	0.0055	0.08	0.02	0.0105	0.6800	4.00	5.99	0.0250	0	0
Metals	Aluminum (Filtered)	14	14	0	0.00	3.8	-5.78	NC	4.50	5.35	11.35	NC	5.35	26.20	7.90	1.6241	1.2951	6.85	10.28	6.1000	0	0
	Aluminum Total	82	82	0	0.00	109	-209.25	131.38	183.75	253.00	445.75	1385.00	253	3350.00	452.00	58.3436	0.8561	262.00	393.00	528.0000	0	0
	Arsenic	80	69	11	13.75	0.2	-0.05	0.20	0.40	0.50	0.70	12.38	0.5	2.80	0.58	0.0564	1.3182	0.30	0.45	0.4400	0	0
	Arsenic (Filtered)	14	14	0	0.00	0.2	0.30	NC	0.30	0.30	0.30	NC	0.3	0.30	0.29	0.0071	10.7407	0.00	0.00	0.0270	0	0
	Cadmium	82	1	81	98.78	<0.05	NC	NC	NC	0.05	81.75	NC	0.05	<0.3	0.05	NC	1.3590	NC	NC	0.0390	51	62.2
	Cadmium (Filtered)	14	0	14	100.00	<0.05	NC	NC	NC	0.03	14.00	NC	0.025	<0.05	0.03	NC	NC	NC	NC	0.0000	0	0
	Chromium	81	69	12	14.81	0.2	-1.21	0.28	0.40	0.90	1.48	12.84	0.9	7.00	1.30	0.1675	1.0000	1.08	1.61	1.3000	0	0
	Chromium (Filtered)	14	1	13	92.86	<0.1	NC	NC	NC	0.05	13.75	NC	0.05	0.10	0.05	NC	4.1538	NC	NC	0.0130	0	0
	Cobalt	82	49	33	40.24	0	-0.35	0.10	0.10	0.10	0.40	43.75	0.1	<1	0.22	0.0279	1.1000	0.30	0.45	0.2000	0	0
	Cobalt (Filtered)	14	1	13	92.86	<0.1	NC	NC	NC	0.05	13.75	NC	0.05	0.10	0.05	NC	4.1538	NC	NC	0.0130	0	0
	Copper	82	72	10	12.20	<0.1	-0.88	0.45	1.00	1.20	2.25	12.40	1.2	13.00	1.60	0.1838	1.0667	1.25	1.88	1.5000	1	1.22
	Copper (Filtered)	14	14	0	0.00	0.4	-0.38	NC	0.60	0.75	1.25	NC	0.75	1.60	0.80	0.0961	2.2222	0.65	0.98	0.3600	0	0
	Iron	82	82	0	0.00	131	-110.63	151.30	189.00	255.50	388.75	1065.60	255.5	1680.00	388.00	37.6015	1.1412	199.75	299.63	340.0000	30	36.59
	Iron (Filtered)	14	2	12	85.71	<5	-4.00	NC	11.00	2.50	21.00	NC	2.5	28.00	4.90	8.5000	0.7000	10.00	15.00	7.0000	0	0
	Lead	81	57	24	29.63	0	-0.96	0.10	0.20	0.30	0.98	32.37	0.3	2.00	0.38	0.0536	0.9744	0.78	1.16	0.3900	0	0
	Lead (Filtered)	14	2	12	85.71	<0.1	-19.25	NC	0.10	0.05	13.00	NC	0.05	0.20	0.06	0.0500	1.5610	12.90	19.35	0.0410	0	0
	Manganese	82	82	0	0.00	4.35	-2.51	4.53	5.25	6.05	10.43	29.29	6.05	32.10	9.00	0.6594	1.5000	5.18	7.76	6.0000	0	0
	Manganese (Filtered)	14	14	0	0.00	0.3	-1.10	NC	1.00	1.50	2.40	NC	1.5	4.00	1.60	0.2549	1.6842	1.40	2.10	0.9500	0	0
	Mercury	79	24	55	69.62	<0.01	-0.02	0.01	0.01	0.01	0.03	74.78	0.01	<0.1	0.01	0.0020	1.2088	0.02	0.03	0.0091	7	8.86
	Mercury (Filtered)	14	1	13	92.86	<0.01	NC	NC	NC	0.01	13.75	NC	0.005	0.01	0.01	NC	4.1538	NC	NC	0.0013	0	0
	Nickel	82	75	7	8.54	0.4	-0.05	0.50	0.70	0.90	1.20	7.31	0.9	<30	2.20	0.0551	0.5500	0.50	0.75	4.0000	0	0
	Nickel (Filtered)	14	14	0	0.00	0.3	0.21	NC	0.40	0.45	0.53	NC	0.45	3.00	0.61	0.1852	0.8841	0.13	0.19	0.6900	0	0
	Selenium	80	2	78	97.50	<0.1	-116.00	NC	1.00	0.25	79.00	NC	0.25	<30	2.30	0.0000	0.4510	78.00	117.00	5.1000	13	16.25
	Selenium (Filtered)	14	0	14	100.00	<0.3	NC	NC	NC	0.15	14.00	NC	0.15	<0.3	0.15	NC	NC	NC	NC	0.0000	0	0
	Strontium	82	82	0	0.00	42.8	36.65	57.84	66.53	73.65	86.45	122.70	73.65	188.00	81.00	2.9732	3.0000	19.92	29.88	27.0000	0	0
	Strontium (Filtered)	14	14	0	0.00	58.2	40.43	NC	63.75	69.35	79.30	NC	69.35	108.00	75.00	4.2243	4.6875	15.55	23.33	16.0000	0	0
	Zinc	81	27	54	66.67	<0.4	-7.09	0.40	1.21	4.10	6.75	72.40	4.1	17.00	3.60	0.8033	1.2414	5.54	8.31	2.9000	0	0
	Zinc (Filtered)	14	1	13	92.86	<0.4	NC	NC	NC	0.20	13.75	NC	0.2	2.30	0.35	NC	0.6250	NC	NC	0.5600	0	0

Notes:
bold - DL ≥50%
NC - not calculatable

Table G.7: Summary Statistics - Yellowknife River, Spring Freshet

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical / Major Ions	pH	82	82	0	0.00	6.79	7.08	7.10	7.40	7.50	7.61	7.85	7.928125	8.41	7.50	0.0252	32.6087	0.21	0.32	0.23	0	0
	Electrical Conductivity (EC)	82	82	0	0.00	40.4	37.36	45.26	49.68	55.15	57.89	61.81	70.20625	70.06667	54.00	0.5967	10.0000	8.21	12.32	5.40	0	0
	Hardness as CaCO3	73	73	0	0.00	12.4	7.33	17.14	18.95	21.70	26.69	29.83	38.30935	31.6	22.00	0.5103	5.0000	7.74	11.62	4.40	0	0
	Alkalinity (total as CaCO3)	76	76	0	0.00	13.73333	9.24	14.53	16.48	20.40	21.30	22.62	28.5375	23.1	19.00	0.3136	7.0370	4.82	7.24	2.70	0	0
	Chloride	81	81	0	0.00	1	1.15	1.40	1.60	1.80	1.90	2.19	2.35	6.3	1.80	0.0628	3.1579	0.30	0.45	0.57	0	0
	Sulphate	76	76	0	0.00	2	1.31	2.30	2.93	3.00	4.00	5.15	5.6125	8	3.30	0.1039	3.6264	1.07	1.61	0.91	0	0
	Total Solids (Filtered)	81	80	1	1.23	<10	0.25	22.04	25.75	34.00	42.75	56.85	68.25	80	35.00	1.3499	2.9167	17.00	25.50	12.00	0	0
	Turbidity	82	82	0	0.00	0.6	0.54	1.14	1.96	2.53	2.90	4.97	4.3175	10.1	2.70	0.1491	1.9286	0.95	1.42	1.40	0	0
Nutrients	Nitrate and Nitrite (as N) (mg/L)	73	19	54	73.97	<0.005	-0.03	0.01	0.02	0.01	0.05	0.19	0.098	<0.2	0.02	0.0149	0.5227	0.03	0.05	0.04	0	0
	Nitrogen (Total)	6	6	0	0.00	0.223	0.21	NC	0.22	0.23	0.23	NC	0.243875	0.233	0.23	0.0017	56.0976	0.01	0.01	0.00	0	0
	Orthophosphate (as P)	18	3	15	83.33	<0.001	0.00	NC	0.00	0.00	0.00	NC	0.0045	<0.004	0.00	0.0003	1.5714	0.00	0.00	0.00	0	0
	Phosphorus	82	61	21	25.61	<2	-5.00	4.00	7.00	8.33	15.00	27.40	27	49	9.60	0.9693	1.2800	8.00	12.00	7.50	73	89.02
	Phosphorus (filtered) (Filtered)	41	31	10	24.39	<0.002	-0.01	0.00	0.00	0.01	0.01	0.07	0.016333	0.085	0.01	0.0032	0.5563	0.01	0.01	0.02	0	0
Metals	Aluminum (Filtered)	9	9	0	0.00	2.2	-4.60	NC	4.55	6.10	10.65	NC	19.8	18.8	7.70	1.8130	1.4259	6.10	9.15	5.40	0	0
	Aluminum Total	65	65	0	0.00	33	-16.00	43.76	62.00	88.60	114.00	182.50	192	301	95.00	5.5307	2.1111	52.00	78.00	45.00	0	0
	Arsenic	48	36	12	25.00	0.2	0.08	0.29	0.45	0.50	0.70	2.05	1.075	2.9	0.64	0.0815	1.4884	0.25	0.38	0.43	0	0
	Arsenic (Filtered)	39	38	1	2.56	<0.1	0.09	0.20	0.28	0.30	0.40	1.13	0.5875	3.7	0.46	0.0941	0.7931	0.13	0.19	0.58	0	0
	Cadmium	78	8	70	89.74	<0.05	-0.10	NC	0.13	0.05	0.28	NC	0.5	0.5	0.07	0.0481	0.9737	0.15	0.23	0.08	59	75.64
	Cadmium (Filtered)	9	0	9	100.00	<0.05	NC	NC	NC	0.03	NC	NC	NC	<0.05	0.03	NC	NC	NC	NC	0.00	0	0
	Chromium	60	40	20	33.33	<0.1	-0.66	0.10	0.20	0.30	0.78	2.17	1.6375	<3	0.58	0.0860	0.9667	0.58	0.86	0.60	0	0
	Chromium (Filtered)	9	0	9	100.00	<0.1	NC	NC	NC	0.05	NC	NC	NC	<0.1	0.05	NC	NC	NC	NC	0.00	0	0
	Cobalt	76	13	63	82.89	<0.1	0.10	NC	0.10	0.05	0.10	NC	0.1	<1	0.14	0.0166	1.0000	0.00	0.00	0.14	0	0
	Cobalt (Filtered)	9	0	9	100.00	<0.1	NC	NC	NC	0.05	NC	NC	NC	<0.1	0.05	NC	NC	NC	NC	0.00	0	0
	Copper	78	69	9	11.54	<0.2	0.20	0.55	0.80	1.00	1.20	2.15	1.8	4.7	1.10	0.0727	1.8966	0.40	0.60	0.58	1	1.28
	Copper (Filtered)	9	7	2	22.22	<0.2	0.03	NC	0.40	0.50	0.65	NC	1.025	0.7	0.43	0.0533	1.9545	0.25	0.38	0.22	0	0
	Iron	78	74	4	5.13	<30	15.00	46.00	69.75	80.00	106.25	199.50	161	217	92.00	4.9272	2.0909	36.50	54.75	44.00	0	0
	Iron (Filtered)	9	1	8	88.89	<5	NC	NC	NC	2.50	NC	NC	NC	8	3.10	NC	1.7222	NC	NC	1.80	0	0
	Lead	76	25	51	67.11	0.0011	-1.23	0.03	0.20	0.20	1.15	3.49	2.575	4	0.40	0.1705	0.6780	0.95	1.43	0.59	0	0
	Lead (Filtered)	9	1	8	88.89	<0.1	NC	NC	NC	0.05	NC	NC	NC	0.1	0.06	NC	3.2941	NC	NC	0.02	0	0
	Manganese	78	74	4	5.13	<2	1.25	2.00	2.60	3.00	3.50	5.78	4.85	18.6	3.30	0.2417	1.5714	0.90	1.35	2.10	0	0
	Manganese (Filtered)	9	6	3	33.33	<0.1	-0.24	NC	0.25	0.30	0.58	NC	1.0625	0.8	0.29	0.0946	1.1154	0.33	0.49	0.26	0	0
	Mercury	46	2	44	95.65	<0.01	NC	NC	NC	0.01	NC	NC	NC	0.02	0.01	0.0050	2.2143	NC	NC	0.00	0	0
	Mercury (Filtered)	9	0	9	100.00	<0.01	NC	NC	NC	0.01	NC	NC	NC	<0.01	0.01	NC	NC	NC	NC	0.00	0	0
	Nickel	76	65	11	14.47	0	0.10	0.30	0.40	0.50	0.60	1.64	0.9	<30	0.96	0.0434	0.4174	0.20	0.30	2.30	0	0
	Nickel (Filtered)	9	7	2	22.22	<0.1	0.15	NC	0.30	0.30	0.40	NC	0.55	0.4	0.27	0.0184	2.0769	0.10	0.15	0.13	0	0
	Selenium	47	1	46	97.87	<0.3	NC	NC	NC	0.25	NC	NC	NC	<10	0.98	NC	0.5765	NC	NC	1.70	7	14.89
	Selenium (Filtered)	39	11	28	71.79	<0.1	0.05	NC	0.10	0.10	0.13	NC	0.183333	0.4	0.10	0.0306	1.3699	0.03	0.05	0.07	0	0
	Strontium	64	64	0	0.00	17.2	12.76	18.10	19.85	22.55	24.58	26.58	31.6625	27.3	22.00	0.3397	8.1481	4.73	7.09	2.70	0	0
	Strontium (Filtered)	9	9	0	0.00	22.4	19.75	NC	22.90	24.90	NC	NC	28.15	25.8	24.00	0.4059	20.0000	2.10	3.15	1.20	0	0
	Zinc	77	32	45	58.44	<0.2	-0.98	0.27	0.61	1.20	1.68	9.59	3.26875	12	2.30	0.4653	0.9583	1.06	1.59	2.40	0	0
	Zinc (Filtered)	9	1	8	88.89	<0.4	NC	NC	NC	0.20	NC	NC	NC	0.6	0.24	NC	1.8462	NC	NC	0.13	0	0

Notes:
bold - DL ≥50%
NC - not calculatable

Table G.8: Summary Statistics - Yellowknife River, Summer Recession

Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical / Major Ions	pH	73	73	0	0.00	7.08	6.97	7.13	7.30	7.42	7.51	7.74	7.845	8.16	7.40	0.0225	38.9474	0.22	0.33	0.1900	0	0
	Electrical Conductivity (EC)	72	72	0	0.00	29.8	33.60	43.02	48.30	54.10	58.10	63.36	72.8	84.00	54.00	0.9298	6.8354	9.80	14.70	7.9000	0	0
	Hardness as CaCO3	67	67	0	0.00	14.2	7.65	16.25	18.00	22.40	24.90	31.02	35.25	34.50	22.00	0.5674	4.7826	6.90	10.35	4.6000	0	0
	Alkalinity (total as CaCO3)	70	70	0	0.00	12.6	8.60	13.73	16.10	20.30	21.10	22.35	28.6	22.80	19.00	0.3522	6.5517	5.00	7.50	2.9000	0	0
	Chloride	73	73	0	0.00	1.2	1.13	1.37	1.59	1.71	1.90	2.13	2.365	2.80	1.70	0.0309	6.5385	0.31	0.47	0.2600	0	0
	Sulphate	70	69	1	1.43	2.5	1.50	2.75	3.00	3.00	4.00	5.00	5.5	7.00	3.40	0.0936	4.1975	1.00	1.50	0.8100	0	0
	Total Solids (Filtered)	72	69	3	4.17	<10	4.75	17.00	24.00	32.50	36.83	47.00	56.08333	98.00	31.00	1.3749	2.5833	12.83	19.25	12.0000	0	0
	Turbidity	71	71	0	0.00	0.9	0.28	1.10	1.61	2.00	2.50	3.96	3.835	17.00	2.30	0.2275	1.2105	0.89	1.34	1.9000	0	0
Nutrients	Nitrate and Nitrite (as N) (mg/L)	64	49	15	23.44	<0.0051	-0.04	0.01	0.01	0.02	0.05	0.10	0.108875	0.13	0.03	0.0040	1.1034	0.04	0.06	0.0290	0	0
	Nitrogen (Total)	6	6	0	0.00	0.213	0.17	NC	0.22	0.24	0.25	NC	0.292	0.26	0.23	0.0066	14.3750	0.03	0.04	0.0160	0	0
	Phosphorus	73	43	30	41.10	<2	-7.50	2.20	5.80	5.00	14.67	143.00	27.96667	273.00	16.00	7.4109	0.4103	8.87	13.30	39.0000	59	80.82
	Phosphorus (filtered) (Filtered)	35	25	10	28.57	<0.002	-0.01	0.00	0.00	0.00	0.01	0.08	0.018	0.09	0.01	0.0047	0.5238	0.01	0.01	0.0210	0	0
Metals	Aluminum (Filtered)	10	9	1	10.00	3.1	2.33	NC	3.45	3.95	4.20	NC	5.325	<30	5.00	0.1687	1.3889	0.75	1.13	3.6000	0	0
	Aluminum Total	62	61	1	1.61	26	-5.82	28.40	50.65	65.50	88.30	167.87	144.775	442.00	77.00	7.2687	1.3509	37.65	56.48	57.0000	0	0
	Arsenic	47	35	12	25.53	0.3	0.10	0.30	0.40	0.50	0.60	2.08	0.9	2.40	0.63	0.0826	1.4651	0.20	0.30	0.4300	0	0
	Arsenic (Filtered)	35	33	2	5.71	0.1	-0.02	0.10	0.20	0.30	0.35	0.56	0.575	<1	0.29	0.0217	2.2308	0.15	0.23	0.1300	0	0
	Cadmium	73	8	65	89.04	<0.05	-0.05	NC	0.10	0.05	0.20	NC	0.35	<0.5	0.08	0.0249	1.1493	0.10	0.15	0.0670	51	69.86
	Cadmium (Filtered)	10	0	10	100.00	<0.05	NC	NC	NC	0.03	NC	NC	NC	<0.1	0.03	NC	3.5443	NC	NC	0.0079	1	10
	Chromium	62	33	29	46.77	<0.1	0.01	0.10	0.20	0.20	0.33	1.75	0.5125	<3	0.48	0.0871	0.8136	0.13	0.19	0.5900	0	0
	Chromium (Filtered)	10	0	10	100.00	<0.1	NC	NC	NC	0.05	NC	NC	NC	<0.3	0.06	NC	1.8750	NC	NC	0.0320	0	0
	Cobalt	72	16	56	77.78	<0.1	-0.01	NC	0.10	0.08	0.18	NC	0.2875	<1	0.17	0.0445	1.0000	0.08	0.11	0.1700	0	0
	Cobalt (Filtered)	10	0	10	100.00	<0.1	NC	NC	NC	0.05	NC	NC	NC	<0.1	0.05	NC	NC	NC	NC	0.0000	0	0
	Copper	71	61	10	14.08	<0.2	0.13	0.41	0.80	0.90	1.25	1.98	1.925	3.00	1.00	0.0655	2.0000	0.45	0.68	0.5000	0	0
	Copper (Filtered)	10	10	0	0.00	0.2	-0.53	NC	0.30	0.45	0.85	NC	1.675	1.35	0.61	0.1288	1.4878	0.55	0.83	0.4100	0	0
	Iron	71	67	4	5.63	0.633333	-2.50	28.20	50.00	65.80	85.00	226.20	137.5	333.00	77.00	7.0877	1.3276	35.00	52.50	58.0000	1	1.41
	Iron (Filtered)	10	0	10	100.00	<5	NC	NC	NC	2.50	NC	NC	NC	<30	3.80	NC	0.9500	NC	NC	4.0000	0	0
	Lead	73	20	53	72.60	<0.1	-1.26	0.10	0.20	0.20	1.18	6.60	2.6375	6.70	0.46	0.3882	0.4600	0.98	1.46	1.0000	0	0
	Lead (Filtered)	10	2	8	80.00	<0.1	NC	NC	NC	0.05	NC	NC	NC	0.23	0.08	0.0150	1.1857	NC	NC	0.0700	0	0
	Manganese	72	67	5	6.94	<1	0.43	1.30	2.00	2.18	3.05	7.36	4.625	19.00	3.00	0.3276	1.1111	1.05	1.58	2.7000	0	0
	Manganese (Filtered)	10	10	0	0.00	0.1	-0.12	NC	0.10	0.20	0.25	NC	0.46875	0.50	0.20	0.0396	1.5385	0.15	0.22	0.1300	0	0
	Mercury	44	6	38	86.36	<0.01	-0.02	NC	0.01	0.01	0.04	NC	0.066875	<0.1	0.01	0.0106	0.7333	0.02	0.03	0.0150	3	6.82
	Mercury (Filtered)	10	0	10	100.00	<0.01	NC	NC	NC	0.01	NC	NC	NC	<0.01	0.01	NC	NC	NC	NC	0.0000	0	0
	Nickel	73	60	13	17.81	<0.1	-0.01	0.30	0.40	0.50	0.68	1.10	1.0875	<30	1.70	0.0322	0.4250	0.28	0.41	4.0000	0	0
	Nickel (Filtered)	10	10	0	0.00	0.3	0.26	NC	0.30	0.30	0.33	NC	0.3625	0.83	0.36	0.0528	2.1176	0.03	0.04	0.1700	0	0
	Selenium	48	1	47	97.92	<0.1	NC	NC	NC	0.25	NC	NC	NC	<10	1.30	NC	0.6842	NC	NC	1.9000	11	22.92
	Selenium (Filtered)	35	12	23	65.71	<0.1	-0.05	NC	0.10	0.10	0.20	NC	0.35	<1	0.13	0.0386	1.0833	0.10	0.15	0.1200	0	0
	Strontium	63	63	0	0.00	16.2	12.95	17.76	20.00	23.00	24.70	27.14	31.75	32.20	22.00	0.3831	7.3333	4.70	7.05	3.0000	0	0
	Strontium (Filtered)	10	10	0	0.00	20.1	20.12	NC	23.06	23.80	25.03	NC	27.96875	26.00	24.00	0.5180	15.0000	1.96	2.94	1.6000	0	0
	Zinc	72	31	41	56.94	0.1	-3.05	0.16	0.70	1.83	3.20	9.52	6.95	12.70	2.50	0.4758	1.0000	2.50	3.75	2.5000	0	0
	Zinc (Filtered)	10	2	8	80.00	<0.4	NC	NC	NC	0.20	NC	NC	NC	<10	0.86	0.1750	0.5733	NC	NC	1.5000	0	0

Notes:
bold - DL ≥50%
NC - not calculatable

Table G.9: Summary Statistics - Yellowknife River, Winter Baseline

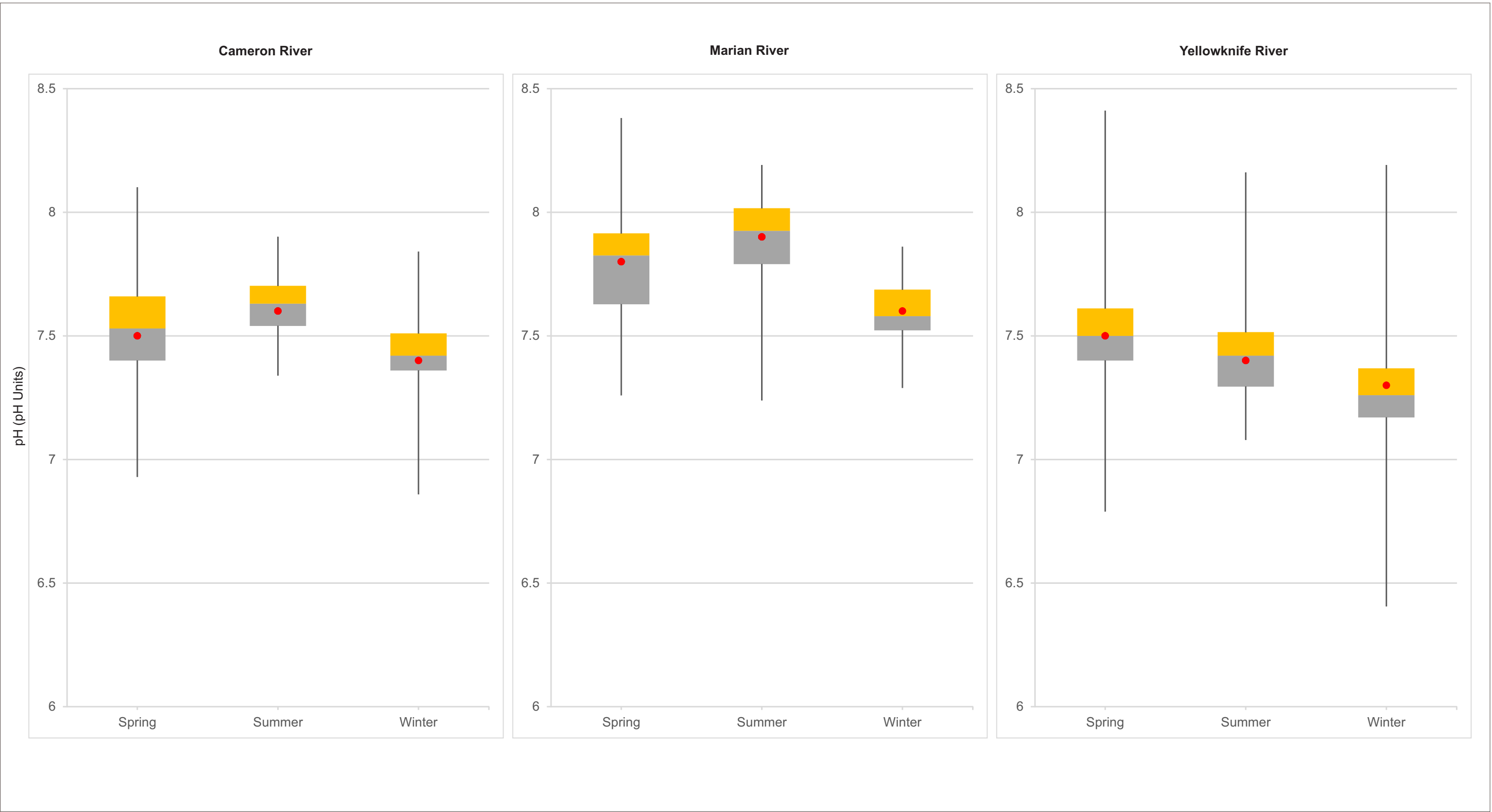
Chem_Group	ChemName	n	D	#ND	%ND	MIN	LOW	5th	Q1	MEDIAN	Q3	95th	HIGH	MAX	MEAN	SE	CV	IQR	1.5*IQR	SD	#GE	%GE
Physical / Major Ions	pH	144	144	0	0.00	6.406667	6.87	6.88	7.17	7.26	7.37	7.70	7.67	8.19	7.30	0.0209	29.2000	0.20	0.30	0.25	2	1.39
	Electrical Conductivity (EC)	146	146	0	0.00	41.566667	38.16	43.20	49.65	53.95	57.31	61.53	68.81	95.20	54.00	0.5649	7.9412	7.66	11.49	6.80	0	0
	Hardness as CaCO3	127	127	0	0.00	5.9	8.47	14.80	18.30	22.20	24.85	29.70	34.68	42.90	22.00	0.4646	4.2308	6.55	9.83	5.20	0	0
	Alkalinity (total as CaCO3)	134	134	0	0.00	13.2	8.95	14.12	16.30	20.10	21.20	22.63	28.55	49.20	19.00	0.3555	4.6341	4.90	7.35	4.10	0	0
	Chloride	140	140	0	0.00	1.2	1.16	1.42	1.66	1.80	2.00	2.40	2.50	6.70	1.90	0.0534	3.0159	0.34	0.50	0.63	0	0
	Sulphate	140	139	1	0.71	2	1.50	2.40	3.00	3.45	4.00	4.80	5.50	<10	3.50	0.0738	3.9773	1.00	1.50	0.88	0	0
	Total Solids (Filtered)	143	138	5	3.50	<10	2.65	19.90	24.00	32.00	38.23	56.70	59.58	76.00	32.00	0.9439	2.6667	14.23	21.35	12.00	0	0
	Turbidity	144	144	0	0.00	0.26	-1.04	0.48	0.70	1.07	1.86	5.10	3.61	29.00	1.80	0.2364	0.6429	1.16	1.74	2.80	0	0
Nutrients	Nitrate and Nitrite (as N) (mg/L)	136	128	8	5.88	<0.008	0.00	0.02	0.04	0.05	0.07	0.11	0.11	<0.2	0.05	0.0024	1.8621	0.03	0.04	0.03	0	0
	Nitrogen (Total)	7	7	0	0.00	0.22	0.21	NC	0.23	0.24	0.25	NC	0.27	0.25	0.24	0.0036	25.5319	0.01	0.02	0.01	0	0
	Phosphorus	143	85	58	40.56	<2	-5.00	3.86	7.00	6.00	15.00	57.90	27.00	260.00	12.00	3.6102	0.4444	8.00	12.00	27.00	120	83.92
	Phosphorus (filtered) (Filtered)	67	47	20	29.85	0.0017	0.00	0.00	0.00	0.01	0.01	0.05	0.02	0.05	0.01	0.0016	0.7708	0.01	0.01	0.01	0	0
Metals	Aluminum (Filtered)	16	16	0	0.00	1.8	-4.04	NC	2.38	4.00	6.65	NC	13.06	13.70	4.80	0.8268	1.4545	4.28	6.41	3.30	0	0
	Aluminum Total	117	100	17	14.53	8.9	-25.19	14.21	21.88	25.00	53.25	246.60	100.31	1230.00	59.00	13.7198	0.4609	31.38	47.06	128.00	0	0
	Arsenic	88	71	17	19.32	<0.2	0.25	0.30	0.40	0.40	0.50	1.14	0.65	2.00	0.49	0.0376	1.6333	0.10	0.15	0.30	0	0
	Arsenic (Filtered)	68	65	3	4.41	<0.1	0.05	0.10	0.20	0.20	0.30	0.47	0.45	<1	0.25	0.0138	2.0833	0.10	0.15	0.12	0	0
	Cadmium	136	30	106	77.94	0.0003	-0.05	0.04	0.10	0.05	0.20	0.53	0.35	0.57	0.08	0.0257	0.8710	0.10	0.15	0.09	90	66.18
	Cadmium (Filtered)	17	0	17	100.00	<0.02	NC	NC	NC	0.03	NC	NC	NC	<0.05	0.02	NC	6.6667	NC	NC	0.00	0	0
	Chromium	114	70	44	38.60	<0.1	-0.25	0.10	0.20	0.20	0.50	2.59	0.95	4.00	0.51	0.0962	0.6892	0.30	0.45	0.74	0	0
	Chromium (Filtered)	17	3	14	82.35	<0.1	-0.16	NC	0.10	0.05	0.27	NC	0.53	0.27	0.08	0.0493	1.1905	0.17	0.26	0.06	0	0
	Cobalt	140	33	107	76.43	<0.1	-0.50	0.10	0.10	0.05	0.50	0.93	1.10	1.00	0.17	0.0446	0.8947	0.40	0.60	0.19	0	0
	Cobalt (Filtered)	17	2	15	88.24	<0.1	NC	NC	NC	0.05	NC	NC	NC	0.17	0.06	0.0350	1.9355	NC	NC	0.03	0	0
	Copper	138	118	20	14.49	<0.2	-0.36	0.50	0.70	0.95	1.41	3.41	2.47	6.50	1.20	0.0977	1.2000	0.71	1.06	1.00	4	2.9
	Copper (Filtered)	17	14	3	17.65	<0.2	-0.30	NC	0.30	0.40	0.70	NC	1.30	1.70	0.51	0.1074	1.2439	0.40	0.60	0.41	0	0
	Iron	139	115	24	17.27	1.4	-32.50	13.80	23.00	30.30	60.00	202.20	115.50	1280.00	59.00	12.3427	0.4836	37.00	55.50	122.00	3	2.16
	Iron (Filtered)	17	2	15	88.24	<5	NC	NC	NC	2.50	NC	NC	NC	<50	5.20	7.5000	0.7429	NC	NC	7.00	0	0
	Lead	139	52	87	62.59	0	-0.81	0.09	0.20	0.10	0.88	3.65	1.89	4.70	0.38	0.1394	0.5507	0.68	1.01	0.69	0	0
	Lead (Filtered)	17	4	13	76.47	<0.1	-0.15	NC	0.11	0.05	0.28	NC	0.53	0.30	0.08	0.0455	1.1739	0.17	0.26	0.07	0	0
	Manganese	139	131	8	5.76	0.8	-1.00	0.96	1.10	1.30	2.50	6.64	4.60	15.90	2.30	0.2010	1.0000	1.40	2.10	2.30	0	0
	Manganese (Filtered)	17	17	0	0.00	0.2	-0.11	NC	0.30	0.40	0.57	NC	0.98	3.90	0.62	0.2108	0.7126	0.27	0.41	0.87	0	0
	Mercury	86	4	82	95.35	<0.01	-0.05	NC	0.02	0.01	0.06	NC	0.13	0.07	0.01	0.0126	0.9286	0.05	0.07	0.01	5	5.81
	Mercury (Filtered)	16	0	16	100.00	<0.01	NC	NC	NC	0.01	NC	NC	NC	<0.01	0.01	NC	NC	NC	NC	0.00	0	0
	Nickel	138	119	19	13.77	<0.1	0.10	0.30	0.40	0.50	0.60	1.20	0.90	<30	1.20	0.0271	0.4000	0.20	0.30	3.00	0	0
	Nickel (Filtered)	17	15	2	11.76	<0.1	0.15	NC	0.30	0.30	0.40	NC	0.55	0.60	0.33	0.0266	2.3571	0.10	0.15	0.14	0	0
	Selenium	89	7	82	92.13	<0.3	-1.83	NC	0.35	0.25	1.80	NC	3.98	<10	0.92	0.3557	0.5750	1.45	2.18	1.60	14	15.73
	Selenium (Filtered)	68	17	51	75.00	<0.1	-0.05	NC	0.10	0.08	0.20	NC	0.35	<0.3	0.10	0.0119	1.8113	0.10	0.15	0.05	0	0
	Strontium	118	118	0	0.00	16.3	14.62	17.48	20.38	23.00	24.21	26.81	29.97	41.50	23.00	0.3050	6.9697	3.84	5.76	3.30	0	0
	Strontium (Filtered)	17	17	0	0.00	21.3	17.81	NC	22.20	24.00	25.13	NC	29.51	27.30	24.00	0.4099	14.1176	2.93	4.39	1.70	0	0
	Zinc	137	76	61	44.53	<0.3	-7.67	0.45	0.82	2.50	6.48	15.26	14.96	17.20	3.70	0.5111	0.9737	5.66	8.49	3.80	0	0
	Zinc (Filtered)	17	4	13	76.47	<0.4	-7.27	NC	0.48	0.20	5.64	NC	13.38	5.65	0.88	1.4663	0.4889	5.16	7.74	1.80	0	0

Notes:
bold - DL ≥50%
NC - not calculatable

APPENDIX H

BOXPLOTS – LOCAL RIVERS (SEASONAL)

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Seasonal\VENW03044-01_FigureH-01_pH.cdr



NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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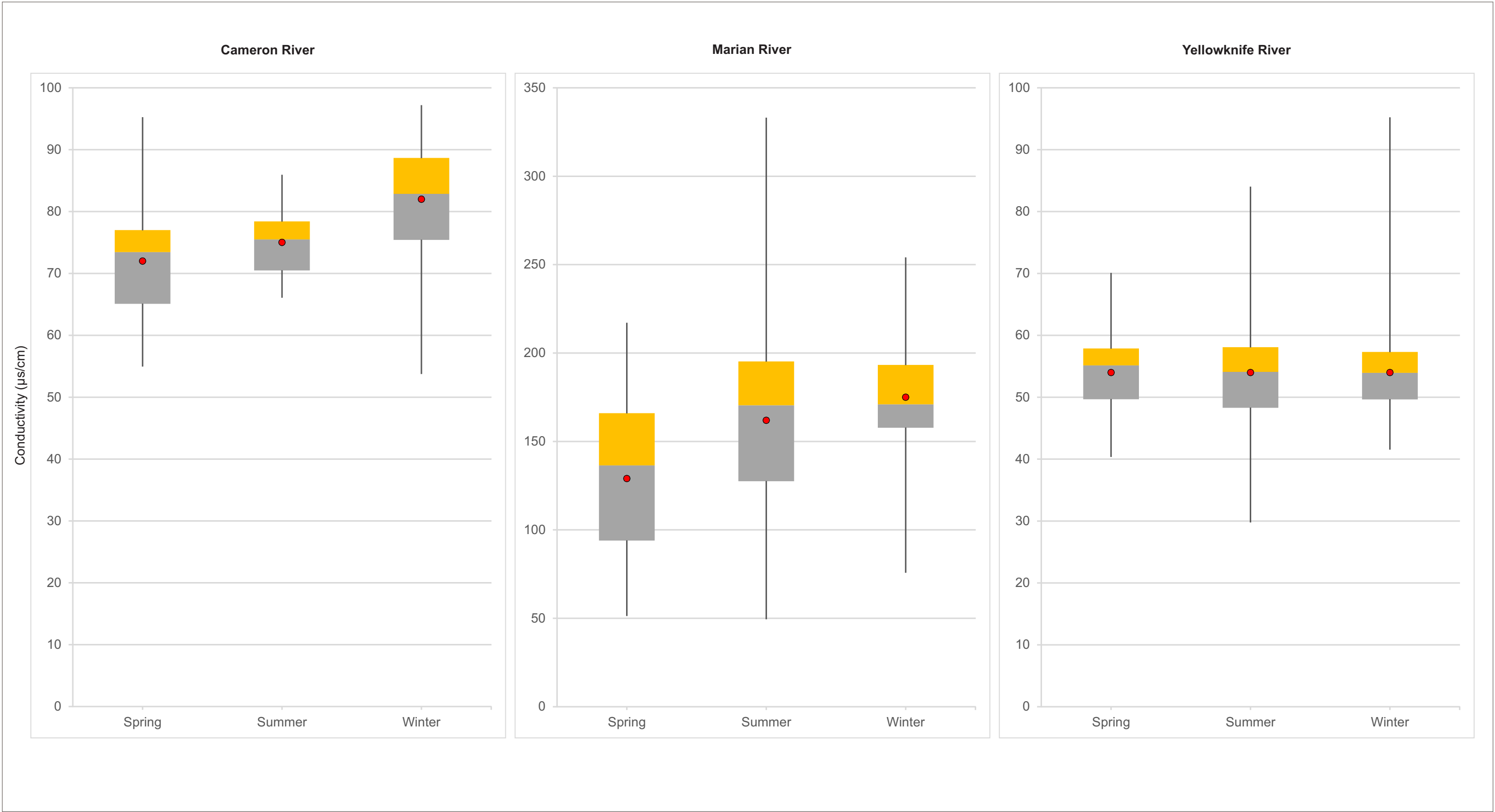
March 30, 2017

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

pH Seasonal Box Plot

Figure H.1

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplot_Seasonal\VENW03044-01_FigureH-02_Conductivity.cdr



NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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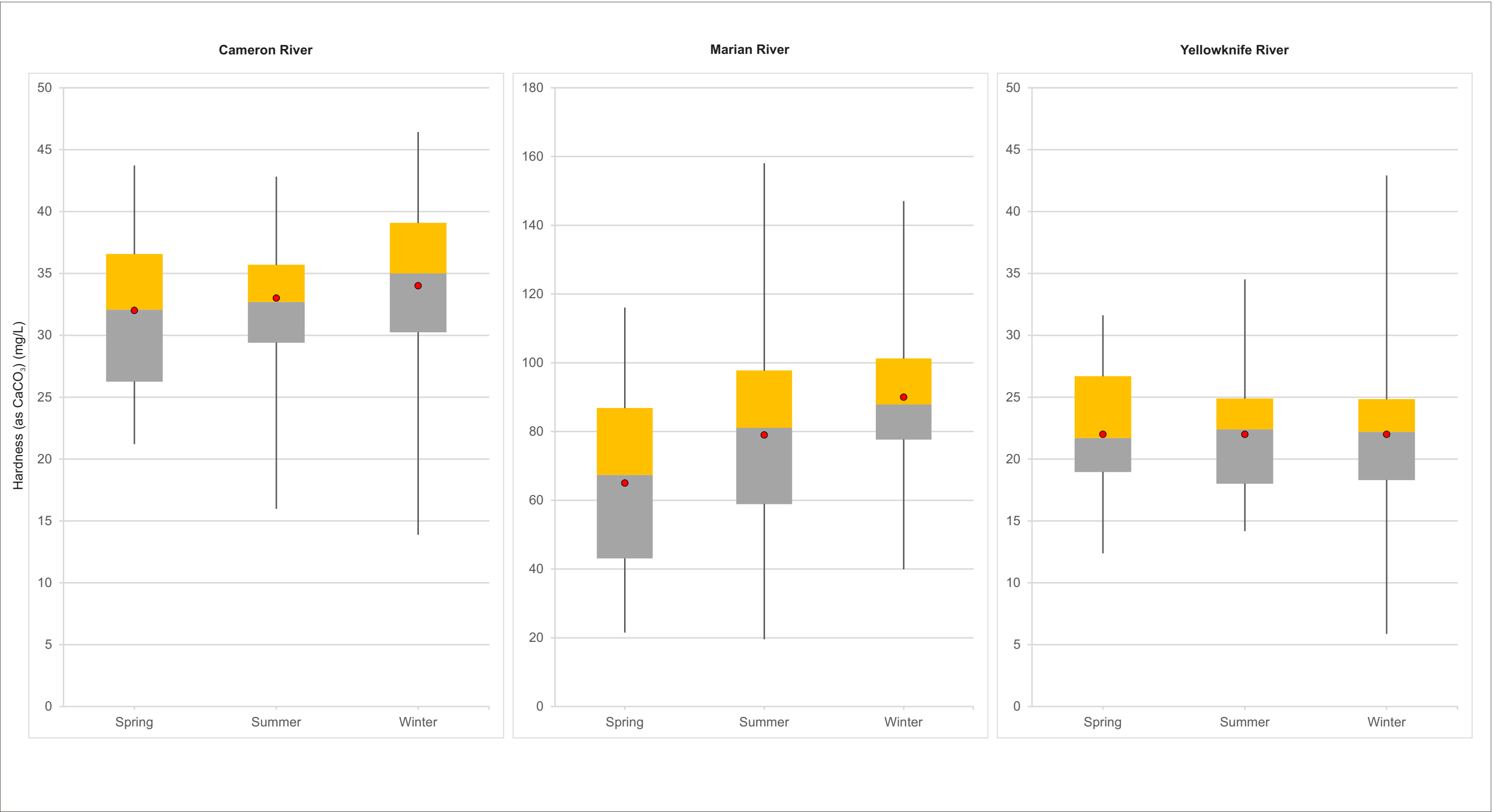
March 30, 2017

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Conductivity Seasonal Box Plot

Figure H.2

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Seasonal\VENW03044-01_FigureH-03_Hardness.cdr



NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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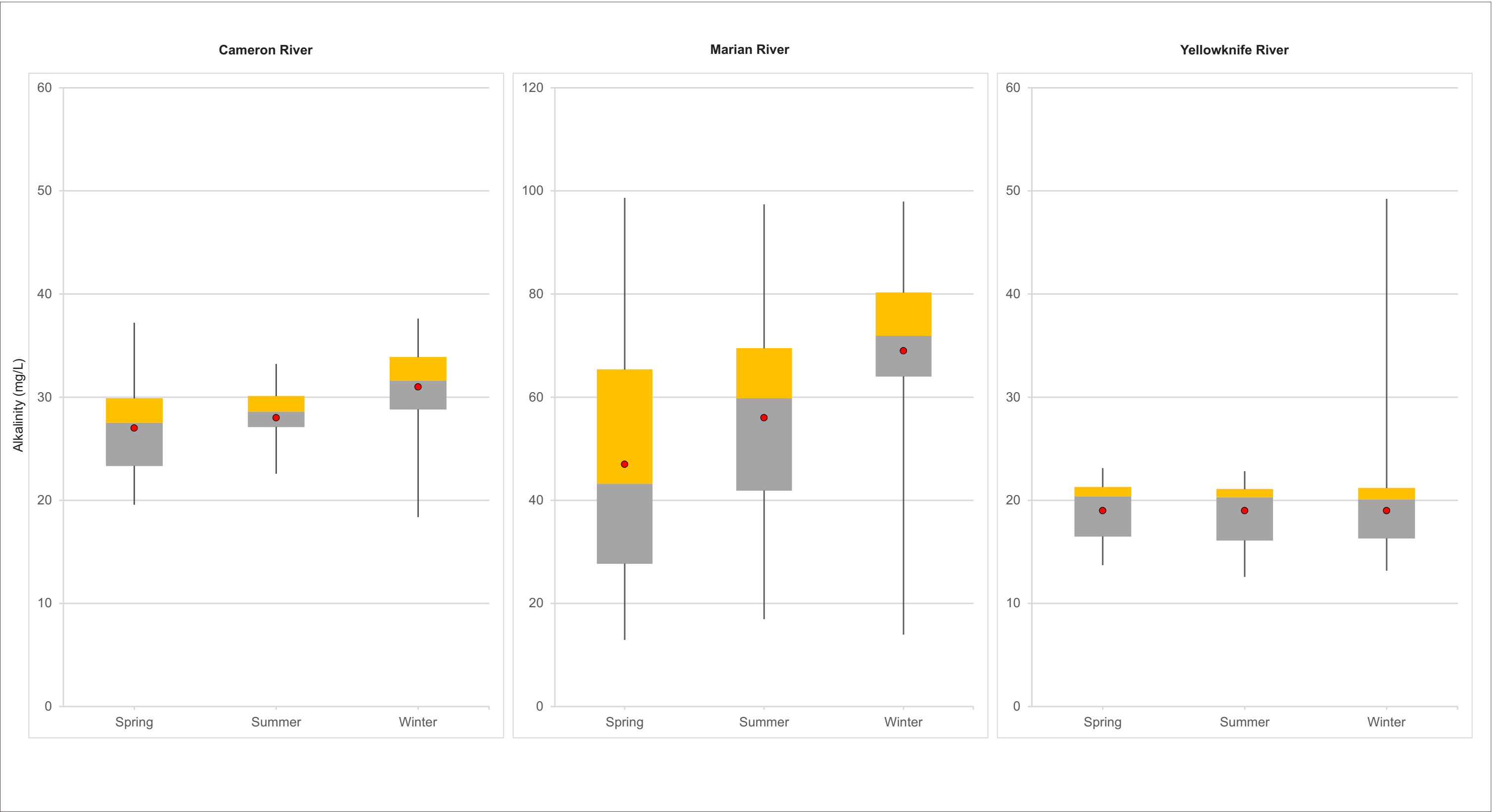
March 30, 2017

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Hardness (as CaCO₃) Seasonal Box Plot

Figure H.3

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Seasonal\VENW03044-01_FigureH-04_Alkalinity.cdr



NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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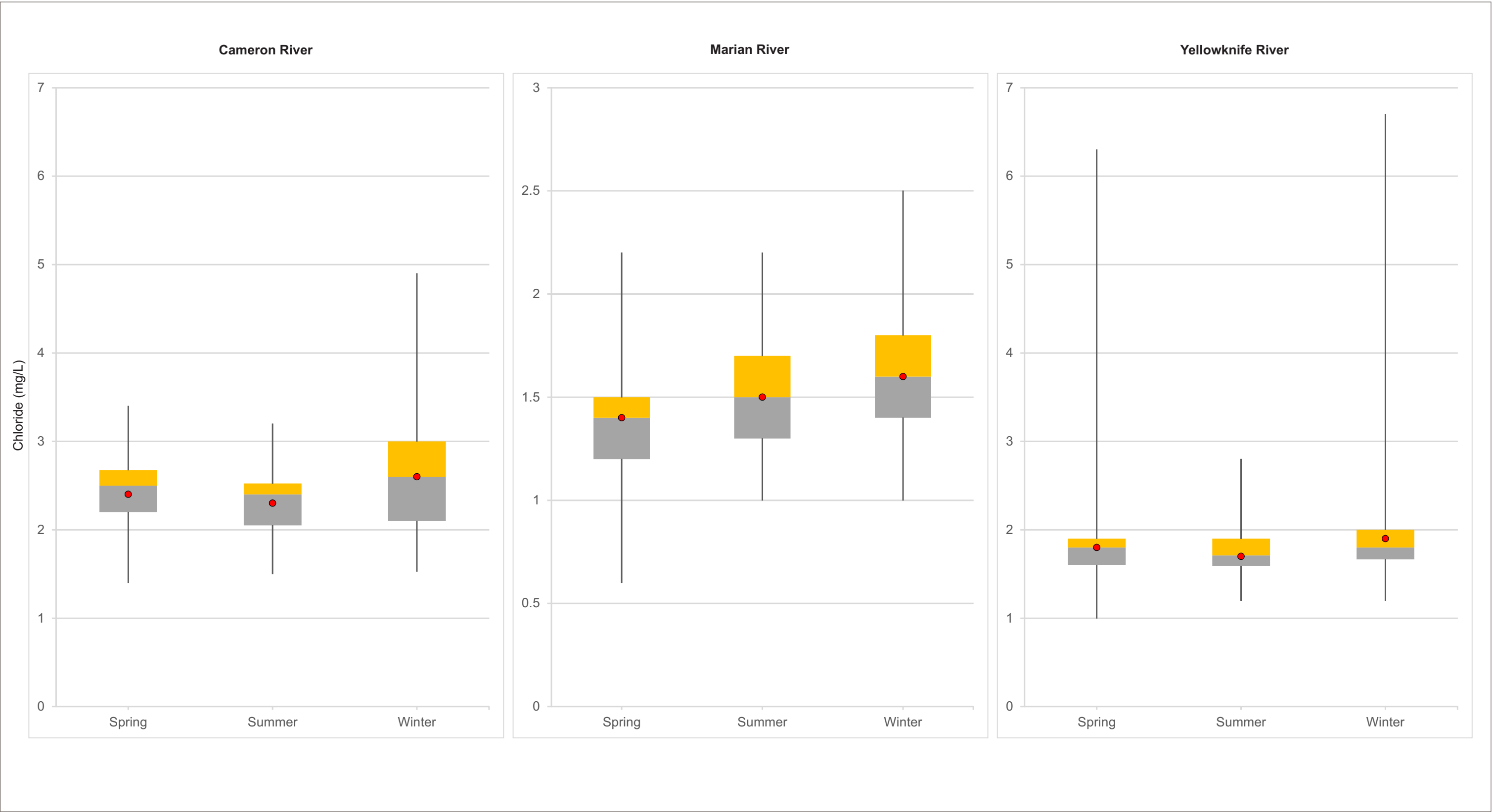
March 30, 2017

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Alkalinity Seasonal Box Plot

Figure H.4

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Seasonal\VENW03044-01_FigureH-05_Chloride.cdr



NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Chloride Seasonal Box Plot

PROJECT NO.

ENW.VENW03044-01

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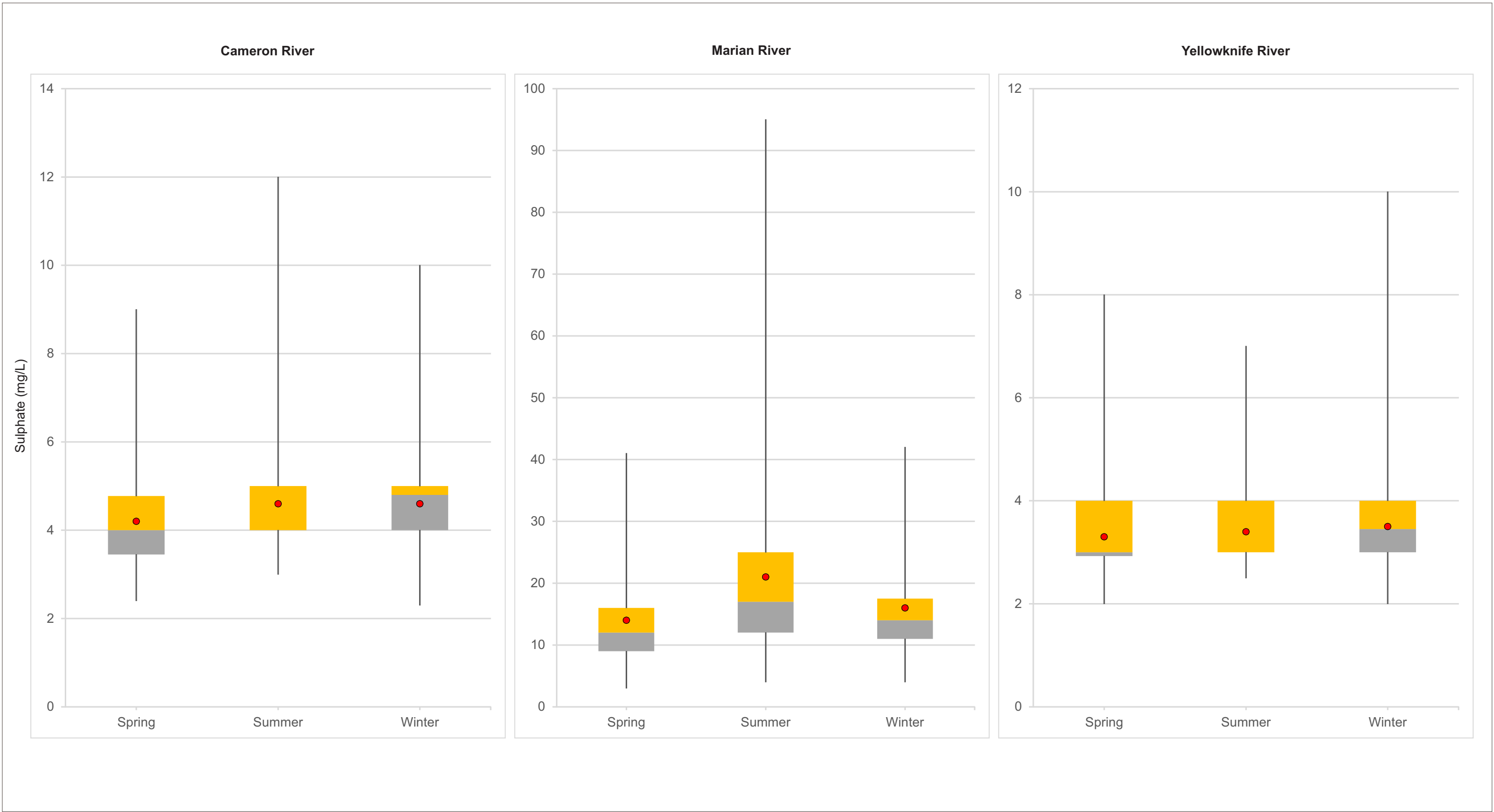
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March 30, 2017

Figure H.5

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Seasonal\VENW03044-01_FigureH-06_Sulphate.cdr



NOTES

1. Line between box colours indicates MEDIAN value.
2. Red dot indicates MEAN value.
3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Sulphate Seasonal Box Plot

PROJECT NO.
ENW.VENW03044-01

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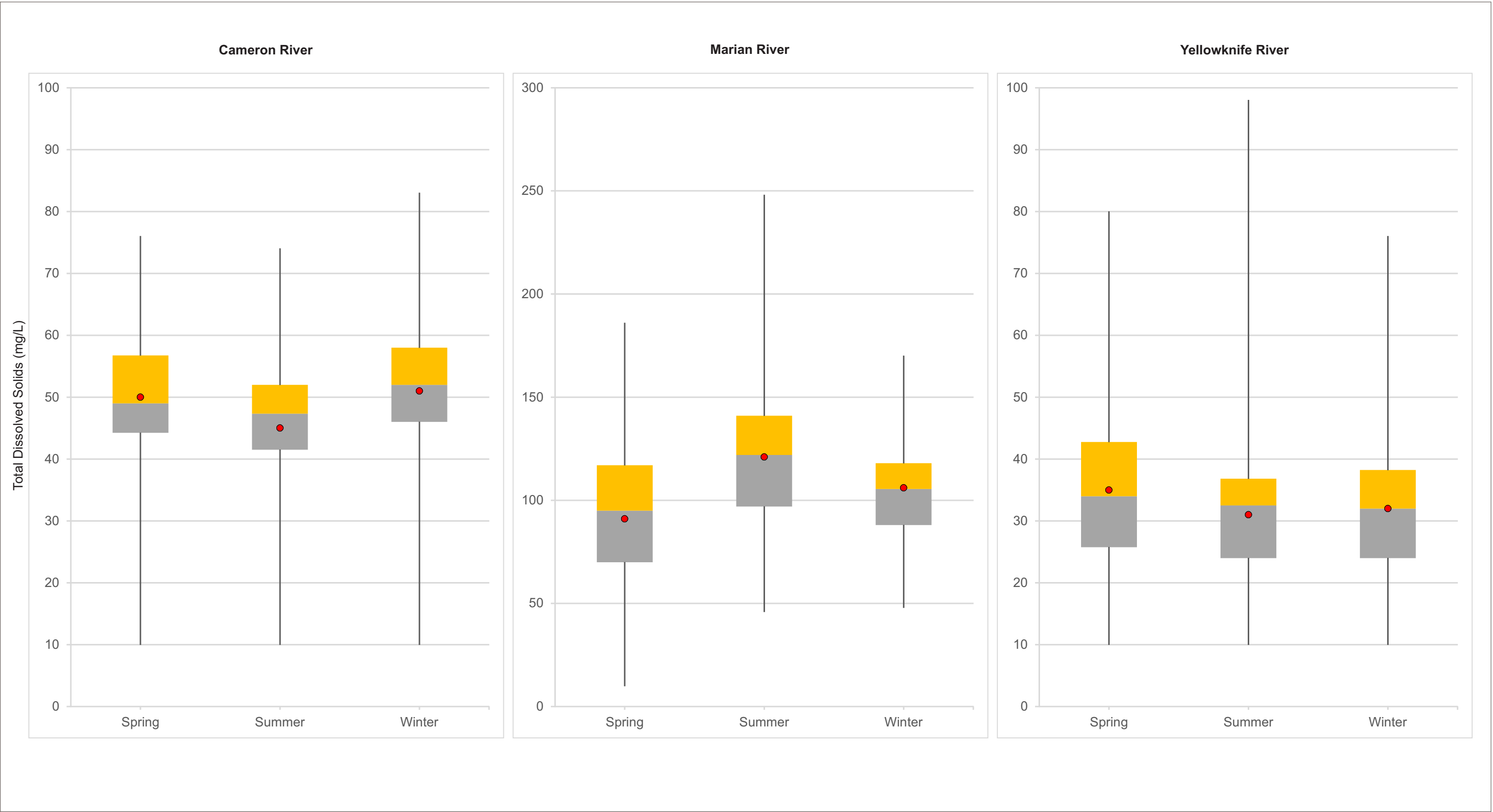
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Figure H.6

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Seasonal\VENW03044-01_FigureH-07_TDS.cdr



NOTES

- 1. Line between box colours indicates MEDIAN value.
- 2. Red dot indicates MEAN value.
- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- 4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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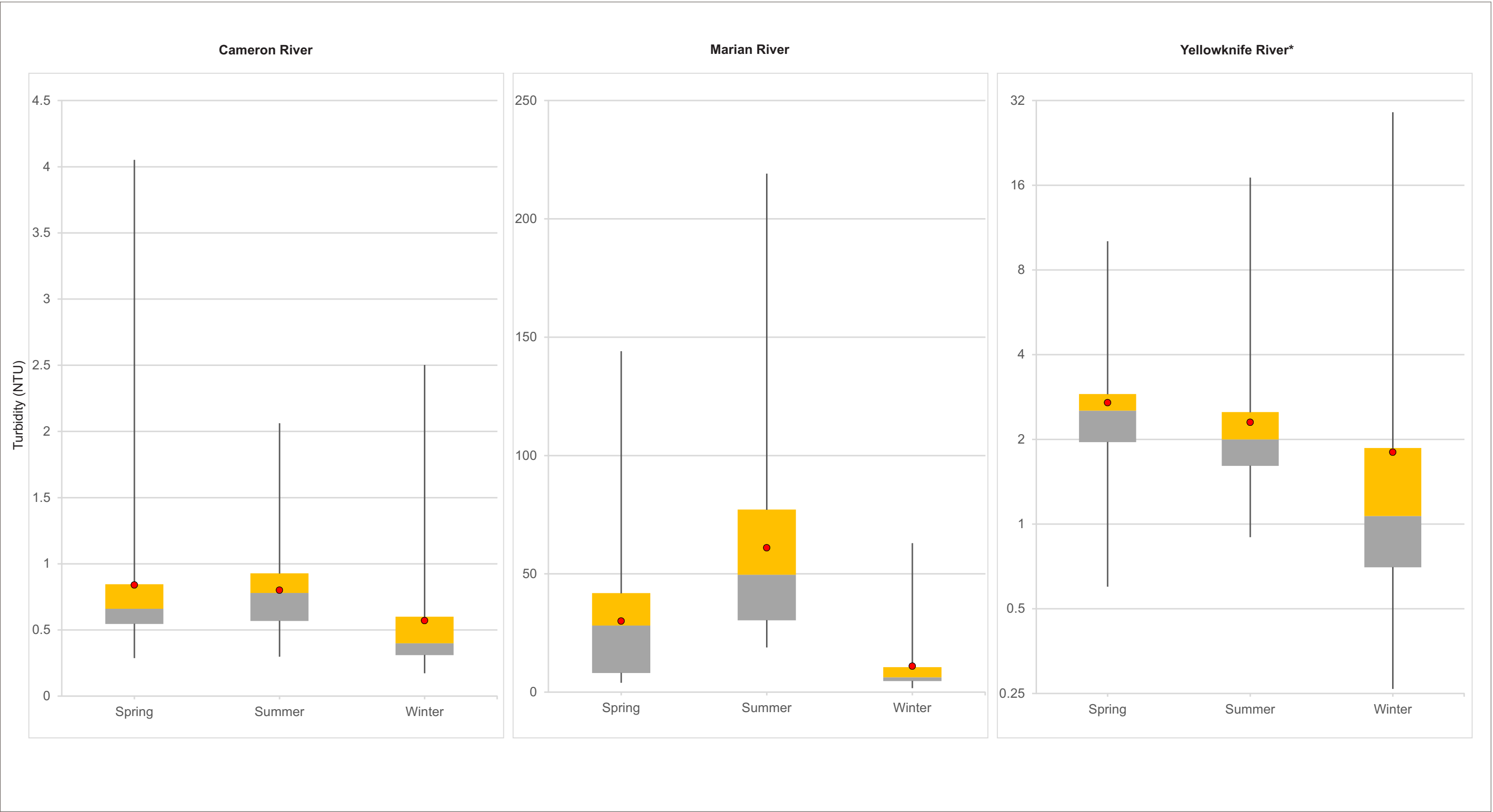
STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Total Dissolved Solids
Seasonal Box Plot

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0
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Figure H.7

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplot_Seasonal\VENW03044-01_FigureH-08_Turbidity.cdr



NOTES

- 1. Line between box colours indicates MEDIAN value.
- 2. Red dot indicates MEAN value.
- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- 4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Turbidity Seasonal Box Plot

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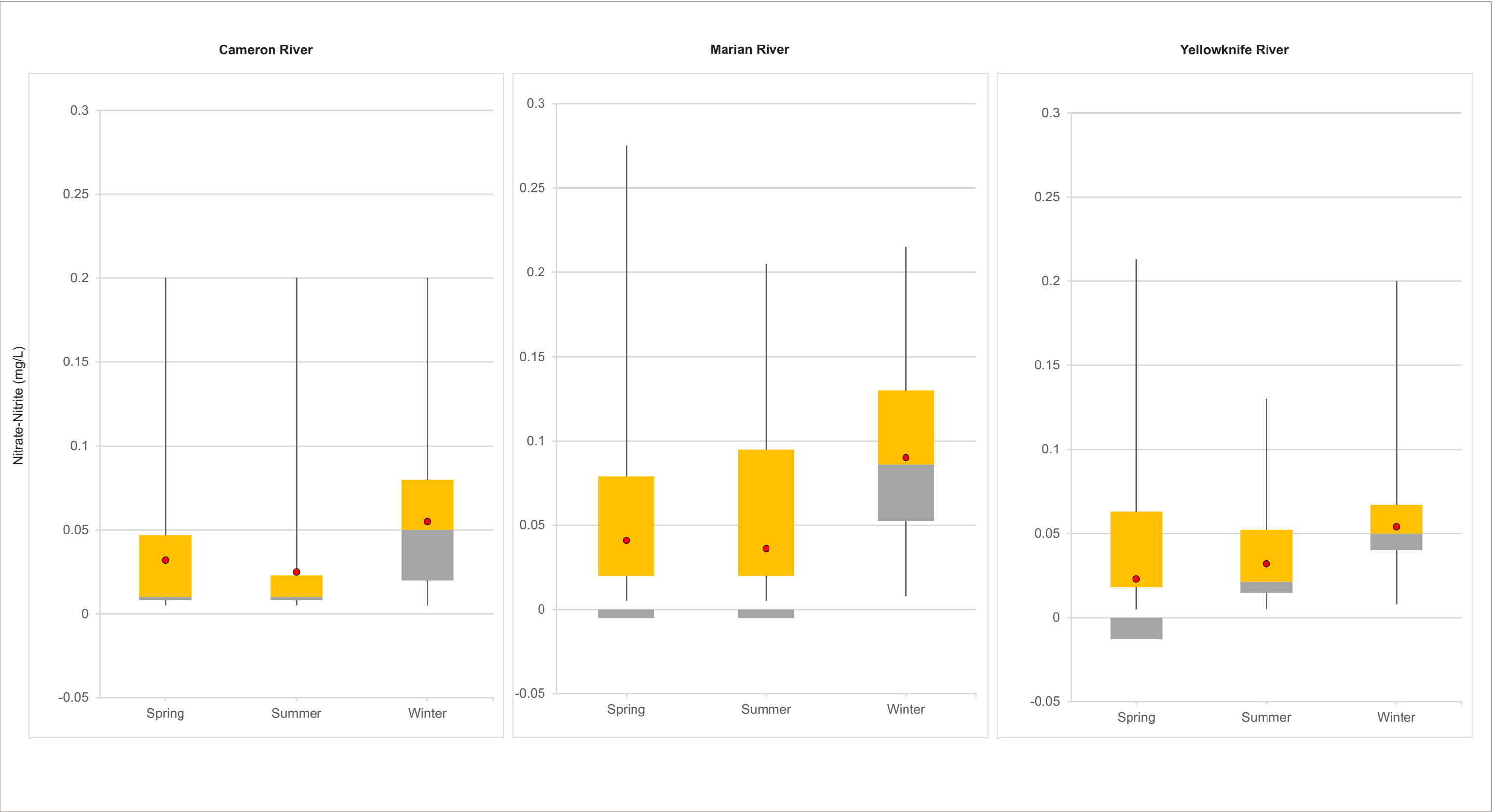
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Figure H.8

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplot_Seasonal\VENW03044-01_FigureH-09_NitrateNitrite.cdr



NOTES

1. Line between box colours indicates MEDIAN value.
2. Red dot indicates MEAN value.
3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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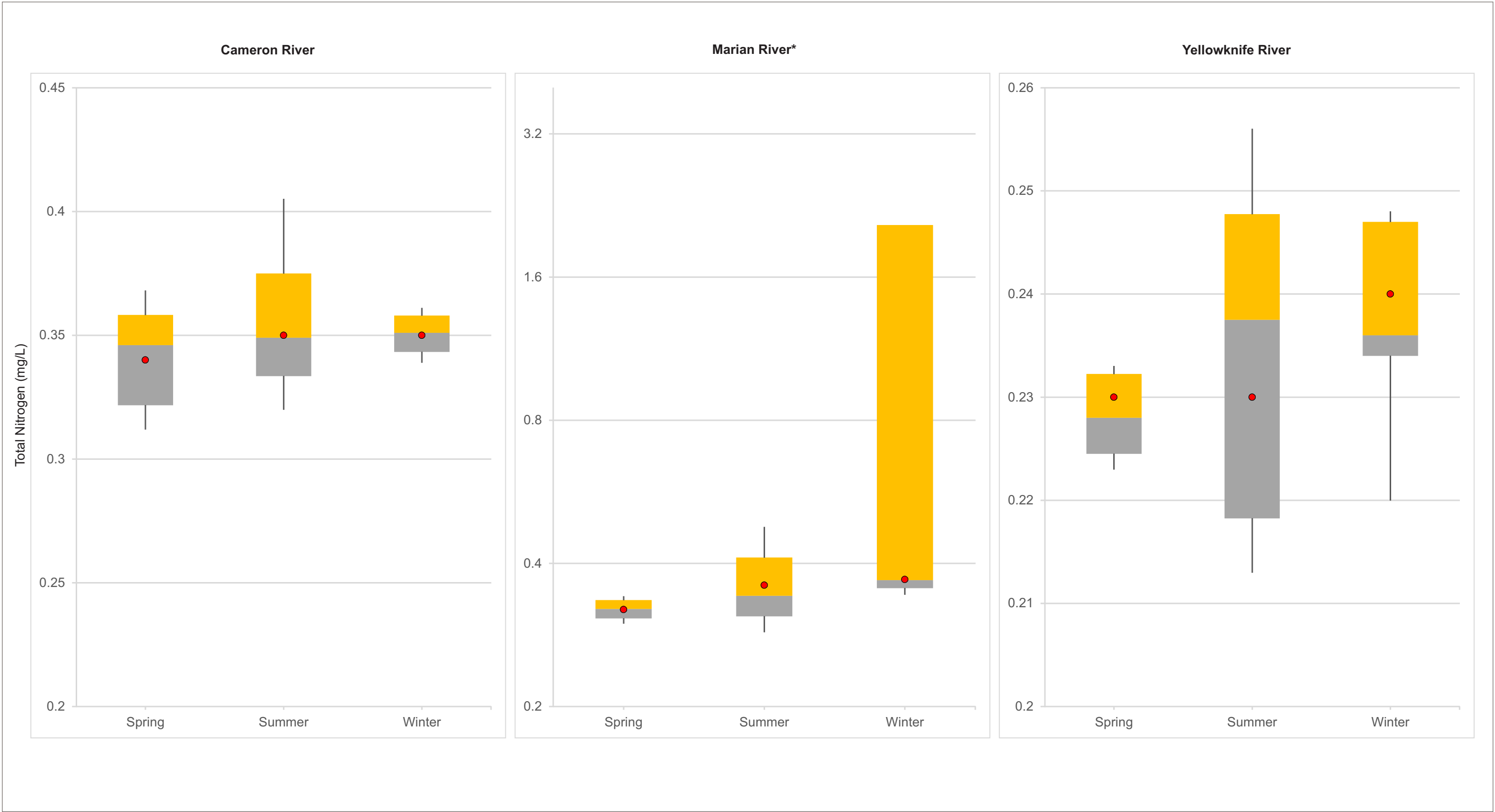
STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Nitrate-Nitrite Seasonal Box Plot

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure H.9

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Seasonal\VENW03044-01_FigureH-10_Nitrogen.cdr



NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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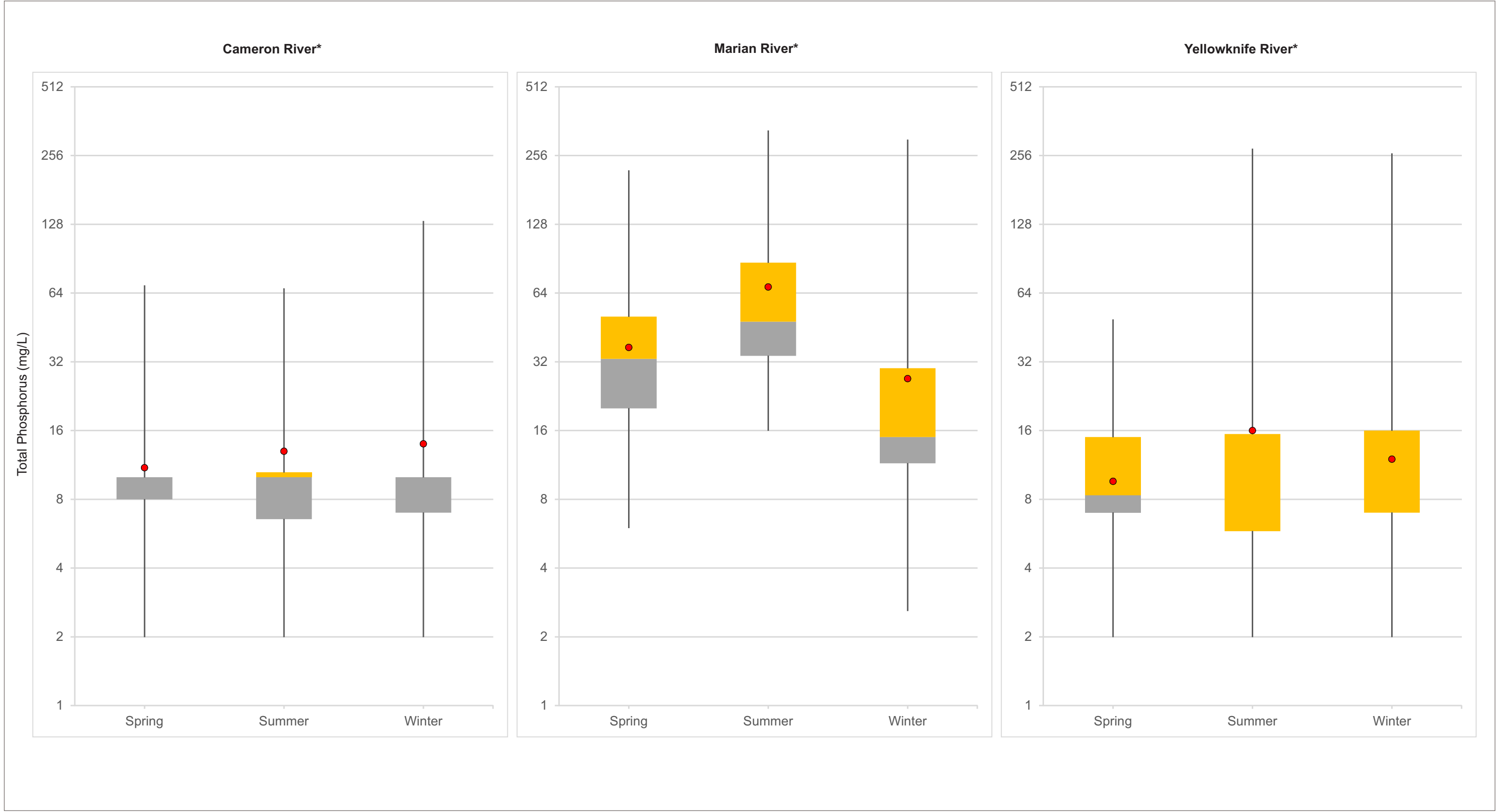
March 30, 2017

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Total Nitrogen Seasonal Box Plot

Figure H.10

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Seasonal\VENW03044-01_FigureH-11_Phosphorus.cdr



NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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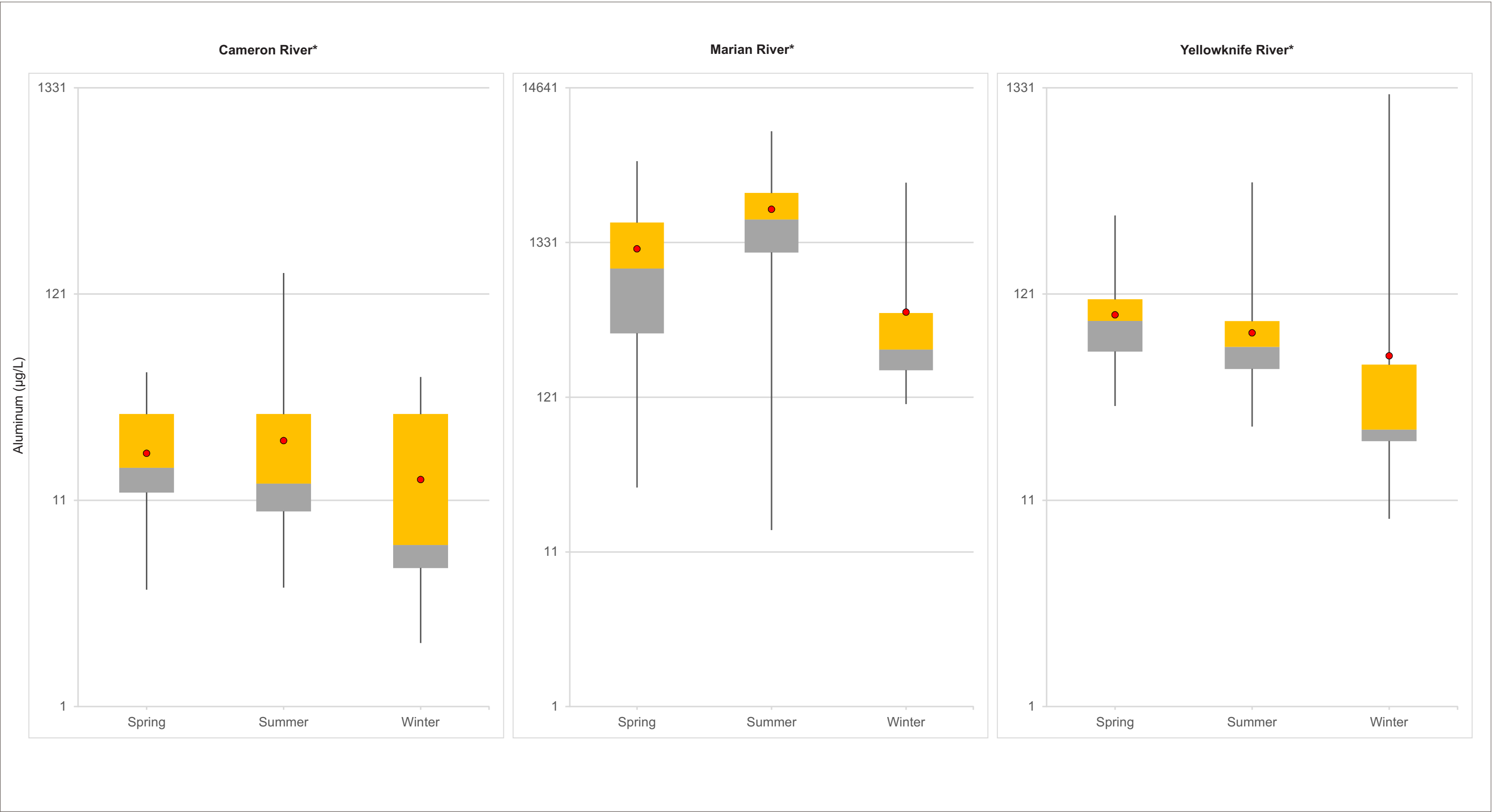
March 30, 2017

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Total Phosphorus Seasonal Box Plot

Figure H.11

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Seasonal\VENW03044-01_FigureH-12_Aluminum.cdr



NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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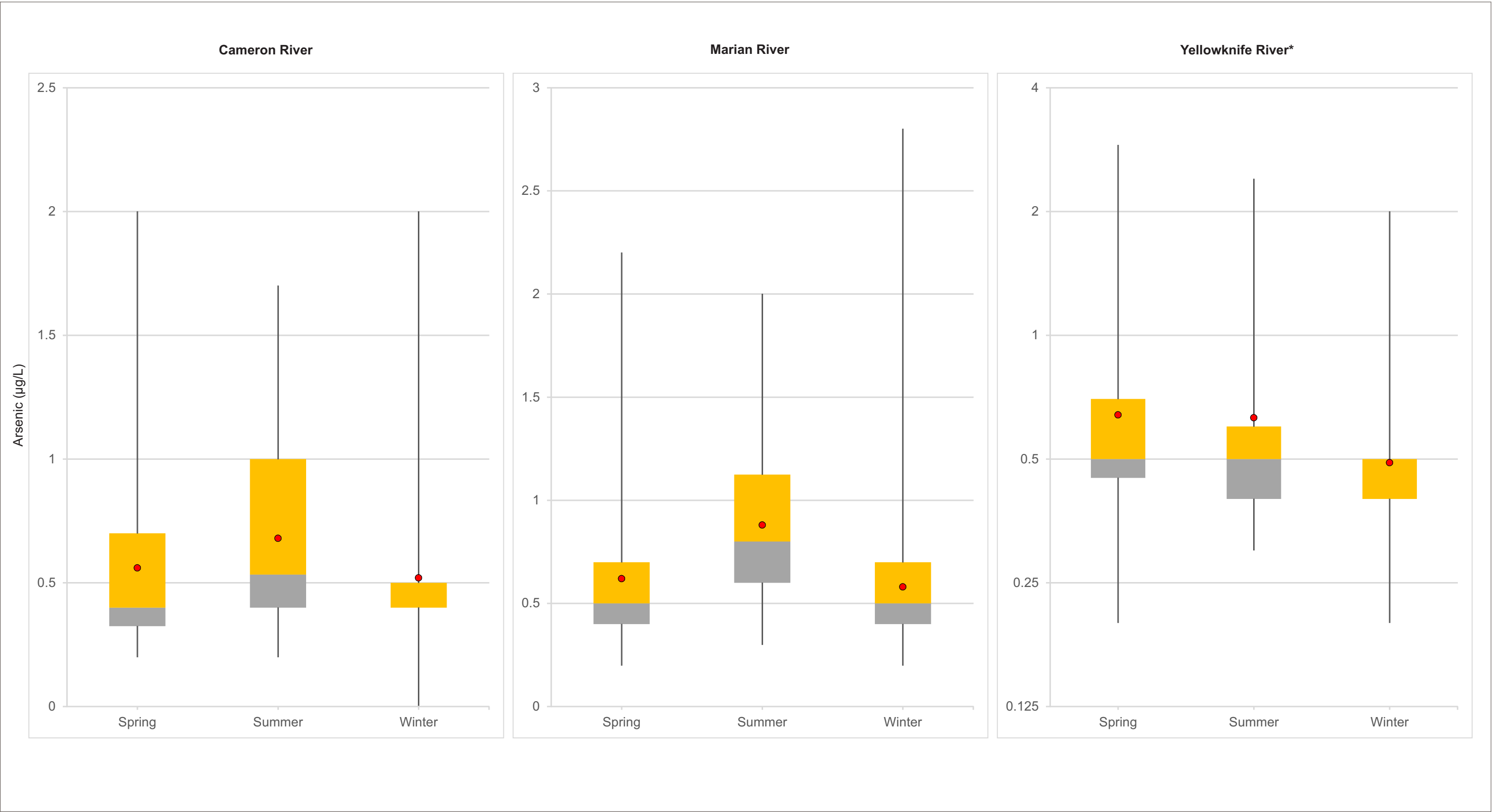
March 30, 2017

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Aluminum Seasonal Box Plot

Figure H.12

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Seasonal\VENW03044-01_FigureH-13_Arsenic.cdr



NOTES

1. Line between box colours indicates MEDIAN value.
2. Red dot indicates MEAN value.
3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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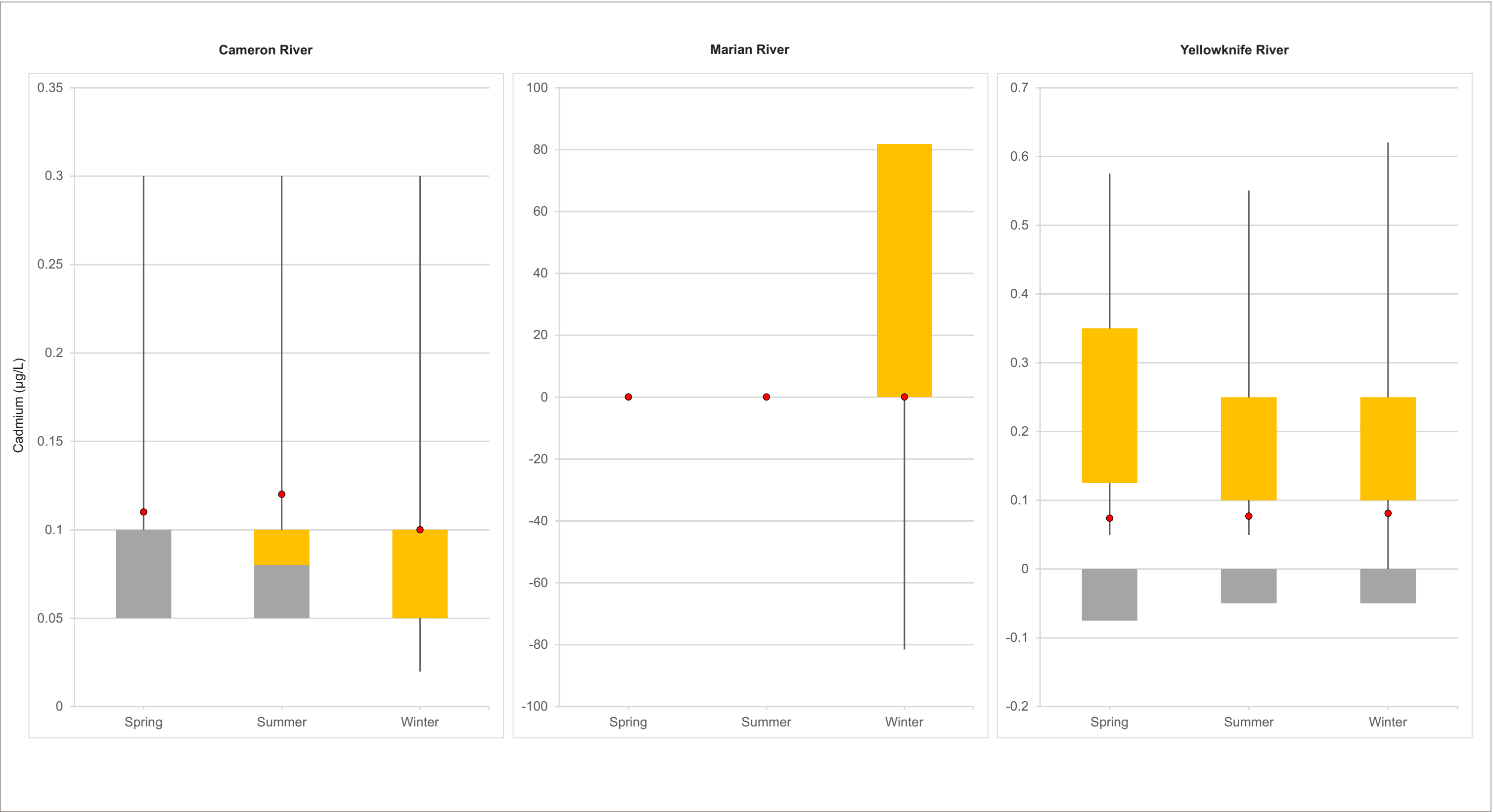
STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Arsenic Seasonal Box Plot

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure H.13

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Seasonal\VENW03044-01_FigureH-14_Cadmium.cdr



NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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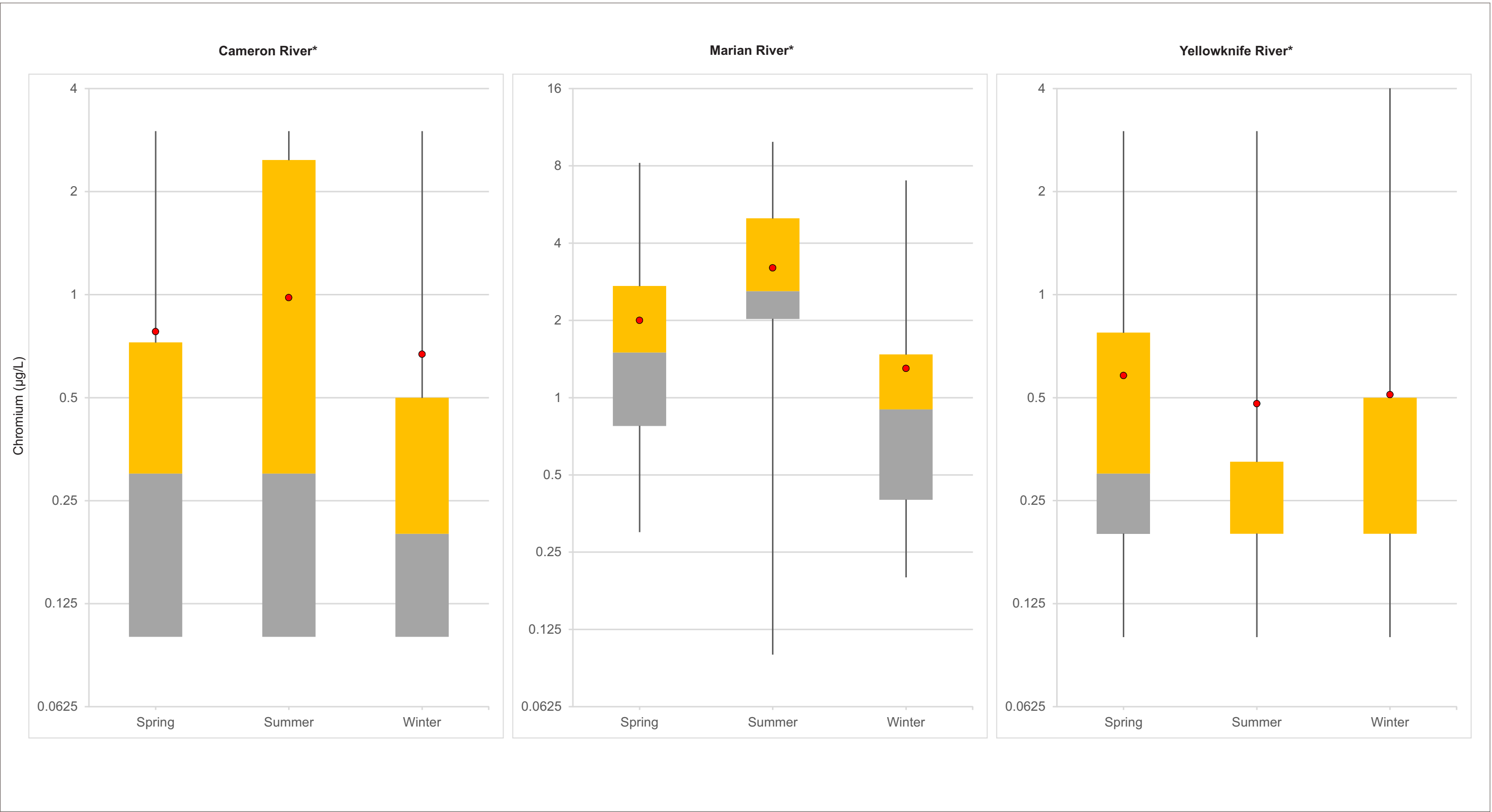
March 30, 2017

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Cadmium Seasonal Box Plot

Figure H.14

Q:\Vancouver\Graphics\704-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Seasonal\VENW03044-01_FigureH-15_Chromium.cdr



NOTES

1. Line between box colours indicates MEDIAN value.
2. Red dot indicates MEAN value.
3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Chromium Seasonal Box Plot

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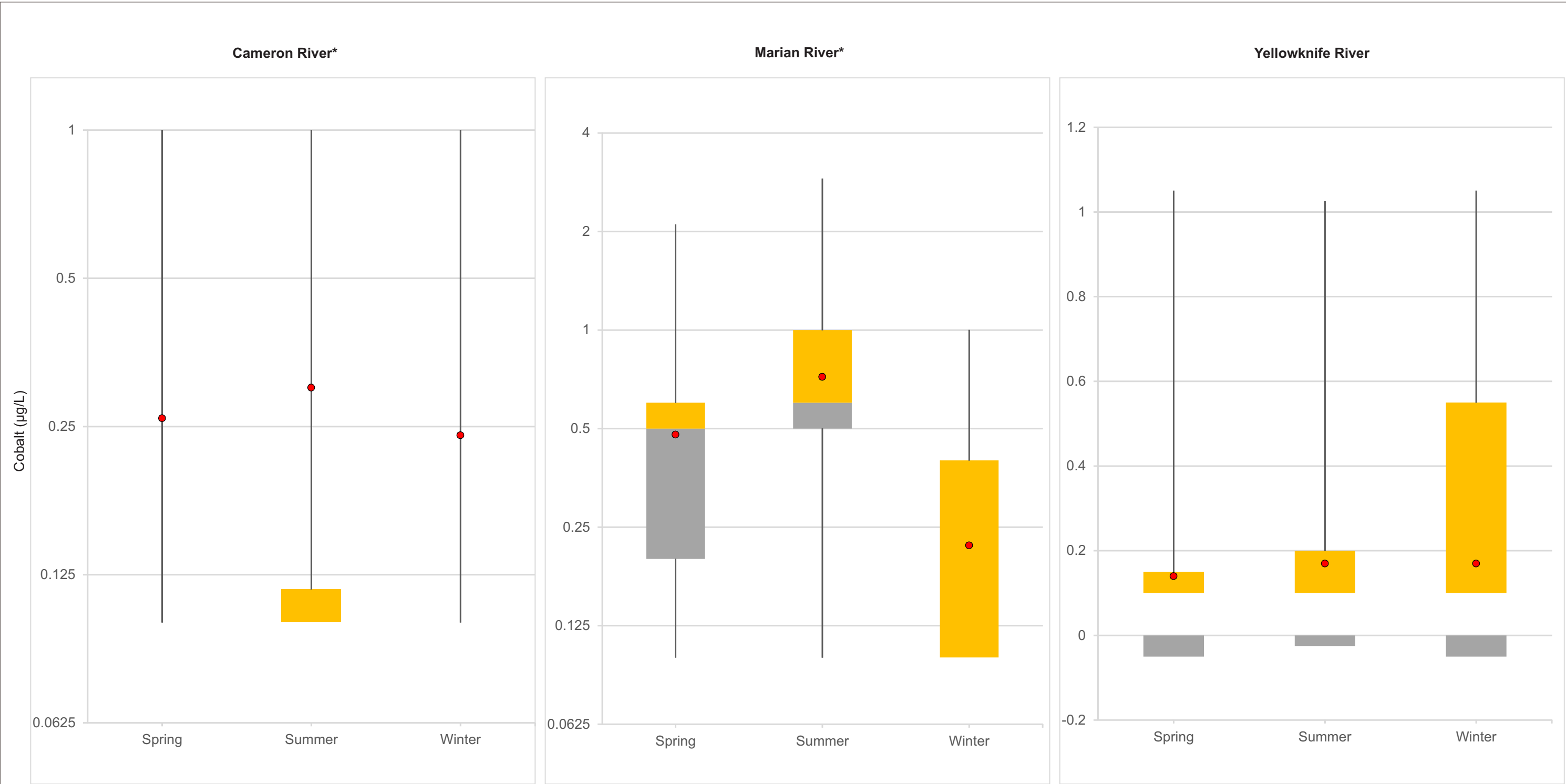
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Figure H.15

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NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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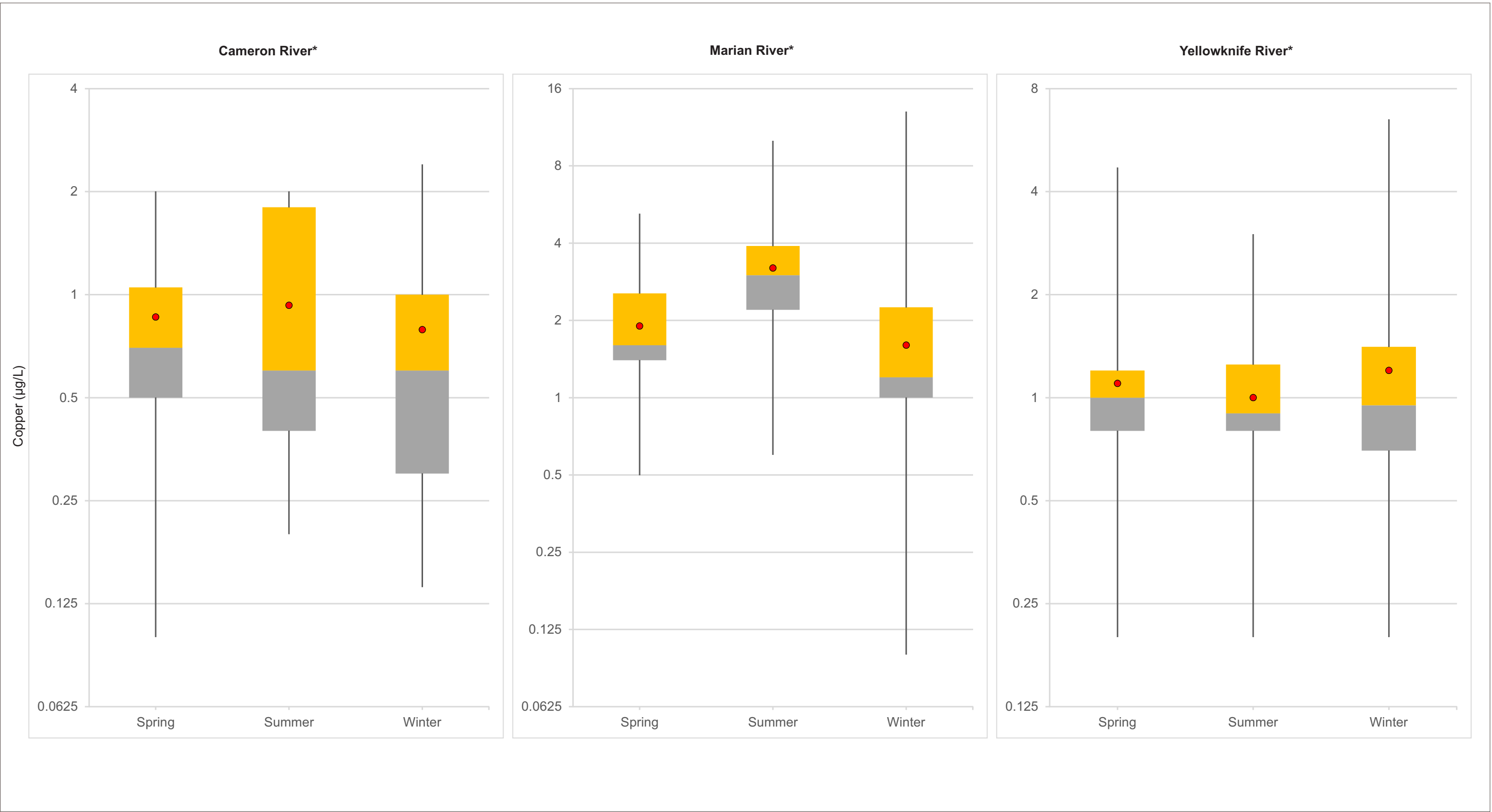
March 30, 2017

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Cobalt Seasonal Box Plot

Figure H.16

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Seasonal\VENW03044-01_FigureH-17_Copper.cdr



NOTES

- Line between box colours indicates MEDIAN value.
- Red dot indicates MEAN value.
- Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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Northwest Territories

TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Copper Seasonal Box Plot

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

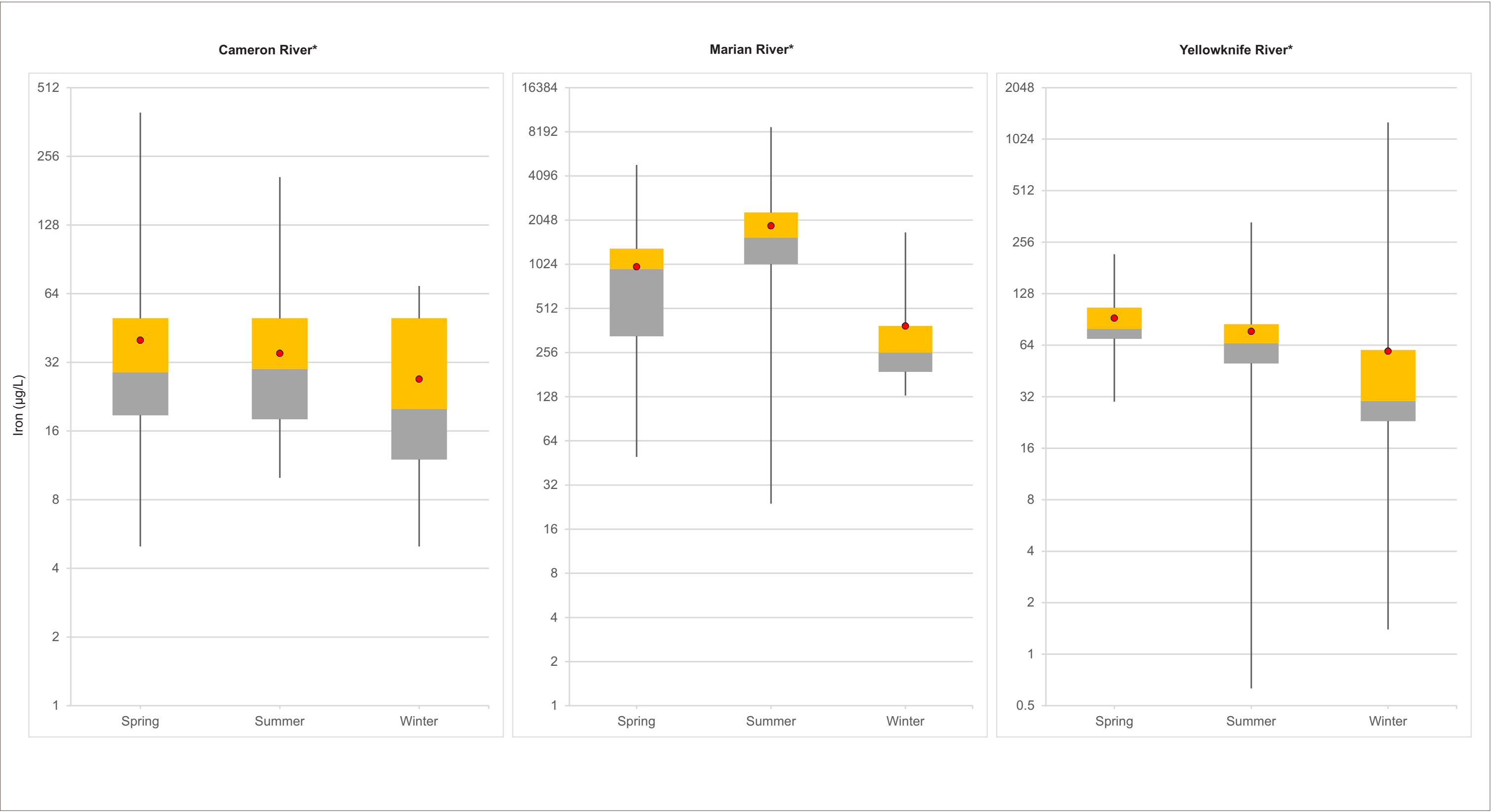
REV
0

OFFICE
Tt-VANC

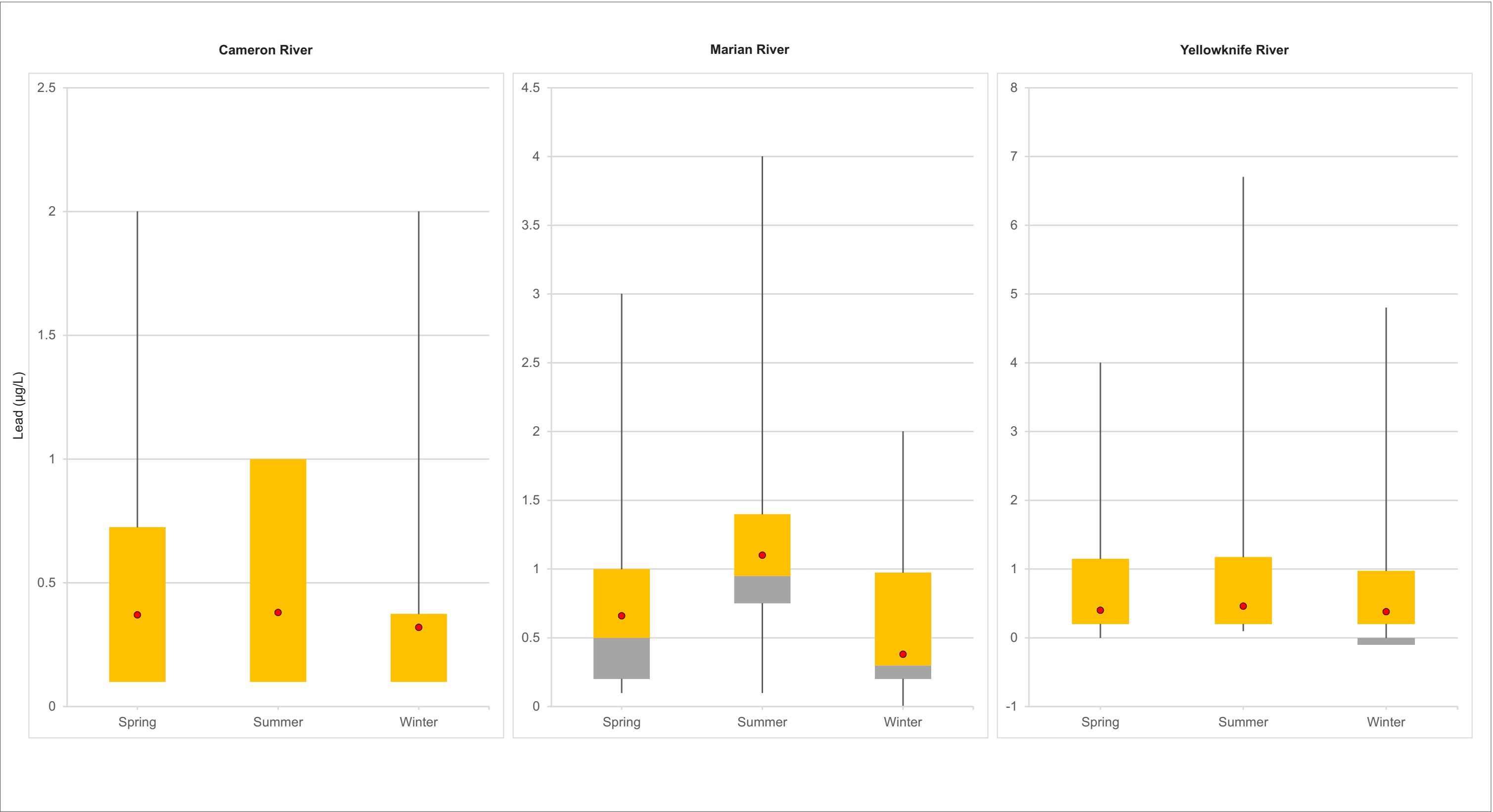
DATE
March 30, 2017

Figure H.17

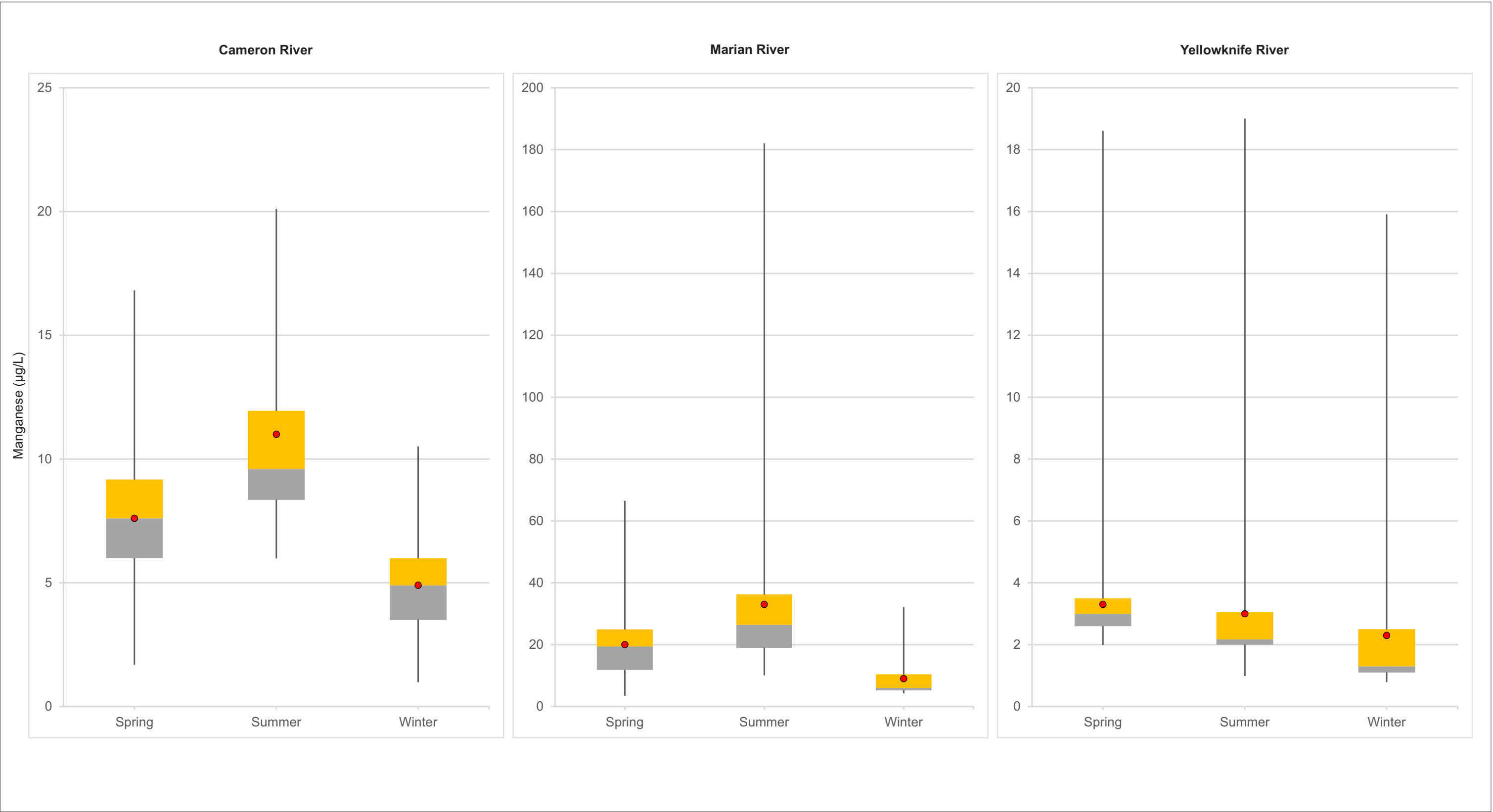
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NOTES

- 1. Line between box colours indicates MEDIAN value.
- 2. Red dot indicates MEAN value.
- 3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
- 4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
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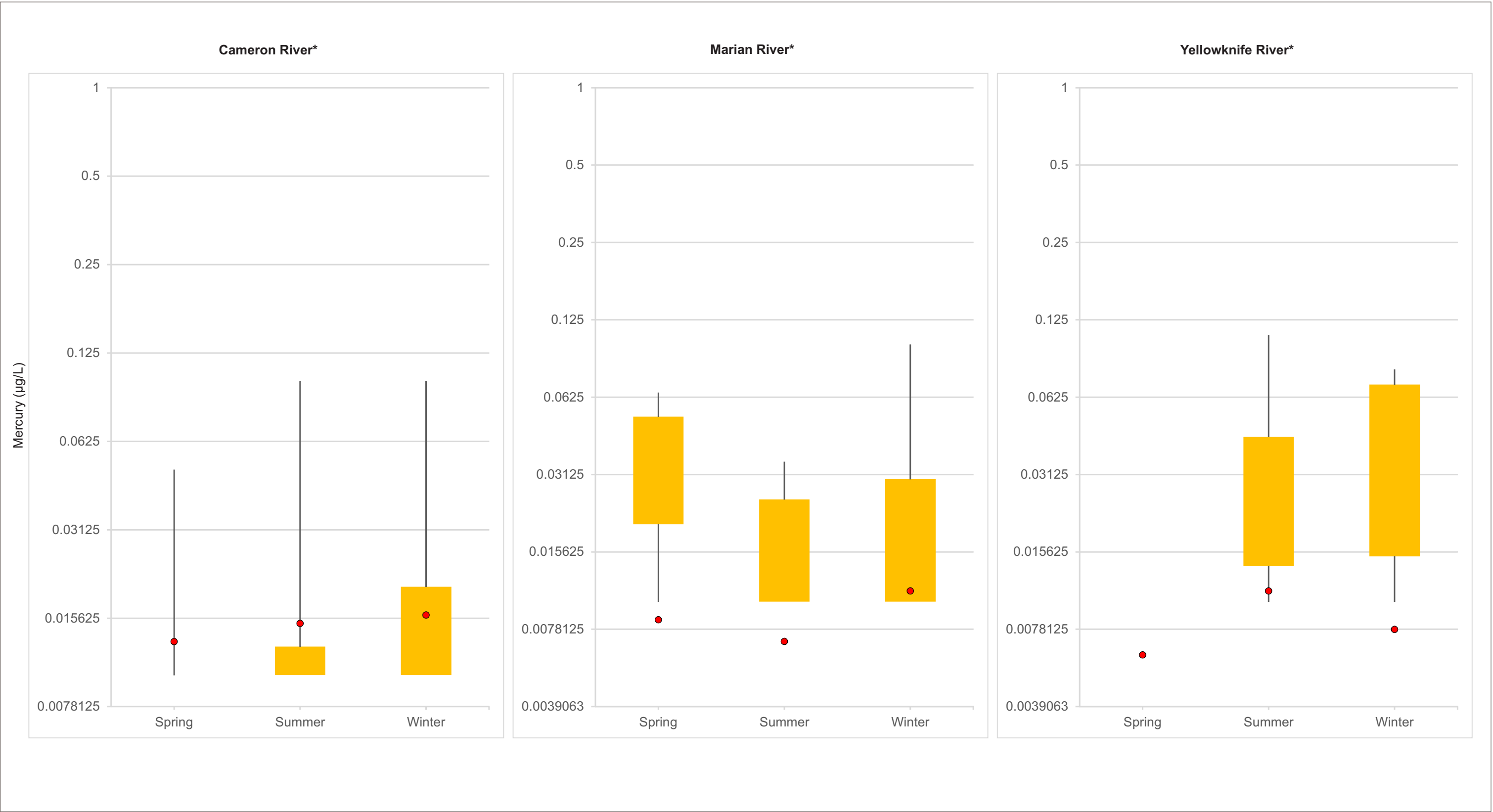
STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Manganese Seasonal Box Plot

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

Figure H.20

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NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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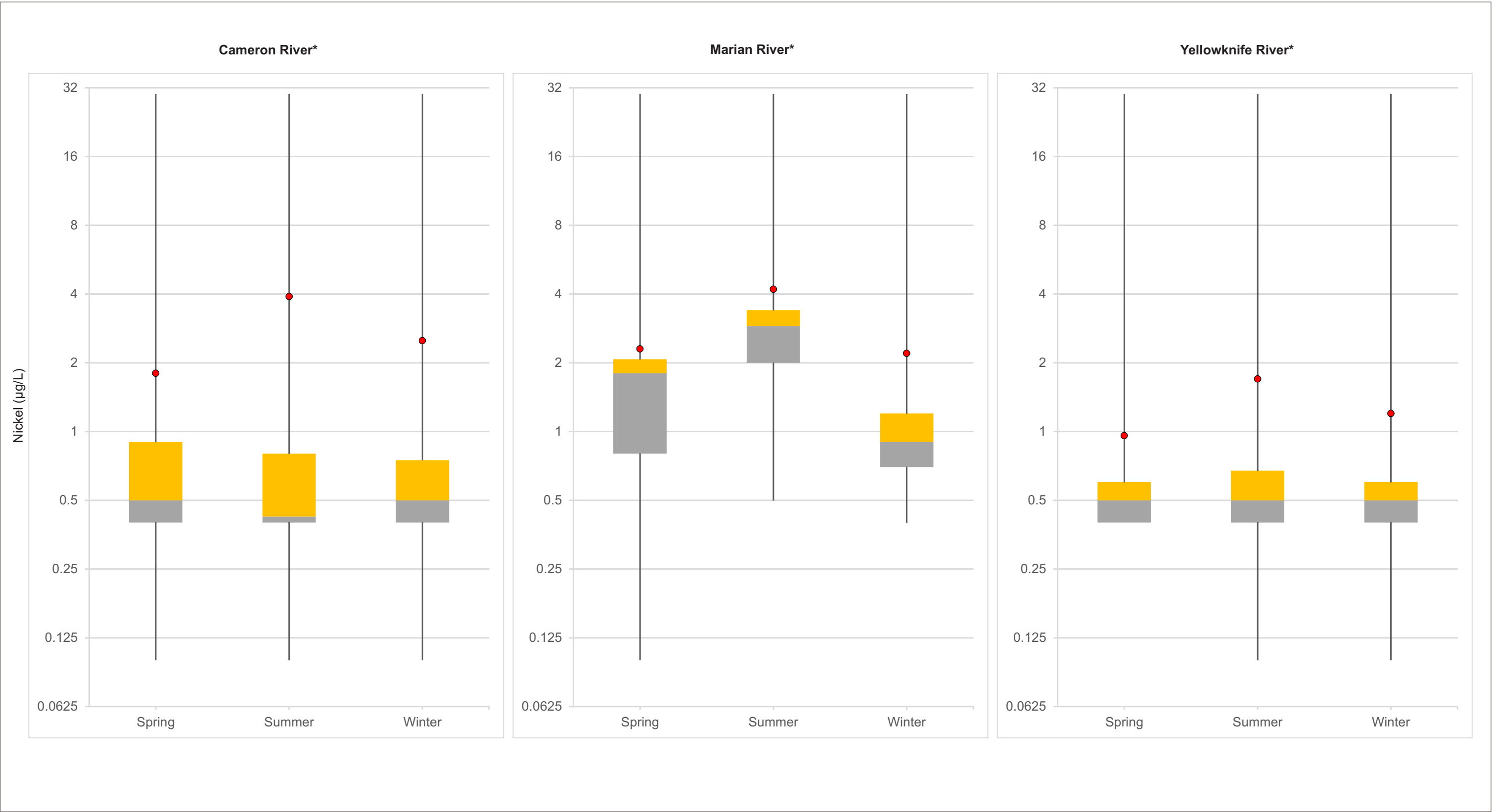
STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Mercury Seasonal Box Plot

Figure H.21

PROJECT NO. ENW.VENW03044-01	DWN SL	CKD MEZ	APVD SW	REV 0
OFFICE Tt-VANC	DATE March 30, 2017			

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NOTES

1. Line between box colours indicates MEDIAN value.
2. Red dot indicates MEAN value.
3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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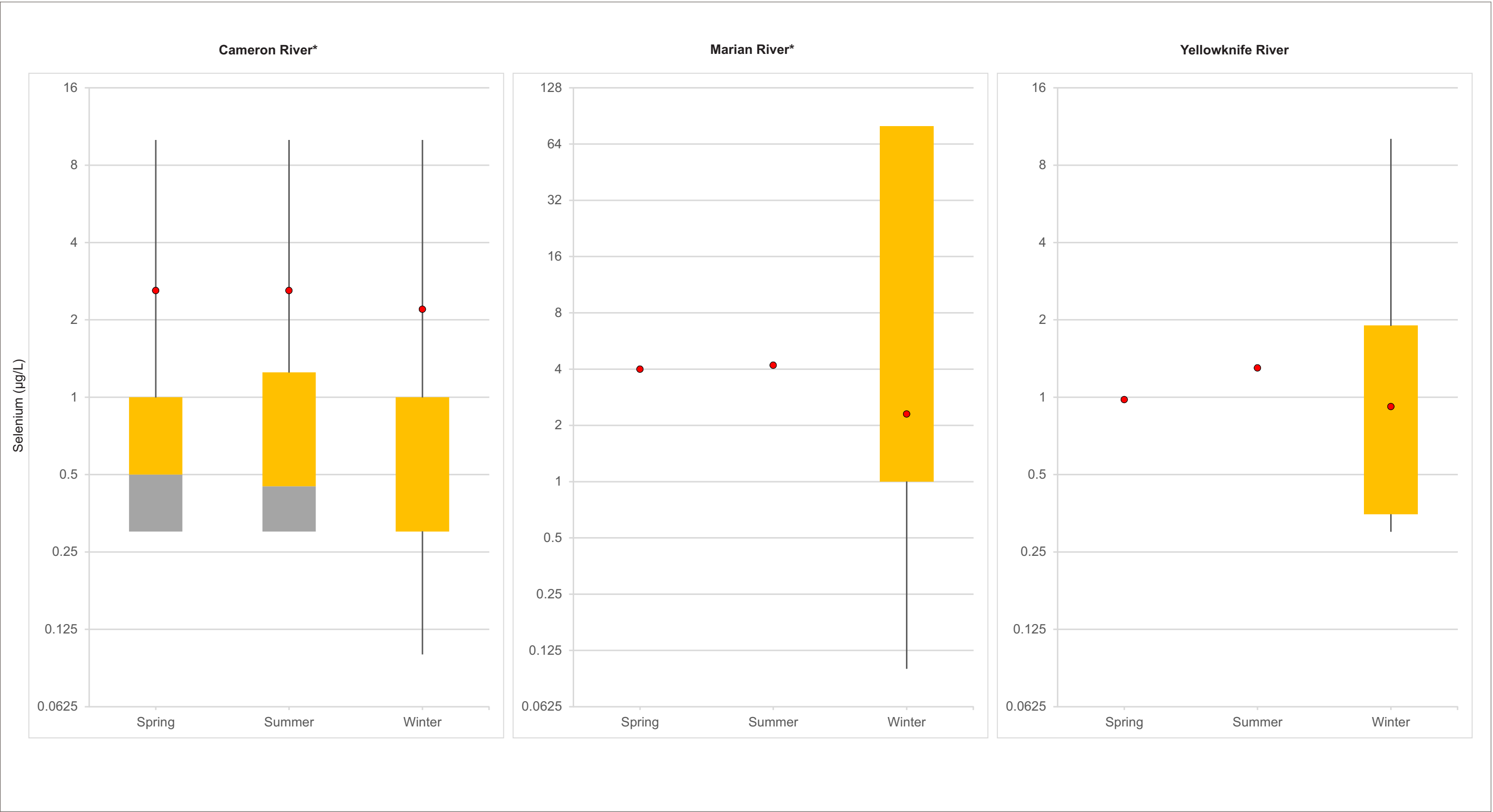
DATE
March 30, 2017

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Nickel Seasonal Box Plot

Figure H.22

Q:\Vancouver\Graphics\70-ENVIRONMENT\ENW\VENW\VENW03044-01\Boxplots_Seasonal\VENW03044-01_FigureH-23_Selenium.cdr



NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS

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ENW.VENW03044-01

DWN

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Tt-VANC

DATE

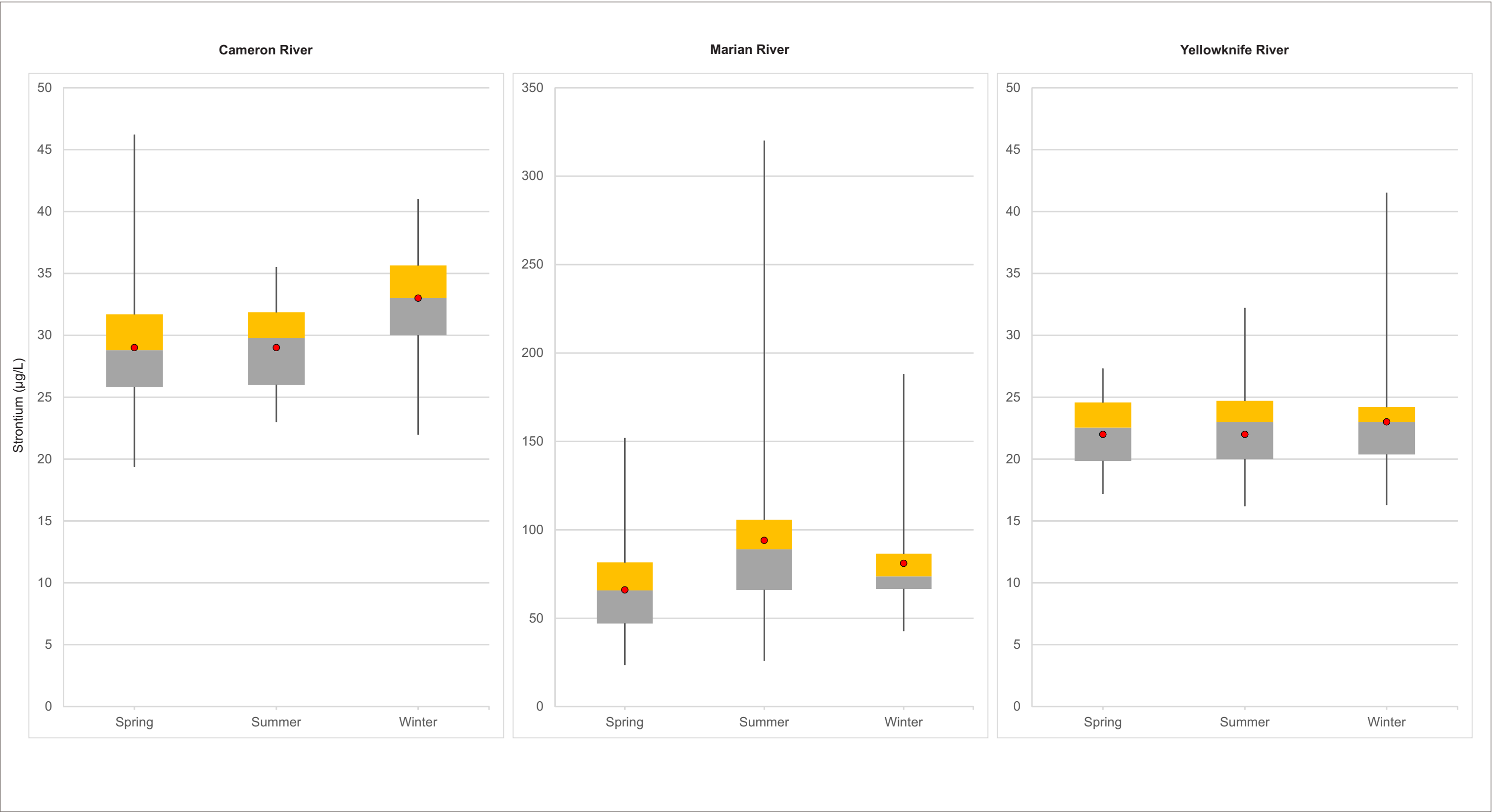
March 30, 2017

STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Selenium Seasonal Box Plot

Figure H.23

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NOTES

1. Line between box colours indicates MEDIAN value.

2. Red dot indicates MEAN value.

3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).

4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

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STATUS AND TRENDS OF WATER CHEMISTRY AND FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Strontium Seasonal Box Plot

PROJECT NO.

ENW.VENW03044-01

DWN

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OFFICE

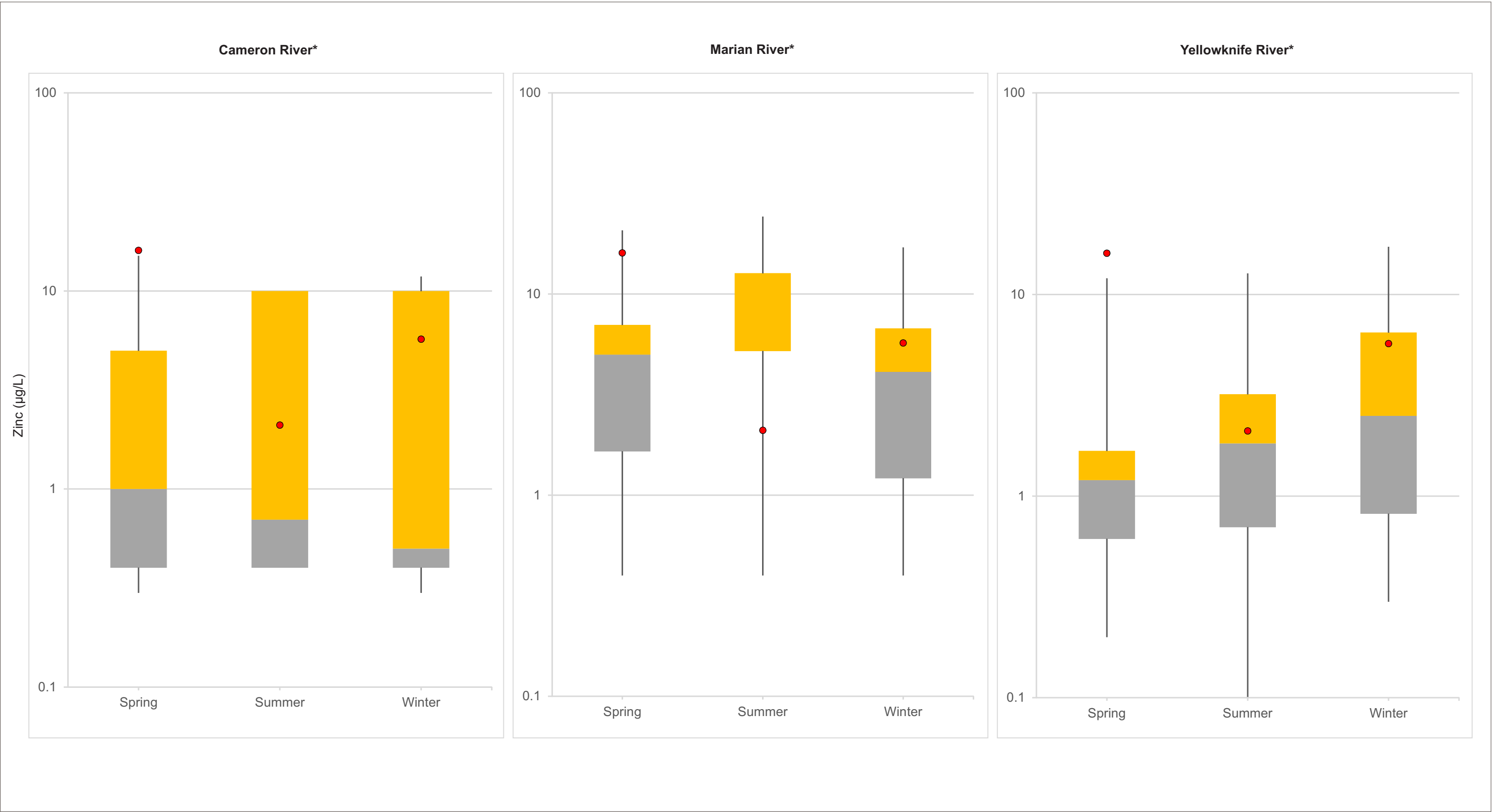
Tt-VANC

DATE

March 30, 2017

Figure H.24

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NOTES

1. Line between box colours indicates MEDIAN value.
2. Red dot indicates MEAN value.
3. Whiskers extend to the highest/lowest value within 1.5*IQR (Interquartile Range).
4. The scale on each graph is variable to best depict spatial distribution. Where necessary a logarithmic scale has been applied and is indicated by an asterisk (*) beside the station name.

STATUS
ISSUED FOR USE

CLIENT



TETRA TECH

STATUS AND TRENDS OF WATER CHEMISTRY AND
FLOW OF TRIBUTARIES INTO GREAT SLAVE LAKE

Zinc Seasonal Box Plot

PROJECT NO.
ENW.VENW03044-01

DWN
SL

CKD
MEZ

APVD
SW

REV
0

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DATE
March 30, 2017

Figure H.25

APPENDIX I

PERCENTAGE OF DISSOLVED METALS PRESENT

Table I.1 - Percentage of Dissolved Metals Present at Water Quality Sites within the Interior Platform

		Buffalo River								Hay River							Kakisa River							Little Buffalo River						
Sampled Date Time		6/16/2014	8/20/2014	5/20/2015	7/27/2015	9/24/2015	7/4/2016	10/25/2016	6/16/2014	8/20/2014	5/20/2015	7/27/2015	9/24/2015	7/4/2016	10/25/2016	6/16/2014	8/20/2014	5/20/2015	7/27/2015	9/23/2015	7/4/2016	#####	6/16/2014	8/20/2014	5/20/2015	7/27/2015	9/24/2015	7/4/2016	#####	
ChemName	output unit	Buffalo River@H WY 5_16 Jun 14	Buffalo River@H WY 5_20 Aug 14	Buffalo River@H WY 5_20 May 15	Buffalo River@H WY 5_27 Jul 15	Buffalo River@H WY 5_24 Sep 15	Buffalo River@H WY 5_04 Jul 16	Buffalo River@HWY 5_25 Oct 16	Hay River WCB_16 Jun 14	Hay River WCB_20 Aug 14	Hay River WCB_20 May 15	Hay River WCB_27 Jul 15	Hay River WCB_24 Sep 15	Hay River WCB_04 Jul 16	Hay River WCB_25 Oct 16	Kakisa River @ HWY 1_16 Jun 14	Kakisa River@ HWY 1_20 Aug 14	Kakisa River @ HWY 1_20 May 15	Kakisa River @ HWY 1_27 Jul 15	Kakisa River @ HWY 1_23 Sep 15	Kakisa River @ HWY 1_04 Jul 16	Kakisa River @ HWY 1_26 Oct 16	LittlBuffaR iv@HWY 5_16 Jun 14	LittlBuffaR iv@HWY 5_20 Aug 14	LittlBuffaR iv@HWY 5_20 May 15	LittlBuffaR iv@HWY 5_27 Jul 15	LittlBuffaR iv@HWY 5_24 Sep 15	LittlBuffaR iv@HWY 5_04 Jul 16	LittlBuffaR iv@HWY 5_25 Oct 16	
Aluminum Total	µg/L	1930	759	140	1100	3760	1600	262	1750	90.1	356	57.5	116	2600	108	0.6	132	142	176	550	81.7	83.9	88.5	38.4	66.9	49.7	110	57.8	72.2	
Aluminum (Filtered)	µg/L	1.3	2	1.3	3	2.4	3.3	3.4	5.5	4.3	6	3.2	17.4	12.6	10.1	71	1.1	1.2	1.5	1	3.7	1.5	0.7	0.9	0.7	1.8	1.1	2.5	1.3	
Arsenic	µg/L	0.07	0.26	0.93	0.27	0.06	0.21	1.30	0.31	4.77	1.69	5.57	15.00	0.48	9.35	11833.33	0.83	0.85	0.85	0.18	4.53	1.79	0.79	2.34	1.05	3.62	1.00	4.33	1.80	
Arsenic (Filtered)	µg/L	2.4	1.6	1.2	1.6	2	2.1	1	2.4	1.2	1.3	0.8	0.8	3.5	0.9	0.3	0.9	0.7	0.9	0.9	0.5	0.6	0.6	1.1	0.9	1.2	0.9	1	0.5	
Cadmium	µg/L	0.12	0.1	0.1	0.1	0.1	0.1	0.1	0.12	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Cadmium (Filtered)	µg/L	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.07	0.05	0.05	0.05	0.1	0.05	0.05	0.11	0.05	0.05	0.05	0.05	0.05	0.05	0.09	0.05	0.05	0.05	
Chromium	µg/L	41.67	50.00	50.00	60.00	50.00	50.00	50.00	41.67	50.00	50.00	70.00	50.00	50.00	50.00	200.00	50.00	50.00	110.00	50.00	50.00	50.00	50.00	50.00	50.00	100.00	50.00	50.00	50.00	
Chromium (Filtered)	µg/L	3.4	1.7	0.5	1.9	5.2	2.4	0.5	3.1	0.6	0.8	0.3	0.3	4.1	0.4	0.1	0.6	0.6	0.5	0.8	0.1	0.2	0.9	0.6	0.3	0.1	0.2	0.1	0.2	
Cobalt	µg/L	2.94	5.88	20.00	5.26	1.92	4.17	20.00	3.23	16.67	12.50	33.33	33.33	2.44	25.00	500.00	16.67	16.67	20.00	12.50	100.00	50.00	11.11	16.67	33.33	100.00	50.00	100.00	50.00	
Cobalt (Filtered)	µg/L	1.4	0.3	0.3	0.5	1.1	1.2	0.3	1.7	0.2	0.5	0.1	0.2	2.8	0.3	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	
Copper	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Copper (Filtered)	µg/L	7.14	33.33	33.33	20.00	9.09	8.33	33.33	5.88	50.00	20.00	100.00	50.00	3.57	66.67	100.00	100.00	100.00	100.00	33.33	100.00	100.00	100.00	100.00	50.00	100.00	50.00	100.00	50.00	
Iron	µg/L	3.7	3.4	3.5	3	4.6	4.6	2.8	4.2	1.9	3.2	1.7	2	7.5	1.1	0.2	1.4	2.5	1.5	1.8	1.6	1.3	0.2	4.2	0.8	0.4	0.7	0.6	0.2	
Iron (Filtered)	µg/L	0.7	2	1.6	1.7	2.5	1.9	2.1	1.1	1.5	1.8	1.4	1.7	2.8	0.8	0.3	0.8	1.2	1	1.3	1	1	0.2	0.4	0.4	0.4	0.4	0.4	0.2	
Lead	µg/L	18.92	58.82	45.71	56.67	54.35	41.30	75.00	26.19	78.95	56.25	82.35	85.00	37.33	72.73	150.00	57.14	48.00	66.67	72.22	62.50	76.92	100.00	9.52	50.00	100.00	57.14	66.67	100.00	
Lead (Filtered)	µg/L	4750	1570	912	1680	3240	3530	961	4340	418	1270	280	790	5970	1070	5	296	281	310	796	146	196	286	213	217	215	384	273	238	
Manganese	µg/L	44	8	8	7	14	37	31	90	47	113	26	159	165	256	161	5	7	5	5	12	12	55	22	22	12	24	73	66	
Manganese (Filtered)	µg/L	0.93	0.51	0.88	0.42	0.43	1.05	3.23	2.07	11.24	8.90	9.29	20.13	2.76	23.93	3220.00	1.69	2.49	1.61	0.63	8.22	6.12	19.23	10.33	10.14	5.58	6.25	26.74	27.73	
Mercury	µg/L	2.2	0.9	0.7	1	1.9	2.1	0.6	1.9	0.3	0.6	0.2	0.3	3.1	0.2	0.1	0.1	0.2	0.2	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Mercury (Filtered)	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Nickel	µg/L	4.55	11.11	14.29	10.00	5.26	4.76	16.67	5.26	33.33	16.67	50.00	33.33	3.23	50.00	100.00	100.00	50.00	50.00	20.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Nickel (Filtered)	µg/L	118	47.4	38.6	61.3	61.4	81	18.3	126	64.2	85	40.4	40.5	164	50.9	0.4	26.3	24.3	16.9	28.1	9	6.6	38.9	18	35.1	69.4	30.2	55	24.5	
Selenium	µg/L	0.1	0.1	0.4	0.3	0.6	0.3	0.8	2.7	0.9	20.7	18.9	24.2	5.9	37.2	22.9	0.2	2.7	3	0.2	0.4	0.6	32.4	11.3	22.2	57.7	25.4	38.1	21.2	
Selenium (Filtered)	µg/L	0.08	0.21	1.04	0.49	0.98	0.37	4.37	2.14	1.40	24.35	46.78	59.75	3.60	73.08	5725.00	0.76	11.11	17.75	0.71	4.44	9.09	83.29	62.78	63.25	83.14	84.11	69.27	86.53	
Strontium	µg/L	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.06	0.01	0.01	0.01	
Strontium (Filtered)	µg/L	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.06	0.02	0.01	0.01	
Zinc	µg/L	100.00	100.00	50.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	25.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	
Zinc (Filtered)	µg/L	4.6	3	2.4	3.1	4.9	5	3.1	6.3	3	3.1	2.3	2.7	9.7	2.6	0.5	1.3	1.4	1.1	1.5	1.1	1.2	0.6	1.4	1.2	1.5	1.8	1.1	1.2	
	µg/L	1	1.8	1.5	1.6	2.2	2	2.3	2.3	2.6	2	2	2.4	3.7	2.3	0.8	0.9	0.9	0.8	0.8	0.9	1.1	0.4	1.1	1.1	1.3	1.5	0.9	1	
	µg/L	21.74	60.00	62.50	51.61	44.90	40.00	74.19	36.51	86.67	64.52	86.96	88.89	38.14	88.46	160.00	69.23	64.29	72.73	53.33	81.82	91.67	66.67	78.57	91.67	86.67	83.33	81.82	83.33	
	µg/L	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.8	0.5	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	
	µg/L	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.3	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.3	0.4	0.3	
	µg/L	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	80.00	60.00	60.00	37.50	60.00	166.67	60.00	60.00	100.00	60.00	60.00	60.00	60.00	60.00	100.00	100.00	50.00	80.00	60.00	
	µg/L	51.6	58.6	76.4	70.6	69.5	56.9	75.5	136	165	114	161	140	142	162	73.8	92.1	86.7	86.9	85.1	85.3	89.1	2380	3790	2940	5120	5030	3210	3050	
	µg/L	41.7	54.3	69.7	67.3	80.7	52.5	78.4	126	157	94.6	154	138	123	158	87.9	83.1	77.7	85.2	86.4	85.5	84.9	2270	3270	2870	4940	4910	3120	3110	
	µg/L	80.81	92.66	91.23	95.33	116.12	92.27	103.84	92.65	95.15	82.98	95.65	98.57	86.62	97.53	119.11	90.23	89.62	98.04	101.53	100.23	95.29	95.38	86.28	97.62	96.48	97.61	97.20	101.97	
	µg/L	20.6	5.7	5	5.6	12.3	16.3	5	20.1	5	5	5	5	26.8	5	0.4	5	5	5	5	6.9	5	5	5	5	0.4	5	5	5	
	µg/L	0.8	0.4																											

Table I.1 - Percentage of Dissolved Metals Present at Water Quality Sites within the Interior Platform

		Salt River								Slave River @ Fort Smith														
Sampled Date Time		6/16/2014	8/20/2014	5/20/2015	7/27/2015	9/24/2015	7/4/2016	#####	7/16/2012	9/27/2012	7/15/2013	8/28/2013	6/11/2014	7/8/2014	8/16/2014	6/6/2015	7/11/2015	8/6/2015	9/29/2015	6/8/2016	7/4/2016	7/6/2016	9/16/2016	#####
SampleCode		Salt River @ HWY 5_16 Jun 14	Salt River @ HWY 5_20 Aug 14	Salt River @ HWY 5_20 May 15	Salt River @ HWY 5_27 Jul 15	Salt River @ HWY 5_24 Sep 15	Salt River @ HWY 5_04 Jul 16	Salt River @ HWY 5_25 Oct 16	SlaveRiver r@FISmit h_16 Jul 12	SlaveRiver r@FISmit h_27 Sep 12	SlaveRiver r@FISmit h_15 Jul 13	SlaveRiver r@FISmit h_28 Aug 13	SlaveRiver r@FISmit h_11 Jun 14	SlaveRiver r@FISmit h_08 Jul 14	SlaveRiver r@FISmit h_16 Aug 14	SlaveRiver r@FISmit h_06 Jun 15	SlaveRiver r@FISmit h_11 Jul 15	SlaveRiver r@FISmit h_06 Aug 15	SlaveRiver r@FISmit h_29 Sep 15	SlaveRiver r@FISmit h_08 Jun 16	SlaveRiver r@FISmit h_04 Jul 16	SlaveRiver r@FISmit h_06 Jul 16	SlaveRiver r@FISmit h_16 Sep 16	SlaveRiver r@FISmit h_26 Oct 16
ChemName	output unit																							
Aluminum Total	µg/L	180	16.1	391	55.6	52.2	250	47.7	5375	800	4100	1150	2850	1590	540	5030	1530	444	548	1780	7480	6650	3810	724
Aluminum (Filtered)	µg/L	3.1	1.1	317	2.8	1.1	30	4.4	5.2	15.7	59.5	43.8	32.5	25.4	47.4	85.2	12.4	25.7	2.6	32.3	10.7	22.8	52.5	3.3
		1.72	6.83	81.07	5.04	2.11	12.00	9.22	0.10	1.96	1.45	3.81	1.14	1.60	8.78	1.69	0.81	5.79	0.47	1.81	0.14	0.34	1.38	0.46
Arsenic	µg/L	1.1	1.1	2	1.5	1	10	0.5	4.05	1	5.2	2.1	2.5	1.8	0.9	2.8	1.2	0.7	0.6	1.5	4.5	3.3	2.2	1
Arsenic (Filtered)	µg/L	0.9	0.8	2	0.9	0.8	10	0.5	0.4	0.4	0.8	0.6	0.4	0.7	0.5	0.4	0.4	0.5	0.3	0.4	0.4	0.6	0.5	0.3
		81.82	72.73	100.00	60.00	80.00	100.00	100.00	9.88	40.00	15.38	28.57	16.00	38.89	55.56	14.29	33.33	71.43	50.00	26.67	8.89	18.18	22.73	30.00
Cadmium	µg/L	0.1	0.1	1	0.39	0.1	5	0.1	0.2	0.1	0.4	0.1	0.13	0.1	0.1	0.2	0.3	0.1	0.1	0.1	0.4	0.2	0.4	0.1
Cadmium (Filtered)	µg/L	0.05	0.05	0.5	0.36	0.05	2.5	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.44	0.05	0.05	0.05	0.05	0.05	0.05	0.05
		50.00	50.00	50.00	92.31	50.00	50.00	50.00	25.00	50.00	12.50	50.00	38.46	50.00	50.00	30.00	146.67	50.00	50.00	50.00	12.50	25.00	12.50	50.00
Chromium	µg/L	1	0.5	1	0.1	0.2	5	0.7	8	1.6	7.2	2.3	4.7	3.8	1.3	8	2.9	1	0.9	2.6	11.2	9.5	6.1	1.2
Chromium (Filtered)	µg/L	0.2	0.3	1	0.1	0.2	5	0.5	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.1
		20.00	60.00	100.00	100.00	100.00	100.00	71.43	1.25	6.25	1.39	8.70	2.13	2.63	15.38	2.50	3.45	10.00	11.11	3.85	0.89	1.05	6.56	8.33
Cobalt	µg/L	0.2	0.1	1	0.1	0.2	5	0.1	4.4	0.6	3.9	1.2	1.9	1	0.4	2.5	0.7	0.3	0.4	1.3	6.3	3.2	5.3	0.7
Cobalt (Filtered)	µg/L	0.1	0.1	1	0.1	0.2	5	0.1	0.1	0.1	0.1	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		50.00	100.00	100.00	100.00	100.00	100.00	100.00	2.27	16.67	2.56	33.33	5.26	10.00	25.00	4.00	14.29	33.33	25.00	7.69	1.59	3.13	1.89	14.29
Copper	µg/L	0.2	0.2	3.4	0.4	0.6	10	0.2	11.7	1.9	11.2	3.7	6.2	4	1.9	8.5	3	1.7	1.5	4	17	9	13.6	2.1
Copper (Filtered)	µg/L	0.2	0.2	3.8	0.4	0.3	26.7	0.2	1.3	0.9	3	1.6	2.1	3.3	1.9	1.5	1.9	1.2	0.8	1.4	3.1	2.7	4.4	0.7
		100.00	100.00	111.76	100.00	50.00	267.00	100.00	11.11	47.37	26.79	43.24	33.87	82.50	100.00	17.65	63.33	70.59	53.33	35.00	18.24	30.00	32.35	33.33
Iron	µg/L	435	67	356	83	72	256	95	10,300	1430	9630	2510	5460	2870	1030	7200	2040	666	836	2900	14,100	7200	7970	1500
Iron (Filtered)	µg/L	53	25	50	17	16	250	29	17	62	218	109	100	103	88	152	17	31	6	73	85	86	170	35
		12.18	37.31	14.04	20.48	22.22	97.66	30.53	0.17	4.34	2.26	4.34	1.83	3.59	8.54	2.11	0.83	4.65	0.72	2.52	0.60	1.19	2.13	2.33
Lead	µg/L	0.1	0.1	1	0.2	0.2	5	0.1	5.85	0.7	6.4	1.2	3	1.5	0.6	3.5	1.2	0.6	0.5	1.8	8.6	4.4	7.1	1
Lead (Filtered)	µg/L	0.1	0.1	1	0.2	0.3	5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	1	0.6	0.1	0.1	0.1	0.1	0.2	0.1
		100.00	100.00	100.00	100.00	150.00	100.00	100.00	1.71	14.29	1.56	8.33	3.33	6.67	16.67	5.71	83.33	100.00	20.00	5.56	1.16	2.27	2.82	10.00
Manganese	µg/L	33.4	4	54.8	7.9	5.3	27.1	7.2	210	37	183	57.8	98.7	67.8	33.4	122	44.8	25.4	25.5	65.9	238	133	223	39.9
Manganese (Filtered)	µg/L	19.7	2.6	46.3	6.3	4.3	24.8	6.5	0.1	1.2	1.6	1.4	2	1.6	2.1	4.5	0.7	1.2	0.3	1.5	0.8	1	1.8	1
		58.98	65.00	84.49	79.75	81.13	91.51	90.28	0.05	3.24	0.87	2.42	2.03	2.36	6.29	3.69	1.56	4.72	1.18	2.28	0.34	0.75	0.81	2.51
Mercury	µg/L	0.01	0.03	0.13	0.27	0.1	0.5	0.03	0.03	0.01	0.05	0.01	0.01	0.01	0.01	0.03	0.03	0.03	0.01	0.01	0.01	0.01	0.01	0.01
Mercury (Filtered)	µg/L	0.01	0.02	0.18	0.17	0.09	0.5	0.06	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
		100.00	66.67	138.46	62.96	90.00	100.00	200.00	33.33	100.00	20.00	100.00	100.00	100.00	100.00	33.33	33.33	33.33	100.00	100.00	100.00	100.00	100.00	100.00
Nickel	µg/L	1.8	1.5	4.4	2.2	2.4	5	1.9	13.1	2.5	13.6	4.8	7.1	4.3	2.3	8.3	3.5	1.4	1.6	4.4	20.4	11.1	16.6	2.9
Nickel (Filtered)	µg/L	1.4	1.4	4.5	1.9	2.1	5	1.7	0.9	1	2.2	1.6	1.3	1.5	1	1.3	0.8	0.8	0.6	1	2.4	2	2.6	1
		77.78	93.33	102.27	86.36	87.50	100.00	89.47	6.87	40.00	16.18	33.33	18.31	34.88	43.48	15.66	22.86	57.14	37.50	22.73	11.76	18.02	15.66	34.48
Selenium	µg/L	0.7	1.3	5.9	2.9	0.7	25	0.5	0.5	0.5	0.7	0.5	0.6	0.6	0.5	0.8	0.5	0.5	0.5	1.1	0.9	0.9	0.5	0.5
Selenium (Filtered)	µg/L	0.4	1.2	5.8	2.5	0.9	15	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.7	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		57.14	92.31	98.31	86.21	128.57	60.00	100.00	80.00	60.00	42.86	60.00	50.00	50.00	60.00	87.50	60.00	60.00	60.00	60.00	27.27	33.33	33.33	60.00
Strontium	µg/L	2940	4700	3900	4110	3790	3180	3770	154	145	158	139	151	170	130	133	137	138	148	156	172	171	185	142
Strontium (Filtered)	µg/L	2820	4560	3590	4220	3600	3100	3900	131	135	134	133	132	154	125	119	132	136	143	150	130	146	152	133
		95.92	97.02	92.05	102.68	94.99	97.48	103.45	85.06	93.10	84.81	95.68	87.42	90.59	96.15	89.47	96.35	98.55	96.62	96.15	75.58	85.38	82.16	93.66
Zinc	µg/L	5.5	5	69.9	0.4	7.3	250	5	39.5	5	42	10	22.4	11.7	5	23.5	8.4	5	5	11	66.3	29.4	52.3	7.3
Zinc (Filtered)	µg/L	0.5	0.4	67.6	0.7	1.4	100	1.3	0.4	1.2	0.8	0.7	0.4	1.4	0.4	0.8	0.8	1.9	0.4	0.4	0.4	0.7	1.4	0.4
		9.09	8.00	96.71	175.00	19.18	40.00	26.00	1.01	24.00	1.90	7.00	1.79	11.97	8.00	3.40	9.52	38.00	8.00	3.64	0.60	2.38	2.68	5.48

Notes:
Percentage calculated (= dissolved concentration/total concentration)*100
Shaded = percentage of total concentration that is dissolved
Bold = dissolved constituent comprises more than 20% of total concentration

Notes:
 Percentage calculated (= dissolved concentration/total concentration)*100
 Shaded = percentage of total concentration that is dissolved
 Bold = dissolved constituent comprises more than 20% of total concentration

[illegible]

Notes:
Percentage calculated $(= \text{dissolved concentration} / \text{total concentration}) * 100$
Shaded = percentage of total concentration that is dissolved
Bold = dissolved constituent comprises more than 20% of total concentration

Notes:
 Percentage calculated (= dissolved concentration/total concentration)*100
 Shaded = percentage of total concentration that is dissolved
Bold = dissolved constituent comprises more than 20% of total concentration

Table I.2 - Percentage of Dissolved Metals Present at Water Quality Sites within the Slave Province

		Yellowknife River																																					
Sampled Date Time		4/15/2014	5/22/2014	6/18/2014	7/23/2014	8/26/2014	9/26/2014	10/22/2014	11/27/2014	12/15/2014	1/29/2015	2/18/2015	3/9/2015	4/9/2015	5/28/2015	6/25/2015	7/22/2015	8/28/2015	9/23/2015	10/21/2015	11/26/2015	12/15/2015	1/27/2016	2/24/2016	3/16/2016	4/21/2016	5/11/2016	6/28/2016	7/26/2016	8/23/2016	9/29/2016	10/26/2016	11/25/2016	12/13/2016					
SampleCode		YKRiver@ Bridge_DL _15 Apr 14	YKRiver@ Bridge_DL _22 May 14	YKRiver@ Bridge_DL _18 Jun 14	YKRiver@ Bridge_DL _23 Jul 14	YKRiver@ Bridge_DL _26 Aug 14	YKRiver@ Bridge_DL _26 Sep 14	YKRiver@B ridge_DL_2 2 Oct 14	YKRiver@B ridge_DL_2 7 Nov 14	YKRiver@B ridge_DL_1 5 Dec 14	YKRiver@ Bridge_DL _29 Jan 15	YKRiver@ Bridge_DL _18 Feb 15	YKRiver@ Bridge_DL _09 Mar 15	YKRiver@ Bridge_DL _09 Apr 15	YKRiver@ Bridge_DL _28 May 15	YKRiver@ Bridge_DL _25 Jun 15	YKRiver@ Bridge_DL _22 Jul 15	YKRiver@ Bridge_DL _28 Aug 15	YKRiver@ Bridge_DL _23 Sep 15	YKRiver@B ridge_DL_2 1 Oct 15	YKRiver@B ridge_DL_2 6 Nov 15	YKRiver@B ridge_DL_2 5 Dec 15	YKRiver@ Bridge_DL _27 Jan 16	YKRiver@ Bridge_DL _24 Feb 16	YKRiver@ Bridge_DL _16 Mar 16	YKRiver@ Bridge_DL _21 Apr 16	YKRiver@ Bridge_DL _11 May 16	YKRiver@ Bridge_DL _28 Jun 16	YKRiver@ Bridge_DL _23 Aug 16	YKRiver@ Bridge_DL _29 Sep 16	YKRiver@B ridge_DL_2 6 Oct 16	YKRiver@B ridge_DL_2 5 Nov 16	YKRiver@B ridge_DL_2 3 Dec 16						
Aluminum Total	µg/L	18.1	128	82.1	106	90.7	81.95	64.9	442	37.5	17.9	14	13.2	15.5	220	146	109	51.1	88.6	39.9	26.9	53.5	17.9	14.2	19.1	24.1	272	36.5	73.2	88.6	59.3	34.9	82.7	47.9					
Aluminum (Filtered)	µg/L	5	10.2	2.2	6.1	4.9	3.9	4.75	4.3	3.45	2.6	1.9	1.8	2.2	4	4.2	6.4	5.45	3.7	3.6	4.1	4	3.2	4.1	7.2	2.3	13.7	14.9	6.3	18.8	3.3	3.1	4	4					
		27.62	7.97	2.68	5.75	5.40	4.76	7.32	0.97	9.20	14.53	13.57	13.64	14.19	1.82	2.88	5.87	10.67	4.18	9.02	15.24	7.48	17.88	28.87	37.70	9.54	5.04	40.82	8.61	21.22	5.56	8.88	4.84	8.35					
Arsenic	µg/L	0.3	0.2	0.3	0.5	0.5	0.4	0.35	0.4	0.4	0.3	0.3	0.3	0.5	0.7	0.6	0.45	0.6	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	2.9	1.1	0.4	0.4	0.3	0.4						
Arsenic (Filtered)	µg/L	0.3	0.2	0.2	0.4	0.4	0.4	0.3	0.2	0.3	0.3	0.3	0.2	0.3	0.4	0.4	0.5	0.5	0.4	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	1	0.8	0.4	0.3						
		100.00	100.00	66.67	80.00	80.00	100.00	85.71	50.00	75.00	100.00	100.00	100.00	66.67	100.00	80.00	57.14	66.67	111.11	83.33	100.00	100.00	133.33	100.00	100.00	100.00	133.33	100.00	75.00	75.00	34.48	72.73	100.00	75.00					
Cadmium	µg/L	0.05	0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05					
Cadmium (Filtered)	µg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05					
		100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00					
Chromium	µg/L	0.1	1.3	0.2	0.4	1.2	0.2	0.1	0.9	0.45	0.1	0.1	0.1	0.1	0.7	0.8	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.1	0.2	0.2	0.1	0.1	0.2					
Chromium (Filtered)	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1					
		100.00	7.69	50.00	25.00	8.33	50.00	100.00	11.11	22.22	100.00	100.00	100.00	100.00	14.29	12.50	25.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	25.00	100.00	50.00	50.00	100.00	100.00	100.00					
Cobalt	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.1					
Cobalt (Filtered)	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1					
		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	33.33	100.00	100.00	100.00	100.00	100.00				
Copper	µg/L	0.5	0.5	0.2	0.8	0.3	0.9	0.6	0.9	0.75	0.2	0.65	0.2	0.2	0.8	1.7	0.9	0.65	0.9	0.6	0.5	0.2	0.3	0.5	0.5	0.2	0.8	0.5	1.1	0.8	0.6	0.3	0.4	0.5					
Copper (Filtered)	µg/L	0.5	0.2	0.2	0.3	0.2	0.3	1.35	1.3	0.6	0.2	0.7	0.2	0.2	0.4	0.4	0.5	0.65	0.6	0.5	0.4	0.2	0.3	0.6	0.6	0.4	0.7	0.5	0.7	0.6	0.4	0.2	0.3	0.3					
		100.00	40.00	100.00	37.50	66.67	33.33	225.00	144.44	80.00	100.00	107.69	100.00	100.00	50.00	23.53	55.56	100.00	66.67	83.33	80.00	100.00	100.00	120.00	120.00	200.00	87.50	100.00	63.64	75.00	66.67	66.67	75.00	60.00					
Iron	µg/L	18	148	79	95	80	68	47	170	23.5	15	14	13	15	182	116	77	50.5	85	42	27	23	14	11	13	15	194	37	150	63	47	31	44	38					
Iron (Filtered)	µg/L	5	7	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5						
		27.78	4.73	6.33	5.26	6.25	7.35	10.64	2.94	21.28	33.33	35.71	38.46	33.33	2.75	4.31	6.49	9.90	5.88	11.90	18.52	21.74	35.71	45.45	38.46	33.33	2.58	13.51	3.33	12.70	10.64	16.13	11.36	13.16					
Lead	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1					
Lead (Filtered)	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1					
		100.00	100.00	100.00	100.00	100.00	100.00	100.00	200.00	200.00	100.00	300.00	100.00	100.00	50.00	25.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00					
Manganese	µg/L	0.9	5	3.1	3	4.3	2.3	1.8	5.7	1.2	1	0.85	0.8	0.8	4.2	3.2	2.6	2.65	10.1	2.1	1.2	0.9	1.4	1.2	1.1	1.3	7.6	2.7	6.1	3.1	2.3	1.3	1.3	1.1					
Manganese (Filtered)	µg/L	0.5	1	0.8	0.1	0.1	0.1	0.1	0.1	0.25	0.2	0.3	0.3	0.4	0.7	0.1	0.1	0.4	0.5	0.2	0.2	0.3	0.3	0.3	0.4	0.5	3.9	0.4	0.5	0.3	0.2	0.1	0.3	0.2					
		55.56	20.00	25.81	3.33	2.33	4.35	5.56	1.75	20.83	20.00	35.29	37.50	50.00	16.67	3.13	3.85	15.09	4.95	9.52	16.67	33.33	21.43	25.00	36.36	38.46	51.32	14.81	8.20	9.68	8.70	7.69	23.08	18.18					
Mercury	µg/L	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.08	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01					
Mercury (Filtered)	µg/L	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01					
		100.00	100.00	100.00	100.00	100.00	50.00	100.00	12.50	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00				
Nickel	µg/L	0.4	0.5	0.1	0.5	0.4	0.3	0.45	0.5	0.4	0.3	0.4	0.3	0.4	0.6	0.5	0.4	0.4	0.4	0.3	0.4	0.3	0.3																

Table I.3 - Percentage of Dissolved Metals Present at Water Quality Sites within the Churchill Province

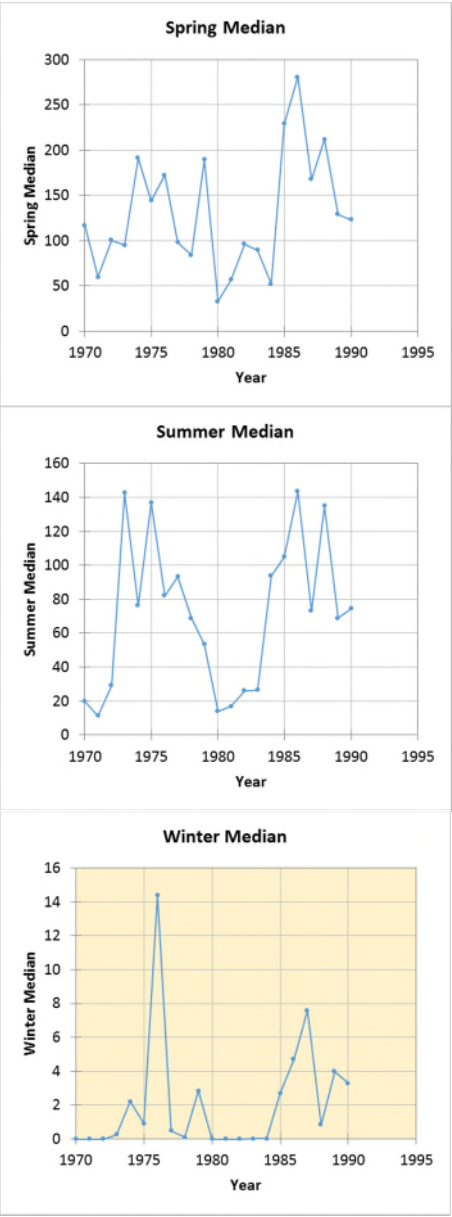
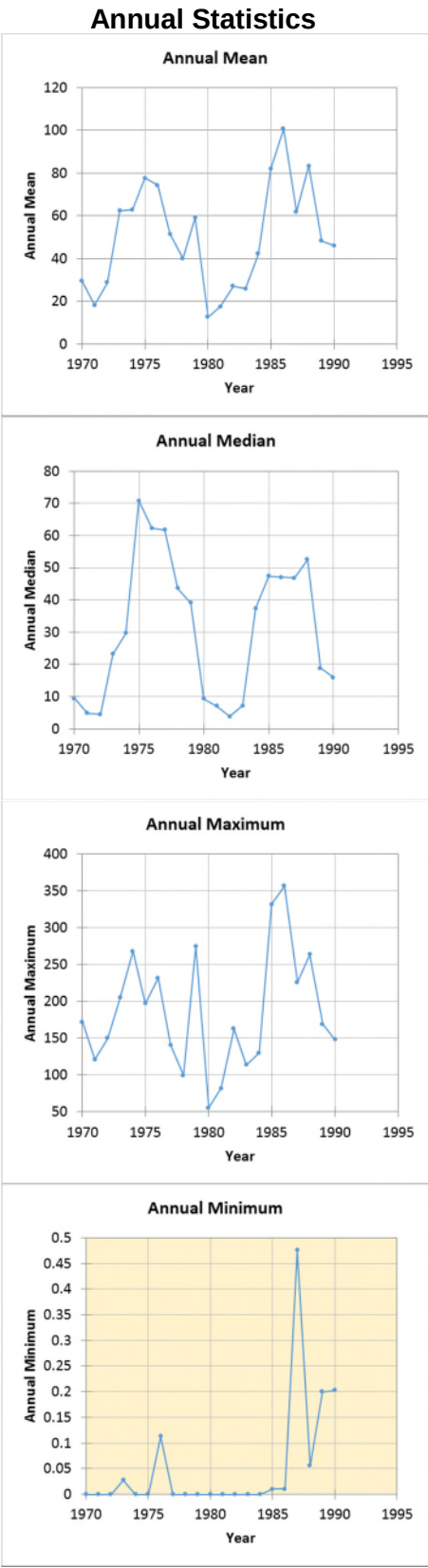
		Snowdrift River	Taltson River @ Mouth				Taltson River @ Nonacho Dam			Tazin River			Thelon River	
Sampled Date Time		7/4/2015	7/22/2015	9/22/2015	7/27/2016		7/22/2015	9/22/2015	7/27/2016	7/22/2015	9/22/2015	7/27/2016	7/20/2015	3/24/2016
SampleCode		Snowdrift@Stark Lake_04 Jul 15	TaltsonRiver@Mouth_22 Jul 15	TaltsonRiver@Mouth_22 Sep 15	TaltsonRiver@Mouth_27 Jul 16		TaltsonR@NonachoDam_22 Jul 15	TaltsonR@NonachoDam_22 Sep 15	TaltsonR@NonachoDam_27 Jul 16	TazinRiver@Mouth_22 Jul 15	TazinRiver@Mouth_22 Sep 15	TazinRiver@Mouth_27 Jul 16	ThelonR@CatlingL_20 Jul 15	ThelonR@CatlingL_24 Mar 16
Aluminum Total	µg/L	332	108	134	186		8.6	6.3	6.9	9.1	12	12.2	7.9	10.6
Aluminum (Filtered)	µg/L	4.1	2.4	2.3	4.5		0.6	1.4	1.9	1.5	1.7	5.5	3	5.8
		1.23	2.22	1.72	2.42		6.98	22.22	27.54	16.48	14.17	45.08	37.97	54.72
Arsenic	µg/L	0.2	0.3	0.2	0.2		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Arsenic (Filtered)	µg/L	0.2	0.2	0.2	0.2		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		100.00	66.67	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Cadmium	µg/L	0.2	0.2	0.1	0.1		0.1	0.05	0.05	0.05	0.05	0.05	0.06	0.05
Cadmium (Filtered)	µg/L	0.08	0.05	0.05	0.05		0.05	0.05	0.05	0.09	0.05	0.05	0.05	0.1
		40.00	25.00	50.00	50.00		50.00	100.00	100.00	180.00	100.00	100.00	83.33	200.00
Chromium	µg/L	1.1	0.5	0.2	0.2		0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Chromium (Filtered)	µg/L	0.1	0.1	0.1	0.1		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		9.09	20.00	50.00	50.00		25.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Cobalt	µg/L	0.3	0.1	0.1	0.1		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Cobalt (Filtered)	µg/L	0.1	0.1	0.1	0.1		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		33.33	100.00	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Copper	µg/L	1.3	0.4	0.4	0.3		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4
Copper (Filtered)	µg/L	0.2	0.2	0.2	0.2		0.2	0.2	0.2	0.2	0.2	0.2	0.2	1.2
		15.38	50.00	50.00	66.67		100.00	100.00	100.00	100.00	100.00	100.00	100.00	300.00
Iron	µg/L	341	110	110	271		5	5	7	26	36	78	42	38
Iron (Filtered)	µg/L	19	5	5	28		5	5	5	5	5	37	5	14
		5.57	4.55	4.55	10.33		100.00	100.00	71.43	19.23	13.89	47.44	11.90	36.84
Lead	µg/L	0.9	0.3	0.1	0.1		0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Lead (Filtered)	µg/L	0.3	0.1	0.1	0.1		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		33.33	33.33	100.00	100.00		33.33	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Manganese	µg/L	11.9	6.4	5.9	9.5		1.5	1.5	1.9	12.9	16.3	12.2	10	2.8
Manganese (Filtered)	µg/L	0.9	0.1	0.4	0.3		0.1	0.1	0.1	0.2	0.2	0.2	0.1	1.3
		7.56	1.56	6.78	3.16		6.67	6.67	5.26	1.55	1.23	1.64	1.00	46.43
Mercury	µg/L	0.03	0.02	0.01	0.01		0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Mercury (Filtered)	µg/L	0.02	0.01	0.01	0.01		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
		66.67	50.00	100.00	100.00		50.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Nickel	µg/L	0.5	0.1	0.2	0.4		0.3	0.1	0.1	0.3	0.1	0.1	0.1	0.2
Nickel (Filtered)	µg/L	0.1	0.1	0.1	0.1		0.2	0.1	0.1	0.3	0.1	0.1	0.1	0.2
		20.00	100.00	50.00	25.00		66.67	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Selenium	µg/L	0.5	0.5	0.5	0.5		0.5	0.3	0.3	0.3	0.3	0.3	0.4	0.3
Selenium (Filtered)	µg/L	0.3	0.3	0.3	0.3		0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3
		60.00	60.00	60.00	60.00		60.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Strontium	µg/L	30.8	34.1	33.2	35.8		29.5	29.3	29.3	28.7	30.5	29.1	7.4	12.3
Strontium (Filtered)	µg/L	29.2	31.4	30.2	34.5		0.1	29.5	28	28.9	27.8	27	6.8	12.6
		94.81	92.08	90.96	96.37		0.34	100.68	95.56	100.70	91.15	92.78	91.89	102.44
Zinc	µg/L	5	5	5	5		5	0.4	0.4	0.4	0.4	0.4	0.4	1.2
Zinc (Filtered)	µg/L	0.4	0.4	0.4	0.4		0.4	0.4	0.4	0.4	0.4	0.4	0.4	5.2
		8.00	8.00	8.00	8.00		8.00	100.00	100.00	100.00	100.00	100.00	100.00	433.33

Notes:
Percentage calculated (= dissolved concentration/total concentration)*100
Shaded = percentage of total concentration that is dissolved
Bold = dissolved constituent comprises more than 20% of total concentration

APPENDIX J

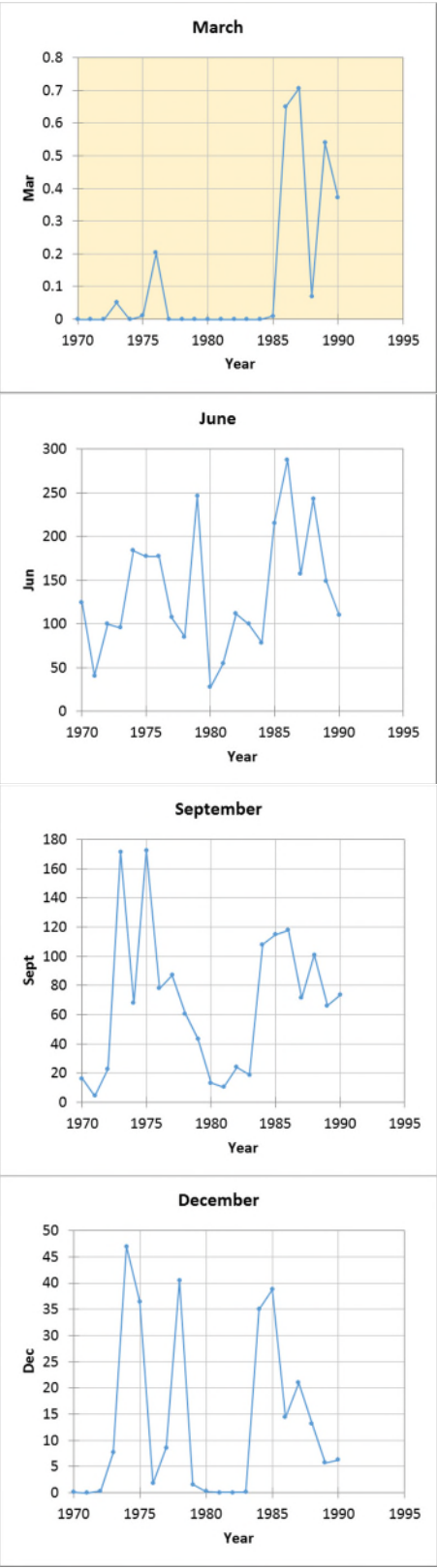
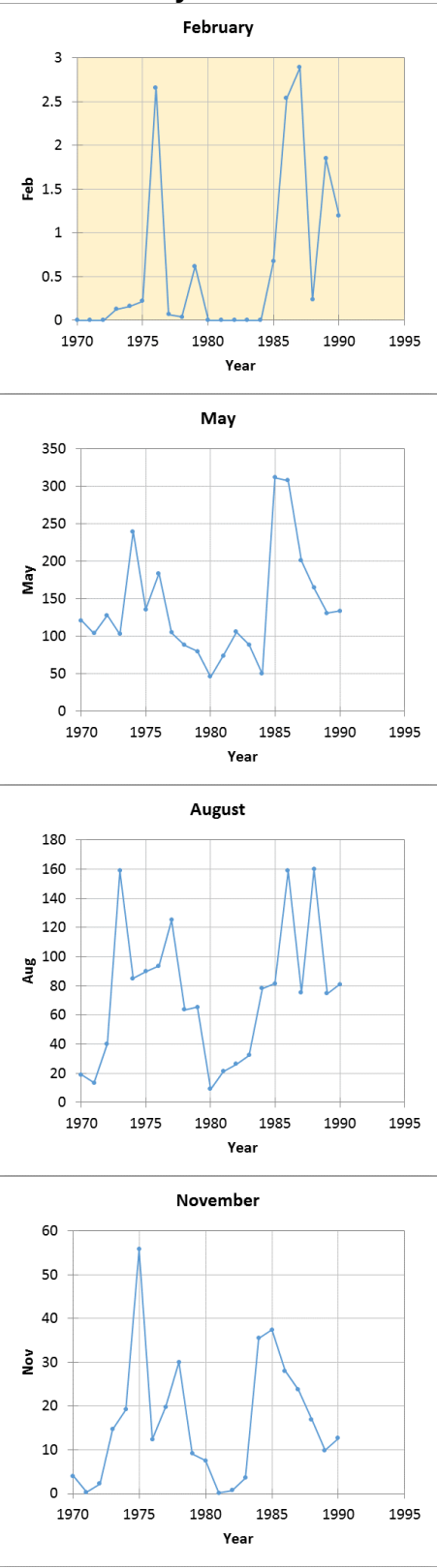
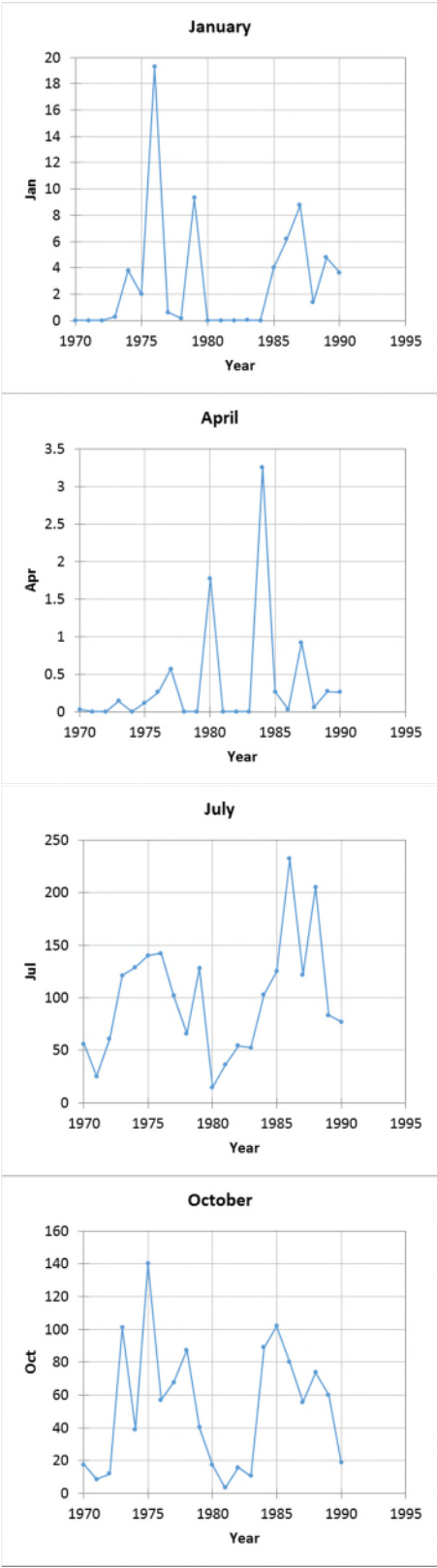
HYDROLOGIC TRENDS OVER PERIOD OF RECORD

Buffalo River at Highway No. 5 - Hydrological Trends over Period of Record

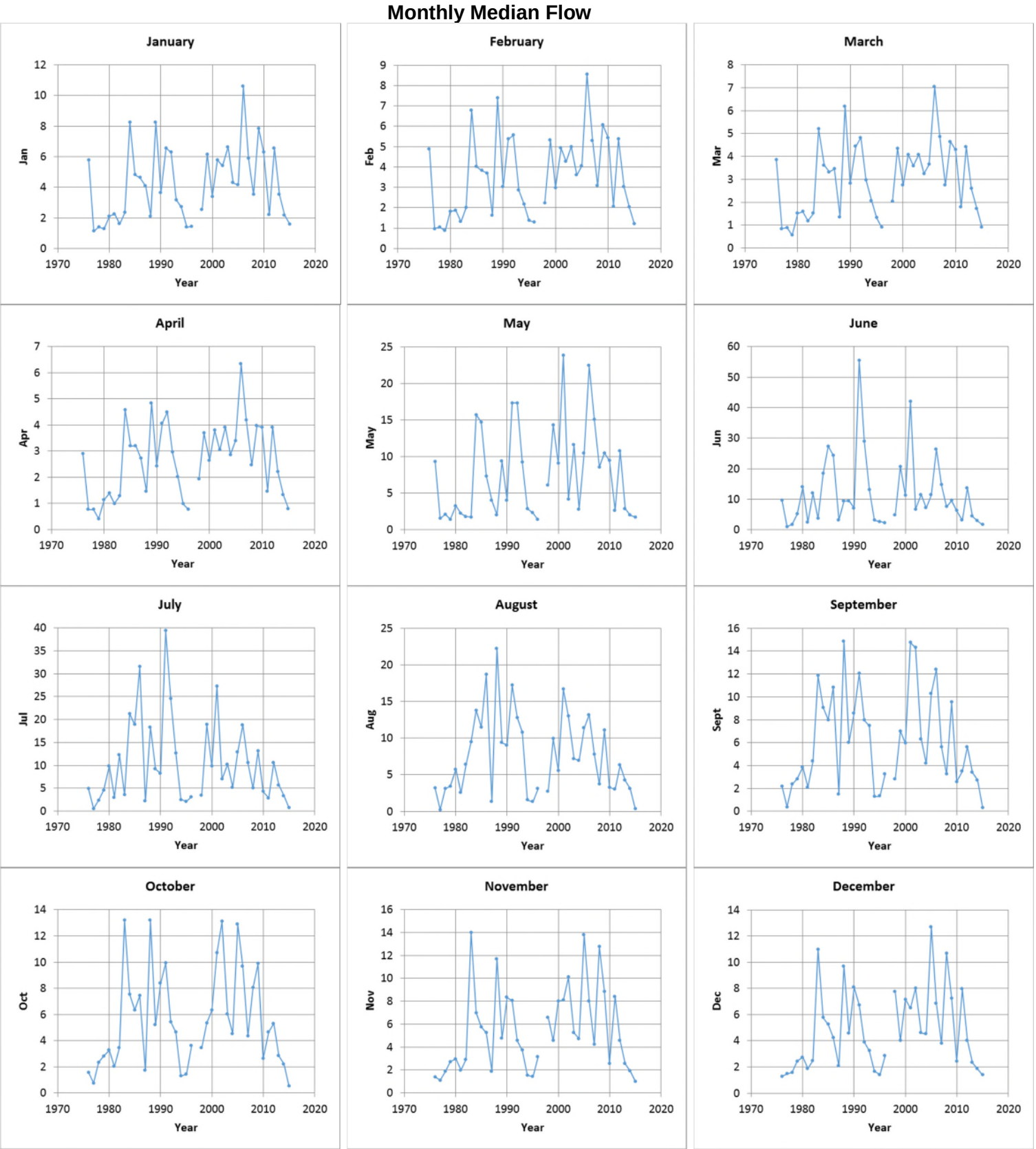
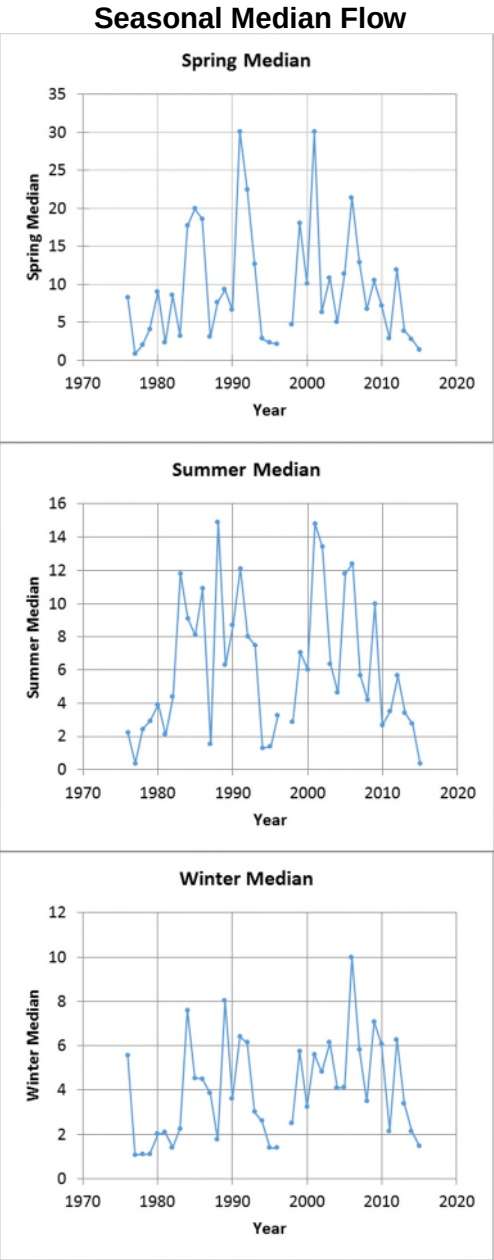
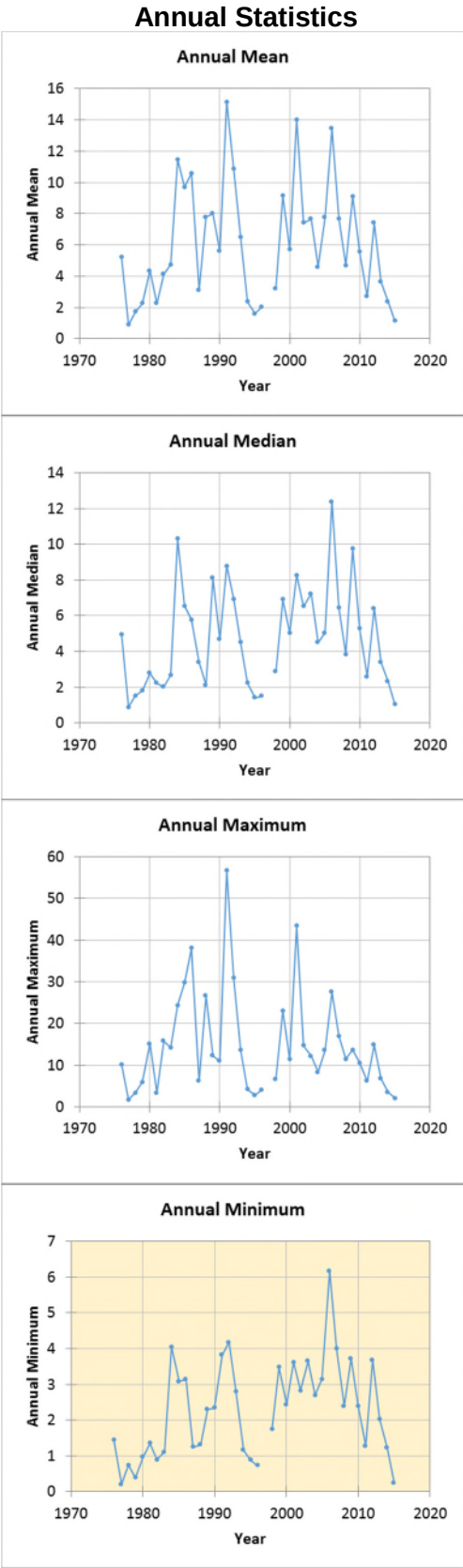


Trend Significance:

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Marginally Significant =	
Moderately Significant =	
Highly Significant =	
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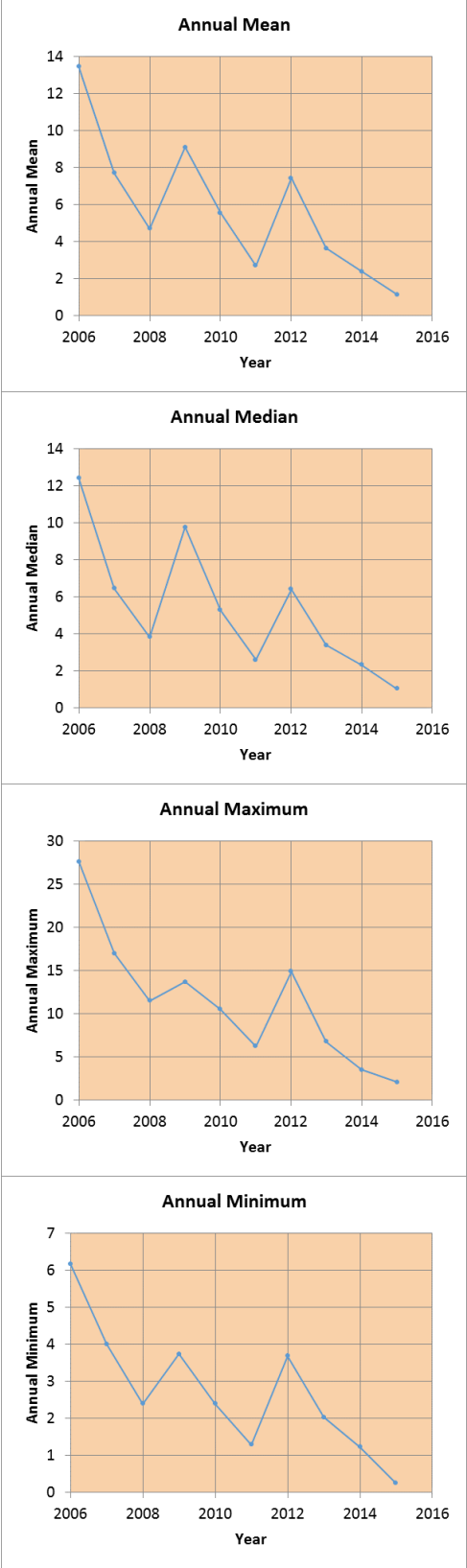


Cameron River - Hydrological Trends over Period of Record

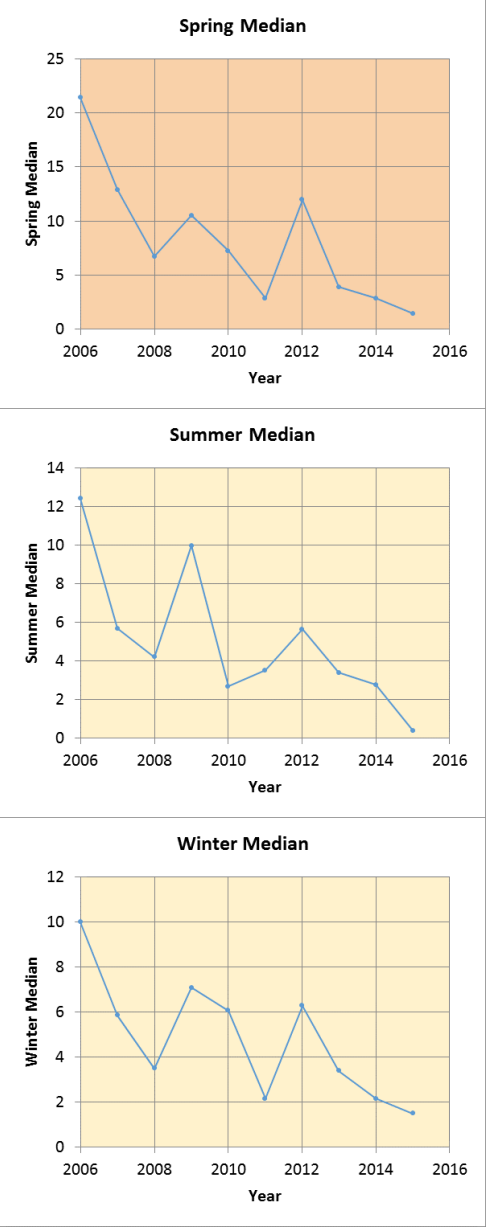


Cameron River - Hydrological Trends over the last Decade

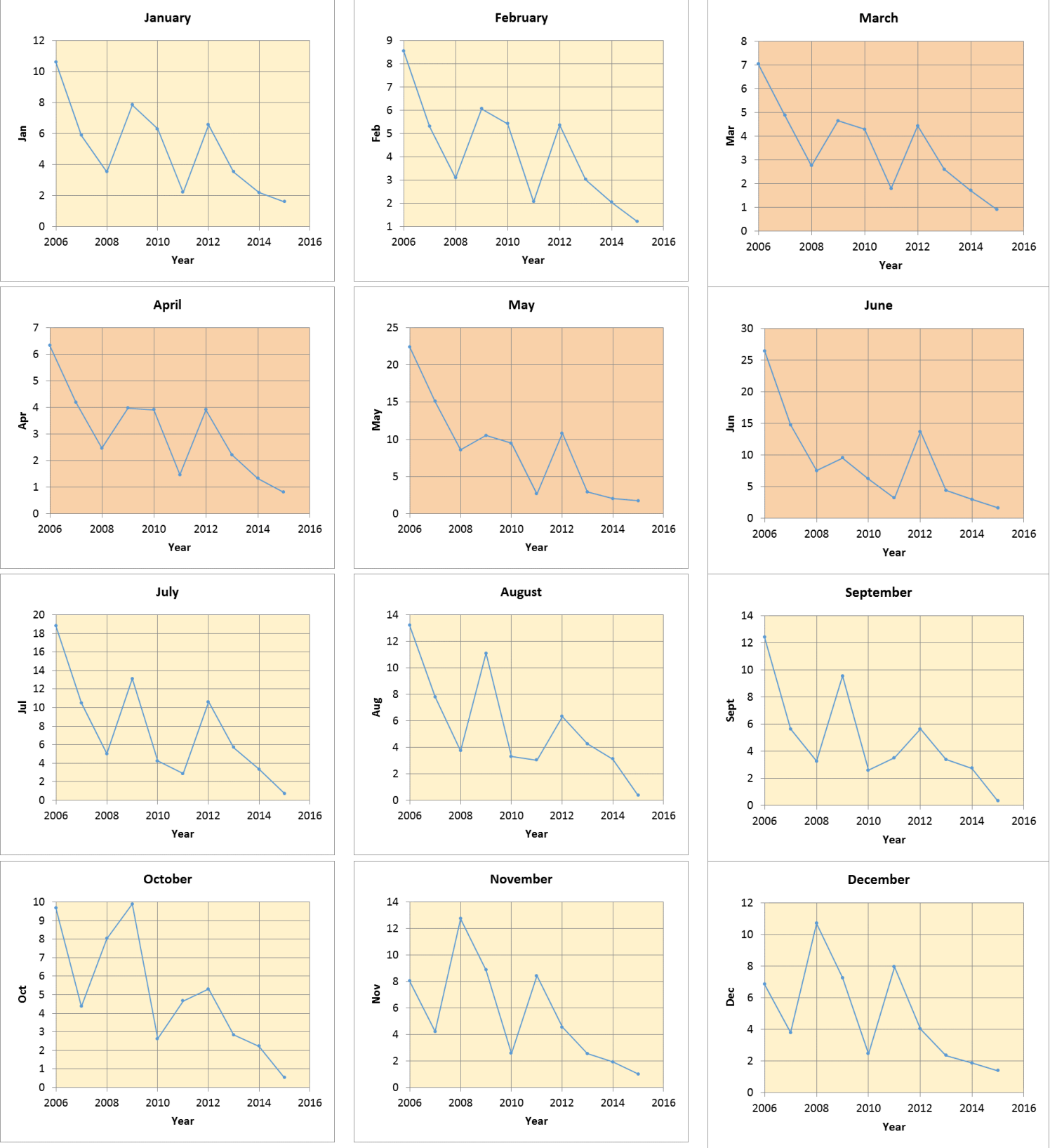
Annual Statistics



Seasonal Median Flow



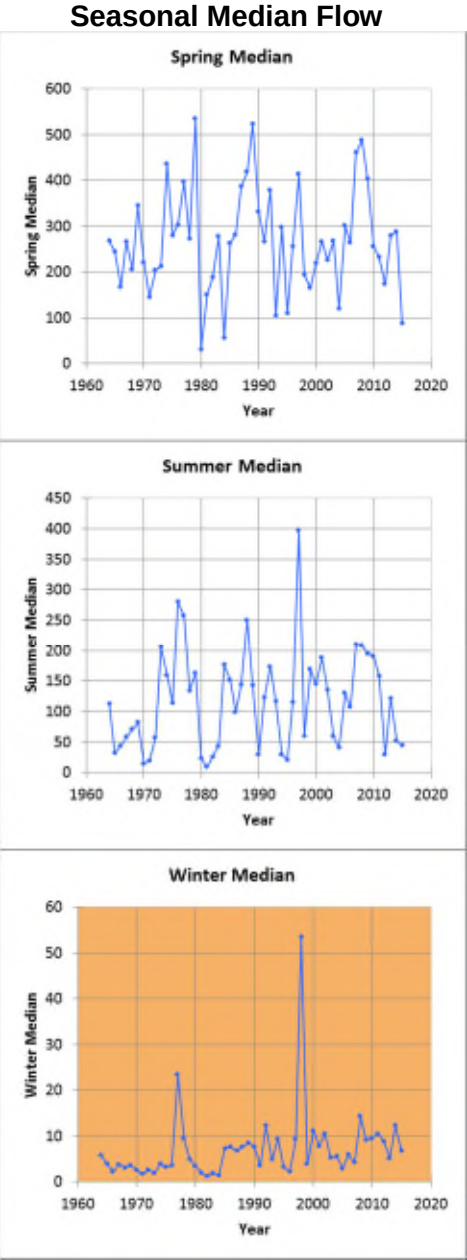
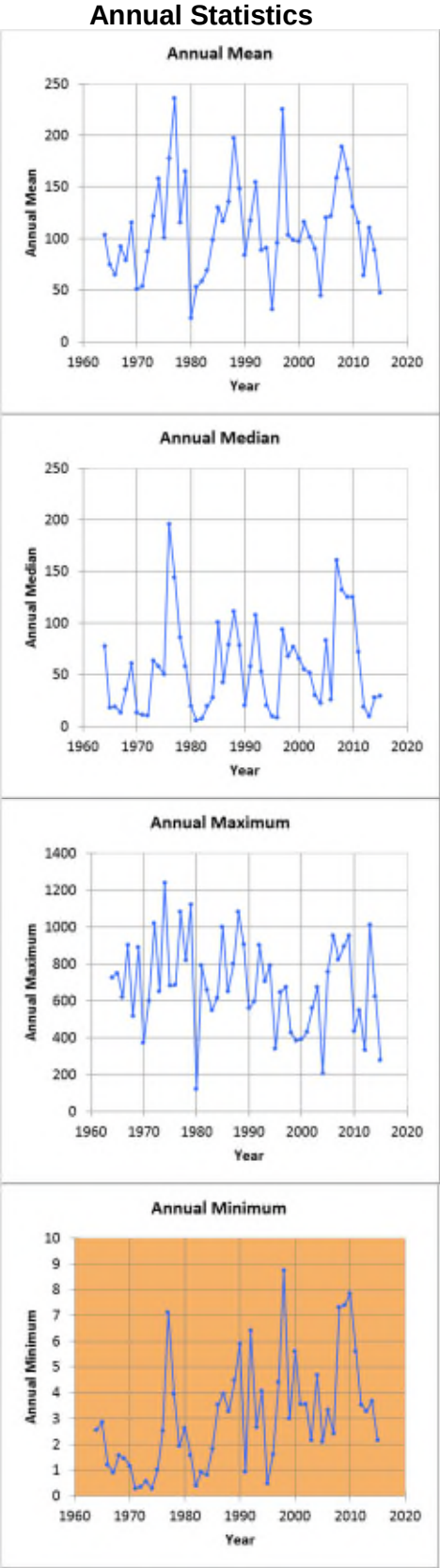
Monthly Median Flow



Trend Significance:

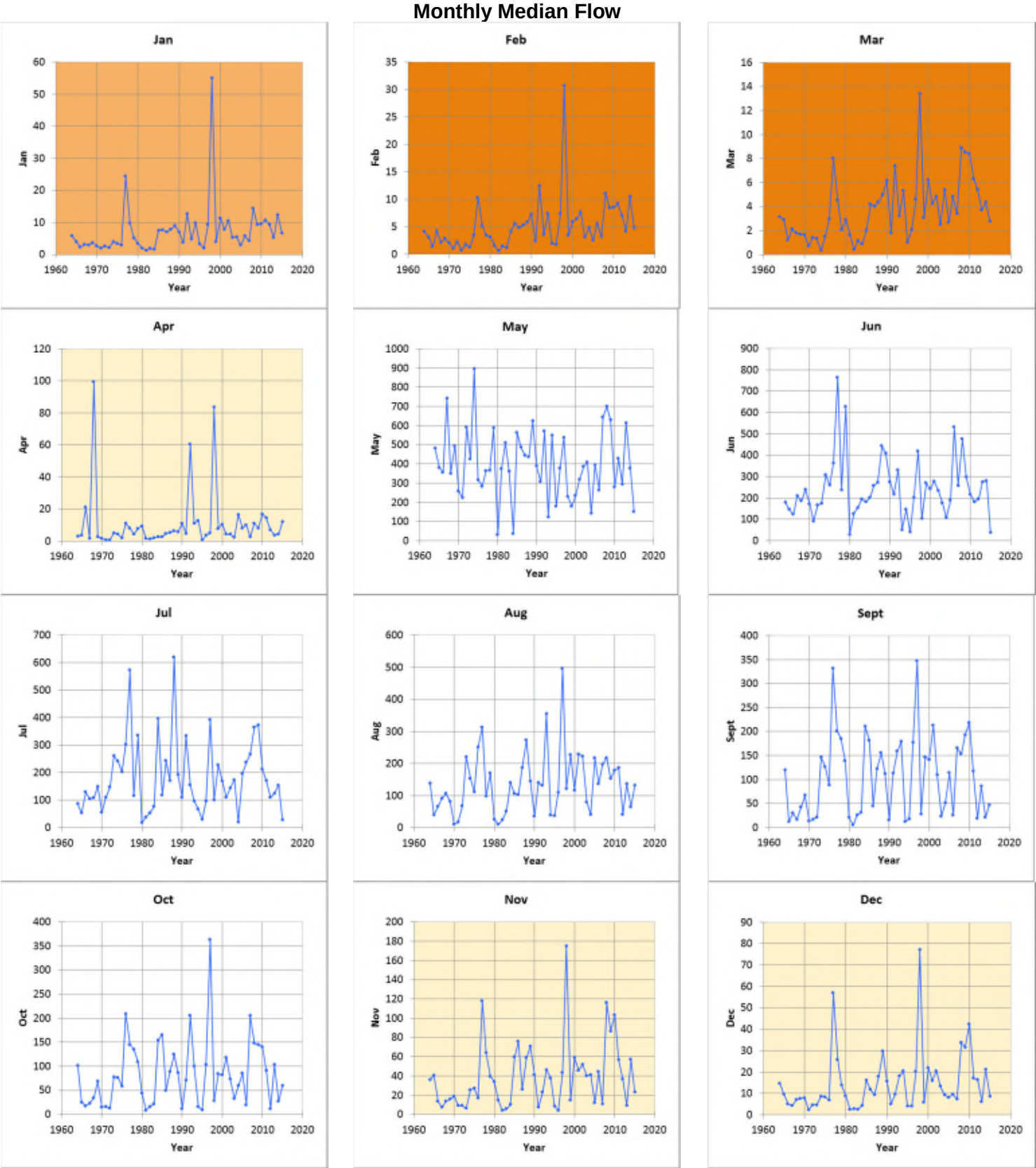
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Hay River near Hay River - Hydrological Trends over Period of Record



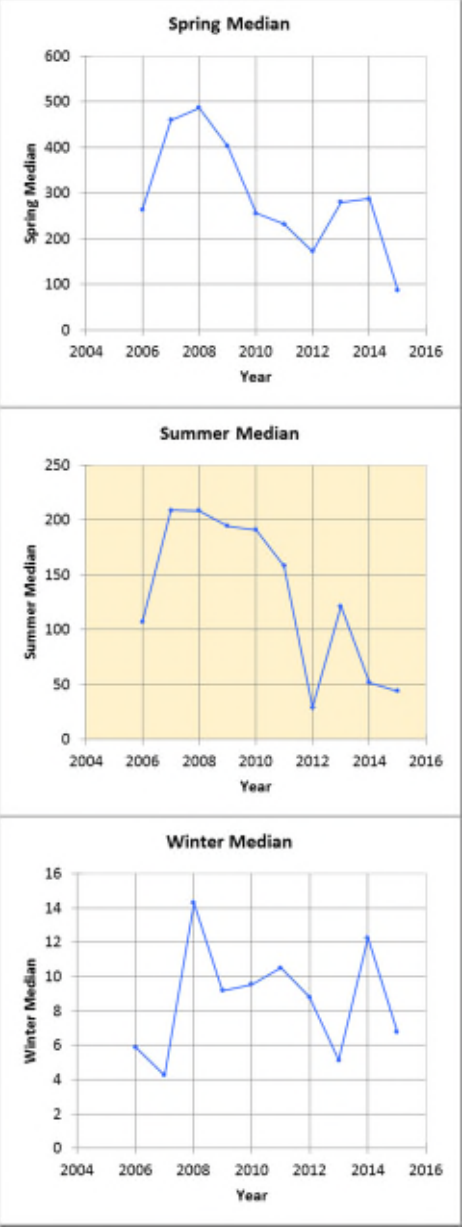
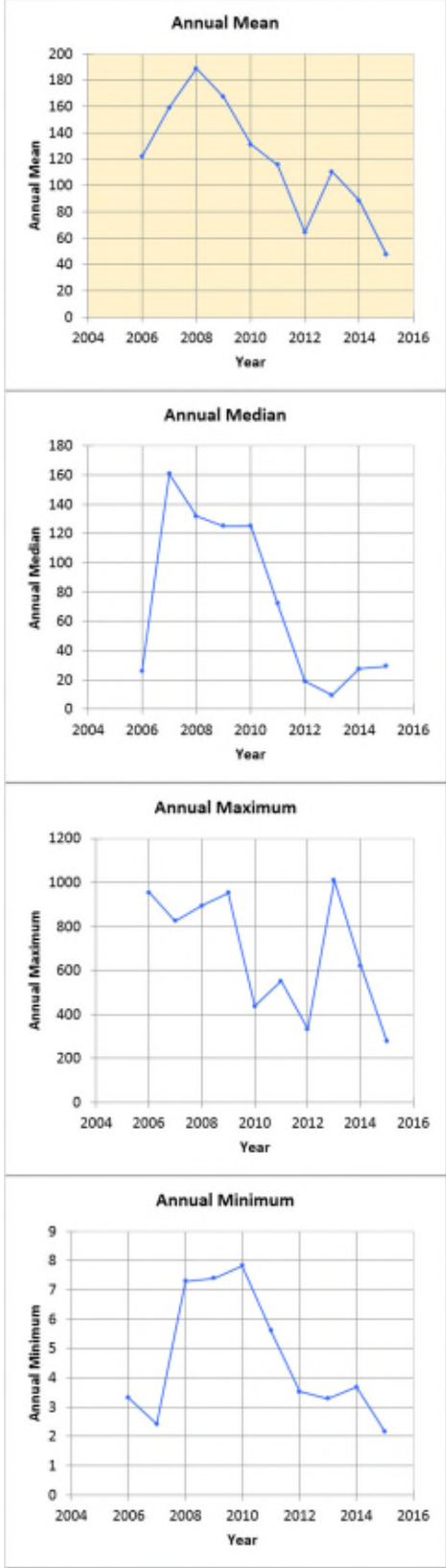
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Hay River near Hay River - Hydrological Trends over the last Decade

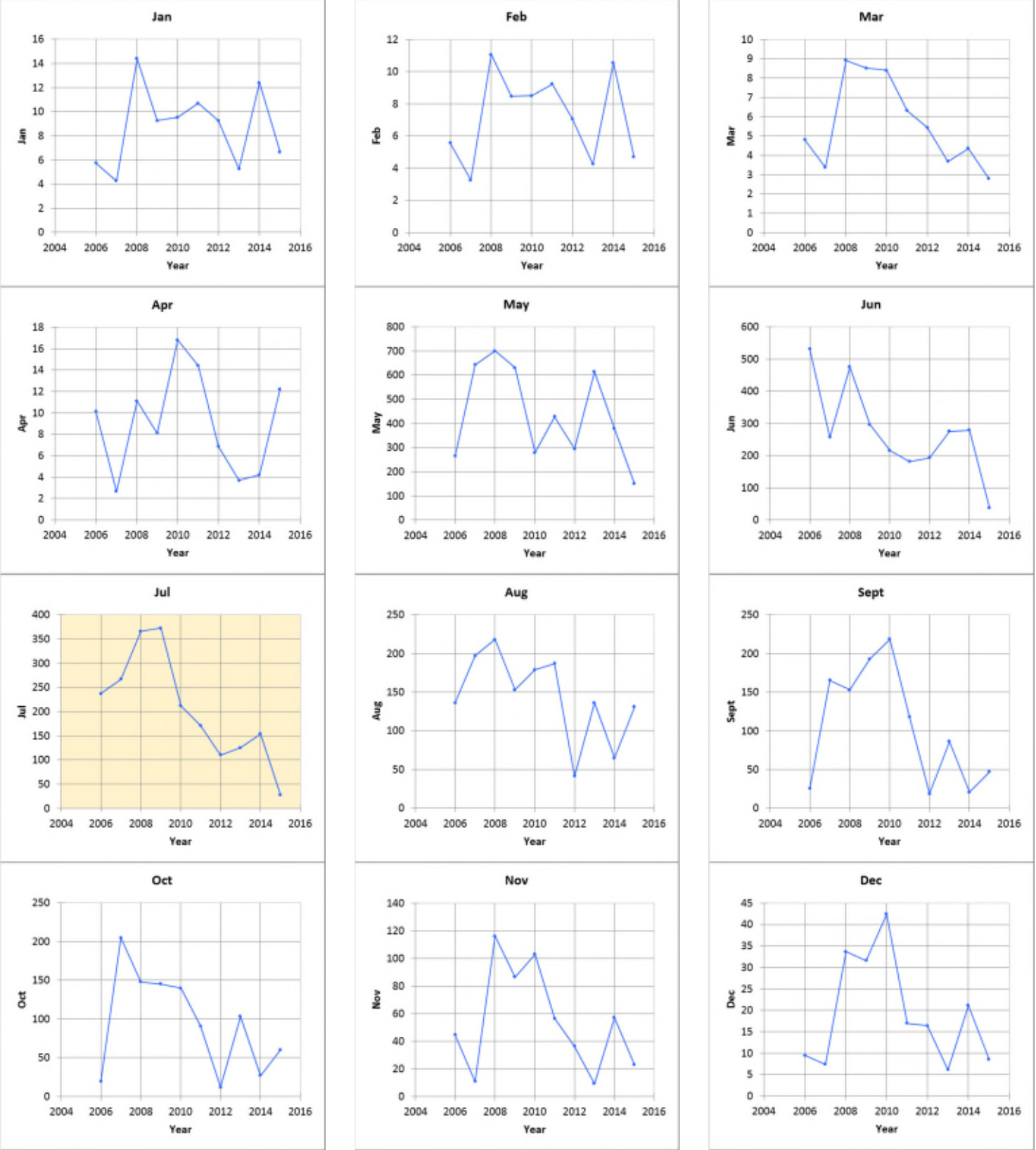
Annual Statistics



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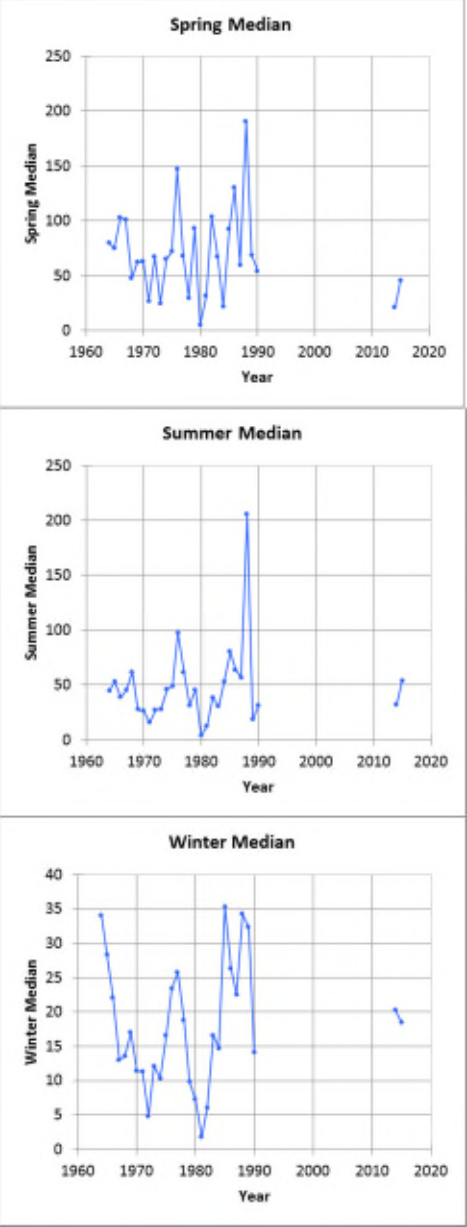
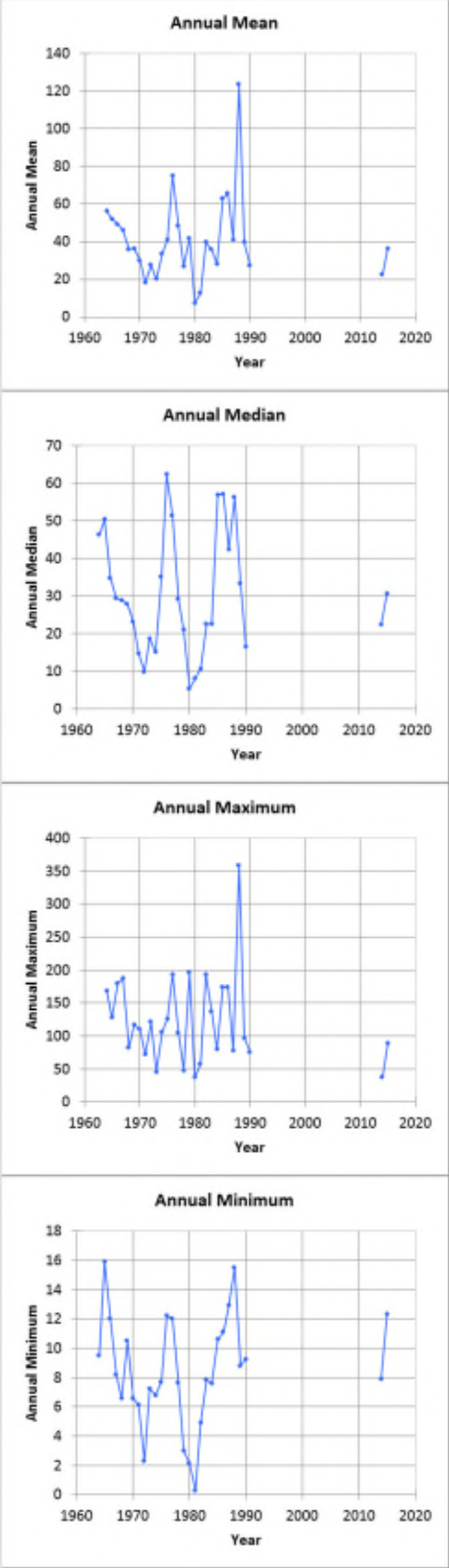
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Monthly Median Flow

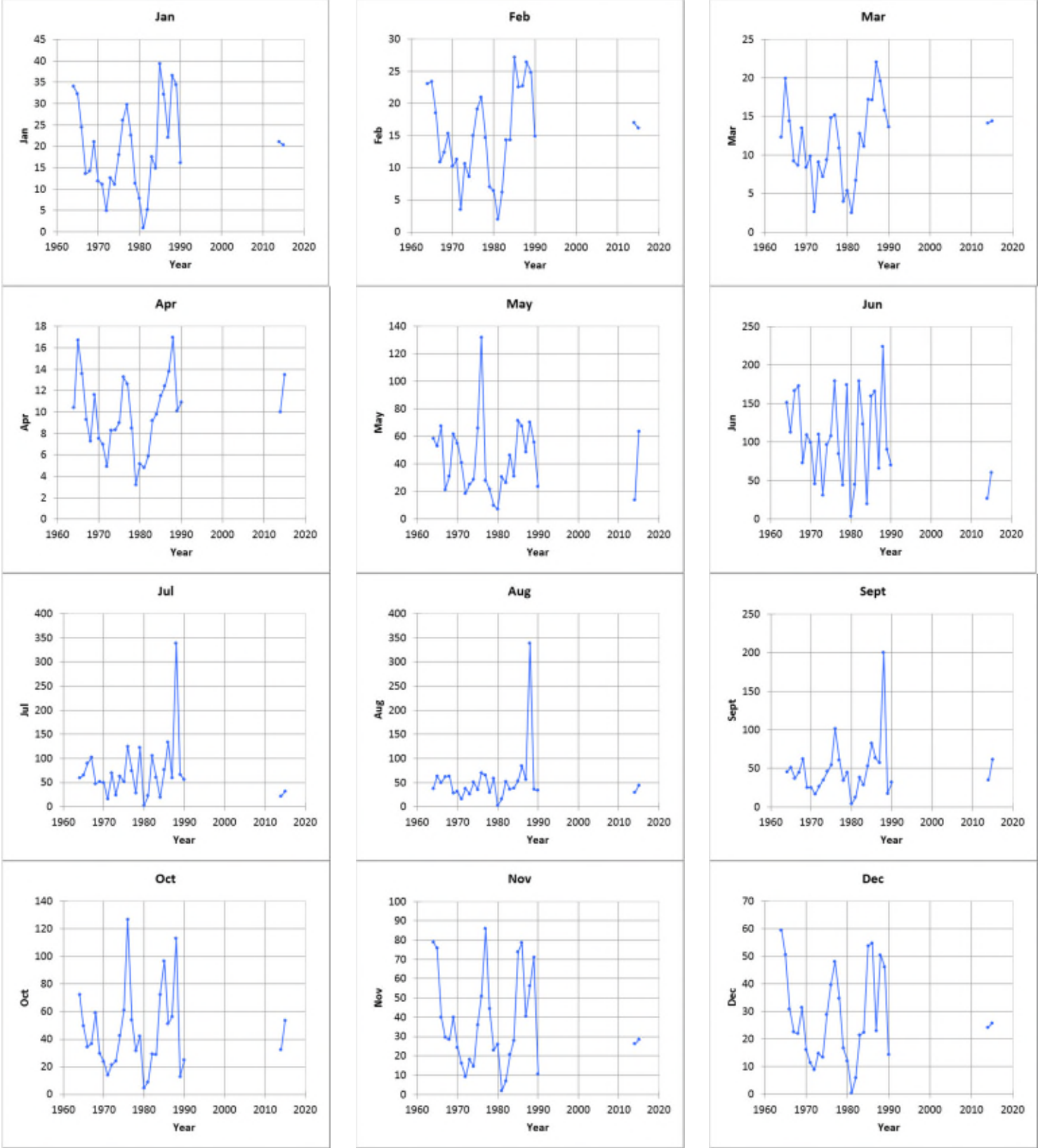


Kakisa River at Outlet of Kakisa Lake - Hydrological Trends over Period of Record

Annual Statistics



Monthly Median Flow

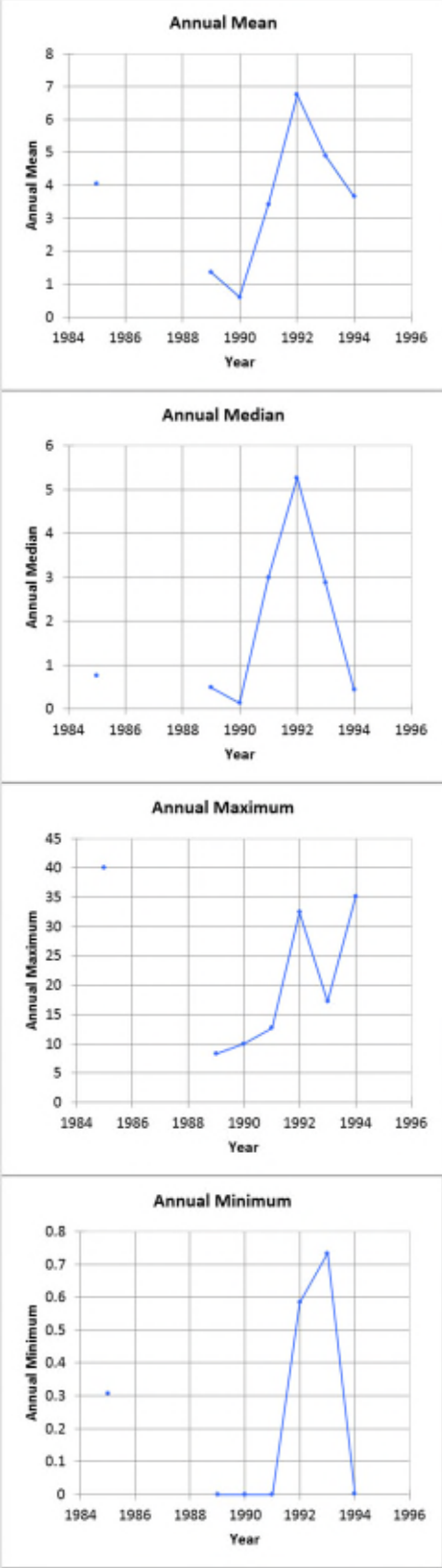


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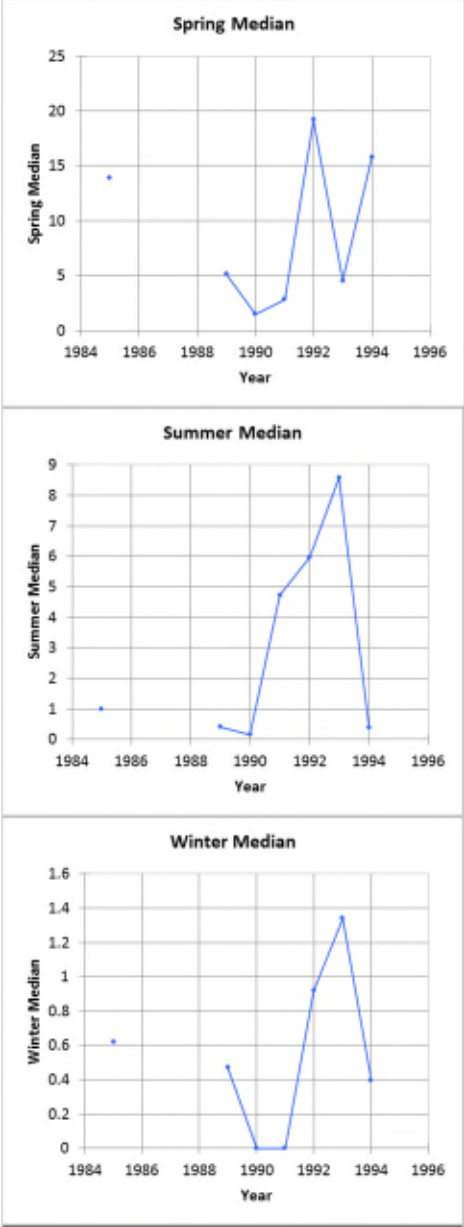
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Little Buffalo River below Highway No. 5 - Hydrological Trends over Period of Record

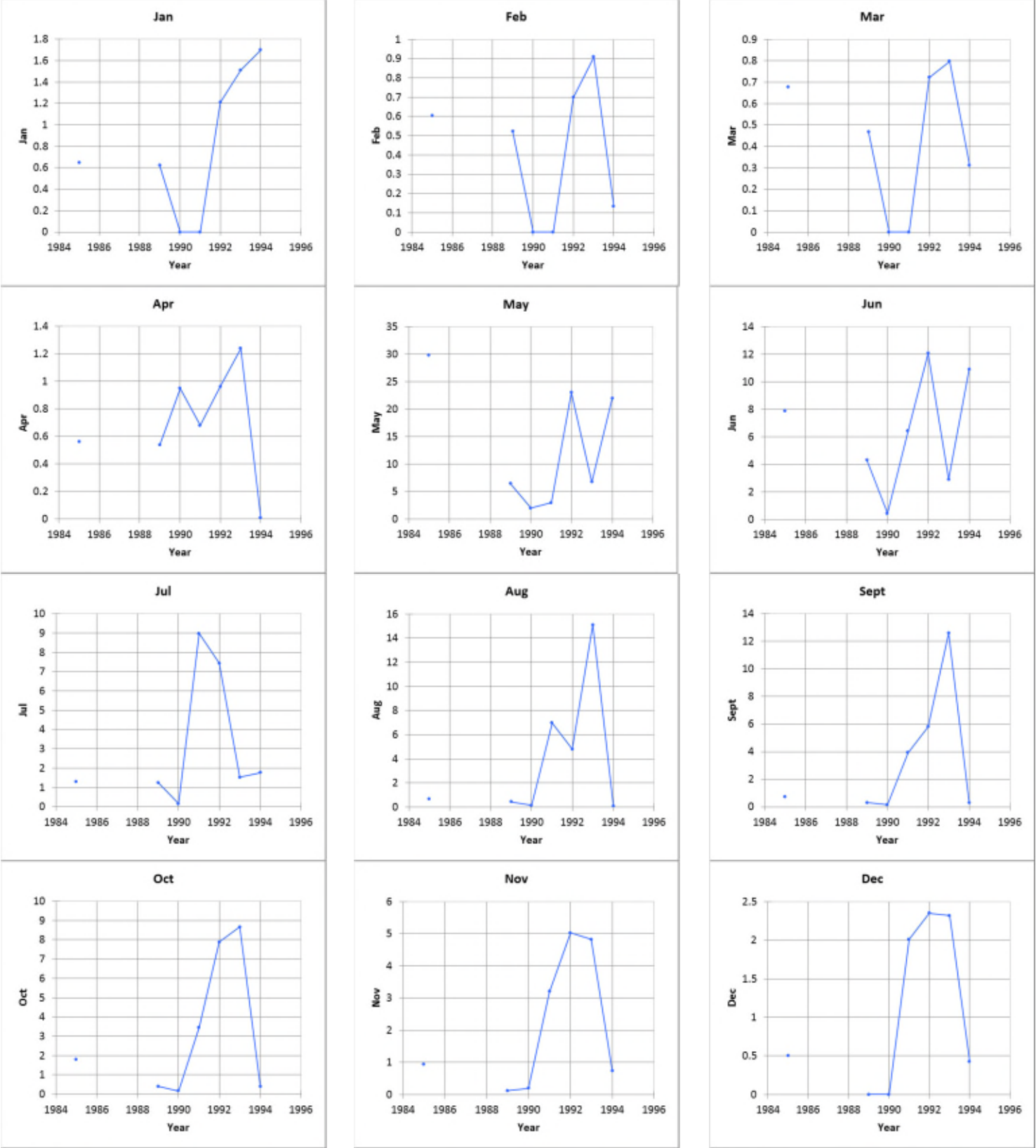
Annual Statistics



Seasonal Median Flow



Monthly Median Flow



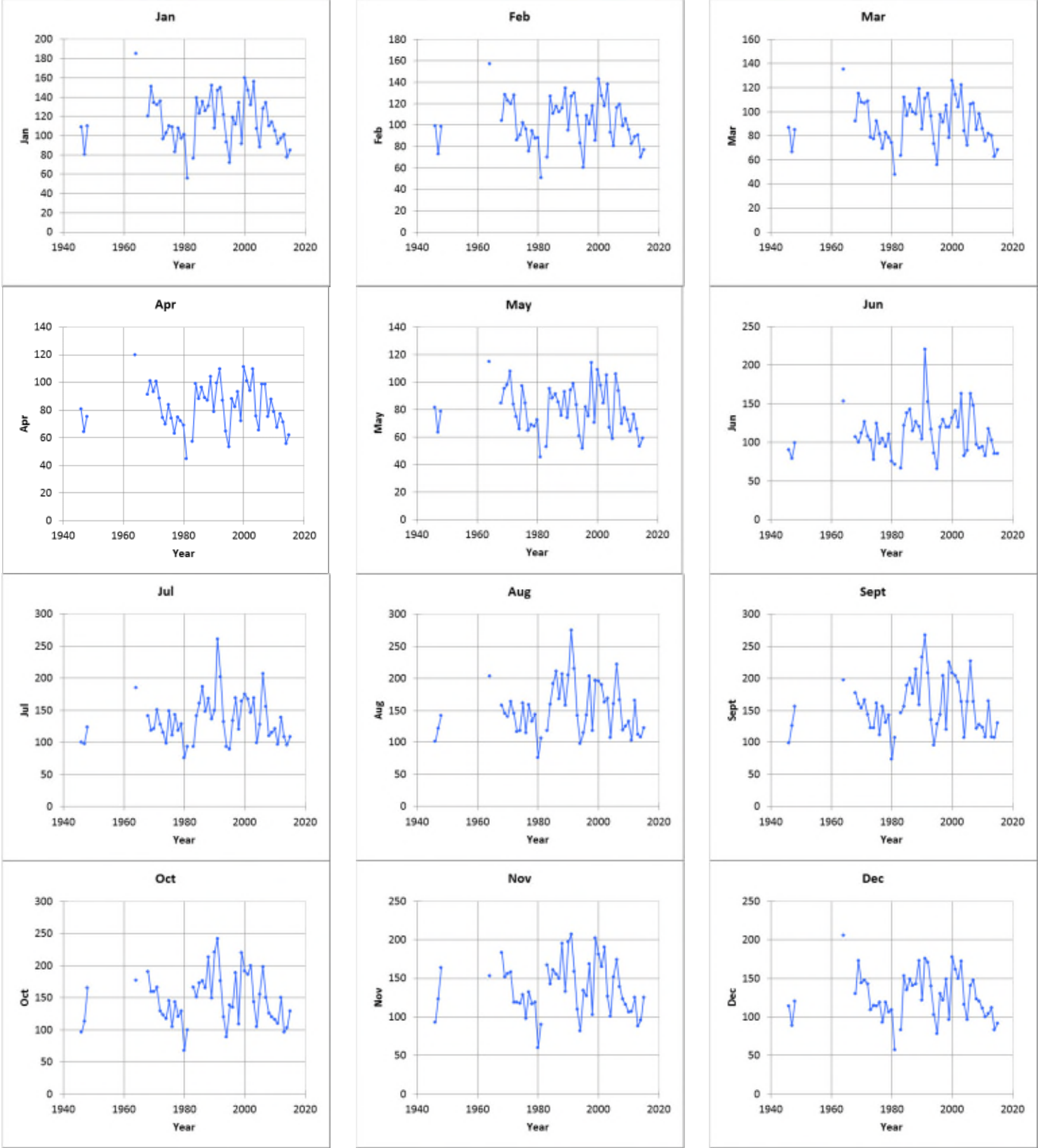
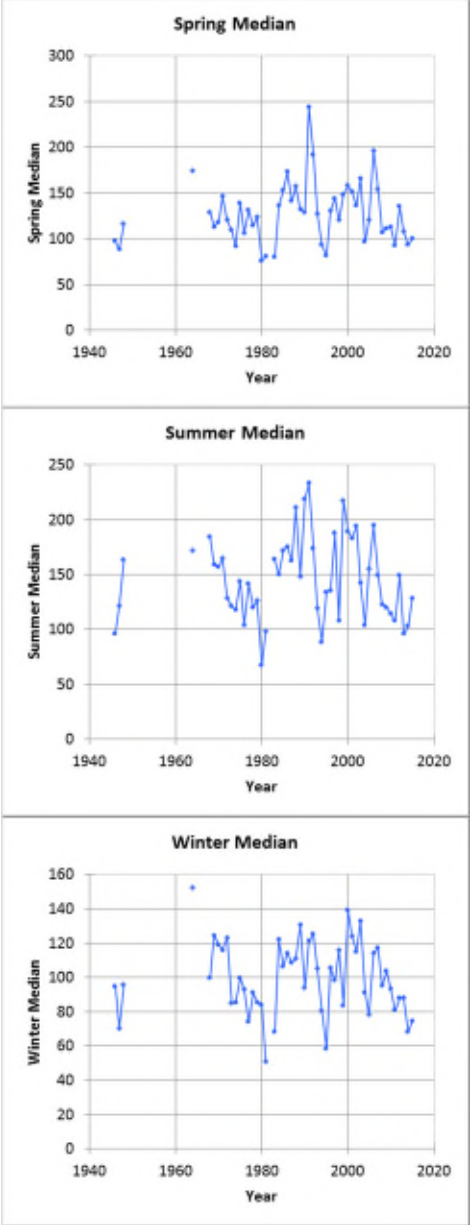
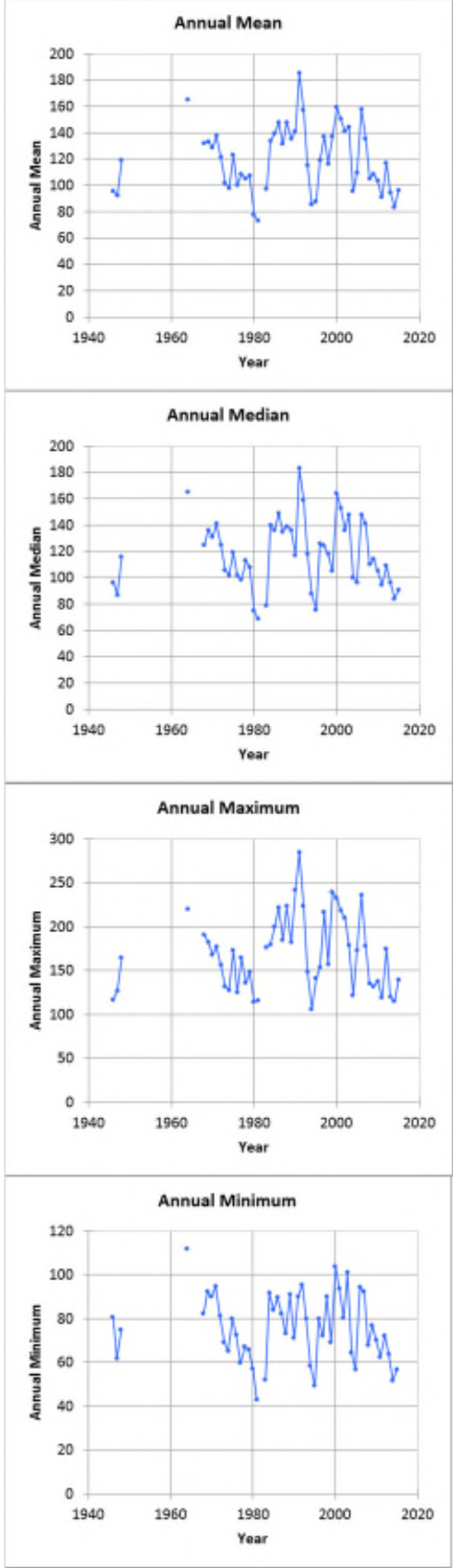
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Lockhart River at Outlet of Artillery Lake - Hydrological Trends over Period of Record
Seasonal Median Flow

Annual Statistics

Monthly Median Flow



Trend Significance:

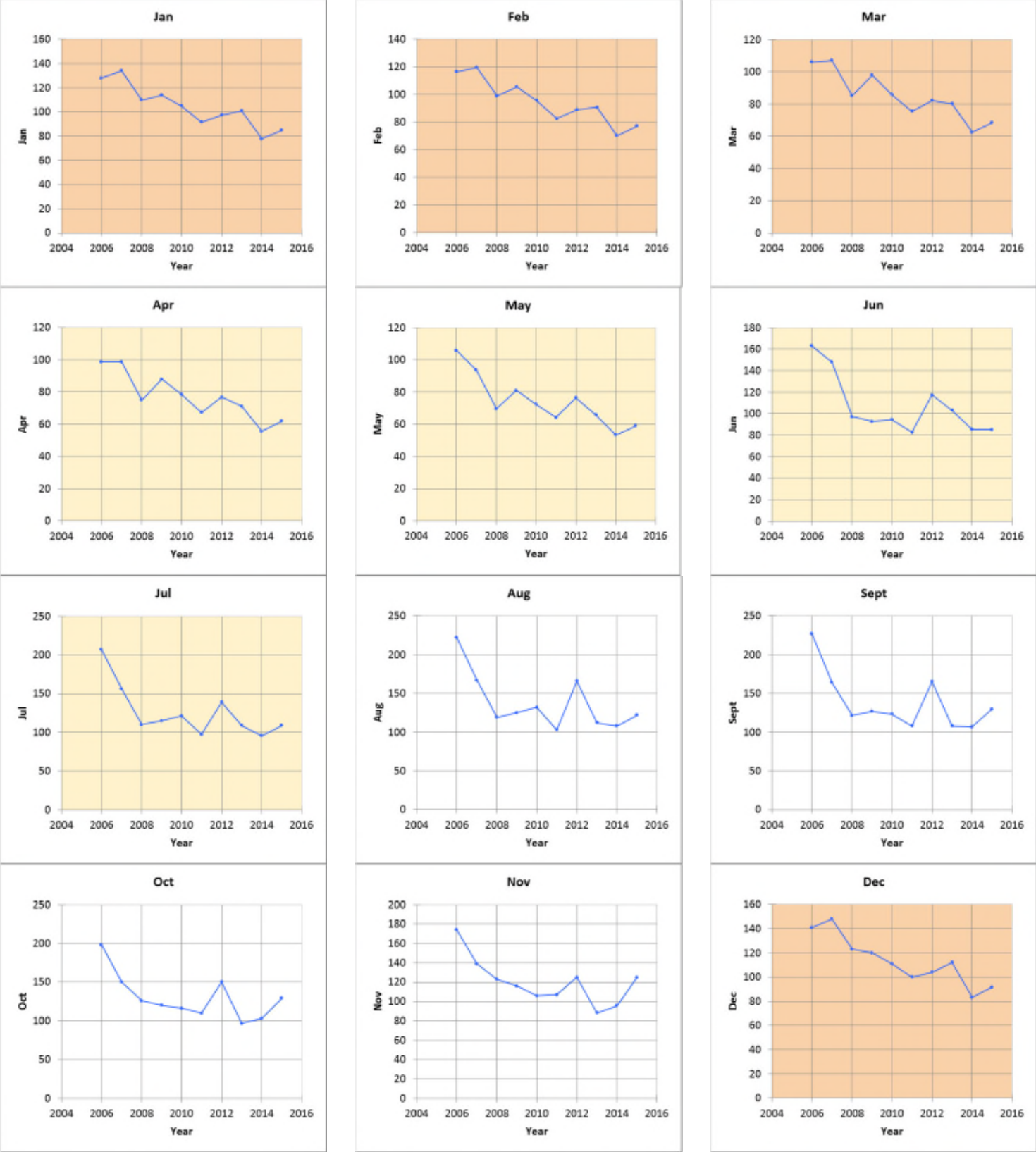
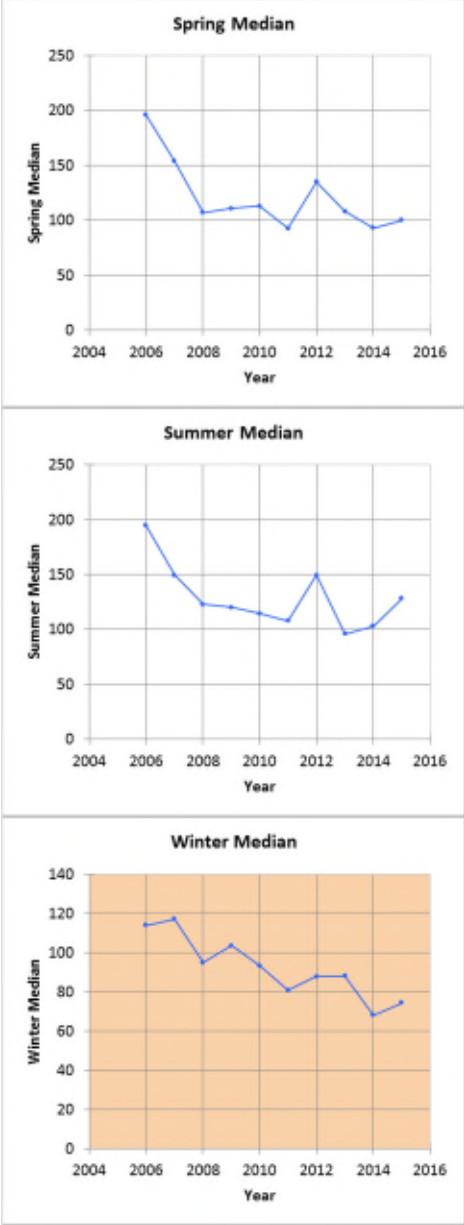
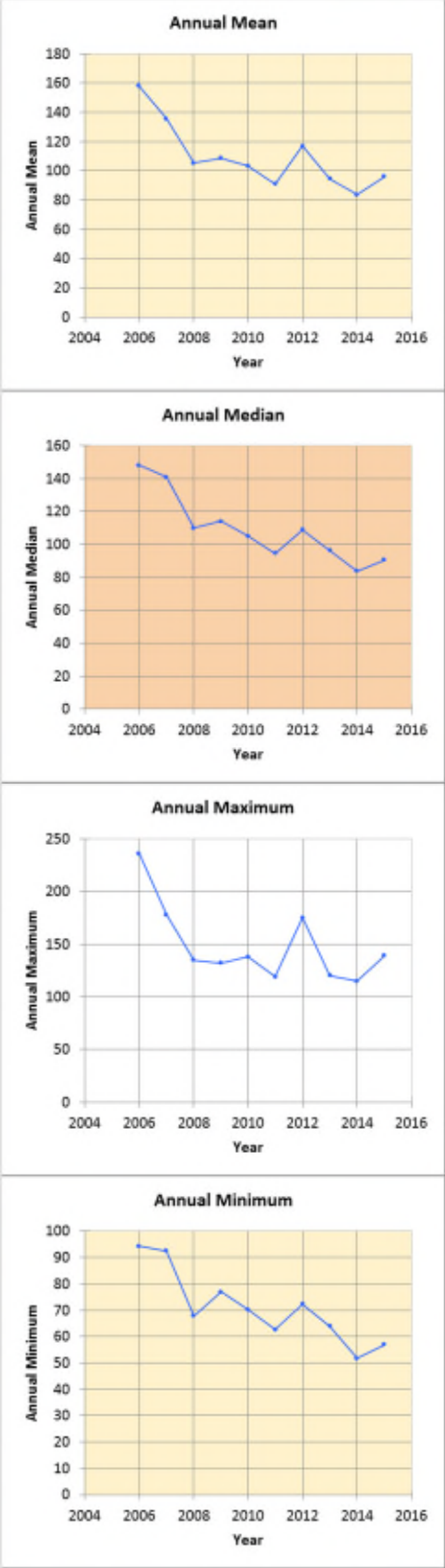
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Lockhart River at Outlet of Artillery Lake - Hydrological Trends over the last Decade

Seasonal Median Flow

Annual Statistics

Monthly Median Flow

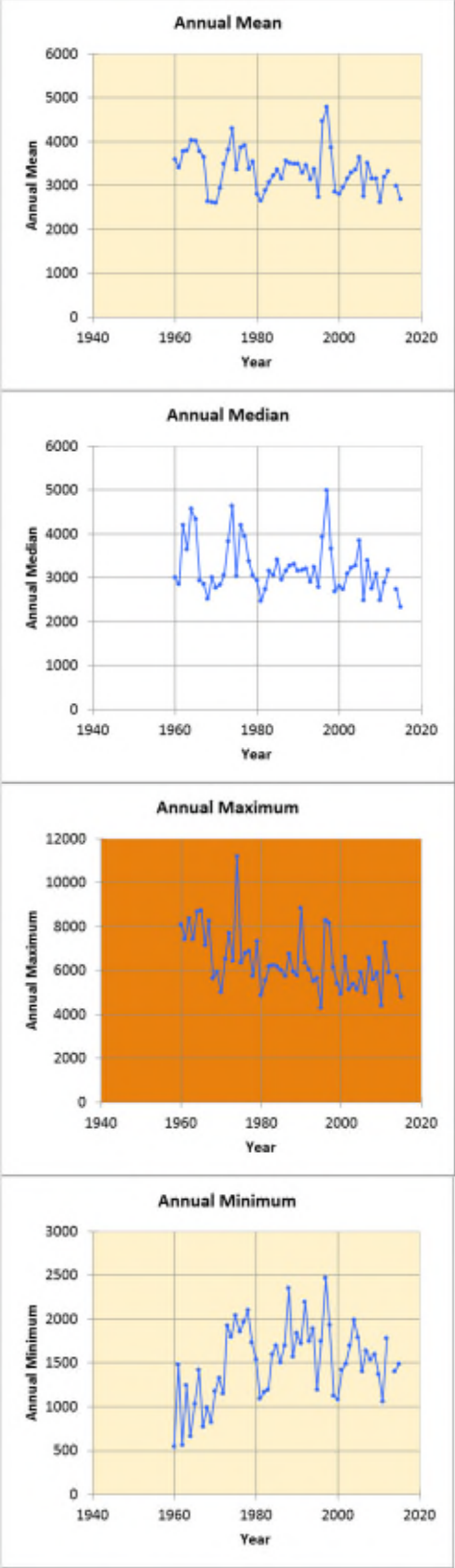


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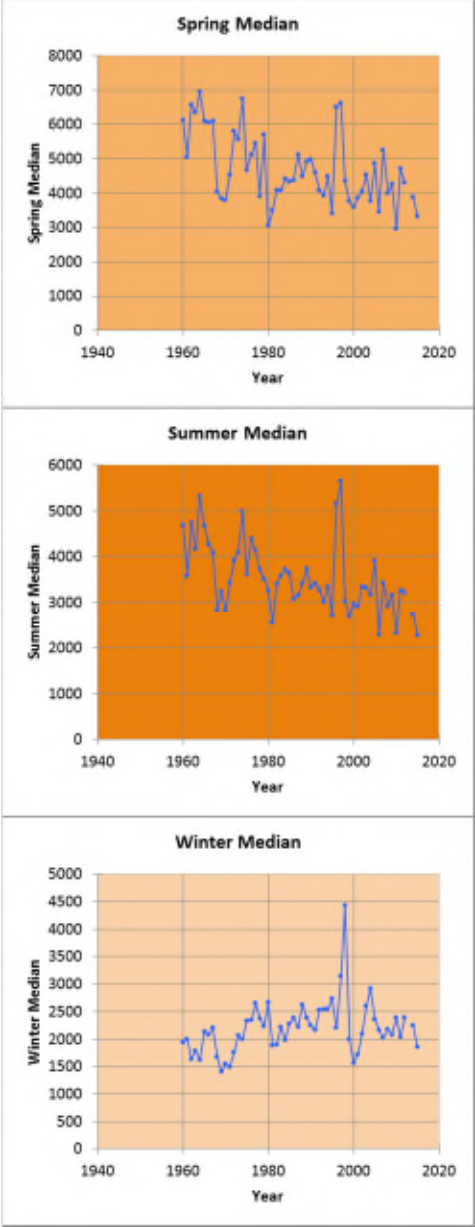
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Slave River at Fitzgerald - Hydrological Trends over Period of Record

Annual Statistics



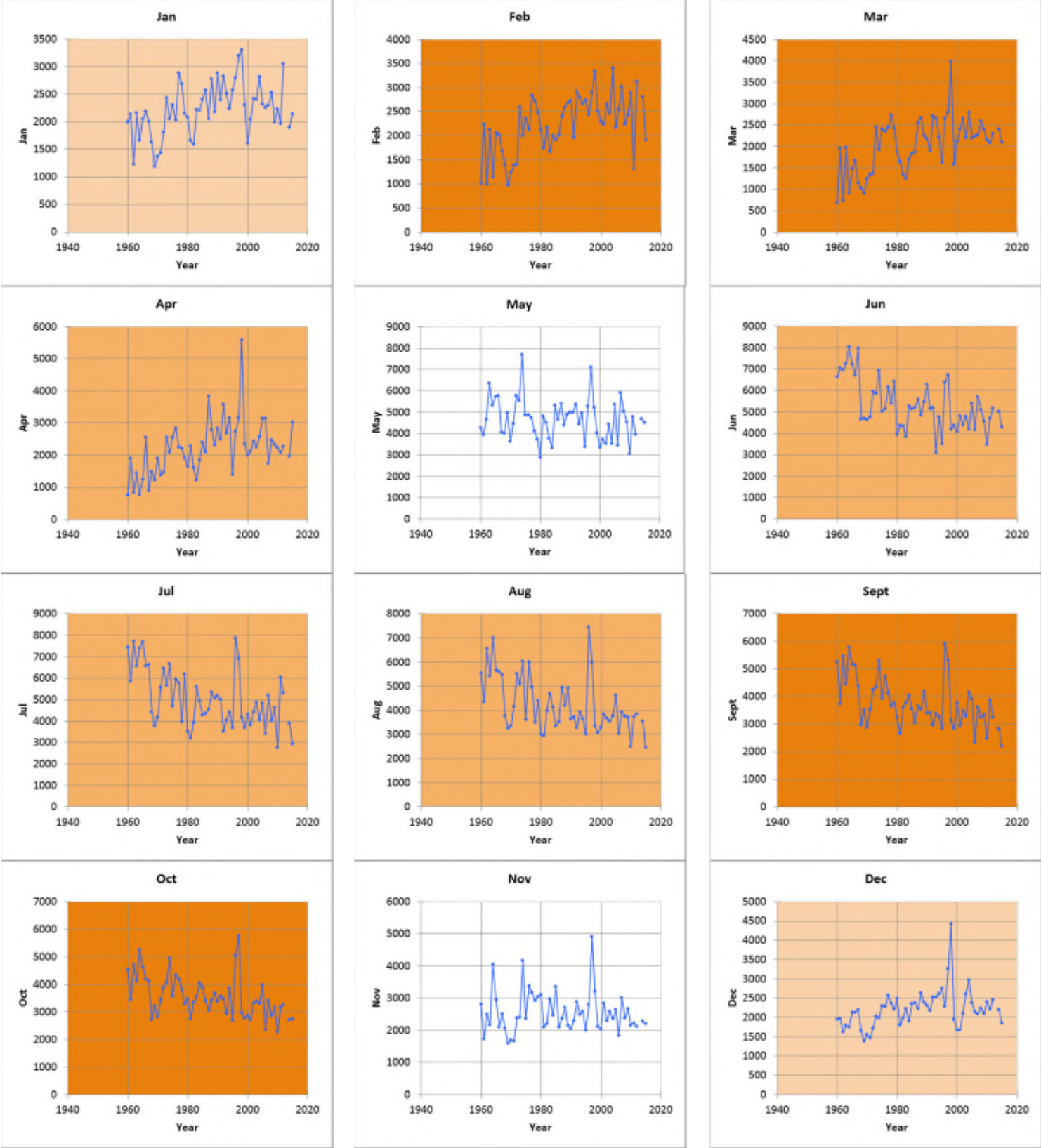
Seasonal Median Flow



Trend Significance:

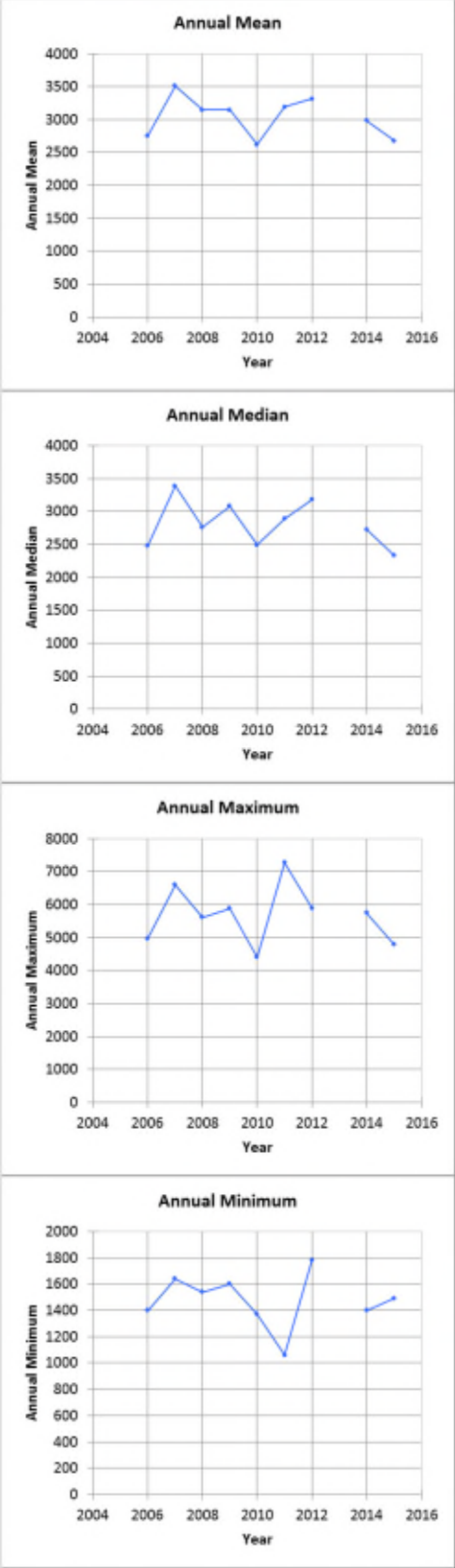
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Monthly Median Flow

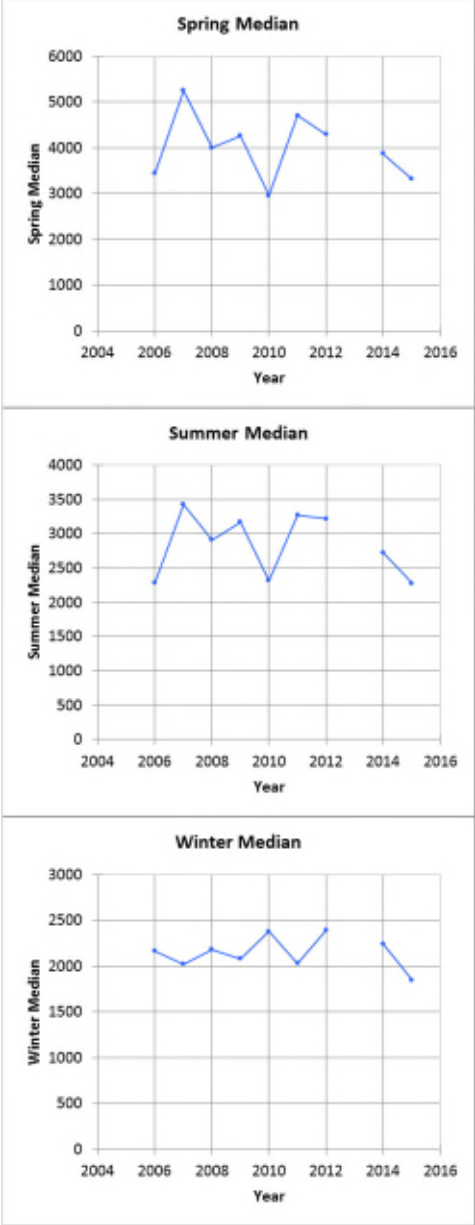


Slave River at Fitzgerald - Hydrological Trends over the last Decade

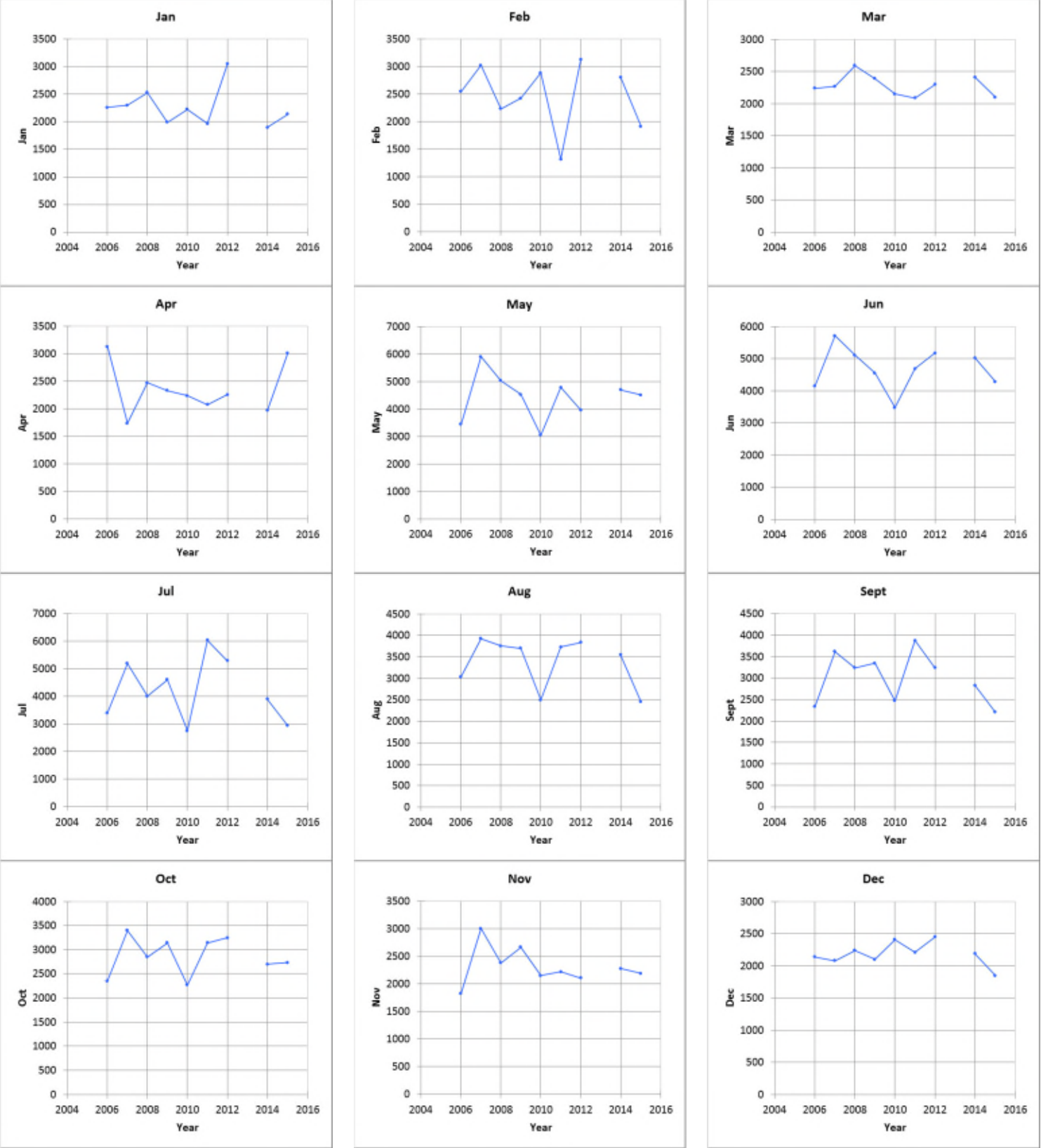
Annual Statistics



Seasonal Median Flow



Monthly Median Flow



Trend Significance:

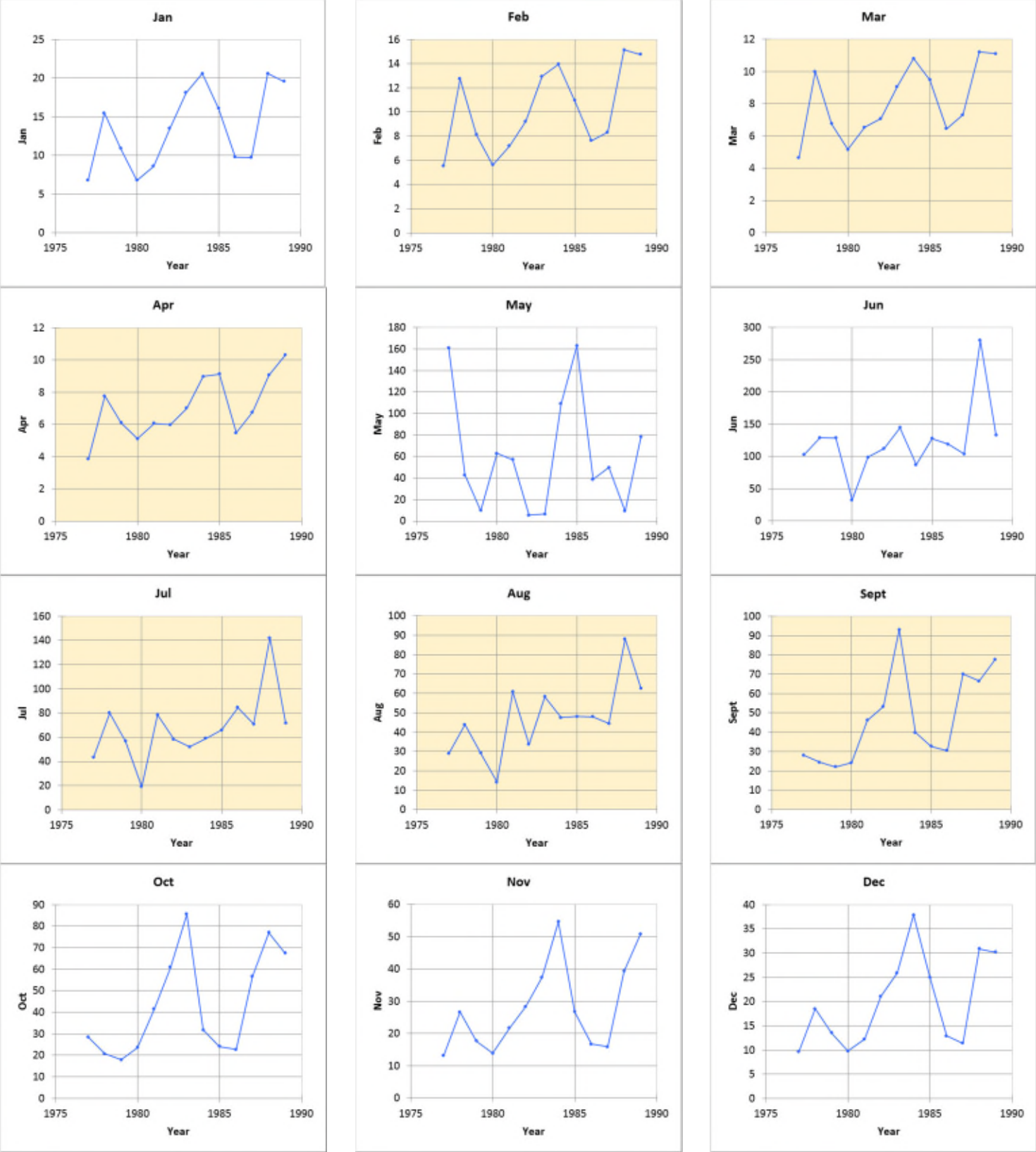
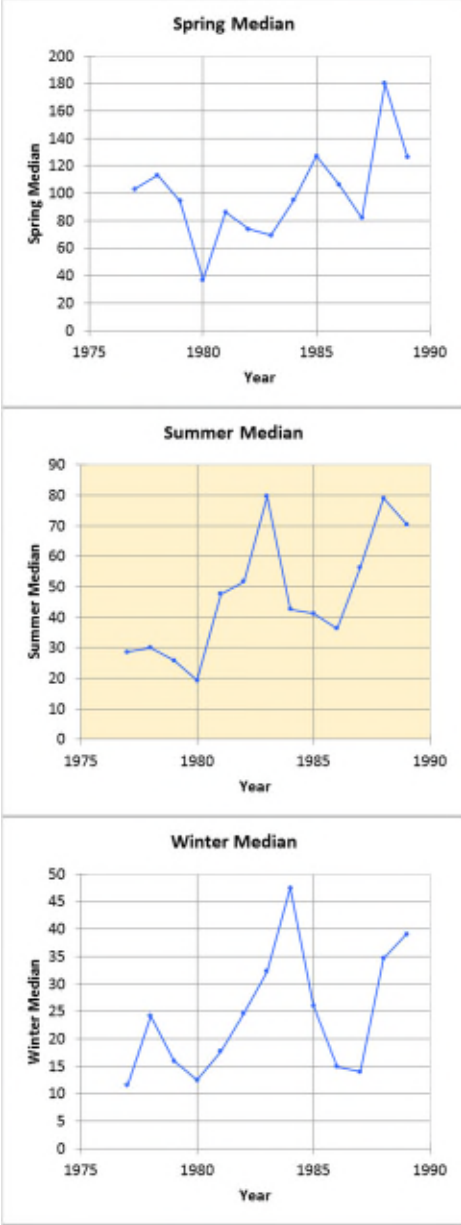
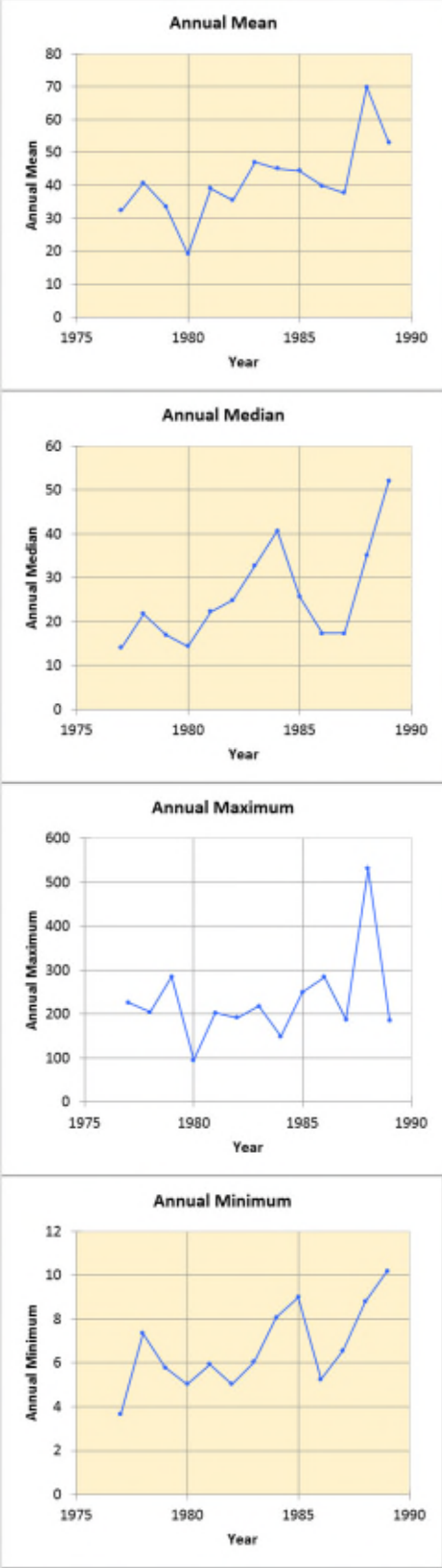
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Snowdrift River at Outlet of Siltaza Lake - Hydrological Trends over Period of Record

Seasonal Median Flow

Annual Statistics

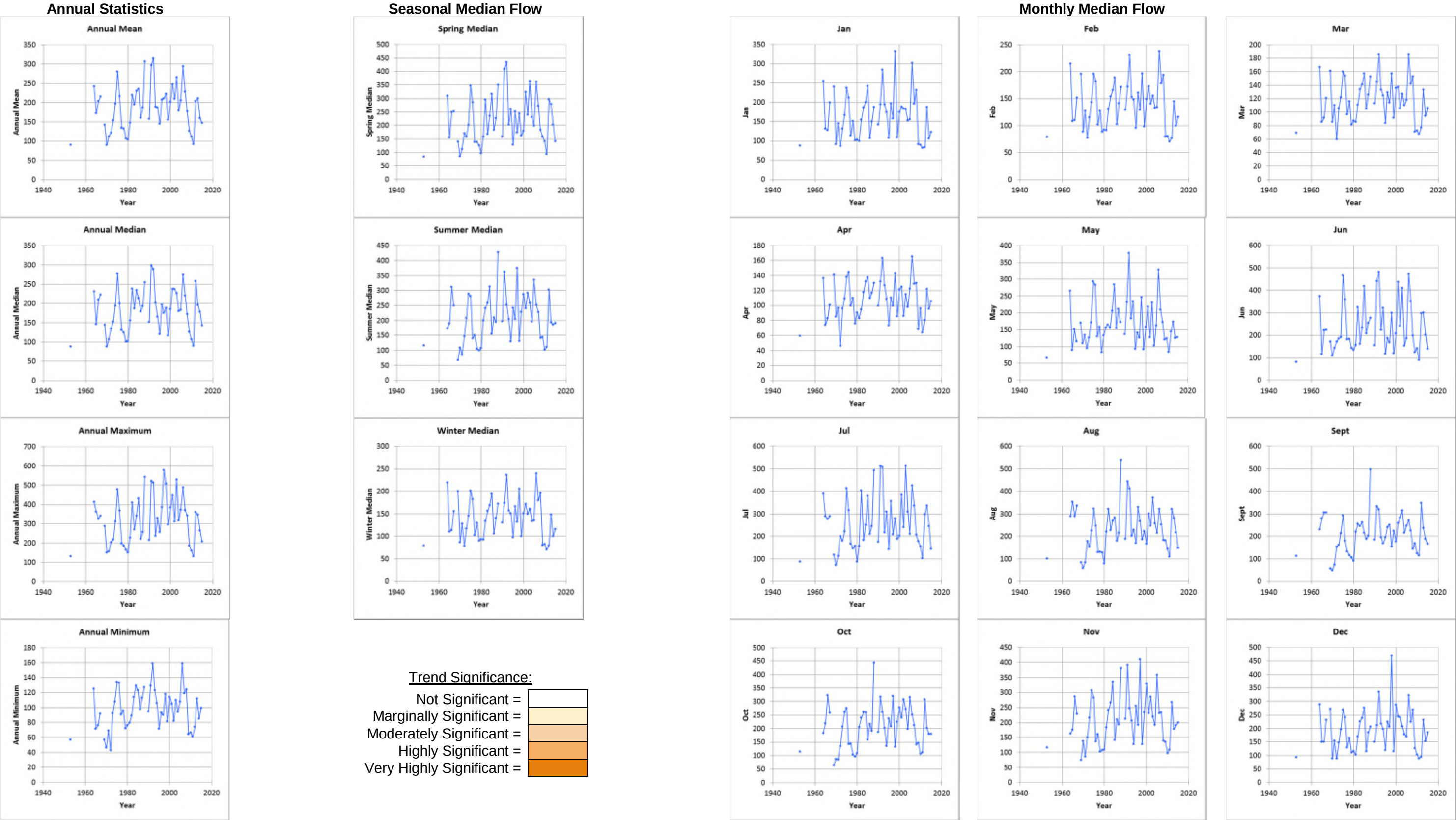
Monthly Median Flow



Trend Significance:

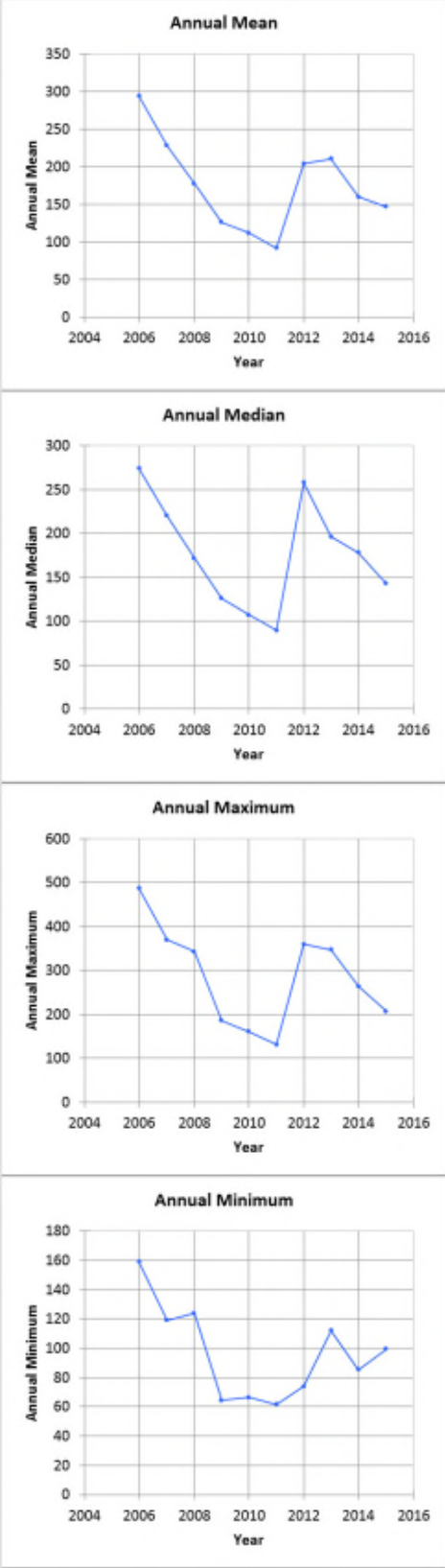
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Taltson River at Outlet of Tsu Lake and Taltson River below Hydro Dam - Hydrological Trends over Period of Record

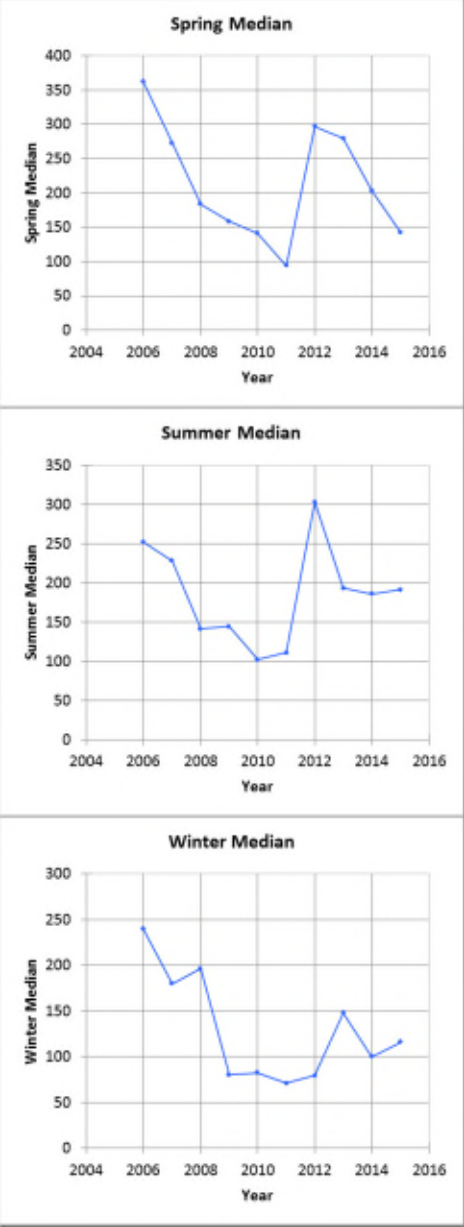


Taltson River below Hydro Dam - Hydrological Trends over last Decade

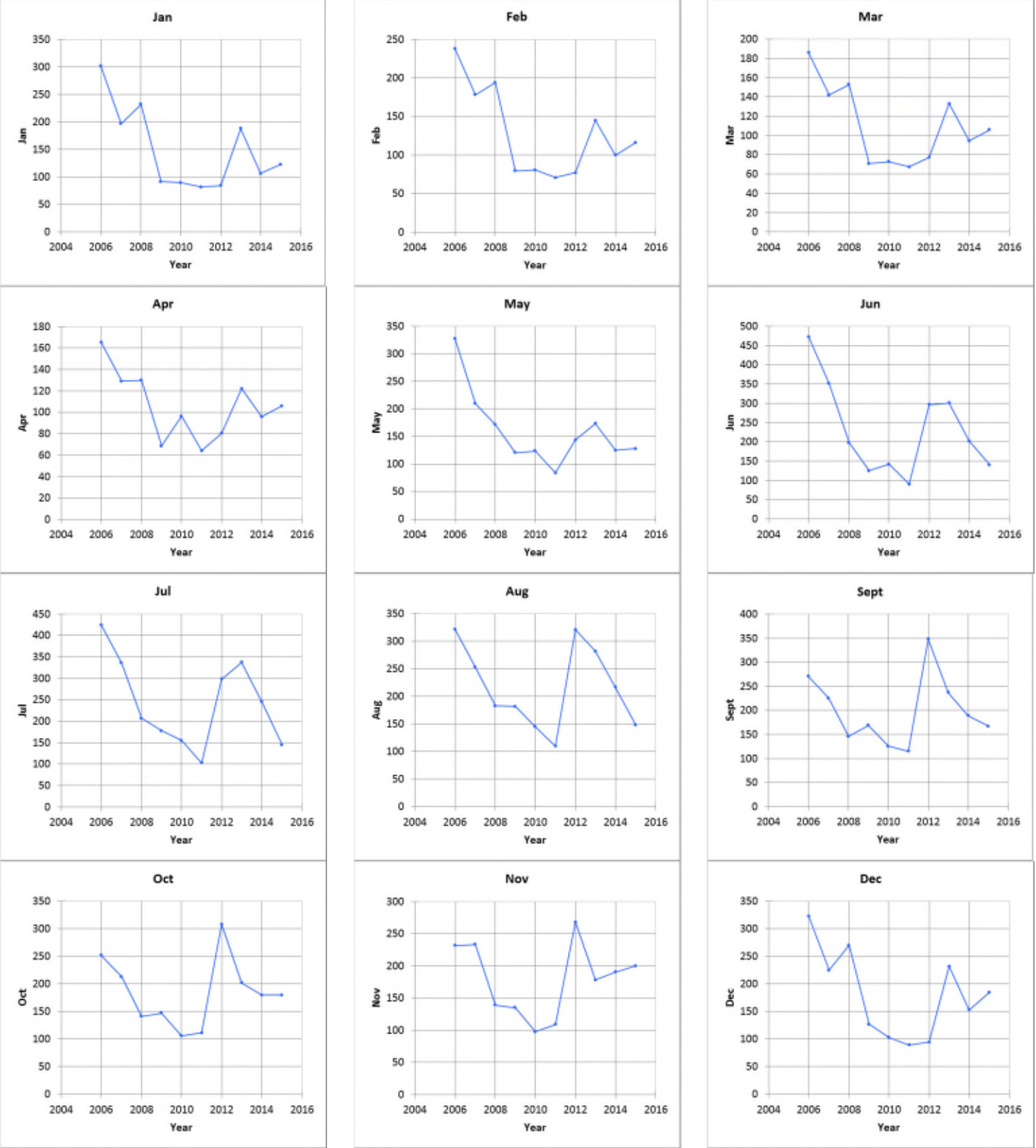
Annual Statistics



Seasonal Median Flow



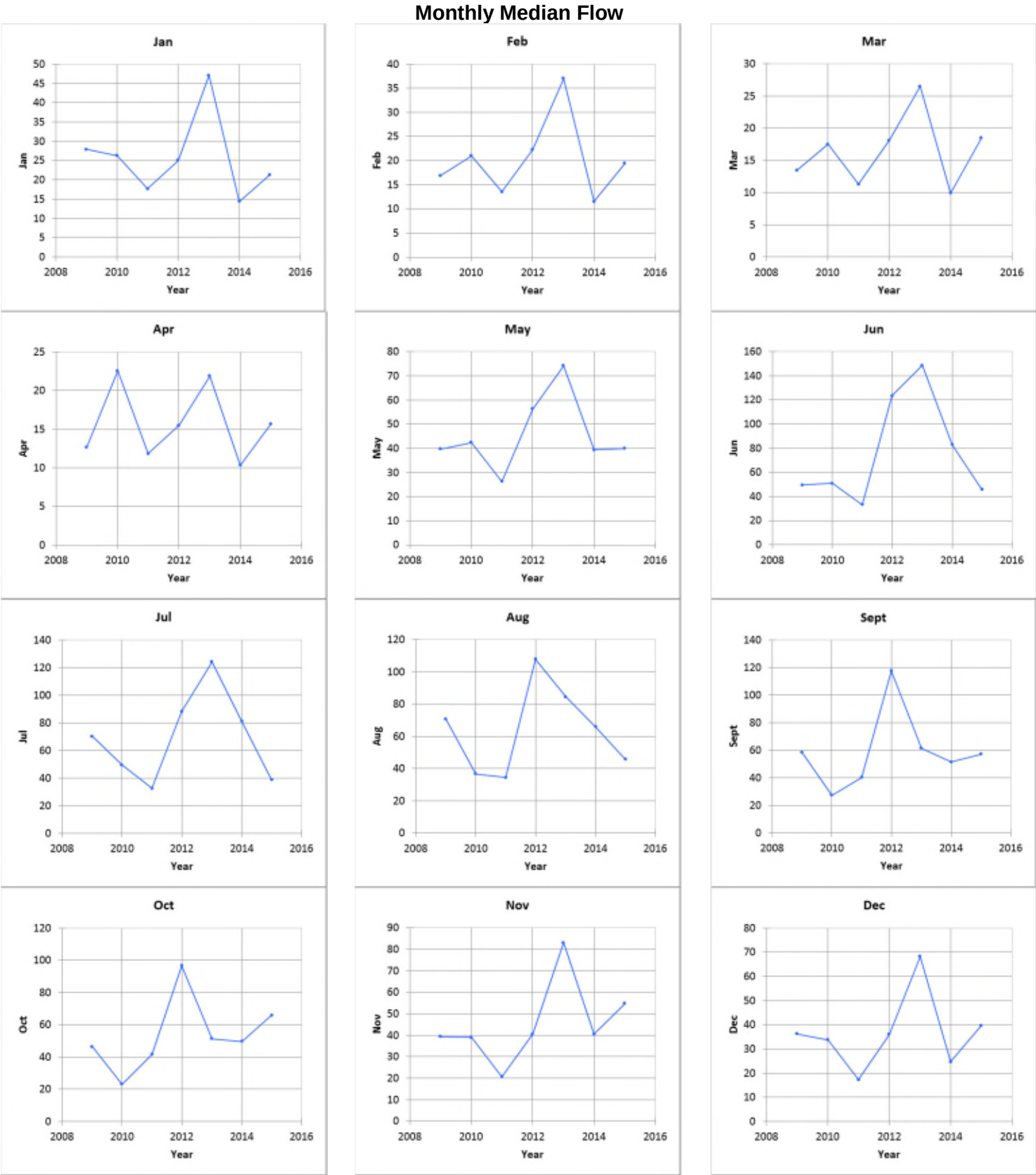
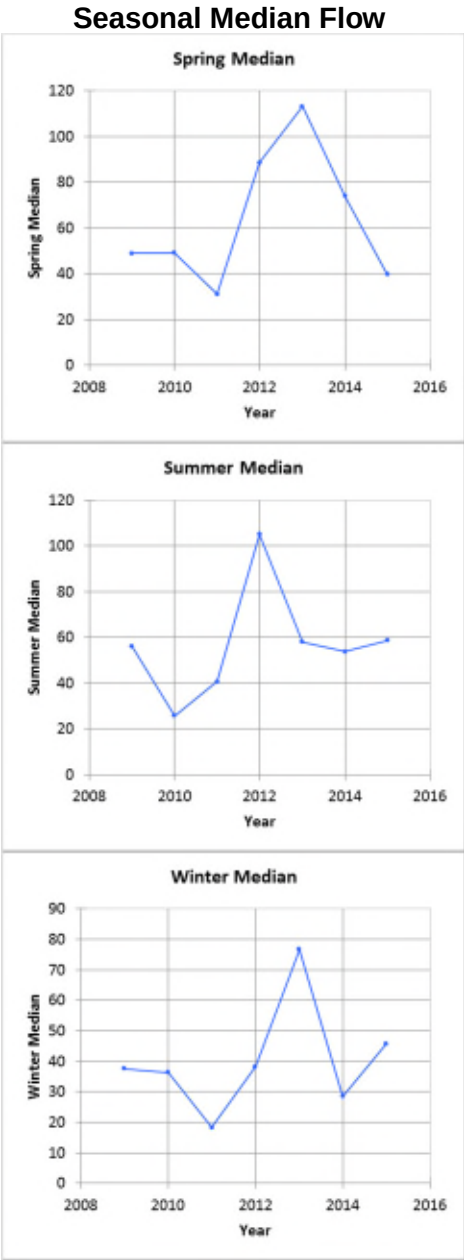
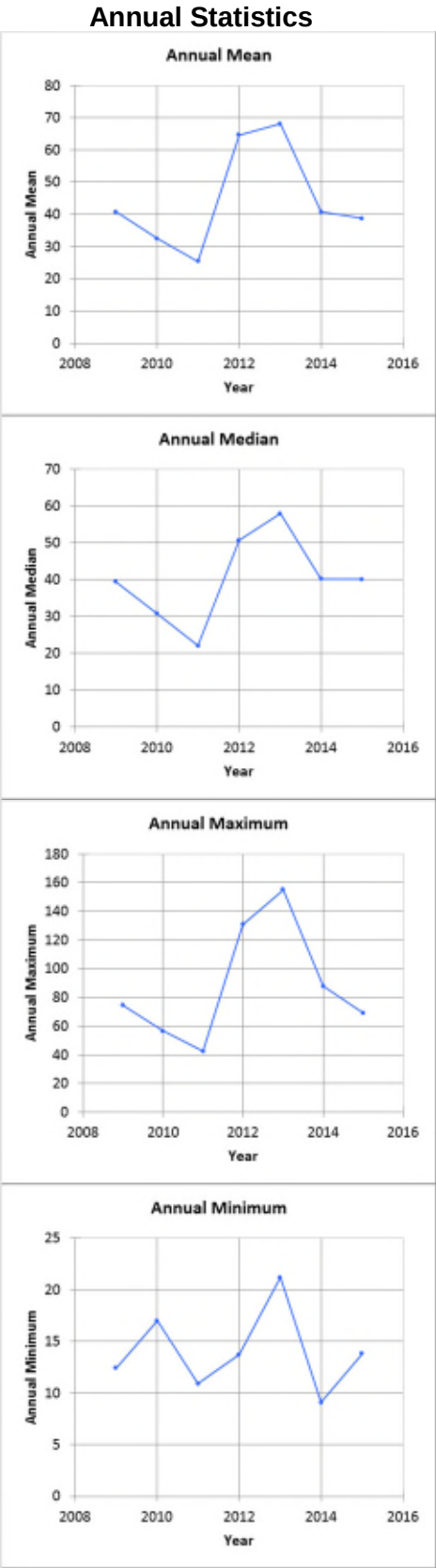
Monthly Median Flow



Trend Significance:

Not Significant =	
Marginally Significant =	
Moderately Significant =	
Highly Significant =	
Very Highly Significant =	

Tazin River near the Mouth - Hydrological Trends over Period of Record



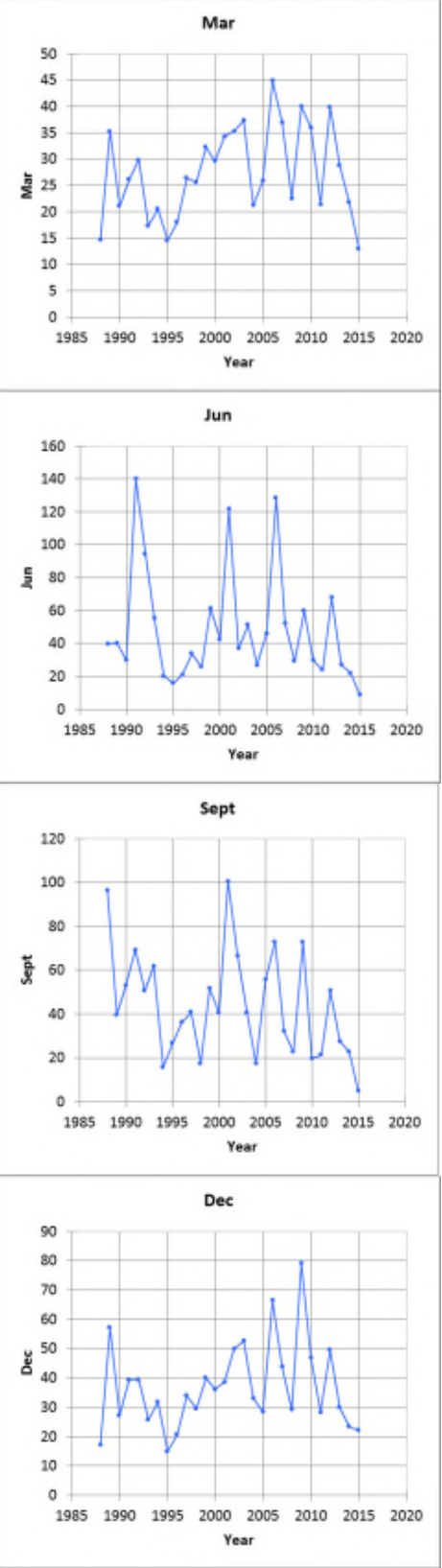
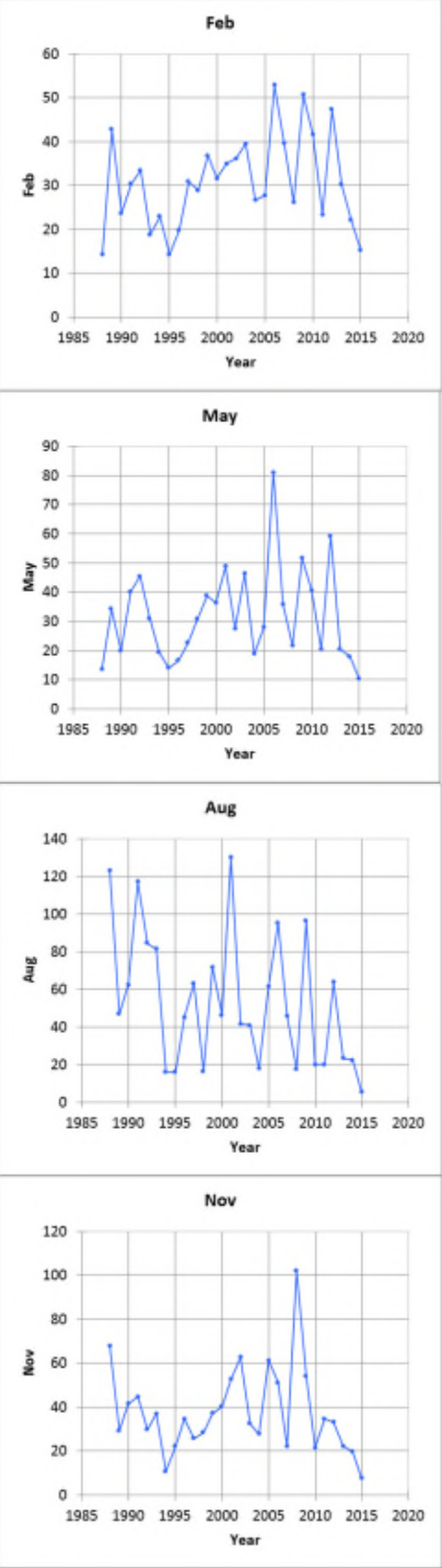
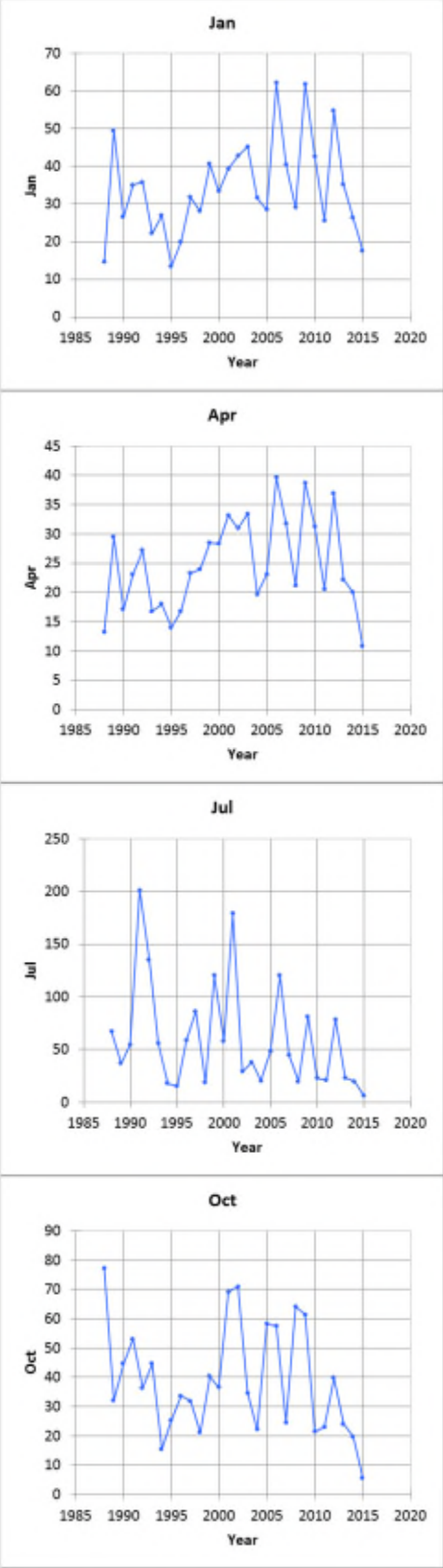
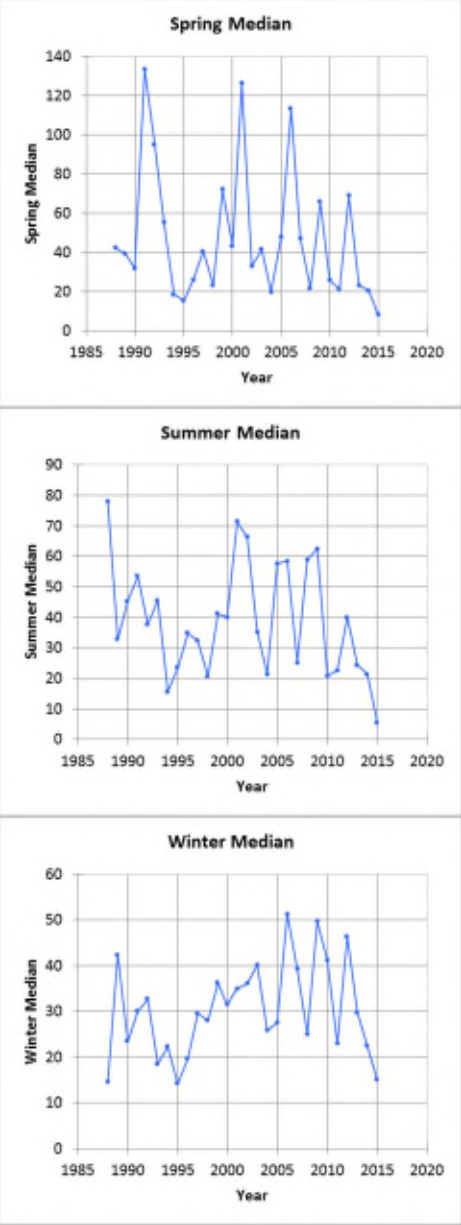
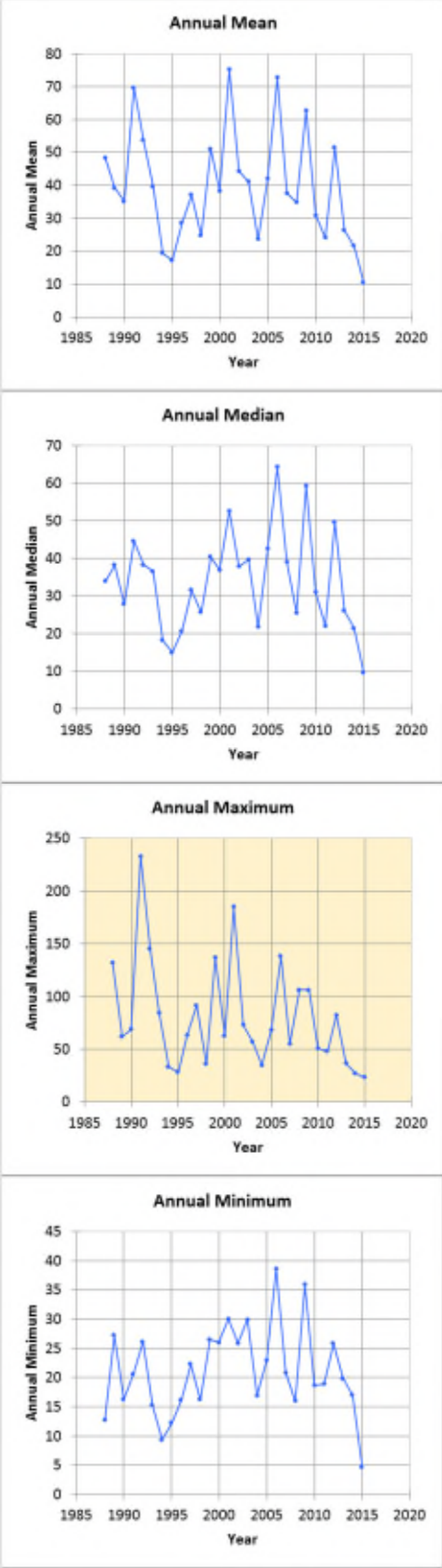
Trend Significance:

Not Significant =	
Marginally Significant =	
Moderately Significant =	
Highly Significant =	
Very Highly Significant =	

Yellowknife River at Outlet of Prosperous Lake - Hydrological Trends over Period of Record
Seasonal Median Flow

Annual Statistics

Monthly Median Flow

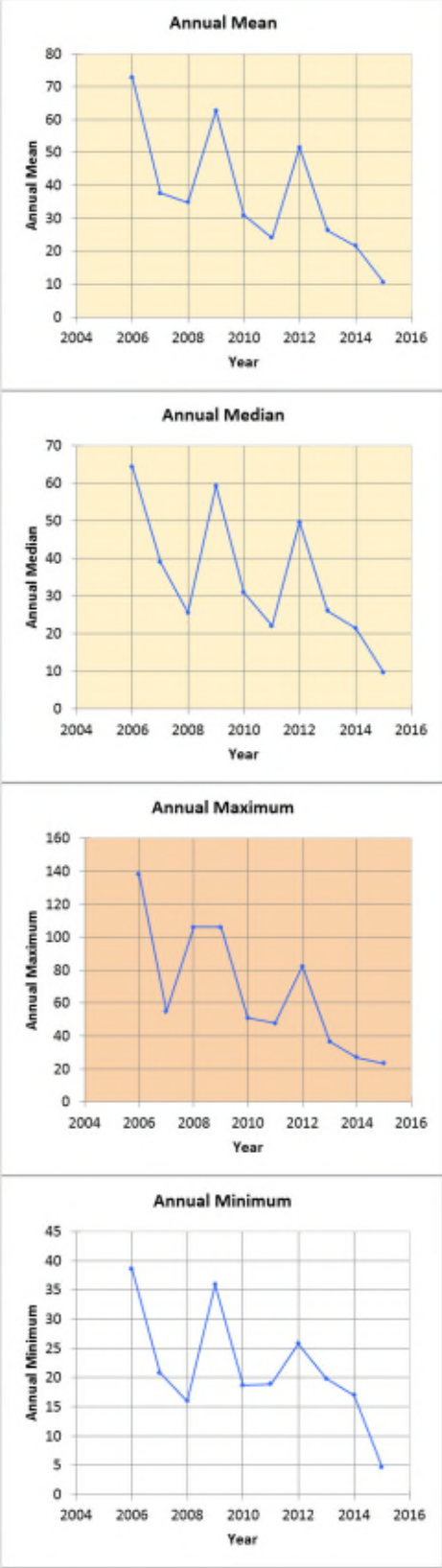


Trend Significance:

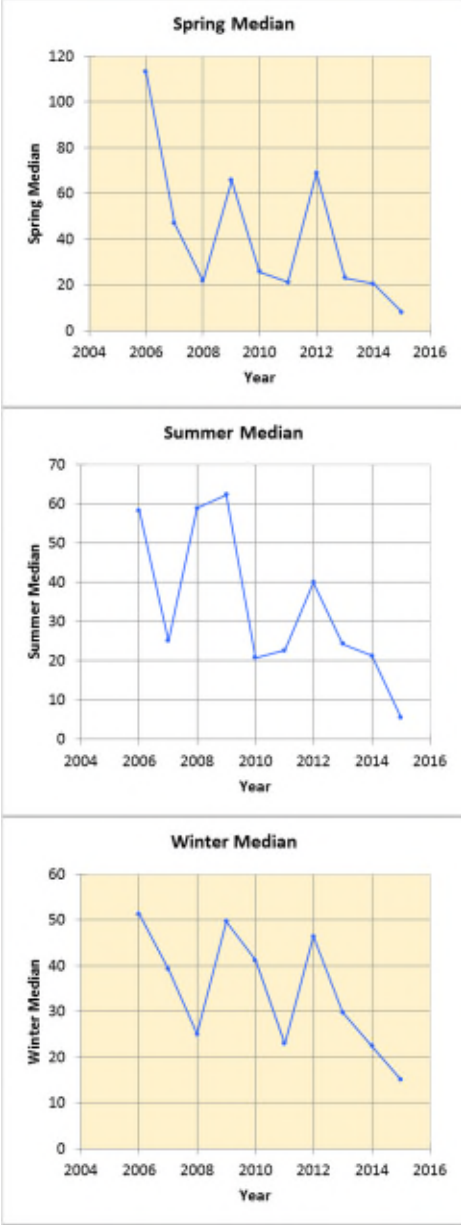
Not Significant =	
Marginally Significant =	
Moderately Significant =	
Highly Significant =	
Very Highly Significant =	

Yellowknife River at Outlet of Prosperous Lake - Hydrological Trends over the last Decade

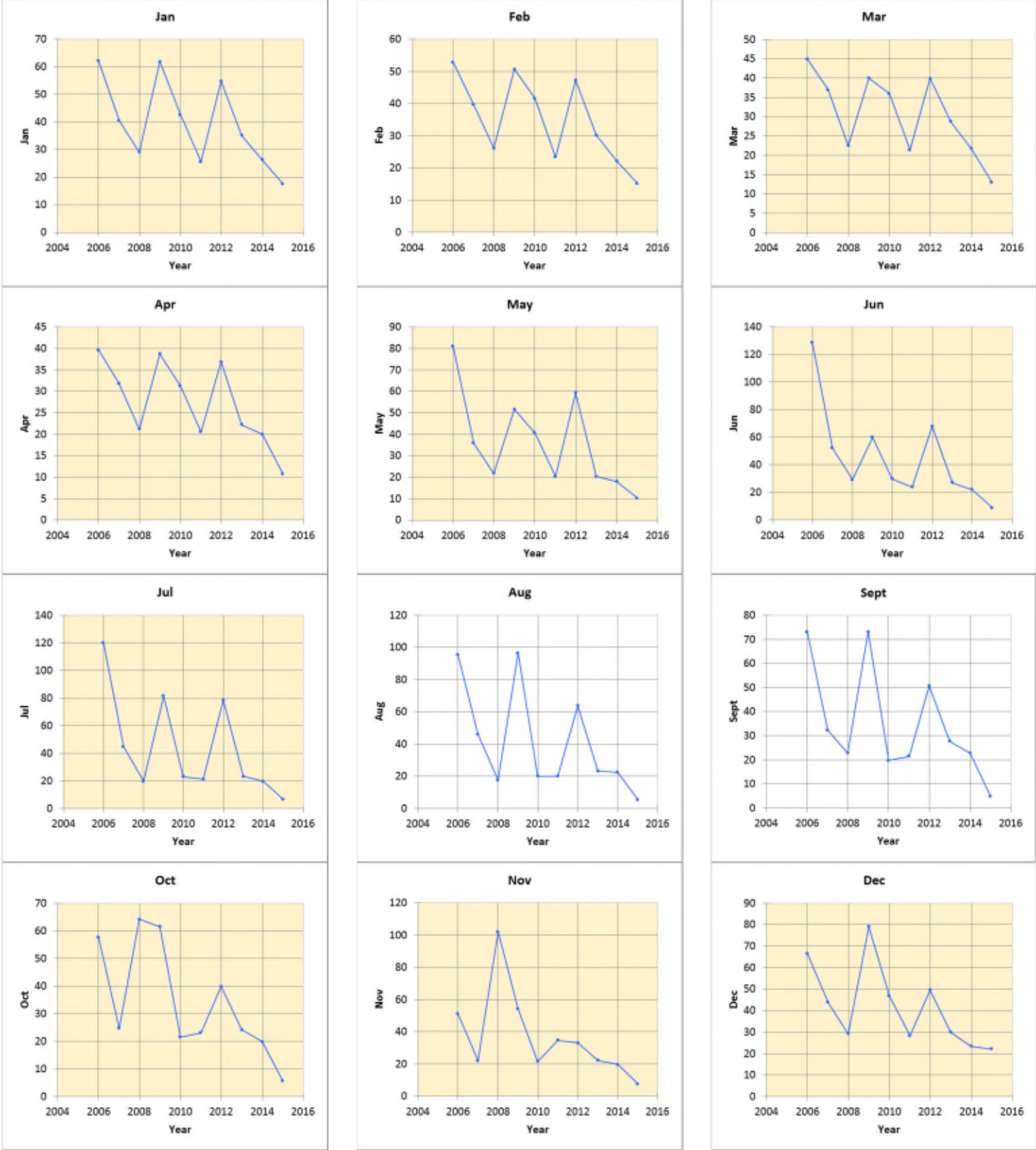
Annual Statistics



Seasonal Median Flow



Monthly Median Flow



Trend Significance:

Not Significant =	
Marginally Significant =	
Moderately Significant =	
Highly Significant =	
Very Highly Significant =	

APPENDIX K

TETRA TECH GENERAL CONDITIONS

GENERAL CONDITIONS

NATURAL SCIENCES

This report incorporates and is subject to these "General Conditions".

1.1 USE OF REPORT AND OWNERSHIP

This report pertains to a specific site, a specific development or activity, and/or a specific scope of work. The report may include plans, drawings, profiles and other supporting documents that collectively constitute the report (the "Report").

The Report is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contract entered into with the Client (either of which is termed the "Services Agreement" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Report when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Report is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, is in fact, caused by the unauthorized use of the Report.

Where TETRA TECH has expressly authorized the use of the Report by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these General Conditions as well as any limitations on liability contained in the Services Agreement with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these General Conditions and the Services Agreement prior to making any use of the Report. Any use made of the Report by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

The Report and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH 's professional work product and shall remain the copyright property of TETRA TECH.

The Report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Report, if required, may be obtained upon request.

1.2 ALTERNATIVE REPORT FORMAT

Where TETRA TECH submits both electronic file and hard copy versions of the Report or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH 's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive the original signed and/or sealed version for a maximum period of 10 years.

Both electronic file and hard copy versions of TETRA TECH 's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH 's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Report have been conducted in accordance with the Services Agreement, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Report. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Report.

TETRA TECH professionals are bound by their ethical commitments to act within the bounds of all pertinent regulations. In certain instances, observations by TETRA TECH of regulatory contravention may require that regulatory agencies and other persons be informed. The client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 ENVIRONMENTAL ISSUES

The ability to rely upon and generalize from environmental baseline data is dependent on data collection activities occurring within biologically relevant survey windows.

1.5 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Services Agreement, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

General Conditions

NATURAL SCIENCES

1.6 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Report, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.7 GENERAL LIMITATIONS OF REPORT

This Report is based solely on the conditions present and the data available to TETRA TECH at the time the data were collected in the field or gathered from publically available databases.

The Client, and any Authorized Party, acknowledges that the Report is based on limited data and that the conclusions, opinions, and recommendations contained in the Report are the result of the application of professional judgment to such limited data.

The Report is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present at or the development proposed as of the date of the Report requires a supplementary investigation and assessment.

It is incumbent upon the Client and any Authorized Party, to be knowledgeable of the level of risk that has been incorporated into the project design or scope, in consideration of the level of the environmental baseline information that was reasonably acquired to facilitate completion of the scope.

The Client acknowledges that TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of property, the decisions on which are the sole responsibility of the Client.

1.8 JOB SITE SAFETY

TETRA TECH is only responsible for the activities of its employees on the job site and was not and will not be responsible for the supervision of any other persons whatsoever. The presence of TETRA TECH personnel on site shall not be construed in any way to relieve the Client or any other persons on site from their responsibility for job site safety.